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Casas del Futuro

CASA PIRAMIDAL

"GRAN RESISTENCIA A SISMOS y HURACANES , EFICIENTE, INTELIGENTE y AUTOABASTECIDA CON ENERGÍA RENOVABLE (Solar + Eólica + Termo Solar) "

BENEFICIOS DE ESTA CASA.

Tiene gran resistencia al sismo y huracanes.

Auto sustentable con energía renovable (Solar + Eólica + Termo solar) y cargador de baterías para vehículos eléctricos.

Gran eficiencia energética.

Estos equipos de energía renovables tienen poco o nulo mantenimiento y una larga vida útil.

Inteligente, con domótica, es la tecnología que convierte la casa en un espacio inteligente y automatizado, capaz de optimizar los recursos energéticos(Internet de las cosas)

Puede estar aislada o conectada a la red eléctrica domiciliaria.

El exceso de energía producida se puede inyectar y vender a la red eléctrica domiciliaria.

No contamina el medio ambiente.

Sencilla, liviana, de rápida construcción y larga vida útil.

Menor costo / m2, comparado con la construcción tradicional de mampostería.

TIPOS DE CASA

Casa Aislada
Zona Rural

Casa Conectada a Red Eléctrica
Zona Urbana – semi Rural

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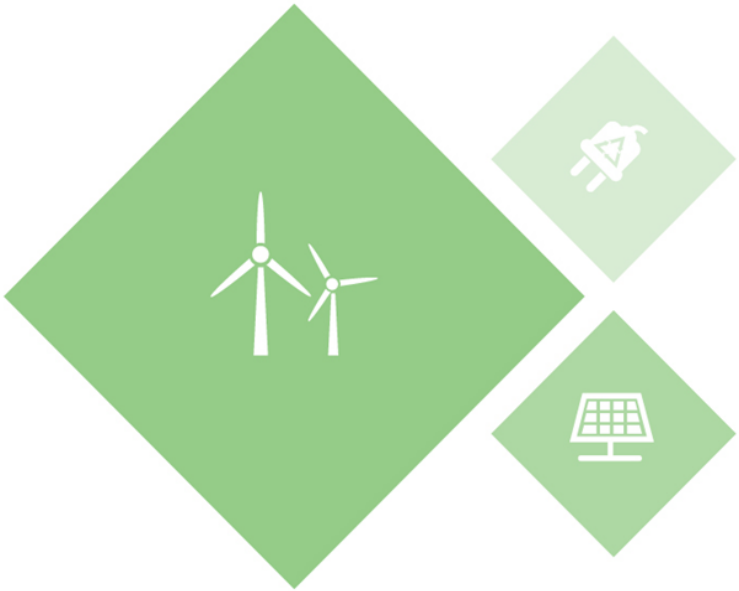
MODELO DE NEGOCIO

Buscamos empresas constructoras y/o desarrolladoras con buenos antecedentes, respaldo económico y disponibilidad técnica, interesadas en tomar la Licencia de la patente, para poder construir y comercializar llave en mano esta casa PIRAMID-ALL Casas del Futuro en cualquier parte del país.

La patente se encuentra actualmente (concedida), se ofrece una (Licencia / Franquicia) por 2 a 3 años con opción a renovar por 5 años más.

También se pretende concesionar a empresas constructoras en otros países, preferentemente Chile, , Centroamérica, México, USA y Japón, que son los países donde hay más sismos y desastres naturales.



ENERGÍA RENOVABLE

Este proyecto está diseñado con energía (solar + eólica + termosolar) y puede estar aislada o conectada a la red eléctrica domiciliaria. Actualmente, se puede abastecer el total de la demanda media de energía de un hogar tipo de 4 personas, siendo de 7 a 10 Kwh/día,.

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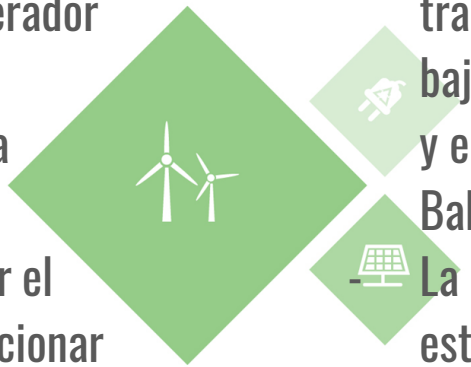
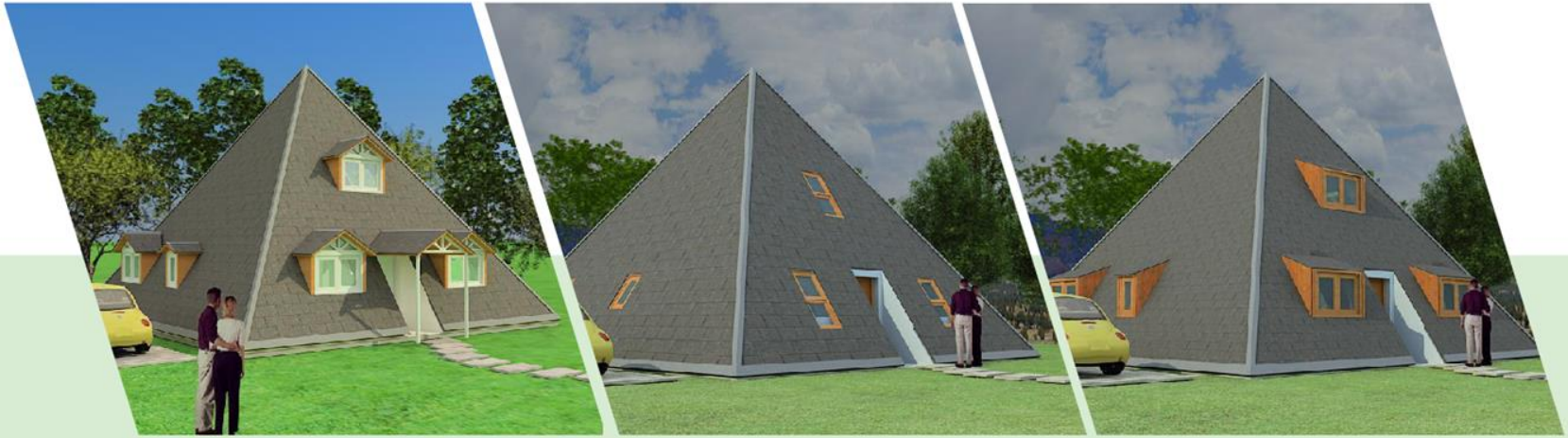
- Tiene Paneles solares ubicados en 1, 2 o 3 caras de la pirámide, dependiendo de la energía que se quiera producir, complementado con un aerogenerador eólico en la cumbre del techo.
- Conexión eléctrica para cargar la batería del vehículo eléctrico.
- Termo tanque solar para calentar el agua de uso doméstico y calefaccionar la casa con radiadores o losa radiante.



- El excedente de energía que se produzca y no se consuma, se puede inyectar y vender a la red, transformándose en un prosumidor, bajo la Ley de Generación Distribuida y el Sistema de Facturación de Balance Neto.
- La estructura es metálica/madera y está diseñada para soportar una gran resistencia al sismo y huracanes, la fundación es con vigas y platea de Hormigón Armado.

TIPOS DE FACHADAS



OPCIÓN 1

OPCIÓN 2

OPCIÓN 3

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TIPOS DE FACHADAS

OPCIÓN 4

OPCIÓN 5

OPCIÓN 6

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TIPOS DE FACHADAS

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PROPUESTA – BARRIO SUSTENTABLE

MAQUETA

PLANTA BAJA

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PLANTA ALTA

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VISTA INTERIOR

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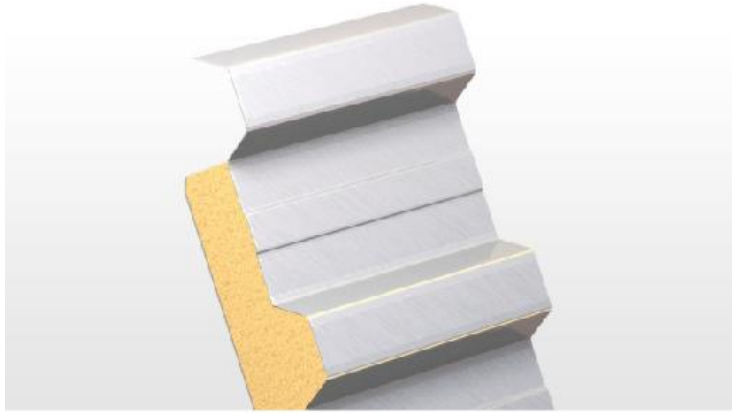
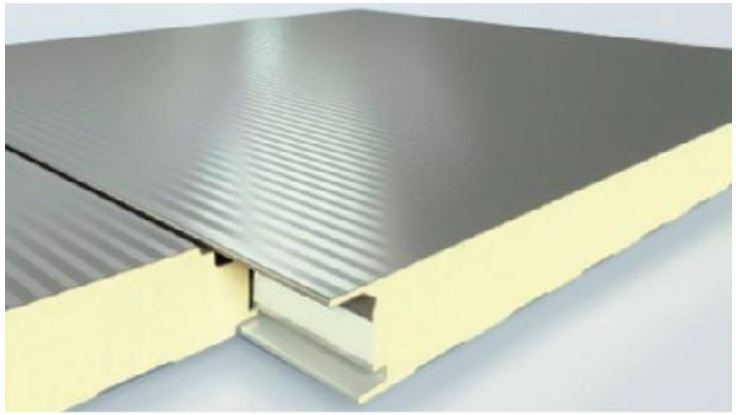
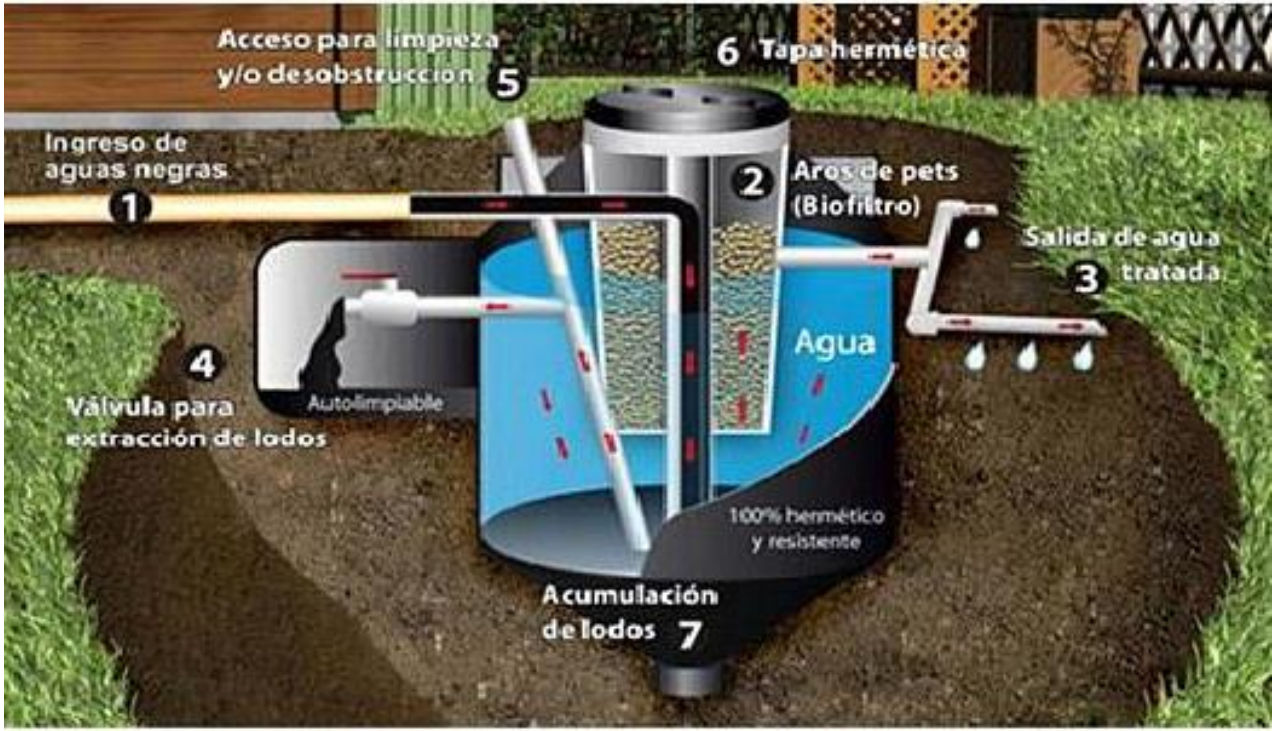



HIGUMASOLAR




Acceso para limpieza
y/o desobstruccion 5
6 Tapa hermética
Ingreso de
aguas negras
1
2 Aros de pets
(Biofiltro)
Salida de agua
tratada
3
Agua
4
Válvula para
extracción de lodos
Autolimpiable
100% hermético
y resistente
Acumulación
de lodos 7

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CNE
Puerto Rico's Think Tank

Center for a New Economy
San Juan + D.C. + Madrid

Hon. William Rodriguez
Secretary
Puerto Rico Housing Department
606 Ave. Barbosa Juan C. Cordero Building
9th Floor
San Juan, PR 00917

Dear Secretary Rodriguez:

I am writing on behalf of the Center for a New Economy ("CNE"), Puerto Rico's only non-partisan, non-profit think tank, to endorse the comments submitted by the Puerto Rico Energy Justice collaborative ("PREJ") regarding the proposed "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan" ("Action Plan") and to submit a few comments of our own.

CNE has been analyzing and studying the Puerto Rico electric system since 2005. Since then we have published numerous research papers and policy briefs about Puerto Rico's electric system, have testified in various public hearings before the U.S. Congress and the Puerto Rico Legislative Assembly, and have actively participated in the search for innovative solutions to our energy problems.

The congressional appropriation of approximately $2 billion in Community Development Block Grant – Disaster Recovery ("CDBG-DR") funds for the modernization of Puerto Rico's electric system presents a once in a generation opportunity to improve the island's aging energy infrastructure. Specifically, Puerto Rico has an opportunity to engage in what the economic development literature is called "leapfrogging" by integrating world-class, cutting-edge technology into our electric system.

In addition to endorsing the comments submitted by PREJ, we also believe the current draft of the Action Plan could be improved in the following areas:

- **The Action Plan Should Focus on Grid Flexibility** – According to a 2018 report from the U.S. Department of Energy: "To better enable system recovery and/or black start restoration, there might be operational benefits for segmenting the transmission system into smaller portions. While this would be done out of necessity following a large-scale event, there could be some advantages to pre-selecting which segments

are likely able to survive a future event, and proactively plan for segmenting the transmission system accordingly. These portions of the system would be identified to include a mix of generating assets, including black-start capable units, along with appropriately sized load, so that when the distribution system is undergoing restoration activities, and enough load would be present to constitute minimum generation capabilities, stable portions of the system could be energized and maintained prior to the longer transmission lines being repaired and energized. These portions of the system could then be re-energized with each other later in the restoration process."[1] We recommend the Action Plan be amended to include this "pre-segmentation" strategy.

- **Maximize Distributed Energy Generation from Renewable Sources** – In terms of generation, the designers of the new electricity system should consider that large centralized generation facilities with investment recovery cycles of more than thirty years are increasingly a thing of the past. Today, there are renewable generation solutions with storage technologies to provide some base load, reserves, other auxiliary services, and additional load at peak hours at very competitive costs. The Action Plan should be amended to encourage new investment in distributed energy generation from renewable sources.
- **Include All Social Costs When Evaluating Traditional Fossil Fuel Generation** – It is important to point out that when comparing the cost of traditional generation alternatives with the cost of renewable energy solutions, it is imperative to include the "all-in" costs associated with traditional generation — which are not just the cost of the fossil fuel but also the social costs as well: the cost of environmental pollution, the cost of medical treatment for asthma, other respiratory problems, eye and skin diseases, and the cost of premature deaths caused by cancer and other diseases directly or indirectly caused by emissions of pollutants.[2] We recommend the Action Plan be amended to include this full cost-benefit analysis when considering funding for new traditional fossil fuel generation facilities.

We appreciate the opportunity to take part in this important public process and we are available to answer any question that you or the members of your staff may have with regard to this important matter.

Respectfully submitted,

Sergio M. Marxuach Colón
Policy Director
Center for a New Economy

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[1] Energy Resilience Solutions for the Puerto Rico Grid, US Department of Energy, June 2018, pp. 22 – 23.
[2] See, for example, Nicholas Z. Muller, Robert Mendelsohn, and William Nordhaus, "Environmental Accounting for Pollution in the United States Economy," *American Economic Review*, vol. 101, (August 2011): 1649-1675.

Initial Comments on CDBG-DR Action Plan for Electricity System Enhancements

December 23, 2021

1.0 Introduction

On November 08, 2021, the Department of Housing of Puerto Rico (DOH) published their CDBG-DR Action Plan (Action Plan) for electricity system enhancements. The Action Plan identifies unmet needs and highlights system improvements that can benefit all residents through improved resiliency. The DOH has also gathered input from stakeholders and taken into consideration activities of interest to the public.

These activities mentioned in the Action Plan, once established, will help to provide a more resilient and sustainable energy system. In this document, LUMA seeks to provide initial comments on this Action Plan.

LUMA is grateful for the opportunity to provide feedback on the Action Plan and looks forward to furthering collaboration with DOH.

2.0 Initial Comments

There are many important considerations to address when planning for the recovery of the electricity infrastructure in Puerto Rico. LUMA welcomes this type of early collaboration with the DOH and other stakeholders, which will help identify the need for future development of regulations, processes, programs, or projects to provide improvements in the resiliency of Puerto Rico's electricity system.

LUMA understands that federal funds and the collaboration of different entities are an essential part of improving Puerto Rico's electrical system and wants to work together with the DOH and other stakeholders that wish to adopt a coordinated approach for the benefit of Puerto Rico. LUMA understands the use of CDBG-DR funds for improvements and mitigation and resilience measures that are not likely to be addressed by other sources of funds.

LUMA supports the Department of Housing's prioritization of projects that:

- Reduce the impact of climate change, such as those using renewable sources of energy
- Improve the efficiency of electric power generation, electricity transmission and distribution infrastructure; and
- Decrease transmission and distribution losses and therefore minimize the consumption of fossil fuels in power generation.

LUMA recognizes that the projects under the Action Plan are part of a transformation process. Several are of special interest to LUMA, including:

- Projects identified as part of the Unmet Needs Assessment;
- Microgrid and distributed generation (DG) programs; and
- Electric Vehicle (EV) infrastructure planning.

Once completed these projects will help provide a more resilient and sustainable energy system. The DOH and industry stakeholders have identified and shared a list of potential projects in the action plan.

3. 0 Future Considerations

LUMA recommends that during the design and implementation phases of the program, DOH carefully consider, among other things:

INTEGRATION OF EXISTING AND PLANNED REGULATIONS

LUMA has and continues to work with the Puerto Rico Energy Bureau on new regulations specific to the proposed projects and activities in this Action Plan. Among them are the Distributed Generation Interconnection regulations, currently in draft.

STAKEHOLDER ROLES AND RESPONSIBILITIES

With recent private public partnerships (PPPs) in the electricity sector, roles of actors have changed. For example, LUMA is in charge of operations, maintenance, and administration of the electricity grid assets that are owned by government of Puerto Rico. New PPPs are expected in the sector.

BUSINESS AND FINANCIAL MODELS USED IN PROPOSED PROJECTS

One of the largest challenges to the sustainable implementation of minigrids is the use of an appropriate business model to finance project capital and operating expenditures.

ROLL OUT OF EV PLANNING

In Case No. NEPR-MI-2021-0013, the Puerto Rico Energy Bureau is identifying goals and policies for the deployment of Electric Vehicle Charging Infrastructure. LUMA would like to collaborate with DOH and other stakeholders in the design and roll out of activities.

CHANGES IN THE LANDSCAPE

The Action Plan builds on an estimate of unmet needs based on planned electric power system improvements. The system in Puerto Rico is a dynamic and complex. As such, the status of some of the projects, including LUMA's, may have changed since development of the unmet needs assessment.

LUMA looks forward to collaborating with DOH in order to coordinate in the activities identified in the Action Plan and others that relating to the electricity sector in Puerto Rico.

4.0 Conclusion

LUMA welcomes the opportunity to provide feedback. LUMA believes that adherence to the objectives and principles summarized in this document will support effective use of CDBG-DR funds for Electric System Enhancements in Puerto Rico in a manner consistent with Puerto Rico's energy public policy. LUMA looks forward to continuing constructive discussion and coordination on the subject.

AYUDA LEGAL PUERTO RICO

20 de diciembre de 2021

Hon. William O. Rodríguez Rodríguez
Secretario
Departamento de la Vivienda de Puerto Rico
PO Box 21365
San Juan, PR 00928-1365

Vía portal

Re: Comentarios al borrador de Plan de Acción para el Uso de los fondos CDBG-DR para la Optimización del Sistema Eléctrico

Estimado secretario Rodríguez Rodríguez:

Reciba un cordial saludo por parte del equipo de Ayuda Legal Puerto Rico. Como es de su conocimiento, somos una organización de apoyo legal comunitario que trabaja en esfuerzos de educación y abogacía en torno al proceso de recuperación post desastres.

Por este medio, presentamos nuestros comentarios al borrador de Plan de Acción para el Uso de los fondos CDBG-DR para la Optimización del Sistema Eléctrico del 8 de noviembre de 2021. Nuestros comentarios responden a nuestro compromiso con la participación comunitaria y disfrute de los derechos humanos de aquellas personas y comunidades que históricamente han sido más vulnerables en nuestra sociedad.

Energía eléctrica, disponible, segura y accesible, como parte del derecho a una vivienda digna, es pieza fundamental del proceso de recuperación. Estos fondos, junto a aquellos para mitigación y asistencia pública, brindan una oportunidad histórica de transformar el sistema público en uno más limpio, seguro y resiliente, tanto a desastres puntuales como los de desarrollo lento como el cambio climático. Como en todo proceso de esta naturaleza, esto dependerá que se creen mecanismos transparentes y confiables comprometidos en garantizar los derechos y necesidades de la gente.

I. Acceso equitativo a los fondos

El Departamento tiene a su haber poco más de $1,900 millones en fondos de CDBG-DR. El Plan de Acción propone distribuirlos a través de dos programas: el Programa de Distribución de Costos para Rehabilitación y Reconstrucción de la Red Eléctrica (ER1) y el Programa para la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2). Según el mandato federal aplicable, estos programas deben ser utilizados "para llevar a cabo actividades estratégicas y de alto impacto para abordar los gastos necesarios y mitigar los riesgos de desastres en sus sistemas de energía eléctrica, mejorar la confiabilidad, resiliencia, eficiencia, sostenibilidad del sistema y abordar la viabilidad financiera a largo plazo de cada sistema".[1]

Más aún, estos fondos son parte de una oportunidad única de transformar el sistema en atención a los impactos del cambio climático.[2] Esta coyuntura es idónea para el despliegue de energía solar en techos con baterías y acortar la brecha económica que de otra forma haría inaccesible a personas y comunidades empobrecidas los beneficios de la energía renovable distribuida. La energía solar distribuida es una respuesta viable y adecuada para transformar nuestro sistema eléctrico. Hacerlo es un imperativo de justicia climática.

A pesar del potencial de estos fondos, el Departamento falla al no enfocarse en soluciones, incluyendo aquellas basadas en la naturaleza, que satisfagan la necesidad de un sistema eléctrico seguro, accesible y asequible. Nuestra política pública tiende a favorecer generación de energía con fuentes alternas, en atención al cambio climático. Sin embargo, el Plan no excluye proyectos que no vayan en esa dirección ni optimiza los proyectos que sí lo hacen.

Los proyectos bajo el programa ER2 no se limitan a la energía generada por fuentes renovables. El proyecto se limita a "fomenta[r] que los proyectos integren activos energéticos y contribuyan a la diversificación de las fuentes de energía",[3] pero no usa los recursos para asegurar que eso suceda. En esa misma línea, se enfatizan las microrredes como alternativa de resiliencia, pero no todas las microrredes son iguales. Los proyectos de microrredes que se componen de solar en techo tiene mayores costos de distribución y transmisión y pueden puede afectar otros usos igualmente necesarios. Experiencia reciente revela múltiples proyectos de fincas solares sobre terrenos agrícolas.[4] Estos proyectos no

[1] 86 F.R. 32681 (June 22, 2021) (traducción suplida)
[2] Véase, *id.*
[3] Plan de Acción, en la pág. 128.
[4] Maricarmen Rivera Sánchez, Alertan del efecto de fincas solares en la agricultura, elvocero.com (26 octubre 2021), https://www.elvocero.com/gobierno/alertan-del-efecto-de-fincas-solares-en-la-agricultura/article_63c5653a-35ff-11ec-a5fd-330ca9c5a344.html

solo limitan recursos que podrían ir a energía en techos, tronchando una verdadera transformación, sino que amenazan otro derecho fundamental, a saber, la alimentación. Este Departamento debe expresamente prohibir desde el Plan de Acción estos proyectos, especialmente aquellos en terrenos agrícolas, como elegibles para fondos ER2. Entendemos que esto refleja un claro desfase entre las metas planteadas en el plan – y el mandato del Aviso de Asignación – y las medidas que en efecto se proponen en el plan para alcanzarlas.

El ejemplo más claro de este desfase es que, el borrador del Plan excluye de plano a organizaciones comunitarias, que usualmente presentan proyectos más pequeños atemperados a las necesidades de las comunidades que benefician, y las limita al programa CDBG-MIT sobre Instalaciones Comunitarias para la Resiliencia Energética y de Abastecimiento de Agua. Son las organizaciones y proyectos de base comunitaria, como el proyecto Coquí Solar o la comunidad de Toro Negro, por mencionar algunos, quienes han liderado los esfuerzos para que comunidades remotas, rurales y empobrecidas accedan a los beneficios de la energía solar. Si les dan los fondos, podrían liderar también la transformación energética que el país necesita.

Al excluir proyectos comunitarios, estos fondos promueven obras de gran tamaño implican costos adicionales en los sistemas de transmisión y distribución, que son menos resilientes ante desastres y eventualmente redundan en mayores costos a los abonados de la Autoridad de Energía Eléctrica. También sirven para enriquecer empresas privadas que responden exclusivamente a los intereses de sus accionistas. Insistimos en que la generación distribuida mediante solar en techo es la mejor alternativa para la transformación energética que necesitamos. Las comunidades son las mejores líderes para esa transformación.

La falta de energía eléctrica fue uno de los principales motores de las muertes después de María. También fue uno de los principales motivos para el desplazamiento hacia Estados Unidos después del huracán.[5] El alto costo y la intermitencia del servicio reduce la calidad de vida de las personas y pone una gran presión sobre empresas, comercios y servicios. No asegurar la transformación del sistema y el acceso equitativo a los beneficios de dicha transformación desplaza. Atenta contra la posibilidad misma de vivir y permanecer en nuestro archipiélago.

[5] Carlos Vargas Ramos and Charles R. Venator-Santiago, Anticipated Vulnerabilities: Displacement and Migration in the Age of Climate Change Holyoke's Response to Hurricane Maria for Massachusetts' Municipal Vulnerability Program (septiembre 2019), disponible en:
https://centropr.hunter.cuny.edu/sites/default/files/PDF/hhmrs_final_2019.pdf

Acción requerida:

- Las actividades elegibles como proyectos de generación deben ceñirse a la definición de energía renovable sostenible establecida en la la Ley de Política Pública de Diversificación Energética por Medio de la Energía Renovable Sostenible y Alterna en Puerto Rico, Ley 82-2010.
- Priorizar soluciones que satisfagan necesidades críticas de comunidades u hogares, como microrredes u otros sistemas pequeños de energía solar con baterías para almacenamiento.
- Enmendar el plan para permitir que proyectos a menor escala de empresas y organizaciones comunitarias sean elegibles para el Programa ER2.
- Reducir la adjudicación mínima a un millón de dólares para proyectos comunitarios.
- Prohibir expresamente en el plan de acción los proyectos ubicados directamente sobre terrenos agrícolas.
- Hacer disponibles fondos para que las comunidades y personas que puedan beneficiarse de la asistencia puedan acceder a asistencia técnico-científica independiente para poder acceder a los fondos y cumplir con los requisitos del programa, en caso de que la necesiten.

II. El borrador del Plan de Acción no incluye un plan de minimización de desplazamientos.

El Aviso de Asignación de fondos del 22 de junio de 2021, contiene un mandato expreso y claro de minimizar desplazamientos que puedan surgir de las actividades subsidiadas con estos fondos. Es específicamente establece:

> (*5) Plans to Minimize Displacement and Ensure Accessibility. The grantee* ***must describe how it plans to minimize displacement*** *of persons or entities,* ***and assist any persons or entities displaced through its electrical power system improvement activities****. This description shall focus on proposed activities that may directly or indirectly result in displacement and the assistance that shall be required for those displaced. The grantee is reminded that it must take into consideration the functional needs of persons with disabilities in the relocation process. Guidance on relocation considerations for persons with disabilities may be found in Chapter 3 of HUD's Relocation Handbook 1378.0 ...*[6]

El borrador del Plan de Acción no incluye un plan de minimización de desplazamientos. El Plan se limita a indicar que el Departamento "ha establecido planes" para este propósito e

[6] 86 F.R. 32686 (June 22, 2021) (énfasis suplido)

indicar que tomará seguirá el Manual de relocalización de HUD en el caso de personas con diversidad funcional.[7] Esta no es una descripción de cómo la agencia va a minimizar los desplazamientos. Ni siquiera se hace referencia a esos planes que el Departamento indica que ya tienes. Si, como ha ocurrido en otros planes de acción se refiere a la Guía de Asistencia Uniforme de Reubicación y Plan de Anti desplazamiento Residencial y Asistencia para Reubicación (Guía URA & ADP), se debe así indicar en el plan. No obstante, reiteramos, como hicimos con los otros planes, que ni URA ni la Guía mencionada son planes de minimización de desplazamiento, sino medidas para personas desplazadas permanente o temporalmente.

Acción requerida:

- Adoptar una política de minimización de desplazamientos basada en derechos humanos, incluyendo el derecho a permanecer y retornar a sus hogares. Cuando esto no sea posible, debe garantizarse el retorno al mismo espacio geográfico, protegiendo así el tejido social comunitario.
- Asegurar la voluntariedad de cualquiera desplazamiento mediante la divulgación de alternativas al desplazamiento, la participación real y efectiva en el proceso decisional, el uso de incentivos, y la provisión de alternativas de vivienda reales y concretas.
- Adoptar un plan de relocalización basado en derechos humanos.
- Crear, publicar y distribuir un inventario de viviendas disponibles y elegibles para reubicación para quienes accedan voluntariamente a ser reubicados.
- Tomar medidas concretas para evitar impactos en la comunidad que permanece, incluyendo la minimización del efecto de tablero de ajedrez (*checkerboarding*).

III. Participación real y efectiva

La participación en los procesos que definen la política pública no solo es un derecho, sino que mejora la calidad sustantiva de las decisiones gubernamentales. Los mecanismos de participación no son, ni pueden ser, espacios meramente para recibir información. Los mecanismos de participación son una oportunidad para involucrar a la población en el proceso decisional y puede ayudar a generar ideas, resolver problemas y fomentar la cooperación entre las personas y los recipientes y subrecipientes de fondos. Estos procesos son, o deben ser, tan beneficiosos para la agencia gubernamental como para las personas. En las palabras de HUD, las personas recuperándose de desastres son las más adecuadas

[7] Borrador del Plan de Acción, en la pág. 106.

para garantizar que los recipientes estén informados de las oportunidades perdidas y los riesgos adicionales que deben abordarse.[8]

Reiteramos, como hemos hecho a lo largo de los procesos relacionados a todos los fondos CDBG-DR, que es imperativo que el Departamento establezca medidas que permitan monitorear no solo la contratación privada sino el desempeño de los contratistas. Ello requiere que el Departamento reciba, atienda y conteste adecuadamente las quejas y señalamientos hacia las acciones de los contratistas y que tome medidas concretas para que los contratistas atiendan sus deficiencias. Esto debe incluir ejercicios de transparencia y divulgación tanto de las deficiencias como de las medidas de corrección a implantarse.

El Estado tiene el deber tanto de permitir la participación como de establecer los mecanismos que faciliten y propicien esa participación En esta coyuntura, a más de cuatro años del paso de los huracanes Irma y María y con la acumulación de desastres que incluyen sismos y una pandemia, es indispensable.

Acción requerida:

- Hacer disponible una traducción al español del Aviso de Asignación.
- Mantener un registro actualizado en vivo que permita monitorear la participación ciudadana, los grupos o comunidades que son representadas.
- Establecer medidas sencillas y ágiles para que la ciudadanía pueda observar y monitorear la contratación privada y el desempeño de los contratistas que se beneficien de esos fondos.

Reiteramos nuestro deseo e interés en aunar esfuerzos para abrir los canales de participación y transparencia y para que el uso de estos fondos se haga de forma equitativa y justa para nuestras comunidades. El País, empezando por aquellas personas más afectadas, tiene derecho a una recuperación justa.

Cordialmente,

s/Lcda. Ariadna M. Godreau Aubert
Directora Ejecutiva

s/Lcda. Verónica González Rodríguez
Abogada comunitaria

s/Lcda. María de L. Vaello Calderón
Abogada comunitaria

[8] 86 F.R. 32689 (June 22, 2021) (énfasis suplido)

Área de mayores problemáticas de energía en Aguadilla

Barrio		Situaciones
Pueblo	Calle Progreso	Se creo un sistema de corriente soterrado y el mismo se encuentra sin ser activado.
	Cuesta Vieja	El mismo cuenta con un sistema débil el cual tiene apagones frecuentes durante el huracán Maria fueron de las comunidades que estuvieron mas de 6 meses sin servicio eléctrico
	Cerros en el casco urbano	Lugar con infraestructura débil el cual sufre de interrupciones frecuentes
Camaseyes	Urb. El Verde	Lugar con infraestructura débil el cual sufre de interrupciones frecuentes
	Paseos de Jaicoa	Interrupciones frecuentes
		Interrupciones frecuentes
Barrio Borinquen	Sector Playuela	Lugar con infraestructura débil el cual sufre de interrupciones frecuentes
	Marbella	Lugar con infraestructura débil el cual sufre de interrupciones frecuentes
Montaña	San Antonio	Lugar con infraestructura débil el cual sufre de interrupciones frecuentes
	Urb. Paseos Reales	Interrupciones Frecuentes
Corrales	Vista Verde	Interrupciones Frecuentes
Caimital Alto	Anexo Carr#2 KM 123.4	Interrupciones Frecuentes
Maleza Alta	Base Ramey	Interrupciones Frecuentes

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December 16, 2021

Puerto Rico CDBG-DR Program
P.O. Box 21365
San Juan, PR 00928-1365

To Whom It May Concern:

CAMBIO PR appreciates the opportunity to provide comments on the Puerto Rico Disaster Recovery Action Plan for the Use of CDBG-DR Funds for Electrical Power System Enhancements and Improvements. As noted in the plan, the Puerto Rico Department of Housing has a unique opportunity to use $1.9 billion in federal funds for the benefit of low-income Puerto Ricans by funding electrical system resiliency needs that would otherwise go unmet.

CAMBIO reiterates the importance and value of rooftop solar and storage systems in providing resiliency to households. Earlier this year, CAMBIO released the results of detailed grid modeling studies analyzing the technical feasibility of supplying 75% of the island's electrical needs with distributed renewable energy and battery storage by 2035, including equipping all homes on the island with small-scale solar and storage systems, specifically 2.7 kW solar paired with 12.6 kWh storage. (See Appendix: "We Want Sun and We Want More", March 2021). The modeling showed that this decentralized and resilient system could be achieved with modest upgrades to the distribution system. If adopted, this approach would reduce and stabilize electric rates by reducing the island's dependence on imported fossil fuels, while radically transforming the resiliency situation for Puerto Rico residents within fifteen years.

CAMBIO estimates that the use of $1.9 billion in CDBG-DR funds to bulk purchase standardized, small-scale rooftop solar and storage systems that could meet household critical needs during a grid emergency could result in the installation of approximately 140,000 systems by a combination of PREPA, municipalities and/or community organizations. This would radically transform the resiliency situation for more than 10% of households on the island, and should be done in a manner that prioritizes low-income communities that experienced the longest delays in service restoration after Hurricane Maria. CAMBIO urges Vivienda to allocate all, or a substantial fraction, of the available CDBG-DR funds towards such an initiative.

Specifically, CAMBIO offers the following comments on the draft Action Plan's "Electric Power Reliability and Resilience Program" and "Energy Grid Rehabilitation and Reconstruction Cost Share Program":

Electric Power Reliability and Resilience Program

1. **Eligible Applicants**: CAMBIO urges that community organizations be eligible to apply for funds under the program. As written, the plan directs "organizations seeking to implement community-based installations of energy production and storage as subrecipients" to the CDBG-MIT program. Given the billions of dollars of unmet need for household level resiliency (see p. 73 of the Action Plan), the rationale for excluding organizations from accessing these CDBG-DR funds is unclear.

   CAMBIO also urges that LUMA Energy not be considered eligible for funding under the program. Given the many past scandals in the use of federal funds for the electrical system (notably Whitefish and Cobra), the management of federal funds requires a high degree of transparency to restore public faith in the process. Since LUMA took over operations of the electrical system, the company has repeatedly failed to deal in a transparent manner with the public, municipalities or the legislature, culminating in the recent arrest order for CEO Wayne Stensby. LUMA's performance in Puerto Rico does not reflect the level of competency or transparency needed to manage billions of dollars of federal funds.

2. **Eligible Activities:** CAMBIO urges that the program guidelines be clarified as to the type of project that will be considered. While the guidelines for what is considered an "eligible activity" are broad, the Plan only specifically discusses "Co-generation & Large Project Microgrids", "Small Project Microgrids", "Centro Medico [microgrid]", and "[other] Generation". In particular,
   a. The "Generation" category broadly contemplates "innovative generation solutions that will propel the Island forward in terms of resiliency, sustainability, and efficiency." Given that Puerto Rico still generates more than 95% of its electricity from fossil fuels, CAMBIO urges Vivienda to only consider generation solutions that meet Law 82-2010's definition of "Sustainable Renewable Energy" and/or "renewable microgrids" as defined by Puerto Rico Energy Bureau regulation 9028. Vivienda should not fund generation projects that would require modifications to PREPA's Integrated Resource Plan (as contemplated at p. 120), which calls for the integration of greater quantities of renewable energy and storage.
   b. Rooftop solar and storage are a proven resiliency solution. They are also less expensive and can be deployed more rapidly than the microgrid solutions that the draft Action Plan appears to favor. CAMBIO urges Vivienda to clarify that community or municipal programs for the bulk purchase of residential rooftop solar and storage installations will be considered for funding.
   c. CAMBIO urges Vivienda to clarify that diesel-based microgrids will not be eligible. We note that LUMA has identified the Culebra and Vieques microgrids as possible unmet needs (p. 58) and that these are diesel-based projects.

3. **Minimum award**: CAMBIO urges Vivienda to lower the minimum award amount significantly below $10 million. In order for community groups to effectively participate, the minimum award should be closer to $250,000. We also note that many of the small microgrids identified by Sandia National Laboratory in their comprehensive microgrid analysis cited in the draft Action Plan would be ineligible for funding under the current proposal, despite serving critical loads, because they are estimated to cost under $10 million.[1]

Energy Grid Rehabilitation and Reconstruction Cost Share Program

CAMBIO does not support the use of $1.06 billion of the CDBG-DR allocation as matching funds for electrical system FEMA 428 funds, as proposed in the Action Plan. We believe that the use of these funds for matching is inconsistent with the purposes of the CDBG-DR allocation outlined in the June 22, 2021 Federal Register notice, for the following reasons:

- According to the Federal Register notice of the allocation of funds, "Grantees must describe how they will integrate the electrical power system improvements into on-going and planned rebuilding, recovery, and mitigation activities, and the extent to which the proposed electrical power system improvement activities are consistent with the objectives outlined in other CDBG–DR or CDBG–MIT action plans".[2] The CDBG-MIT action plan identifies several key electrical system vulnerabilities, including: a centralized system highly dependent on long-distance transmission; the high and increasing cost of imported fossil fuels; and the difficulty of fuel deliveries during emergencies.[3] However, the 10-Year Infrastructure Plan that PREPA and LUMA are using for the deployment of the FEMA 428 funds proposes to rebuild the same centralized system that failed during hurricane Maria and not to spend any of the FEMA funds on renewable energy or storage. This is not consistent with addressing the key vulnerabilities identified in the CDBG-MIT Action Plan.
- Similarly, the fund allocation notice states that, "Grantees must describe how the electrical power system improvements will be designed and implemented to address the impacts of climate change, including any nature-based solutions and other improvements that will enhance the ability of the grantee to implement renewable and clean energy sources and strategies, and align with long-term goals for decarbonizing the electricity sector."[4] Using CDBG-DR funds to support the projects described in the 10-Year Infrastructure Plan would be incompatible with this requirement, given that the 10-Year Infrastructure Plan directs zero dollars towards renewable energy and storage, and thereby does not further the implementation of renewable energy or the decarbonization of the grid.

[1] https://www.osti.gov/servlets/purl/1481633/, pp. 56-60.
[2] 86 FR 32687
[3] CDBG-MIT Action Plan, April 19, 2021. Pp. 119 – 122.
[4] 86 FR 32687

- Finally, the fund allocation notice states that "At least 70 percent of the entire CDBG–DR grant must be used for activities that benefit low- and moderate-income persons."[5] The 10-Year Infrastructure Plan, which is largely a plan for reinforcing the existing transmission and distribution system, does not specifically benefit low- and moderate-income persons. In fact, by not using federal funds to promote access to resiliency for low and moderate-income households, and leaving it to the private market to provide rooftop solar and storage solutions, the use of FEMA funds proposed in the 10-Year Infrastructure Plan leaves low-income households behind.

For these reasons, CAMBIO urges Vivienda to eliminate the Energy Grid Rehabilitation and Reconstruction Cost Share Program as inconsistent with the renewable energy, decarbonization and low-income requirements of the CDBG-DR funding allocation. Instead, we urge Vivienda to deploy funding towards low-income household resiliency by funding community and governmental programs to bulk purchase and install small-scale residential rooftop solar and storage systems.

Thank you for this opportunity to provide comments.

Ingrid M. Vila Biaggi MS, PE

President/co-founder

Cathy Kunkel MS

Energy Program Manager

[5] 86 FR 32693

Appendix

Institute for Energy Economics and Financial Analysis
IEEFA.org

We Want Sun and We Want More

75% Distributed Renewable Generation in 15 Years in Puerto Rico Is Achievable and Affordable

Ingrid M Vila Biaggi, MS PE, CAMBIO
Cathy Kunkel, IEEFA Energy Finance Analyst
Agustín A. Irizarry Rivera, PhD, PE

With support from:

March 2021

We Want Sun and We Want More

75% Distributed Renewable Generation in 15 Years in Puerto Rico Is Achievable and Affordable

Ingrid M Vila Biaggi, MS PE, CAMBIO; Cathy Kunkel, IEEFA Energy Finance Analyst; Agustín A. Irizarry Rivera, PhD, PE

March 2021

Executive Summary

In 2018, Queremos Sol ("We Want Sun"), a multi-sectoral coalition of Puerto Rican community, environmental and labor organizations, put forward a policy proposal for the renewable energy transformation of Puerto Rico's electrical system under a reformed public ownership model. The proposal emphasized efficiency and distributed renewable energy, particularly rooftop solar and behind-the-meter storage, as a strategy to provide resilience to households in future blackouts, to reduce the impact on agricultural and ecologically valuable lands from utility-scale renewable energy projects, and to reduce the island's dependence on imported fossil fuels and extensive transmission systems. Queremos Sol proposes a transformation that is equitable, affordable and that ensures a transition to renewables that is fair to PREPA workers.

In this report, we summarize the result of in-depth grid modeling studies completed in early 2021 to investigate specific technical aspects of the Queremos Sol proposal. Specifically, Telos Energy and EE Plus performed modeling of the Puerto Rico Electric Power Authority's generation, transmission and distribution infrastructure, using data obtained from PREPA, to analyze scenarios of increasing penetration of renewable energy, up to 75% (with over half of that from residential installations) of total electricity consumption by 2035. Energy Futures Group used these grid modeling results to estimate costs. Key results of this analysis are:

- Achieving 75% distributed renewable energy generation in 15 years is feasible with minimal upgrades to the distribution system.
- Equipping 100% of homes with 2.7 kW PV and 12.6 kWh battery backup can provide 2700 MW of power to the Puerto Rico grid, which would need to be supplemented by solar installations at commercial sites (rooftops and parking lots) to reach 75% renewable energy penetration.
- Seventy-five percent distributed renewable energy by 2035 would cut imported fossil fuel costs to $430 million/year (relative to recent expenditures over $1.4 billion/year) and reduce carbon dioxide emissions by more than 70%.
- The distributed energy scenarios demonstrate there is no need for new fossil fuel generation or conversions of existing units to natural gas. It is possible to move directly to the widespread deployment of distributed solar and storage technologies, rather than locking in decades of new natural gas infrastructure.

- Under the 75% distributed renewable energy scenario, the vast majority of PREPA's current power plants would no longer be used, included the AES coal plant, which can be retired in the next 4 years.[1]
- The 75% distributed renewable energy scenario is less expensive than the base case of PREPA's current grid.

Puerto Rico's future electric rates face significant uncertainty due to federal funding, privatization contracts and PREPA's ongoing debt restructuring. Without including legacy debt, the 50% and 75% distributed energy scenarios modelized here result in average system costs equal or less than 20 cents per kWh. The study does not assume any specific ratemaking policy. **If $9.6 billion in federal funding is used to cover necessary distribution system improvements and to invest in distributed solar and battery systems as proposed by Queremos Sol and modeled, the average system cost is less than 15 cents/kWh in 2035.** Moreover, Puerto Rico's dependency on fluctuating fossil fuel prices would be dramatically reduced providing greater stability in rates.

After the 2017 hurricanes, high-level rhetoric has emphasized transitioning to a renewable energy-based, resilient electrical system, while money has flowed to privatization, centralized generation and natural gas infrastructure. Most recently, PREPA's 10-Year Infrastructure Plan calls for spending about $10 billion in federal funds to harden PREPA's centralized transmission and distribution systems and to build out new natural gas infrastructure, with zero dollars directed towards renewable energy and storage. Decisions over the use of billions of dollars in federal funding will shape Puerto Rico's grid for decades to come.

A distributed energy future for the island is technically achievable, affordable and would provide real resiliency to Puerto Rico homes and businesses. In this report, we make the case for policy development and prioritization of federal funding to widely deploy rooftop solar and storage, coupled with energy efficiency, across Puerto Rico.

[1] Retirement of AES modeled follows substitution of its generation capacity with roof-top solar and PV. However, Queremos Sol's demand for immediate retirement of AES can also be attained through other operational modifications.

Background

The future of Puerto Rico's oil-dependent, poorly maintained and bankrupt electrical system has been highly contested. In the aftermath of Hurricanes Irma and Maria in 2017, this debate received much greater attention island-wide and in the continental United States. At a high level, there has been significant recognition of the role that distributed renewable energy could play in enhancing resiliency.

Law 17-2019, Puerto Rico's Energy Public Policy Act envisions an electrical system "that empowers the consumer to be part of the energy resources portfolio through the adoption of energy efficiency strategies, demand response, the installation of distributed generators."[2]

However, in the three years since the hurricane, distributed energy resources have not played a central role in the transformation process, which continues to perpetuate a centralized generation model.

PREPA's twenty-year Integrated Resource Plan (IRP) - the long-term plan for the island's generation system approved by its regulator, the Puerto Rico Energy Bureau – is supposed to be the guiding document for investments in the generation system.[3] PREPA's IRP was based on electric generation capacity expansion modeling that evaluated the cost of adding new capacity and retiring existing capacity to arrive at the least-cost trajectory for transforming the island's generation mix. However, the capacity expansion model was not capable of simulating distribution system investments and simply assumed a certain penetration of rooftop solar resources (13% by 2035[4]). While this is common practice in integrated resource planning in the continental United States, it is an impediment to achieving the desired widespread penetration of distributed energy resources in Puerto Rico.

Additionally, despite the alleged primacy of the IRP in guiding the development of Puerto Rico's electrical system, investments in the generation system have moved forward outside of the IRP process. Notably, PREPA entered into a contract with New Fortress Energy subsidiary NFEnergia for the conversion of units 5 and 6 of the San Juan power plant to natural gas and for a five-year supply of natural gas (with possible extension up to 20 years).[5] The deal has been criticized for its lack of clarity on savings to ratepayers, for taking place outside of the IRP process, for NFE's failure to gain approval from the Federal Energy Regulatory Commission for its project, for failing to notify and consult neighboring communities, and for numerous red flags in the contracting process itself.[6]

[2] Act 17-2019, Article 1.5(2)(e).
[3] Act 57-2014, Article 6.23.
[4] PREPA's workpaper for the Energy System Modernization scenario (its preferred IRP scenario) in 2035 shows 1,508 GWh of customer-owned PV generation out of a total generation of 11,780 GWh. (See PREPA file "ESM_Metrics_Base_SII-mm with action plan tab" filed with the Puerto Rico Energy Bureau in Case No. CEPR-AP-2018-0001 on June 28, 2019).
[5] Gerardo E. Alvarado León, "La AEE y NFEnergía firman contrato de combustible," El Nuevo Día, March 5, 2019.
[6] Tom Sanzillo and Ingrid Vila-Biaggi, "Is Puerto Rico's Energy Future Rigged?", Institute for Energy Economics and Financial Analysis, June 2020.

Most recently, PREPA has earmarked federal funding to build new natural gas infrastructure that was rejected by the Energy Bureau in the IRP proceeding. Specifically, PREPA plans to spend over $500 million in federal funds to construct a 400 MW natural gas plant near San Juan in 2024, despite the fact that this was not approved in the IRP.[7] PREPA does not plan to spend any FEMA grid reconstruction funds on renewable energy or storage.

The laws passed by the Puerto Rico legislature since Hurricane Maria are aimed primarily at privatizing the electrical system (Law 120-2018 and Law 17-2019). These laws set up a streamlined and non-transparent process for the lease of PREPA's T&D system to a private operator and for the sale or lease of generation assets to private buyers. In the absence of clear prioritization of distributed renewable energy, this legislation has facilitated natural gas interests (like NFEnergia) pushing centralized natural gas infrastructure in Puerto Rico.

Finally, ongoing negotiations with PREPA's creditors to restructure PREPA's $9 billion in legacy debt are likely to have a material impact on future investment in the electrical system. The most recent debt restructuring agreement (RSA) seeks to recover legacy debt from a surcharge on rates for the next 47 years. The debt charge, which grows to 4.552 cents/kWh over that period, would also be applied to electricity generated by distributed solar panels installed after September 2020.[8] This structure thwarts the goal of incentivizing distributed generation on the island. As of February 2021, the RSA has not received court approval because the 2020 earthquakes and pandemic have dramatically worsened economic conditions in Puerto Rico.

In short, the transformation process post-hurricane Maria has been fraught with contradictions that, so far, have furthered more of the same: politically-driven contracting focused on centralized generation, particularly natural gas. Yet there is still much that is uncertain about the future of the power system. PREPA's proposals for new natural gas infrastructure were largely rejected by the Energy Bureau in its latest IRP, despite PREPA's ongoing attempts to circumvent the Bureau. The outcome of debt restructuring negotiations are still uncertain. The recent concession of PREPA's operations (excluding generation) to a private third-party has drawn stiff opposition. The imminent disbursement of over $10 billion in FEMA funds for the electrical system, plus the potential future disbursement of nearly $2 billion in HUD funds, will shape the grid for decades to come.[9]

Queremos Sol Modeling Initiative

In this context, Queremos Sol ("We Want Sun"), a multi-sectoral coalition of Puerto Rican community, environmental and labor organizations, put forward a policy proposal for the renewable energy transformation of Puerto Rico's electrical system under a reformed public ownership model in 2018. Queremos Sol explicitly rejected the push for privatization of the electrical system and centered energy efficiency and distributed renewable energy in its vision.

[7] See: Puerto Rico Electric Power Authority, Revised 10-Year Infrastructure Plan, February 2021. And Puerto Rico Energy Bureau, Final Resolution and Order, Case No. CEPR-AP-2018-0001, August 21, 2020, paragraph 620.
[8] Definitive Restructuring Support Agreement, May 3, 2019. (See Appendix C: Recovery Plan Term Sheet).
[9] José Delgado, "FEMA aprueba cerca de $13,000 millones para reconstruir la red eléctrica y el sistema educativo," El Nuevo Día, September 18, 2020.

The vision included specific goals of 25% energy efficiency by 2035, 50% renewable energy by 2035 and 100% by 2050. Queremos Sol specifically advanced the proposal of providing 75% of homes in Puerto Rico with a minimum level of energy security, in the form of solar with battery back-up, by 2035. Queremos Sol also rejected the development of new natural gas infrastructure on the island.[10]

In this report, we present the results of modeling conducted on behalf of CAMBIO to lend more analytical detail to the Queremos Sol proposal. A key focus of this modeling was analyzing the costs and technical operations of a grid heavily based on decentralized renewable energy (rooftop solar and storage). As noted above, this type of modeling was absent from PREPA's most recent IRP. The modeling analyzed three scenarios of increasing penetration of decentralized renewable energy to find out what that would mean in terms of: (a) generation mix; (b) costs; and (c) upgrades required to maintain grid stability and reliability.

The modeling was conducted by Telos Energy and EE Plus, using data provided to CAMBIO and the Institute for Energy Economics and Financial Analysis (IEEFA) as a result of a public records request.[11] Energy Futures Group used these grid modeling results to estimate costs. The modeling evaluated four scenarios for the Puerto Rico grid in 2035: a base case scenario that projects today's grid and generation mix into 2035, and three scenarios with increasing levels of renewable energy penetration. As shown in Table 1, these scenarios meet 25, 50 and 75% of Puerto Rico's assumed 2035 electricity consumption with renewable energy and assume that 50, 75 and 100% of residential homes are equipped with 2.7 kW solar panels and 12.6 kWh battery backup, respectively.[12]

Table 1: Summary of Renewable Energy Scenarios[13]

		25% DPV	50% DPV	75% DPV
Renewable Share	% of Total Generation	25%	50%	75%
Resilient Homes	% of Resilient Homes	50%	75%	100%
Distributed PV Capacity (MW)*	Residential	1,350	2,025	2,700
	Commercial	143	1,212	2,282
	Total	1,493	3,237	4,982
Distributed BESS Capacity	Power Rating (MW)	1,178	1,853	2,528
	Energy Rating (MWh)	5,301	8,339	11,376
	Duration (hrs)	4.5	4.5	4.5

*Includes existing distributed PV

[10] For more details, see queremossolpr.com

[11] Although data used was provided by PREPA the model has been independently developed by consultants on behalf of CAMBIO and in no way represents any proposal, projection or representation of the Puerto Rico Electric Power Authority.

[12] 100% of homes refers to 1,000,000 homes that are projected to be inhabited by 2035. Multi-family units, or houses where PV installation is not possible, are assumed to be served by nearby home, community or commercial installations.

[13] Telos report, Table 1.

These scenarios were evaluated using a production cost model (PLEXOS) that optimized the use of generation resources on the grid in each scenario, according to assumptions about solar availability, fuel prices, and operations and maintenance costs for each generating unit. The full details of this analysis are found in the report of Telos Energy (hereafter "Telos report"). Telos also ran a transmission model (PSS/E) that simulated the flow of power on PREPA's transmission network in each scenario. This showed how the integration of increasing amounts of distributed renewable energy changes PREPA's traditional reliance on south-to-north transmission lines to bring power from generators in the south to population centers in the north. It also provided an opportunity to analyze the stability of the grid under increasing amounts of renewable energy systems, which do not respond to disruptions to the grid (generator or transmission outages) in the same way as traditional fossil fuel-based generators.

EE Plus used the transmission system power flow modeling output from the Telos analysis to model power flows on the distribution system using OpenDSS. EE Plus analyzed 976 feeders (89% of PREPA's distribution system mileage) to determine which distribution lines would need to be rebuilt or reconductored in order to accommodate increasing amounts of rooftop solar interconnected directly to the distribution system.

Energy Futures Group analyzed the energy efficiency measures that could be used to meet Queremos Sol's vision of 25% energy efficiency by 2035 and forecasted the 2035 island-wide electricity demand that was input into the Telos and EE Plus modeling. Energy Futures Group also modeled the total costs of each scenario, including the costs of acquiring the solar and battery storage resources.

Modeling Results

No New Natural Gas Infrastructure Is Needed to Achieve High Penetrations of Renewable Energy

The modeling analysis conducted here shows that it is possible to skip over natural gas as a "bridge fuel" and move directly to the widespread deployment of distributed solar and storage technologies, rather than locking in decades of new natural gas infrastructure. The modeling shows there is no need for the construction of any new natural gas infrastructure or for the conversion of existing plants to gas. In contrast, the integrated resource plan (IRP) presented by PREPA to the Energy Bureau included substantial investment in new natural gas infrastructure. Although many of these proposals were rejected by the Bureau, the Bureau did authorize PREPA to move forward with preliminary permitting activities and studies for a 300 MW natural gas plant at Palo Seco and also stated that it would consider the conversion of the AES coal plant to natural gas as part of the next IRP cycle.[14] Moreover, PREPA's 10-Year Infrastructure Plan also calls for the use of FEMA funding to build new natural gas infrastructure, although the

[14] Puerto Rico Energy Bureau, Final Resolution and Order, Case No. CEPR-AP-2018-0001, August 21, 2020, p. 284.

Bureau has ordered PREPA not to move forward with implementation of this initiative beyond $5 million for preliminary studies.[15]

The Scenarios Allow for the Retirement of the AES Coal Plant and Varying Amounts of Oil and Natural Gas Capacity

In the modeled scenarios, increasing amounts of distributed renewable energy displace the current fossil-based generation and allow for the retirement of existing units. Telos used a weighted ranking – that included age, cost, emissions, flexibility, forced outage rate, and location – to prioritize units for retirement.

The 25% DER scenario allows for the retirement of the AES coal plant and Palo Seco units 3 & 4.[16] If pursued starting in 2021, this scenario can be attained by 2024. The 50% DER scenario allows for the additional retirement of the Aguirre steam units 1 & 2. And the 75% DER scenario allows for the additional retirement of the Aguirre combined cycle plant, for a total of 2,306 MW of conventional generation retired. This is shown in the following table:

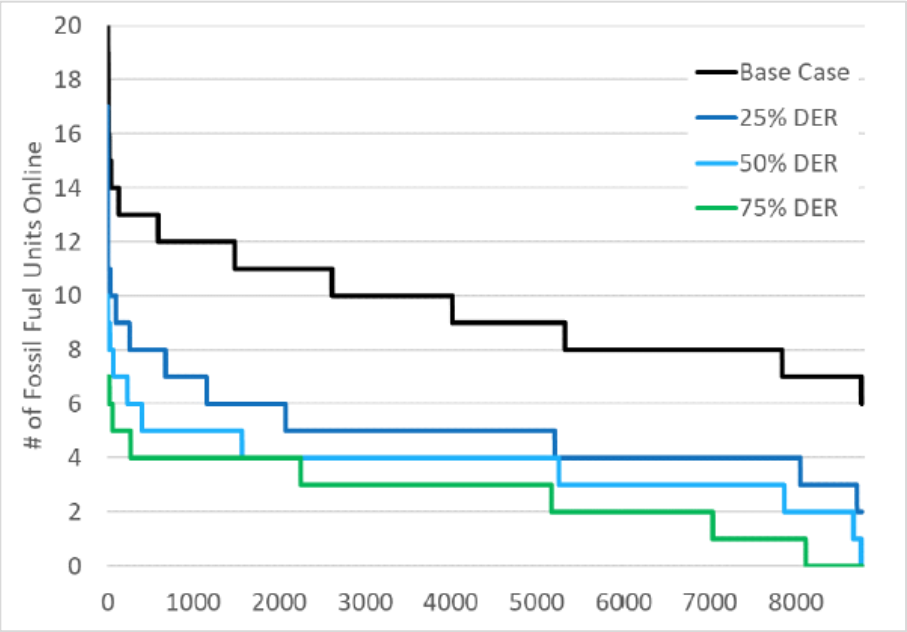
Table 2: Unit Retirements Under Distributed Renewable Energy Scenarios[17]

Case	Units Retired	Incremental Capacity (MW)	Cumulative Capacity (MW)
Base Case	Not Applicable	0	0
25% DER	AES 1 & 2 and Palo Seco Steam 3 & 4	886	886
50% DER	Aguirre Steam 1 & 2	900	1,786
75% DER	Aguirre CC 1 & 2	520	2,306

It is worth noting that in the 75% DER scenario, the majority of the fossil generation units remaining on the system are rarely, if ever, used. As shown in the following figure, a maximum of 7 fossil generating units (out of a current total of 39) are generating power during the 75% DER scenario. A more detailed resource adequacy analysis could likely identify additional units that could be retired.

[15] PREPA, "Response to Resolution and Order Entered on January 25, 2021 and Request for Approval of Revised 10-Year Infrastructure Plan," Puerto Rico Energy Bureau Case No. NEPR-MI-2021-0002, February 16, 2021.
[16] Retirement of AES modeled follows substitution of its generation capacity with roof-top solar and PV. However, Queremos Sol's demand for immediate retirement of AES can also be attained through other operational modifications.
[17] Telos report, Table 2

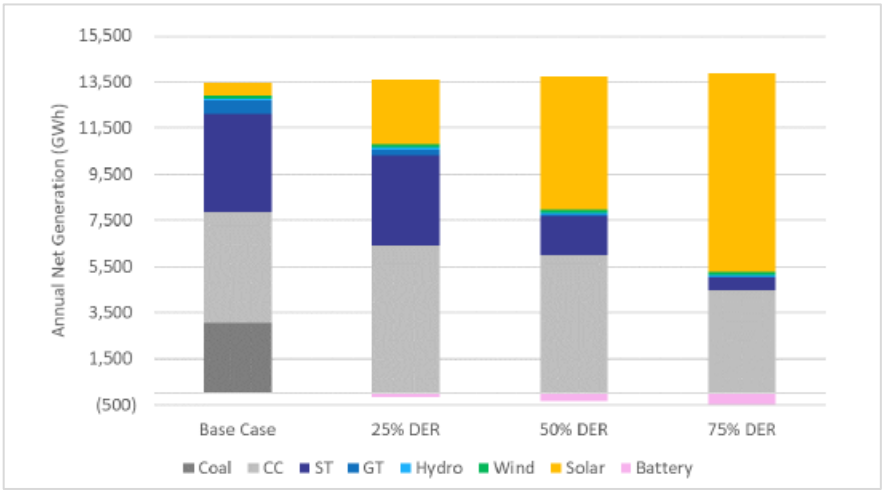
Figure 1: Number of Fossil Fuel Units Generating Power Per Hour of the Year in 2035[18]



Decreased reliance on PREPA's unreliable power plants, which are a frequent cause of power outages, also provides a reliability benefit for the distributed energy scenarios.

Figure 2 shows Puerto Rico's energy generation mix under the modeled scenarios. There is no coal generation in any of the DER scenarios since the AES coal plant is retired. The natural gas- and oil-fired units (blue and light grey bars) initially increase to compensate for some of the lost coal generation, but are ultimately partially displaced by solar. In the 75% DER scenario, both oil and natural gas consumption have declined by more than 50% relative to the current grid. The San Juan 5 and 6 units were modeled as operating with fuel oil in 2035.

Figure 2: Electricity Generation by Fuel Type in 2035[19]



[18] Telos report, Figure 30
[19] Telos report, Figure 15.

The amount of renewable energy resources built out in the 75% DER scenario is comparable to the S3S2B scenario in PREPA's IRP, which was the most aggressive renewable energy scenario that PREPA analyzed for implementation over a 20-year period. The 75% DER scenario achieves 8,802 GWh of renewable energy generation, over half of which is from residential rooftop installations.[20] The S3S2B scenario presented by PREPA achieves 7,613 GWh of utility-scale renewable energy and 1,508 GWh of residential rooftop solar by 2035.[21] The key difference is that the 75% DER scenario is based on distributed resources rather than utility-scale solar generation and therefore provides a much greater level of household-level resiliency and reduced dependency on transmission.

The Modeled Scenarios Cut Puerto Rico's Imported Fuel Bill by Close to $600 Million per Year

As a result of the decreased reliance on fossil fuels, Puerto Rico is able to dramatically decrease its bill for imported fossil fuels (i.e. all fossil fuels) across the modeled scenarios. Table 3 shows total operating costs (not including capital costs) for the fossil fuel units across all of the scenarios. Using modeled 2035 fuel prices from PREPA's integrated resource plan, the distributed energy scenarios save close to $600 million in fuel costs in 2035 relative to Puerto Rico's current grid. The 75% renewable energy by 2035 scenario would cut imported fossil fuel costs to $432 million/year (relative to recent expenditures over $1.4 billion/year)

Table 3: Costs of Operating Fossil Fuel Units in Each Scenario[22]

Case	Base	25% DER	50% DER	75% DER
Fuel Costs	$1,003	$926	$677	$432
Fixed O&M + Cap. Maint.	$255	$198	$151	$130
Variable O&M	$59	$32	$21	$13
Startup Costs	$24	$31	$34	$28
Total Costs	**$1,341**	**$1,188**	**$883**	**$603**

Distributed Energy Scenarios Both Reduce Puerto Rico's Contribution to Climate Change and Enhance Resilience to Future Storms

By 2035, the 75% DER scenario results in a 70% reduction in carbon dioxide emissions relative to the base case from 8.9 million tons per year to 2.6 million tons per year. [23] This is a direct result of reduced consumption of fossil fuels.

At the same time as the much greater reliance on distributed renewable energy reduces Puerto Rico's contribution to climate change, it also greatly enhances household resiliency to more severe storms. In the 75% DER scenario, all households have a 2.7 kW rooftop solar system with

[20] See Table 17 of Telos report.
[21] PREPA IRP workpaper "S3S2B_Metrics_Base_SII" filed with the Puerto Rico Energy Bureau in Case No. CEPR-AP-2018-0001.
[22] EFG Report, Table 12.
[23] Telos report, p. 38.

12.6 kWh battery storage to serve critical loads, providing continued access to electricity even if the transmission system is severely damaged by a hurricane.

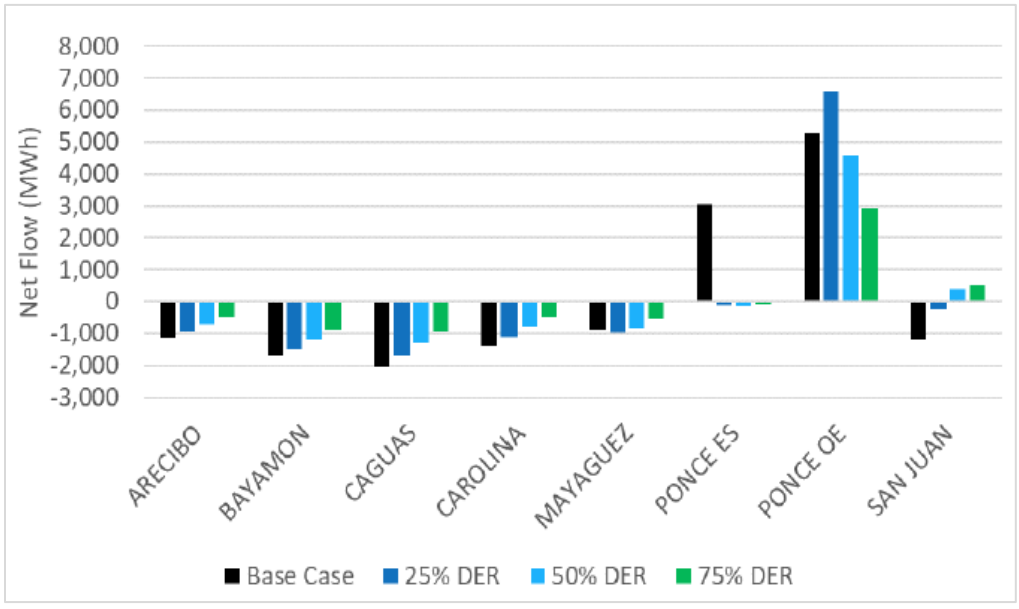
The strategy pursued by Queremos Sol and modeled here would place Puerto Rico at the forefront of worldwide climate change mitigation objectives while adopting a cost-effecting approach to much needed adaptation, in order to reduce vulnerabilities.

Increased Reliance on Distributed Renewable Energy Dramatically Reduces Reliance on South-To-North Transmission

One of the vulnerabilities of Puerto Rico's current grid configuration, which was dramatically exposed by hurricane Maria, is its over-reliance on south-to-north transmission because the majority of the power plants are located in the south and the main population center (the San Juan metropolitan area) is in the north. This is shown in Figure 3, where the black bars (the current grid configuration) show large net power flows out of the two Ponce transmission zones located along the south coast.

In the modeled scenarios, solar is distributed evenly across the island's eight transmission zones, roughly proportional to population within each zone. As a result of the location of more power generation in the north, power imports decline across all of the northern transmission zones (Arecibo, Bayamon, Carolina, and San Juan). Power export declines dramatically out of the eastern Ponce zone ("PONCE ES") because of the retirement of the AES coal plant in all DER scenarios. Power export actually increases out of the western Ponce zone ("PONCE OE") to compensate for the AES retirement in the 25% DER scenario, but then power exports decrease as more distributed solar is integrated to the grid.[24]

Figure 3: Net Annual Flow of Power Out of Each Transmission Zone[25]



[24] Telos report, pp. 40-41.
[25] Telos report, Figure 22.

Energy Efficiency Programs Can Be Scaled to Meet 25% of Puerto Rico's Demand by 2035

Energy Futures Group identified several areas where energy efficiency programs could be scaled to meet the goal of meeting 25% of projected 2035 electricity demand through energy efficiency. However, EFG's projection of 2035 sales does not depend entirely on specific energy efficiency programs. Efficiency gains are a combination of: natural energy efficiency (savings that occur without additional policy intervention through the tightening of appliance energy efficiency standards); energy efficiency programs administered by the utility; and the conversion of 70% of residential electric water heaters to solar water heaters.[26] Utility-sponsored energy efficiency programs include incentive programs to improve the efficiency of residential lighting, residential air conditioning, commercial lighting, commercial refrigeration, commercial lighting controls and more.[27]

Operational Changes to Achieving 75% Renewable Energy Grid by 2035 Can Be Addressed

One of the critical results of the Telos study is that achieving high levels of distributed renewable energy penetration (75%) on the Puerto Rican grid is technically feasible by 2035. Solar is different from traditional power plant generation in that it is only available when the sun is shining. The addition of batteries allows solar power to be stored for use to meet electricity demand at other times. But even so, solar plus battery storage at high levels of penetration changes grid operations. The Telos study explored these changes at length, modeling how a grid with increasing amounts of distributed renewable energy would respond to different disruptive events like a generator outage or a transmission line fault. The study identified mitigation options, including introducing Fast Frequency Response (FFR), synchronous condensers, and grid forming inverters, to result in a reliable grid with 75% renewable energy penetration by 2035.

Little Investment in the Distribution System Is Required to Achieve High Levels of Renewable Energy Penetration; No Investment Required in Transmission

The EE Plus study modeled 89% of the distribution system including Vieques and Culebra. It identified distribution feeder lines that would need to be rebuilt or reconductored in order to avoid overheating of lines and equipment, and to maintain voltages within the needed range, in the distribution system as a result of integrating renewable energy generation at the distribution level. In the 75% DER penetration scenario, this analysis found that 4,504 miles of distribution lines would need to be reconductored or rebuilt (about 14% of the total line-miles

[26] EFG Report, p. 7-8.

[27] The baseline load forecast assumed for modeling is slightly higher than what PREPA assumed in its integrated resource plan. This modeling assumed, before accounting for energy efficiency, 0% growth in sales by 2035, whereas the IRP modeled a 4% decline in sales by 2038. (Puerto Rico Energy Bureau, Final Resolution and Order, Case No. CEPR-AP-2018-0001, August 21, 2020, p. 47).

of Puerto Rico's distribution system), and 149 MVA of transformers upgraded.[28] The cost of these upgrades are estimated in Table 4.

Table 4: Cost of Distribution System Upgrades in 75% DER Scenario[29]

Scenario	Transformer Upgrade Cost	Line Reconductor Cost	Line Rebuild Cost	Total Cost
Base	$0	$41,141,424	$243,592,659	$284,734,084
25% DER	$0	$77,545,581	$455,887,200	$533,432,781
50% DER	$2,410,800	$76,269,071	$516,119,531	$594,799,403
75% DER	$7,330,800	$97,837,352	$546,739,997	$651,908,149

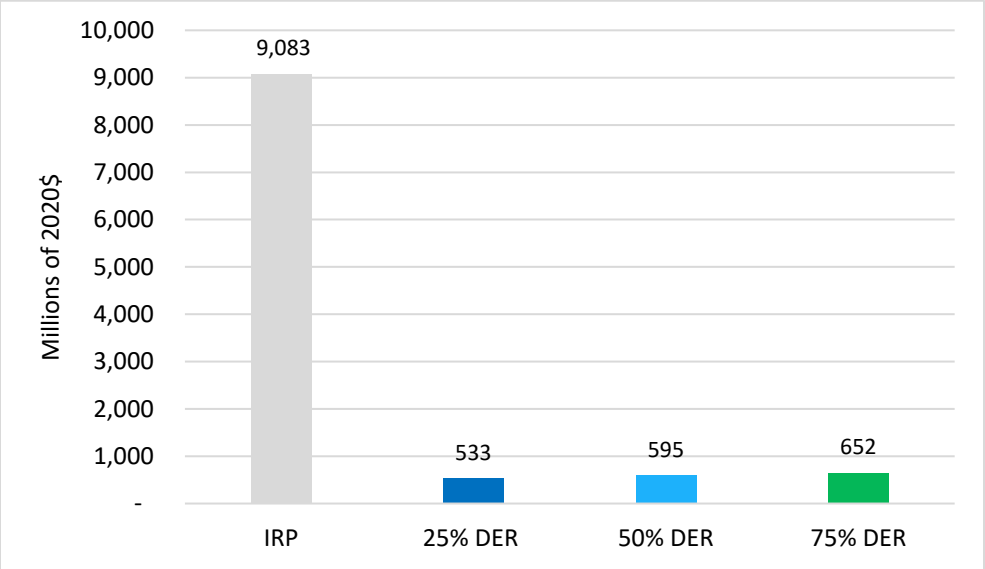
Two factors contribute to the relatively low level of distribution system improvements needed to integrate this high level of distributed generation. One is the fact that highly distributed, rooftop systems allow for a large amount of generation to be consumed on site, minimizing use of the distribution system. The second is the coordinated deployment of rooftop solar with battery storage, which helps to minimize impact on system voltage.[30]

No additional upgrades to the transmission system were identified in the Telos study for integration of renewables.

These levels of transmission and distribution system investment are much lower than proposed by PREPA in its most recent integrated resource plan. PREPA's IRP devoted more than $5 billion to its minigrid concept. Beyond this, the IRP included over $3 billion for hardening of existing infrastructure and bringing it up to standards. Because we lacked data on the current condition of distribution system assets, the EE Plus study does not include costs to bring this infrastructure up to standard. It may be that at least some of the $3+ billion in upgrades and urgent improvements of existing transmission and distribution system infrastructure are needed. Even with such costs included, transmission and distribution system capital investments would still be over $5 billion less than proposed by PREPA in its IRP.

[28] EE Plus report, p. 22.
[29] EFG report, Table 10.
[30] EE Plus report, p. 5.

Figure 4: Total Transmission & Distribution System Capital Costs[31]



Investment in Solar and Storage Required to Achieve High Penetrations of Distribution Renewable Energy Is Comparable To Generation System Investment Proposed by PREPA for a Centralized System

Even though the high distributed energy scenarios require significant capital investment in PV and battery storage technologies, total capital costs in those scenarios are still comparable with capital investment in new generation proposed by PREPA in its IRP. Figure 4 compares the total amount of generation system capital investment in each DER scenario to PREPA's preferred scenario in its IRP. Note that PREPA's IRP did not include the cost of the 848 MW of distributed solar that it assumed customers would install; adding that cost would raise the cost of the IRP scenario by roughly $1 billion to over $7.5 billion.

On the other hand, as mentioned earlier there is a dramatic difference in investment proposed for distribution and transmission by PREPA and the investment required in the 75% scenario. When adding all components (generation, transmission & distribution), Figure 6 shows that even the 75% scenario of distributed renewable generation is over $5 billion less than PREPA's preferred IRP scenario.

[31] EFG Report, Figure 14.

Figure 5: Total Generation System Capital Costs, 2020-2035[32]

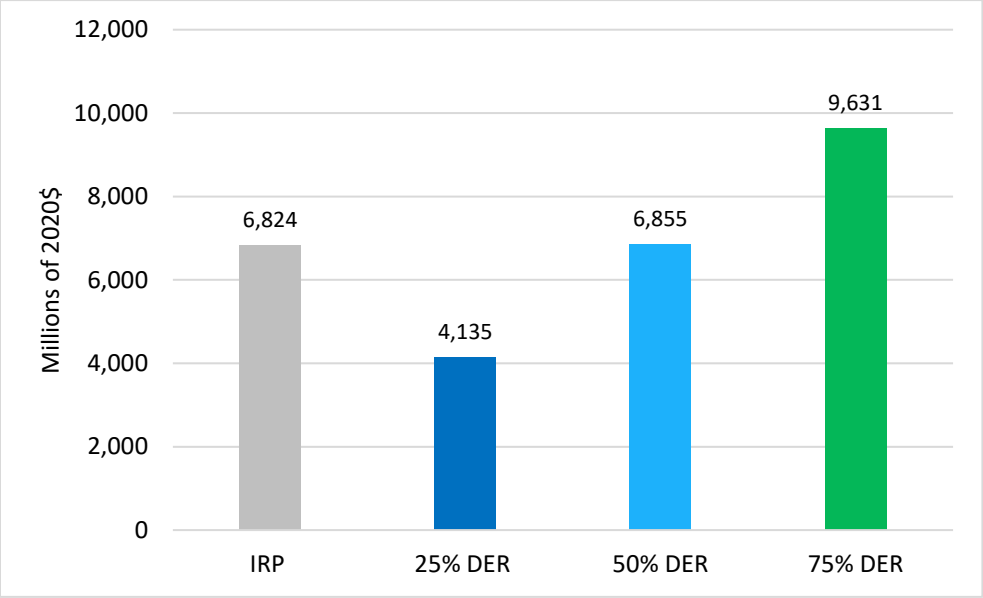
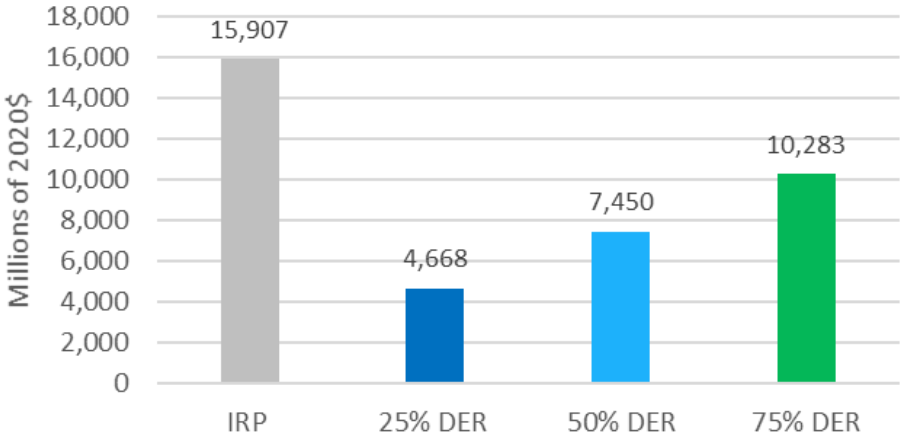


Figure 6: Total Capital Costs[33]



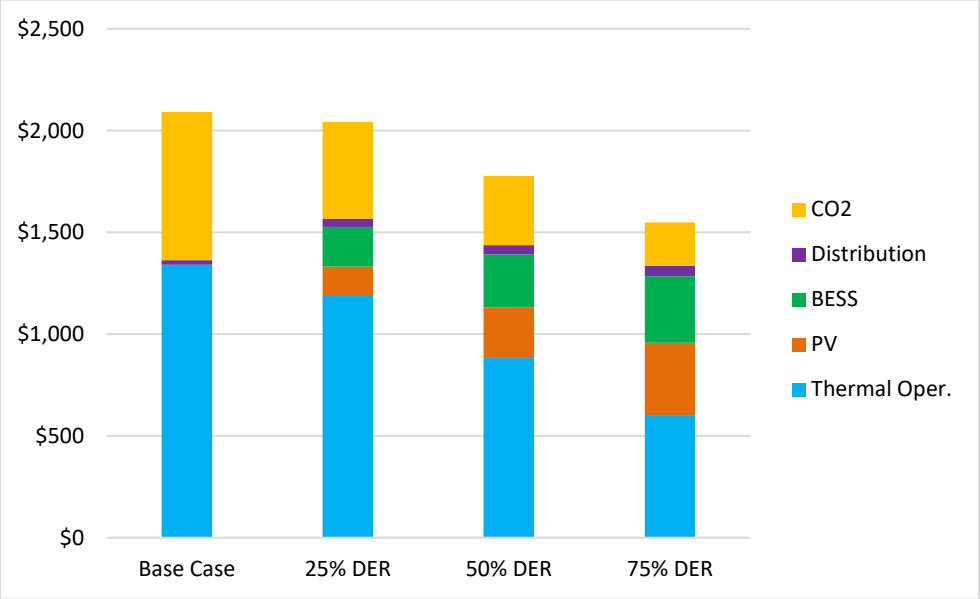
Overall 2035 Costs Are Lower in the 75% DER Scenario

Figure 7 shows the total costs of the scenarios in 2035, including both operational costs and the annualized cost of solar and battery storage systems. The base case includes no capital costs for

[32] Source: EFG Report, Figure 12.
[33] Fuente, Informe EFG

new generation which represents a conservative approach. Capital costs are modeled assuming a 6.5% cost of capital, an estimate that assumes that PREPA is responsible for financing of solar and battery storage systems.[34] The figure also includes a carbon cost to take into account the climate change damage caused by burning fossil fuels. Including carbon costs, all of the DER scenarios are progressively less expensive than the base case. Even without the carbon cost, and without capital costs for new generation in the base case, the 75% DER cost scenario is slightly less expensive than the base case, as increasing capital costs are balanced by declining fuel import costs.

Figure 7: Total System Costs (Millions of 2020$) in 2035[35]



Impact on Electric Rates

To evaluate the affordability of these scenarios, we derived an estimate of the electric rate in each DER scenario in 2035. Generation costs shown in Figure 8 include thermal unit operational costs and the annualized capital costs for PV and storage, assuming that PREPA finances the installation of these systems.[36] Non-generation costs are based on PREPA's certified FY 2021 budget, but excluding costs related to the privatization of the system and to PREPA's bankruptcy process, under the assumptions that PREPA remains a public utility and emerges from bankruptcy well before 2035.[37] The non-generation system costs also include the

[34] PREPA's most recent long-term debt issuances prior to bankruptcy had interest rates in the 5-7% range. EFG modelled financing costs using a value that was conservatively high compared to the interest rates faced by other public power utilities.

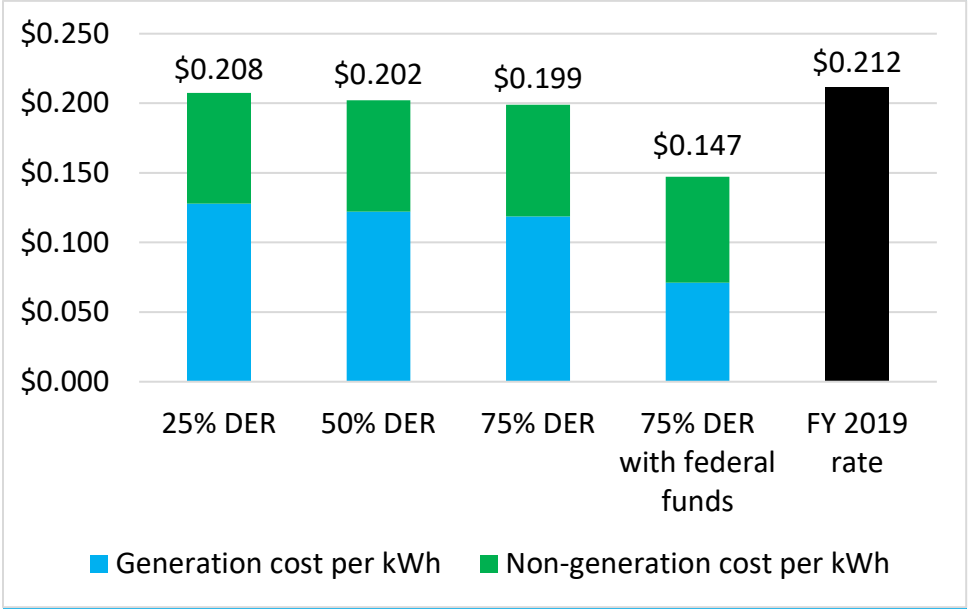
[35] EFG Report, Figure 6.

[36] Our analysis assumes that PREPA customers in 2035 are paying the debt service on prior years' installations. As a sensitivity, we analyzed the impact on rates if PREPA finances these installations at 8.5%, not 6.5%. In that case, the cost of the 75% DER scenario only increases by about 1 cent to 21.1 cents/kWh.

[37] Specifically, our non-generation cost estimate is derived from PREPA's FY 2021 Certified Budget. Labor costs were adjusted based on the ratio of non-generation to total employees. Generation maintenance expenses as well as line

annualized cost of financing the distribution system capital upgrades identified in the EE Plus study. We further include a scenario in which Puerto Rico is able to direct $9 billion in grid reconstruction funding towards distributed energy resources and $650 million to distribution system upgrades to achieve the 75% DER scenario.[38] We arrive at total system costs at or below 20 cents per kWh in the 50% and 75% DER scenarios, and below 15 cents/kWh in the scenario with federal funding. It is worth noting that 20 cents per kWh is the rate set as desirable target in PREPA's Fiscal Plans and defined in the Preamble of Law 17-2019.

Figure 8: Average Costs in 2035 per kWh (in 2020 dollars)



These scenarios compare favorably with recent PREPA rates, shown in the black bar in Figure 7. We emphasize that electric rates in the DER scenarios will be much less subject to fuel price volatility than current rates.

It is worth highlighting that the scenarios evaluated for modeling were never cost-optimized. That is, the scenarios were developed to explore the operation of the Puerto Rico grid at pre-defined high levels of distributed renewable energy penetration, with renewable energy and household resiliency goals in mind. They were not developed to minimize total system cost (and decisions about which units to retire included factors such as emissions rates, age, flexibility and location, in addition to cost). Therefore, it is particularly significant that we find that the high-penetration DER scenarios are affordable, as defined by Law 17-2019.

items for "PREPA Restructuring & Title III," "FOMB Advisor Costs allocated to PREPA", "P3 Authority Transaction Costs" and "T&D Operator Costs" were also excluded. Finally, we included an estimate of energy efficiency program costs based on PREPA's IRP modeling.

[38] This assumption takes into account $1.9 billion in forthcoming HUD funding for grid reconstruction work, an existing allocation of $850 million in FEMA 404 funding for natural gas plants that could be repurposed and the fact that PREPA has proposed to spend $8.4 billion in FEMA 428 funding on its transmission and distribution systems despite only receiving Energy Bureau approval to spend about $2 billion over the next 5 years.

It is also important to note that the non-generation costs in the above figure do not reflect any costs related to PREPA's legacy debt or its underfunded pension liability. The May 2019 PREPA Restructuring Support Agreement would impose a surcharge on electric rates of 2.6 cents/kWh in 2035,[39] which would push rates above 20 cents/kWh in all but the last of the scenarios show in Figure 7, without any provision for PREPA's pension liability.

Finally, we highlight that Figure 8 reflects average cost of the system; no specific ratemaking policy is assumed. The cost of residential and commercial rooftop solar and battery installations will decline over time, and it should be a goal of public policy to ensure that rates for all customers are just and reasonable. This would require decisions about how to allocate subsidies across income levels to ensure an equitable transition in which low-income households are able to participate in energy resiliency solutions.

Achieving the Queremos Sol Scenario

The Queremos Sol high penetration scenario (75% distributed renewable energy by 2035) is the most cost-effective strategy modeled thus far for PREPA to achieve RPS goals, mitigate risks due to grid failure, lower CO_2 emissions and attain reasonable and more stable rates. PREPA's current path will not achieve these goals or the DER scenarios proposed by 2035. PREPA has been ordered by the Energy Bureau to procure a large amount of renewable energy and storage over the next several years (3750 MW of solar by 2023), but the focus is not on rooftop solar systems.

If PREPA were to aim specifically for a higher penetration of distributed renewable energy, it could implement an on-bill financing program in which customers could install solar and battery systems and pay back their investment through their electric bills. PREPA could directly offer the systems to customers, using PREPA employees and a network of local contractors, as needed, to perform the installations. A well-designed program should make use of community partners to market the program to households. If it is a requirement of federal funding that PREPA retain ownership of the systems, PREPA could lease the systems to customers.

It is clear that federal funds present a unique opportunity to lower overall systems costs while implementing DER scenarios modeled. In light of the experience of Hurricane Maria, there is a clear case to be made that siting generation at points of consumption (rather than relying on long-distance transmission) and enabling households to become self-sufficient in energy production will save lives in future severe storms. Significant federal funding is available (around $12 billion)[40], although thus far PREPA has proposed to use those funds towards rebuilding a centralized generation system reliant on fossil fuels.[41] In contrast, $9-$10 billion in federal funding could be deployed towards implementing high DER scenarios that would result

[39] The Restructuring Support Agreement provides for 3.76 cents/kWh in FY 2035, which we have converted to 2020 dollars for consistency with Figure 6.

[40] Including FEMA 404 and 428 funds, and HUD CDBG funds

[41] PREPA currently proposes to spend over $800 million in FEMA 404 funds for a new natural gas plant near San Juan and new peaker generation. PREPA has also proposed to spend $8.4 billion in FEMA 428 funds on upgrades to its transmission and distribution systems.

in real resiliency, e.g. through deployment of rooftop PV and storage to serve critical loads. This level of funding leaves $2-$3 billion of federal funds available to address upgrades that require urgent attention at the transmission and distribution level.

Other jurisdictions provide examples of policies that have successfully achieved higher levels of distributed renewable energy penetration than PREPA is currently seeking to achieve. For example, more than 21% of households in Australia have rooftop solar installations.[42] Initially, feed-in tariffs helped drive the market for rooftop solar, but they have now been phased out. Rebates are still available to cover roughly one-third of upfront costs.[43] High electric rates (above US $0.20/kWh) have helped make rooftop solar an economic choice for households. Hawaii has achieved even higher penetrations of rooftop solar, with one-third of homes on the island of Oahu having rooftop solar.[44] With the highest electric rates in the United States, rooftop solar makes economic sense in Hawaii and has also been driven by supportive policies to compensate homeowners for power exported to the grid.[45]

Additionally, achieving the Queremos Sol scenario also requires significant investment in energy efficiency, which PREPA has already been ordered to do by the Energy Bureau.[46] There are many examples in the United States of ratepayer funded energy efficiency programs to achieve the levels of energy savings described in the EFG study. Such programs offer financial incentives to customers to install more efficient lighting, refrigeration, air conditioning, and other products, as well as solar hot water heaters, to encourage the adoption of efficient technologies. Although such programs cost money and are funded through electric rates, they ultimately save money for all customers because they are cheaper than the cost of investing in new generation. An important first step would be to conduct an energy efficiency potential study to inform the design of cost-effective energy efficiency programs.

Areas for Future Work

The modeling conducted for this study reveals several opportunities for future work:

- The Telos study was conservative in its decisions about which existing power plants could be retired. A more detailed study of resource adequacy would show which additional units would be candidates for retirement or conversion to synchronous condensers.
- Both the Telos and EE Plus studies recommended additional studies and modeling tools to evaluate other options for grid stability at the 75% DER scenario.

[42] Australian Department of Industry, Science, Energy and Resources, "Solar PV and Batteries," https://www.energy.gov.au/households/solar-pv-and-batteries, last accessed January 26, 2021.
[43] Jason Deign, "What the U.S. can learn from Australia's roaring rooftop solar market," Greentech Media, August 3, 2020.
[44] Hawaiian Electric, "2019 saw 21% jump in solar generation capacity," January 17, 2020.
[45] Hawaiian Electric, "Private Rooftop Solar," last accessed January 26, 2021.
[46] The Energy Bureau ordered PREPA to "Support all necessary steps to establish EE programs at 2%/year savings including quick-start programs." (Puerto Rico Energy Bureau, Final Resolution and Order, Case No. CEPR-AP-2018-0001, August 21, 2020, p. 283.)

- A residential appliance saturation study, and a similar study to determine baseline commercial energy consumption, should be undertaken to better understand current energy consumption. This would inform the design of effective energy efficiency programs to achieve the desired savings.[47]
- Additional avenues for future study are outlined in Section 10 of the Telos report.

In addition to technical modeling needs, more work must be done to identify workforce development and training needs and to identify possible sources of federal funding to support worker training. Additional investigation is also needed to develop a plan for recycling of PV and battery systems at the end of their useful lives.

Conclusions

In 2018, Queremos Sol put forth a vision of Puerto Rico's electrical system based on efficiency and decentralized, renewable energy. The modeling summarized in this report has shown that achieving 75% distributed renewable energy in 2035, with 100% of households equipped with solar and battery storage to address critical loads, is both technically and economically feasible. This scenario would result in a grid that is far less dependent on long-distance south-to-north transmission, that does not rely extensively on imported fossil fuels and that does not lock Puerto Rico into new natural gas infrastructure. Achieving this scenario will require a change of course in policy to truly prioritize rooftop solar and storage systems. Puerto Rico has a historic opportunity to use billions of dollars of federal grid reconstruction funding to redesign an electrical grid to promote real resiliency, an opportunity which is unlikely to come again.

[47] EFG report, p. 8.

About the Authors

Ingrid M. Vila-Biaggi

Ingrid M. Vila-Biaggi is co-founder and President of CAMBIO, a non-profit organization based in Puerto Rico that designs, promotes and implements sustainable policies and practices. She has held several government positions, including Chief of Staff for the Commonwealth of Puerto Rico where she oversaw policy development and implementation of over 100 agencies and corporations and served as liaison to the Puerto Rico White House Task Force. She collaborates and coordinates Queremos Sol, an alliance of environmental, labor, community groups and energy experts, aimed at transforming Puerto Rico's energy sector, establishing a 100% clean renewable path. She also works with the Caño Martín Peña communities as Urban Waters Ambassador. Vila-Biaggi is a former Open Society Leadership in Government Fellow and recently joined the Institute for Energy Economics and Financial Analysis' Board. Vila-Biaggi has a bachelor's degree in Civil and Environmental Engineering from Cornell University and a master's degree in Environmental Engineering from Stanford University.

Cathy Kunkel

Cathy Kunkel, an Energy Finance Analyst at the Institute for Energy Economics and Financial Analysis, has written reports and given expert testimony on the finances of Appalachian natural gas pipelines and drilling; electric utility mergers, rates and resource planning; energy efficiency; and Puerto Rico's electrical system. She has degrees in physics from Princeton and Cambridge.

Agustín Alexi Irizarry-Rivera

Agustín Alexi Irizarry-Rivera is a professor in the Electrical and Computer Engineering Department at the University of Puerto Rico Mayagüez. Dr. Irizarry-Rivera conducts research on renewable energy and how to adapt the existing power grid to add more renewable resources to our energy portfolio. He has served as a consultant on renewable energy and energy efficiency projects to Puerto Rico government agencies, municipalities, private developers and consulting firms in and outside Puerto Rico. He is author or coauthor of over 50 refereed publications including two book chapters. Dr. Irizarry-Rivera served as one of the first elected consumer representatives on the Board of Directors of the Puerto Rico Electric Power Authority (PREPA) from 2012 to 2014, including serving as vice-president of the Board. Dr. Irizarry-Rivera obtained his bachelor's degree at the University of Puerto Rico Mayagüez (1988), masters at University of Michigan, Ann Arbor (1990) and Ph.D. at Iowa State University, Ames (1996), all in electrical engineering.

Universidad Interamericana de Puerto Rico
Oficina del Presidente

15 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario
Departamento de la Vivienda
Avenida Barbosa 606
San Juan, P.R. 00923

Estimado secretario Rodríguez Rodríguez:

Reciba de mi parte un saludo cordial. Le escribo para endosar el documento de Justicia Energética con comentarios extensos sobre el propuesto *Action Plan* bajo el programa CDBG-DR sometido por el *Puerto Rico Energy Justice Collaborative*. La Universidad Interamericana de Puerto Rico como institución está comprometida con apoyar e insertarse en el tema de justicia energética para todos los puertorriqueños y puertorriqueñas, y más aún en estos momentos en que Puerto Rico cuenta con los fondos federales para hacer una verdadera transformación de nuestro sistema eléctrico. Es el momento para repensar la manera que todos concebimos que debe generarse la electricidad en el País, considerando que somos una isla que recibe tanta luz solar anualmente y cuenta con las mejores mentes científicas e instituciones educando a los futuros ingenieros e ingenieras eléctricos que pueden reformular cómo generamos, almacenamos y distribuimos energía de una forma justa y accesible.

Indudablemente estamos en un punto crítico de inflexión y debemos tomar todas las medidas a nuestro alcance para construir un sistema eléctrico robusto, pero tomando en cuenta principalmente a los consumidores que cada vez tienen que pagar más cuando su servicio se ve interrumpido con mayor frecuencia. El rol de la academia en este momento debe ser de enlace para compartir información con todos los actores principales para juntos crear un verdadero plan que tenga como meta primordial bajarle el costo de luz a los consumidores, y dejar a un lado la generación de electricidad con métodos que crean tanta contaminación, como lo son el petróleo y el carbón, que al día de hoy siguen siendo los que mayormente utilizamos en Puerto Rico.

Como indica el *Puerto Rico Energy Justice Collaborative* en sus comentarios públicos al *Puerto Rico Electrical Power System Enhancement and Improvements Action Plan* del programa CDBG-DR, este es el momento preciso para repensar cómo el sistema eléctrico del País puede ser una herramienta para erradicar la pobreza y traerles justicia energética a los consumidores. Además, en sus comentarios indican que el Negociado de Energía de Puerto Rico (PREB, por sus siglas en inglés) debe ser parte clave del *Action Plan* para que el mismo cuente con el insumo del regulador creado por la Ley 57-2014, ya que es un ente independiente y especializado que tiene el peritaje necesario para poder ejecutar una verdadera

transformación del sistema eléctrico del País. No solo esa agencia reguladora tiene una visión a larga escala, pensando en un futuro con un sistema más fuerte a nivel de las generatrices de energía, pero pueden contribuir a la creación de un proceso más ágil y sencillo para que prosumidores puedan generar energía en sus propias casas en un periodo de tiempo mucho más corto, así bajando el costo de luz de miles de puertorriqueños y puertorriqueñas. Es claro el mandato de la Ley 17-2019 de incluir al Negociado de Energía como ente regulador y fiscalizador que genera la política pública en el tema de energía de Puerto Rico y su inclusión en el *Action Plan* es imprescindible.

El Decano de Ingeniería del Recinto de Bayamón de la Universidad Interamericana, el Ing. Javier Quintana, quien se ha desempeñado por años en este entorno, y este servidor estamos comprometidos con el desarrollo de programas académicos que investiguen la generación de energía limpia y también con implementar proyectos de energía solar en todos nuestros recintos. Luego del Huracán María, todos aprendimos que nuestro paradigma energético había cambiado, y que teníamos que juntos transformar nuestro sistema de energía para crear un País más resiliente, y como institución estaremos disponibles para seguir concientizando a la ciudadanía mediante nuestros programas académicos, talleres y foros que regularmente tenemos en nuestros recintos. Endosamos todos los comentarios sometidos por *Energy Justice Puerto Rico* sobre el CDBG-DR *Puerto Rico Electrical Power System Enhacement and Improvements Action Plan* y seguiremos colaborando en el futuro con este tema para continuar creando un sistema verdaderamente justo y asequible para todos.

Cordialmente,

Manuel J. Fernós
Presidente

Hon. William O. Rodríguez Rodríguez
Secretary
PR Department of Housing (PRDOH)
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary Rodríguez:

Puerto Rico Energy Justice Collaborative Public Comments on PRDOH Proposed CDBG-DR "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"

I am pleased to submit the "Energy Justice for Puerto Rico Public Comments" on PRDOH Proposed CDBG-DR "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan" (Action Plan) draft, published on November 8, 2021. As it is well known, PRDOH is the recipient and administrator of CDBG funds; as such, it serves as the entity responsible for administering the funds and developing an Action Plan that will be submitted to the U.S. Department of Housing and Urban Development (HUD). PRDOH initiated the process to obtain the approval of the Action Plan. Therefore, the Action Plan was subject to a public hearing and published as a draft. As part of the approval process, PRDOH opened a public comment period as an opportunity for citizens and other stakeholders to actively participate, ensuring that their concerns, recommendations, and points of view are considered on the development of the Action Plan as per HUD regulations.

Energy Justice for Puerto Rico (EJPR) is a local non-profit organization recently organized as an independent entity from Instituto de Competitividad y Sostenibilidad Economica de Puerto Rico (ICSE). As a former program of ICSE, EJPR has accumulated extensive policy development experience and participation in regulatory proceedings in the energy sector. As one of its goals, EJPR seeks to guarantee the optimal use of state and federal funds for Puerto Rico's immediate and long-term energy needs. EJPR has reviewed the proposed Action Plan published by PRDOH.

The proposed Action Plan, as presented for public comments now, has failed to recognize the Puerto Rico Energy Bureau's (PREB) critical role in Puerto Rico's energy sector and does not comply nor aligns with the 2020 Integrated Resource Plan (IRP) and Act 17-2019 goals, the energy public policy of Puerto Rico. Therefore, the Action Plan must be significantly amended to fully comply with the local, legal, regulatory, planning and development framework as required by HUD. Consequently, EJPR submits the "Puerto Rico Energy Justice Collaborative Public Comments" regarding the current Action Plan.

In summary, EJPR comments focuses on the following topline recommendations to prioritize short term solutions:

1. **Compliance with Act 17-2019:** PRDOH must fully engage ad integrate the PREB into the Action Plan.
2. **Focus on Distributed Energy Resources & Lowering Energy Bills:** Support ongoing PREB efforts to advance a regulated electricity market, increasing access to distributed energy resources to underserved and low &-moderated income communities, while assuring compliance with existing public policy and energy efficiency and renewable portfolio mandates 2025 and beyond.

3. **Public Participation Process**: Incorporate PREB stakeholder engagement process, include mechanisms and funding to support public participation and implement a bottom-up planning process.
4. **Leverage the Private Sector:** Incorporate commercial/technical capacity and financial resources and create public-private sub-grantee channels to maximize total program investments and deliver more affordable solutions increasing Public Interest impact.
5. **Expertise & Staff for Effective Program Management:** Ensure that the PRDOH, the DDEC, and PREB have well-coordinated expert consultants, trained staff, and other resources to complete the Action Plan and to administer program guidelines and grants with robust public participation and private sector investment.

EJPR firmly believes that integrating these PREB/Act17-2019 inputs and recommendations will assure the Action Plan further achieves Puerto Rico's immediate and long-term goals for the energy sector while strengthening the roles of the prosumer and the private sector in Puerto Rico's energy transformation to eradicate energy poverty.

EJPR has played a leading role in building working/educational alliances and collaborations with important members of the private sector that supports EJPR institutional mission and work to transform Puerto Rico's energy system. These private sector entities recognizes the importance of optimal use of CDBG-DR funds to transform Puerto Rico's centralized and inefficient grid into a distributed, green resilient, efficient and affordable energy system that will guarantee a sustainable livelihood. Therefore, the following EJPR allies from the private sector had endorsed EJPR "Puerto Rico Energy Justice Collaborative Public Comments" and had prepared endorsement letters that will be submitted as annexes along with our comments:

1. Puerto Rico Manufacturers Association (PRMA)
2. Pontificia Universidad Católica de Puerto Rico (PUCPR)
3. Universidad Interamericana de Puerto Rico (uipr)
4. ESI-Energy
5. Center for a New Economy (CNE)
6. Food Marketing, Industry and Distribution Chamber (MIDA)

The EJPR Movement invites PRDOH to collaborate jointly to align the Action Plan with Act 17 and the PREB which will render a positive outcome for energy consumers and the public interest in line with HUD National Objectives.

_____

Waleska Rivera
President of the Board
Energy Justice for Puerto Rico

Annex, Comments to PRDOH Action Plan

CÁMARA DE MERCADEO, INDUSTRIA Y DISTRIBUCIÓN DE ALIMENTOS

December 20, 2021

Hon. William O. Rodríguez Rodríguez
Secretary of Housing
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary,

I am writing to you as executive vice president of The Food Marketing, Industry and Distribution Chamber (MIDA) and on behalf of its board of directors, in response to the draft Puerto Rico Electrical Power System Enhancement and Improvements Action Plan (the "Plan").

MIDA is a private non-profit organization, composed of over 250 members in the food industry supply chain in Puerto Rico, from agro-industrial production to retail. For our members, as well as for every consumer, the availability of an efficient, resilient and cost-effective energy service is paramount.

Unfortunately, the island's energy market has historically lacked good public governance, well-regulated investment and competitive infrastructure. Potential investors that require affordable and reliable electricity are unconvinced there is a PREPA/LUMA credible plan to lower energy costs that will not be affected by the ongoing fiscal and economic crisis, future natural disasters, or the painstakingly slow, conflicted and costly FEMA/PREPA reconstruction fund management.

For the draft Action Plan to enable affordable, resilient and reliable energy that also brings back competitive business investments to Puerto Rico it must comply with the Public Energy Policy of Puerto Rico. Act 17-2019 and the Puerto Rico Energy Board (PREB) regulations require public participation and programs that leverage much needed distributed energy efficiency and resiliency to both the customers and the overall grid. To achieve a real long-term transformation, Puerto Rico Department of Housing (PRDOH) and HUD must include a public participation process coordinated with ongoing PREB proceedings that brings together the best knowledge and resources of the private sector, with the energy programing and regulatory capacity of local authorities. By complying with established local energy policies and agency programming we can make sure that private sector resources, consultants and trained personnel are included in the development of the Plan for the best use of private and public available funds, for lowering energy costs and improving resiliency for underserved communities in all of Puerto Rico.

Therefore, we concur with the statements of noncompliance of the current draft Plan and the recommendations made on December 15th by the Energy Justice movement for community development and request open public participation in its development process.

We are confident the PRDOH will accept these MIDA and Energy Justice for Puerto Rico (EJPR) recommendations for Plan compliance with our energy policy. The importance and seriousness of these

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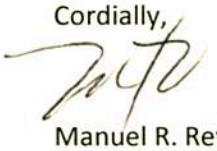
whole-community energy market transformation matters cannot be overlooked given the historic opportunity for HUD and PRDOH to truly build back better.

MIDA is convinced we can build back better with a Plan and guidelines for the short and long-term lowering of cost and disaster mitigation risks, if we allow public participation and properly use the private and government resources. Coherently completing the Plan with guidelines that comply with PREB approved programs is an opportunity to rebuild economic well-being for all with leading environmental and social governance resources that the EJPR and our members can bring to the table.

Cordially,



Manuel R. Reyes Alfonso
Executive VP

24 diciembre de 2021

William O. Rodríguez Rodríguez, Esq.
Secretario
Departamento de Vivienda de Puerto Rico
Plan de Acción de Red de Energía - CDBG (pr.gov)
https://cdbg-dr.pr.gov/iframes/PublicCommentsIFRM.html
CDBG-MIT@vivienda.pr.gov

Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico

Estimado Sr. Rodríguez,

Estos Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico ("Borrador del Plan de Acción") se presentan en nombre de

Según el Borrador del Plan de Acción, la mayoría de los fondos para el sistema eléctrico se asignarían al Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1) con un presupuesto de $ 1,055,811,031 que irían para reconstruir los postes, torres, cables y otros componentes del sistema centralizado de transmisión y distribución de energía eléctrica que conecta las grandes plantas de generación de energía a base de la quema de combustibles fósiles, principalmente ubicadas en el sur de Puerto Rico con las y los abonados. Otros fondos irían al Programa para la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2) al que se le asignarían $ 760,595,149 para proyectos que alegadamente no se prevé que sean financiados por otras fuentes federales o locales.

El Borrador del Plan de Acción adolece de nueve fallas principales;

1.- niega la capacidad de la energía renovable, especialmente sistemas solares ubicados en techos o cercanos al lugar de consumo y los sistemas de almacenamiento de energía (baterías) para proporcionar un servicio eléctrico confiable, resiliente y costo-efectivo y retrasa el uso de estas opciones,

2.- perpetúa el sistema de transmisión y distribución que mantiene la dependencia a largo plazo en las plantas de generación de energía a base de la quema de combustibles fósiles,

3.-incumple con el Plan Integrado de Recursos ("PIR") emitido por el Negociado de Energía,

4.-no aporta significativamente a lograr los mandatos de porcientos de energía renovable establecidos por ley requeridos en el 2022 y 2025,

5.-asume erróneamente que los fondos de FEMA no se pueden utilizar para la energía renovable distribuida (sistemas solares ubicados en techos y baterías),

6.-hecha a perder la oportunidad de lograr la justicia social y ambiental a través del acceso de comunidades de bajos y medianos ingresos a las energía renovable distribuida (sistemas solares ubicados en techos y baterías),

7.-no cumple con las disposiciones ambientales, sobre cambio climático y control de inundaciones,

8.- crea presión para el aumento de las tarifas eléctricas,

9.-es vago, ambiguo e impreciso y no informa al público sobre aspectos claves del plan, lo que niega la participación pública efectiva.

La cantidad histórica de fondos de HUD y FEMA asignados para el sistema eléctrico de Puerto Rico deben invertirse en sistemas solares en techos o cercanos al lugar de consumo y alternativas similares para proveer acceso a la resiliencia energética a los sectores de bajos y medianos ingresos que salvará vidas y aportará para lograr la justicia ambiental y climática. La justicia social requiere que la resiliencia energética no se limite a las personas de altos ingresos que puedan adquirir estos equipos. La viabilidad futura de Puerto Rico depende de que estos fondos se utilicen para el promover el desarrollo económico endógeno.

Wanda J Rios

Asociacion de Residentes La Margarita

info CDBG

From: Anthony Martinez <aprocessforsuccess@gmail.com>
Sent: Tuesday, November 9, 2021 9:54 PM
To: info CDBG

Saludos

1. Necesitamos una junta multi-sectorial con inclinaciones innovadores y del medio ambiente.
2. Evaluar tres (3) países y propuestas aplicables a trópico, con un plan a 20 o 30 años, que todos los partidos se comprometan y cuiden. Convertilo en ley intocable, tal vez creando una "autoridad" (Authority agency) independiente, aunque con cooperación de todos los partidos y sectores.
3. Un país con nuestros retos económico necesita capital. Las familias necesita sustanciales beneficios (grants o subsidios) a la independencia de cada familia de invertir en energía renovable u otra. Eso es capital nuevo para economía, políticamente correcto y valores (moral).
4. Poner economistas y otros que han demostrado valores de servicio al prójimo, como el comunitario.

Anthony Martínez
787.372.2000

info CDBG

From: Candida Lozada <candidalozada88@gmail.com>
Sent: Wednesday, November 10, 2021 9:55 AM
To: info CDBG

Para mi es un proyecto muy bueno en y lo recomiendo

20 de diciembre de 2021

William O. Rodríguez Rodríguez, Esq.
Secretario
Departamento de Vivienda de Puerto Rico
Plan de Acción de Red de Energía - CDBG (pr.gov)
https://cdbg-dr.pr.gov/iframes/PublicCommentsIFRM.html

Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico

Estimado Sr. Rodríguez,

Estos Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico ("Borrador del Plan de Acción") se presentan en nombre de la Alianza Comunitaria Ambiental del Sureste (ACASE).

Según el Borrador del Plan de Acción, la mayoría de los fondos para el sistema eléctrico se asignarían al Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1) con un presupuesto de $ 1,055,811,031 que irían para reconstruir los postes, torres, cables y otros componentes del sistema centralizado de transmisión y distribución de energía eléctrica que conecta las grandes plantas de generación de energía a base de la quema de combustibles fósiles, principalmente ubicadas en el sur de Puerto Rico con las y los abonados. Otros fondos irían al Programa para la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2) al que se le asignarían $ 760,595,149 para proyectos que alegadamente no se prevé que sean financiados por otras fuentes federales o locales.

El Borrador del Plan de Acción adolece de nueve fallas principales; 1.- niega la capacidad de la energía renovable, especialmente sistemas solares ubicados en techos o cercanos al lugar de consumo y los sistemas de almacenamiento de energía (baterías) para proporcionar un servicio eléctrico confiable, resiliente y costo-efectivo y retrasa el uso de estas opciones, 2.- perpetúa el sistema de transmisión y distribución que mantiene la dependencia a largo plazo en las plantas de generación de energía a base de la quema de combustibles fósiles, 3.-incumple con el Plan Integrado de Recursos ("PIR") emitido por el Negociado de Energía, 4.-no aporta significativamente a lograr los mandatos de porcientos de energía renovable establecidos por ley requeridos en el 2022 y 2025, 5.-asume erróneamente que los fondos de FEMA no se pueden utilizar para la energía renovable distribuida (sistemas solares ubicados en techos y baterías), 6.-hecha a perder la oportunidad de lograr la justicia social y ambiental a través del acceso de comunidades de bajos y medianos ingresos a las energía renovable distribuida (sistemas solares ubicados en techos y baterías), 7.-no cumple con las disposiciones ambientales, sobre cambio climático y control de inundaciones, 8.- crea presión para el aumento de las tarifas eléctricas, 9.-es vago, ambiguo e impreciso y no informa al público sobre aspectos claves del plan, lo que niega la participación pública efectiva.

La cantidad histórica de fondos de HUD y FEMA asignados para el sistema eléctrico de Puerto Rico deben invertirse en sistemas solares en techos o cercanos al lugar de consumo y alternativas similares para proveer acceso a la resiliencia energética a los sectores de bajos y medianos ingresos que salvará vidas y aportará para lograr la justicia ambiental y climática. La justicia social requiere que la resiliencia energética no se limite a las personas de altos ingresos que puedan adquirir estos equipos. La viabilidad futura de Puerto Rico depende de que estos fondos se utilicen para el promover el desarrollo económico endógeno.

December 2021

William O. Rodríguez Rodríguez, Esq.

Secretary

Puerto Rico Department of Housing

Comments to the Puerto Rico CDBG-DR Electrical Systems Enhancements & Improvements Action Plan

Dear Mr. Rodriguez,

These Comments to the CDBG-DR Action Plan for the Optimization of the Electricity System ("Draft Action Plan") are presented on behalf of JunteGente, a non-profit organization focused on fostering meetings, conversations and alliances between organizations that fight for social and environmental justice.

According to the Draft Action Plan, most of the funds for the electrical system would be allocated to the Cost Distribution Program for the Rehabilitation and Reconstruction of the Electrical Grid (ER1) with a budget of $ 1,055,811,031 that would go to reconstruct the poles, towers, cables and other components of the centralized electric power transmission and distribution system that connects the large power generation plants based on the burning of fossil fuels, mainly located in the south of Puerto Rico with the subscribers. Other funds would go to the Electric Power Reliability and Resilience Program (ER2) to which $ 760,595,149 would be allocated for projects allegedly not anticipated to be funded by other federal or local sources.

The Draft Action Plan suffers from nine main flaws:

1.- denies the capacity of renewable energy, especially solar systems located on roofs or close to the place of consumption and energy storage systems (batteries) to provide a reliable, resilient and cost-effective electrical service and delays the use of these options. It offers no concrete commitment to use

the significant majority of the funds fund renewable energy systems, which are the most resilient, sustainable and socially-just option for Puerto Rico.

2.- perpetuates the transmission and distribution system that maintains long-term dependence on fossil fuel power generation plants. The Plan fails to note that decentralized renewables could provide greater resiliency not only in comparison to T&D systems but also compared to conventional generation. It also fails to recognize the reality of a decreased need of T&D systems in the current context of Puerto Rico.

3.- fails to comply with the Integrated Resource Plan ("IRP" or "PIR" in Spanish) issued by the Energy Bureau , and evades public participation. The IRP mandates deployment of renewable energy including distributed renewable, but the Draft Action Plan instead relies heavily on studies that promote more, new fossil-fired power plant. It also subverts the established PREB regulatory process which establishes that new projects need to be approved by the PIR. This, in turn, hinders citizen participation, which the PIR guarantees in thus approval process.

4.-does not contribute significantly to achieving the mandates of percent of renewable energy established by law required in 2022 and 2025, in the Puerto Rico Public Policy on Energy Diversification by Means of Sustainable and Alternative Renewable Energy Act (Act 82-2010). This law established Puerto Rico's first Renewable Portfolio Standard and required that any retail energy provider procure 12% of its power needs through renewable energy by 2015, 15% by 2020, and 20% by 2035. With the Draft Action Plan, the Government of Puerto Rico is now on route to violate the new legally mandated renewable energy goals. Puerto Rico's commitment, credibility and reputation to transform its electric system would be damaged with the implementation of the Draft Plan.

5.-erroneously assumes that FEMA funds cannot be used for energy distributed renewable (solar systems located on roofs and batteries). FEMA has not approved any of the projects proposed by PREPA, LUMA and PRASA. If "the electrical grid must be rebuilt from the ground up", as argued in the Draft Action Plan, why not take advantage of this opportunity to build power

infrastructure that truly addresses the reliability and resilience needs of Puerto Rico?

6.-misses the opportunity to achieve social and environmental justice through improving access of low and medium income communities to distributed renewable energy (solar systems located on roofs and batteries). It has long been shown that in Puerto Rico, poorer, less white communities –particularly those in the southern region of the island (Salinas, Peñuela, Guayama, Guayanilla)– are the most affected by the pollution from electricity generation. This inequality was magnified in the process of reconnecting electricity after Maria. A recent study (F. Tormos et al. 2021, "Energy inequality in the wake of disasters", Energy Policy) showed the reconnections took longer in communities with lower incomes and higher percentages of non-white populations. These communities could avoid this reconstruction bias through distributed, community-managed renewable systems.

7.- does not comply with environmental regulations, on climate change and flood control. Under NEPA and the Puerto Rico, Environmental Public Policy Act (Act 416), a purpose and need statement must allow for consideration of all reasonable alternatives that fall within the statutory authority for a project with significant impact. The Finding of No Significant Impact ("FONSI") issued by FEMA for electric system work in Puerto Rico contradicts NEPA's requirements, and is contrary to President Biden's Executive Orders on Climate and Environmental Justice. It is clear that the massive undertaking to rebuild of the electrical grid "from the ground up" has a significant impact on electricity generation and consequently emissions of regulated pollutans, and therefore, requires the preparation of an Environmental Impact Statement ("EIS") guided by NEPA and the Puerto Rico. Connecting to fossil-fired plants fails to increase resilience comparable to distributed renewables and does not address the impacts of climate change, on the contrary, worsens such impacts and makes the system more vulnerable to them.

8.- creates pressure to increase electricity rates. The capacity and scale of rebuilding of the T&D system would add to electric rate hikes that have been estimated to surpass .30 cents per kw, a hike which would inflict untold hardship to

the majority of the population This is worsened by the private company LUMA Energy's intention to control all of the FEMA funds and Other Federal Funds, plagued by Conflicts of Interests and Potential Self-Dealing.

9.- it is vague, ambiguous and imprecise and does not inform the public about key aspects of the plan, which negates effective public participation. PRDOH's proposal to adopt the "reliability of the electrical power system in low-and moderate-income areas that are primarily residential" (P.113) fails to define what is the reliability metric (i.e. how much improvement in power reliability qualifies). Neither does it define "innovative generaiton solutions". PRDOH should provide its citizen participation plan for public inspection. There has not been a sufficient consultation of affected local governments in municipalities designated in covered major disaster declaration in determining the uses of funds.

In conclusion, the historical amount of funds from HUD and FEMA allocated for Puerto Rico's electrical system must be invested in solar systems on roofs or near the place of consumption and similar alternatives to provide access to energy resilience to low and middle income sectors that will save lives and will contribute to achieving environmental and climate justice. Social justice requires that energy resilience is not limited to high-income individuals who can purchase this equipment. The future viability of Puerto Rico depends on these funds being used to promote endogenous economic development.

Sincerely

Gustavo Garcia-Lopez, PhD

Secretary, JunteGente

December 23, 2021

Mr. William Rodríguez Rodríguez
Secretary
Puerto Rico Department of Housing
606 Barbosa Avenue
San Juan, PR 00923

Dear Mr. Secretary:

RE: Review and Comments to CDBG-DR Energy System Enhancement Action Plan

The Hato Rey Financial District Redevelopment Corporation (known by its Spanish language acronym "CODEFIN") is a not-for-profit 501(c)3 certified organization founded in 1990 with the mission of promoting, amongst other things, the economic, urban, social, and cultural development of the Hato Rey Financial District. Its membership includes commercial building owners within the District and collaborators like universities, local businesses, residential communities, and other community activist organizations. The community within Hato Rey worked hard to keep Puerto Rico operational to recover after Hurricane María. Therefore, we are interested in sharing comments related to the Community Development Block Grant - Disaster Recovery (CDBG-DR) Energy System Enhancement Action Plan.

Our review and comments to the Action Plan are as follows:

1) The Action Plan should delineate clear, practical, and legal parameters for communities and proponents to recommend projects that can impact areas with diverse attributes; different levels of economic activity, mixed low- and middle-income residential areas, and other elements.
2) A methodology for communities to identify, select and propose their own sustainability goals of their microgrid proposals and how they impact activities and services provided within the proposed area while contributing to the main network's ability to recover.
3) To harmonize the CDBG-DR Action Plan with existing public policies as it appears in the following documents:
    a. The Central Office for Recovery, Reconstruction and Resilience (COR3) "Grid Modernization Plan for Puerto Rico";
    b. The PREPA-commissioned "Transmission & Distribution Roadmap" written by Sargent & Lundy LLC;
    c. The US Department of Energy's Office of Scientific and Technical Information (OSTI) report written by Sandia National Laboratories.

The above documents identify vital elements to appropriately design microgrids to provide our Island's electrical system's resiliency. They objectively quantify the positive impact on community resilience and provide a toolset to measure the social burden imposed on different communities. CODEFIN requests that these three documents become part of the final version of a Plan that bedrocks community-defined energy resiliency initiatives.

Evidently, objective and transparent methods exist to determine project effectiveness and scrutinize their medium- and long-term goals. In contrast, while the CDBG-DR Action Plan does pursue a reformed distributed grid, it lacks an explicit commitment to qualify one or a sum of "microgrids". CODEFIN requests that such commitment be added to the Action Plan, specifically "Ward-sized" microgrid applications that community proponents should easily seek and develop.

CODEFIN, its members, consultants, and our community collaborators remain committed to improve Hato Rey's resiliency and post-disaster capacity to provide continuous, uninterrupted services to the entire Island. The goal is to restore its vibrant, active, socially, and economically diverse environment in which residents, visitors, and businesses thrive and support the Island pre- and post-disaster as it has done so historically.

All improvements and investments made and to be made within the CODEFIN District directly impact the surrounding neighborhoods and are beneficial to Puerto Rico's business and social continuity. Our group is available to discuss these comments with you and/or your CDBG-DR team at your earliest convenience.

Sincerely,

Héctor Santiago Gómez
Executive Director CODEFIN
hsantiagog61@gmail.com
(787) 553-6253

cc. Rafael Delgado: rafaeldelgado43@gmail.com
Néstor Rivera Galguera: nestor.rivera@stesinc.com

Comentarios de la Alianza para el Manejo Sostenible de los Recursos (*AMANESER 2025*) al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico

Persona Contacto: Juan E. Rosario
Director Ejecutivo, 787-462-5088
amaneser2020@gmail.com

A continuación, lo comentarios al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico de la Alianza para el Manejo sostenible de los Recursos (*AMANESER 2025*).

INTRODUCCION

AMANESER 2025 es una organización sin fines de lucro incorporada en el Departamento de Estado de Puerto Rico. Se creo para educar y acompañar comunidades en la implantación de medidas para atender los efectos del Cambio Climático. Además de la energía, *AMANESER 2025* trabaja con modelos sostenibles en materia de residuos sólidos, comunicaciones, manejo del agua, alimentación y planificación estratégica. Lo anterior se hace mediante procesos colaborativos entre los vecinos que aumenta su nivel de autosuficiencia y reduce su dependencia.

AMANESER 2025 se incorporó antes del huracán María. Después de dos décadas de advertir que el cambio climático hacia cada vez más probable que fuéramos impactados por un huracán de categoría mayor, y ver que no se hacía nada, decidimos comenzar a hacer algo junto a las comunidades. Así, después de María cuando el estado desapareció completamente durante meses, con la colaboración de los Ministerios Globales, profesores del Recinto Universitario de Mayagüez y lideres de la comunidad en Veguita Zama en Jayuya, pudimos llevar por primera después electricidad a la comunidad con un pequeño sistema en el centro comunal. Ese sistema ha estado funcionando ininterrumpidamente desde comienzos del 2018 por casi 4 años. Gracias a

ese esfuerzo en estos momentos más del 20% de toda la comunidad tiene seguridad energética de forma segura[1] a un costo que una parte de la comunidad puede pagar.

Ese proceso se ha comenzado en Jayuya, Caguas, Cayey, San Juan, Bayamón, Cidra, Ponce, Aguada y Yabucoa. En estos municipios se han adiestrado grupos comunitarios en lo relacionado con Cambio Climático y Energías Renovables. En todos se ha comenzado el proceso de instalación de sistemas fotovoltaicos fuera de la red (off-grid) para suplir la energía necesaria para atender las cargas críticas.

Desde hace más de dos décadas hemos estado promoviendo la transformación de nuestro sistema eléctrico.

1. Proponemos un sistema distribuido; basado en el uso de fuentes renovables.
2. Todo ciudadano tiene derecho a una cantidad de energía que le permita satisfacer sus necesidades a un precio asequible
3. La transformación debe garantizar que hay una Transición Justa para todos los sectores incluyendo los trabajadores.
4. Todo ciudadano tiene derecho a tener proteger su vida y salud mediante sistemas que puedan suplir suficiente energía para sus cargas críticas[2].

ANALISIS DEL PLAN

El documento contiene mucha información y análisis que sin duda van a incrementar nuestro entendimiento sobre el contexto de Puerto Rico, sobre todo después del huracán María y el papel de las energías renovables en la transición hacia un sistema eléctrico más sostenible y resiliente.

VULNERABILIDAD Y LOS EFECTOS DE MARIA

Esta es probablemente la sección mas completa y acertada del documento. Se reconoce y documenta algunos de los elementos estructurales que causan vulnerabilidad en gran parte de nuestra población. “Las poblaciones socialmente vulnerables tienen menos recursos para

[1] Todos los sistemas son conectados e inspeccionados por un perito electricista que fue enviado a adiestrarse y certificarse en sistemas fotovoltaicos por **AMANECER 2025.**
[2] Esto lo incorporamos al modelo después de María.

ayudar en la preparación ante un desastre, suelen sufrir las peores consecuencias del impacto de un desastre y, como consecuencia, les toma más tiempo recuperarse de un evento desastroso"[3].

Lo anterior lo hemos presenciado en cada comunidad donde trabajamos. En todas hay porciones de la comunidad que su capacidad para prepararse y responder es inconcebiblemente limitada. En este contexto no deberíamos sorprendernos la magnitud de la tragedia que provocó María. "Los huracanes tuvieron un impacto devastador sobre el sistema de energía eléctrica y provocaron el apagón de mayor duración en la historia moderna de los Estados Unidos. La falta de electricidad impidió el acceso de los residentes a servicios de salud, comunicaciones, refrigeración, agua, sistemas de ventilación y aire acondicionado, y seguridad"[4].

Al efecto inmediato siguieron otros que duraron durante meses, en algunos casos un año, sumieron a parte de nuestra población mas vulnerable en una incesante incertidumbre. Esto provocó un estado de depresión que se generalizó en esa población socialmente marginada. "La falta de energía eléctrica tuvo un impacto directo sobre la salud de la población puertorriqueña. Más allá del impacto sobre las condiciones de salud física, tanto el paso del huracán como la ausencia de energía eléctrica a largo plazo tuvieron un impacto profundo en la salud mental de la población"[5].

El documento del Plan reconoce también que esos efectos no han cesado. "Han pasado más de cuatro (4) años desde que los Huracanes Irma y María azotaron a Puerto Rico en septiembre de 2017. Sin embargo, el impacto de estos huracanes sobre la red eléctrica sigue muy presente en el diario vivir de los residentes en la Isla"[6].

Hemos presenciado eso durante los últimos años, pero la situación se intensificó este año con la llegada de LUMA. "Las interrupciones en el servicio de energía eléctrica son comunes e impredecibles, los costos de la electricidad continúan en aumento y los relevos de carga debido a la falta de generación suficiente han sido frecuentes. Ante una inseguridad sistémica sostenida, los residentes siguen enfrentando muchos de los mismos

[3] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo., pág. 51

[4] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo, pág. 1

[5] Ibid., pág. 43

[6] Ibid., Resumen Ejecutivo, pág. 1

impactos, se ha dificultado la recuperación económica y el ciclo de recuperación no puede ser completado"[7]. Afortunadamente sabíamos que esa transición iba a ser accidentada y rediseñamos nuestros procesos y sistemas.

De todos los efectos el más dramático fue que hubo miles de muertes por la falta de electricidad. "Debido a la avería eléctrica y la dependencia del combustible, la salud y los servicios médicos estuvieron en riesgo y, como consecuencia, se perdieron miles de vidas durante el transcurso del prolongado desastre"[8].

CONCLUSIONES

El estudio elaborado por profesores del Recinto de Mayagüez[9] y citado en el documento establece claramente varias cosas. Primero una tercera parte de las horas/clientes sin electricidad después de María se debieron a "los últimos 200,000 clientes que fueron reconectados a la red desde el día 156 hasta el día 329 después del huracán" y segundo, estos residían en áreas remotas. Por eso plantea que: "Tomando en cuenta la **fase de transición** que atraviesa la industria de la energía eléctrica en Puerto Rico, es fundamental que se dé prioridad a los intereses de los clientes que residen en las comunidades remotas al considerar sistemas resilientes de energía distribuida". De igual forma, el estudio propone que "[e]l contexto remoto **requiere de soluciones energéticas descentralizadas, operadas principalmente por sistemas solares fotovoltaicos con baterías (PV+B) en los hogares** (énfasis suplido***)"[10].***

La cantidad de residente viviendo en comunidades vulnerables son mucho más que el casi 20% que se desprende de los que fueron reconectados después de 5 meses. No todos estos residentes vivían en comunidades remotas. Todo el mundo conoce en Puerto Rico lo que son los famosos bolsillos, sectores a los que el sistema es incapaz de darle energía a pesar de que todos los demás vecinos ya la tienen. Además, las personas que serán más afectadas por el próximo huracán no tienen que ser las mismas que afectó María. Gran parte de los efectos dependerá de la trayectoria del huracán, cosa que no podemos predecir en estos

[7] Ibid., Resumen Ejecutivo, pág. 1
[8] Ibid., pág. 44
[9] Castro-Sitiriche, M., Cintrón-Sotomayor, Y. y Gómez-Torres, J. (2018)., *"The Longest Power Blackout in History and Energy Poverty", Proc. 8th Int. Conf. Appropriate Technology*

[10] Plan Ibid., Pág 56, citando estudio de Castro-Sitiriche et al.

momentos. Así que, probablemente el numero de viviendas que deben ser considerados vulnerables desde el punto de vista energético, y que requieran las soluciones que plantean los profesores de Mayagüez, podría ser hasta el doble de las que se mencionan en el estudio.

La prioridad por ende del uso de estos fondos debería ser la de lograr la seguridad energética, lo más rápido posible para entre 300 a 400 mil residencias en todo Puerto Rico. Esto es entre 20% y 30% de todos los abonados de la Autoridad de Energía Eléctrica.

Es evidente de que esto no puede ser logrado con los fondos que FEMA ha asignado en los programas que el documento del Plan sugiere que sean usados por los ciudadanos para encausar su necesidad de seguridad energética. Además de que muchos de los residentes no cualificarían para esos fondos estos son claramente insuficientes.

No hay una agencia en el gobierno de Puerto Rico que deba tener un mayor interés en lograr la seguridad energética de los ciudadanos mas vulnerables, de manera rápida, de forma autogestionada reduciendo la dependencia y a un costo asequible que el Departamento de la Vivienda. No conocemos ningún otro modelo en Puerto Rico que esté haciendo eso al costo con que lo estamos haciendo.

RECOMENDACIONES

1. Que se usen los fondos para promover la seguridad energética para las comunidades vulnerables, determinadas por:
    a. Su condición económica, (bajos y medianos recursos)
    b. el tiempo que tardaron en reconectarse a la red después del huracán María
    c. cualquier otro criterio objetivo de vulnerabilidad comunitaria.
2. Para ello solicitamos que se separen por lo menos el 50% de los fondos del ER2 para proyectos de autogestión comunitaria como los que planteamos. Con esto se podría dar seguridad energética a cerca del 33% de las personas que estuvieron sin energía más de 5 meses después de María.
3. Se reduzca el costo mínimo de cada proyecto a $250,000. La cantidad actual de 10 millones excluye prácticamente a todos los grupos comunitarios bonafide.

4. Los modelos a implantarse deben proveer dicha seguridad en un periodo breve de tiempo. Los procesos de identificar, reclutar, adiestrar a los residentes hasta que los sistemas se monten deben transcurrir en el mismo año.
5. Los modelos deben ser:
    a. Simples de manera que permitan una participación significativa de los mismos residentes en su implantación
    b. Reproducibles de manera que puedan ser implantados en muchos lugares con variaciones mínimas
    c. Escalables de manera que se puedan montar por etapas y aumentar su escala de una manera orgánica. El sistema que se monte en la primera etapa para proveer seguridad energética inmediata debe aumentar la resiliencia de la red y ser compatible con la creación posterior de microredes o sistemas conectados a la red.
6. Se incluya como proyectos elegibles los proyectos en donde colectivamente grupos comunitarios, entidades sin fines de lucro y municipios (o alianzas entre estos) generen instalaciones distribuidas en los techos de las residencias tal y como está definido en el Reglamento de Microredes del Negociado de Energía de Puerto Rico.
7. La estrategia de distribución de fondos debe promover alianzas entre municipios, comunidades y organizaciones que estén llevando a cabo trabajos para proveer seguridad energética a los residentes de manera colaborativa y de forma costo efectiva.

Estos comentarios los sometemos para fortalecer el Plan que el Departamento de la Vivienda ha preparado fortalecer sus posibilidades de servir de instrumento para desarrollar un Puerto Rico, prospero, justo, democrático, sostenible y feliz.

Ing. Jose F. Ortiz
Pasado Presidente de AAA,
Pasado Director Ejecutivo de AEE y
Pasado Presidente de Junta de Directores de AEE
17 de diciembre de 2021

Comentarios al Plan de Acción CDBG-DR

Optimización del Sistema Eléctrico

Con el trasfondo de haber preparado el Plan Fiscal de AEE, el Plan Integrado de Recursos ante el NEPR, el Plan de 10 años de AEE, haber sido parte del los comités para la redacción de las leyes 120 de 2018 y 17 del 2019, la negociación de los fondos de Asistencia Pública (FEMA 428) y participado en reuniones en HUD y el congreso conducentes al mejor uso del fondo CDBG-DR para el Sistema Eléctrico; humildemente someto los siguientes comentarios al Plan de Acción para su mejor sincronía con el cumulo de iniciativas en el sector energético llevándose a cabo en la Isla.

Necesidades No Satisfechas de AEE y LUMA

I. Infraestructura de Medición Avanzada - Proyecto del cual, en gran medida, depende de tener el receptor de la información (subestaciones) en funcionamiento. La gran mayoría de estas (>300) esta en el plan de mejoras y tomara mas de 6 años su total funcionamiento. Recomiendo una partida reducida de $250MM para lo que realmente e puede utilizar en ese período de tiempo.

II. Microredes Vieques y Culebra - Buenos proyectos de resiliencia

III. Cable submarino de Vieques y Culebra - Totalmente innecesario. Los cables hacia Vieques y Culebra fueron probados para conductividad en 2018 con resultados muy positivos. El proyecto para resiliencia de ambas islas es la microred en cada una incluidas en este programa. Las islas cuentan ademas, con generadores de emergencia para operar en su totalidad en caso de que la microred o el cable submarino fallasen.

IV. Reemplazo del Centro de Control Energético - Proyecto fundamental para mejorar el servicio eléctrico

Programa de Distribución de Costos para Rehabilitación y Reconstrucción la Red Eléctrica (ER1)

Con la fecha de cierre del programa en 6 años y un programa de obras capitales de LUMA que solo podrá desarrollar unos $4,000 MM en ese mismo período, recomiendo recortar esta asignación del programa a unos $400 MM. Luego de los 6 años, puede conseguirse el pareo mediante capital privado o emisiones de bonos. Cuando se escogió a LUMA para esta labor, se considero su capacidad de proveer financiamiento a esos fines.

Programa de la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2)

Para establecer el tipo de Microredes alrededor de la Isla debe seguirse el Reglamento de Microredes aprobado en el 2018 por el Negociado de Energia. El mismo contempla los estándares para las Microredes Renovables, CHPs e Híbridas.

Conociendo los costos de construcción y operación y el efecto positivo de conectar estas fuentes estables y baratas a la red, recomendamos que el programa subvencione un sub-recipiente elegible con un promedio de 40% del costo de desarrollo. Eso promoverá apalancamiento privado para extender los servicios a mas comunidades aledañas al proyecto base.

Recomiendo también el aumento a este fondo a un mínimo de $1,000MM dado que representarían la estabilidad distribuida de generacion eléctrica que se busca lograr con la ley 17 de 2019 Sobre Politica Publica Energética. El eliminar varias plantas antiguas como Costa Sur y Aguirre, así como AES antes del 2028 traerán un serio déficit de generación ante la demanda actual sin incluir la demanda a producirse por las políticas agresivas de inserción de vehículos eléctricos.

Esta ley busca que la gente de recursos bajos y modernos puedan tener acceso al servicio eléctrico con un costo aspiracional de 20 centavos por kilovatio hora. Al momento, los costos de la energía renovable con baterías a gran escala, sumados a los costos de transmisión, distribución, servicio de la deuda y aportación a retiro se encontraría cerca de los 30 centavos. Las microredes que puedan extenderse a esos sectores seria la mejor manera de proveer resiliencia económica a

estos sectores de la sociedad. El desarrollo acelerado de tecnologías para accesar el hidrógeno como combustible limpio en unos 3 años, reemplazara al gas natural como medio de combustión renovable. El area metropolitana y los sectores industriales del area este demandan el 70% de la producción eléctrica. Los sistemas de microredes CHPs serian los de menor impacto pues el terreno es escaso. No es asi en el sur y oeste de la Isla donde existe el terreno suficiente para el desarrollo de microredes renovables o híbridas.

23 de diciembre de 2021
William O. Rodríguez Rodríguez, Esq., Secretario
Departamento de Vivienda de PR
Plan de Acción de Red de Energía - CDBG (pr.gov)
https://cdbg-dr.pr.gov/iframes/PublicCommentsIFRM.html

COMENTARIOS AL PLAN DE ACCIÓN CDBG-DR PARA LA OPTIMIZACIÓN DEL SISTEMA ELÉCTRICO

Estimado Sr. Rodríguez:

Los siguinetes Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico ("Borrador del Plan de Acción") se someten en nombre del US Green Building Council, Capítulo de PR a través de su fundador. El Borrador del PLan de Acción debe revisarse para que se atiendan de forma procativa y prioritaria los siguientes asuntos:

1. Lograr una verdadera resiliencia energética para todas las clases sociales de Puerto Rico a través de una asignación para el desarrollo comunitario de la generación distribuida de energía solar. Esto debe hacerse principalmente sobre los techos de viviendas y edificios existentes suplementada con baterias de reserva, limitando las fincas solares sobre suelos bioproductivos.

2. Re asignar los recursos disponibles para que se pueda cumplir con las metas energéticas establecidas por ley para el 2025 y hasta el 2050.

3. Cumplir con los requisitos ambientales, para mitigar el cambio climático.

4. Proponer controles reales y efectivos para evitar el aumento de las tarifas eléctricas

5. Utilizar, como es permisible, los fondos de FEMA para la energía renovable distribuida.

Gracias adelantadas por atender estas peticiones.
Saludos Sostenibles,

Dr. Fernando Abruña, FAIA
Arquitecto y Presidente Fundador USGBC Caribe
abrumus@gmail.com

i) El principio de eficiencia obliga a la correcta asignación y utilización de los recursos de tal forma que se garantice la prestación del servicio al menor costo económico posible		**PROMOCION**	**REGULACION**
ii) En virtud del principio de calidad, el servicio eléctrico debe cumplir con los requisitos técnicos y los estándares de confiabilidad y calidad que se establezcan para él;		**PROMOCION**	**REGULACION**
iii) El principio de continuidad implica que el servicio se deberá prestar aun en casos de quiebra, liquidación, intervención, sustitución o terminación de contratos de las empresas responsables del mismo, sin interrupciones diferentes a las programadas por razones técnicas, fuerza mayor, caso fortuito, o por las sanciones impuestas al consumidor por el incumplimiento de sus obligaciones;			**REGULACION**
iv) El principio de adaptabilidad conduce a la incorporación de los avances de la ciencia y de la tecnología que aporten mayor calidad y eficiencia en la prestación del servicio al menor costo económico;		**PROMOCION**	**REGULACION**
v) El principio de imparcialidad exige, dentro de las mismas condiciones, un tratamiento igual para los consumidores, independientemente de su condición social y poder adquisitivo o de las condiciones y características técnicas de la prestación del servicio;		**PROMOCION**	**REGULACION**
vi) El principio de solidaridad entiende que al diseñar el régimen tarifario se tendrá en cuenta el objetivo de que los precios del servicio eléctrico sean asequibles para todos los consumidores, en especial aquellos de menores ingresos;		**PROMOCION**	**REGULACION**
vii) El principio de equidad promueve que se alcance una cobertura equilibrada y adecuada en los servicios de energía en las diferentes regiones y sectores de la isla, para garantizar la satisfacción de las necesidades básicas de toda la población.		**PROMOCION**	**REGULACION**
ARTICULO 1.5			
1) Acceso Universal al servicio electrico	(a) Garantizar un costo asequible, justo, razonable, y no discriminatorio para todos los consumidores de servicio eléctrico en Puerto Rico		**REGULACION**
	(b) Asegurar al pueblo de Puerto Rico la disponibilidad de abastos e insumos energéticos		**REGULACION**
1) Modelo de Servicio Eléctrico	(a) Promover los cambios necesarios para transformar al Sistema Eléctrico en uno que responda a las necesidades energéticas de Puerto Rico en el Siglo XXI;	**PROMOCION**	
	(b) Velar por la implantación de estrategias para lograr eficiencia en la generación, transmisión y distribución de la energía eléctrica, de manera que se asegure su disponibilidad y su suministro a un costo asequible, justo y razonable;		**REGULACION**
	(f) Diseñar una red eléctrica que contemple el desarrollo e integración de comunidades solares, el trasbordo de energía y la creación de microredes, cooperativas eléctricas o cooperativas de energía, como alternativas y herramientas		**REGULACION**

	para aumentar el acceso a energía renovable, y para contribuir a su resiliencia ante desastres naturales;		
3) Regulador de Energía y Regulación Basada en el Rendimiento	(a) El Negociado de Energía será la entidad independiente encargada de regular el mercado de energía en Puerto Rico.	**PROMOCION**	
4) Cultura Energética, Educación, Investigación y Desarrollo	(a) Fomentar el uso responsable y eficaz de los recursos energéticos en Puerto Rico entre los clientes residenciales, comerciales e industriales;	**PROMOCION**	
	(b) Promover esfuerzos educativos para concientizar a la ciudadanía y los clientes de servicio eléctrico sobre estrategias de eficiencia energética, reducción de consumo, generación distribuida y otras herramientas disponibles para empoderar al consumidor y lograr que este tome mayor control sobre sus hábitos de consumo energético;	**PROMOCION**	
	(c) Reforzar la investigación y el desarrollo de la energía solar, hidroeléctrica, eólica y oceánica, entre otras tecnologías de generación sustentables para maximizar su uso;	**PROMOCION**	
5) Programas de Generación de Energía, Eficiencia y Respuesta a la Demanda	(a) Reducir nuestra dependencia en fuentes de energía derivadas de combustibles fósiles, y desarrollar planes a corto, mediano y largo plazo que permitan establecer una cartera de energía balanceada y óptima basada en el desarrollo de energía renovable	**PROMOCION**	**REGULACION**
	(b) Requerir que las unidades de generación a base de combustibles fósiles, tanto existentes como futuras, tengan la capacidad de operar con al menos dos tipos de combustibles fósiles, de los cuales uno debe ser gas natural, que minimicen las emisiones de gases de efectos de invernadero, y aumenten la capacidad de la red eléctrica para integrar generación distribuida y energía renovable;	**PROMOCION**	**REGULACION**
5) Programas de Generación de Energía, Eficiencia	(a) Reducir nuestra dependencia en fuentes de energía derivadas de combustibles fósiles, y desarrollar planes a corto, mediano y largo plazo que permitan establecer una cartera de energía balanceada y óptima basada en el desarrollo de energía renovable	**PROMOCION**	**REGULACION**

y Respuesta a la Demanda	(b) Requerir que las unidades de generación a base de combustibles fósiles, tanto existentes como futuras, tengan la capacidad de operar con al menos dos tipos de combustibles fósiles, de los cuales uno debe ser gas natural, que minimicen las emisiones de gases de efectos de invernadero, y aumenten la capacidad de la red eléctrica para integrar generación distribuida y energía renovable;	**PROMOCION**	**REGULACION**
	(f) Establecer programas y estrategias de respuesta o manejo de demanda y de eficiencia energética que contemplen metas a corto, mediano y largo plazo e incentiven a los clientes a consumir de manera eficiente con un enfoque que resulte en una reducción de costos, reducción en el consumo eléctrico, mayor estabilidad y confiabilidad;	**PROMOCION**	**REGULACION**
	(b) Reducir agresivamente el uso de combustibles fósiles, minimizar las emisiones de gases de efecto de invernadero y apoyar las iniciativas de Puerto Rico con respecto a la problemática del cambio climático en las vertientes de mitigación, adaptación y resiliencia;	**PROMOCION**	**REGULACION**
	(a) Asegurar la integración de energía renovable al Sistema Eléctrico de forma segura, confiable, a un costo razonable, e identificar las tecnologías y los lugares aptos para viabilizar la integración en atención a los mejores intereses de Puerto Rico,		**REGULACION**
6) Responsabilidad Ambiental	(b) Reducir agresivamente el uso de combustibles fósiles, minimizar las emisiones de gases de efecto de invernadero y apoyar las iniciativas de Puerto Rico con respecto a la problemática del cambio climático en las vertientes de mitigación, adaptación y resiliencia;	**PROMOCION**	**REGULACION**
8) Energía Distribuida, Almacenamiento de Energía e Integración de Tecnología	(a) Asegurar la integración de energía renovable al Sistema Eléctrico de forma segura, confiable, a un costo razonable, e identificar las tecnologías y los lugares aptos para viabilizar la integración en atención a los mejores intereses de Puerto Rico,		**REGULACION**
	(b) La Autoridad y cualquier otra compañía de servicio eléctrico deberán cumplir con las normas de interconexión de generación distribuida y microredes, incluidos los procedimientos acelerados bajo la regulación		**REGULACION**
	(c) Fomentar el desarrollo de microredes, especialmente en instalaciones de servicios indispensables según definido en la Ley 57-2014 y áreas remotas, como mecanismo para promover la resiliencia y la modernización de las redes de distribución.	**PROMOCION**	
	(d) Requerir a cada compañía de servicio la adopción de medidas concretas de seguridad cibernética de manera que puedan prevenir y manejar efectivamente los ataques cibernéticos;		**REGULACION**

	(e) Realizar los estudios correspondientes para establecer los objetivos específicos de almacenamiento de energía que mejor se adapten a las necesidades de Puerto Rico;		**REGULACION**
9) Diseño de la infraestructura, resiliencia, mantenimiento y seguridad	(f) Asegurar la continua mejora de la red eléctrica para promover la resiliencia y la diversificación combinando la capacidad de generación con la demanda por región y facilitando una transición efectiva a nuevas tecnologías y fuentes de energía renovables;		**REGULACION**
	(g) Proporcionar incentivos para la modernización de la red que incorpore tecnología adecuada para cumplir con los objetivos de transformación que no implique costos excesivos;	**PROMOCION**	
10) Servicio al Consumidor, Participación y Transparencia	(a) Garantizar a todo consumidor el derecho a un servicio eléctrico confiable, estable y de excelencia, a precios asequibles, justos y razonables, a una factura transparente y fácil de entender y a una respuesta de servicio rápido;	**PROMOCION**	
	(c) Promover la transparencia y la participación ciudadana en todos los procesos relacionados al servicio de energía en Puerto Rico.	**PROMOCION**	
ARTICULO 1.6 Objetivos Iniciales			
1) Promover la más rápida y efectiva reconstrucción, modernización y actualización del sistema de transmisión y distribución de la red para desarrollar un sistema robusto, flexible que pueda integrar nuevas tecnologías, generación distribuida, fuentes de energía renovable, mecanismos de eficiencia energética y provea a los consumidores alternativas en el sector energético		**PROMOCION**	
2) Promover el uso de centrales eléctricas de menor escala, que tengan la capacidad de operar con múltiples combustibles (“diversified fuel mix”), de los cuales uno debe ser gas natural, que minimicen las emisiones de gases de efectos de invernadero, con tecnología e infraestructura asociada moderna y de alta eficiencia (“high efficiency capacity”), según definido por el Negociado de Energía, y con capacidad para integrar generación distribuida y energía renovable a la red eléctrica.		**PROMOCION**	
3) Eliminar el uso de carbón como fuente de generación de energía no más tarde del 1 de enero de 2028.			**REGULACION**
4) Viabilizar que el consumidor del servicio de energía pueda convertirse en prosumidor mediante programas como medición neta, la adopción de diseños tarifarios que promuevan la generación detrás del contador (“behind-the-meter		**PROMOCION**	

7) Reducir, hasta eventualmente eliminar, el uso de combustibles fósiles para la generación de energía, mediante la integración de energía renovable de forma ordenada y progresiva, garantizando la estabilidad del Sistema Eléctrico mientras se maximizan los recursos de energía renovable a corto, mediano y largo plazo. Para ello, **se establece una Cartera de Energía Renovable con el fin de alcanzar un mínimo de 40% para en o antes del 2025; 60% para en o antes del 2040; y 100% para en o antes del 2050.**	**PROMOCION**	
8) Facilitar la interconexión de generación distribuida a la red eléctrica por cualquier mecanismo disponible, incluyendo, pero sin limitarse a la generación distribuida, fuentes de energía renovable, medición neta y el uso de microredes	**PROMOCION**	
9) Impulsar el uso de tecnología para almacenamiento de energía en todos los niveles de consumidores para facilitar y acelerar la integración de fuentes de energía renovable y capitalizar su capacidad como mecanismo de energía distribuida.		**REGULACION**
10) Promover programas de respuesta a la demanda y eficiencia energética con un calendario definido e incentivos para viabilizar los programas a corto, mediano y largo plazo enfocándose en los beneficios que tales programas proveen a los consumidores y al Sistema Eléctrico.	**PROMOCION**	**REGULACION**
11) Alcanzar una meta de treinta por ciento (30%) de eficiencia energética para el 2040, según lo dispuesto en la Ley 57-2014.		**REGULACION**
14) Robustecer las facultades y funciones del Negociado de Energía de Puerto Rico para viabilizar y ejecutar la implementación de la política pública energética de Puerto Rico concediéndole mayor autonomía presupuestaria, ampliando sus poderes para investigar, incentivar, fiscalizar y penalizar cualquier persona natural o jurídica bajo su jurisdicción.		**REGULACION**
15) Requerir que toda compañía de servicio eléctrico en Puerto Rico cumpla con el Plan Integrado de Recursos aprobado por el Negociado de Energía.		
16) Establecer los elementos necesarios para alcanzar la aspiración del Pueblo de Puerto Rico de contar con un nuevo Sistema Eléctrico con tarifas menores a los veinte centavos por kilovatio/hora (20¢/kWh), y energía limpia, moderna y confiable	**PROMOCION**	**REGULACION**
ARTICULO 1.9 Planificación a largo plazo del Sistema Eléctrico Contenido del Plan Integrado de Recursos	**REGULACION**	

Dicha planificación consistirá de un Plan Integrado de Recursos, de conformidad con lo dispuesto en esta Ley, la Ley 57-2014 y la Ley 83. El Plan Integrado de Recursos será elaborado por la compañía de energía responsable de la operación del Sistema Eléctrico y será aprobado por el Negociado.	**PROMOCION**	**REGULACION**
Término y revisión continua. El Plan Integrado de Recursos contemplará un horizonte de planificación de hasta veinte (20) años. El Plan Integrado de Recursos describirá la combinación de recursos de suministro de energía y de conservación que satisfaga a corto, mediano y largo plazo las necesidades actuales y futuras del sistema energético de Puerto Rico y de sus clientes al menor costo razonable. El Plan Integrado de Recursos deberá ser revisado cada tres (3) años,	**PROMOCION**	**REGULACION**
(F) Una evaluación de la combinación de recursos que se designan para promover diversificación de fuentes de energía; estabilizar los costos energéticos; y mejorar la confiabilidad y estabilidad de la red eléctrica.	**PROMOCION**	**REGULACION**
3) Contenido del Plan Integrado de Recursos		
(A) Una gama de pronósticos de la demanda futura establecidos mediante el uso de métodos que examinen el efecto de las fuerzas económicas en el consumo de electricidad, así como el efecto del uso de los terrenos al amparo del Plan de Uso de Terrenos para Puerto Rico vigente, y de los cambios de dirección, el tipo y la eficiencia de la electricidad y sus usos finales.		**REGULACION**
(F) Una evaluación de la combinación de recursos que se designan para promover diversificación de fuentes de energía; estabilizar los costos energéticos; y mejorar la confiabilidad y estabilidad de la red eléctrica.	**PROMOCION**	**REGULACION**
ARTICULO 1.11 Generación de Energía		**REGULACION**
(a) Generación fósil altamente eficiente y a base de diversos combustibles. Toda planta de generación, de nueva construcción o existente, a la fecha de aprobación de esta Ley, que no sea una que opere exclusivamente con fuentes de energía renovable, deberá tener la capacidad de operar a base de dos (2) o más combustibles, donde uno de estos debe ser gas natural, considerando que a partir de la aprobación de esta Ley, se prohíbe la concesión de nuevos contratos y/o permisos para el establecimiento de plantas de generación de energía a base de carbón, y que ningún permiso o enmienda a contrato existente a la fecha de aprobación de esta Ley podrá autorizar o contemplar la quema de carbón como fuente para la generación de energía a partir del 1 de enero de 2028.	**PROMOCION**	**REGULACION**
(b) Contratos de Compra de Energía Todo contrato de compra de energía o toda enmienda o extensión a un contrato de compra de energía otorgado previo a la aprobación de la Ley 57-2014, entre la Autoridad, o el Contratante de la red de transmisión y distribución, y cualquier productor independiente de energía se	**PROMOCION**	**REGULACION**

otorgará de conformidad con lo establecido en el Artículo 6.32 de la Ley 57-2014 y la reglamentación adoptada por el Negociado al amparo de dicho Artículo.		
(c) Margen de reserva	**PROMOCION**	
(d) Energía Renovable. La Autoridad, o el Contratante de la red de transmisión y distribución, deberá maximizar el uso de energía renovable	**PROMOCION**	**REGULACION**
(e) Generación Distribuida. La generación distribuida contará con acceso abierto y no discriminatorio a las redes de distribución, sujeto a la reglamentación que establezca el Negociado. La Autoridad, o el Contratante de la red de transmisión y distribución, identificarán las maneras más efectivas y económicas de hacer que la infraestructura eléctrica de Puerto Rico sea más distribuida, inteligente, resiliente, confiable, y que se fomente el uso y la integración estratégica de tecnologías y prácticas energéticas sostenibles, de conformidad con la reglamentación del Negociado. En el cumplimiento de este deber, la Autoridad o el Contratante de la red de transmisión y distribución, llevará a cabo la planificación, construcción y actualización de los sistemas de distribución para asegurar el despliegue adecuado y ordenado de recursos de generación distribuida y tecnologías como las microredes.	**PROMOCION**	**REGULACION**
(f) Proyectos de energía renovable:		**REGULACION**
(1) Para facilitar el desarrollo de proyectos de energía renovable y cumplir con la Cartera de Energía Renovable establecida en la Ley 82-2010, según enmendada por esta Ley, todos los permisos, consultas, variaciones, endosos, certificaciones, concesiones y/o autorizaciones para los proyectos de energía renovable, incluyendo, pero sin limitarse a, los trámites relativos al cumplimiento con la Ley 416- 2004, según enmendada, conocida como Ley sobre Política Pública Ambiental, deberán ser tramitados por la Oficina de Gerencia de Permisos y demás agencias concernidas siguiendo los procedimientos expeditos para estados de emergencia establecidos al amparo de la Ley 76-2000, según enmendada, y las órdenes administrativas y reglamentación aplicable a estos casos de las agencias concernidas. El trámite expedito para la tramitación de permisos, consultas, variaciones, endosos, certificaciones, concesiones y/o autorizaciones para los proyectos de energía renovable provisto bajo esta Ley, es sin perjuicio para el proponente de un proyecto de energía renovable, del beneficio del trámite expedito de permisos que pueda obtener mediante la designación de su proyecto como un proyecto crítico a tenor con lo dispuesto en el Artículo V del Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA).		**REGULACION**
(2) La Oficina de Gerencia de Permisos y las agencias concernidas podrán atender solicitudes de permisos, consultas, variaciones, endosos, certificaciones, concesiones y/o autorizaciones para proyectos de energía renovable utilizando los procesos expeditos a los que hace referencia el inciso anterior por un periodo de sesenta (60) meses, contados a partir de la fecha de efectividad de esta Ley.		**REGULACION**
ARTICULO 1.12 Interconexión de Microredes		**REGULACION**

El desarrollo de microredes es un componente esencial para el desarrollo de un sistema confiable, robusto y descentralizado que promueva la resiliencia, integre nueva tecnología, fuentes de energía renovable, evite la pérdida de energía en instalaciones de servicio indispensable y provea alternativas a los consumidores. Para ello es necesario garantizar que los procedimientos de interconexión de microredes al sistema de transmisión y distribución sean expeditos, uniformes en todas sus regiones y efectivos en términos de costo y tiempo de procesamiento para promover el desarrollo de estos proyectos.		**REGULACION**
Un ingeniero colegiado y licenciado deberá certificar que la microred cumple con las especificaciones requeridas por la reglamentación del Negociado para estos proyectos, y que la misma fue completada de acuerdo con las leyes, reglamentos y normas aplicables a la interconexión de microredes del sistema de distribución y transmisión.		**REGULACION**
Los procedimientos de interconexión para microredes deben proveer para que una microred de una capacidad menor de un (1) MW puedan conectarse a la red de distribución, siempre y cuando las características técnicas de la microred a interconectarse y las condiciones de la red eléctrica así lo permitan. Disponiéndose, que para la interconexión de microredes de más de quinientos (500) kilovatios pero menores de un (1) megavatio (MW), se podrán requerir los estudios de confiabilidad necesarios, los cuales deberán realizarse de manera expedita. Además, los procedimientos de interconexión deben proveer para la interconexión de microredes con una capacidad máxima de cinco megavatios (5MW) conectados a voltajes de sub-transmisión o transmisión (38 kV o 115 kV). La interconexión de microredes en exceso de 5MW tendrá que ser aprobadas por el Negociado en un proceso que incluya la participación pública.		**REGULACION**
Los procedimientos de interconexión para microredes deben proveer para que una microred de una capacidad menor de un (1) MW puedan conectarse a la red de distribución, siempre y cuando las características técnicas de la microred a interconectarse y las condiciones de la red eléctrica así lo permitan. Disponiéndose, que para la interconexión de microredes de más de quinientos (500) kilovatios pero menores de un (1) megavatio (MW), se podrán requerir los estudios de confiabilidad necesarios, los cuales deberán realizarse de manera expedita. Además, los procedimientos de interconexión deben proveer para la interconexión de microredes con una capacidad máxima de cinco megavatios (5MW) conectados a voltajes de sub-transmisión o transmisión (38 kV o 115 kV). La interconexión de microredes en exceso de 5MW tendrá que ser aprobadas por el Negociado en un proceso que incluya la participación pública.		**REGULACION**
La Autoridad, su sucesora o el Contratante de la red de transmisión y distribución deberán evaluar la solicitud de interconexión conforme a la reglamentación adoptada para ello de conformidad al Artículo 1.13 de esta Ley. En aquellos casos en que se deniegue la interconexión de la microred o determine que resulta necesario el que se implementen requisitos técnicos adicionales y mejoras al sistema eléctrico de		**REGULACION**

distribución, el solicitante tendrá derecho a cuestionar dicha determinación o hallazgos ante el Negociado, dentro del término de treinta (30) días, contados a partir de la fecha de notificación de la determinación sobre la solicitud de interconexión.		
ARTICULO 1.13 Reglamentación para la Interconexión de Microredes		**REGULACION**
Se ordena a la Autoridad, o al Contratante de la red de transmisión y distribución, a adoptar un reglamento de interconexión de microredes conforme a la política pública de interconexión de microredes establecidas en el Artículo 1.12 de esta Ley. Dicho	**PROMOCION**	**REGULACION**
ARTICULO 1.14 Penalidades incumplimiento con interconexión de generadores distribuidos o microredes: $1,000.00 DIARIOS	**PROMOCION**	**REGULACION**
ARTICULO 1.15 Infraestructura del Sistema Eléctrico		
Infraestructura del Sistema Eléctrico (i) Integrar el uso de microredes como medio para hacer el Sistema Eléctrico más resiliente ante eventos mayores, tales como tormentas y huracanes, permitiendo la continuidad del servicio o un rápido restablecimiento del mismo a instalaciones de servicios indispensables, sectores industriales y áreas remotas para facilitar la integración de generación distribuida, robustecer el sistema y evitar la interdependencia de servicios.	**PROMOCION**	**REGULACION**
Infraestructura del Sistema Eléctrico (j) Evaluar la viabilidad de sustituir la generación existente mediante la integración de activos de generación de menor escala, más flexibles e inteligentes que puedan producir energía más eficientemente, a un costo menor, y que reduzcan y respondan efectivamente a las fallas críticas del sistema.	**PROMOCION**	**REGULACION**
Infraestructura del Sistema Eléctrico (o) Adoptar tecnologías, en coordinación con el Negociado de Energía, que puedan mejorar la estabilidad del sistema, su resiliencia, eficiencia y habilidad para integrar generación distribuida y energía renovable a la red, siempre y cuando la utilización de los recursos redunden en un mayor beneficio público,	**PROMOCION**	**REGULACION**
Infraestructura del Sistema Eléctrico (p) Adoptar tecnologías que mejoren los servicios al cliente, incluyendo y sin limitarse, al uso de contadores inteligentes, acceso a través del internet y minimizar el tiempo de espera necesario para obtener algún servicio de atención al cliente.	**PROMOCION**	**REGULACION**
Artículo 8.1.- Se enmienda la Sección 4030.17 del Capítulo 3 del Subtítulo D de la Ley 1-2011	**PROMOCION**	**REGULACION**
Fideicomiso de Energía Verde. Se autoriza al Secretario del Departamento de Desarrollo Económico y Comercio, actuando como fideicomitente, a otorgar la escritura pública mediante la cual se establecerá un fideicomiso que se conocerá como "Fideicomiso de Energía Verde", con personalidad jurídica independiente, de carácter privado y perpetuo, irrevocable, y con fines no pecuniarios (“el Fideicomiso”). El Corpus del Fideicomiso estará comprendido por los recursos económicos que reciba mediante asignaciones o donaciones de entidades públicas o privadas. El Fideicomiso podrá someter propuestas o	**PROMOCION**	**REGULACION**

subvenciones competitivas a las que el Gobierno de Puerto Rico sea elegible, y según los requisitos de las entidades públicas o privadas que proveerán dichas subvenciones.		
ARTICULO 1.19 Futuro establecimiento de un mercado eléctrico El Negociado de Energía deberá realizar un estudio sobre la viabilidad y conveniencia de establecer en Puerto Rico un mercado eléctrico basado en la libre competencia y presentará un informe con los resultados de dicho estudio ante la Asamblea Legislativa y al Gobernador en o antes del 30 de junio de 2025.	**PROMOCION**	**REGULACION**
TOTAL	**80**	**80**
Eficiencia 8	**13**	**9**
Renovable 3	**10**	**13**
Generación Distribuida 3	**9**	**5**
Fósiles 7	**8**	**7**
Costo 8	**7**	**12**
Microredes 4	**6**	**12**
Resiliencia 3	**4**	**6**
Interconexión 2	**3**	**10**
Diversificación 2	**2**	**3**
	62	**77**

ICSE DE PUERTO RICO | INSTITUTO DE COMPETITIVIDAD Y SOSTENIBILIDAD ECONOMICA

December 22, 2021.

Hon William O. Rodríguez Rodríguez, Secretary
PR Department of Housing (PRDOH)
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary Rodríguez:

ICSE has reviewed the proposed CDBG-DR Action Plan published by PRDOH as required by HUD regulations. The proposed Action Plan, as presented for public comments now, doesn't comply nor aligns with Act 17-2019, the Energy public policy of Puerto Rico. In fact, significant portions of it are contrary to applicable Law.

Therefore, the Action Plan has to be rejected, reformulated and substantially modified in order to comply with said Law. Both, Law 17 2019 and Puerto Rico Energy Bureau (PREB) IRP of August 2020 noncompliance, and the absolute lack of attention to "energy system unmet needs", as per Law 17, solutions to low-income and all consumers needs make the draft action plan incomplete and unacceptable. Only after the full compliance review by PRDOH, and approval by PREB with robust citizen participation, the Action Plan will follow local energy regulation as specifically required by HUD regulations and thus can be approved by HUD.

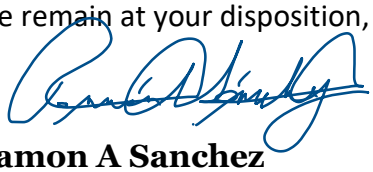
ICSE Fellows and staff, and our Act 17 implementation collaborators are willing and fully prepared to provide assistance and expert advice to PRDOH and the PREB on energy matters, as we have done for six (6) years now in PREB proceedings, US Congress and Puerto Rico Legislature hearings and other public-private efforts to educate and promote prosumer participation in the Puerto Rico energy transformation. As part of this initial comment process, we endorse the Energy Justice for Puerto Rico movement comments to PRDOH, including the support letters from Puerto Rico Manufacturers Association, Universidad Interamericana, Pontificia Universidad Catolica de Ponce, and Centro de Nueva Economía. We understand these very reputable non-governmental organizations understand, as does ICSE, how to participate and pursue a public interest planning and regulation of electrical system improvements that is open and accessible to broad consumer participation, per local public policy.

Our aim is to help educate and promote broad consumer participation and support the principal stakeholder PREB early coordination with PRDOH so that: ongoing PREB processes and PRDOH efforts align the final Action Plan with Act 17 requirements and mandates, IRP dispositions and PREB proceedings thar are underway including broad stakeholders' participation. We propose similar to Energy Justice for P.R. that assignment of the funds plan for improves energy efficiency (EE), behind the meter programs and distributed energy resources (DER's) deployed near the consumer and within the customer side of the system to both lower short term consumer bills and the short- and long-term load and costs of the overall grid.

Through diverse alternatives of funding consumer initiatives, including smart collaboration with local banks, cooperatives and participation of energy services business the CDBG-DR funds will leverage private sector investment and PREB programs EE/DER that deliver solutions across the

island, not just certain specific subsidized community projects PREB may not approve. These programs, PREB approved with optimal private resources leverage we understand best directly combat energy poverty, and the blight of underserved communities and customers who are segregated from obtaining equal access to low cost, affordable electric services in line with HUD National Objectives.

We remain at your disposition,



Ramon A Sanchez
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Annex, Comments to PRDOH Action Plan

Public Comments on PRDOH Draft CDBG-DR
"Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"
December 8, 2021

"Cheap energy should be one of PR's big advantages" Joseph Stiglitz
San Juan CNE Growth Policy Summit, December 3, 2021

PRDOH Action Plan doesn't comply with Act 17-2019 Puerto Rico Energy Policy

The PRDOH proposed Action Plan, as presented for public comments now, doesn't comply nor aligns with Act 17. In fact, it is contrary to applicable Law. Therefore, the Action Plan has to be rejected, reformulated and substantially modified in order to comply with said Law. Both, Law 17 and IRP noncompliance, the absolute lack of attention to "energy system unmet needs", as per Law 17, and lack of attention and solutions to low-income consumers unmet energy needs make the action plan unacceptable. The PR Energy Bureau has specifically rejected electric infrastructure investments which are not Law 17 and IRP compliant. Thus, compliance with Act 17 and the IRP are crucial and unavoidable energy system unmet needs that PRDOH must specify and adopt for the energy system of Puerto Rico.

The Action Plan recommended funding doesn't include references to Act 17, nor IRP compliance as required by federal regulations, thus, the document has to be rejected and thoroughly revised for compliance. The document does not include an analysis proving that it aligns with other planned improvements to other energy systems and other infrastructure development efforts consistent with Act 17 policies, vision and direct mandates.

Act 17 mandates a total transformation of Puerto Rico electric system from its decades old generation fleet and technology, the consequential unacceptable high cost and unreliability, and its environmentally damaging fossil fuel burning consequences towards a clean, renewable based, distributed, efficient, interconnected, and intelligent customer centric electric system. This transformation must result in dramatic and immediate lower electric costs (cheap energy) to the customers which is crucially needed to attract investment, promote, and sustain economic growth for Puerto Rico.

HUD CDBG-DR funds, and any other improvements to PREPA and Puerto Rico's electric system, must be submitted for review and approval by the PR Energy Bureau (PREB) as public interest regulator mandated by Laws 57-2014 and 17-2019.

Specific Action Plan violations of applicable Law and Regulations are: **HUD Regulations [Docket No. FR–6261–N–01] Allocations, Common Application, Waivers… Electrical Power Systems in Puerto Rico …** Section V.A.2.a. rules include dispositions that specifically mandate PRDOH to detail compliance with local energy laws and plans. Selected excerpts follow:

- "**Grantees shall reference any long-term infrastructure plan of the grantee's public utility** …, **or with any utility integrated resource plan or other strategic plan adopted by the grantee for the development of its energy infrastructure…**

- **Each grantee must describe how it will align** its electrical power system improvements with other planned improvements to its other energy systems and its other infrastructure development efforts. …"
- **Grantees must describe in the action plan** whether their programs and projects will provide electrical power system improvements to communities with concentrations of vulnerable populations, …" as well as concentrated areas of poverty, **and specify the activities that the grantees plan to undertake to assist in providing lower electricity rates or increasing reliability, quality, and durability** of electrical infrastructure for these populations..."

Compliance with PREB involves two distinct aspects:

- Energy sector infrastructure investments, programs, activities, and funding are subject to Energy Compliance certification by PREB. This Certification is through a specific proceeding, or,
- Through specific compliance to the Integrated Resources Plan (IRP) presented by PREPA or its agent and approved by PREB modified with citizen input in August of 2020.

ICSE recommends that a throughout compliance review of the Action Plan against Act 17 mandates and requirements must be performed by PRDOH. This review will render two distinct areas of action:

1. Submission of the Action Plan to PREB with a substantial compliance review aligning the reformatted Action Plan with Act 17 mandates and requirements.
2. Submission of the Action Plan funding and activities to compliance review with the approved IRP and a proposal strategy towards the new IRP process to be started by PREB in 2022.

ICSE is prepared and willing to assist PRDOH in the recommended compliance review in both areas of action.

Overview of Act 17/IRP Non-Compliance Findings of Concern[1]

The approved IRP constitutes the comprehensive governance instrument plan for all energy investments and activities within the electric system in PR, and the PREB routinely conducts programmatic processes including hearings for public comments. The PREB has expressed that any federal fund earmarked for the energy system must comply with the approved IRP, or request to modify the same by PREB.

1. The Action Plan must be conformed to Act 117 through PREB by aligning its data compilation, evaluation, analysis, and funding recommendations to current PREB proceedings underway. Proceedings such as new IRP formulation, System optimization, Energy Efficiency, Performance Metrics and others must be addressed in the Action Plan. PRDOH must describe how the proposed funded activities align with Act 17 and the IRP, and, if needed, coordinate with PREB for a specific proceeding to approve Energy Compliance by the Action Plan.

[1] Annex: Table of Act 17 Transformational Mandates (Spanish)

Article 1.5 Section 3) of Act 17-2019 mandates that the PR Energy Bureau (PREB) is the independent regulator entity in charge of the energy market in Puerto Rico. This mandate expressly requires PREB to perform a high scrutiny on electric system maintenance and to require periodic reports as needed. The Action Plan has a direct impact over the electric system performance that requires PREB to review its entire scope and approve its programs, projects, and funding recommendations

2. Table 12 of the Action Plan, Resiliency Projects (Page 72), for a total of $4.5 Bill. including approx. $500 million for intelligent metering project and over $250mill T&D/Generation Vieques/Culebra are not included in the IRP and must be submitted for IRP compliance to PREB. The public review process under PREB may result in substantial reformulation of the funding. Art 1.9 of Act 17-2019 mandates that the long-range planning of the electric system must be made through an Integrated Resources Plan (IRP) submitted by the T&D operator to the PREB. Submission to IRP proceeding of improvement electrical projects in the Action Plan is a requirement by Act 17 and a requirement of federal regulation (see above reference.

3. Table 18, Summary of Program Budget (Page 109), includes $1.0 billion proposed flexible matching fund to match projects in PREPA-FEMA long range 10-year plan which projects have yet to be specifically IRP reviewed and approved by PREB. This funding must be thoroughly revised and redirected towards immediate Act 17 compliant energy unmet needs.

   Art 1.9 of Act 17-2019 mandates that the long-range planning of the electric system has to be made through an Integrated Resources Plan (IRP) submitted by the T&D operator to the PREB. Submission to IRP proceeding of improvement electrical projects in the Action Plan is a requirement by Act 17 and a requirement of federal regulation. FEMA Plan was submitted by PREPA to PREB, but PREB required a revision for compliance with Act 17 of all projects in FEMA 10 Year Plan. The FEMA 10 Year Plan as submitted by PREPA to PREB didn't comply with Act 17.

   Regarding the $1.0 Billion that PRDOH has recommended be assigned to PREPA to provide matching funding to the FEMA projects, ICSE recommends that the full amount be reassigned to fund an Immediate Impact Program of Distributed Energy Resources projects and programs. This massive program will directly benefit consumers, households and small businesses promoting a broad prosumer transformation of vast number of consumers. The net result will be a vast step up in consumer side efficiency and resilience, a vast increase of self-generation and storage of electric energy in the consumer side and an overall increase in behind the meter improvements in the electric system.

4. The Action Plan is not aligned with 23 mandates and requirements that promote and regulate fast integration of renewables generation to the electric system. Neither complies with 22 requirements promoting or regulating energy efficiency. The Goals of

40% renewables generation and 10% Efficiency for 2028 are not funded. In addition, the Plan is not aligned with 13 mandates and requirements promoting and regulating broad deployment of distributed energy throughout the electric system nor with 80 Act 17 mandates and requirements to procure lower energy costs, develop micro and mini grids, achieve resilience in the consumer side, reduce and eliminate fossil generation, diversify the generation portfolio, promote interconnectedness of the grid, and promote solar generation and storage.

Act 17 includes no less than 80 requirements that either promote or regulate Efficiency, renewables deployment, distributed energy resources deployment, reduction from fossil fuels use, lower energy costs, microgrid deployment, resiliency improvements interconnection and diversification of the electric system. 62 requirements promote these actions while 77 regulate the same. A complete Act 17 compliance reassessment is sorely needed to align the Action Plan with Act 17 mandates and requirements.

Conclusion

We reaffirm to PRDOH our firm recommendation that the CDBG-DR Action Plan as published for public comments be rejected by you and HUD and promptly establish coordination and public participation processes in collaboration with PREB to put the plan in compliance with local energy regulations.

The Action Plan must be reformulated for Act 17-2019, IRP and all other ongoing PREB proceedings compliance, for electrical system improvements. After the full compliance review with public comment processes that facilitate concurrent approval by PREB, the Action Plan by PRDOH will follow local energy regulation as specifically required by HUD regulations and thus very prompt HUD approvable.

ICSE Fellows and staff are willing and fully prepared to provide assistance and expert advice collaboration to help PRDOH align the Action Plan with all Puerto Rico policy mandates.

Annex: Act 17 requirements

23 de diciembre de 2021

Comentarios de la Liga de Cooperativas de Puerto Rico al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico

Los siguientes comentarios al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico se hace a nombre de La Liga de Cooperativas de Puerto Rico.

La Liga de Cooperativas es la entidad legal de más alto nivel en el Movimiento Cooperativo de Puerto Rico. Fue creada, dirigida y sostenida por las cooperativas de Puerto Rico, para entre otras funciones, ejercer la representación del Movimiento y ser el guardián de la doctrina y principios filosóficos del modelo.

La Liga promulgó una Política Energética Cooperativa cuyo propósito principal es la transformación de nuestro sistema eléctrico de una manera justa y equitativa. En esa Política se establece lo siguiente:

1. El acceso a energía es un derecho de la humanidad y como tal debe estar garantizado a todos los habitantes del país.

2. Todos los habitantes deben tener acceso a la energía eléctrica necesaria a un precio justo para el desarrollo de una vida digna.

3. El sistema eléctrico debe convertirse en uno distribuido y redundante aumentando su resiliencia.

4. Cualquier proceso de trasformación y desarrollo de nuevas fuentes de energía debe garantizar el acceso ciudadano a este servicio esencial, así como garantizar una Transición Justa para todos los sectores incluyendo los trabajadores.

La Liga no solamente promulgó una Política Energética, sino que, se ha involucrado directamente, a través de alianzas y colaboraciones con cooperativas locales, lideres comunitarios y una entidad sin fines de lucro, en la promoción de modelos de transición energética autogestionados por las propias comunidades. La Liga tiene un interés imperioso de que nuestras comunidades mas vulnerables tengan acceso lo más rápido posible a seguridad energética para suplir sus cargas críticas. Esto no surge solo de los principios cooperativos. Después del Huracán María decenas de miles de nuestros socios se quedaron durante meses sin el servicio de energía eléctrica.

El Plan de Acción es un documento muy elaborado y que comprende asuntos que la Liga no va a atender en estos comentarios. Nuestros comentarios van dirigidos a atender tres asuntos fundaméntales:

1. El contexto socioeconómico de Puerto Rico y la situación de vulnerabilidad de ciertos sectores de la población;

2. La descripción y el análisis sobre los efectos del Huracán María sobre Puerto Rico, específicamente sobre el sistema eléctrico, y las consecuencias de esos efectos en la población;

3. Si la manera de definir los proyectos elegibles y los que no son elegibles; y la escala mínima (definida por el costo del proyecto) son el mejor uso de fondos públicos para atender lo que fueron los peores efectos del huracán mientras proveen a su vez resiliencia a los ciudadanos.

Contexto socioeconómico y la vulnerabilidad de algunos sectores en Puerto Rico

El Plan contiene valiosa información del contexto socioeconómico y la vulnerabilidad de sectores en Puerto Rico frente a eventos naturales como los huracanes. Comienza reconociendo la diferencia de base la situación de pobreza de casi la mitad de la población:

> *"En Puerto Rico, un promedio de 43.5% de personas vive en pobreza, de acuerdo con los estimados del Censo de los EE. UU. para el 2019"*[1].

Señala el Plan las diferencias entre la capacidad de prepararse y responder a los efectos en situaciones de emergencia o desastres vis a vis sus contrapartes norteamericanas.

[1] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, pág. 46

"Varias de las características socioeconómicas son marcadamente distintas en Puerto Rico al compararlas con los Estados Unidos, lo que coloca a los residentes en una desventaja inmediata en términos de su capacidad para prepararse, responder y recuperarse de situaciones de emergencia, como desastres naturales"[2].

Reconoce que la:

"vulnerabilidad social es un fenómeno bien conocido y minuciosamente documentado"[3]. *"La vulnerabilidad social define la capacidad de un área para prepararse, responder y recuperarse de un evento de desastre y tiene un extenso historial conceptual y teórico en los campos de las ciencias sociales y ciencias de desastres. Las poblaciones socialmente vulnerables tienen menos recursos para ayudar en la preparación ante un desastre, suelen sufrir las peores consecuencias del impacto de un desastre y, como consecuencia, les toma más tiempo recuperarse de un evento desastroso"*[4].

El Movimiento Cooperativo de Puerto Rico y la Liga como su representante conoce de primera mano la situación de vulnerabilidad de gran parte de nuestra población. Esa es la misma población que compone la mayoría de la membresía de nuestras cooperativas. Esas fueron las miles de familias que frente a un sistema que, colapso completamente frente al impacto del huracán María, especialmente el casi total apagón que siguió durante los siguientes meses.

Por lo anterior La Liga tiene un interés de que esos sectores vulnerables tengan seguridad energética lo más rápido posible.

Descripción y análisis sobre los efectos del Huracán María sobre Puerto Rico

El documento también hace una buena descripción y análisis sobre los efectos de los huracanes y las consecuencias sobre los ciudadanos y el sistema eléctrico.

"Los huracanes tuvieron un impacto devastador sobre el sistema de energía eléctrica y provocaron el apagón de mayor duración en la historia moderna de los Estados Unidos. La falta de electricidad impidió el acceso de los residentes a servicios de salud, comunicaciones, refrigeración, agua, sistemas de ventilación y aire acondicionado, y seguridad"[5].

[2] Opus. Cit. pág. 49
[3] Opus. Cit, pág. 49
[4] Opus. Cit, pág. 51

[5] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo, pág. 1

No solamente se reconoce el efecto devastador, sino que, se admite que aun al día de hoy gran parte de esos efectos persisten.

> "*Han pasado más de cuatro (4) años desde que los Huracanes Irma y María azotaron a Puerto Rico en septiembre de 2017. Sin embargo, el impacto de estos huracanes sobre la red eléctrica sigue muy presente en el diario vivir de los residentes en la Isla*"[6].
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> *"Las interrupciones en el servicio de energía eléctrica son comunes e impredecibles, los costos de la electricidad continúan en aumento y los relevos de carga debido a la falta de generación suficiente han sido frecuentes. Ante una inseguridad sistémica sostenida, los residentes siguen enfrentando muchos de los mismos impactos, se ha dificultado la recuperación económica y el ciclo de recuperación no puede ser completado"*[7].

El reconocimiento del papel central del sistema eléctrico en la vida y el futuro de Puerto Rico se establece en la misma primera página:

> *"La energía sigue siendo el factor más amplio y más importante para el futuro de la Isla"*[8].

El Plan reconoce el impacto profundo en la salud de los puertorriqueños de la falta de electricidad causada por el huracán María; sobre todo hace un reconocimiento del impacto a largo plazo que tuvo la falta de electricidad en la salud mental de la población:

> *"La falta de energía eléctrica tuvo un impacto directo sobre la salud de la población puertorriqueña. Más allá del impacto sobre las condiciones de salud física, tanto el paso del huracán como la ausencia de energía eléctrica a largo plazo tuvieron un impacto profundo en la salud mental de la población"*[9].

Ese impacto a largo plazo de la falta de electricidad produjo la pérdida de vidas más grande en toda la historia de Puerto Rico. Nos parece que la adjudicación, a nuestro juicio correcta, de miles de muertes a la falta de electricidad es realmente una contribución al entendimiento de lo que ha sido probablemente la tragedia más grande en nuestra historia.

[6] Opus. Cit, Resumen Ejecutivo, pág. 1
[7] Opus. Cit, Resumen Ejecutivo, pág. 1
[8] Opus. Cit, Resumen Ejecutivo, pág. 1
[9] Plan Opus. Cit, pág. 43

"Debido a la avería eléctrica y la dependencia del combustible, la salud y los servicios médicos estuvieron en riesgo y, como consecuencia, se perdieron miles de vidas durante el transcurso del prolongado desastre"[10].

La razón por la cual estamos repasando y analizando las afirmaciones que se hacen en el Plan sobre las devastadoras consecuencias de la ausencia de energía eléctrica sobre el periodo muy prolongado, en el caso de las comunidades más remotas es porque este análisis debe, por fuerza, primar en el diseño y la selección de las soluciones que se planteen.

En el documento se cita extensamente un estudio realizado por profesores del Recinto Universitario de Mayagüez (UPR). En el mismo se detalla como el huracán María produjo el apagón mas grande en la historia de Estados Unidos y el segundo más grande en la historia de la humanidad. Cuantifica, además, como la mayoría del este se debió al tiempo que tuvieron sin electricidad las comunidades más remotas.

*"La UPR, Recinto de Mayagüez, realizó un estudio en el 2018 para analizar datos relacionados con el apagón que se experimentó luego del Huracán María y sus implicaciones en las comunidades rurales remotas de todo Puerto Rico. El estudio se basa en el total de horas que los clientes estuvieron sin servicio de electricidad (**CHoLES**), lo que destaca la necesidad de ofrecer una alternativa viable para las comunidades rurales remotas, que suelen ser las últimas en recuperar el acceso a los servicios de energía eléctrica. El estudio demostró que casi una tercera parte del total de CHoLES (900 millones) se debió a los últimos 200,000 clientes que fueron reconectados a la red desde el día 156 hasta el día 329 después del huracán"*[11].

A continuación, incorporamos una gráfica que compara la magnitud del apagón producido por María con la de los siguientes seis (6) producidos por huracanes que le siguen[12].

[10] Plan Opus. Cit, pág. 44
[11] Plan Opus. Cit, pág. 55
[12] Source: A. Kwasinski, F. Andrade, M. J. Castro-Sitiriche and E. O'Neill-Carrillo, "Hurricane Maria Effects on Puerto Rico Electric Power Infrastructure," in IEEE Power and Energy Technology Systems Journal, vol. 6, no. 1, pp. 85-94, March 2019. http://bit.ly/mariaPOWER and Houser, T. and Marsters, P. 2018. The World's Seconds Largest Blackout. Rhodium Group, https://rhg.com/research/puerto-rico-hurricane-María-worlds-second-largest-blackout/

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Como se puede observar en la gráfica el huracán María produjo un apagón que fue más grande que la suma de los producidos por Georges, Sandy, Irma y Hugo. Un efecto realmente sorprendente si se considera que Sandy fue el huracán mas grande (en diámetro) en la historia de Estados Unidos y Georges, Irma y Hugo fueron huracanes mayores.

> *"Cinco meses después del Huracán María, el 80% o más de la población de Puerto Rico había recuperado el servicio de electricidad, con excepción de la Región de Caguas, que incluye municipios remotos de la Cordillera Central, como Orocovis, y de la costa suroeste, como Yabucoa, Humacao y Naguabo. Las regiones de Caguas y Arecibo tardaron más que otras en recuperar el servicio de energía eléctrica. Esto se debió, en gran medida, al hecho de que la mayoría de la población de estos municipios está ubicada en la Cordillera Central"*[13]

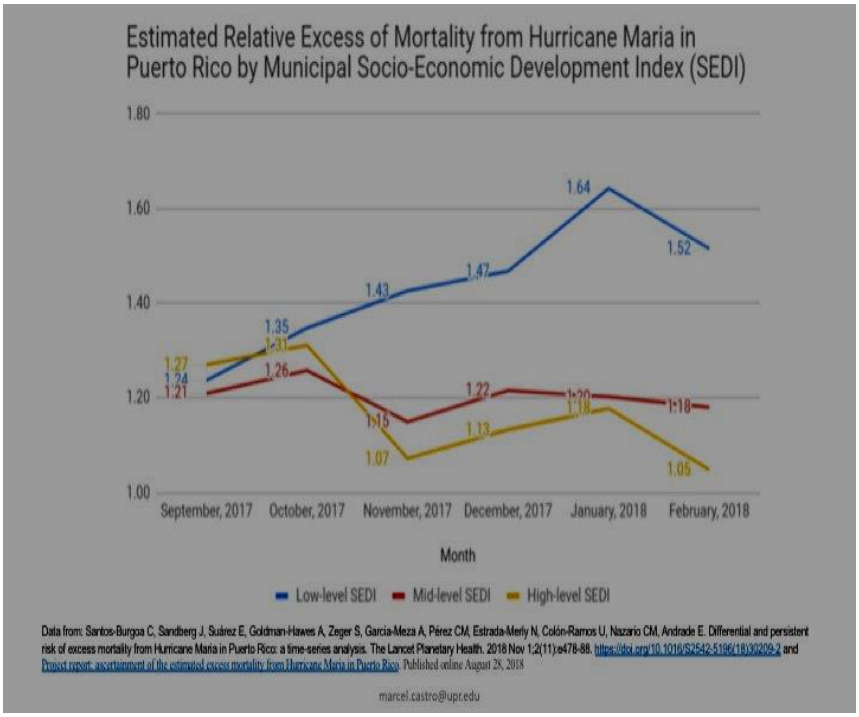
El casi 20% de los abonados de la Autoridad de Energía Eléctrica que todavía estaban sin energía representan más de un cuarto de millón de abonados. Una porción sustancial de esos estuvieron sin energía hasta por once meses.

> *"El estudio sugiere que la situación de la recuperación de energía, a diez (10) meses del Huracán María, demostró que se tiene que dar prioridad a las áreas rurales remotas. "Tomando en cuenta la fase de transición que atraviesa la industria de la energía eléctrica en Puerto Rico, es fundamental que se dé prioridad a los intereses*

[13] Castro-Sitiriche, M., Cintrón-Sotomayor, Y. y Gómez-Torres, J. (2018)., *"The Longest Power Blackout in History and Energy Poverty", Proc. 8th Int. Conf. Appropriate Technology*

de los clientes que residen en las comunidades remotas al considerar sistemas resilientes de energía distribuida". De igual forma, el estudio propone que "[e]l contexto remoto requiere de soluciones energéticas descentralizadas, operadas principalmente por sistemas solares fotovoltaicos con baterías (PV+B) en los hogares (subrayado nuestro)"[14].

A continuación, incluimos una gráfica[15] que cuantifica el exceso de mortalidad debido al huracán y su relación con el Índice de Desarrollo Socio-económico Municipal (SEDI por sus siglas en inglés).



La grafica demuestra que el huracán impactó a diferentes sectores de la población de manera desigual. Durante el evento el exceso de mortalidad fue muy parecido en todos los municipios. De hecho, en municipios con índices socio económicos más alto fue ligeramente superior al de los municipios con más bajo SEDI. Durante el primer mes el exceso de mortalidad continuó aumentando en todos, pero aumento más rápidamente en los municipios con un SEDI más bajo.

[14] Plan Opus. Cit, Pág 56, citando studio de Castro-Siatiriche et al.
[15] Differential and persistent risk of excess mortality from Hurricane Maria in Puerto Rico: a time-series análisis Carlos Santos-Burgoa, John Sandberg, Erick Suárez, Ann Goldman-Hawes, Scott Zeger, Alejandra Garcia-Meza, Cynthia M Pérez, Noel Estrada-Merly, Uriyoan Colón-Ramos, Cruz María Nazario, Elizabeth Andrade, Amira Roess, Lynn Goldman

Lo que ocurrió después del primer mes nos indica con meridiana claridad de cual debe ser la prioridad en el manejo de fondos destinados a atender la transformación del sistema eléctrico de Puerto Rico. Desde mediados de octubre tanto los municipios con un alto SEDI como los que tenían un SEDI moderado comenzaron a ver su exceso de mortalidad reducirse. Mientras tanto, los municipios con un SEDI bajo, experimentaron un alza dramática en su exceso de mortalidad tras el huracán. Esa alza continuó hasta mediados de enero. Durante el periodo de diciembre de 2017 hasta enero de 2018 se produjo el aumento más dramático en el exceso de mortalidad en esos municipios.

Metas del Plan, asignación de fondos y caracterización de los proyectos elegibles y los no elegibles.

En varios lugares en el documento se hace referencia a cuales son las metas y los objetivos del Plan.

> *"Este Plan de Acción busca ajustar los principales hallazgos de estos informes e identificar las necesidades no satisfechas de las comunidades que permanecen vulnerables a los impactos de la inseguridad energética. El propósito es identificar oportunidades de resiliencia para reforzar el sistema de energía eléctrica a largo plazo para el beneficio de todos los residentes"*[16].
>
> *"Vivienda tiene como prioridad facilitar una recuperación transparente y enfocada en las personas, que garantice que se integre un factor de resiliencia al abordar las necesidades de energía. El uso efectivo de estos fondos en la infraestructura de energía eléctrica de Puerto Rico brindará a una sociedad más sostenible una oportunidad única de integrar nueva tecnología de energía con la capacidad de resistir futuros desastres. El Plan de Acción para la Optimización del Sistema Eléctrico está diseñado para fortalecer las comunidades de ingresos bajos y moderados con estrategias de fuentes de energía resilientes diseñadas para proteger a las personas y la propiedad"*[17].

El Departamento de la Vivienda propone repartir los fondos entre dos programas. En el primero, Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1), se usarían $1,055,811,031 (55%), para fundamentalmente proveer el pareo para poder recibir los fondos asignados por FEMA para la rehabilitación y modernización del sistema eléctrico.

[16] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo, pág 1

[17] Plan Opus. Cit, pág 111

Considerando la dificultad para levantar los fondos de pareo con dinero local pensamos que es una manera razonable de asegurarse que podamos recibir los fondos de FEMA.

Además, se propone crear un segundo fondo de $760,595,149 para el Programa de Confiabilidad y Resiliencia Energética. Este sería el programa en el cual entidades sin fines de lucro, comunidades, municipios, empresas pueden solicitar para promover proyectos. De esos $532,416,604 deben ser usados para satisfacer necesidades de residentes de ingresos bajos o moderados.

Con relación a ese programa tenemos varias preocupaciones. Primero se plantea que los proyectos que se van a aceptar son proyectos a gran escala. El costo mínimo del proyecto que seria elegible seria de 10 millones de dólares. Evidentemente ninguno de los proyectos que estamos apoyando en diferentes municipios cualificaría.

En el documento se despacha eso planteando que hay otros programas en los cuales cuales los residentes pueden solicitar. El problema es que muchos de esos programas tienen unos requisitos que muchos de nuestros residentes no pueden cumplir. Por ejemplo se afirma que los residentes pueden solicitar al Programa de Instalaciones Comunitarias para la Resiliencia Energética y el Abastecimiento de Agua (CEWRI), pero cuando vamos a las guias del programa encontramos que el uso permitido de fondos y los criterios de elegibilidad dicen:

El propósito de este Programa es trabajar con y complementar algunos de los Programas CDBG-DR. Por consiguiente, los solicitantes elegibles quedan limitados a participantes o beneficiarios de los siguientes programas[18]:

> • Programa R3: o, Los propietarios de viviendas que reciban ayuda bajo el Programa R3 y que hayan recibido un aviso de adjudicación para reparación, reconstrucción o relocalización.
>
> • Programa SBIA: o, Organizaciones sin fines de lucro, unidades de gobierno local, organizaciones con fines de lucro, privadas y gubernamentales para reparar Incubadoras de Pequeñas Empresas existentes o construir nuevas que participen en el Programa SBIA. o Negocio adjudicado bajo el Programa SBIA para Rehabilitación, Reconstrucción o Nueva Construcción.

[18] Guías del Programa CDBG-DR Programa de Instalaciones Comunitarias para la Resiliencia Energética y el Abastecimiento de Agua (CEWRI) 20 de agosto de 2021 (V.2), pág. 9

• Programa SIH: o Organización Sin Fines de Lucro y No Gubernamental o Proyectos en el proceso de Rehabilitación, Reconstrucción o Nueva Construcción, adjudicados bajo el Programa SIH.

No solamente, no cualificarían, sino que estos programas son programas para proveer ayudas a personas de manera individual. La Liga y los grupos con los que colaboramos estamos desarrollando proyectos de autogestión comunitaria donde se fomenta el esfuerzo propio y la ayuda mutua. Aunque los equipos se instalan en cada techo de la vivienda, el proceso de adiestramiento, instalación y mantenimiento se realiza colectivamente por los miembros del grupo comunitario. Así mismo el proceso de diseño, cotización y adquisición de los equipos se hace en grupo.

El resultado de esto es uno solamente un sistema fotovoltaico instalado, sino un proceso de autogestión que va poco a poco creando las condiciones para reducir la dependencia y por ende la vulnerabilidad de las comunidades. Y esto se hace a un costo que no puede ser igualado por ninguno de los demás modelos existentes.

En estos momentos un sistema de cargas críticas tiene un costo material de alrededor de 3 mil dólares. El proceso desde que comienzan a adiestrarse los vecinos hasta que se instalan los equipos poder ser tan rápido como 3 meses. En el caso de que se tuvieran que adquirir equipos manufacturados en Estados Unidos el precio del equipo podría ser de alrededor de 7 mil dólares.

La mayor objeción que tenemos con la manera en que se establecieron las estrategias y se definieron los proyectos elegibles es que son casi una garantía de que si el año que viene volviéramos a sufrir el embate de un huracán como María volveríamos a tener la misma tragedia nuevamente. Con los modelos que se están proponiendo con estos fondos y con los que existen no hay manera de darle seguridad energética a los más de medio millón de ciudadanos que estuvieron sin electricidad por más de cinco meses.

En cambio con el modelo que estamos proponiendo junto a nuestro colaboradores se podría hacer esto dentro de periodo de tiempo que prevé esta asignación.

Proponemos concretamente que:

1. Se redefina lo que son proyectos individuales y se acepte que los proyectos que promovemos son proyectos comunitarios que deben ser elegibles para recibir fondos de esta asignación.
2. Se separen por lo menos 350 millones para el tipo de proyecto que planteamos. Esto permitiría la instalación de entre 50 y 70 mil sistemas que proveerían seguridad energética a por lo menos 200 mil personas.

3. Se reduzca el costo mínimo de cada proyecto individual hasta $250,000 para que los grupos comunitarios y las entidades que colaboran con ellos puedan realmente tener una oportunidad de proveerse ellos mismo la seguridad energética que les provea paz y tranquilidad que pierden cada vez que anuncian una nueva temporada de huracanes y de paso crear comunidades más sostenibles y resilientes

Sometemos respetuosamente estos comentarios que esperamos sirvan para fortalecer el Plan que el Departamento de la Vivienda ha preparado.

Cooperativamente,

Juan R. Luna Otero
Presidente Junta de Directores

Mildred Santiago Ortiz
Directora Ejecutiva

23 de diciembre de 2021

Comentarios de la Liga de Cooperativas de Puerto Rico al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico

Los siguientes comentarios al Plan de Acción Para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico se hace a nombre de La Liga de Cooperativas de Puerto Rico.

La Liga de Cooperativas es la entidad legal de más alto nivel en el Movimiento Cooperativo de Puerto Rico. Fue creada, dirigida y sostenida por las cooperativas de Puerto Rico, para entre otras funciones, ejercer la representación del Movimiento y ser el guardián de la doctrina y principios filosóficos del modelo.

La Liga promulgó una Política Energética Cooperativa cuyo propósito principal es la transformación de nuestro sistema eléctrico de una manera justa y equitativa. En esa Política se establece lo siguiente:

1. El acceso a energía es un derecho de la humanidad y como tal debe estar garantizado a todos los habitantes del país.

2. Todos los habitantes deben tener acceso a la energía eléctrica necesaria a un precio justo para el desarrollo de una vida digna.

3. El sistema eléctrico debe convertirse en uno distribuido y redundante aumentando su resiliencia.

4. Cualquier proceso de trasformación y desarrollo de nuevas fuentes de energía debe garantizar el acceso ciudadano a este servicio esencial, así como garantizar una Transición Justa para todos los sectores incluyendo los trabajadores.

La Liga no solamente promulgó una Política Energética, sino que, se ha involucrado directamente, a través de alianzas y colaboraciones con cooperativas locales, lideres comunitarios y una entidad sin fines de lucro, en la promoción de modelos de transición energética autogestionados por las propias comunidades. La Liga tiene un interés imperioso de que nuestras comunidades mas vulnerables tengan acceso lo más rápido posible a seguridad energética para suplir sus cargas críticas. Esto no surge solo de los principios cooperativos. Después del Huracán María decenas de miles de nuestros socios se quedaron durante meses sin el servicio de energía eléctrica.

El Plan de Acción es un documento muy elaborado y que comprende asuntos que la Liga no va a atender en estos comentarios. Nuestros comentarios van dirigidos a atender tres asuntos fundaméntales:

1. El contexto socioeconómico de Puerto Rico y la situación de vulnerabilidad de ciertos sectores de la población;

2. La descripción y el análisis sobre los efectos del Huracán María sobre Puerto Rico, específicamente sobre el sistema eléctrico, y las consecuencias de esos efectos en la población;

3. Si la manera de definir los proyectos elegibles y los que no son elegibles; y la escala mínima (definida por el costo del proyecto) son el mejor uso de fondos públicos para atender lo que fueron los peores efectos del huracán mientras proveen a su vez resiliencia a los ciudadanos.

Contexto socioeconómico y la vulnerabilidad de algunos sectores en Puerto Rico

El Plan contiene valiosa información del contexto socioeconómico y la vulnerabilidad de sectores en Puerto Rico frente a eventos naturales como los huracanes. Comienza reconociendo la diferencia de base la situación de pobreza de casi la mitad de la población:

> *"En Puerto Rico, un promedio de 43.5% de personas vive en pobreza, de acuerdo con los estimados del Censo de los EE. UU. para el 2019"*[1].

Señala el Plan las diferencias entre la capacidad de prepararse y responder a los efectos en situaciones de emergencia o desastres vis a vis sus contrapartes norteamericanas.

[1] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, pág. 46

"Varias de las características socioeconómicas son marcadamente distintas en Puerto Rico al compararlas con los Estados Unidos, lo que coloca a los residentes en una desventaja inmediata en términos de su capacidad para prepararse, responder y recuperarse de situaciones de emergencia, como desastres naturales"[2].

Reconoce que la:

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Por lo anterior La Liga tiene un interés de que esos sectores vulnerables tengan seguridad energética lo más rápido posible.

Descripción y análisis sobre los efectos del Huracán María sobre Puerto Rico

El documento también hace una buena descripción y análisis sobre los efectos de los huracanes y las consecuencias sobre los ciudadanos y el sistema eléctrico.

"Los huracanes tuvieron un impacto devastador sobre el sistema de energía eléctrica y provocaron el apagón de mayor duración en la historia moderna de los Estados Unidos. La falta de electricidad impidió el acceso de los residentes a servicios de salud, comunicaciones, refrigeración, agua, sistemas de ventilación y aire acondicionado, y seguridad"[5].

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[3] Opus. Cit, pág. 49
[4] Opus. Cit, pág. 51

[5] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo, pág. 1

No solamente se reconoce el efecto devastador, sino que, se admite que aun al día de hoy gran parte de esos efectos persisten.

> "*Han pasado más de cuatro (4) años desde que los Huracanes Irma y María azotaron a Puerto Rico en septiembre de 2017. Sin embargo, el impacto de estos huracanes sobre la red eléctrica sigue muy presente en el diario vivir de los residentes en la Isla*"[6].
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El reconocimiento del papel central del sistema eléctrico en la vida y el futuro de Puerto Rico se establece en la misma primera página:

> *"La energía sigue siendo el factor más amplio y más importante para el futuro de la Isla"*[8].

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> *"La falta de energía eléctrica tuvo un impacto directo sobre la salud de la población puertorriqueña. Más allá del impacto sobre las condiciones de salud física, tanto el paso del huracán como la ausencia de energía eléctrica a largo plazo tuvieron un impacto profundo en la salud mental de la población"*[9].

Ese impacto a largo plazo de la falta de electricidad produjo la pérdida de vidas más grande en toda la historia de Puerto Rico. Nos parece que la adjudicación, a nuestro juicio correcta, de miles de muertes a la falta de electricidad es realmente una contribución al entendimiento de lo que ha sido probablemente la tragedia más grande en nuestra historia.

[6] Opus. Cit, Resumen Ejecutivo, pág. 1
[7] Opus. Cit, Resumen Ejecutivo, pág. 1
[8] Opus. Cit, Resumen Ejecutivo, pág. 1
[9] Plan Opus. Cit, pág. 43

"Debido a la avería eléctrica y la dependencia del combustible, la salud y los servicios médicos estuvieron en riesgo y, como consecuencia, se perdieron miles de vidas durante el transcurso del prolongado desastre"[10].

La razón por la cual estamos repasando y analizando las afirmaciones que se hacen en el Plan sobre las devastadoras consecuencias de la ausencia de energía eléctrica sobre el periodo muy prolongado, en el caso de las comunidades más remotas es porque este análisis debe, por fuerza, primar en el diseño y la selección de las soluciones que se planteen.

En el documento se cita extensamente un estudio realizado por profesores del Recinto Universitario de Mayagüez (UPR). En el mismo se detalla como el huracán María produjo el apagón mas grande en la historia de Estados Unidos y el segundo más grande en la historia de la humanidad. Cuantifica, además, como la mayoría del este se debió al tiempo que tuvieron sin electricidad las comunidades más remotas.

*"La UPR, Recinto de Mayagüez, realizó un estudio en el 2018 para analizar datos relacionados con el apagón que se experimentó luego del Huracán María y sus implicaciones en las comunidades rurales remotas de todo Puerto Rico. El estudio se basa en el total de horas que los clientes estuvieron sin servicio de electricidad (**CHoLES**), lo que destaca la necesidad de ofrecer una alternativa viable para las comunidades rurales remotas, que suelen ser las últimas en recuperar el acceso a los servicios de energía eléctrica. El estudio demostró que casi una tercera parte del total de CHoLES (900 millones) se debió a los últimos 200,000 clientes que fueron reconectados a la red desde el día 156 hasta el día 329 después del huracán"*[11].

A continuación, incorporamos una gráfica que compara la magnitud del apagón producido por María con la de los siguientes seis (6) producidos por huracanes que le siguen[12].

[10] Plan Opus. Cit, pág. 44
[11] Plan Opus. Cit, pág. 55
[12] Source: A. Kwasinski, F. Andrade, M. J. Castro-Sitiriche and E. O'Neill-Carrillo, "Hurricane Maria Effects on Puerto Rico Electric Power Infrastructure," in IEEE Power and Energy Technology Systems Journal, vol. 6, no. 1, pp. 85-94, March 2019. http://bit.ly/mariaPOWER and Houser, T. and Marsters, P. 2018. The World's Seconds Largest Blackout. Rhodium Group, https://rhg.com/research/puerto-rico-hurricane-María-worlds-second-largest-blackout/

Source: A. Kwasinski, F. Andrade, M. J. Castro-Sitiriche and E. O'Neill-Carrillo, "Hurricane Maria Effects on Puerto Rico Electric Power Infrastructure," in *IEEE Power and Energy Technology Systems Journal*, vol. 6, no. 1, pp. 85-94, March 2019. http://bit.ly/mariaPOWER and Houser, T. and Marsters, P. 2018. The World's Seconds Largest Blackout. *Rhodium Group*, https://rhg.com/research/puerto-rico-hurricane-Maria-worlds-second-largest-blackout/

Como se puede observar en la gráfica el huracán María produjo un apagón que fue más grande que la suma de los producidos por Georges, Sandy, Irma y Hugo. Un efecto realmente sorprendente si se considera que Sandy fue el huracán mas grande (en diámetro) en la historia de Estados Unidos y Georges, Irma y Hugo fueron huracanes mayores.

> *"Cinco meses después del Huracán María, el 80% o más de la población de Puerto Rico había recuperado el servicio de electricidad, con excepción de la Región de Caguas, que incluye municipios remotos de la Cordillera Central, como Orocovis, y de la costa suroeste, como Yabucoa, Humacao y Naguabo. Las regiones de Caguas y Arecibo tardaron más que otras en recuperar el servicio de energía eléctrica. Esto se debió, en gran medida, al hecho de que la mayoría de la población de estos municipios está ubicada en la Cordillera Central"*[13]

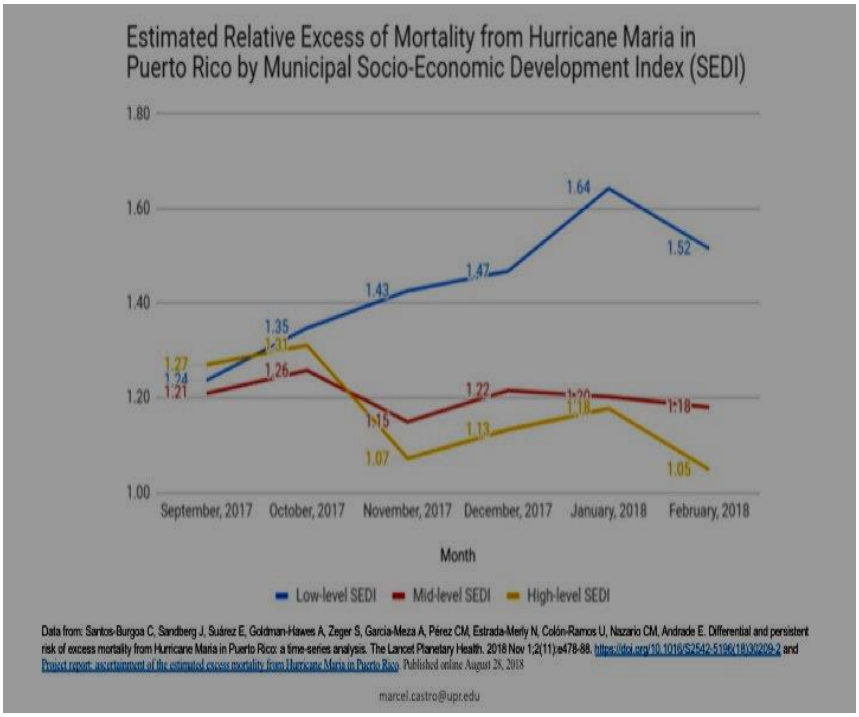
El casi 20% de los abonados de la Autoridad de Energía Eléctrica que todavía estaban sin energía representan más de un cuarto de millón de abonados. Una porción sustancial de esos estuvieron sin energía hasta por once meses.

> *"El estudio sugiere que la situación de la recuperación de energía, a diez (10) meses del Huracán María, demostró que se tiene que dar prioridad a las áreas rurales remotas. "Tomando en cuenta la fase de transición que atraviesa la industria de la energía eléctrica en Puerto Rico, es fundamental que se dé prioridad a los intereses*

[13] Castro-Sitiriche, M., Cintrón-Sotomayor, Y. y Gómez-Torres, J. (2018)., *"The Longest Power Blackout in History and Energy Poverty", Proc. 8th Int. Conf. Appropriate Technology*

de los clientes que residen en las comunidades remotas al considerar sistemas resilientes de energía distribuida". De igual forma, el estudio propone que "[e]l contexto remoto requiere de soluciones energéticas descentralizadas, operadas principalmente por sistemas solares fotovoltaicos con baterías (PV+B) en los hogares (subrayado nuestro)"[14].

A continuación, incluimos una gráfica[15] que cuantifica el exceso de mortalidad debido al huracán y su relación con el Índice de Desarrollo Socio-económico Municipal (SEDI por sus siglas en inglés).



La grafica demuestra que el huracán impactó a diferentes sectores de la población de manera desigual. Durante el evento el exceso de mortalidad fue muy parecido en todos los municipios. De hecho, en municipios con índices socio económicos más alto fue ligeramente superior al de los municipios con más bajo SEDI. Durante el primer mes el exceso de mortalidad continuó aumentando en todos, pero aumento más rápidamente en los municipios con un SEDI más bajo.

[14] Plan Opus. Cit, Pág 56, citando studio de Castro-Siatiriche et al.
[15] Differential and persistent risk of excess mortality from Hurricane Maria in Puerto Rico: a time-series análisis Carlos Santos-Burgoa, John Sandberg, Erick Suárez, Ann Goldman-Hawes, Scott Zeger, Alejandra Garcia-Meza, Cynthia M Pérez, Noel Estrada-Merly, Uriyoan Colón-Ramos, Cruz María Nazario, Elizabeth Andrade, Amira Roess, Lynn Goldman

Lo que ocurrió después del primer mes nos indica con meridiana claridad de cual debe ser la prioridad en el manejo de fondos destinados a atender la transformación del sistema eléctrico de Puerto Rico. Desde mediados de octubre tanto los municipios con un alto SEDI como los que tenían un SEDI moderado comenzaron a ver su exceso de mortalidad reducirse. Mientras tanto, los municipios con un SEDI bajo, experimentaron un alza dramática en su exceso de mortalidad tras el huracán. Esa alza continuó hasta mediados de enero. Durante el periodo de diciembre de 2017 hasta enero de 2018 se produjo el aumento más dramático en el exceso de mortalidad en esos municipios.

Metas del Plan, asignación de fondos y caracterización de los proyectos elegibles y los no elegibles.

En varios lugares en el documento se hace referencia a cuales son las metas y los objetivos del Plan.

> *"Este Plan de Acción busca ajustar los principales hallazgos de estos informes e identificar las necesidades no satisfechas de las comunidades que permanecen vulnerables a los impactos de la inseguridad energética. El propósito es identificar oportunidades de resiliencia para reforzar el sistema de energía eléctrica a largo plazo para el beneficio de todos los residentes"*[16].
>
> *"Vivienda tiene como prioridad facilitar una recuperación transparente y enfocada en las personas, que garantice que se integre un factor de resiliencia al abordar las necesidades de energía. El uso efectivo de estos fondos en la infraestructura de energía eléctrica de Puerto Rico brindará a una sociedad más sostenible una oportunidad única de integrar nueva tecnología de energía con la capacidad de resistir futuros desastres. El Plan de Acción para la Optimización del Sistema Eléctrico está diseñado para fortalecer las comunidades de ingresos bajos y moderados con estrategias de fuentes de energía resilientes diseñadas para proteger a las personas y la propiedad"*[17].

El Departamento de la Vivienda propone repartir los fondos entre dos programas. En el primero, Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1), se usarían $1,055,811,031 (55%), para fundamentalmente proveer el pareo para poder recibir los fondos asignados por FEMA para la rehabilitación y modernización del sistema eléctrico.

[16] Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico, Resumen Ejecutivo, pág 1

[17] Plan Opus. Cit, pág 111

Considerando la dificultad para levantar los fondos de pareo con dinero local pensamos que es una manera razonable de asegurarse que podamos recibir los fondos de FEMA.

Además, se propone crear un segundo fondo de $760,595,149 para el Programa de Confiabilidad y Resiliencia Energética. Este sería el programa en el cual entidades sin fines de lucro, comunidades, municipios, empresas pueden solicitar para promover proyectos. De esos $532,416,604 deben ser usados para satisfacer necesidades de residentes de ingresos bajos o moderados.

Con relación a ese programa tenemos varias preocupaciones. Primero se plantea que los proyectos que se van a aceptar son proyectos a gran escala. El costo mínimo del proyecto que seria elegible seria de 10 millones de dólares. Evidentemente ninguno de los proyectos que estamos apoyando en diferentes municipios cualificaría.

En el documento se despacha eso planteando que hay otros programas en los cuales cuales los residentes pueden solicitar. El problema es que muchos de esos programas tienen unos requisitos que muchos de nuestros residentes no pueden cumplir. Por ejemplo se afirma que los residentes pueden solicitar al Programa de Instalaciones Comunitarias para la Resiliencia Energética y el Abastecimiento de Agua (CEWRI), pero cuando vamos a las guias del programa encontramos que el uso permitido de fondos y los criterios de elegibilidad dicen:

El propósito de este Programa es trabajar con y complementar algunos de los Programas CDBG-DR. Por consiguiente, los solicitantes elegibles quedan limitados a participantes o beneficiarios de los siguientes programas[18]:

> • Programa R3: o, Los propietarios de viviendas que reciban ayuda bajo el Programa R3 y que hayan recibido un aviso de adjudicación para reparación, reconstrucción o relocalización.
>
> • Programa SBIA: o, Organizaciones sin fines de lucro, unidades de gobierno local, organizaciones con fines de lucro, privadas y gubernamentales para reparar Incubadoras de Pequeñas Empresas existentes o construir nuevas que participen en el Programa SBIA. o Negocio adjudicado bajo el Programa SBIA para Rehabilitación, Reconstrucción o Nueva Construcción.

[18] Guías del Programa CDBG-DR Programa de Instalaciones Comunitarias para la Resiliencia Energética y el Abastecimiento de Agua (CEWRI) 20 de agosto de 2021 (V.2), pág. 9

• Programa SIH: o Organización Sin Fines de Lucro y No Gubernamental o Proyectos en el proceso de Rehabilitación, Reconstrucción o Nueva Construcción, adjudicados bajo el Programa SIH.

No solamente, no cualificarían, sino que estos programas son programas para proveer ayudas a personas de manera individual. La Liga y los grupos con los que colaboramos estamos desarrollando proyectos de autogestión comunitaria donde se fomenta el esfuerzo propio y la ayuda mutua. Aunque los equipos se instalan en cada techo de la vivienda, el proceso de adiestramiento, instalación y mantenimiento se realiza colectivamente por los miembros del grupo comunitario. Así mismo el proceso de diseño, cotización y adquisición de los equipos se hace en grupo.

El resultado de esto es uno solamente un sistema fotovoltaico instalado, sino un proceso de autogestión que va poco a poco creando las condiciones para reducir la dependencia y por ende la vulnerabilidad de las comunidades. Y esto se hace a un costo que no puede ser igualado por ninguno de los demás modelos existentes.

En estos momentos un sistema de cargas críticas tiene un costo material de alrededor de 3 mil dólares. El proceso desde que comienzan a adiestrarse los vecinos hasta que se instalan los equipos poder ser tan rápido como 3 meses. En el caso de que se tuvieran que adquirir equipos manufacturados en Estados Unidos el precio del equipo podría ser de alrededor de 7 mil dólares.

La mayor objeción que tenemos con la manera en que se establecieron las estrategias y se definieron los proyectos elegibles es que son casi una garantía de que si el año que viene volviéramos a sufrir el embate de un huracán como María volveríamos a tener la misma tragedia nuevamente. Con los modelos que se están proponiendo con estos fondos y con los que existen no hay manera de darle seguridad energética a los más de medio millón de ciudadanos que estuvieron sin electricidad por más de cinco meses.

En cambio con el modelo que estamos proponiendo junto a nuestro colaboradores se podría hacer esto dentro de periodo de tiempo que prevé esta asignación.

Proponemos concretamente que:

1. Se redefina lo que son proyectos individuales y se acepte que los proyectos que promovemos son proyectos comunitarios que deben ser elegibles para recibir fondos de esta asignación.
2. Se separen por lo menos 350 millones para el tipo de proyecto que planteamos. Esto permitiría la instalación de entre 50 y 70 mil sistemas que proveerían seguridad energética a por lo menos 200 mil personas.

3. Se reduzca el costo mínimo de cada proyecto individual hasta $250,000 para que los grupos comunitarios y las entidades que colaboran con ellos puedan realmente tener una oportunidad de proveerse ellos mismo la seguridad energética que les provea paz y tranquilidad que pierden cada vez que anuncian una nueva temporada de huracanes y de paso crear comunidades más sostenibles y resilientes

Sometemos respetuosamente estos comentarios que esperamos sirvan para fortalecer el Plan que el Departamento de la Vivienda ha preparado.

Cooperativamente,

Juan R. Luna Otero
Presidente Junta de Directores

Mildred Santiago Ortiz
Directora Ejecutiva

Comentarios Públicos sobre el Plan de Acción de Recuperación de Desastre (Versión en español)

GENERALES

 # 1: Enfoque salud, resiliencia, y accesibilidad

Comentario:
Es importante resaltar y comendar el gran trabajo del Departamento de Vivienda en la elaboración de este plan de acción. Es de gran valor el enfoque y balance que se da a temas de salud, económicos y medioambiental. Consideraciones sociales que buscan una mejor distribución de recursos y atender a las comunidades de menores ingresos con el apoyo y resiliencia energética necesaria. De gran valor también las necesidades identificadas tales como acceso a agua potable, infraestructura crítica, mejoras en el servicio, y reducción de costos en el servicio eléctrico, buscando asegurar resiliencia en servicios básicos y primordiales.

#2: Alineamiento con el Plan de Infraestructura a 10 años de la Autoridad de Energía Eléctrica (AEE)

Comentario:
Dentro del contexto del plan de acción se recomienda incluir referencia y buscar áreas de coordinación y alinear las acciones tanto con el plan de infraestructura a 10 años de la AEE así como el Plan Integrado de Recursos, dados los objetivos comunes de incremento en el uso de energías renovables, incrementar la resiliencia energética, mejoras a la accesibilidad del servicio, entre otros.

#3: *Necesidades no satisfechas de la AAA.*

Tabla 9 – Proyectos fotovoltaicos propuestos por la AAA (página 65)

Comentario:
El precio de los sistemas fotovoltaicos (FV) listados llegan a casi los 2500 USD/kWp instalado, el cual es considerado en el sector y Puerto Rico muy por encima del actual costo de instalación.

Es importante de igual forma reflejar las economías de escalas en proyectos FV, donde el precio por kWp instalado se reduce conforme se aumenta el tamaño del sistema. El estudio de caso de RMI sobre el sistema de energía de Santa Lucía muestra que los sistemas de energía que incorporan energías renovables pueden conducir a un sistema de menor costo. El estudio completo se puede encontrar aquí: https://rmi.org/insight/saint-lucia-case-study/

Se recomienda, en caso de no haber sido incluido, el uso de almacenamiento en batería para aumentar la resiliencia de las plantas de tratamiento.

#4: *"Según presentado por la AEE a Vivienda, "[e]l proyecto incluye la adquisición de nueve (9) unidades móviles para generación de emergencia –cada una con una capacidad de generación de aproximadamente 30 MW, para un total de 270 MW– para reemplazar las turbinas de gas existentes y posiblemente instalarlas según sea necesario en lugares estratégicos alrededor de la Isla donde pueda haber necesidad de energía luego de una emergencia, como un huracán o terremoto ... De conformidad con la Orden del NEPR del 26 de marzo, la AEE explorará la posibilidad de satisfacer esta necesidad con recursos de energía renovable y almacenaje de energía en baterías. Este proyecto está sujeto a las necesidades de los sistemas y a la revisión y aprobación del NEPR. "* (página 62)

Comentario:
Estos tipos de sistemas son sensibles a las importaciones de combustibles y los precios mundiales de los combustibles. Aunque brindan beneficios de resiliencia, los sistemas de microredes de baterías y paneles solares distribuidos en todo Puerto Rico pueden brindar beneficios de resiliencia similares a la vez que son más económicos a largo plazo, más limpios y capaces de brindar estabilidad a la red. Los sistemas de paneles solares y baterías también se pueden usar en una configuración móvil, como lo usa Footprint Project: https://www.footprintproject.org/about

RMI elogia la decisión de usar energía renovable como las microredes de batería y paneles solares distribuidos que brinden resistencia y energía a instalaciones críticas en áreas remotas y / o vulnerables.

#5: *Microrredes de Vieques y Culebra* (página 63-64)

Comentario:
Existe alguna razón en particular por la cual el enfoque para renovar el parque de generación eléctrica en Vieques y Culebra se haga inicialmente solo con generadores diésel. También consultar sobre el porcentaje estimado de penetración de energía solar y almacenamiento en baterías.

Esto considerando las dificultades experimentadas con la generación en base a diésel al ser más costosa y contaminante, limitada y de difícil logística en periodos de desastres naturales, contaminación sonora y local, riesgos de derrames entre otros.

#6: *"El uso de energía solar reduce considerablemente la huella de carbono, en comparación con el uso de combustibles fósiles, además de promover una reducción considerable en costos de operación y mantenimiento para la AAA. A pesar de estas ventajas, estos proyectos necesitan redundancia para ofrecer una fuente de energía alternativa para eventos catastróficos."* (página 66)

Comentario:

Estas pautas de diseño (https://rmi.org/insight/solar-under-storm/) publicadas por RMI y Clinton Climate Initiative pueden proporcionar información sobre las estrategias de construcción que hacen que los sistemas solares montados en el suelo y en los techos sean más resistentes a eventos catastróficos.

#7: *"El DOE pone estas prioridades en orden al consolidarlas en cuatro áreas principales:*

- *Confiabilidad y resiliencia del sistema*
- *Seguridad del sistema y estabilidad de la red*
- *Eficiencia energética y sostenibilidad*
- *Mitigación de riesgos de desastre"* (página 59)

Comentario:
Dentro de "Eficiencia energética y sostenibilidad" es importante la consideración del uso racional de la energía. El kWh más barato es el no consumido. Esto para fomentar no solo el uso de equipos y tecnologías más eficientes, pero invertir y fomentar a la población, industria y demás sectores en hacer un uso más racional de la energía.

#8: *Estaciones de bombeo* (página 66-67)

Comentario:
El enfoque hacia el uso de generadores diésel como sistema de respaldo deja en similar vulnerabilidad al sistema de bombeo de agua y acceso a agua potable. Esto debido a como se observó después del Huracán María de los primeros faltantes fue el acceso a combustibles incluido el diésel por su alta demanda en sistemas de respaldo.

Ante un servicio básico de tanta importancia como lo es el agua potable se recomienda la utilización de sistemas solares con almacenamiento, estos pueden aportar a reducir los costos de consumo de electricidad, y brindar una resiliencia local sin depender de la importación de combustibles. Además, la misma posibilidad del almacenamiento de agua en tanques, permite utilizarles como "batería" donde el bombeo se priorice en horas de alta radiación solar.

#9: *Enfoque en la energía renovable* (página 72)

Comentario:
La Iniciativa de Resiliencia Energética Comunitaria (CERI), una colaboración entre RMI, la Fundación Rockefeller y la Fundación Comunitaria de Puerto Rico (FCPR) ha realizado un trabajo similar para identificar instalaciones críticas que son vitales para las comunidades vulnerables que serían candidatos potenciales para paneles solares resilientes. y sistemas de batería. El equipo de CERI está trabajando para escalar un modelo financiero combinado para aumentar el acceso a estos sistemas para

instalaciones críticas. El equipo de CERI se complace en compartir los procesos de adquisición de aprendizajes y la estructuración de fondos para aumentar la energía resiliente y centrada en la comunidad.

#10: *Creación de empleos* (página 73)

Comentario:
Es importante reforzar la oportunidad para creación de empleos y generación de ingresos. RMI colaboró en un estudio reciente (https://microgridknowledge.com/microgrids-jobs-climate-americans/) que estima en 9000 la cantidad de nuevos empleos esperados en microrredes al 2030 y 1.2 USD billones en PIB.

#11*: Vehículos eléctricos (página 75)*

Comentario:
Se recomienda fomentar el uso de vehículos eléctricos e iniciar en el sector público mediante la masificación eléctrica del transporte público con el afán de demostrar el alcance y el impacto por persona en la movilización de la población.

#12: "*La Ley 17 elevó la cartera de energía renovable a un mínimo de un 20% para el 2022, 40% para el 2025, 60% para el 2040 y 100% para el 2050."* (página 86)

Comentario:
RMI estima que los sistemas de baterías y paneles solares ubicados en las instalaciones críticas de Puerto Rico por sí solos podrían representar aproximadamente más que 650 MW de generación.

#13: "*Como parte de la evaluación del proyecto, Vivienda evaluará los estimados de presupuesto para llevar a cabo las actividades de operación y mantenimiento durante la vida útil del proyecto. Es un requisito de Vivienda, para poder recibir fondos, que los solicitantes documenten su enfoque de Operación y Mantenimiento. Se puede realizar una consulta al Equipo de Consultoría Técnica (TCT, por sus siglas en inglés) en cuanto a evaluaciones técnicas específicas sobre viabilidad, según sea necesario."* (página 104)

Comentario:
Esto puede representar una barrera potencial para las entidades comerciales de propiedad local (por ejemplo, farmacias, organizaciones comunitarias sin fines de lucro, etc.) que sirven como instalaciones críticas para las comunidades de ingresos bajos y moderados y que tienen interés en una microrred de

paneles solares y batería. Algunos de estos propietarios de instalaciones carecen de la experiencia necesaria para diseñar y adquirir microrredes rentables y económicamente viables. Para priorizar un impulso de la comunidad para la resiliencia energética, los expertos técnicos con conocimiento de dichos sistemas deben estar disponibles para trabajar con estas instalaciones críticas para crear proyectos convincentes.

RMI también considera que las prácticas de operación y mantenimiento (O&M) y el desarrollo de capacidades son fundamentales para potenciar la resiliencia de la comunidad y la propiedad de las microrredes comunitarias. Al igual que en el diseño del proyecto, los solicitantes deben disponer de asistencia técnica para ayudarlos a crear planes de operación y mantenimiento significativos.

#14*: "Infraestructura de Medición Avanzada - $569,400,000*

a. Instalar Infraestructura de Medición Avanzada en todo Puerto Rico, con el propósito de mejorar la confiabilidad y la resiliencia, así como la experiencia del cliente." (página 63)

Comentario: Hay valores adicionales de la medición inteligente, incluido el avance de la red distribuida e inteligente según lo prescrito en la Ley 17.

#15: *Otras iniciativas*

Comentario:
Se recomienda evaluar y considerar otras iniciativas con enorme potencial para mejorar la resiliencia, descarbonización, y accesibilidad al servicio eléctrico, entre ellas:

- Iniciativa de eficiencia energética y uso racional de energía para proyectos solares. Cabe destacar la importancia de abordar proyectos de microrredes renovables tomando los pasos iniciales de eficiencia energética y mejoras en el consumo eléctrico para maximizar las capacidades de los sistemas a ser instalados.
- Combinación de fondos públicos, privados, y filantrópicos para proyectos para el financiamiento de microrredes comunitarias y para facilidades críticas. Buscar alianzas y colaboraciones con entidades financieras como las cooperativas y otra banca, organizaciones sin fines de lucro, y el sector privado para aumentar los recursos disponibles.
- Combinar esfuerzos en el uso de fondos públicos con entidades financieras de Puerto Rico que permitan/faciliten acceso a préstamos y condiciones favorables para proyectos parcialmente financiados con fondos públicos. Esto facilitará a los usuarios finales a poder costear el capital de los proyectos.
- Maximizar la disponibilidad de fondos públicos buscando equidad en el acceso a sistemas de energía solar con almacenamiento. Por ejemplo, brindar una subvención que vaya enfocada a la vida útil del proyecto y que vaya de la mano del ahorro obtenible.
- Microrredes comunitarias públicas donde se cree una red resiliente en los municipios de los servicios críticos como por ejemplo policía, clínicas, escuelas, y bomberos, entre otros servicios públicos. Así aumentar la resiliencia de los municipios a responder a desastres naturales y mantener servicios operando en caso que falle la red eléctrica.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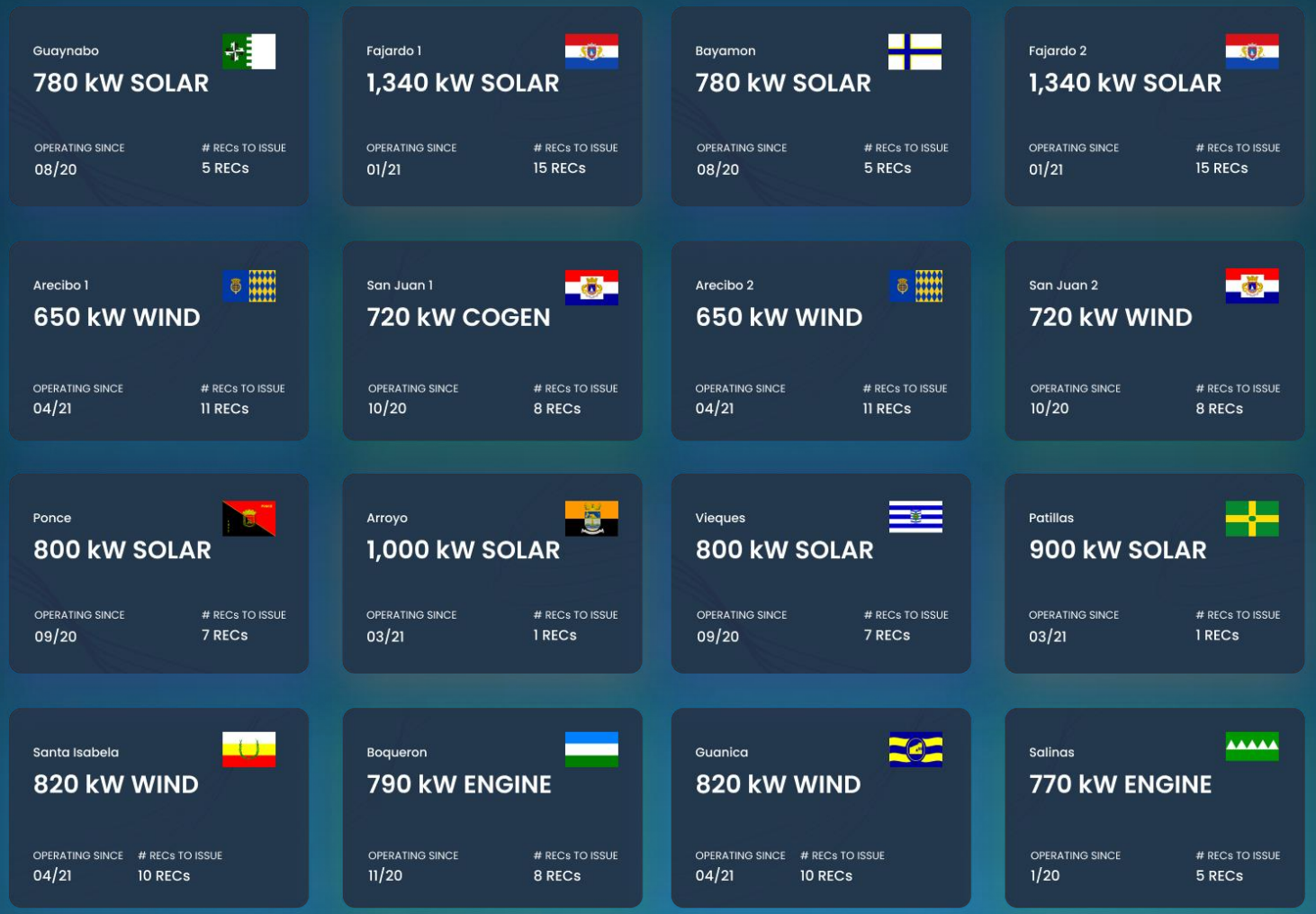
COMMUNITY MICROGRIDS

Resilient web of microgrids



Driving successful communities

ENERGY COMPANY

REGULATED IN PR

ANCHOR

MUNICIPALITY

DEXGRID

SOFTWARE

Municipality leadership

REGROUPING

BUSINESS ANCHORS

EASEMENT RIGHTS

GRID INFRASTRUCTURE

Enabling together!

LOCAL SPONSOR

MUNICIPALITY

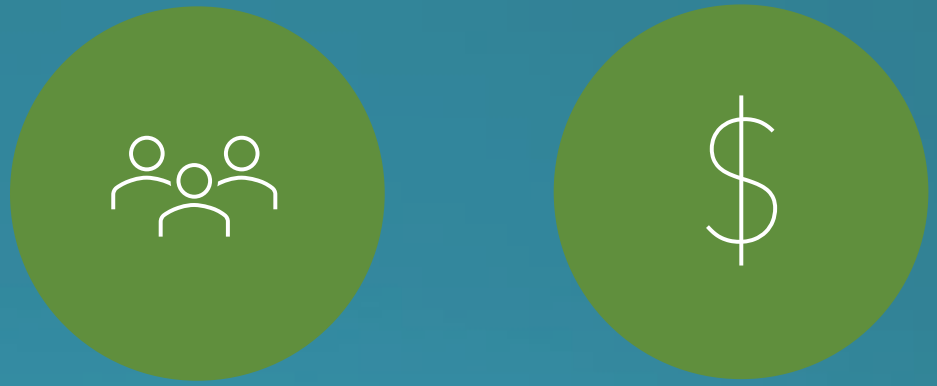
LOCAL ANCHOR

BUSINESS

MANUFACTURER

ASSOCIATION

GRIDLAUNCHER



MODELING

MICROGRID DEVELOPMENT

CAPITAL RAISING

OPPORTUNITY

Coordinating funding sources

SOURCE	PROGRAMS	DETAILS
• CDBG • USDA • Corporate • Bank loans • Private • Grants	• 3 programs • Rural • ESG programs • Energy loans • Investors • Public & private	• $2,800,000,000 • Loans & grants • PR & mainland • Collateralized • Equity based • Social inclusion

Opportunities for communities

ELECTRICITY

RELIABLE & ACCESSIBLE

JOBS

COMPANIES & STAFF

RESILIENCY

ECONOMIC & SOCIAL GROWTH

DexGrid solution

TURNKEY

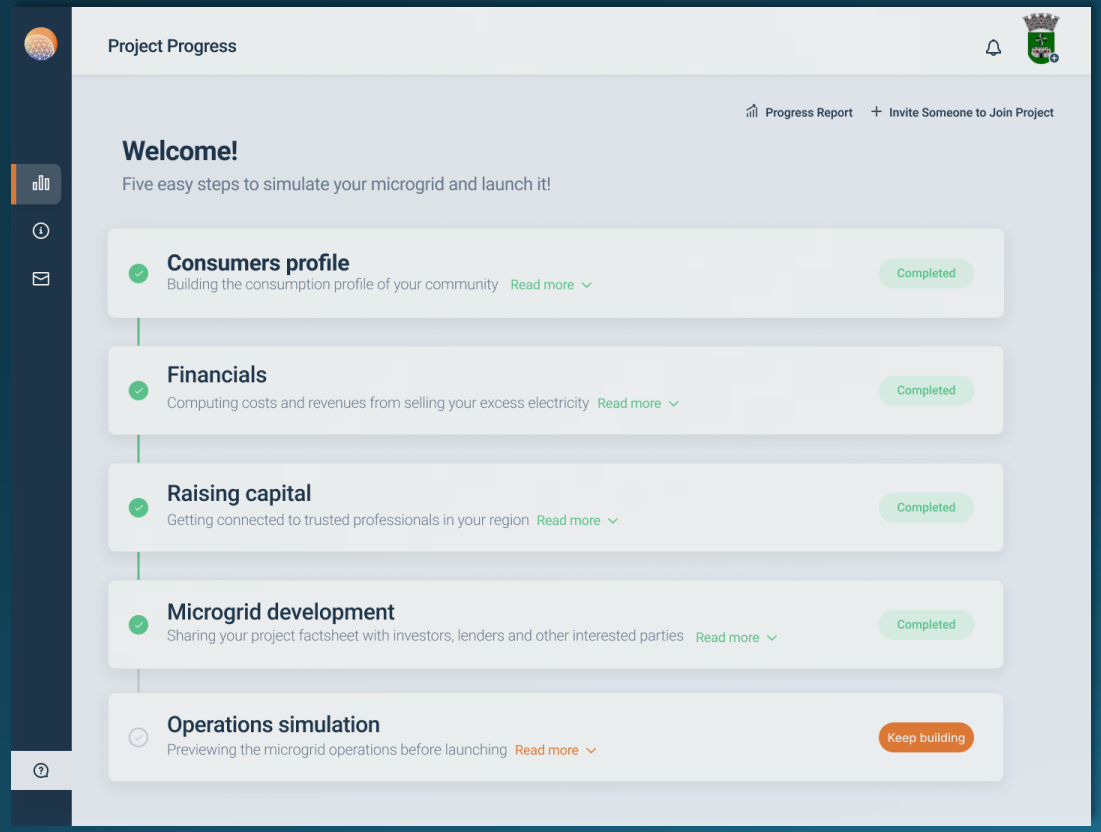
OPERATIONS

FLEXIBLE

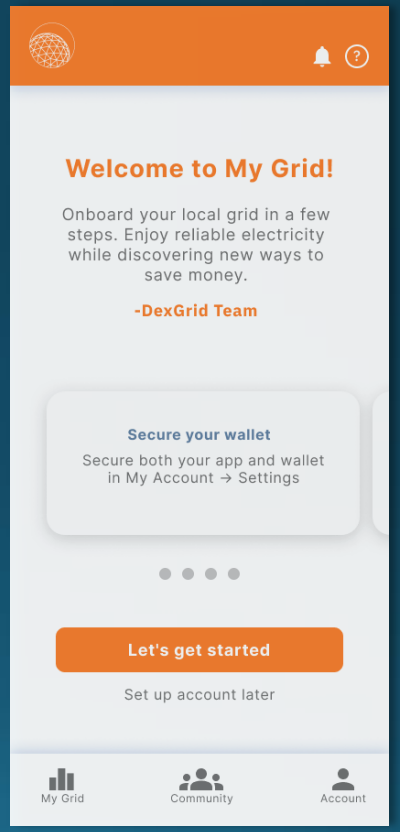
SIMPLE

SCALABLE

Our applications



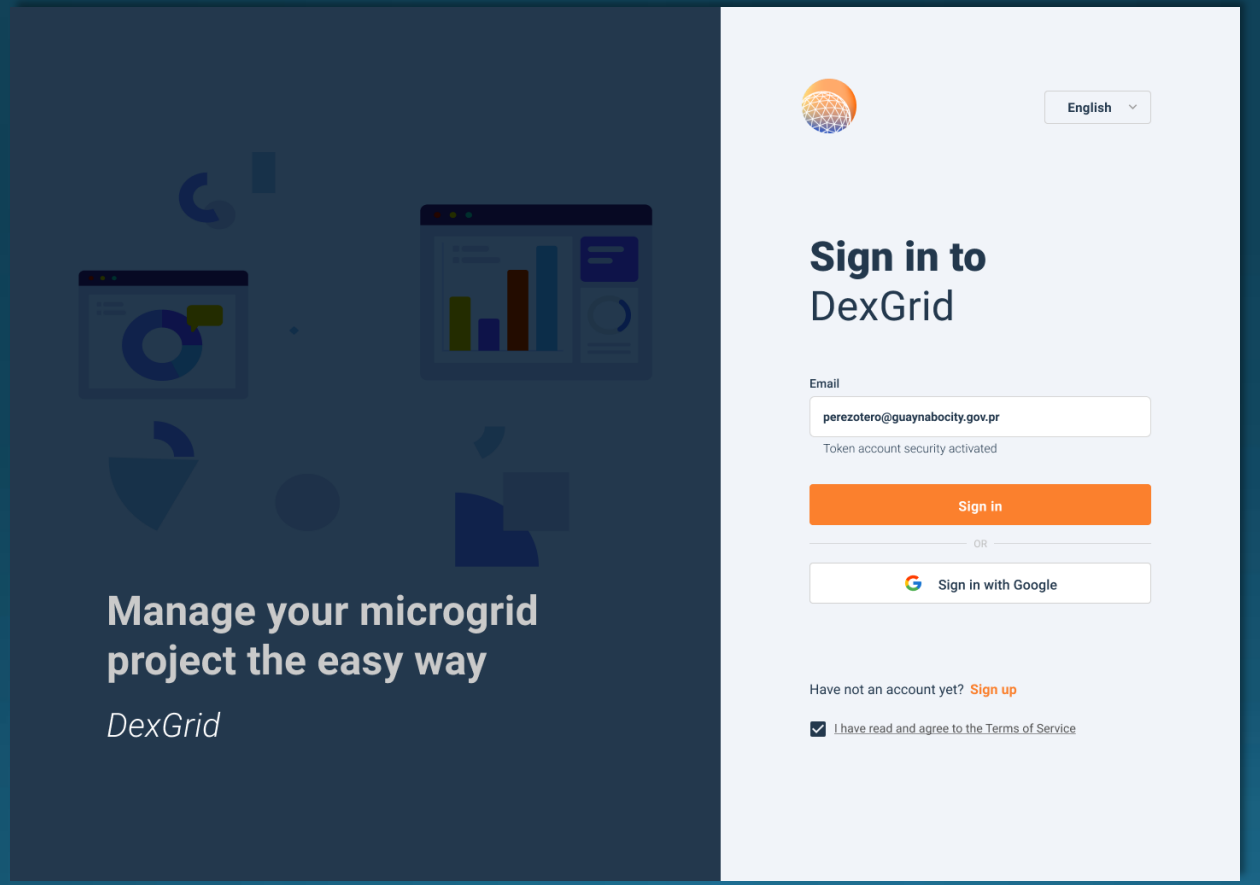
GRIDLAUNCHER APP



CONSUMER APP

Example ICC Community Anchor

Let’s build!


Manage your microgrid project the easy way
DexGrid
English
Sign in to
DexGrid
Email
perezotero@guaynabocity.gov.pr
Token account security activated
Sign in
OR
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I have read and agree to the Terms of Service

Thank you!

Proudly Puerto Rican

Questions?

info@dexgrid.io

23 de diciembre 2021

A: Hon. William O. Rodríguez Rodríguez
Secretario
Departamento de la Vivienda de Puerto Rico
PO Box 21365
San Juan, PR 00928-1365

De: Amy Orta Rivera
Coordinadora de Política Pública Ambiental
El Puente- Enlace Latino de Acción Climática Puerto Rico
San Juan, Puerto Rico
elac@elpuente.us

Asunto: ***Comentarios al Plan de Acción CDBG-DR para la optimización de la red eléctrica de Puerto Rico***

El Puente-Enlace Latino de Acción Climática Puerto Rico (ELAC) es un programa que se creó en 2015, con el objetivo de desarrollar proyectos y actividades educativas a nivel isla sobre el tema de cambio climático en Puerto Rico. ELAC surge como extensión de la organización sin fines de lucro El Puente de Williamsburg en Nueva York, que trabaja desde el 1986 por la paz y la justicia social en Brooklyn. En el contexto de Puerto Rico, nos encontramos trabajando junto a varias comunidades temas como la crisis climática, las transiciones justas, la mitigación, la adaptación al cambio climático y la energía renovable.

La política pública de Puerto Rico a través de la Ley 17-2019 (Ley de Política Pública Energética) y Ley 33- 2019 (Ley de Mitigación, Adaptación y Resiliencia al Cambio Climático de Puerto Rico,) son el referente para la transformación energética y por tanto para la utilización de fondos de recuperación. La Ley 33-2019 tiene entre sus propósitos el "*adaptar los sectores productivos e incorporar el análisis de la resiliencia al cambio climático en la planificación, las actividades, las infraestructuras y las edificaciones.*"[1] Esta Ley reconoce los riesgos inminentes que son exacerbados por el cambio climático, por tanto se debe proclamar el Principio de Precaución para reducir la exposición de las comunidades ante los peligros naturales. La disponibilidad de estos fondos es una oportunidad para que el gobierno de Puerto Rico pueda atender, no

[1] Art. 4, inciso 5, Ley Núm 33-2019

solamente las áreas que han sido impactadas, sino también el de cumplir con la política pública de Puerto Rico establecida para estos fines.

En el 2017 Puerto Rico sufrió uno de los más profundos impactos con los huracanes Irma y María y en el 2020 la serie de terremotos que dejaron a más de 1.5 millones de personas sin su servicio eléctrico. Al primero de octubre del 2017, sólo el 5 por ciento de los y las puertorriqueñas contaban con electricidad.[2] De manera directa e indirecta, el componente que cobró más vidas fue la ineficiencia energética. Reconocemos que un sistema de energía confiable es vital para poder mantener maquinaria y medicamentos de los que la gente depende para vivir en momentos de emergencia, pero también fuera de estas. Al presente Puerto Rico no solamente se encuentra vulnerable ante los desastres naturales, también por desastres políticos y sociales. Durante el año 2021 se han sufrido decenas de apagones afectando enseres eléctricos y otros equipos de importancia para la salud de la familia; se ha privatizado la distribución de la energía lo que aumenta el costo y el riesgo a su estabilidad como servicio esencial para las familias.

La cantidad histórica de fondos de Departamento de Vivienda Federal (HUD, por sus siglas en inglés) y Agencia Federal de Manejo de Emergencias (FEMA, por sus siglas en inglés) asignados para el sistema eléctrico de Puerto Rico deben invertirse en sistemas solares en techos o cercanos al lugar de consumo y alternativas similares para proveer acceso a la resiliencia energética a los sectores de bajos y medianos ingresos, que salvará vidas y aportará para lograr la justicia ambiental y climática. La justicia social requiere que la resiliencia energética no se limite a las personas de altos ingresos que puedan adquirir estos equipos. La viabilidad futura de Puerto Rico depende de que estos fondos se utilicen para promover el desarrollo económico local. De esta manera, estaríamos ampliando el acceso y garantizando un servicio esencial como lo es la electricidad. Desde nuestro trabajo, a través de los Oasis Energéticos nos dedicamos a la instalación de sistemas fotovoltaicos en centros comunitarios. La energía generada ayuda a preservar los suministros alimentarios y medicinas vitales, recargar los dispositivos electrónicos y las máquinas de apoyo a la salud, además de la creación de un espacio de encuentro comunitario, vital para la recuperación. Con esto, ofrecemos una capacitación comunitaria para continuar promoviendo los beneficios de las energías renovables.

Desde esta perspectiva, sometemos estos comentarios al Plan de Acción de los fondos CDBG-DR para la optimización de la red eléctrica de Puerto Rico:

[2] Centro de Periodismo Investigativo, *Hurricane María's Dead*, (encontrado el 22 de diciembre de 2021).

1. Destinar fondos a propuestas basadas en la energía renovable

El sistema eléctrico en Puerto Rico está centralizado con transmisiones de sur a norte que impactan la capacidad del sistema en momentos de desastres, relacionados o no al clima. Además, son líneas eléctricas de largas distancias que provocan vulnerabilidad al constituirse como sistemas más complejos. Nuestra experiencia con el huracán María y con los terremotos recientes, nos ha hecho evidente la necesidad de descentralizar las redes de energía, es decir que la generación de energía esté cerca del consumidor. Un sistema distribuido de generación de energía solar, que pueda estar centrado en techos representa una alternativa más resiliente para nuestro contexto. En casos de emergencia, permitiría la restauración de servicios de energía con mayor brevedad, atendiendo la responsabilidad de preservar la vida.

Acción requerida

- Solicitar que todo proyecto nuevo sea energizado por fuentes renovables de energía descentralizada, según lo establece la Ley 17-2019. La tarea a futuro debe concentrarse en priorizar y maximizar el uso de energía renovable y minimizar las emisiones de gases en proyectos de recuperación.
- Evaluar e incluir la propuesta de Queremos Sol y al Estudio de Integración de Energías Renovables como guía para la distribución de fondos destinados a mejorar el sistema eléctrico de Puerto Rico.
- Prohibir la utilización de fondos para proyectos industriales de energía solar en terrenos agrícolas y de conservación.

2. Implementar la propuesta local de Queremos Sol y Estudio de Integración de Energías Renovables

Así como la Autoridad de Energía Eléctrica (AEE), Autoridad de Acueductos y Alcantarillado (AAA), Luma Energy (LUMA) y los municipios afectados aportaron al Plan de Acción como parte del proceso de participación de las partes interesadas, entendemos que hay otra alternativa para la utilización de los $1.9 mil millones de dólares en fondos de reconstrucción al sistema eléctrico: la propuesta ciudadana Queremos Sol y el Estudio de Integración de Energías Renovables desarrollado por la organización de CAMBIO PR.

La propuesta de Queremos Sol fue conformada en el 2018 por un grupo de ciudadanos, organizaciones ambientales, académicos y profesionales en las áreas de energía, ingeniería, derecho y justicia social y ambiental. Las organizaciones y grupos fundadores son: Asociación de Empleados Gerenciales de la Autoridad de Energía Eléctrica, Sierra Club de Puerto Rico, la Unión de Trabajadores de la Industria Eléctrica y Riego, el Instituto de Economía y Análisis Financiero de la Energía, El Puente-Enlace Latino de Acción Climática, Centro de Educación de Ingeniería,

CAMBIO PR, Amaneser 2025, Coalición de Organizaciones Anti-Incineración, Amigos del Río Guaynabo, Comité Diálogo Ambiental, Asociación de Empleados Gerenciales de la Autoridad de Energía Eléctrica, Departamento de Biología y el Departamento de Ingeniería Eléctrica de la Universidad de Puerto Rico-Mayagüez y la Clínica de Asistencia Legal de la Escuela de Derecho de la Universidad de Puerto Rico. Recientemente, la Asociación de Contratistas y Consultores de Energía Renovable de Puerto Rico (ACONER) endosó la propuesta de Queremos Sol como la vía para transformar el sistema eléctrico de Puerto Rico.

Queremos Sol tiene como propósito presentar "una ruta energética hacia la autosuficiencia y la sostenibilidad, basada en el uso de recursos renovables endógenos, principalmente el sol, que promueve la tenencia y el progreso económico local mediante el uso de tecnologías renovables limpias y la implementación de procesos y estructuras inclusivas que persiguen sacar la política-partidista y eliminar la corrupción del sistema."[3] La ruta energética se basa en la instalación de sistemas fotovoltaicos en techos junto a sistemas de almacenamiento como lo son las baterías para guardar el exceso de energía y poder utilizarlos en momentos donde la luz solar no sea suficiente o en las noches.

En marzo del 2021, se publicó el Estudio de Integración de Energías Renovables, el cual detalla cómo la propuesta de Queremos Sol puede implementarse en Puerto Rico para alcanzar la mayor descentralización, estabilidad, resiliencia y que a la vez que se reduzcan los costos en comparación con los planes de la AEE. Entre los hallazgos más importantes se encuentran[4]:

- Se puede lograr que Puerto Rico tenga una generación de energía renovable distribuida de 75% al 2035.
- Se puede instalar en un 100% de los hogares en Puerto Rico, sistemas con capacidades de 2.7kW y almacenamiento de 12.6kW para proveer 2,700 MW.
- Ayudaría a reducir nuestra dependencia de los combustibles fósiles, así como de los precios en el mercado de estos. Es decir, que se puede reducir unos $430 millones al año.
- Al 2035, seríamos un país de vanguardia al reducir significativamente nuestra contribución de dióxido de carbono a la atmósfera en un 70%.
- Queremos Sol conlleva una inversión de $5,000 millones menos que el Plan Integrado de Recursos de la AEE.[5]

[3] Queremos Sol (2020), *Sostenible, Local y Limpio* p. 4.
[4] CAMBIO (2021), Queremos Sol, Queremos Más, p.2-3
[5] Ibid p. 15.

- En la medida que se integren los paneles fotovoltaicos en techos y sistemas de baterías, las unidades de combustibles fósiles de Applied Energy Systems (AES), Palo Seco y Aguirre se pueden retirar.[6]

El Estudio llegó a esos hallazgos gracias a que utilizaron modelos para simular diversos escenarios de generación, transmisión y distribución de energía. Uno de los asuntos más interesantes de este estudio es que uno de esos modelos es de Siemens Industry y es el mismo que utilizó la AEE para crear el Plan Integrado de Recursos. Sin embargo, la AEE no propone una transformación radical al sistema eléctrico y esas faltas le van a costar al país más de $15 mil millones de dólares, mientras que la propuesta de Queremos Sol tiene un costo de un poco más de $10 mil millones de dólares.[7]

Acción requerida

- Una de las maneras para implementar Queremos Sol con los fondos del Departamento de Vivienda es utilizar menos de $235,322,500 para cubrir los 270 MW de la Generación de Emergencia. Según el Plan de Acción el plan original de la AEE, y que el Negociado de Energía de Puerto Rico le denegó, era utilizar este monto para nueve (9) turbinas de gas.[8] Nos parece pertinente separar una partida para la Generación de Emergencia diferente a la propuesta por la AEE. Por eso solicitamos que se priorice la propuesta de Queremos Sol para estos fines.
- Creemos firmemente que si deseamos alcanzar la mayor integración de energías renovables conforme a la Ley 17-2019 (Ley de Política Pública Energética de Puerto Rico) es responsabilidad del Estado procurar que hayan partidas que prioricen la integración de energías renovables en techos sean más allá que la generación de emergencia.

3. Panorama incompleto del Sistema Eléctrico

Destacamos que uno de los errores del Plan de Acción es que no menciona a la planta de gas metano de ciclo combinado de New Fortress Energy (NFE), también conocida como San Juan 5 y 6, como parte del sistema eléctrico actual de Puerto Rico.[9] El Plan de Acción solo menciona a solo dos productores de energía independientes: Applied Energy System (AES) y a EcoEléctrica. Según información provista por la Autoridad de Energía Eléctrica, las plantas que dirige NFE tienen una capacidad de 440 MW. [10] La importancia de esta distinción recae en que averías

[6] Ibid p. 8-10.
[7] Ibid p. 16.
[8] Puerto Rico Disaster Recovery Action Plan (2021), *Electrical System Current Situation*, p. 57
[9] Ibid, p. 53.
[10] Autoridad de Energía Eléctrica, *Generación de Sistema Eléctrico*. Encontrado el 21 de diciembre de 2021.

durante el 2021 en las plantas de San Juan 5 y 6, han dejado a miles de personas sin servicio eléctrico. El Plan de Acción reconoce que la AEE ha hecho esfuerzos para convertir algunas unidades de diesel a gas metano con el pretexto de reducir costos en combustible.[11] También se menciona que la dependencia al costo volátil impacta negativamente a los abonados y a la economía de Puerto Rico. Sin embargo, no se menciona el ahorro económico, si alguno, de tener a New Fortress Energy como productor independiente de energía.

Acción requerida

- Descartar el gas metano como fuente de energía de transición. Entendemos que si se pretende maximizar el uso de fondos federales, no se deben utilizar para 'mejorar' plantas de gas metano o utilizar el dinero para convertir plantas de diesel a gas metano. Sin importar cuantas mejoras o conversiones se realicen con dineros federales a generatrices de combustibles fósiles, el mercado global es el regulador de los costos de los combustibles, por lo que Puerto Rico quedaría atado a costos insostenibles.
- Maximizar el uso de los fondos federales para la instalación de pequeños sistemas solares en techos, sistemas de almacenamiento de energía, así como se expresa en el estudio de Integración de Energía Renovable realizado por CAMBIO.
- Disminuir la dependencia energética a los combustibles fósiles y sus costos.

4. Proyectos Industriales de Energía Solar en terrenos agrícolas y de conservación

Se ha documentado que Puerto Rico enfrenta una pérdida histórica de 70 por ciento del suelo para usos agrícolas desde 1966. Recientemente, el Negociado de Energía dio su autorización al menos a 16 proyectos que en conjunto representan más de 14 mil cuerdas de terreno de valor agrícola y ecológico afectado directamente por estos proyectos. La extensión de Puerto Rico es de 2.1 millones de acres, de los cuales 474,332 (22%) son clasificados como agrícolas según el censo del Departamento de Agricultura Federal (USDA, por sus siglas en inglés) en el 2018. Sin embargo, el gobierno está obligado por ley a validar el Plan de Uso de Terrenos. Dicho plan clasificó alrededor de 635,000 cuerdas de terrenos como Suelo Rústico Especialmente Protegidos de Valor Agrícola; áreas designadas únicamente para uso agrícola. La producción de energía de manera industrial, como lo son las fincas solares, no es compatible con la producción agrícola. Los efectos de expandir la urbanización e impermeabilización de los terrenos para estos proyectos conllevan: la degradación de los suelos y del paisaje que impide los cultivos y afecta al turismo, la reducción de la capacidad para almacenar (secuestrar) carbono, afectar los abastecimientos de agua, aumentar la dependencia de comida importada del extranjero (actualmente de un 85%) y la pérdida histórica del área agrícola. Proyectos industriales que se encontraban establecidos al paso de los huracanes Irma y María se vieron inmensamente

[11] Puerto Rico Disaster Recovery Action Plan (2021), *Electrical System Current Situation*, p. 54

afectados a diferencia de los efectos de las placas solares en techos de hogares. Estos proyectos no representan una resiliencia energética y una sostenibilidad a corto y largo plazo.

Acciones requeridas

- Viabilizar la generación de energía solar a través de placas solares en los techos y sistema de batería en los hogares.
- Prohibir el uso de fondos de recuperación para el desarrollo de proyectos industriales de producción de energía en terrenos agrícolas y de valor ecológico.

5. Justicia Energética

A través del American Rescue Act Plan, El Programa de Política Pública Energética del Departamento de Desarrollo Económico y Comercio tiene una partida de $20 millones de dólares para la instalar sistemas fotovoltaicos en pequeños y medianos comerciantes.[12] Cada comerciante hace una solicitud para la cual puede recibir hasta $25,000 para obtener su sistema de energía renovable. Un concepto similar a esta iniciativa del Gobierno es el que propone Queremos Sol y al que se puede desarrollar para la instalación de energía renovable en techos de los hogares.

Acción requerida

- Instalar estos sistemas en los techos de familias cumple con el principio de justicia energética, el cual busca que toda persona pueda tener acceso y beneficiarse de una sistema estable, limpio y económico.[13] Así como muchos pequeños y medianos comerciantes se beneficiarán de los fondos del American Rescue Act Plan, solicitamos que se tomen en consideración a familias de escasos recursos para que de igual manera participen de la transformación energética trazada por el Plan de Acción.

Consideraciones y conclusiones

Queremos resaltar el apoyo por parte del Congreso a una transformación energética diferente utilizando los fondos federales. El 25 de febrero de 2021, los miembros del Congreso de los Estados Unidos: Alexandria Ocasio-Cortés, Nydia Velázquez y Charles Schumer declararon en una carta hacia FEMA lo siguiente (véase anejo).

- La dependencia a combustibles fósiles afecta desproporcionadamente a las comunidades en más desventaja económica.

[12] Departamento de Desarrollo Económico y Comercio, *Apoyo Energético*, (encontrado el 22 de diciembre de 2021).
[13] *Initiative for Energy Justice, What is Energy Justice, (encontrado el 22 de diciembre de 2021).*

- Solicitan a FEMA que requiera a la AEE promover la generación de energía descentralizada utilizando energías renovables en techos y sistemas de almacenamiento de energía.
- Se debe invertir en descentralizar todo el sistema de transmisión y distribución.
- Utilizar dineros federales para crear energía renovable distribuida en Puerto Rico para romper con el ciclo de daños por desastre y reconstrucción.
- Resaltan que en una carta, FEMA establece que no hay una ley o regulación que prohíba a que Puerto Rico o a la AEE propongan proyectos de microredes.

Conclusión

Como organización a la que le ocupa fortalecer la capacidad local y nacional en temas relacionados principalmente al ambiente y al sistema energético, entendemos que los fondos CDBG-DR representan una oportunidad para mejorar las condiciones de las comunidades ante eventos de emergencia, como también a una mejor calidad de vida para las poblaciones que se han visto más afectadas históricamente. Nos basamos en la experiencia de que en la medida que las comunidades se encuentran fortalecidas, tienen mejores herramientas para enfrentar momentos de crisis, entre ellas las crisis climáticas-sociales.

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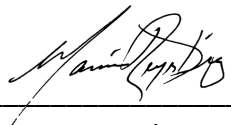
Amy Orta Rivera
Coordinadora de Política Pública Ambiental

_____

Grace Blanco Rosario
Coordinadora de Alcance Comunitario



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Marissa Reyes Díaz
Coordinadora de Movilización

Anejo

Congress of the United States
Washington, DC 20515

February 25, 2021

Deanne B. Criswell
Administrator Designate
Federal Emergency Management Agency
500 C Street, SW.
Washington, DC 20472

Robert J. Fentor, Jr.
Acting Administrator
Federal Emergency Management Agency
500 C Street, SW.
Washington, DC 20472

Dear Ms. Criswell & Mr. Fentor:

We write to you to express our deep concern regarding how the estimated $9.6 billion in Federal Emergency Management Agency (FEMA) funds may be used to repair Puerto Rico's electrical grid.[1] The historic amount will be made available to the Puerto Rico Electric Power Authority (PREPA) to repair the damage to its electric grid caused by Hurricane Maria and other natural disasters. However, these funds will perpetuate the existing vulnerable centralized transmission and distribution system – while further entrenching fossil fuel generation infrastructure on the island for decades to come – if they are used in the way currently intended by PREPA. We are supportive of the call the Puerto Rican people have made for an electrical grid based on distributed renewable energy as evidenced by the work of grassroots advocacy organizations. We urge your agency to reconsider how these funds will be used and encourage the creation and implementation of a plan to best serve the people of Puerto Rico in the face of a changing climate.

As you know, Puerto Rico has endured the damage and suffering of frequent natural disasters. In September 2017, Hurricanes Irma and Maria struck the island and made landfall two weeks apart, demolishing and devastating much of Puerto Rico's electricity transmission and distribution infrastructure and water services.[2] In January 2020, the island was then hit by a 6.4 magnitude earthquake, and ensuing aftershocks, which left two-thirds of the population of Puerto Rico without power. The earthquakes significantly damaged two of the island's natural gas-fired power plants. Two months after the disaster, thousands of Puerto Ricans were still living outside with

[1] The Wall Street Journal, "Trump Administration Grants $11.6 Billion in Aid to Puerto Rico" https://www.wsj.com/articles/trump-administration-to-announce-11-6-billion-in-aid-for-puerto-rico-11600440469
[2] RAND Corporation, "Hurricanes Irma and Maria: Impact and Aftermath" https://www.rand.org/hsrd/hsoac/projects/puerto-rico-recovery/hurricanes-irma-and-maria.html

hundreds of families unable to pay for their damaged homes.[3] Today, Puerto Rico still faces severe challenges in its recovery.

In 2019, Puerto Rico's legislature enacted and the governor signed into law the Energy Public Policy Act which requires PREPA to have 40% of its electricity generated by renewable sources by 2025, 60% by 2040, and 100% by 2050. Puerto Ricans do not want to depend on fossil fuels and gas and coal companies any longer. However, recent data demonstrates that 75% of the energy generated in Puerto Rico comes from imported petroleum products and in 2020 petroleum-fire plants generated almost 50% of Puerto Rico's electricity, 29% was generated using natural gas imports, and only 2.5% of total electricity generation was from renewable sources of energy.[4] Puerto Rico's dependency on fossil fuels means its population pays two to three times higher for electricity than the mainland United States.[5]

Currently, much of the existing energy infrastructure in Puerto Rico is in flood-prone areas at risk from sea-level rise, storm surge, tsunamis, or other flooding risks. These vulnerabilities have led to constant outages on the island, community displacement, and harm to local economies. Furthermore, the island's electric grid is highly centralized and large fossil fuel generation plants in southern Puerto Rico must transmit power to demand centers in the north using long transmission lines that cross the island's central mountain range, making Puerto Rico's power system exceptionally vulnerable to natural disasters.

Those existing vulnerabilities will be compounded by PREPA's most recent infrastructure investment plan. In December 2020 PREPA submitted to your agency a ten-year Infrastructure Modernization Plan (IMP) setting forth how it intends to use the $9.6 billion allocation of federal disaster relief funds, including the earmarking of $853 million for the construction of new natural gas generation infrastructure, in direct violation of the twenty-year Integrated Resource Plan (IRP) approved by the Puerto Rico Energy Bureau (PREB). This continued dependence on fossil fuels, which will cause disproportionate harm to Puerto Rico's poorer communities, should not be perpetuated by PREPA nor abetted by FEMA. Instead, FEMA should require PREPA to promote the installation of distributed electricity generation capacity using renewable energy sources, including photovoltaic and battery energy storage systems and rooftop and onsite solar to be installed by a trained workforce in coordination with local contractors and direct community input.

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[3] The New York Times, "Months After Puerto Rico Earthquakes, Thousands Are Still Living Outside" (March 01, 2020), https://www.nytimes.com/2020/03/01/us/puerto-rico-earthquakes-fema.html

[4] U.S. Energy Information Administration, "Puerto Rico Territory Energy Profile" https://www.eia.gov/state/print.php?sid=RQ#:~:text=Under%20the%20Puerto%20Rico%20Energy,coal%2Dfired%20generation%20by%202028.

[5] EIA, "Puerto Rico: Territory Profile and Energy Estimates" https://www.eia.gov/state/data.php?sid=RQ

By inducing PREPA to invest in and focus on decentralizing its electricity transmission and distribution system, while relying on distributed energy generation using renewable resources, Puerto Rico will break its dependence on fossil fuels, become more resilient, and develop the capability to restore electric power efficiently and quickly after natural disasters. And, in the process of decarbonizing the electric grid, FEMA will also be supporting massive job creation programs and protecting the livelihoods and health of local populations.

In November of 2020 our colleagues Senator Schumer and Representative Velazquez wrote to your predecessor making the case for an environmentally friendly electrical grid.[6] We fully endorse that petition and were excited to hear in FEMA's response that there "are no governing statutes, regulations, or guidance that prohibit Puerto Rico or PREPA from pursuing and proposing power grid projects that support renewable generation and storage in their recovery solutions" and that there "are no governing statutes, regulations, or guidance that prohibit Puerto Rico or PREPA from pursuing and proposing microgrid projects in their recovery solutions.". **Earmarking federal funds to transition to distributed renewable energy systems would break the vicious cycle of disaster damage, reconstruction, and repeated impairment of the vulnerable, centralized transmission and distribution system while also extending energy resilience to the poorest sectors of the population that cannot afford the life-saving transition away from fossil fuels absent federal investment.**

We commend the Biden administration for working to expedite other sources of desperately needed aid to Puerto Rico and we look forward to working with you to secure a greener, energy independent Puerto Rico.

Sincerely,

Alexandria Ocasio-Cortez
Member of Congress

Charles E. Schumer
United States Senator

Nydia M. Velàzquez
Member of Congress

[6] InsuranceNewsNet, "In New Letter To FEMA, Leader Schumer And Congresswoman Velazquez Seek Answers On How Its $10 Billion Grant To Puerto Rico Ensures Rebuilding A Stronger, Environmentally Friendly Electrical Grid" (November 17, 2020) https://insurancenewsnet.com/oarticle/in-new-letter-to-fema-leader-schumer-and-congresswoman-velazquez-seek-answers-on-how-its-10-billion-grant-to-puerto-rico-ensures-rebuilding-a-stronger-environmentally-friendly-electrical-grid

/s/
Raul Grijalva
Member of Congress

/s/
Mark Takano
Member of Congress

/s/
Earl Blumenauer
Member of Congress

/s/
Jerrold Nadler
Member of Congress

/s/
Grace Meng
Member of Congress

/s/
Mark Pocan
Member of Congress

/s/
Adriano Espaillat
Member of Congress

/s/
Darren Soto
Member of Congress

/s/
Mike Levin
Member of Congress

/s/
Albio Sires
Member of Congress

/s/
Mondaire Jones
Member of Congress

/s/
Ritchie Torres
Member of Congress

/s/
Kathy Castor
Member of Congress

/s/
Jamaal Bowman
Member of Congress

MAIN GOAL: Implement a Collaborative Entrepreneurship Plan focused on Community Empowerment and Resilience. PADF as a Center for Social Justice Programs, Business Incubation and Labor Training.

ARTIVISM: Performing Arts, Creative Industries and Cultural Factories will be used as the central strategy for the eradication of prejudice, discrimination, racism and abuses of power. We are fighting against such destructive actions with innovative programs. With the development of other industries that contribute to the social, economic and community enforcement of the east-central area of Puerto Rico, from a rural area of San Lorenzo. Labor Training and Micro-Enterprises, apart from opening the way to obtaining jobs in a more formal and professional way, will provide a new perspective to the industry with the identification of creative goods, promotion of innovative companies, formation of

audiences, creation of audiences, social security, preservation of spaces, greater financial stability in communities and less dependence on government entities. All focused-on projects of social justice, equity and inclusion.

Some of the initiatives and benefits included in this project:

1. Different Creative Industries (activities that integrate heritage, arts, media and creative services) will become Cultural Factories (incubation of cultural and creative activity, which generate immediate economic impact).

2. Integrated into other service programs and product offerings in stages of innovation and renewal with other Industries: Tourism, Agricultural, Gastronomic, Textile, Technological, Medical and Manufacturing.

3. Social entrepreneurship of collaborative work, cooperative practices, solidarity economy, green tourism and renewable energy, through alliances and boards of various sectors.

4. Grant Programs will allow us to demonstrate the growth capacity and socio-economic development of these industries for the most vulnerable sectors of our country. Affected by deteriorated demographic area, low education, lack of jobs and / or consequences of disasters such as atmospheric phenomena
two (Hurricanes Irma and María), earthquakes (earthquakes) or recently occurred health situations (Covid 19).

5. As Incubator and Accelerator, PADF will establish and comply with the National Action Plan for Recovery, Reconstruction and Resilience, for San Lorenzo and its communities, and from there to other towns in the east-central region. In its evolution, it will encompass and impact the entire island.

6. It will establish an organizational and operational structure, with proven business strategies and will promote a program of strengthening, supervision and support, in solidarity economy environments. It will serve as a link to various collaboration structures, where they can create and work in an inclusive way, with a diversity of services, products, disciplines and self-management modalities.

7. Institute of Puerto Rican Culture and Company of Commerce and Exportation, in interagency alliances, established a training and mentoring program to promote Cultural Factories as a business model in development and growth processes. This essential and meritorious management allows us to strengthen our heritage and infrastructure, as well as the production of related goods and services. PADF shares this vision and embraces it as a community mission.

8. In the country there are several initiatives and alternative spaces, with business management through Creative Industries as the central axis. But the model promoted by

PADF will be the first of its kind and will certainly have an immediate impact with great initial appeal in Puerto Rico. It will arouse the interest of foundations with grant and investment possibilities, willing to contribute with this economic formula. Business Movement to be replicated in each region.

9. ConsultCom, an organization recognized for being Designers of the Incubator Model of Solidarity Community Microenterprises (iMECs), reflected in a Book, will train PADF personnel to obtain Incubation Certification that reinforces the accompaniment processes. In addition, they will be providing advisory and mentoring services to micro-businesses.

10. Cultural Investment, organization with training workshops in entrepreneurship development, with Creative Industries, will be an integral part of the project, offering mentoring support. They promote our integrated business model, with support resources for organizations and entrepreneurs to execute processes with excellent results.

11. The concept "Creative Industries" was instituted in France in the 70s, and has gained ground and visibility, (it is a primary source of income for a large part of the population in Europe, Latin America and of course, the United States). Creative industries are estimated to represent between 4-6% of the world's Gross Domestic Product (GDP) and generate between 3-5% of total employment. As the architect of many initiatives, it is a support for artistic and cultural work, especially with a social and community focus, representing an opportunity for self-management with significant income to the government, until it is able to leave direct dependence on subsidies.

12. Based on current data, and as part of the Creative Industries model, we present as a vehicle for commercial conjuncture, the concept of Micro-Theater (short-term plays with few audiences and in reduced spaces) that, in tune with our new reality and The need for resilience, after the pandemic, is a perfectly pertinent solution to comply with sanitary and adaptable standards. Mode widely used in the world, around which an entire economic, tourist and cultural movement develops. The Micro-Theater began in Spain in 2009 and is a source of employment for an immense range of trades in Miami, Mexico and Argentina, as well as in the United States, which maintain different versions of the concept. Theater as an economic activity is labor intensive and inclusive, and allows for a diversity of roles that represent economic opportunity for local workers. As an artistic activity, it causes indirect impacts on businesses surrounding the events.

13. PADF will have a complete administrative enforcement and oversight team, so that all purchasing, disbursement, and compliance with tax and legal matters are carried out to the letter. Certified Public Accountants and Attorneys with vast experience and knowledge.

14. PADF will provide physical spaces for gastronomy, technology, domestic agriculture, design, media, manufacturing, health and wellness and coordination of various services. The arts in different manifestations and modalities will be the main and unifying attraction.

15. The center will maintain, at the same time, services with a social focus, in prevention, education and / or rehabilitation. Due to the current conditions of a new reality, micro-theater will be a very successful modality in the immediate future, and therefore, micro-companies that develop in their environment, in the same way, will receive the necessary impulse and visibility to become effective and favored. PADF will have a café theater and an experimental room (multipurpose) for audiences of different functions.

16. This PADF initiative with the SBIA will promote economic and community development, with suitable spaces for training, qualification, employment experience and the establishment of new transition processes towards the labor and / or business world.

17. Many communities will be able to rehabilitate themselves physically and emotionally, from the obvious damage caused by Hurricanes Irma and María for Puerto Rico. Vulnerable sectors that today more than ever, face marked pitfalls and difficulties, caused by the imposition of austerity measures with the Fiscal Oversight Board, abrupt change of government, earthquakes, onset of pandemic, cancellation of activities, reduction of employment opportunities and greater accumulated economic and health difficulties.

Multiplying effect of the implementation of our project in the rural area of San Lorenzo:

- As the managing and custodial agency, it will seek to implement the plan immediately, with its own testimonial empathy.
- Socio-economic heritage and legacy in the short-medium-long term.
- Policy of inclusion and solidarity with the most vulnerable sectors of our population, which has lost and diminished income and even see the possibilities of improvement and resilience disappear.
- Main objectives for the use of these funds; precisely to be a vehicle for recovery and self-sustainability throughout the country.
- Training strategies assisted by the collaborative entrepreneurship approach and monitored from start to finish with creative industries as a unifying link.
- Opportunity to have specialists in all areas of education, training, construction, services, products.
- The revitalization of the area has a direct impact, but also indirect, causing a movement economic vital and necessary for our most marginalized and most vulnerable populations. It will be a network of resilient support to the region.
- As a non-profit organization, with high experience, communication and community entrepreneurship, in charge of such an important grant allows citizens to be involved in processes of creation, empowerment and revitalization of spaces that new entrepreneurs will use.
- Sense of belonging, empowerment and solidarity economy, which do not occur in the same way, when it is a private entity, those who manage incubation programs and/or training.
- The variety of services and benefits will be very wide in Counseling and Mentoring: General Orientation, Training Basic, Interactive Workshops, Business Model

Development, Administrative Guide, Marketing and Strategic Plans, Legal Aspects, Contracts, Requirements, Regulations, Permits, Incentives, Risk Mitigation, Drills, Insurance, Technology, Marketing, Access to Capital Investments and / or Self-Sustainability, etc.

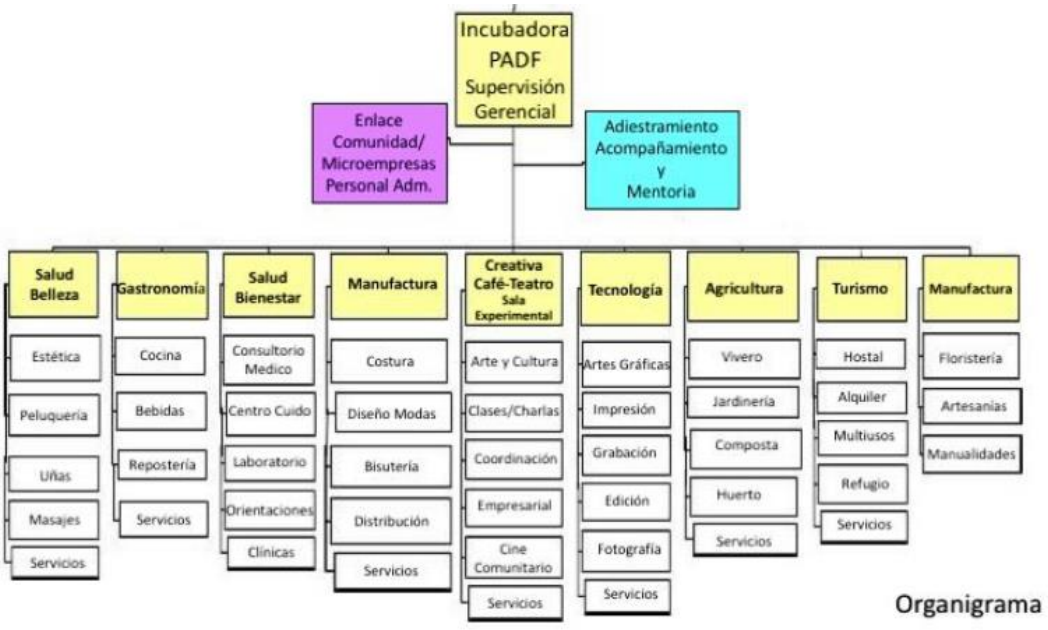
- Resilient circumstances, linked to the innovation of integration of Creative Industries with Other Industries, as an economic solidarity movement, will open a market to develop the concept in other parts of the country, as is happening in the world.
- Economic development through new jobs prevents growth of socially alarming aspects: desertion school, delinquency and criminality in different modalities. High vulnerability sectors (due to high poverty rate and unemployment), they will begin to be and feel protected.
- People with different capacities, minorities, marginalized sectors, women, disadvantaged families, will be able to direct different prevention, rehabilitation, improvement and / or entrepreneurship processes. Vulnerable sectors will have a voice through the creative industries and their derivatives.
- Students, Apprentices, Entrepreneurs in training, prospects in different fields of workforce, related to culture, education, art and community, they will be able to live holistic experiences that contribute to a inclusive socialization environment. Thus, we avoid triggers and such harmful manifestations (such as some recent) of groups with antagonistic roles.
- Artists, Cultural and Educational Managers. Creatives and Specialists in different disciplines, will be resources for Train new prospects and, at the same time, be able to cover their own employment and self-management needs.
- Multidisciplinary functional center for community, cultural, educational, artistic and economic entities, such as direct service to citizens.
- Productive, effective, and continuous and permanent activities. Entertainment alternative that does not represents being a danger zone.
- Opportunity for new alliances with entities that use the arts as a form of impact to provoke positive changes in behavior, minimizing risk factors in populations and spending time on resilient activities.
- Exchange of Cultural and Educational Initiatives, artistic, professional and community presentations, will open additional channels of collective work.

We can provide further information, evidence, and implementation efforts. We have the language barrier to be able to communicate more effectively, but with a translator in the initial stage, we are sure that we will be able to establish ties of inclusion and openness for the good of our most disadvantaged communities.

Interiores de Estructura

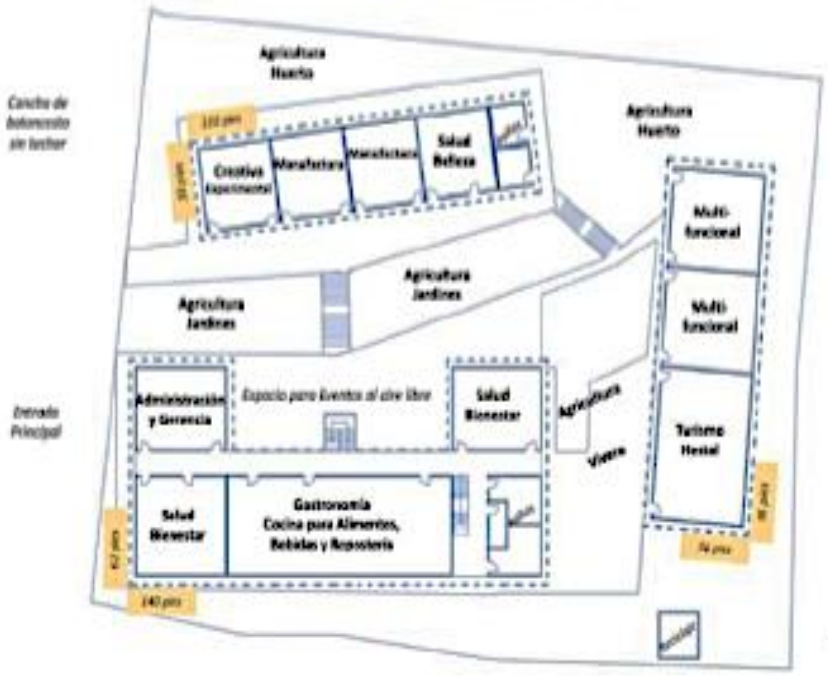
Exteriores de Estructura

La estructura, tanto en exterior, como en interior, aun es rescatable. Paredes, puertas, ventanas, sistema de rejas, baños, y verja necesitan reparación. En varias áreas, se requiere remoción y sustitución. Reconstrucción y empañetado de paredes, escaleras, áreas comunes y rampa (construir una o dos). Tratamiento de techo, instalación de placas solares, revisión sistema eléctrico, agua potable-cisternas, internet, etc.

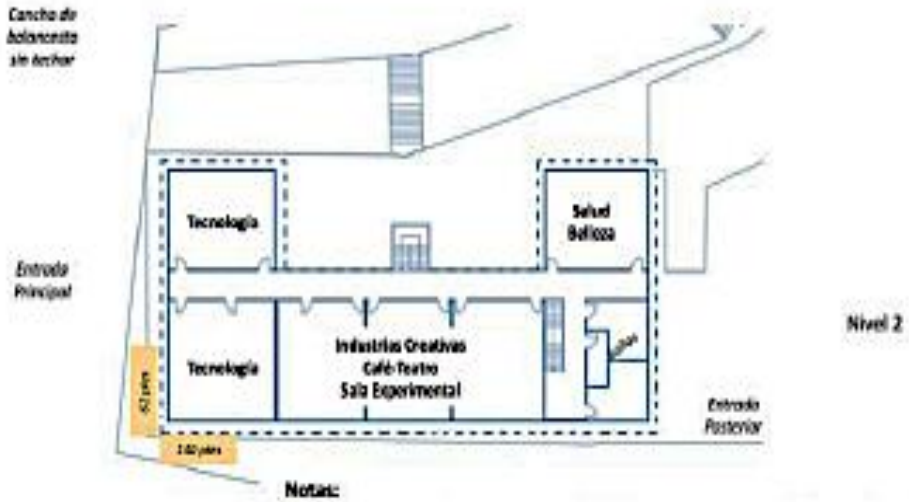


Organigrama

CROMA CREATIVO COMUNITARIO
CENTRO de INCUBACION EMPRESARIAL PADF



CROMA CREATIVO COMUNITARIO
CENTRO de INCUBACION EMPRESARIAL PADF



Notas:

- Estructura en condiciones aptas para rehabilitación y reconstrucción de áreas afectadas.
- Las instalaciones estarán rodeadas de portones, verjas y controles de acceso.
- Estacionamiento al frente de instalaciones y una cancha de baloncesto, sin techar.
- Baños en ambos pisos y en las demás estructuras del primer nivel.
- Algunas rampas de acceso disponibles y se construirán otras adicionales.
- Se colocarán sillas y mesas en patio exterior, que cuenta con dos pequeñas tarimas.
- Instalación de placas solares, resuelve problemas y altos costos de electricidad.
- Tres áreas de disposición de servicios. Se establecerá programa de reciclaje.
- Se gestionará construcción de acueducto comunitario.
- Centro disponible para refugio y programas de resiliencia comunitaria.

PRODUCTORA ÁNGELES-DEL-FIN

REVISTA INFORMATIVA

En esta Edición

- ¿Quiénes somos y qué hacemos?
- Impacto Comunitario y Creativo
- Nuestra Trayectoria...

¿Quiénes somos y qué hacemos?

Nacimos por una genuina preocupación de jóvenes, con motivación y positivismo, residentes en un lugar sin opciones reales de superación. Decidimos llevar un mensaje de impacto, entretenido, dinámico e interactivo con oportunidad de integración y colaboración. Nuestros integrantes forman parte de una "gran familia" para transmitir actitud positiva y buena energía a través de sus dones y talentos. **Ayudamos a alcanzar metas profesionales, a vencer obstáculos personales y familiares y a mantener una buena salud mental.** Buscamos integración y descartamos competencia desigual. Laboramos con amor, compromiso, liderazgo, inclusion, tolerancia, transparencia, sentimiento solidario y empático.

Impactamos poblaciones intergeneracionales, en comunidades de alto riesgo en: delincuencia, deserción escolar, uso de sustancias controladas, actitudes autodestructivas. Caracteristicas limitantes como: bajo ingreso, poca escolaridad, problemas de desempleo, impedimentos, familias con caracteristicas no tradicionales, crianzas dificiles y otros males sociales. **Extendemos nuestras charlas motivacionales a personas de tercera edad con necesidades de atención emocional y física, asi como talleres de enfoque social, profesional y familiar.**

La causa principal de tantos problemas sociales, más que económica, es de actitudes y conductas aprendidas. Predomina la baja autoestima individual y colectiva. Hay falta de comunicación, manejo de emociones, del coraje y de sanación emocional. Buscamos sanar heridas, restaurar familias, enfocar vocaciones y habilidades. Hemos identificado necesidad de participación y consideración a nivel comunitario, en la toma de decisiones, independientemente del sector social. Todos necesitan sentir que aportan, ser escuchados, aceptados, amados y comprendidos. Sentido de pertenencia y empoderamiento.

Nuestros Talleres Interactivos Motivacionales y Obras de Teatro Educativo, abarcan temáticas diversas. Van dirigidos a comunidades, entidades, profesionales de diferentes campos, y estudiantes de todos los niveles académicos. **Promovemos una especie de programa de consejería y rehabilitación a través de bellas artes, incluyendo el ofrecimiento de Clases de actuación para medios de comunicacion, bailes modernos y folklóricos, manualidades, producción, tecnología, dirección, confección de máscaras, vestuarios, utilería, escenografía, publicidad básica, etc**. Ofrecemos espectáculos de música folklórica, donde se realzan las costumbres y tradiciones de nuestro pais. Personajes pueblerinos, históricos, ilustres o ejemplares, son recreados con sus características positivas. Asi sirven de guía y enlace para mejorar relaciones humanas, de trabajo y colaboración en todos los sectores de nuestra sociedad.

Ofrecemos servicios de Tutorías y Mentoría en niños y jóvenes con alguna deficiencia en aprendizaje académico, a traves del acercamiento a diferentes disciplinas artísticas. Combinamos estrategias eficaces de mejoramiento académico , pero enfocadas en compromiso social y colectivo, ayudando a superar conflictos y dificultades. Enfoque vocacional y tecnico siempre es una ruta de evidente satisfacción para el participante.

Proyectos Culturales y Comunitarios: Teatro Social. Educativo y Prevención Talleres Interactivos y Motivacionales Arte, Creatividad, Innovación, Resiliencia

Coordinamos y participamos en eventos comunitarios, gubernamentales corporativos, públicos y/o privados. Colaboramos con instituciones educativas, de prevención, orientación, rehabilitación, consejería, servicios residenciales, administrativos, legales y/o vocacionales. Ayudamos en documentacion, iniciativas filantropicas, participación ciudadana. Exponemos noticias positivas a través de diferentes medios de comunicación. Recopilamos información y modelamos innovadores programas de prevención.

El éxito de permanencia y continuidad en nuestra organización es precisamente la manera estratégica de llevar el mensaje; educar y crear consciencia, cambiando actitudes, desde la empatia, comprensión y modelaje de transformación. **Métodos de enseñanza no tradicionales** que incluyen juegos, diálogos interactivos, dinámicas de integración, participación colectiva, competencias, propuestas escénicas, comités de diálogo, baile, música, manualidades, tecnología y toda clase de recursos en materiales de reciclaje y bajo costo. Vamos a lugares, donde quizas nunca han tenido la experiencia del teatro, hacemos entrevistas, organizamos grupos con desa-rrollo de líderes y utilizamos lenguaje sencillo y cotidiano.

Llegamos a todos los rincones de nuestra isla y desarrollamos proyectos que aportan al crecimiento de mayores y mejores oportunidades para nuestras nuevas generaciones, asi como el respaldo y estabilidad que merecen nuestros antecesores.

Contamos con **Exención Federal. Clasificación 501c3.** Aspiramos a establecer el innovador concepto de **Micro-Teatro Regional y Rodante,** donde podamos establecer un centro cultural multifunctional y de primera categoria. Establecimos alianza con **Inversión Cultural** como **agentes fiscales,** para fondo federal privado, que permite acceder a distintas alternativas de financimiento y demostrar capacidad administrativa y fiscal.

Nuestro sueño ha sido contar con un centro multidisciplinario, donde podamos ofrecer nuestros servicios, adiestrar profesionales, presentar obras, ofrecer talleres, transmitir programación radial y televisiva, asi como desarrollar circuitos de alianzas en servicios sociales y microempresas comunitarias.

El resultado de nuestro impacto en la comunidad con diferentes proyectos de educación, prevención, orientación, cultura y recreación, a través del Teatro Social, Talleres Interactivos y Bailes Folklóricos

En treinta (**30**) años de labor ininterrumpida, hemos visitado alrededor de **700** escuelas alrededor de todo Puerto Rico. Esto incluye estudiantes de todos los niveles académicos. Desde Primer Grado a Duodécimo Grado (Cuarto Año). Incluso, hemos impactado muchos centros pre-escolares, colegios privados y niveles vocacionales, técnicos y universitarios.

Nuestro público abarca todas las generaciones. Miles de personas quienes han presenciado nuestro trabajo. Las audiencias van desde una veintena (20) de personas hasta unas dos mil (2,000) en el mismo evento.

Desde 1990 en adelante, hemos recorrido diferentes escenarios (teatros, anfiteatros, salones de actos, escuelas, colegios privados, centros comunales, canchas, parques, iglesias, hogares de rehabilitación, centros de envejecientes, hospitales, cárceles, instituciones juveniles, haciendas, restaurantes, hoteles, residenciales públicos, urbanizaciones, etc.) a través de los setenta y ocho (78) pueblos de la isla (todos), llevando representaciones teatrales, folklore y talleres motivacionales e interactivos.

Hemos realizado más de quinientas (**500**) **Representaciones Teatrales** alrededor de toda la isla. Algunas de las obras que tenemos en nuestro Catálogo de Servicios son las siguientes:

- Chicos de la Calle (157 funciones)
- Ta'kitao (102 funciones)
- Maraña Patraña (97 funciones)
- Ayúdame a ser Útil (77 funciones)
- Promesas Cumplidas (49 funciones)
- Tarzán, Rey de Selva (51 funciones)
- Cuatro Puntos, Manos a la Obra (57 funciones)
- Gaia Mia (61 funciones)
- Así es mi Isla (77 funciones)
- Mi Pequeño Mundo (55 funciones)
- Voces y Cantos de Amor a la Vida (52 funciones)
- Recuerdos de mi Tierra (57 funciones)
- Querer es Poder (25 funciones)
- Experiencias Cumbres (25 funciones)
- Manolito, Un Ángel Caído (27 funciones)
- Abuelo, ¿y la Navidad? (21 funciones)
- Mini Héroes del Tra-Tra-Cadabra (22 funciones)
- Luz Prietita (33 funciones)
- Adolescentimientos (18 funciones)
- La Boda de Betsy (17 funciones)
- ¡Ay, mi Madre! (23 funciones)
- El Negro sale del Klóset (12 funciones)
- Tod@s som@s Niños (12 funciones)
- Celebrando-ando la Vida-Vida (14 funciones)
- Súper Amor Sonrojado (27 funciones)
- Cada Cual en su Camino (14 funciones)
- Hijo$ del... Privilegio (13 funciones)
- En-Amor-a-Dos (7 funciones)
- Cuatro Obras y un Gran Maestro (7 funciones)
- Con Pelos y sin Pelos (7 funciones)
- Chicos, Chicas, ¡Cuidado! (7 funciones)
- Jóvenes por la Vida (5 funciones)
- Kike, Guardián del Bosque (17 funciones)
- Cyberbullying (7 funciones)
- Mi Cita con Dios (5 funciones)
- Un Corillo Rankeao (3 funciones)
- Mini-Tribunal de Valores (15 funciones)
- Martir-monio en la Playa (3 funciones)
- Juventud, Divino Tesoro: ¡Cuidado! (32 funciones)
- Diferentes iniciativas por encargo de mentoria, escrito, montaje, dirección y/o producción.

Nuestra Trayectoria...

Como organización, hemos participado en importantes salas teatrales, en **eventos de relevancia** coordinados por otras entidades, tales como:

- Centros de Bellas Artes de San Juan, Caguas, Guaynabo, Aguada
- Eventos Folklóricos, Comparsas, Reinados, Competencias Estudiantiles y Deportivas
- Convención de CPA's de Latinoamérica y el Caribe
- Encuentro de Personas de la Tercera Edad (isla)
- Festival Internacional del Monólogo en Miami
- Hotel Riu Palace, República Dominicana
- Paradas Puertorriqueñas de Chicago y Florida
- Disney World, Orlando (dos ocasiones)
- Festivales de Teatro, Encuentros, Muestras, entre otros
- Intercambios Culturales
- Gran Parada de Navidad (Univisión Puerto Rico)
- Centros Convenciones de San Juan, Aguada y Guayama
- Museo de Arte, San Juan
- Teatros en Escuelas de Bellas Artes de Carolina, Guaynabo, Arecibo y Humacao
- Teatros Universidad del Turabo, Gurabo
- Teatros Univ Interamericana (San Juan y Aguadilla)
- Esc. Libre Música—Caguas
- Teatro Luis Arcelay - Caguas
- Teatro Priscila Flores, San Lorenzo
- Teatro Castro Pereda, Juncos
- Centro Cultural, Cidra
- Teatro Tapia, San Juan
- Teatro Yagüez, Mayagüez
- Teatro La Perla, Ponce
- Teatro Taboas, Manatí
- Teatro Georgetti, Santurce
- Teatro Salvador Brau, Santurce
- Teatro Fénix, Vega Baja
- Teatro Braulio Castillo, Bayamón
- Teatro Universidad de Puerto Rico, Rio Piedras

- Teatro Facultad Educación UPR, Rio Piedras
- Teatro Ramón Frade, UPR, Cayey
- Teatro UPR, Aguadilla, Bayamón, Humacao
- Teatros y Anfiteatros Sistema Ana G. Méndez (Caguas, San Juan y Bayamón)
- Teatro Universidad Católica, Bayamón
- Antiguo Teatrito del Instituto de Cultura
- Teatro al Fresco, La Beckett, Rio Piedras
- Corralón de San José, San Juan

Desde el año 1997, colaboramos con **Programas TRIO**, que se dedica a orientar y facilitar transcisión hacia la vida universitaria de miles de estudiantes, con iniciativas como **"Talent Search", "Upward Bound**" y otros. Realizamos de uno a dos eventos por año para grupos de participantes y familias, con proyectos de teatro y talleres interactivos como estrategias de impacto, para resiliencia y empoderamiento.

Desde el año 2000 colaboramos con la **Alianza para un Puerto Rico sin Drogas (APPRSD),** en distintos proyectos de prevención y orientación, en contra del consumo de drogas, alcohol y violencia para estudiantes de todos los niveles. Visitamos unas veinte (20) escuelas por año escolar, con grupos de setenta y cinco (75) estudiantes en impacto directo, que reciben cinco (5) talleres de formación del carácter por temporada, y a la misma vez, impactamos a todo el plantel escolar con la realización de campañas publicitarias, que luego se muestran en todos los canales de televisión de Puerto Rico, radio, cine y prensa escrita. Son auspiciados por diferentes entidades o empresas privadas:

- "Transformando Visión en Acción" (Auspiciado por Johnson & Johnson)
- Salva tu Comunidad (Auspiciado por HIDTA)
- "Raising Awareness" (Auspiciado por HIDTA)
- "Drug Prevention Transformative Arts" (Auspiciado por Fundación Medtronic)
- "100% Bien" (Auspiciado por Pfizer)
- "Changing Attitudes" (Auspiciado por HIDTA)
- Prende tu Talento (Auspiciado por Fund Banco Popular)
- "Prevention Talent" (Auspiciado por Fundación Amgen)
- Reporteros Positivos (Auspiciado por Fund. Amgen)
- Proyecto de Vida (Auspiciado por Fund Medtronic)
- Noticiario Estudiantil (Auspiciado por Merk Company)
- Iniciativas Control del Alcohol y Drogas (Auspiciadas por AMSSCA)
- "Music Makes a Difference" (Auspiciado por Fundación FORD)
- Contagiando Amor (Auspiciado por Procter & Gamble)
- Otros proyectos de corta duración, auspiciados por diferentes entidades

Nuestra Trayectoria... (Cont.)

Junto a **Alianza para un Puerto Rico sin Drogas**, también trabajamos dos proyectos de impacto (sobre mejorar la conducta y poner en práctica los valores y los buenos modales), dirigidos a niños de seis (6) a doce (12) años:

- **Quiero ser un Ejemplo** (147 funciones aproximadas a más de 200 estudiantes por función durante 7 temporadas de presentaciones) Auspiciado por Fundación Ángel Ramos y otras entidades.
- **Sembrando Valores** (525 talleres interactivos teatrales, a grupos de 50 estudiantes por actividad. Hemos realizado unos 10 eventos masivos para publicos de 500 estudiantes o más). Auspiciado por Fundación Ángel Ramos, Fundación Comunitaria, Medtronic, Walmart , Reliable, Aerostar, FLIC, HIDTA y Procter & Gamble.

Desde el año 2000 al 2012, participamos junto a **Instituto Interdisciplinario en Avance, Inc. (INIEA)**, en **talleres interactivos de desarrollo profesional, capacitación y eventos motivacionales**. Dirigidos para **maestros, directores, y miembros de la facultad en general**, así como también a **familiares de estudiantes y comunidad en general**. Impacto en todas las regiones de la isla. Desde cincuenta (50) hasta cien (100) personas por talleres. Con **INIEA** ofrecimos **talleres interactivos motivacionales, capacitaciones** y **actividades culturales**. Temas diversos: erradicar rezago académico, solucionar conflictos, mejorar autoestima, desarrollar sentido de pertenencia, trabajar en equipo, tomar decisiones acertadas, controlar embarazos, rechazar drogas y alcohol, controlar emociones, etc.

Desde el año 2006 al 2009, coordinamos el **Centro de Aprendizaje de la Comunidad Lorenzo del Valle en San Lorenzo**, por cuatro (4) años a matrícula ascendente a cuatrocientos (400) estudiantes. Servicio ofrecido por primera vez a la comunidad y logrando brindar la experiencia de participar en campamentos de verano. También le ofrecimos talleres, clases y varios servicios a las familias.

Desde 2009 al 2012 impartimos **clases de teatro** y colaboramos en realización de eventos motivacionales y de prevención a través de bellas artes, para **Boys & Girls Club de San Lorenzo**, visitando alrededor de trescientas (300) familias por año y presentándonos en lugares donde hay otras casas clubes con igual o mas cantidad de familias impactadas.

Desde 2007 hasta el presente, participamos en diferentes iniciativas de **INSEC** (Instituto Socio Económico Comunitario). Hemos coordinado **campamentos de verano** para niños y jóvenes. Alrededor de ciento cincuenta (150) participantes por temporadas. Junto a **INSEC**, también

llevamos **proyectos teatrales comunitarios** a diferentes regiones de servicio, enfocados en costumbres y tradiciones, así como resiliencia, empoderamiento y buenas relaciones entre comunidades. Se presentan mayormente.en temporadas de verano y navideñas. Unas siete (7) presentaciones por año, con cantidad mínima de setenta y cinco (75) espectadores.

Con **Grupo Yuviplena**, participamos desde 2012 al presente, en diferentes eventos sociales (fiestas privadas, familiares, hoteles, corporaciones, gobierno, etc.), como bailarines, vejigantes, cabezudos, zanqueros y personajes típicos.

En P.A.D.F. hemos reclutado **cientos de integrantes**. Los hemos ayudado en su desarrollo académico y professional, no solo para las **industrias creativas**, sino para todo tipo de industrias y sectores laborales: sicólogos, maestros, policías, contadores públicos autorizados, enfermeros, terapistas físicos, cocineros, relacionistas públicos, abogados, mecánicos, oficinistas, hojalateros, actores, bailarines, coreógrafos, directores, productores, maquillistas, vestuaristas, empresarios y diferentes oficios. Personas de bien, enfocados en mejorar la calidad de vida de nuestra isla. También hemos tenido invitados especiales y recursos en ciertos proyectos.
Así habremos alcanzado la cifra mínima de cuatrocientos cincuenta (550) talentos desarrollados.

Más de Nuestra Trayectoria...

Colaboraciones en los Medios

Varios productores han utilizado nuestros talentos en sus proyectos, ya sean películas, comerciales, programas de radio o televisión. Algunos ejemplos de proyectos son:

- Bien_Estar (Canal 40)
- Casos Inesperados (Canal 4)
- El Tesoro del Yunque (Canal 4)
- Extremos (Canal 2)
- Película Por Amor en el Caserío
- Película Cayo
- Anda Pal Cará (Canal 11)
- Mónica en Confianza (Canal 4)
- Entre Nosotras (Canal 4)
- Película Ilusión
- Película Aviolines
- El Show de Raymond Arrieta (Canal 2)
- Risas en Combo / Remix (Canal 4)
- Desde mi Pueblo (Canal 6)
- Telecómicas (Canal 2)
- Nuestra Película (Canal 11)
- Pelicula I Witness
- Película Never say Die
- Película Absolution
- Ay ay ay, Que Locura! (Canal 24)
- Bosque Mágico; Coliseo
- Tierra de Paz; Capitolio
- No te duermas (Canal 2)
- Mi Gente (Canal 13)
- Proyectos comunitarios, universitarios y estudiantiles con recursos audivisuales diversos

Talleres Interactivos y Motivacionales

Varios de los temas que tocamos en nuestras obras y en los talleres interactivos motivacionales que realizamos son:

- Sentido de Pertenencia
- Valores y Buenos Modales
- Empoderamiento y Resiliencia
- Control del Coraje
- Venciendo la Presión de Grupo
- Desarrollando Mentoría
- Liderazgo y Trabajo en Equipo
- Venciendo el Rezago
- Respeto por las Generaciones
- Desarrollo de Autoestima Saludable
- Hábitos de Estudio
- El Arte de hablar en Publico
- Música y su efecto en emociones
- Rechazo al Uso y Trasiego de Drogas
- Evitando la Violencia
- Control de Embarazos
- Abstinencia y Sexualidad
- Nutrición y Alimentación
- Costumbres y Tradiciones
- Toma de Decisiones
- Pensamiento Crítico
- Recreación y Deportes
- Evitando el Suicidio
- Tolerancia e Inclusión
- Servicio y Voluntariado

Reconocimientos

Algunos de los reconocimientos que nos han otorgado son:

- **Medalla de la Cultura**, Sor Isolina Ferré, Otorgada por Legislatura de Puerto Rico e Institución
- **Medalla Centenario** Teatro Luis M. Arcelay de Caguas, Otorgado por el Municipio de Caguas
- **Maestro de Teatro del Año**, Otorgado por UNESCO y Fundación Puertorriqueña Juventud
- **Mención Especial Premio a la Solidaridad**, Otorgado por la Fundación Miranda
- **Premio Pisadas, Desarrollo Cultural,** Otorgado por la Fundación Pisadas de Amor
- Reconocimiento **Labor Cultural**, Otorgado por Municipio de San Lorenzo (dos ocasiones)
- **Medalla 40 Aniversario**, Gíbaro de Puerto Rico (ballet folklórico)
- Grupo Destacado de **Teatro Regional**, Otorgado por el Círculo de Críticos de Teatro P.R.
- **Compañía Ejemplar** en Cultura, Educación y Orientación, Otorgado por APPRSD
- Mención Especial Participacion **Festival Internacional de Monólogos** en Havanafama, Miami
- Inclusión como miembros de **Latinx Theatre Commons**, con representacion de todo Estados Unidos y sus territorios.
- Reconocimientos por **Labor Cultural y Social** en San Lorenzo, Cidra, Ponce, Caguas y Región Este de P.R. (otorgados por diferentes organizaciones)

Más de Nuestra Trayectoria... (Cont.)

Representación Internacional

Nuestros integrantes han recibido de forma individual, importantes reconocimientos y han representado al país en varios lugares del mundo. Oportunidades de desarrollo profesional, becas, promociones, beneficios, destacándose siempre, gestión que realizan a través de nuestra organización artística, educativa y de industrias creativas.

- Intercambio cultural de forma individual, con varios de nuestros participantes, o junto a otras compañías, para sitios como España, Francia, Bélgica, Miami, Costa Rica, Nueva York, Los Ángeles, Méjico, etc.

Viajes de representación cultural como organización:

- Convenciones de Teatro Latinoamericano en Texas, Florida y Los Angeles
- Festival del Monólogo "A Una Sola Voz", Miami Florida (tres ocasiones)
- Festival Niñologando - Categoría Infantil, Festival del Monologo (dos ocasiones)
- Parque Magic Kingdom, Disney World (dos ocasiones)
- Downtown Disney, Orlando, Florida
- Cadena de Hoteles RIU, Punta Cana, República Dominicana
- Desfile Puertorriqueño de Orlando, Florida
- Desfile Puertorriqueño de Chicago, Illinois

Acción y Colaboración

Labor voluntaria, contratacion y/o alianza colaborativa:

- Departamento Arte y Cultura, Teatro Priscilla Flores, Oficina Asuntos Juventud, Enlace Comunitario, etc. Municipio de San Lorenzo (1995-2000)
- Arte y Cultura (Festivales y eventos desde 1990) Municipio Autónomo de Caguas
- Departamentos de Educación, Salud, Familia, Corrección, Recreación y Deportes
- Policía de Puerto Rico e Instituciones Juveniles
- Departamentos de Cultura en varios municipios
- Alianza para un Puerto Rico sin Drogas
- Boys & Girls Club
- Programas Trio (Talent Search, Upward Bound)
- Instituciones Educativas Universitarias
- Colegios Católicos y Privados
- Inversión Cultural
- Fundación Angel Ramos
- Fundación Flamboyán
- Tuna de Cayey
- Escuela Ecológica de Caguas
- INSEC (todas las regiones)
- Colegios CPA de Puerto Rico
- Institución Ana G Mendez
- Instituto COSEY
- Centro CENCE
- Proyecto PECES
- Instituto INIEA
- Residenciales Públicos
- Centros Culturales y Comunales
- Centros Universitarios Privados
- Asociación de Maestros
- Federación de Maestros
- Fundación Chana y Samuel Levis
- Iniciativa Stop & Go - Fortaleza
- Clubes Altrusas y Damas Cívicas
- Clubes de Leones
- ILTB "I Learn to Be"
- Caguas Courtyard Residences
- Producciones Cesar Santiago
- Taller Colectivo Teatral de Caguas
- Talleres Danza-Teatro
- Ligas Atléticas y/o Deportivas
- Municipios y Agencias Públicas

Proyectos en Producción o Planes Futuros:

- Programa Radial/Internet **Algún día es… HOY**
- Cortometraje **CANAS y ARRUGAS**
- Documental: **ABUELOS, LIBROS ABIERTOS**
- Celebración **30 Aniversario PADF**
- Cortometraje: **ADICTO al SEXO** (prevención sexual)
- **VIVIENDO por la FE:** Especiales televisivos o vía internet, sobre la espiritualidad
- Programa Infantil: **SEMBRANDO VALORES**
- Festival **SABORES y COLORES de mi TIERRA**, Encuentro Cultural para el área este del país.
- Adquirir **Escuela en Desuso** para Rehabilitación
- Establecer **Micro-Teatro Regional y Rodante**.
- Incubadora **CROMA CREATIVO Comunitario** Centro MicroEmpresarial y de Capacitación Laboral

https://www.facebook.com/angelesdelfinpr

https://www.facebook.com/canasyarrugas

https://www.youtube.com/c/angelesdelfinpr

https://www.instagram.com/angelesdelfinpr

PADF

PRODUCTORA ÁNGELES-DEL-FIN

H.C. 20 Box 26393 San Lorenzo, Puerto Rico 00754

Horario Administrativo: Lunes a Viernes: 8:00 am—5:00 pm
Sábados: 9:00 am—1:00 pm

Horario Servicio Directo: De acuerdo a necesidades y eventos

Teléfono: 787-608-9334

e-mail: angelesdelfinpr@gmail.com

angelesdelfin.wixsite.com/padf

Carlos González Jr.
(Director)

GOBIERNO DE PUERTO RICO
MUNICIPIO DE CIALES
HON. ALEXANDER BURGOS OTERO
ALCALDE

Departamento De Programas Federales

Municipality of Ciales Renewable Energy Microgrid Initiative

Suheily Gonzalez Lozada
Federal Affairs Director
December 16,2021

P.O. BOX 1408,CIALES, P.R. 00638
787-871-3500 871-0000

Municipality of Ciales Renewable Energy Microgrid Initiative

I. Introduction

Ciales, Puerto Rico, is located in the northern elevations of the Cordillera Central in the central-northern part of the main island of Puerto Rico. It has an area of 171.6 square km/66.0 square miles.

After the collapse of the PREPA electric system after the impact of Hurricane María on September 20, 2017, Ciales had to wait 9 months for full power restoration. A small percentage of the population had personal power generators, but the majority did not. While power generators were brought for critical facilities such equipment highly polluted the environment and impacted the health of the residents of Ciales. This caused widespread losses of life, property, and escalated business costs due to long operational interruptions, with some businesses and NGOs closing altogether. The status of the electrical grid throughout the Puerto Rican archipelago has been evolving continuously after Hurricane Maria.

Renewable energy (RE) microgrids (solar photovoltaics [PV] and battery storage) can provide more resilient power and increase survivability to minimize the devastating effects of future disasters. A sustainable microgrid like this can also provide for local business opportunities and workforce development which is of great importance and highly needed for Ciales.

The Municipal Government of Ciales is interested in improving the energy resilience of Ciales. In pursuing such, the Municipal Government of Ciales will partner with the Puerto Rico Community Foundation (PRCF), a leading 501(c)(3) Non-Government Organization that serves communities in Puerto Rico, and the Polytechnic University of Puerto Rico School of Electric Engineering. Local NGOs and local stakeholders that assist in providing social, economic, environmental, educational, and cultural services in Ciales, along with community

organizations will be part and are critical partners in the success of this project, specifically when working with remote and isolated very low-income communities in Ciales.

The Municipality of Ciales Renewable Energy Microgrid Initiative

The Initiative consists of ***creating a renewable energy based microgrid*** where (1) all the critical facilities, businesses and NGOs located in the downtown area of Ciales can be connected to an efficient system through (by) underground electric power lines, and (2) creating community-based renewable energy microgrids in all wards to cover all household units in Ciales. This Project has been included in the approved 2021 Mitigation Plan for the Municipality of Ciales.

Specifically, the Initiative will help mitigate the lack of power and provide sustainable continuity of operations for:

- 11 critical facilities that provide critical essential services for communities in Ciales during and in the aftermath of a disaster;
- 55 businesses; and
- 5,831 households that exists in Ciales as per the 2019 US Census.

This Initiative promotes compliance with federal and Puerto Rico clean energy policies, provides sustainable energy redundancy, and will promote local business opportunities and workforce development.

Among others, it will require the purchase of equipment (solar photo voltaic (PV) panels and inverters, hurricane resistant racking, batteries, installation, and related ancillaries), power generators to serve as energy back-up (with all necessary components) and technical assistance and capacity building. This microgrid can be used continuously throughout the year. The Initiative will also include an educational component regarding energy efficiency and energy consumption. The Initiative also will provide for having all

recipients of solar PV/storage to participate in the net metering program now administered by LUMA Energy, so that they can sell excess production and generate income.

The proper implementation of the proposed project will guarantee the 15,808 residents of Ciales to continue receiving the critical services necessary for their day to day living, including business continuity and economic development.

This project will provide more resilient power and increase survivability, prevent the loss of life and property to minimize the devastating effects of future natural and human-induced disasters. A key aspect of projects like the one proposed here is having controls that allow the system to operate independent of the grid.

It is also a sustainable and equitable locally led solution in addressing climate change that will help Puerto Rico meet its renewable energy goals of 40% by 2025, 60% by 2040, and 100% by 2050.

II. Preliminary Cost Analysis for Critical Infrastructure, Business and NGOs, and Residential Sector

A. Energy Resilient Businesses

The PRCF is a leading philanthropic organization, committed by charter to the needs of the community. Over the past 35 years, it has granted over $75 million in grants to nonprofit organizations and low-income communities throughout Puerto Rico. As part of its mission, it has granted +$1.5 million in grants to +50 non-profit organizations for solar energy systems, including the first community solar project in the rural Toro Negro community in Ciales, and a second one recently in the San Salvador community, Caguas; and the first certified Micro Grid Energy Bureau, Esperanza Village in Juncos. Recently, the applicant received grants ($4.1M) by US Economic Development Administration install a 100% solar energy system to support businesses and critical facilities in Culebra; and from FEMA ($25 million in HMGP/404 funds) to improve the energy resiliency of + 200 Non-PRASA rural water systems throughout Puerto Rico.

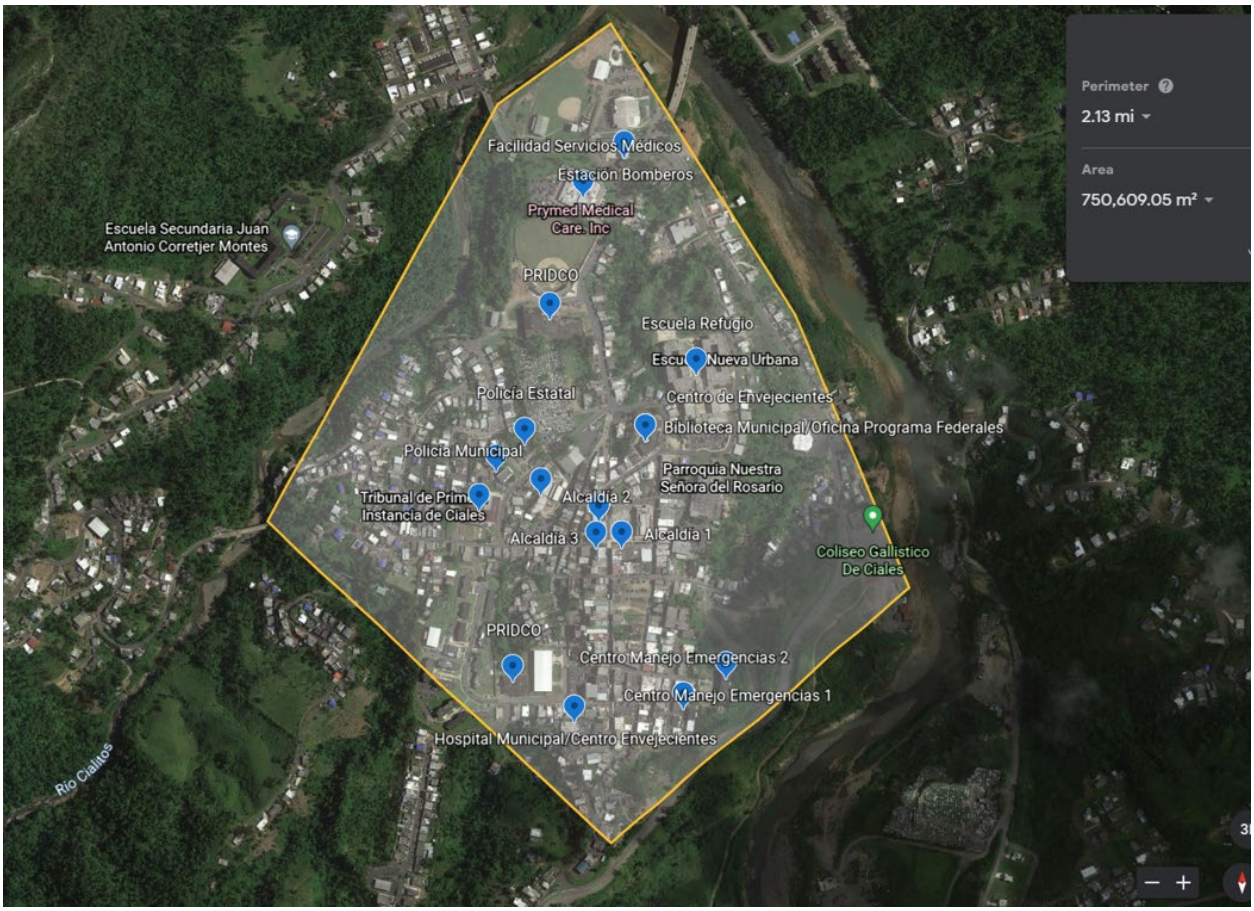
The PRCF will replicate in Ciales its pioneer clean energy, business continuity and mitigation *Renewable Energy System for Business and NGOs for Resiliency and Economic Development*, initially implemented in the municipality of Culebra through a grant from the U.S. Economic Development Administration. This phase of the Initiative will provide individual solar photovoltaic systems to at least 55 small and medium size businesses (supermarkets, drugstores gas stations, etc. and other critical services) and/or NGOs designated as essential service facilities during a natural or human-induced disaster in Ciales. This phase specifics include:

- Impact: 55 small and medium size businesses and NGO
- Projected project cost: $90,910 per business or NPO for a total of **$5,000,000**
- Preliminary Engineering Design: Available Upon Request

B. Energy Resilient Critical Infrastructure & Essential Services

The PUPR is performing a high-level energy resilience assessment for certain critical infrastructure in downtown Ciales, identifying potential locations for placing the renewable energy microgrid to promote the energy resilience of such critical infrastructure, and determining potential ground areas for solar PV and storage. This phase specifics include:

- Impact: 11 critical infrastructure and essential services located in downtown Ciales
- Estimated Cost: **$9,125,000**
- Preliminary Engineering Design: Under development by the School of Engineering – Electric Engineering Program of the Polytechnic University of PR



C. Energy Resilient Housing

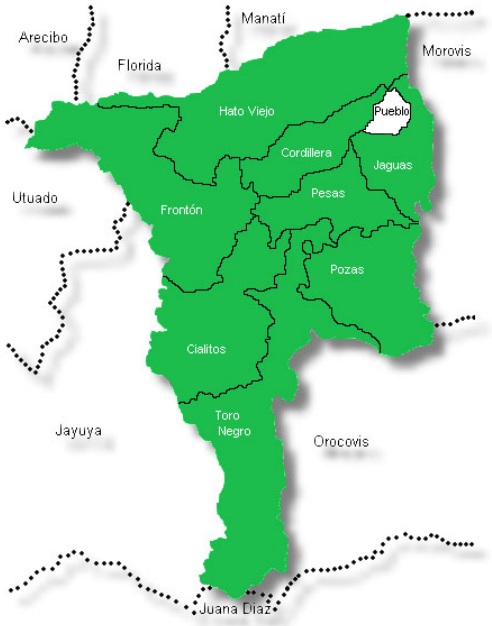
The PRCF will assist the Municipal Government of Ciales, and different communities located in all wards in Ciales, mostly remote and isolated very low-income communities, to develop a self-sustainable and resilient community based RE microgrids like it has done in other communities throughout Puerto Rico. Conventional power systems have never been a cost-effective alternative for these rural isolated communities. Its residents waited for months after Hurricane Maria to have power restored, and given their location, energy interruptions are a common occurrence. Keeping these communities solely relying in the traditional power grid is not a permanent and economically viable solution. Through community empowerment and reliable

infrastructure, the Municipal Government of Ciales and the communities will prevent the loss of life and properties, as well as repetitive losses, in the case of a future disaster. Expert technical assistance and solar equipment (solar panels and inverters, batteries, hurricane-resistant racking, installation, and related appurtenances) will be installed. The communities will be organized to assume maintenance and management responsibilities, with the financial and technical assistance of the PRCF and other philanthropic partners. This phase specifics include:

- Impact: 5,831 households (15,808 residents)
- Preliminary Engineering Design: Available Upon Request
- As per the 2019 US Census*, the Municipality of Ciales had 5,831 households. Based on an average cost of Solar PV + storage for each house unit of $15,000, it would cost approximately **$87,465,000** to energize with renewables the entire residential sector of Ciales using rooftops preferably or adjacent household land.

Barrios Oficiales

Cialito, Cordillera, Frontón, Hato Viejo, Jaguas, Pezas, Pozas, Pueblo y Toro Negro.

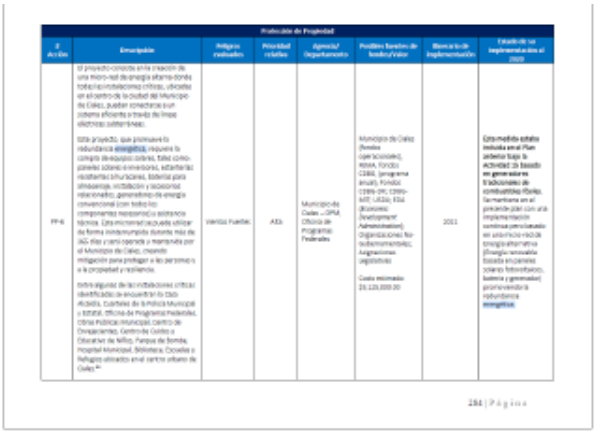


III. Conclusion

The traditional conventional energy system that serves electricity to Ciales is not sustainable and keeps residents vulnerable facing future disasters, and even during the current daily scenario due to the fragility of the Puerto Rico electric grid. The preliminary results of PUPR and FCPR's analyses indicate that RE microgrids appear to be technically and economically viable for Ciales. Total Estimated Cost for the Ciales RE Microgrid (critical infrastructure downtown micro grid [$9,125,000], businesses [$5,000,000] and housing [$87,465,000], plus) is **$96,590,000**.

Having a RE Microgrid for Ciales with hurricane-resistant rooftop solar photovoltaic panels, combined with storage, and related ancillaries will improve its energy resilience and will ensure the preservation of life, property and continuity of critical services and businesses in the case of a future disaster.

Reference: Municipality of Ciales – Action PP6 on the mitigation Plan – All Hazard Mitigation Plan, 4.6.3.1.2 "Vulnerabilidad de las instalaciones y activos críticos" page 159.



December 23, 2021

William O. Rodríguez Rodríguez, Esq.
Secretary
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365
Via Puerto Rico CDBGDR (pr.gov)

Re: Comments to the Puerto Rico CDBG-DR Electrical Systems Enhancements & Improvements Action Plan

Dear Mr. Rodríguez,

These Comments to the Puerto Rico CDBG-DR Electrical Systems Enhancements and Improvements Action Plan ("Draft Action Plan", "DAP") are submitted on behalf of Comite Dialogo Ambiental, Inc.

Executive Summary

According to the Draft Action Plan, "The Electrical System Enhancements and Improvements Programs consist of two (2) lines of effort. The Energy Grid Rehabilitation and Reconstruction (ER1) Cost Share Program is designed to meet the non-federal cost-share need of FEMA's unprecedented PA allocation for PREPA's Island-wide FEMA Accelerated Award Strategy (FAASt) Project. The Electrical Power Reliability and Resilience Program (ER2) will serve the needs of communities by funding projects that are not currently anticipated to be funded from other federal or local sources." (P.109). The proposed Energy Grid Rehabilitation and Reconstruction ("ER1") Cost Share Program would be allotted $1,055,811,031 and the Electrical Power Reliability and Resilience Program ("ER2") would be allotted $760,595,149 under the Draft Action Plan.

The Draft Action Plan ("DAP") fails on nine counts, the DAP: 1) wrongly denies that renewable energy and battery storage can provide reliable, resilient and cost-effective electric service and delays the deployment of renewable energy; 2) perpetuates transmission and distribution that enables long-term dependence on centralized fossil-fired generation; 3) fails to abide by the Integrated Resource Plan ("IRP") issued by the Puerto Rico Energy Bureau ("PREB"); 4)makes no significant contribution to achieve the upcoming, 2022 and 2025 renewable energy legal mandates; 5) assumes that FEMA funds are not available for distributed renewables; 6) misses the opportunity to achieve social and environmental justice through Low to Moderate Income ("LMI") community access to distributed renewables; 7) fails to comply with the requisite environmental review, climate and flood control provisions; 8) drives up electric rates; and 9) is impermissibly vague, ambiguous and imprecise and fails to inform the public about key aspects of the plan, thereby denying effective public participation.

The historic amount of HUD and FEMA funds allocated for the electric system should be invested in distributed renewables such as on-site and rooftop solar and battery energy storage systems and similar alternatives that will provide life-saving electric service to LMI residents in Puerto Rico.

1. The Draft Action Plan wrongly denies that the renewable energy and battery storage can provide reliable, resilient, and cost-effective electric service and delays renewable energy deployment

Multiple studies confirm that distributed renewables such as rooftop solar and battery energy storage systems are the most resilient and viable option in the face of more frequent and intense hurricanes triggered by climate change.[1] The relevant studies listed in Appendix A have shown the viability, reliability, and economic benefits of rooftop solar and storage in Puerto Rico. Last year, the U.S. Department of Energy ("DOE") National Renewable Energy Laboratory ("NREL") highlighted the rooftop solar potential in Puerto Rico, stating that solar energy generation sited on rooftops offset or reduce the overall amount of energy needing transmission and distribution. **According to the NREL study, Puerto Rico has the potential to produce four to five times as much solar energy than is needed to meet its current residential demand**. More than a decade ago, faculty at the University of Puerto Rico found that rooftop solar is "the least environmentally intrusive" to generate energy in Puerto Rico. The report recommended generating power locally with solar energy and, in certain cases, creating microgrids, such as for high-rise buildings. More recently, Cambio PR and the Institute for Energy, Economics and Financial Analysis set out a plan to achieve 75 percent renewable power generation in 15 years. Solar energy deployment in Puerto Rico is expected to create nearly 20,000 jobs by 2030. [2]

The relevant agencies acknowledge the reliability, resiliency and cost-effectiveness of distributed renewables. Rooftop solar and storage systems qualify under the Department of Housing and Urban Development ("HUD") definition of an electrical power system which includes distributed energy resources.[3] The DAP notes that the, "Legislature has dictated a clear message to reduce energy costs and diversify the energy portfolio through greater reliance on renewable energy and decentralized energy options..." (P.76). Article 5 (14) of Law 33-2019 provides that(P.76) Yet, in the DAP, the Puerto Rico Department of Housing ("PRDOH") is required to evaluate and develop programs to encourage individuals or legal entities to acquire and install renewable energy equipment with available federal funds. Yet, in the DAP PRDOH proposes to funnel the majority of the funds to rebuild the centralized, fossil-enabling grid. The DAP notes that Act 57 provides that, "There is a broad consensus on the need to evolve from

[1] A list of the studies is attached as Appendix A to these comments.
[2] Interstate Renewable Energy Council (IREC), Solar Workforce Development (2021), https://irecusa.org/programs/puerto-rican-solar-business-accelerator/solar-workforce-development
[3] Federal Register / Vol. 86, No. 117 / Tuesday, June 22, 2021 / Notices 32681. https://www.govinfo.gov/content/pkg/FR-2021-06-22/pdf/2021-12934.pdf.

our dependence on fossil fuels and use to the maximum extent possible the Island's energy resources such as the sun and the wind, conservation, and efficiency." (P.78) The allocation of the funds in the Draft Action Plan—largely slated to meet state matching requirements to rebuild the centralized, fossil-enabling grid—does not align with the narrative statements in the DAP.

The Draft Plan advocates for "**strengthened primary generation**" (P. 8), referring to fossil-fired plants as "primary generation" that will be "strengthened", thus denying the capacity of renewable energy paired with battery energy storage systems to provide reliable electric supply. Renewable energy has been shown to meet energy needs, including critical loads such as hospitals on equal footing with conventional fossil-fired plants while eliminating toxic and climate warming emissions.[4] In addition, distributed renewables have the added advantage of minimizing the need for costly transmission and distribution systems, including undergrounding and providing resiliency benefits.[5]

A. <u>No commitment to significantly fund renewables and battery energy storage systems</u>

According to that Draft Plan, "The Electrical Power Reliability and Resilience Program (ER2) provides assistance to subrecipients to create electrical system reliability and resilience. The program will serve the needs of communities by funding projects that are not currently anticipated to be funded from other federal or local sources." (P. 115-8) But ER2 projects do not necessarily include renewables; rather, the projects are merely, "encouraged to integrate energy assets and contribute to the diversification of energy resources." (P. 115-8).

The DAP provides that, "**A project for instance, a microgrid, may include localized improvements to transmission and distribution assets, which would be considered ancillary to the microgrid improvement**." (P.108-110). "Projects pursued as Microgrids shall conform to a minimum threshold of 75% of its energy output derived from renewable resources (plus storage) to ensure compliance with Act 82-2010." But microgrid projects may include transmission and distribution infrastructure, thus funds spent on microgrid transmission might not result in much renewable generation at all especially "Large Project Microgrids" by virtue of integration "into district and community-level microgrids." PRDOH admits that these projects

[4] PREB's consultant acknowledged that, many of the transmission hardening projects "might likely be marginal or not cost effective relative to DER solutions", for two reasons: "If you do have a lot more DERs, it can have the effect of reducing blue sky peak loads in addition to being able to provide resiliency during extreme events. Negociado de Energía en vivo, *2nd Technical Workshop (Optimization) / NEPR-MI-2020-0016*, YouTube (Feb. 23, 2021), https://youtu.be/lYG9XBIiOaE?t=7963; Energía en vivo, *2nd Technical Workshop (Optimization) / NEPR-MI-2020-0016* – Part II, YouTube (Feb. 23, 2021), https://youtu.be/oGYujWJ8S7s?t=109. [hereinafter, *2nd Technical Workshop (Optimization)*].

[5] According to the Congressional Research Service, the cost of undergrounding power lines can be 5 to 10 times (or more) the cost of an overhead line. Additionally, the University of Florida and some Florida electric utilities conducted a study concluding that undergrounding overhead electric distribution systems is costly and that the costs exceed quantifiable benefits except in rare cases. U.S. GOV'T ACCOUNTABILITY OFF., GAO-21-274, Electricity Grid: Opportunities Exist for DOE to Better Support Utilities in Improving Resilience to Hurricanes. at 10-11 (2021). https://www.gao.gov/products/gao-21-274.

involve, “customized technical challenges which include significant infrastructure cost, for which ER2 funds may contribute. Microgrids funded under the ER2 Program will foster renewable energy integration” Renewable energy **integration** and fostering as opposed to renewable energy **deployment** is an alternate way to describe transmission and distribution spending. This scheme was not approved in the IRP. The DAP does not clarify or distinguish infrastructure within a renewable-based microgrid that is needed for operation of the system from T&D infrastructure external to the microgrid.

The Plan notes that, “Considering the lessons learned from hurricanes Irma and María, the power supply for those critical loads must be highly reliable and resilient.” (P.12-13). It cites the Port of San Juan as an example of critical load, “which cannot be sustained on available backup generation capabilities. Disruption of service-due to damage at the substations themselves or the aerial power lines connecting them to the terminals-would drastically reduce the ability of the port to receive containerized cargo.” “Potential solutions include the use of microgrid systems with underground distribution infrastructure to ensure the electric power supply even in a catastrophic situation.” (P. 12-13). This scheme fails to specify whether the funds would be used for transmission and distribution (“T&D”) systems to build the microgrid or renewable energy as an option to meet critical need and disregards the high costs. The DAP must clarify that the HUD funds should be used for deployment of renewables. The DAP also fails to acknowledge the vulnerabilities of undergrounding in flood prone coastal areas, not to mention the complexities and high costs of installation and repair of underground lines.[6]

The DAP notes that “voltage instability, which is a persistent issue across Puerto Rico, may result in the internal equipment and machinery of a dependent water treatment plant or maritime port terminal burning out or being degraded more quickly than anticipated.” but fails to consider distributed renewable energy coupled with battery energy storage systems as a primary solution. (P.13-14).

The Draft Plan adopts the Puerto Rico Aqueduct and Sewer Authority (“PRASA”) Photovoltaic (“PV”) projects for essential water purification and treatment systems. However, PRDOH fails to couple the PV systems with battery energy storage systems instead of diesel-fired generators. (P.60-1).

PRDOH proposes to fund diesel-based microgrids in Vieques and Culebra at a cost of $48,000,000 and **subsequently “involve integration of renewables and energy storage to reduce the diesel footprint” and “to reduce historic diesel consumption.”** (P.58). PRDOH fails to explain why it is not proposing distributed renewables as a first option. PRDOH is biased against renewable energy deployment. Ironically, many Puerto Rico Electric Power Authority (“PREPA”) substations include on-site solar installations.[7] The Draft Plan notes that the Bipartisan Budget Act of 2018 and the Disaster Recovery Act of 2018, “emphasize the resilience

[6] *Id.*
[7] *2nd Technical Workshop (Optimization)*.

aspect of the electric power system enhancements". (P.80-1) but fails to allocate the bulk of the resources for the most resilient energy options.

There is overwhelming social acceptance and support for distributed renewables and battery energy storage systems at schools and other essential public services, but the Draft Plan is very noncommittal: "Large-scale energy resilience installations, including those considered for public institutions such as those related to education, **may also be evaluated for funding**." (P.118). The DAP uses similar non-binding language as to "Small and moderately sized microgrids may provide much-needed energy resilience at the community level. These microgrids **may** be targeted to non-PRASA communities and vulnerable communities that were without power the longest, which tend to be hard-to reach communities in the mountains or in rural areas." (P. 119) (Emphasis added).

2. The Draft Action Plan and the LUMA Contract perpetuate transmission and distribution that enables long-term dependence on centralized fossil-fired generation

The Government of Puerto Rico, while paying lip service to renewable energy, continues to push the business-as-usual reconstruction of the 20th century electric system that overburdens nearby communities and has failed after each hurricane in the past thirty years and sometimes during lesser storms too. Governor Pedro Pierluisi, who took power with barely 32% of the vote and the Government of Puerto Rico are asking FEMA to hand over a whopping $9.6B that has been allocated for the electric system to rebuild the transmission and distribution grid and add new methane gas-fired, import-dependent plants and not one penny for renewables. In 2005, **Congress determined that rebuilding these lines over and over was not a cost-effective strategy: "…electric power transmission and distribution lines in insular areas [including Puerto Rico] are inadequate to withstand damage caused by the hurricanes and typhoons which frequently occur in insular areas and such damage often costs millions of dollars to repair;"**[8] In contrast, civil society proposals put forward by community, environmental, labor and professional organizations, academia and religious congregations are calling on FEMA and the Puerto Rico Electric Power Authority ("PREPA") to invest the historic amount of federal funds allocated for the electric system to provide life-saving distributed renewable energy, primarily on-site or rooftop solar and battery energy storage systems to enable Puerto Rico residents, businesses and institutions access to resilient power as set out in the We Want Sun/Queremos Sol (queremossolpr.com) proposal.

In the 21st century, long distance transmission is no longer the only or even the most reliable, resilient or cost-effective option "necessary for the provision of reliable, resilient, stable, and cost effective electrical service." On the contrary, transmission systems represent a major vulnerability to power delivery as multiple hurricanes have shown. Furthermore, large power plants (the core of a centralized power system) are not a resilient option either as shown by

[8] 48 U.S.C.A. § 1492(5).

recent seismic activity in Puerto Rico. **In contrast, distributed renewables such as rooftop solar and storage provide direct electric service, eliminating energy losses and costly transmission investments.**

Centralized transmission and distribution infrastructure is not compatible with, "Puerto Rico's dense vegetation, mountainous geography that tends to increase wind speeds by channeling wind through valleys, and the natural increase in wind speed at higher elevations". (P. 36-7). Rebuilding the centralized T&D system as proposed in the ER1 program in the Draft Plan would perpetuate the delivery of energy to the "primary load center" located in the north (San Juan Metro Area and Humacao Industrial District, approximately 70% of total load)" from the large fossil-fired plants "in the south (approximately 70% of online generation capacity)." (P.67).

The extreme vulnerability of the transmission system is best reflected in the following sentence, "One of the most critical transmission areas in Puerto Rico is located in the north of the Coquí community, in the Municipality of Salinas, where the transmission lines from the Aguirre and AES power plants meet. It is in this crucial area where lines carrying the power capacity from all the main generation plants converge." When hurricanes hit this area, power supply is interrupted throughout Puerto Rico but especially the San Juan metropolitan area. As Congress recognized, replicating this centralized system and "hardening" the transmission system will not prevent subsequent hurricanes from knocking down the towers, poles, lines and transformers and having a domino effect on the rest of the electric system.

The Draft Plan notes that, "The electric power infrastructure remains unsuitable to face a new atmospheric event" (P.24) and depicts the extensive damage to transmission lines as, "one of the hurricane's most significant impacts on Puerto Rico's power infrastructure" but fails to acknowledge that distributed renewables largely eliminate the need for vulnerable transmission and substations. (P.36).

The Draft Action Plan indicates that Hurricanes Irma and María destroyed 80% of the "electric power system", apparently referring to the transmission and distribution grid and substations and alleges that "deep" reconstruction of the T&D system is required, characterizing reconstruction of the centralized T&D system as "permanent solutions to ensure system resiliency and sustainability..." (P.vi) However, T&D systems that include poles, towers, lines, transformers and substations are especially vulnerable to hurricane force winds, vegetation and wildlife impacts and many other common events.[9] The Plan acknowledges, "The high vulnerability of the transmission and distribution (T&D) power lines was evidenced during the passage of Hurricane María. The fact that most of the electrical power in Puerto Rico is produced at the southern part of the Island and is exported to the high-density population metropolitan area makes the transmission network highly vulnerable. The highly mountainous

[9] Industry bias in favor of fossil fuels and transmission hardening, and against distributed solar + storage systems: "My worry is the bias [in favor of transmission and against distributed resources]. There's an industry bias." *2nd Technical Workshop (Optimization)*.

topography inside the transmission lines corridor and dense forest areas represent a real challenge for access and maintenance." (P.8). The epicenter of the recent seismic activity was in southern Puerto Rico and disable two large power plants that transmit energy mostly to the north.

The extreme vulnerability of the electric system is captured in the following statements; "Other reports stated that 74% of the nearly 350 substations incurred moderate to severe flooding and varying levels of wind damage. Damaged substation components included "capacitor banks, disconnect switches, switchgear support structures[,] and perimeter fences."

The ER1 program in the Draft Plan fails to tackle the vulnerabilities of the T&D and fossil plants. The Plan admits that "PREPA Assets, namely power plants, power substations, power transmission centers, and power transmission lines (38KV, 115KV, and 230KV), although widely disbursed across Puerto Rico, have also been built in places with flood risk, different vulnerabilities, and a range of LMI conditions" but fails to discuss alternatives such as distributed solar which would eliminate many of these risks. (P.25).

PRDOH states that, "sea level has risen by about four inches relative to Puerto Rico's shoreline since 1960, and it is likely to increase by one (1) to three (3) feet in the next century, according to the U.S. Environmental Protection Agency (EPA)." The Plan is vague as to the solutions for Sea Level Rise ("SLR") that makes the power infrastructure located around the coastline more vulnerable, ambiguously stating the need to "address mitigation elements for future projects." (P.27). Distributed renewables could address these risks directly and should not be relegated to an uncertain future. Central station electric infrastructure is also vulnerable to storm surge: "During hurricane María, winds raised sea level and pushed the water inland, causing a severe storm surge." Although PRDOH notes that nearly half of the power stations are located in an LMI block group and the majority of them are located in current (and future) flood hazard areas and states that, "This finding is of great concern and may require additional resilience measures be taken to safeguard these critical facilities from future flooding impacts", the Draft Plan utterly fails to consider distributed renewables to address this issue. (P 28).

The Plan fails to note that decentralized renewables could provide greater resiliency not only in comparison to T&D systems but also compared to conventional generation. Yet the plan acknowledges significant damage to conventional generation, noting that "the Cambalache Gas Turbines, was (sic) damaged due to flooding." (P.33-4) and "[s]everal power plants experienced flooding, such as the Cambalache Power Plant located in Arecibo. Also, various portions of the AES Power Plant coal conveyor belt showed moderate damage. (P.35).

When Hurricane Ida tore down the T&D system in New Orleans and southeastern Louisiana, the new gas-fired plant was no help to residents who were without power for weeks.[10] Even

[10] Civil society groups are increasingly holding rogue utilities like Entergy in Louisiana to account. *See* Deep South Center for Environmental Justice, *Energy & Justice in New Orleans: Power to People!* (Sept. 14, 2021), https://www.dscej.org/the-latest/energy-justice-in-new-orleans-power-to-people.

considering funding T&D rather than distributed renewables is arbitrary and capricious—and contrary to the purpose or authority of PRDOH with regard to CDBG funding—given the vast evidence that continued investment in long-distance transmission system and propping up fossil fuel generation in flood zones is not viable.

The Operation and Management Agreement between LUMA Energy, the Puerto Rico Public-Private Partnerships Authority (P3A) and PREPA is centered on the rebuild of the transmission and distribution system which connects the large fossil-fired generation plants in southern Puerto Rico with the San Juan metropolitan area and the other demand centers in the north. The experience with the LUMA contract has resulted in less reliable service and electric rate hikes.[11] See Appendix B including a partial list of 22 articles published in Puerto Rico media on LUMA. The DAP notes that the events have been "exacerbated in recent months due to continuous power outages and blackouts caused by an already debilitated power system." The Draft Plan attributes power outages to generation issues but fails to acknowledge T&D system causes and LUMA's failure to deliver electric service. (P.24).

A. Environmental Justice

The operation of large, centralized fossil-fired power plants emit pollutants regulated under the Clean Air Act ("CAA") and the National Ambient Air Quality Standards ("NAAQS"), that harm the health of the communities near these plants in the municipalities of Salinas, Guayama, Penuelas, Guayanilla, and parts of the San Juan metro area.[12] The additional methane gas-fired power plants and Liquefied Natural Gas "LNG" imports proposed by PREPA would impose air polluting emissions of Volatile Organic Compounds ("VOCs") and impacts on communities near the power plants, whereas customer-sited rooftop solar and storage systems would remove these impacts. The negative effects of LNG and "Natural" (Methane) Gas which in its liquid state is a highly flammable material poses hazards to human health and the environment. Burning methane gas at multiple facilities throughout Puerto Rico would increase public health risks. Methane gas combustion emits increased VOCs such as formaldehyde, benzene, toluene, hexane, and styrene.[13]

Renewables avoid the multiple public health and safety risks of fossil fuel combustion including fuel releases that increase during disasters. Community and environmental groups, with the help of allies have advocated not only for the decarbonization of the Puerto Rico electric

[11] A list of media articles is attached as Appendix B to these comments.
[12] *See* U.S. Envtl. Prot. Agency, Green Book, *Puerto Rico Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants* (Nov. 30, 2021) https://www3.epa.gov/airquality/greenbook/anayo_pr.html.
[13] FERC, *Public Comments by Pediatric Environmental Health Specialty Unit (PEHSU) Mount Sinai Medical School* at 1-2, Aguirre Offshore GasPort LLC, Dkt. No. CP13-193-000 (Sept. 9, 2014) file:///C:/Users/acorrea/Downloads/20140929-5079_AOGP%20Mount%20Sinai%20EIS_comment_Letter_090814%20(1).PDF

system but also its decentralization, democratization and decolonization.[14] Centralized transmission and distribution grid infrastructure perpetuates the operation of the fossil-fired plants in southern Puerto Rico, making it a sacrifice zone for the San Juan metropolitan area and what has been called the "periphery of the periphery."[15]

Because PREPA and the Commonwealth of Puerto Rico are in bankruptcy, FEMA , HUD and other federal funds are the only viable way in which Puerto Rico can achieve its Renewable Portfolio Standard, renewable energy goals, and attain accessible electric rates. Financing of new power purchase agreements with PREPA as a credit counterparty would entail prohibitively high interest rates and financing costs that would lead to skyrocketing of the already astronomical electric rates that are currently about double the average U.S. rate.[16]

FEMA was obligated to consider environmental justice in drafting the FONSI. As EPA has explained, "Federal agencies must consider environmental justice in their activities under NEPA."[17]Environmental Justice ("(EJ")) Executive Order (EO) 12898 specifically calls for agencies to address significant adverse environmental effects on minority and low-income communities in mitigation measures outlined or analyzed in EAs and FONSIs[18]. Indeed, CEQ issued an EJ guidance document, including 6 principles for agency EJ analyses. ER1 would serve as matching funds for PREPA's 10-year plan and its funding requests to FEMA for spending at least $853 million on multiple new natural gas-fired power plants. Moreover, the plan would funnel over $8 billion for transmission and distribution system work that would perpetuate the existing long distance, south to north, transmission of energy, as well as the environmental injustice experienced by fence line communities located near heavily contaminating power plants in southern Puerto Rico.

Rebuilding and hardening the existing transmission and distribution system perpetuates reliance on fossil fuels, centralized generation and transmission would condemn these communities — comprised of a majority of impoverished Afro-descendent communities — to continued disproportionate adverse health effects caused by air, water and land pollution. PREPA's plan, currently being evaluated by FEMA, fails to adequately consider the rooftop/on-site solar and storage alternatives that could have positive, enduring multiplier effects in environmental justice communities, the local economy and employment rates. Moreover, wide scale rooftop/on-site solar and storage would not rely on the system of overhead wires whose collapse in Hurricane Maria led to blackouts that were linked to hundreds of deaths because

[14] Catalina M De Onís,. Energy Islands: Metaphors of Power, Extractivism, and Justice in Puerto Rico (University of California Press, 2021)..

[15] Hilda Lloréns, *Toxic racism in Puerto Rico's Sacrifice Zone*, NACLA Report on the Americas at 275-280 (2021) [https://nacla.org/news/2021/07/28/environmental-racism-puerto-rico]

[16] U.S. Energy Info. Admin. (EIA), Puerto Rico Territory Energy Profile (Dec. 16, 2021) https://www.eia.gov/state/print.php?sid=RQ

[17] *Environmental Justice and National Environmental Policy Act,* U.S. Envtl. Prot. Agency, https://www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act

[18] Exec. Order No. 12,898, 32 C.F.R. § 651.17 (1994).

life-saving medical equipment lacked energy supply. The LUMA contract establishes that the grid work must "align" with the Grid Modernization Plan, which is the Puerto Rico government's proposal to rebuild the existing grid rather than transform the electric system to provide the resilience that would make the difference between life and death in the face of disaster and shock events. PREPA's Transmission and Distribution System Operation and Maintenance Agreement with LUMA Energy promotes the operation of centralized generation that lacks the life-saving resiliency of distributed renewable energy and storage and perpetuates environmental injustice. Rebuilding the T&D system to connect to these plants perpetuates their operation. In addition to Executive Order 12,898 on Environmental Justice, the Biden Administration's Executive Order, "Tackling the Climate Crisis at Home and Abroad" provides further support for environmental justice claims. The communities near the existing fossil-fired power plants, most of which are located in southern Puerto Rico, are overburdened by the operation of the plants. The Guayama region is an environmental justice community with high poverty rates and where the majority of residents are Afro-descendants.

According to the Toxic Release Inventory this region suffers the greatest contamination of any region in Puerto Rico. The Guayama region also has among the highest poverty, unemployment, and school dropout rates in Puerto Rico. Simultaneously, the region has experienced a sharp decrease in medical services available to this environmental justice community with the closure of two hospitals and only one hospital currently in operation. The Applied Energy System (AES) Corporation coal-fired power plant and the Aguirre Power Complex, located in southeastern Puerto Rico are the two primary sources of toxic emissions in Puerto Rico and disproportionately impact some of the poorest communities. [19]These two plants also extract large amounts of freshwater from the South Coast Aquifer and have contributed to the water scarcity that led to water rationing in summer 2019 and in previous years. The AES coal burning power plant in Guayama transmits electricity to northern Puerto Rico, including the San Juan metro area and accumulates hundreds of thousands of tons of coal ash waste at its plant site. The facility and its polluting practices already contaminated part of the South Coast Aquifer, the sole source of potable water for tens of thousands of people in Puerto Rico. The Costa Sur and EcoElectrica plants in southwestern Puerto Rico both burn imported methane gas and also transmit energy long distance. Gas combustion is the substitution of one group of contaminants for others. The myth that methane gas is a cleaner energy source is a fallacy. The LNG imported to Puerto Rico must be stored under cryogenic conditions and revaporized/regasified before it can used at the plants. These additional processes add to the total emissions of LNG use in a way that can exceed the CO2 emissions of

[19] Hilda Lloréns, *In Puerto Rico, Environmental Injustice and Racism Inflame Protests over Coal Ash*, The Conversation (Dec. 8, 2016 9:08 PM), https://theconversation.com/in-puerto-rico-environmental-injustice-and-racism-inflame-protests-over-coal-ash-69763; Hilda Lloréns, *Puerto Rico's Coal-Ash Material Publics and the Summer 2019 Boricua Uprising, in* SOCIETY & SPACE MAG. (Feb. 25, 2020). https://www.societyandspace.org/articles/puerto-ricos-coal-ash-material-publics-and-the-summer-2019-boricua-uprising; See also, De OnÍs, *supra* at note .23.

other fossil fuels. Methane gas combustion also emits increased VOCs such as formaldehyde, benzene, toluene, hexane, and styrene. Multiple scientific studies, including a Harvard University report found that, "A small increase in long-term exposure to PM2.5 leads to a large increase in COVID-19 death rate, with the magnitude of increase 20 times that observed for PM2.5 and all-cause mortality to air pollution and COVID-19 mortality in the United States. The study results underscore the importance of continuing to enforce existing air pollution regulations to protect human health both during and after the COVID-19 crisis."[20] The specific findings demonstrate that, an increase of only 1 ug/m3 in PM2.5 is associated with a 15% increase in the COVID-19 death rate, at a 95% confidence interval. Particulate matter is emitted by electric power plants, motor vehicles and other sources of air contamination. Continued reliance on fossil-fired plants for energy transmission to San Juan and northern Puerto Rico is another climate disaster in the making.

The transformation of the electric system in civil society proposals such Queremos Sol/We Want Sun would alleviate the load on poor and largely Afro-descendent communities that are overburdened by the centralized fossil-fired electric system in Salinas, Guayama, Penuelas, Guayanilla, and parts of the San Juan metro area. But Puerto Rico civil society proposals have thus far, fallen on deaf ears. While various community groups and philanthropic organizations have carried out a few distributed renewable energy rooftop solar and battery storage projects throughout Puerto Rico, the pace and scale of these alternatives is dwarfed by the proposed rebuild of the centralized transmission and distribution grid and the rollout of new methane gas plants. Higher income individuals are seeing an uptick in rooftop solar and storage installations but with close to a 44% poverty rate, most people in Puerto Rico cannot access the life-saving essential electric service and resiliency that these systems can provide. In Puerto Rico and in other hurricane-prone places like the Gulf Coast and beyond, the investment of FEMA and HUD funds in distributed renewables and batteries is a matter of equity and environmental and climate justice. In addition, using FEMA and HUD funds to rebuild the Puerto Rico grid would be a terrible waste of taxpayer money.

B. Decreased need for T&D infrastructure

The Draft Plan acknowledges that electric demand is on the decline since 2005, from an all-time high of 3,685 MW down to less than 3,000 MW in 2017, (P.5). Recent reports show that energy demand is plummeting even further.[21] In contrast, "At the time when Hurricane María hit Puerto Rico, the Island's total power generation capacity was 5,839MW", which is nearly twice the energy demand. (P.6). Another 254 MW are supplied by different renewable energy

[20] X. Wu, R. C. Nethery, M. B. Sabath, D. Braun,. and F. Dominici, *Air Pollution and COVID-19 Mortality in the United States: Strengths and Limitations of an Ecological Regression Analysis,* Science Advances, (Nov. 4, 2020), https://projects.iq.harvard.edu/covid-pm.

[21] *Generación, consumo, costo, ingresos y clientes del sistema eléctrico de Puerto Rico,* Indicadores.PR (Nov. 23, 2021) https://www.indicadores.pr/dataset/generacion-consumo-costo-ingresos-y-clientes-del-sistema-electrico-de-puerto-rico/resource/8025f821-45c1-4c6a-b2f4-8d641cc03df1

independent power producers. (P.53) In addition, large industrial, commercial and institutional operations have their own generation facilities, estimated at over 250 MW.[22] Although some of the power plants are not functional, these numbers clearly reflect a trend towards decreased demand and diminished need for centralized generation, transmission and distribution.

The Department of Energy ("DOE") National Renewable Energy Laboratory ("NREL") has determined that rooftop solar is an "offset" to the electric system.[23] The more electric power is generated and used on-site, the less T&D is required. This means that there is an inverse relationship between rooftop solar and storage and the movement of energy through T&D infrastructure. In contrast, PRDOH argues that distributed generation such as residential and community-based solar require, "hosting capacity of the current transmission and distribution system and to make the upgrades necessary to support additional power integration." However, the allegation contradicts NREL's findings that rooftop solar and storage are "offsets" that minimize the need for T&D use. Achievement of the energy public policy enacted in Act 57 to use, "to the maximum extent possible the Island's energy resources such as the sun and the wind, conservation, and efficiency" requires casting aside the rhetoric of "renewable integration" to the grid, which implies that existing grid planning, construction and operational philosophies will be perpetuated. Instead, planning and construction of a new power infrastructure, truly reliable and resilient, based on local, renewable, distributed energy resources is required.

Although the Draft Plan references "key reports" including the Energy Resilience Solutions for the Puerto Rico Grid[24], by insisting on the rebuild of the T&D system, the Draft Plan fails to heed the calls in the reports to prioritize resilience in disaster recovery efforts. (P.66).

The Draft Plan notes that the extended delays in restoring electric service after Hurricane Maria was related to T&D system components. "PREPA experienced a delay in the recovery process due to the lack of principal materials such as poles, cables, and electric insulators, among others." (P.20). The question is why the Government of Puerto Rico is not using the vast amounts of FEMA and HUD funding for lifesaving distributed renewables.

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[22] Puerto Rico Energy Bureau, Final Resolution and Order On The Puerto Rico Electric Power Authority's Integrated Resource Plan at paragraph 892, CEPR-AP-2018-0001 (Aug. 24, 2020) [hereinafter, *Final IRP Resolution*] https://energia.pr.gov/wp-content/uploads/sites/7/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf

[23] Meghan Mooney, Katy Waechter, and the National Renewable Energy Laboratory (NREL), *Puerto Rico Low-to-Moderate Income Rooftop PV and Solar Savings Potential* (Dec. 17, 2020), https://www.nrel.gov/docs/fy21osti/78756.pdf.

[24] U. S. Dep't of Energy, *Energy Resilience Solutions for the Puerto Rico Grid*, Final Report (June, 2018) https://www.energy.gov/sites/prod/files/2018/06/f53/DOE%20Report_Energy%20Resilience%20Solutions%20for%20the%20PR%20Grid%20Final%20June%202018.pdf; *See also*, U.S GOV'T ACCOUNTABILITY OFF., GAO-20-141, *Puerto Rico Electricity Grid Recovery - Better Information and Enhanced Coordination Is Needed to Address Challenges* (Oct. 2019)

C. T&D infrastructure perpetuates dependence on imported, highly volatile fossil fuel prices

Contrary to the false assertion in the Draft Plan that, "most of the customers depend on the electric power produced by outdated oil units" (P. 53-4), methane gas (Natural Gas) is the largest fuel source in Puerto Rico as reflected in the Energy Information Administration reports, except for 2020.[25] In addition to the "unsteady oil costs" referenced in the Draft Plan, Natural Gas prices have been soaring, a fact that the Plan fails to acknowledge.[26] The "historically volatile electric rates which continue to negatively affect the customers and the economy" referenced in the Plan would not be resolved by constructing new gas-fired plants and rebuilding the T&D system that connects the fossil-fired plants to the load centers. The way to address "wild fluctuation" in electric rates is to invest in distributed renewables. However, with only 3% of the energy mix coming from renewables "the citizens and the total economy of Puerto Rico are vulnerable and highly dependent on fluctuating fuel prices." (P.54). The Draft Plan perpetuates dependence on volatile fuel prices and fails to acknowledge the need to invest the bulk of the funds in distributed renewables.

3. The Draft Action Plan fails to abide by the Integrated Resource Plan and evades public participation

The Integrated Resource Plan ("IRP") mandates deployment of renewable energy including distributed renewables.[27] The Draft Action Plan fails to abide by the IRP issued by the Puerto Rico Energy Bureau and instead relies heavily on studies that promote more, new fossil-fired power plants such as the PREPA 10- Year Infrastructure Plan, the Grid Modernization Plan, and the 2021 PREPA Fiscal Plan. "This Action Plan seeks to adjust critical findings from these reports and identify the remaining unmet need for communities that stand vulnerable to the impacts of power insecurity." (P.i).

The DAP proposes, "Replacing old generation units with high-efficiency ones" in contravention of the IRP. The Energy Bureau specifically rejected a new 400 MW gas-fired plant at the Palo Seco site and multiple new gas-fired peaking units and instructed PREPA to deploy renewable generation instead.[28] The Draft Plan admits that, "Remaining Peaking Capacity (Generation - $235,322,500)", consisting of nine 30 MW units for a total of 270 MW" was denied by the

[25] U.S. Energy Info. Admin. (EIA), Electricity, *Preliminary Monthly Electric Generator Inventory (based on Form EIA-860M as a supplement to Form EIA-860), (Nov. 24, 2021)* *https://www.eia.gov/electricity/data/eia860m/; See also*, Autoridad de Energía Eléctrica, *2021 Fiscal Plan for the Puerto Rico Electric Power Authority, As certified by the Financial Oversight and Management Board for Puerto Rico* at p. 29. (May 27, 2021) https://drive.google.com/file/d/1dXFJldZpOIsAObMZDBd7T2P3j2xMPaal/view

[26] Methane (natural gas) import price (average) in Europe was $31/MMBTU in October 2021. $31/MMBTU, Ycharts, *Natural Gas Price Indicators for Europe* (2021), https://ycharts.com/indicators/europe_natural_gas_price *See also*, BBC News, *Nord Stream 2: Gazprom says new pipeline to Germany is ready* (Sept. 10, 2021) https://www.bbc.com/news/world-europe-58520563

[27] *Final IRP Resolution* at 283.

[28] *Id.* at 284.

Puerto Rico Energy Bureau (PREB) in a Resolution and Order dated March 26, 2021. However, PRDOH and PREPA are disregarding the regulator's determination by asserting, with PRDOH asserting that the "mobile generating units will also support distributed generation alternatives". (P.57). Thus, adding more fossil-fired generation in contravention of the IRP.

The Draft Plan subverts the PREB regulatory process: "proposed CDBG-DR energy projects are not required to be approved in the IRP in order to apply for funding." (P. 122) PRDOH is undermining the IRP and relegating regulatory agency evaluation to certain contingencies. In fact, PRDOH attempts to de facto amend the IRP and sidestep regulations more broadly:

> "However, depending on the impact of the project, the project may be required to undergo regulatory agency evaluation, and **the project may need to be amended into the IRP before it can be implemented.** An IRP amendment can take more than seven (7) months, and requests for an amendment may need to be supported with modeling that substantiates the request. For example, if a non-PREPA/LUMA entity seeks to fund an energy project, it would have to establish a rate that covers operation and maintenance expenditures. That rate would then go to PREB for review and approval. In other instances, PREB may need to evaluate the impact of a project on the rest of the system or ratepayers. For example, the cost of fuel is paid and spread across ratepayers, so projects that would impact fuel consumption would need to be evaluated. While the IRP does not have to be amended to include renewable energy projects, it is important to note that **the current approved IRP does not have microgrids in the plan.** Even if a project is for a component already included in the IRP or otherwise identified as Public Policy, it may still need to be validated by the corresponding regulatory agencies in order to ensure there are no inconsistencies with the Public Policy. This review period is designed to be completed within thirty (30) days." (P. 122) (Emphasis added).

PRDOH is in effect, proposing amendments to the approved IRP to add more fossil-fired generation and T&D infrastructure for microgrids. The PRDOH Draft Action Plan is based on expected amendments to the IRP. Therefore, the Draft Plan does not abide by the IRP approved by the Energy Bureau. The IRP was the result of a long administrative process with robust public participation. The IRP is one of only two provisions of Puerto Rico law that may not be abrogated by Puerto Rico Oversight Management and Economic Stability Act ("PROMESA").[29] The PRDOH scheme to fund projects not included in the IRP process would circumvent public participation , violate PROMESA, and local law and may not be approved.

PRDOH proposes to group distributed renewables with microgrids and "other energy components" in a way that further dilutes the allocation of funds for renewables. The Draft Plan is telling; "**A project for instance, a microgrid, may include localized improvements to transmission and distribution assets, which would be considered ancillary to the microgrid improvement**." The implication is that funds for a microgrid could be used for transmission and

[29]PROMESA, H.R. 5278, 114th Cong. (2016).

distribution work and thereby diminish or completely eliminate investment in distributed renewables. Furthermore, PRDOH's abrogation of complete discretion to, "reallocate budgets between components at 10% or less of the budget for each component" in addition to the scheme outlined above will decimate investments in distributed renewables. This "finer level of detail "is not amenable to public participation. (P. 108-10).

The ER2 program in the Draft Plan proposes "developing micro-grids electrical systems" (P.8) But the expenditures for the microgrids would include hefty investments in new gas-fired plants or other fossil generation, such as diesel generation and transmission and distribution infrastructure that would drain funds for distributed renewables.

The indication that projects not approved in the IRP may be funded belies the allegation that the, "Electrical Power System Enhancement and Improvements Action Plan is authorized under State and local law (as applicable) and that PRDOH, and any entity or entities designated by PRDOH, and any contractor, subrecipient, or designated public agency carrying out an activity with CDBG–DR funds, possess(es) the legal authority to carry out the program for which it is seeking funding, in accordance with applicable HUD regulations and the notice 86 FR 32681 ("Notice").[30] PRDOH's certification that "activities to be undertaken with funds under this notice are consistent with its Action Plan," (P. 139), is inconsistent with the plain language of the IRP is inconsistent with the plain language of the IRP in light of the statement that projects not included in the IRP may apply for funds. This determination could create false expectations on the part of potential developers and investors applying and obtaining these funds, damaging Puerto Rico's opportunities for future investments in distributed renewables, a situation similar to the uncertainties created between 2010 to 2012 when PREPA's Governing Board approved over 60 large-scale renewable energy contracts even though there was evidence that most of those projects could not be built.

4. The Draft Action Plan makes no significant contribution to achieve the upcoming, 2022 and 2025 renewable energy legal mandates

The Puerto Rico electric system is highly centralized and depends on fossil-fired power plants for 97% of energy generation. Renewable energy generation is mandated in the Puerto Rico Renewable Portfolio Standard ("RPS") by virtue of the Puerto Rico Energy Public Policy Act (Act 17-2019) and the Climate Change Mitigation, Adaptation and Resiliency Act (Act 33-2019) that require renewable energy generation of 20% by 2022, 40% by 2025, 60% by 2040, and 100% by 2050. "Transformative mitigation and resilience" that complies with these legal mandates can be directly achieved with widescale deployment of distributed renewables such as rooftop solar and storage as opposed to the rebuild that the PRDOH and the Government of

[30] Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Disaster Recovery Grantees; Electrical Power Systems in Puerto Rico and the U.S. Virgin Islands, 86 Fed. Reg. 32,681 (June 28, 2021).

Puerto Rico propose of the "extremely weak" T&D system which allegedly is "susceptible to collapse from any future major event". (P.vii).

The Plan fails to adequately address "mitigation and resilience measures to protect against the anticipated effects of future extreme weather events, other natural hazards…" (P.ii) and focuses on and long-term risks, long-term carbon reduction goals and does not establish how imminent renewable energy mandates enshrined in Puerto Rico law and federal policies will be achieved.

The Government of Puerto Rico violated the Puerto Rico Public Policy on Energy Diversification by Means of Sustainable and Alternative Renewable Energy Act (Act 82-2010), which established Puerto Rico's first Renewable Portfolio Standard and required that any retail energy provider procure 12% of its power needs through renewable energy by 2015, 15% by 2020, and 20% by 2035. **With the Draft Action Plan, the Government of Puerto Rico is now on route to violate the new legally mandated renewable energy goals.** Again, Puerto Rico's commitment, credibility and reputation to transform its electric system would be damaged with the implementation of the Draft Plan.

5. The Draft Action Plan assumes that FEMA funds would not be available for distributed renewables and battery energy storage systems

The unmet needs assessment in the Draft Action Plan is erroneously based on the assumption that Federal Emergency Management Agency ("FEMA") funds are not available for distributed renewables and "not likely to cover electrical power system needs." (P.ii). PRDOH has an affirmative duty to show that the costs could not be charged to FEMA funds: "The Department notes the substantial amount of FEMA Public Assistance funding that has also been committed to electrical power system improvements. Accordingly, grantees are advised that when CDBG– DR funds for electrical power system improvements are used in combination with FEMA or USACE funds, the grantee must document that such CDBG–DR funds were not used to pay for costs that could be charged to the FEMA or USACE award…"[31]

PRDOH argues that, "Specific critical loads must be considered relevant unmet needs for the entire island of Puerto Rico." (P.12-13). However, there is no reason why the vast, unprecedented, and historic amount of FEMA funding cannot be used to deploy widescale rooftop solar and storage to meet energy demand, including critical loads in Puerto Rico.

The rebuild of the T&D grid proposed in the studies cited by PRDOH is an extremely expensive proposition that fails to address direct resiliency options such as rooftop solar and storage. PRDOH admits that the rebuild of the electric system could cost anywhere from $17.6 billion, "accounting for modern technology as a resilience measure." to $21 billion as proposed in COR3's Grid Modernization Plan. (P.53).

[31] *Id*.

PRDOH's assumption that FEMA funds are not available for distributed renewables does not align with the fact that FEMA has not approved, "the projects proposed by PREPA, LUMA and PRASA in this section" (P.55). PRDOH could propose to use the funds allocated by HUD for distributed renewables. However, the Plan proposes to use the majority of the funds allocated by HUD for the electric system to serve as matching funds to rebuild the centralized T&D system. Moreover, the use of HUD funds to provide the territory's matching share for the $9.6B FEMA allocation to rebuild the T&D system means that the funds for the rebuild would be close to $11B, more than ten times the amount for distributed renewables in PRDOH's other programs. In addition, PRDOH's CEWRI program is not exclusively for distributed renewables so the resources for rooftop solar and storage are further diluted. In fact, PRDOH calculates that only 12,000 residences would be equipped with rooftop solar systems under the CEWRI program. As noted in the DAP, "The PREPA 10-Year Infrastructure Plan was issued in June 2021 and includes a funding estimate of $10.5 billion to repair and/or replace electrical systems with FEMA's Public Assistance 428 Program. PREPA's vast infrastructure contains thousands of miles of transmission and distribution lines, along with electrical substations and power generation systems." (P.55). "Depending on available funding, PRDOH may also consider the viability of matching the non-federal cost shares of other federal grant-in-aid programs related to electrical system improvements."

The Draft Plan repeatedly alleges that, "the electrical grid must be rebuilt from the ground up", failing to acknowledge the ability of distributed renewables to do just that. PRDOH's focus on "long-term recovery from Hurricane María" casts aside meeting the imminent legally mandated renewable energy targets. For the reasons stated above, the Commenters oppose the pending request by the Government of Puerto Rico for "FEMA consideration of 100% federal funding for all permanent work under the Major Disaster Declaration related to Hurricane María (FEMA DR 4339-PR)." (P.112). If "the electrical grid must be rebuilt from the ground up", why not take advantage of this opportunity to build power infrastructure that truly addresses the reliability and resilience needs of Puerto Rico?

6. The Draft Action Plan Misses the opportunity to achieve social and environmental justice through LMI access to distributed renewables

The Draft Plan notes that in Puerto Rico, "43.5% of the population(is) living under federal poverty rates. Puerto Ricans had already been faced with cuts to the working hours of public employees, increases in taxes, reduction in salaries received by young adults, a decrease in allocations for non-profit organizations, and increases in the costs of water and electricity." (P.39). The Draft Plan indicates that 80% of the population is classified as Low to Moderate Income ("LMI"). (P.44). The Draft Plan further notes that hospital, "backup generator systems failed due to hurricane-related damage or lack of sufficient fuel to keep buildings operating and able to run life-saving equipment such as nebulizers and dialysis machines, or to keep critical medicines refrigerated. The Island-wide blackout caused a series of healthcare risks that cost the lives of many Puerto Ricans." … "Because of the power failure and the dependence on fuel,

health and medical services were placed at risk, and as a cause of this thousands of lives were lost over the course of the prolonged disaster" (P.39-40). The extent and magnitude of electric system damage and deaths related to the prolonged outage could have been avoided with direct energy supplied from on-site or rooftop solar and storage that don't depend on vulnerable transmission lines, poles, towers, transformers, substations and other components of a centralized energy delivery system or imported fossil fuels.

Commenters agree that, "educational facilities are key candidates for the possible installation of distributed energy generation with the necessary electrical infrastructure, incorporating renewable resources to the extent feasible." (P 42). However, the Draft Plan does not provide any level of detail or ensure the actual implementation of distributed energy projects at educational institutions such as public schools.

The Commenters totally agree with the "UPR, Mayagüez Campus, Study in 2018 that analyzes the data related to the blackout experienced after hurricane María and the implications on remote rural communities across Puerto Rico. The total customer hours of lost electricity service (CHoLES), highlights the need to provide a viable alternative for remote rural communities that usually are the last to recover access to electric power services because almost a third of the total CHoLES (900 million) was due to the delay in providing power to the last 200,000 customers that were reconnected to the grid from day 156 to day 329 after the Hurricane." (P.51). In addition, it should be noted that the largest number of CHoLES were attributable to the large number of people throughout Puerto Rico and especially in the San Juan metropolitan area that lacked essential electric service because the centralized T&D system was downed by the hurricane. The Action Plan fails to consider that most of the CHoLES stemmed from the large number of customers throughout Puerto Rico and in the San Juan metropolitan area that were without essential electric service and that they too require resilient power solutions such as rooftop solar and storage. Although the Draft Plan mentions that the damage caused by Hurricane Maria left millions of people without electric service, the Plan fails to highlight the number of ChoLES for the 95% of residents that did not have service as of September 26, 2017, the 89% as of October 6th, 88% one month after the storm, and 45% three (3) months after the hurricanes. (P19). The Draft Plan notes that, "Six (6) weeks after Hurricane María made landfall, only 30% of the power had been restored; two (2) months after only 50% of the power had been restored"(P.19) but fails to acknowledge that the entire population of Puerto Rico experienced long delays in restoration of essential electric service for significant amounts of time which was a generalized life-threatening situation and distributed renewables and solar should be accessible to all LMI communities.

The Draft Plan notes that, "Most LMI people who live in the remote rural areas of Puerto Rico do not have the financial resources to buy a reliable electrical backup system for their homes. They depend on the electric grid to have electricity in their houses and have an average quality of life. During the aftermath of the hurricane, those who were able to purchase an electric generator spent considerable resources trying to find fuel to run them for at least a few hours a

day." The Draft Plan fails to acknowledge that "LMI people" are dispersed in communities all over Puerto Rico and also lack financial resources to buy backup generators. That is precisely the reason why PRDOH should channel the funds to distributed renewables, battery energy storage systems and other alternatives to central station, fossil-fired generation.

The Draft Plan fails to explain how "PRDOH shall appropriately ensure that activities that meet these criteria do not benefit moderate income persons to the exclusion of low-income persons." (P.90). The proposed rebuild of the T&D system is generalized and not in any way specific to low-income communities, contrary to the case with distributed renewables where PRDOH could easily focus resources in low-income communities.

The Draft Plan rejects the possibility of "the rate-subsidy scenario for a subset of ratepayers" or lowering rates for communities with the high poverty levels. Ruling out these options could inflict extreme hardship on low-income residents of Puerto Rico.

The ER1 proposal does not allow compliance with the requirement that, "Funds will be used solely for necessary expenses of electrical power system enhancements and improvements in the most impacted and distressed areas as defined by HUD in section II of the Notice. 2. With respect to activities expected to be assisted with CDBG–DR funds, the Action Plan has been developed to give the maximum feasible priority to activities that will benefit low- and moderate-income families. 3. The aggregate use of CDBG–DR funds shall principally benefit low- and moderate-income families in a manner that ensures that at least 70% (or another percentage permitted by HUD in a waiver published in an applicable Federal Register notice) of the grant amount is expended for activities that benefit such persons." (P.90-1). The DAP fails to explain how PRDOH would meet these requirements. The LMI Benefit requirement which requires that 70% of the funds benefit LMI households is unworkable for the Energy Grid Rehabilitation and Reconstruction (ER1) Cost Share Program. The meaning and implications of PRDOH's allegation that it, "will apply the goal in a fungible manner so long as the target for the allocation as a whole is met" are not at all clear. "Regarding the measurable improvement in reliability, there has been much deliberation regarding the key performance indicators and baseline data against which to evaluate LUMA performance. Additionally, LUMA, as operator, has indicated that data for residential-level outages and service area impact by feeder improvement are not readily available due to limitations on available data, included GIS capabilities, as well as the difficulty of segmenting or partitioning the impact of improvements from one area to the next." (P. 91). This is an admission that the measuring improvement in reliability lacks the necessary baseline data.

PRDOH's focus on the "long-term impact of Federal investments on the electrical power system" loses sight of the urgent need to start to provide energy resiliency and comply with the upcoming, legally mandated RPS in 2022 and 2025. PRDOH admits that the work proposed in the Draft Plan entails, "unprecedented complexity". (P.92). Based on the studies cited above, Commenters contend that wide scale implementation of rooftop solar and storage would be more straightforward and provide direct, life-saving resiliency.

PRDOT's reference to CDBG-DR and CDBG-MIT programs such as the CDBG-MIT Community Energy and Water Resilience Installations Program ("CEWRI") to provide access to distributed renewables is misleading for a number of reasons: 1-the CEWRI program is not exclusive for energy projects, 2-the funding level dwarfs in comparison to the amounts proposed for T&D rebuild, 3-some of the programs are limited to previous disaster assistance recipients or have other exclusionary conditions, 4-the Draft Plan falsely implies that the funds are not eligible for residential or community scale projects. Furthermore, the CEWRI program, "is anticipated to provide approximately 12,000 households with localized energy resilience" (P.108) which is nowhere near the 1.4 million electric customers in Puerto Rico.

PRDOH must specify its "plans to minimize displacement of persons or entities, and assist any persons or entities displaced as a result of its electrical power system improvement activities." (P.96) Potential community displacements related to the work to be funded is crucial information that should be made accessible to the public and potentially impacted communities. PRDOH alleges that, "it has in effect and is following a residential anti-displacement and relocation assistance plan in connection with any activity assisted with funding under the CDBG-DR Program." The plan should be available to the public.

7. The Draft Action Plan drives up electric rates

The Draft Plan notes that, "PREPA finances have been considerably declining over the last two (2) decades because of increased debt and insufficient capacity to pay its lenders. Electricity sale projections did not meet objectives, and the revenues were not enough to sustain the utility's operation and maintenance in a sustainable way. On July 2, 2017, due to its critical financial condition, PREPA filed a petition in the U.S. District Court for the District of Puerto Rico for relief under Title III of the Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA)". (P.4) PREPA's bankruptcy status makes it a poor candidate for public private partnership schemes. As a counterparty to public private partnerships and power purchase agreements, PREPA's insolvency will drive up financing and transactional costs. Increased costs would then be passed on to Puerto Rico ratepayers. The scheme proposed in the Draft Action Plan is particularly pernicious in that the capacity and scale of rebuilding of the T&D system would add to electric rate hikes that have been estimated to surpass .30 cents per kw.[32] The projected rate hikes would inflict untold hardship on most of the population.[33]

"The Legislature approved Act 120 in response to the many deficits in the PREPA-operated energy system, including, among other things, "[…] the high cost of fuel in a very volatile and

[32] Including the RSA charge, LEI estimates that PREPA rates would have to rise to 27.8 to 30 cents per kWh (nominal) over the next five years under the "Base Case" and roughly similarly under the "Alternative Case". Rosario Fajardo, *Confidential Report Slams Proposed Prepa Transition Charge* , The Weekly Journal (Feb. 5, 2020) https://www.theweeklyjournal.com/business/confidential-report-slams-proposed-prepa-transition-charge/article_2810a5a4-478b-11ea-bba1-bbbc0fb919a8.html

[33] *Id.*

speculative market; an old and deteriorated electric power infrastructure dependent on the costliest, less efficient, and most polluting fuels [….].” (P.80-1). Therefore, one key element to preventing rate hikes is to cut down dependence on fossil fuels. High fossil fuel costs was one of the contributing factors to PREPA’s insolvency. Fossil fuel costs drain the Puerto Rican economy.

The Draft Plan notes that, “neither PREPA nor the Government have the necessary financial resources to carry out its operational restructuring” (P.78). The HUD funds in conjunction with other federal funds could finance the “operational restructuring” of the electric system to roll out widescale life-saving distributed renewables.

The Draft Plan does not address how the rebuild of T&D would tackle the “key historical challenges leading to PREPA’s current problematic financial position”, “lack of rate adjustments to cover costs, macro-economic challenges that led to fewer customers and a lower revenue base” where “existing customers have had to pay higher rates to cover fixed system costs,” and an “overreliance on fossil fuels with fluctuating prices for power generation.” On the contrary, the T&D rebuild would hike up electric rates,[34] and perpetuate reliance on fossil-fired generation. If demand continues to decline and new, distributed technologies are available, why does the plan continue insisting on infrastructure and business models that do not align with the Puerto Rican socio-economic context?

Commenters oppose the inclusion of for-profit companies as grant subrecipients because experience has shown that power purchase and operation agreements (“PPOAs”) like the existing utility scale renewable energy PPOAs are very high cost, some reaching up to $197 MW which will lead to rate hikes. In addition, the for-profit utility scale renewable energy installations have destroyed agricultural land and ecologically sensitive areas. Commenters oppose electrical power system improvements “installed or applied on private lands for the same reason”. PRDOH’s expansive definition of electrical power system improvements to include “interim assistance and financing public or private acquisition for reconstruction or rehabilitation, and reconstruction or rehabilitation, of privately owned property” and the refinancing or paying down of debt will undoubtedly increase electric rates. (P. 113). The proposed Draft Plan would further deepen, “the financial inability of PREPA to recover “as it would funnel resources to for-profit corporations. (P. 111). The CDBG–DR grantee should not be awarded a waiver of the prohibition of funding to a privately-owned utility as the experience has been that this will result in increased rates and increased contamination from fossil-fired generation. (See the discussion on the AES coal-fired power plant and coal ash waste). (P. 121).

The minimum award amount of $10,000,000 and the open-ended maximum award in the Draft Plan places barriers for community-based and non-profit organizations that endeavor to develop renewable energy initiatives. This is further evidence of the discriminatory nature of

[34] *Id*.

the Draft Plan against distributed renewables, and the bias in favor of large, centralized projects that will not improve Puerto Rico's energy resilience.

Distributed renewables have much more "Cascading Impact: Demonstrated community benefits tied to electrification" (P.122) and multiplier effects in the local economy since there is a mature industry of local designers and contractors in Puerto Rico.

A. LUMA Energy Control Over FEMA and Other Federal Funds, Conflicts of Interests and Potential Self-Dealing

The Puerto Rico Transmission and Distribution System Operation and Maintenance Agreement dated June 22, 2020 between the Puerto Rico Electric Power Authority as Owner, the Puerto Rico Public-Private Partnerships Authority as Administrator, Luma Energy, LLC as ManagementCo, and Luma Energy Servco, LLC as ServCo (the LUMA contract)20 is a long, expensive and exclusive scheme that creates a private monopoly over energy transmission, distribution, generation dispatch, customer service, planning and other electric system functions and perpetuates the operation of the fossil-fired generation plants that overburden poor and majority Afro-descendent communities. The contract grants LUMA Energy control over HUD and FEMA funds assigned for the Puerto Rico electric system as detailed below.

1. LUMA participates and has veto power in the selection of the federal funds grant manager. Contract Section 1.1, page 17.

2. LUMA can request changes or modifications to the federal funding, including modifications to, or reallocations between, the project worksheets related to the T&D System prepared by FEMA pursuant to Section 428 of the Stafford Act or the Integrated Resource Plan. Contract Section 4.3 (j) Pages 50-1.

3. LUMA, in conjunction with the Administrator determines that capital improvements are done to maximize the potential realization of the federal funding anticipated or received. Contract Section 5.9, Page 70.

4. LUMA has "complete flexibility, subject to compliance with the Contract Standards and prior consultation with, but not subject to approval by, Administrator or PREB, to (i) reallocate, accelerate or postpone expenditures within the approved Operating Budget, (ii) reallocate, accelerate or postpone expenditures within the environmental and community organizations on behalf of which this Request for Reconsideration is submitted make up the majority of the organizations forming the AERA. 20 executed-consolidated-om-agreement-td.pdf (pr.gov) 9 approved Capital Budget – Federally Funded, subject to the Federal Funding Requirements,"…Section 7.3, Page 89.

5. LUMA and its subcontractor will "deal with federal funds management" to manage "long term recovery using federal funding on behalf of the Owner". Page Annex II-39, Page (pdf) 207.

6.LUMA Energy, LLC, was created by Quanta Services and ATCO, an affiliate of Canadian Utilities. These companies are expected to benefit from the billions of dollars in federal funds. LUMA's parent company, Quanta Services plans to "compete for work associated with Puerto Rico's electric T&D system modernization efforts that are separate from its ownership interest in LUMA", "expected to be funded by U.S. federal disaster relief agencies and managed by LUMA."[35]

7. The contract states that the Operator (LUMA) will work with IEM (as its subcontractor) to manage federal funds.

8. LUMA establishes a governance framework to manage long term recovery using federal funds on behalf of PREPA. (VII. Federal Funds Procurement Manual).

9. LUMA may request changes or modifications to federal funding (including modifications or reassignments between project worksheets related to the T&D system prepared by FEMA pursuant to Section 428 of Stafford Act) or the Integrated Resource Plan. (LUMA contract page II-39, pdf 207).

10. Luma Energy objects to PREPA using funds allocated for the electric system by FEMA and other federal agencies to install rooftop solar systems and batteries. LUMA and its affiliated companies Quanta and ATCO plan to use the funds for transmission projects. In a proceeding before the Energy Bureau, one of the LUMA Energy representatives, Lee Wood, falsely alleged that FEMA would not allow the use of funds for behind the meter generation, that is, located in the residence or business of the consumer, mainly rooftop solar.[36]

8. The Draft Action Plan does not comply with the requisite environmental review, and climate and flood control provisions

The Draft Plan notes that, "the Congressional Research Service stated, '[b]efore the Department of Housing and Urban Development (HUD) can grant an applicant request for

[35] "Quanta believes there is opportunity for it to compete for work associated with Puerto Rico's electric T&D system modernization efforts that are separate from its ownership interest in LUMA. Puerto Rico's electric T&D system is at a critical juncture after the destruction caused by Hurricanes Maria and Irma. As a result, the government of Puerto Rico, through the P3 and in collaboration with PREPA, have embarked on a plan to rebuild, modernize, harden and "green" its power grid, a majority of which is expected to be funded by U.S. federal disaster relief agencies and managed by LUMA. The P3 estimates that more than $18 billion of electric T&D capital investment could be required through 2028 for this initiative." Press Release, Quanta Services Inc., Quanta Services and ATCO-Led Consortium Selected by the Puerto Rico Public-Private Partnership Authority for the Operation and Maintenance of Puerto Rico's Electric Power Transmission and Distribution System (June 22, 2020).

[36] In the recording of the proceedings before the Energy Bureau, LUMA's representative tries to argue that PREPA cannot use the FEMA funds assigned to it to install solar systems with batteries for its subscribers. See, *2nd Technical Workshop (Optimization)* at 1:49:00, https://youtu.be/oGYujWJ8S7s?t=6471. See also, José Delgado, *Alexandria Ocasio Cortez, Nydia Velázquez y Charles Schumer reclaman priorizar la energía renovable en Puerto Rico*, El Nuevo Día, (Feb. 25, 2021 3:50 PM), https://www.elnuevodia.com/corresponsalias/washington-dc/notas/alexandria-ocasio-cortez-nydia-velazquez-y-charles-schumer-reclaman-priorizar-la-energia-renovable-en-puerto-rico/

Community Development Block Grant (CDBG) funds, that applicant must complete an environmental review of the proposed project. A required element of that review is the applicant's certification that compliance with any applicable requirements related to historic preservation, floodplain management, endangered species, air quality, and farmland protection have been considered. This review is required to meet NEPA obligations and ensure that the project being funded does not violate other applicable laws." (P.82).

In an effort to comply with the National Environmental Policy Act ("NEPA") and other federal environmental review requirements for the eligible projects under the ER1 scenario (cost share), PRDOH proposes to adopt the FEMA Environmental Review process (P. 114). Under NEPA, a purpose and need statement must allow for consideration of all reasonable alternatives that fall within the statutory authority for a project – that is, it must not frustrate Congressional intent and the objectives of federal laws by evaluating only some of the ways a project could be accomplished, rather than the full scope of options available under the law. See Simmons v. U.S. Army Corps of Eng'rs, 120 F.3d 664, 666 (7th Cir. 1997); see also Native Ecosystems Council v. U.S. Forest Serv., 428 F.3d 1233, 1245-1246 (9th Cir. 2005). Similarly, and for similar reasons, a purpose and need statement may not be limited to what applicants propose. Nat'l Parks & Conservation Asss'n v. Bureau of Land Mgmt., 586 F.3d 735, 747-748 (9th Cir. 2009). The Finding of No Significant Impact ("FONSI") issued by FEMA for electric system work in Puerto Rico falls short of NEPA's demands and is contrary to President Biden's Executive Orders on Climate and Environmental Justice.

On October 30, 2021 - Comité Diálogo Ambiental, Inc., El Puente de Williamsburg, Inc. – Enlace Latino de Acción Climática, Comité Yabucoeño Pro-Calidad de Vida, Inc., Alianza Comunitaria Ambientalista del Sureste, Inc., Sierra Club Puerto Rico, Inc., Mayagüezanos por la Salud y el Ambiente, Inc., Coalición de Organizaciones Anti Incineración, Inc., Amigos del Río Guaynabo, Inc., and Campamento Contra las Cenizas en Peñuelas, Inc., collectively known as Alianza Energía Renovable Ahora ("AERA"), together with the Unión de Trabajadores de la Industria Eléctrica y Riego ("UTIER"), formally requested that FEMA reconsider its highly flawed decision to issue a Finding of No Significant Impact ("FONSI") for the Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment in the Commonwealth of Puerto Rico, DR4Community Request for Reconsideration of FEMA's issuance of a FONSI.[37] **The Request for Reconsideration is attached to these comments for inclusion in this case and the arguments contained therein are incorporated by reference into these comments**.

It is clear that the massive undertaking, the proposed rebuild of the electrical grid "from the ground up" requires the preparation of an Environmental Impact Statement ("EIS") guided by NEPA and the Puerto Rico Environmental Public Policy Act (Act 416). (P.111-5).

"The Puerto Rico Department of Housing certifies that it will not use CDBG–DR funds for any activity in an area identified as flood prone for land use or hazard mitigation planning purposes

[37] Attached as Appendix C.

by the State, local, or tribal government or delineated as a Special Flood Hazard Area (or 100-year floodplain) in FEMA's most current flood advisory maps, unless it also ensures that the action is designed or modified to minimize harm to or within the floodplain, in accordance with Executive Order 11988 and 24 C.F.R. Part 55. The relevant data source for this provision is the State, local, and tribal government land use regulations and current hazard mitigation plans and the latest-issued FEMA data or guidance, which includes advisory data (such as Advisory Base Flood Elevations) or preliminary and final Flood Insurance Rate Maps." The Action Plan notes that, "**raising an electrical power system component to the Base Flood Elevation (BFE) plus three feet may transfer the flood risk to the surrounding area**" (P.124) but fails to acknowledge how nearby communities would be increased flood levels caused by 'raising an electrical system component'.

PRDOH's proposal to "elevate structures associated with the electrical power system" to address flood risks, or the demolition and reconstruction of an elevated structure would be costlier than installation of rooftop solar and storage. Homes in flood prone areas are already elevated.

A. Climate Change

On January 27, 2021, President Biden issued Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, which declared that this Administration's policy is to: organize and deploy the full capacity of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy; increases resilience to the impacts of climate change; protects public health; conserves our lands, waters, and biodiversity; delivers environmental justice; and spurs well-paying union jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure. The Order further provides that "[t]he Federal Government must drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy, marshaling the creativity, courage, and capital necessary to make our Nation resilient in the face of this threat."[38] It establishes a National Climate Task Force and specifies that "[t]o the extent permitted by law, Task Force members shall prioritize action on climate change in their policy-making and budget processes…and in their engagement with State, local, Tribal, and territorial governments; workers and communities…." In addition, the Order directs agency heads to "identify opportunities for Federal funding to spur…deployment of clean energy technologies and infrastructure…and then take steps to ensure that, to the extent consistent with applicable law, Federal funding is used to spur…deployment of clean energy technologies and infrastructure."[39]

The Plan claims to be aware of the electric system vulnerability to the impacts of climate change such as heat, storms, drought, and sea-level rise and alleges that, "PRDOH will prioritize

[38] Exec. Order No. 14008, 86 Fed. Reg. 14,403 (Jan. 27, 2021).
[39] *Id.*

projects to reduce the impact of climate change, such as those using renewable sources of energy." PRDOH attempts to argue that T&D buildout "can substantially reduce impacts to climate change. By decreasing transmission and distribution losses, these projects minimize the consumption of fossil fuels in power generation" (P.55) but fails to acknowledge that distributed renewables coupled with battery energy storage systems totally eliminate GHG emissions along with criteria pollutants and a whole slew of other contaminants. In addition, distributed renewables act as "offsets" that minimize the need for costly transmission and distribution infrastructure.

HUD requires that the funding be used for, "activities to increase the resilience of the electrical power system to future disasters and to address the impacts of climate change." (P. 93). Rebuilding the T&D system that connects to the fossil-fired plants fails to increase resilience comparable to distributed renewables and does not address the impacts of climate change.

Rebuilding of the T&D system as proposed in the Draft Action Plan (ER1) does not meet the purposes of the CDBG–DR funds to improve the cost-effectiveness, reliability, resilience, efficiency, sustainability, and long-term financial viability.

9. The Draft Action Plan is impermissibly vague, ambiguous and imprecise and fails to inform the public about key aspects of the plan, thereby denying effective public participation (matching activities, microgrids transmission)

PRDOH's proposal to adopt the "reliability of the electrical power system in low-and moderate-income areas that are primarily residential" (P.113) is impermissibly vague. How much improvement in power reliability qualifies? Is a very small improvement in reliability from the egregiously high LUMA outages sufficient? Furthermore, "Measurably improved reliability" (P.113) is defined as "a documented decrease in power supply interruptions, excluding planned interruptions and interruptions caused by major events." The exclusion of major events defeats the purpose of the reliability metric. In effect, LUMA would have free reign to excuse nonperformance during "major events". In other words, outages such as the aftermath of Hurricane Maria would not count as an interruption!

The reliability metric is not clearly defined in the Draft Plan, "**Noticeably improves** the reliability of the system" through reducing the Impact on the number of days without power; and/or documented decrease in power supply interruptions". The resilience metric is similarly imprecise, "**Noticeably improves** the resilience of the system, projected Impact on the number of total accumulated Customer Hours of Lost Electricity Service (CHoLES) after an event"(Emphasis supplied).

The Draft Plan erroneously claims that, "as outlined by FEMA, "Costa Sur is the largest of four (4) power plants on the Island and provides about a quarter of the electric power throughout Puerto Rico." (P.21).

The Plan notes that liquefaction susceptibility studies show that "the edges of San Juan Bay" are high risk areas but fails to underscore that the San Juan and Palo Seco power plants are located in this same area. (P.23).

PRDOH must define "innovative generation solutions "and whether that would include incineration, nuclear energy or similar false solutions.

PRDOH should provide its citizen participation plan for public inspection. Commenters question the level of consultation "with affected local governments in municipalities designated in covered major disaster declarations…in determining the uses of funds, including the method of distribution of funding, or activities carried out directly by the State" when the activities proposed to be funded are so vague in both the ER1 and ER2 Programs. (P.140).

Conclusion

We urge the PRDOH and the Federal Government to earmark the historic amount of HUD and FEMA funds allocated for the electric system for on-site and rooftop solar and battery systems and similar alternatives that will provide life-saving electric service to the LMI residents in Puerto Rico and alleviate the burden of poor and largely Afro-descendant communities close to the fossil-fired power plants mostly in southern Puerto Rico. The use of the historic amount of HUD and FEMA funds allocated for the electric system will determine the viability of Puerto Rico for generations to come and could be instrumental in achieving environmental and climate justice in the archipelago.

In Salinas, Puerto Rico.

Sincerely,

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APPENDIX A

Seven Studies That Have Shown the Viability, Reliability and Economic Benefits of Rooftop Solar and Storage in Puerto Rico

1. Meghan Mooney & Katy Waechter, *Puerto Rico Low-to-Moderate Income Rooftop PV and Solar Savings Potential, National Renewable Energy Laboratory* (2020), https://www.nrel.gov/docs/fy21osti/78756.pdf

2. *Estudio de Integración de Recurso Solar Distribuido en Puerto Rico, Sol + Techos*, Cambio PR (2021), https://cambiopr.org/solmastechos/#downloads

3. Ingrid M.Vila Biaggi et al., *We Want Sun and We Want More (Summary)* (2021), https://cambiopr.org/wp-content/uploads/2021/03/Modeling-Study-Fact-Sheet-03_21.pdf

4. *Puerto Rico Distributed Energy Resource Integration Study: Achieving a Renewable, Reliable, and Resilient Distributed Grid, Telos Energy* (December 2020), https://cambiopr.org/wp-content/uploads/2021/03/PuertoRicoDistributed-Energy-Resource-Integration-Study-Telos-Energy.pdf

5. *Puerto Rico Distribution Modeling*, EE Plus (2021), https://cambiopr.org/wp-content/uploads/2021/03/Puerto-Rico-Distribution-Modeling-EE-Plus.pdf

6. *Puerto Rico Distributed Energy Resource Integration Study: Load, Energy Efficiency, and System Cost*, Energy Futures Group (2021), https://cambiopr.org/wp-content/uploads/2021/03/Puerto-Rico-Distributed-EnergyResourceIntegration-Study-Energy-Futures-Group.pdf; Achievable Renewable Energy Targets ("ARET") Ch. 4 Solar Resource, https://www.uprm.edu/aret/docs/Ch_4_Solar_resource_and_solar_thermal.pdf)

7. Agustín A. Irizarry Rivera et al., *Achievable Renewable Energy Targets ("ARET")* (2008), https://bibliotecalegalambiental.files.wordpress.com/2013/12/achievable-renewable-energy-targets-fo-p-r.pdf.

APPENDIX B

PARTIAL LIST OF 22 ARTICLES PUBLISHED IN PUERTO RICO MEDIA ON LUMA

1. Yaritza Rivera, *LUMA reconoce que sus plataformas digitales están abrumadas y no funcionan correctamente*, June, 4, 2021, https://www.elvocero.com/gobierno/luma-reconoce-que-sus-plataformas-digitales-est-n-abrumadas-y-no-funcionan-correctamente/article_194d6304-c4cb-11eb-b464-df919d17eb73.html.

2. *Primeros dos meses de Luma: retrasos, daños y servicio deficiente*, Sin Comillas, Aug. 16, 2021, https://sincomillas.com/primeros-dos-meses-de-luma-retrasos-danos-y-servicio-deficiente/.

3. *Paciente de esclerosis múltiple clama a LUMA Energy por servicio de electricidad*, Cybernews, June 15, 2021, https://www.periodicolaperla.com/paciente-de-esclerosis-multiple-clama-a-luma-energy-por-servicio-de-electricidad/.

4. *Alcalde de Ponce emplaza a LUMA Energy por deficiencias en el servicio eléctrico que afecta a residentes y comerciantes*, Redacción Digital, June 11, 2021, https://www.periodicolaperla.com/alcalde-de-ponce-emplaza-a-luma-energy-por-deficiencias-en-el-servicio-electrico-que-afecta-a-residentes-y-comerciantes/.

5. José Rafael Hernández, *Reclaman a LUMA Energy atienda los problemas de electricidad en Caguas*, June 17, 2021, http://www.presenciapr.com/reclaman-a-luma-energy-atienda-los-problemas-de-electricidad-en-caguas/.

6. Luis Penchi, *Municipio de San Juan activa brigadas ante problemas con LUMA*, July 12, 2021, https://www.elforodepuertorico.com/municipio-de-san-juan-activa-brigadas-ante-problemas-con-luma/.

7. *Alcalde de Villalba alega que no logra comunicación efectiva con LUMA*, Telemundo Aug. 15, 2021, https://www.telemundopr.com/noticias/puerto-rico/alcalde-de-villalba-alega-que-no-logra-comunicacion-efectiva-con-luma/2248393/.

8. *PIP pide investigar deficiencias operativas de LUMA*, Noticel, June 11, 2021, https://www.noticel.com/legislatura/ahora/pip/politica/20210611/pip-pide-investigar-deficiencias-operativas-de-luma/.

9. Istra Pacheco, *LUMA confronta problemas con la facturación a clientes*, Sept. 29, 2021, https://www.elvocero.com/gobierno/agencias/luma-confronta-problemas-con-la-facturaci-n-a-clientes/article_adee728a-1c11-11ec-a567-470d7815aba2.html

10. Cathy Kunkel, *Retrasos, daños y mal servicio: los dos primeros meses de LUMA Energy ponen de relieve los defectos de la privatización*, Aug. 16, 2021, https://ieefa.org/retrasos-danos-y-mal-servicio-los-dos-primeros-meses-de-luma-energy-ponen-de-relieve-los-defectos-de-la-privatizacion/

11. Eliván, Martínez, *Apagones empeoraron desde la entrada de LUMA, reconoce un documento de la empresa*, Sept. 30, 2021, https://periodismoinvestigativo.com/2021/09/apagones-empeoraron-desde-la-entrada-de-luma-reconoce-un-documento-de-la-empresa/.

12. *Más de 270,000 abonados sin servicio eléctrico en Puerto Rico*, EFE, Sept. 28, 2021, https://www.diariolibre.com/usa/actualidad/mas-de-270000-abonados-sin-servicio-electrico-en-puerto-rico-EI29036772.

13. *Investigan el origen de la explosión que produjo apagón en Puerto Rico*, EFE, June 11, 2021, https://www.swissinfo.ch/spa/p-rico-apag%C3%B3n--resumen-_investigan-el-origen-de-la-explosi%C3%B3n-que-produjo-apag%C3%B3n-en-puerto-rico/46699210.

14. Cynthia López, *Alza en tarifa de la luz es cuestión de tiempo, Luma dice que tuvo pérdidas de $80 millones*, Sept. 9, 2021, https://jayfonseca.com/alza-en-tarifa-de-la-luz-es-cuestion-de-tiempo-luma-dice-que-tuvo-perdidas-de-80-millones/.

15. *Aseguran que LUMA es responsable de problemas recientes con el sistema eléctrico*, Radio Isla, June 17, 2021, https://radioisla.tv/aseguran-que-luma-es-responsable-de-problemas-recientes-con-el-sistema-electrico1/.

16. *LUMA pone en peligro vidas y propiedades de residentes a través de la isla*, Redacción Digital, June 28, 2021, https://www.periodicolaperla.com/luma-pone-en-peligro-vidas-y-propiedades-de-residentes-a-traves-de-la-isla/.

17. Yaritza Rivera, *Reconocen problemas de LUMA Energy*, El Vocero, Aug. 3, 2021, https://www.elvocero.com/gobierno/reconocen-problemas-de-luma-energy/article_307e48bc-f48d-11eb-b865-ef16ecc194b3.html.

18. *Siguen los problemas con LUMA: Tras apagones, restablecen el servicio de energía*, Sala de Redacción, Aug. 23, 2021, https://www.elforodepuertorico.com/siguen-los-problemas-con-luma-tras-apagones-restablecen-el-servicio-de-energia/.

19. Juan Marrero, *LUMA no revela querellas por enseres eléctricos dañados en apagones*, Sept. 16, 2021, https://www.metro.pr/pr/noticias/2021/09/16/luma-no-revela-querellas-enseres-electricos-danados-apagones.html.

20. Yennifer Alvarez, *Sin mecanismo para presentar reclamaciones clientes con enseres dañados por apagones*, June 16, 2021, https://jayfonseca.com/sin-mecanismo-para-presentar-reclamaciones-clientes-con-enseres-danados-por-apagones/.

21. Sofía Rico, *Aunque LUMA esté en transición, no es excusa para perjudicar los derechos del consumidor*, Noticel, July 12, 2021, https://www.noticel.com/ahora/gobierno/20210712/aunque-luma-este-en-transicion-no-es-excusa-para-perjudicar-los-derechos-del-consumidor/.

22. Luis Penchi, *Comisionada pedirá rendición de cuentas a LUMA y AEE por mala administración en el sistema de energía de Puerto Rico*, Sept. 17, 2021, https://www.elforodepuertorico.com/comisionada-pedira-rendicion-de-cuentas-a-luma-y-aee-por-mala-administracion-en-el-sistema-de-energia-de-puerto-rico/.

23. Gerardo Alvarado, *Fallas en el sistema de facturación de LUMA Energy frenaron un aumento mayor para los consumidores*, Sept. 22, 2021, https://www.elnuevodia.com/noticias/locales/notas/fallas-en-el-sistema-de-facturacion-de-luma-energy-frenaron-un-aumento-mayor-para-los-consumidores/.

24. *Vuelven los cacerolazos: protestan contra LUMA y constantes apagones*, Telemundo, Sept. 28, 2021, https://www.telemundopr.com/noticias/puerto-rico/vuelven-los-cacerolazos-protestan-contra-luma-y-constantes-apagones/2263504/.

October 29, 2021

Via Email

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RE: Request to Reconsider the Finding of No Significant Impact ("FONSI") regarding FEMA's Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment, Commonwealth of Puerto Rico, DR-4339-PR.

Dear Messrs. Gorman and Baquero Tirado:

Comité Diálogo Ambiental, Inc. ("CDA"), El Puente de Williamsburg, Inc. – Enlace Latino de Acción Climática ("El Puente – ELAC"), Comité Yabucoeño Pro-Calidad de Vida, Inc. ("YUCAE"), Alianza Comunitaria Ambientalista del Sureste, Inc. ("ACASE"), Sierra Club Puerto Rico, Inc. ("Sierra Club PR"), Mayagüezanos por la Salud y el Ambiente, Inc. ("MSA"), Coalición de Organizaciones Anti Incineración, Inc. ("COAI"), Amigos del Río Guaynabo, Inc. ("ARG), and Campamento Contra las Cenizas en Peñuelas, Inc., collectively known as Alianza Energía Renovable Ahora ("AERA"),[1] together with the Unión de Trabajadores de la Industria Eléctrica y Riego ("UTIER"), respectfully request that the Federal Emergency Management Agency ("FEMA") reconsider its highly flawed decision to issue a Finding of No Significant Impact ("FONSI") for the Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment in the Commonwealth of Puerto Rico, DR-4339-PR ("PEA"), finalized in August, 2021.

FEMA's assertion that spending more than $10 billion on rebuilding Puerto Rico's electric grid could have "no significant impact" on the environment defies reality, just as FEMA has, for decades, defied Congress's explicit directives to issue regulations ensuring that taxpayers' limited funds are spent only on resilient measures that protect communities over the long term. Had FEMA issued the regulations and guidance that Congress specifically required it to promulgate years ago, taxpayers would not face the prospect of pumping $10 billion into reconstruction of long-distance transmission lines almost certain to be downed, yet again, by hurricanes, earthquakes, rapid vegetation growth, and floods. Such a long-distance transmission system is doubly vulnerable to these hazards as it relies on large, centralized, fossil fueled generation that recent experience has shown to be particularly susceptible to seismic damage, among other disasters. FEMA has failed to comply with its own regulations in spending nearly $2 billion on rebuilding roads and bridges repeatedly damaged by storms. It is time for FEMA to heed Congress' instructions and stop funding non-resilient infrastructure that will require repeated injections of taxpayer money every time they are, predictably, damaged or destroyed.

[1] The environmental and community organizations on behalf of which this Request for Reconsideration is submitted make up the majority of the organizations forming the AERA.

Even without those regulations that it should, but does not, have on the books, FEMA has both the authority and the duty to evaluate all reasonable options for how the approximately $10 billion allocated to rebuilding Puerto Rico's electric grid may be spent, including utilizing the entirety or bulk of those funds for distributed energy resources and battery storage solutions. Rather than issue a FONSI, FEMA should have conducted an Environmental Impact Statement ("EIS") taking into account all such options. Even if FEMA were only required to perform a more limited "Environmental Assessment" ("EA") under the National Environmental Policy Act ("NEPA"), FEMA should have, but did not, evaluate using the funds for distributed energy resources and storage – measures that would build a more resilient, equitable electric system in Puerto Rico while minimizing climate change impacts and promoting environmental justice. By failing to consider those measures, FEMA fell short of NEPA's demands, acted contrary to President Biden's Executive Orders on Climate and Environmental Justice, and ignored Congress' explicit instructions that taxpayers' limited funds be directed *only* to resilient measures that withstand the storms and earthquakes that batter the archipelago.

FEMA must do far better. FEMA should (a) comply with Congress' repeated instructions to direct federal funds into sustainable, resilient rebuilding efforts that will stand up to increasing storms; (b) withdraw its FONSI for the PEA and issue a revised PEA and EIS that evaluates utilizing the over $10 billion of taxpayer money for sustainable, resilient measures, including distributed energy resources and storage; and (c) reject proposals to use FEMA funds to rebuild vulnerable, costly transmission lines that exacerbate environmental injustice, climate change, and harmful air and water pollution.

FEMA has a unique historic opportunity to counter climate change and build a far more just electric grid in Puerto Rico. FEMA itself recognizes that the "restoration of the Puerto Rico energy grid provides an opportunity for transformational change for the citizens of Puerto Rico, specifically more resilient and sustainable energy."[2] However, as currently planned, FEMA's actions will not only squander that once-in-a-lifetime opportunity, but they will also exacerbate climate change pollution and environmental injustice. FEMA must change course immediately.

A. Background: After the Hurricanes, Puerto Rico Regulators Require Development of Renewable Energy and Storage, but FEMA Presses Ahead with Business as Usual.

The current Puerto Rico electric grid is dependent on long-distance transmission lines that carry power from multiple centralized fossil fuel power plants in the south of the island, across the mountainous, densely vegetated inland, to the population center around San Juan in the northeast. These elevated lines are vulnerable not only because Puerto Rico experiences frequent and severe storms, but also because Puerto Rico's mountainous geography tends to increase wind speeds by channeling wind through valleys. In September 2017, two hurricanes hit Puerto Rico: Irma on September 7 and the even more devastating Maria on September 20. These hurricanes caused significant damages to the transmission lines, as well as to distribution lines, poles, towers, and substations. *Almost all transmission lines in the eastern half of the island experienced severe damage*. Even with reinforcements from outside lineworkers, and despite Herculean efforts from

[2] Letter from Jose Baquero, Fed. Disaster Recovery Coordinator, Joint Recovery Off. Dir. of P.R., Fed. Emergency Mgmt. Agency, to Manuel Laboy, Exec. Dir., Cent. Off. of Recovery, Reconstr. & Resiliency ("COR3"), at 3 (Sept. 24, 2021) [hereinafter "Sept. 2021 FEMA Letter"].

its union workforce, PREPA was only able to restore power to half of the island's customers after 75 days, and 90% after 175 days – this was the longest blackout in U.S. history.

Following Hurricane Maria, then-President Trump issued a disaster declaration encompassing the entire territory.[3] The declaration authorized federal public assistance to affected communities and certain non-profit organizations per the Federal Emergency Management Agency ("FEMA"), and in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1974 (42 U.S.C. 5172); the Sandy Recovery Improvement Act (SRIA) of 2013; and the Bipartisan Budget Act of 2018 (Public Law 115-123). The Central Office of Recovery, Reconstruction and Resiliency (COR3) is the Applicant for FEMA grants and multiple agencies may be Sub-Applicant for specific projects, including the Puerto Rico Electric Power Authority ("PREPA").

In September 2020, pursuant to its authority under Section 428 of the Stafford Act, FEMA approved a $10.7 billion grant primarily for PREPA to "repair and replace thousands of miles of transmission and distribution lines, electrical substations, power generation systems, and other grid improvements."[4] *The aid exceeds the total public assistance funding of any single federally declared disaster other than hurricanes Katrina and Sandy*.

After the hurricanes, the Puerto Rico Energy Bureau, the archipelago's energy regulatory body, authorized PREPA to file an updated Integrated Resource Plan (IRP) to determine the impacts of the disaster on the electric system. According to the Energy Bureau, an "IRP" is a plan "that considers all reasonable resources to satisfy the demand for electric power services during a specific period of time, including those relating to the offering of electric power, whether existing, traditional, and/or new resources [. . .]."[5] As part of the IRP update, PREPA filed an appendix entitled "Renewable Project Status" which included a study that determined that up to 580 MW of utility scale projects could be safely and reliably interconnected to the grid.[6] In August 2020, the Energy Bureau ordered PREPA to engage in an aggressive renewables' deployment and embrace

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[3] Fed. Emergency Mgmt. Agency, *Puerto Rico Hurricane Maria, DR-4339-PR* (Sept. 20, 2017), https://www.fema.gov/disaster/4339.

[4] P.R. Elec. Power Auth. ("PREPA"), *In re: Review of the Puerto Rico Electric Power Authority's 10-Year Infrastructure Plan—December 2020*, Response to Resolution and Order Entered on Jan. 25, 2021, at 4 (Feb. 16, 2021), https://energia.pr.gov/wp-content/uploads/sites/7/2021/02/Response-to-Resolution-and-Order-Entered-on-Jan-25-2021-and-Request-for-Approval-of-Revised-10-Year-Infraestructure-Plan-NEPR-MI-2021-0002-1.pdf.

[5] P.R. Energy Bureau, *In re: Review of the Puerto Rico Electric Authority Integrated Resource Plan*, Final Resolution and Order on the Puerto Rico Electric Authority's Integrated Resource Plan at 22 (Aug. 24, 2020) [hereinafter "IRP Order"] (quoting Reg. 9021, § 1.08(B)(20)), http://blogs.edf.org/energyexchange/files/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf

[6] P.R. Elec. Power Auth., *In re: Review of the Puerto Rico Electric Authority Integrated Resource Plan*, Appendix 3 – Renewable Energy Project Status at 2 (2019), https://energia.pr.gov/wp-content/uploads/sites/7/2019/02/PREPA-Ex.-1.03-IRP-2019-Appendix-3-Renewable-Energy-Project-Status.pdf.

distributed solar + storage to comply with Puerto Rico's renewable energy targets (20% by 2022; 40% by 2025; 60% by 2040, and 100% by 2050).[7] Puerto Rico is at 2-3% renewable energy now.[8]

That same month, August 2020, FEMA issued a Notice of Availability for the programmatic environmental assessment (PEA) for "Utility Repair, Replacement, and Realignment" for Puerto Rico after Hurricane Maria, and accepted public comment for 60 days.[9] FEMA's stated purpose for its action is "to provide grant funding to restore damaged utilities and increase their resiliency for future weather events."[10] FEMA's stated need is "to re-establish a safe and reliable network of utilities (through repair, replacement, or relocation) in order to reconnect the communities affected by the storm with safe and efficient delivery of energy, water, sewer service, and communications, and help reduce the potential for future damages by upgrading damaged utilities in accordance with current engineering codes and standards."[11]

The PEA did not consider distributed energy resources and storage as a primary use for the funds, nor did it consider climate impacts or environmental justice impacts. FEMA considered only the following four alternatives in the PEA:

- **No Action**: The "no action alternative" where FEMA would not provide grant funding and the local governments of Puerto Rico would have to fund the projects from other sources;
- **Replacement**: Applies to the repair, replacement, and upgrading of an existing utility within a maintained right of way at an existing location. Includes upgrading or rebuilding up to 20 linear miles of pipeline, transmission or distribution line, and hardening the system with flood barriers and wastewater systems;
- **Relocation**: Includes utility realignment or relocation according to the needs of subrecipients and engineering recommendations—projects are considered on a case-by-case basis. Also involves installation of on-site backup generation like combined heat and power systems, rooftop solar, fossil fuel powered standby generators, battery storage, and building energy management systems. Associated actions will involve the construction of on-site fuel storage, installation of transmission and distribution lines, and construction of substations or switch stations; and
- **Combination (FEMA's Preferred Alternative)**: Includes some combination of the No Action, Replacement, and/or Relocation alternatives to provide the post-disaster recovery effort with "flexibility in the planning and decision-making process to address such contingencies."[12]

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[7] IRP Order, *supra* note 5.
[8] *Id*.
[9] Public Notice for PEA, https://www.fema.gov/disaster-federal-register-notice/dr-4339-pr-environmental-assessment-public-notice-002.
[10] U.S. Dept. of Homeland Sec., Fed. Emergency Mgmt. Agency, Region II, *Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment* at 9 (Aug. 2020) [hereinafter "FEMA PEA"], https://www.fema.gov/sites/default/files/2020-08/fema_ea_puerto-rico_utility-repair-replacement-realignment_guidedbook_august-2020.pdf; *see also* PEA Exec. Summary, https://www.fema.gov/sites/default/files/2020-08/fema_dr-4339_puerto-rico_executive-summary.pdf.
[11] *Id.*
[12] *Id.* at 11-17.

From August to December 2020, numerous environmental and community groups submitted public comments on the PEA. Emphasizing that "Hurricanes Irma and Maria demonstrated that the transmission and distribution system that carries power from the large, centralized power plants, especially the plants in Southern Puerto Rico to the North are a key vulnerability of the Puerto Rico electric system," Commenters urged FEMA to consider alternatives to rebuilding the failed transmission and distribution lines that exacerbate harmful pollution by enabling dependence on fossil-fuel-fired power plants.[13] Specifically, Commenters highlighted the alternative of installing photovoltaic systems sited on rooftops or near existing structures, coupled with battery energy storage systems (BESS) and energy conservation, education and efficiency programs.[14] Unlike the alternatives in the PEA, these alternatives were informed by the recently finalized Integrated Resource Plan and its ongoing implementation processes.

In December 2020, as required by FEMA and the applicant COR3, PREPA submitted a 10-Year Plan to FEMA with a roadmap for how it would spend these funds on the "reconstruction and hardening" of the electric system infrastructure. Inexplicably, PREPA's plan was not consistent with the approved Integrated Resource Plan, and even included several fossil fuel projects that had been explicitly rejected in the approved IRP: for example a gas-fired power plant at Palo Seco, and 330 MW of gas-fired peakers around the island. In January 2021, the Energy Bureau concluded that the 10-Year Plan was inconsistent with the final IRP order from August and recognized the 10-Year Plan as a collateral attack on the final IRP order.[15] PREPA agreed the plans are inconsistent,[16] but subsequently submitted a "modified" plan not much different from the initial 10-Year Plan.

On January 27, 2021, President Biden issued Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, which declared that this Administration's policy is to:

> organize and deploy the *full capacity of its agencies to combat the climate crisis* to implement a Government-wide approach that reduces climate pollution in every sector of the economy; *increases resilience to the impacts of climate change*; protects public health; conserves our lands, waters, and biodiversity; *delivers environmental justice*; and *spurs well-paying union jobs* and economic growth, especially through innovation, commercialization, and *deployment of clean energy technologies and infrastructure*.[17]

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[13] Alianza Energía Renovable Ahora, Comments Objecting to the Approval of the Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment, Commonwealth of Puerto Rico, DR-4339-PR at 1-3 (Dec. 21, 2020), attached hereto as **Attachment 1** [hereinafter "AERA Comments"].
[14] *Id*. at 3-10.
[15] *Id.*
[16] *Id.*
[17] Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, 86 Fed. Reg. 7619, 7622 (Feb. 1, 2021) (emphasis added).

The Order further provides that "[t]he Federal Government must drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy, marshaling the creativity, courage, and capital necessary to make our Nation resilient in the face of this threat."[18] It establishes a National Climate Task Force, including the Secretary of Homeland Security (of which FEMA forms part) as a member, and specifies that "[t]o the extent permitted by law, Task Force members shall prioritize action on climate change in their policy-making and budget processes…and in their engagement with State, local, Tribal, and territorial governments; workers and communities…."[19] In addition, the Order directs agency heads to "identify opportunities for Federal funding to spur…deployment of clean energy technologies and infrastructure…and then take steps to ensure that, to the extent consistent with applicable law, Federal funding is used to spur…deployment of clean energy technologies and infrastructure."[20]

In June 2021, having failed to consider climate change, environmental justice, or distributed clean energy deployment options as part of the PEA, FEMA issued the final PEA and a finding of no significant impact (FONSI)[21] in open disregard of Congressional mandates, the extensive comments, Executive Order 14008, and the requirements of NEPA.

B. Two Decades Ago, Congress Instructed FEMA to Direct Funding To Resilient Infrastructure that Stands Up to Repeated Storms. FEMA Still Has Not Done So.

In October 2000, Congress passed the Disaster Mitigation Act, which "replac[ed] prior mitigation planning provisions with a new set of requirements primarily designed to authorize a program for pre-disaster mitigation… and control the Federal costs of disaster assistance."[22] In that Act, Congress directed FEMA to:

> promulgate regulations to *reduce* the Federal share of assistance under [Section 406 of the Stafford Act] to not less than 25 percent in the case of repair, restoration, reconstruction, or replacement of any eligible public facility … following an event associated with a major disaster – (A) *that has been damaged, on more than one occasion within the preceding 10-year period, by the same type of event*; and (B) the owner of which has failed to implement appropriate mitigation measures to address the hazard that caused the damage to the facility.[23]

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[18] *Id*.
[19] *Id*. at 7623.
[20] *Id*. at 7625.
[21] U.S. Dept. of Homeland Sec., Fed. Emergency Mgmt. Agency, *Finding of No Significant Impact — Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment* (June 17, 2021) [hereinafter "FEMA FONSI"] (emphasis added), https://www.fema.gov/sites/default/files/documents/fema_oehp-fonsi-utilities-repair_06-17-21.pdf.
[22] Memorandum from Joseph V. Cuffari, Inspector General, to the Honorable Deanne Criswell, Administrator, FEMA, *FEMA Has Not Prioritized Compliance with the Disaster Mitigation Act of 2000, Hindering Its Ability to Reduce Repetitive Damages to Roads and Bridges* (July 6, 2021), available at https://www.oig.dhs.gov/sites/default/files/assets/2021-07/OIG-21-43-Jul21.pdf [hereinafter "Inspector General Report"].
[23] 42 U.S.C. 5172(b)(2) (Stafford Act Section 406(b)(2)).

FEMA never completed the tasks set forth by Congress, and as a result has been operating on a 20th century reactive disaster spending mindset ever since. Then, in 2018, in the wake of the hurricanes that devastated Puerto Rico, Congress passed the Disaster Recovery Reform Act ("Reform Act"), directing FEMA to ensure funding for rebuilding infrastructure goes to those projects that are *resilient* to future disasters. The Reform Act requires FEMA to "estimate the eligible cost of repairing, restoring, reconstructing, or replacing a public facility…," among other criteria, "in a manner that allows the facility to meet the definition of resilient developed pursuant to this subsection."[24] It instructs FEMA to "issue a final rulemaking that defines the terms 'resilient' and 'resiliency' for purposes of this subsection" by April 5, 2020,[25] as well as to issue interim guidance prior to the finalization of that rulemaking, and any "necessary guidance related to the rulemaking" after the rulemaking is complete.[26] The Reform Act likewise requires that FEMA put resiliency into action by authorizing FEMA to contribute up to 75% of the cost of "hazard mitigation measures which the President has determined are cost effective and which substantially reduce the risk of, *or increase resilience to*, future damage, hardship, loss, or suffering in any area affected by a major disaster."[27]

Twenty-one years after passage of the Disaster Mitigation Act, FEMA still has not adopted the required regulations that discourage continued injections of funding into infrastructure repeatedly destroyed by natural disasters.[28] And, notwithstanding Congress' deadlines, FEMA has still not fulfilled the Reform Act's mandate to issue regulations or guidance defining "resilient" and to ensure that no funds are provided to rebuild infrastructure that is not resilient.

FEMA's failure to comply with Congress' mandates has already resulted in the wasteful, improper expenditure of billions of dollars. The Inspector General concluded in July that FEMA's failure to promulgate the required regulations has led to inappropriate federal expenditures of *nearly $2 billion on roads and bridges alone*.[29] Meanwhile, FEMA has continued spending taxpayer dollars at unprecedented levels—due largely to the increasing storms and wildfires that Congress foresaw in limiting FEMA funding to responsible, resilient measures.[30] The New York Times reported in August that, "Between 2005 and 2019 alone, the federal government spent almost half a trillion dollars on disaster assistance.[31] In the last four years, FEMA's appropriations have dwarfed those of all other federal agencies, as FEMA's own spending graph clearly shows:[32]

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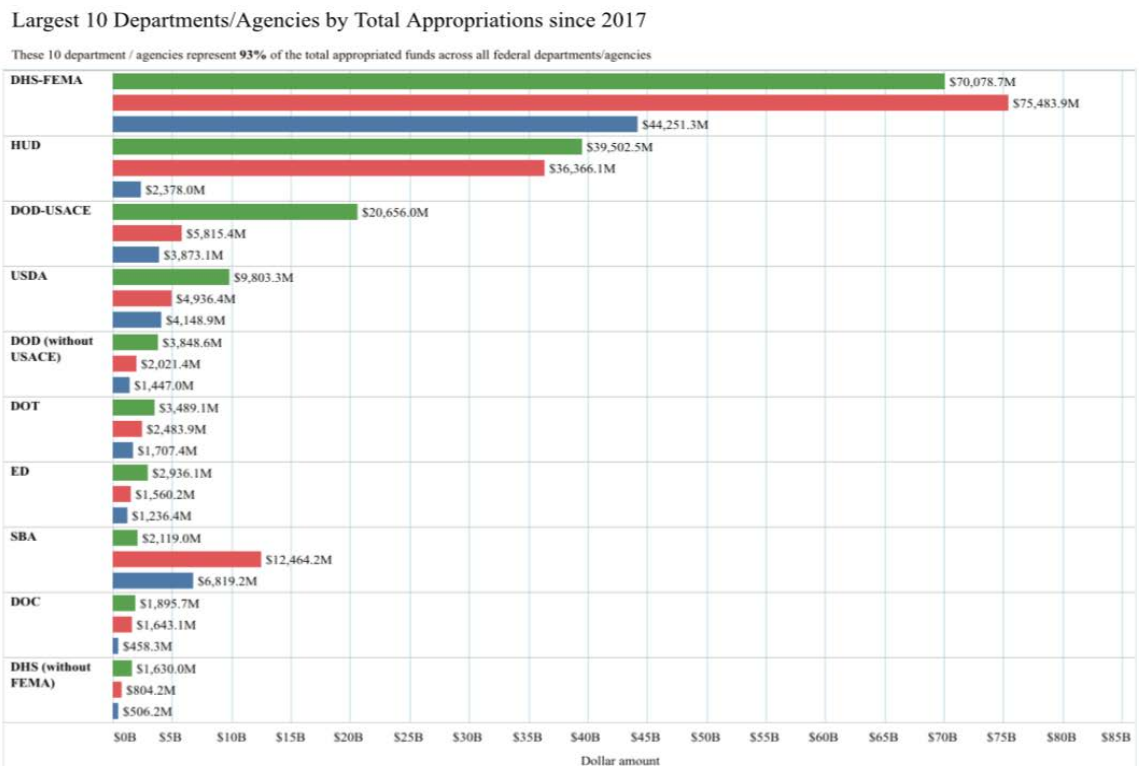
[24] *Id*. § 5172(e)(1)(a)(iii) (added by the Disaster Recovery Reform Act, Pub. Law 115-254 (Oct. 5, 2018)).
[25] *Id*. § 5172(e)(5)(a).
[26] *Id*.
[27] 42 U.S.C. § 5170c (amended by the Disaster Recovery Reform Act, Pub. Law 115-254 (Oct. 5, 2018)).
[28] Inspector General Report, *supra* note 22.
[29] *Id.*
[30] Christopher Flavelle, *Biden Announces Record Amount of Climate Resilience Funding*, N.Y. TIMES (Aug. 5, 2021), https://www.nytimes.com/2021/08/05/climate/FEMA-disaster-money-climate.html. ("Starting with a string of hurricanes and wildfires in 2017, the United States has suffered devastating disasters every year since: Hurricane Michael wiping out towns in the Florida panhandle in 2018, Midwest flooding in 2019, and a record 12 major storms making landfall in 2020. Last year, 22 disasters that struck the country each caused at least $1 billion in damage — another record.")
[31] *Id*.
[32] Fed. Emergency Mgmt. Agency, *Spending explorer*, https://recovery.fema.gov/spending-explorer (visited Oct. 19. 2021).



With over $10 billion allocated to the rebuilding of Puerto Rico's grid, FEMA's failure to comply with Congress' directives *threatens far greater waste of taxpayers' money*. Puerto Rico's vulnerable long-distance transmission lines are precisely the type of infrastructure that the Disaster Mitigation Act would restrict funding for: they have been damaged repeatedly by hurricanes, which will only become more frequent and intense with the climate crisis—and that hazard has neither been addressed nor mitigated. Indeed, as far back as 2005, Congress recognized that "electric power transmission and distribution lines in insular areas [including Puerto Rico] *are inadequate to withstand damage* caused by the hurricanes and typhoons which frequently occur in [such] areas and such damage often costs millions of dollars to repair."[33] Clearly, when FEMA finally gets around to promulgating its now long-overdue definition of "resilient," that definition must be informed by the Congressional finding that Puerto Rico's long-distance transmission lines cannot withstand the archipelago's storms and thus are, under any definition, <u>not</u> resilient.

In short, Congress has been clear that repeated injections of funding into unstable, inviable infrastructure is neither a proper nor a sensible use of federal funds. FEMA has ignored Congress' directives, resulting in the needless and wasteful expenditure of billions of dollars and portending far greater unnecessary loss of taxpayer money—as well as more destroyed infrastructure, damaged economies, and lost lives—if FEMA continues to disregard Congress' mandates. FEMA should issue the required regulations and guidance immediately.

[33] 48 U.S.C.A. § 1492(a)(5) (emphasis added).

C. FEMA Should Have Prepared an Environmental Impact Statement.

The decision to use $10 billion to rebuild vulnerable transmission lines that facilitate continued reliance on dirty, fossil-fuel burning centralized plants, rather than using those vast funds to build distributed renewable energy and storage, is necessarily a decision with significant impacts requiring completion of a full Environmental Impact Statement ("EIS").[34] Just the idea that the nature or effect of spending more than $10 billion on Puerto Rico's electric grid could be minimal defies common sense. Spending $10 billion on rebuilding the electric system *should* have a positive environmental impact – if not, then that vast expenditure of money is a wasted opportunity to achieve resiliency and mitigate the harm of future disasters (precisely what Congress made clear is essential).

Moreover and critically, FEMA's billions *will be* the primary factor determining whether and how the archipelago's electric system is transformed to integrate the distributed renewable energy and storage called for by the Alianza Energía Renovable Ahora and authorized by the IRP.[35] All parties agree that this transformation is necessary – but PREPA and FEMA appear to have given no thought to whether the $10B investment will help that transformation or interfere with it. Commenters, on the other hand, noted the centrality of the funding, pointing out that this huge sum "present[s] a once-in-a-lifetime opportunity to reduce electric system vulnerability with onsite/rooftop solar plus storage…."[36] Given PREPA's bankruptcy, the idea that it could serve as a creditworthy counterparty to obtain capital to finance the costs of the electric system transformation demanded by the IRP is simply implausible.[37] In short, if the $10 billion in FEMA funds is not invested in building a new, far more resilient electric system for Puerto Rico centered on distributed energy resources and storage, such an electric system will not be built, and FEMA will have lost an essential opportunity to fight climate change and environmental injustice.

It is no surprise, given the size of the appropriation for Puerto Rico, that the size, nature, and effects of spending FEMA's funds as described in the PEA are the subject of major dispute between FEMA and affected residents. Commenters raised safety concerns, risks, and significant environmental impacts stemming from the planned channeling of the FEMA funds to vulnerable transmission lines, including but not limited to: (a) the reduction in water and air pollution that would result if distributed energy resources were invested in, rather than long-distance transmission lines that enable continue reliance on fossil fuel plants; (b) risks of flooding, both affecting and stemming from "undergrounding" of transmission lines and changes to topography associated with rebuilding failed transmission lines; and (c) significant impacts from the use of seawater for cooling.[38] Commenters' warnings about these impacts are already proving true: the

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[34] *See* 40 C.F.R. §§ 1502.1, 1508.27.

[35] *See* AERA Comments at 3-4; Letter from Tom Sanzillo, Director of Financial Analysis, Institute for Energy Economic and Financial Analysis, to Deanne Criswell et al., (Oct. 13, 2021) [hereinafter "Sanzillo Letter"], attached as **Attachment 2**.

[36] AERA Comments at 3-4.

[37] *See* Sanzillo Letter at 2 (explaining that "The federal funds available in this moment represent the best, *and only*, opportunity for Puerto Rico to realize this vision [of a transition to renewable energy]") (emphasis added).

[38] *See* AERA Comments at 7, 15-17.

impacts from the use of seawater for cooling and other water needs at plants have become increasingly troubling in recent days, as ocean-side fossil fuel plants continue to falter in part due to high volumes of sargassum that operators have been unable to clear away.[39]

In sum, the environmental and human impacts of spending over $10 billion to rebuild Puerto Rico's electric grid are (and should be) significant, and there is clearly a substantial dispute over the size, nature, and effect of the actions planned in the PEA. FEMA has not provided, nor could it provide, sufficient data to ensure that environmental consequences have been – or could be – fairly evaluated with an Environmental Assessment ("EA") alone. Only an EIS that considers all reasonable, available alternatives – including the distributed renewable energy and storage systems called for by AERA and Rep. Raúl Grijalva, Chair of the House Committee of Natural Resources,[40] among others – could suffice.

Why, then, did FEMA fail to prepare a full EIS? Why did it refuse to consider distributed energy resources and storage – the path called for by vast numbers of Puerto Ricans – in favor of a fossil-fuel-friendly restoration of the existing transmission system that connects the fossil fuel-fired plants with the energy demand centers, when this Administration's policy is to address the climate crisis and halt environmental injustice? Why did it fail to evaluate the most cost-effective, resilient options for Puerto Rico's electric system when Congress has repeatedly directed FEMA to fund resilient measures? FEMA's actions leave us confused, frustrated, and wondering whether FEMA takes its obligations under Executive Order 14008 and to the people of Puerto Rico seriously.

D. Even assuming an EA is permissible, FEMA's PEA does not satisfy NEPA

FEMA was required, but failed, to conduct a detailed analysis of reasonable alternatives to rebuild Puerto Rico's electric grid. The narrow list of alternatives the FEMA included in its PEA fall far short of NEPA's requirements. Rather than "build back better," FEMA limited its view to rebuilding the same old infrastructure that proved unable to withstand the multiple storms that the archipelago must now come to expect. This is inconsistent with its statutory authority and the mandates of NEPA to consider all reasonable alternatives.

a. The alternatives FEMA considered in the PEA do not include all reasonable alternatives available and necessary to meet the purpose and need for the PEA.

NEPA requires federal agencies to prepare an environmental assessment to assess the impacts of its actions, and these requirements are specified by the Council on Environmental Quality (CEQ) regulations.[41] An environmental assessment is a document that briefly provides

[39] Patricia Mazzei, *'Why Don't We Have Electricity?': Outages Plague Puerto Rico*, N.Y. Times (Oct. 19. 2021), https://www.nytimes.com/2021/10/19/us/puerto-rico-electricity-protest.html ("The system is so frail that a power plant recently went offline because sargassum — seaweed — blocked its filters.").

[40] *See* Letter from Rep. Raúl Grijalva, Chair, House Committee on Natural Resources, to FEMA Administrator Deanne Criswell (dated Oct. 25, 2021), attached hereto as Attachment 3.

[41] 42 U.S.C. § 4332(E) (NEPA requires federal agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts

"evidence or analysis" on which the agency determines whether to prepare an impact statement (EIS).[42] If the agency determines that an EIS is not required, it prepares a FONSI.[43]

NEPA requires federal agencies to consider whether they can carry out their proposed action in a less environmentally damaging manner and whether "appropriate" and "reasonable" alternatives exist that make the action unnecessary.[44] The alternatives requirement is the heart of the NEPA process and is required for both an EA and an EIS.[45] The alternatives analysis is determined by the agency's "purpose and need" statements: alternatives are intended to be those that advance the purpose and meet the need for the project.[46] Agencies must consider multiple available alternatives to achieve the stated purpose and need, rather than rely on only a narrow set of options to achieve that purpose. The point is to determine which options can be used to achieve a particular goal and to understand the environmental impacts of each of them, so that the public and decision-makers—in this case, FEMA—can chose the best option.

Here, FEMA's articulated purpose is "to provide grant funding to restore damaged utilities *and increase their resiliency* for future events."[47] That purpose demands consideration of far more alternatives than FEMA evaluated.

In the PEA, FEMA explicitly mentions its authority under Sections 404 and 406 of the Stafford Act and the Bipartisan Budget Act of 2018. Congress also granted greater authority to FEMA under the Reform Act, discussed above. As detailed below, all of those statutory provisions authorize—indeed, demand—consideration of alternatives that are more resilient than the rebuilding of vulnerable long-distance transmission lines discussed in the PEA.[48]

The Stafford Act, the primary legislation governing FEMA, authorizes "hazard mitigation" funding under different provisions. Section 406 of the Act authorizes contributions "to a State or local government for the repair, restoration, reconstruction, or replacement of a public facility damaged destroyed by a major disaster and for associated expenses incurred by the government."[49] Section 404 of the Act authorizes the funding of hazard mitigation projects, "subject to approval by the President."[50] The funding may be used to "conduct activities to help reduce the risk of future damage, hardship, loss, or suffering in any area affected by a wildfire or a windstorm"[51] or "to

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concerning alternative uses of available resources."); 40 C.F.R. § 1501.4(b); *see also* 40 C.F.R. § 1504.8 (agency may prepare environmental assessment though not required to do so).

[42] 40 C.F.R. § 1508.9(1).

[43] *Id*. § 1501.4(e)*; see also* 40 C.F.R. § 1508.13 (definition).

[44] 42 U.S.C. § 4332(E).

[45] 40 C.F.R. § 1502.14; 40 C.F.R. § 1502.2(d) (alternatives considered must achieve NEPA's statutory requirements); 40 C.F.R. § 1505.1(e) (alternatives considered must be within range of alternatives considered in relevant environmental documents); 40 C.F.R. § 1508.25(b).

[46] 40 C.F.R. § 1502.13; 40 C.F.R. § 1501.5(c)(2); 40 C.F.R. § 1508(9)(b); *see also Native Ecosystems Council v. U.S. Forest Serv*., 428 F.3d 1233 (9th Cir. 2005).

[47] FEMA PEA, *supra* n. 10, at 9.

[48] *Id.*at 12-13, 62.

[49] 42 U.S.C. 5172(a)(1)(A); Stafford Act Section 406(a)(1)(A).

[50] *Id*. § 5170c(a) (Stafford Act Section 404(a)).

[51] *Id*. § 5170c(f) (Stafford Act Section 404(f)).

help reduce the risk of future damage, hardship, loss, or suffering in any area affected by earthquake hazards…."[52]

The Bipartisan Budget Act of 2018, a portion of which is explicitly aimed at addressing Puerto Rico's hurricane recovery, likewise offers additional authority for hazard mitigation funding. Section 20601 of that Act authorizes FEMA to fund, under the alternate funding procedures set out in Section 428 of the Stafford Act, projects in Puerto Rico for critical services, including power,[53] that "replace or restore the function of a facility or system to industry standards *without regard to the pre-disaster condition of the facility or system*" or "replace or restore components of the facility or system not damaged by the disaster where necessary to fully effectuate the replacement or restoration of disaster-damaged components to restore the function of the facility or system to industry standards."[54]

Finally, 2018's Disaster Recovery Reform Act expanded FEMA's authority to fund hazard mitigation measures. The Reform Act amended Section 404(a) of the Stafford Act to authorize FEMA to contribute up to 75% of the cost of "hazard mitigation measures which the President has determined are cost effective and which *substantially reduce the risk of, or increase resilience to, future damage, hardship, loss, or suffering in any area affected by a major disaster*."[55]

Notwithstanding Congress' multiple directives to FEMA to direct funding to resilient, harm-limiting measures, FEMA's PEA did not include *any* alternatives – such as using the funds for distributed energy resources and storage, as Commenters strongly recommended – that would replace and restore the function of Puerto Rico's electric system in any sort of cost-effective, resilient manner. Instead, FEMA only proposed rebuilding Puerto Rico's vulnerable long-distance transmission lines, poles and towers, apparently failing to recognize that rebuilding those lines reduces neither the risk of future damage to the lines nor the loss of health and life that will result when those lines are again knocked down – and the centralized fossil fuel plants they connect to, damaged – by the archipelago's powerful Hurricane winds, floods, or earthquakes.

Only now, after issuing the FONSI, is FEMA beginning to explore a broader range of available alternatives for rebuilding Puerto Rico's electric system. In a September 2021 letter to COR3, FEMA reported that – together with the Department of Energy – it is "getting ready to launch a comprehensive study to evaluate scenarios and pathways to meet Puerto Rico's renewable energy targets in a way that achieves both short-term recovery goals and long-term resilience."[56]

Again, the people of Puerto Rico ask: why? Why would FEMA intentionally exclude from the PEA the very options that will actually protect the archipelago's grid, economy, and residents from future harm? Why would it only begin to evaluate additional alternatives for the resilient

[52] *Id*. § 5170c(g) (Stafford Act Section 404(g)).
[53] The Bipartisan Budget Act adopts the definition of "critical services" under Section 406 of the Stafford Act, which defines them to include power, water, emergency medical care, and several other services. *See* Pub. L. 115-123. Sec. 20601; 42 USC 5172(a)(3)(B) (Stafford Act Section 406(a)(3)(B)).
[54] Pub. L. 115-123. Sec. 20601(1)-(2).
[55] 42 U.S.C. § 5170c (amended by the Disaster Recovery Reform Act, Pub. Law 115-254 (Oct. 5, 2018)).
[56] Sept. 2021 FEMA Letter, *supra* n. 2, at 2.

reconstruction of Puerto Rico's electric system *after*, and outside of, the NEPA process, the purpose of which is to explore those alternatives *before* funds are allocated?

b. The Purpose and Need Statement of the PEA, as interpreted by FEMA, Frustrates Congressional Directives and the Objectives of Federal Statutes.

While the alternatives evaluated by FEMA were far fewer than those which FEMA could and should have evaluated to achieve the PEA's stated purpose and need, that purpose and need statement is itself too narrow. A purpose and need statement must allow for consideration of all reasonable alternatives that fall within the statutory authority for a project – that is, it must not frustrate Congressional desires and the objectives of federal laws by evaluating only some of the ways a project could be accomplished, rather than the full scope of options available under the law.[57] Similarly, and for similar reasons, a purpose and need statement may not be limited to what applicants propose.[58]

Here, FEMA has wrongly narrowed the scope of its PEA to whatever PREPA proposes in the 10-Year Plan. As noted above, FEMA described the respective purpose and need of the PEA as:

> to provide grant funding to restore damaged utilities and increase their resiliency for future events [and] to re-establish a safe and reliable network of utilities (through repair, replacement, or realignment) in order to reconnect the communities affected by the storm with safe and efficient delivery of energy. . . and help reduce the potential for future damages *by upgrading damaged utilities in accordance with current engineering codes and standards*.[59]

As explained above, FEMA's authority and duty go far beyond that narrow scope. The Stafford Act and the Bipartisan Budget Act of 2018 authorize FEMA to fund far more alternatives than its purpose and need statement might suggest are available. FEMA is not constrained, for example, to "upgrading damaged utilities in accordance with current engineering codes and standards." Rather, FEMA is obligated to fund cost-effective measures that "substantially reduce the risk of, or increase resilience to, future damage, hardship, loss, or suffering" in disaster-affected areas, including by funding projects that "*replace or restore the function of a* facility or *system without regard* to the pre-disaster condition of the *system.*"[60] Here, the *only* projects that would cost-effectively restore the function of Puerto Rico's electric system in a manner that will reduce the risk of future damage, hardship, loss, and suffering, as required by the Bipartisan Budget Act and the Reform Act, are the distributed energy and storage projects described by Commenters. Yet FEMA did not consider them at all.

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[57] *See Simmons v. U.S. Army Corps of Eng'rs*, 120 F.3d 664 (7th Cir. 1997); *see also Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233 (9th Cir. 2005).
[58] *Nat'l Parks & Conservation Asss'n v. Bureau of Land Mgmt.*, 586 F.3d 735 (9th Cir. 2009).
[59] FEMA FONSI, *supra* n. 21, at 2 (emphasis added).
[60] Pub. L. 115-123. Sec. 20601(1)-(2).

Nor does FEMA have any basis to evaluate, in this PEA, only transmission and distribution projects to the exclusion of generation.[61] Again: the only cost-effective method to restore the function of Puerto Rico's electric system in a manner that will reduce the risk of future harm and damage – as well as minimize the need for further massive taxpayer expenditures to replace infrastructure damaged yet again by storms – are distributed renewable resources and battery storage, as Commenters explained. Investing in those technologies would mean that rebuilding of the vast majority of transmission lines *would not be needed*.[62] By considering in this PEA only the rebuilding of those extensively vulnerable—an action that the Council of Environmental Quality recognizes is improper[63] and to wonder *why FEMA is asking taxpayers to pour $10 billion down the drain.*.

c. FEMA's failure to evaluate viable alternatives frustrates NEPA's objectives.

FEMA's narrow scope in the PEA also frustrates NEPA's objectives. Section 102 of NEPA dictates a Congressional mandate that "the policies, regulations, and public laws of the United States *shall be interpreted and administered in accordance with the policies set forth in this chapter.*"[64] FEMA is thus obligated to interpret and administer the Stafford Act and other authorizing statutes in accordance with NEPA objectives—that is, it must make decisions based on environmental factors even if those are not expressly identified in those statutes. Because, as explained herein, FEMA did not do so here, it has acted contrary to the objectives of NEPA. Rather than disregard the mandate to educate the public and decision-makers about the environmental impacts of all available alternatives, FEMA should complete a PEA and EIS that considers all lawful alternatives for building a better electric grid in Puerto Rico—including the alternative of responsibly utilizing the $10 billion to invest in distributed energy resources and storage.

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[61] *See* Sept. 2021 FEMA Letter, *supra* n. 2, at 3 (declaring that "power transmission may be covered in the PEA, but power generation is not covered….").

[62] *See* Cambio Puerto Rico *and* Inst. for Energy Econs. & Fin. Analysis, *We Want Sun and We Want More: 75% Distributed Renewable Generation in 15 Years in Puerto Rico Is Achievable and Affordable* (Mar. 2021), https://cambiopr.org/wp-content/uploads/2021/03/We-Want-Sun-and-We-Want-More-Summary-ENGLISH-03_21.pdf ("Queremos Sol Report"). The Queremos Sol Report concludes that a system powered by distributed resources would dramatically reduce reliance on the vulnerable long-distance transmission lines. *Id.* at 11-12. The report's authors demonstrate that their proposal would lower the T&D investment from the $9B sought by PREPA, to about $650M. *Id.* at 12-13; *see also* Nat'l Renewable Energy Lab., Presentation: *Puerto Rico Low-to-Moderate Income Rooftop PV and Solar Savings Potential* at slide 10 (Dec. 17, 2020) ("We Can Offset All Residential Electricity Consumption With Residential Rooftop Solar in PR"), https://www.nrel.gov/docs/fy21osti/78756.pdf.

[63] Council on Envtl. Quality, *National Environmental Policy Act Implementing Regulations Revisions*, 86 Fed. Reg. 55757, 55760 (Oct. 7, 2021) ("Always tailoring the purpose and need to an applicant's goals when considering a request for an authorization could prevent an agency from considering alternatives that better meet the policies and responsibilities set forth in NEPA merely because they do not meet an applicant's stated goals. Additionally, an applicant's goals themselves could be potentially confusing or unduly narrow or restrictive. …[A]gencies should consider a range of alternatives that are technically and economically feasible and meet the purpose and need for the proposed action but that are not unreasonably constrained by an applicant's stated goals.").

[64] 42 U.S.C. § 4332.

E. FEMA Unlawfully Failed to Consider Climate Impacts in issuing the FONSI.

FEMA was obligated to consider climate change impacts in the EA. Climate change impacts are reasonably foreseeable impacts of FEMA's allocation of billions of dollars in funding for Puerto Rico's electric grid. *In fact, it is FEMA's obligation to ensure that these taxpayer funds do have a positive impact on climate*.[65] Using those funds to maintain transmission lines that cross Puerto Rico and enable the continued operation of climate-changing, large oil-, coal- and gas-burning power plants, rather than using them to acquire and install distributed energy generation has undeniable harmful climate impacts. Accordingly, FEMA was obligated to consider those impacts in the EA. Commenters raised those concerns,[66] yet FEMA still failed to consider climate impacts. FEMA's failure to do flies in the face of NEPA mandates and President Biden's Executive Order 14008, Tackling the Climate Crisis at Home and Abroad.

F. FEMA Did Not Comply with Executive Orders and other Duties to Assess and Account for Environmental Justice in issuing the FONSI for the PEA.

FEMA was obligated to consider environmental justice in finalizing the PEA. As EPA has explained, "Federal agencies must consider environmental justice in their activities under NEPA."[67] President Clinton's EJ Executive Order (EO) 12898 specifically calls for agencies to address significant adverse environmental effects on minority and low-income communities in mitigation measures outlined or analyzed in EAs and FONSIs.[68] Indeed, CEQ issued an Environmental Justice (EJ) guidance document, including 6 principles for agency EJ analyses.[69]

There are environmental justice concerns associated with the rebuilding of Puerto Rico's electric grid. The comments of the Alianza Energía Renovable Ahora on the PEA specifically note that FEMA's PEA fails to document the high numbers of Afro-descent population in Guayama, Salinas, and other municipalities where the most polluting electric power plants are located,[70] the continued use of which would be enabled by rebuilding the archipelago's repeatedly-damaged long-distance transmission lines. Commenters also underscored that without FEMA financing, low- and medium-income residents of Puerto Rico "would not be able to access loans, rebates or leases for solar + storage," making FEMA financing essential to equitable and broad use of distributed energy resources.[71]

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[65] Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, 86 Fed. Reg. 7619, 7622 (Feb. 1, 2021).
[66] In its Comment, the Rincón chapter of Surfrider Foundation addressed the gap in FEMA's EA of any mention of climate change as a criterion for determining potential environmental impacts.
[67] U.S. Envtl. Prot. Agency, *Environmental Justice and National Environmental Policy Act*, https://www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act.
[68] Executive Order 12898, *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, 59 Fed. Reg. 7629 (Feb. 16, 1994).
[69] *See* n. 67, *supra*.
[70] FEMA FONSI, *supra* n. 21 at 21 (disregarding or failing to answer with any specificity in its responses to comments on this issue).
[71] AERA Comments at 9.

FEMA failed to consider environmental justice in any meaningful way in issuing the FONSI. FEMA's reply in the FONSI does not indicate that any of these considerations were taken into account. Although FEMA "acknowledge[s] the prevalence of afro descendant (black Hispanic) populations throughout the Commonwealth,"[72] FEMA's response indicates that FEMA did *nothing* to examine whether its funding decisions for Puerto Rico's electric grid would have disproportionate impacts on black Hispanic Puerto Ricans.

FEMA's actions are inconsistent with Executive Order 12898 and President Biden's Executive Order 14008. As federal courts have noted, "environmental Justice is not merely a box to be checked:"[73] rather, it is an obligation that—as President Biden has made clear—must be taken very seriously. FEMA's failure to meaningfully evaluate the environmental justice implications of the PEA in issuing the FONSI begs the questions: what is FEMA's commitment to environmental justice, and how exactly does it intend to act on that commitment when it is ignoring the demands of thousands of Puerto Ricans to build a cleaner, more resilient, more reliable electric system?

G. Where does FEMA go from here?

FEMA stands at a crossroads. It can comply with Congress' and President Biden's mandates to direct funding to resilient, cost-effective measures that counter climate change and ensure environmental justice. Or, if can continue the status quo of pouring billions of dollars into old, polluting, climate-changing infrastructure that harms communities and will require repeated injections of taxpayer dollars in the coming years.

We believe that FEMA can rise to the occasion of climate- and environmental justice, but it must start now. FEMA must withdraw the FONSI; prepare an EIS; evaluate climate change impacts and all viable, cost-effective, resilient alternatives for the use of the more than $10 billion dedicated to rebuilding Puerto Rico's electric grid; and begin the process of distributing that funding so that all Puerto Ricans have access to reliable, affordable clean power.

Sincerely,

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Comité Yabucoeño Pro-Calidad de Vida, Inc.
Alianza Comunitaria Ambientalista del Sureste, Inc.
Sierra Club Puerto Rico, Inc.
Mayagüezanos por la Salud y el Ambiente, Inc.
Coalición de Organizaciones Anti Incineración, Inc.
Amigos del Río Guaynabo, Inc.
Campamento Contra las Cenizas en Peñuelas, Inc.
Unión de Trabajadores de la Industria Eléctrica y Riego

[72] *Id.*
[73] *Friends of Buckingham v. State Air Pollution Control Board*, 947 F.3d 68, 92 (2020).

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On behalf of Comité Diálogo Ambiental, Inc. and Sierra Club Puerto Rico., Inc.

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Exhibit 1

December 21, 2020

VIA Email

Thomas Von Essen
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Federal Disaster Recovery Coordinator, Puerto Rico and USVI
Federal Emergency Management Agency Region II – DR-4339-PR
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RE: Comments Objecting to the Approval of the Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment, Commonwealth of Puerto Rico, DR-4339-PR.

Dear Messrs. Von Essen and Baquero Tirado:

Comité Diálogo Ambiental, Inc. ("CDA"), El Puente de Williamsburg, Inc. – Enlace Latino de Acción Climática ("El Puente – ELAC"), Comité Yabucoeño Pro-Calidad de Vida, Inc. ("YUCAE"), Alianza Comunitaria Ambientalista del Sureste, Inc. ("ACASE"), Sierra Club Puerto Rico, Inc. ("Sierra Club PR"), Mayagüezanos por la Salud y el Ambiente, Inc. ("MSA"), Coalición de Organizaciones Anti Incineración, Inc. ("COAI"), Amigos del Río Guaynabo, Inc. ("ARG), Campamento Contra las Cenizas en Peñuelas, Inc., and Cambio, PR, Inc., collectively known as Alianza de Energia Renovable Ahora ("AERA") submit these comments to the Federal Emergency Management Agency ("FEMA") Draft Programmatic Environmental Assessment: Utility Repair, Replacement, and Realignment in the Commonwealth of Puerto Rico, DR-4339-PR ("PEA").

We submit these comments to the Draft FEMA PEA to raise concerns about the inadequacies of the PEA, the failure to address safety issues, risks, and significant adverse environmental impacts and repercussions of not preparing an Environmental Impact Assessment. The FEMA funds for which the PEA is proposed represent an opportunity to provide a lifeline to residents and businesses in Puerto Rico, especially low- and medium-income ("LMI") communities. The comments are based on many years of work on energy issues in Puerto Rico.

BACKGROUND

The vulnerabilities and public health risks of the existing electric system

Hurricanes Irma and Maria demonstrated that the transmission and distribution ("T&D") system that carries power from the large, centralized power plants, especially the plants in Southern Puerto Rico to the North are a key vulnerability of the Puerto Rico electric system. Moreover, the South-to-North transmission system is vulnerable to multiple types of weather events, earthquakes, vegetation growth, wildlife impacts, lack of investment in maintenance, difficult access to servitudes and easements, among others. As a matter of basic physics, the T&D's interconnected vertical structures, will likely succumb in the next hurricane(s) even if "hardened".

The centralized configuration and heavy dependence on South-to-North transmission in the path of hurricanes that usually make landfall in Eastern Puerto Rico and cut across the Island from east to west increases the risks of power outages. After previous hurricanes, like Hugo in 1989, Hortensia in 1996, George in 1998, when the network was presumably strong and the required maintenance was done, electricity outages lasted months because a failure in one part of the centralized grid triggered interruptions in other parts of the system and sometimes complete outages.

This year's seismic events further demonstrated and alerted to the vulnerability of large, centralized plants and the affiliated transmission system: The Costa Sur and EcoElectrica plants in Southwestern Puerto Rico were both damaged by the earthquakes and aftershocks. Furthermore, the U.S. Geological Survey has determined that the areas where the San Juan and Palo Seco plants are located are at high risk of liquefaction in the event of earthquakes.[1] The Great Southern Puerto Rico Fault Zone runs through the Jobos Bay area where the Aguirre Power Complex and the Applied Energy System ("AES") Corporation AES coal burning power plants are located.[2]

Much of the existing energy infrastructure is in flood prone areas or at risk of impacts from sea level rise, storm surge, tsunamis or other flooding risks to the plants and T&D infrastructure. The Palo Seco plant, depot and accompanying infrastructure are in a tsunami flood area.[3]

The operation of all fossil fuel plants in Puerto Rico emit multiple contaminants that adversely impact public health and the environment. The AES coal-fired power plant and the

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[1] Jeffrey L.Bachhuber, James V. Hengesh, & Sean T. Sunderman, *Liquefaction Susceptibility of the Bayamon and San Juan Quadrangles, Puerto Rico*, at 30, Figure 6, (2008), https://earthquake.usgs.gov/cfusion/external_grants/reports/03HQGR0107.pdf (noting very high susceptibility zones in areas along the Bayamon coastal plain, Bahia de San Juan, and Laguna San Jose); James V. Hengesh, & Jeffrey L. Bachhuber, *Liquefaction susceptibility zonation map of San Juan, Puerto Rico*, in Mann, P. (ed.), Active tectonics and seismic hazards of Puerto Rico, the Virgin Islands, and offshore areas: Geological Society of America Special Paper 385, at 249–262 (2005).

[2] *Id*. at 250.

[3] Cent. Off. for Recovery, Reconstruction and Resiliency, *The Grid Modernization of Puerto Rico* at 107, Figure 6-6 ("Map of Palo Seco Plant and Depot in Flood Area," listing PREPA as the source of this information).

Aguirre Power Complex located in Southeastern Puerto Rico are the two primary sources of air pollution and toxic emissions in the archipelago[4] and disproportionately impact some of the poorest communities. These two plants also extract large amounts of freshwater from the South Coast Aquifer and have contributed to the water scarcity that led to water rationing in summer 2019 and in previous years.[5]

The Costa Sur and EcoElectrica plants in Southwestern Puerto Rico both burn imported Liquified Natural Gas ("LNG", liquified methane gas) and also transmit energy long distance using the vulnerable T&D system.

Except for the renewable energy facilities on the eastern coast of Puerto Rico, where Hurricane Maria made landfall, solar installations withstood the hurricane force winds. However, utility-scale, land-based renewable installations that depend on the vulnerable T&D system were unable to transmit power to where it was needed. Some higher-income Puerto Rico residents and businesses have installed photovoltaic systems and/or energy storage equipment on their rooftops or onsite to supply at least part of their energy needs and provide resilience. However, the upfront investments and/or high leasing costs have prevented widespread uptake of rooftop or onsite solar and storage.

The FEMA funds should support efforts to incentivize the Puerto Rico Electric Power Authority ("PREPA") to acquire photovoltaic ("PV") and Battery Energy Storage Systems ("BESS") to be installed by its trained workforce in conjunction with local contractors and organized communities. Widespread onsite solar installations could subsequently provide the path to rooftop solar communities that operate as microgrids with the ability to connect and disconnect from the main grid along with energy demand management and efficiency programs and the other alternatives discussed in these comments.

Given the economic crisis in Puerto Rico, available resources, such as the FEMA funds should be invested in options that save lives, promote local economic development, and change the trajectory of exporting billions of dollars per year for fossil fuels and power purchase payments to maintain a stagnant system. Moreover, the funds present a once-in-a-lifetime opportunity to

[4] U.S. Envtl. Prot. Agency, 2018 Toxic Release Inventory (TRI) Factsheet: State – Puerto Rico (Nov. 12, 2019), https://enviro.epa.gov/triexplorer/tri_factsheet.factsheet_forstate?pZip=&pParent=NAT&pCity=&pCounty=&pState=PR&pYear=2018&pDataSet=TRIQ1&pPrint=0.

[5] *See, e.g.*, Puerto Rico Departamento de Recursos Naturales, Orden Administrativa 2016 - 018 Para Declarar como Área Crítica los Acuíferos del Sur de los Municipios de Ponce, Juana Díaz, Santa Isabel, Salinas, Guayama, y Arroyo (June 28, 2016), http://www.drna.pr.gov/documentos/orden-administrativa-2016-018-para-declarar-como-area-critica-los-acuiferos-del-sur-de-los-municipios-de-ponce-juana-diaz-santa-isabel-salinas-guayama-y-arroyo/; Jason Rodríguez Grafal, Acuífero del Sur: Retrocede la única fuente de agua potable de 30 mil sureños, La Perla del Sur (May 29, 2019), https://www.periodicolaperla.com/acuifero-del-sur-retrocede-la-unica-fuente-de-agua-potable-de-30-mil-surenos1/; U.S. Geol. Survey, USGS Water Use Data for Puerto Rico, https://waterdata.usgs.gov/pr/nwis/wu (last visited Mar. 5, 2020); Franquicia para el uso y aprovechamiento de aguas de AES-RO-06-10-99-PFI-70380

reduce electric system vulnerability with onsite/rooftop solar plus storage and provide a lifeline to Puerto Rico residents.

VIABLE ALTERNATIVES FOR LIFE-SAVING ELECTRIC SERVICE NOT CONSIDERED IN THE PEA

The commenters promote alternatives to central station, fossil fuel generation including the following options:

1. Energy efficiency and conservation measures;
2. Energy storage for rooftop or onsite solar photovoltaic (PV) installations;
3. Solar installations at schools, water purification and treatment plants, parking lots and similar areas;
4. Energy demand management programs that incorporate time of use incentives to address the nighttime peak and other demand response options;
5. Rooftop or onsite PV installations and solar communities as recommended in studies by the University of Puerto Rico at Mayaguez faculty.[6]

Numerous civil society groups, including community, environmental, labor, professional organizations and academia co-founded and endorse the Queremos Sol Proposal ("We Want Sun", www.queremossolpr.com) which promotes the transformation of PREPA to achieve a life-sustaining, renewable energy electric system. Reliable electric service is required to power life-sustaining medical equipment and medications. Studies have documented that the power failure after hurricane Maria led to thousands of deaths.[7] Queremos Sol proposes widescale adoption of rooftop solar + storage and is largely consistent with the Puerto Rico's legally mandated Renewable Portfolio Standard (RPS) to achieve 20% renewable energy by 2022, 40% by 2025, 60% by 2040 and 100% renewable energy by 2050.

Studies commissioned by the Puerto Rico Energy Bureau ("PREB") project that new solar generation will cost about 6.7 cents / kWh.[8] Furthermore, rooftop solar + storage systems have low interconnection costs and system impacts. In order to achieve the legally mandated renewable energy goals, Puerto Rico must attain a minimum of 3,750 MW of renewables and 1,500 MW of storage by August 2025 according to the Integrated Resource Plan ("IRP") recently approved by PREB.[9]

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[6] Instituto Tropical de Energía, Ambiente y Sociedad, http://www.uprm.edu/aret/docs/Ch_1_Summary.pdf, p. 1-13,1-14.

[7] Tom Dreisbach, Problems With Health Care Contributed To Hurricane Maria Death Toll In Puerto Rico (2009), https://www.npr.org/2019/02/21/696769824/problems-with-health-care-contributed-to-hurricane-maria-death-toll-in-puerto-rico, (last visited Dec. 17, 2020).

[8] Puerto Rico Energy Bureau, Appendix A -Report on the Cost Allocation Methods and Unbundling Issues for Puerto Rico, at 61, In Re: Unbundling of the Assets of the Puerto Rico Electric Power Authority, PREB Dkt. NEPR -AP-2018-0004 (Sept. 4, 2020).

[9] Puerto Rico Energy Burau, Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan, PREB Dkt. No. CEPR-AP-2018-0001, (Aug. 24, 2020). (Hereinafter, "Final Resolution and Order")

Dozens of PREPA employees are trained to implement net metering and to install and maintain rooftop solar + storage systems. These employees have completed coursework on net metering and design and installation of rooftop solar + storage systems, offered through PREPA's Commercial Operations Training Center ("CAOC") and Electrical System Training Center ("CASE").[10] Employees trained through this program could install, and maintain rooftop solar + storage systems, work to interconnect the massive backlog of rooftop solar + storage systems in the interconnection queue, and implement *Comunicado Técnico* 19-02, which would allow for automatic interconnection of rooftop systems.[11]

PREPA installations could be done in conjunction with local renewable energy contractors and organized community groups. When the next storm strikes Puerto Rico, these efforts would allow rooftop solar + storage systems to power microgrids for hospitals and other critical infrastructure. The advantages of enlisting PREPA to implement a rooftop or onsite solar program is that the utility already has the service relationship with households and businesses such that transaction costs and wait times can be minimized. Through PREPA, residents in the lowest income strata can access renewable energy and storage technologies. Installations by the public utility will allow for mitigation of the most risk for the highest number of beneficiaries possible.

A. Energy conservation, efficiency, customer engagement and demand response programs

The Queremos Sol proposal highlights the importance of energy conservation, efficiency, customer engagement, and demand response programs. During the IRP technical hearings, expert witnesses identified several cost-effective Quick-Start Energy Efficiency programs such as solar water heaters, energy efficient refrigerator incentive programs, appliance replacement programs, tuning up air conditioners or replacing very old air conditioners, expanding the Office of Energy Public Policy's low-income weatherization program, to name a few.[12]

The IRP assumes that PREPA will comply with the 2% annual reduction in load due to energy efficiency as required by the Puerto Rico Energy Public Policy Act ("Law 17-2019"), culminating in a 30% reduction in PREPA's total load by 2040. Law 17-2019, Section 1.9(3)(B)

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[10] Partnership Committee Report, *Puerto Rico Public-Private Partnership for the Electric Power Transmission and Distribution System*, at 259 (2020). https://aeepr.com/es-pr/QuienesSomos/Documents/Partnership%20Committee%20Report%20-%20Transmission%20and%20Distribution%20System.pdf CASE and CAOC offer hundreds of courses and eleven certifications, including numerous courses on renewables and distributed renewables. For example, CAOC courses teach about net metering. Engineer Javier Chaparro Echevarria, PREPA Mayagüez regional administrator, approved by the State Office of Public Energy Policy (OEPPE) to teach courses on installation of Renewable Electrical Systems and Wind Turbines. One of those courses is CASE 340: Design and Installation of Photovoltaic Systems. Engineer Chaparro has also taught courses with the Colegio de Ingenieros de Puerto Rico (Puerto Rico Engineering Association).

[11] As envisioned by the Final Resolution and Order, paras. 78, 83, https://energia.pr.gov/wp-content/uploads/sites/7/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf.

[12] Negociado de Energía en vivo, Evidentiary Hearing / CEPR-AP-2018-0001, YouTube (Feb. 4, 2020), https://youtu.be/-RXb0bf5ScY?t=13532.

requires the IRP to include an evaluation of the conservation resources, including electricity demand management and the necessary programs to improve energy conservation. The Energy Bureau's consultant highlighted that: the initial $300M investment in energy efficiency would save $1B in avoided generation costs over the planning period, and the next $700M in energy efficiency spending would save an additional $1.8B in avoided generation costs over the planning period.[13]

PREPA must coordinate with stakeholders in designing a customer engagement plan "to educate citizens and electric power service customers on energy efficiency, consumption reduction, distributed generation strategies, and other available tools to empower consumers to have more control over their energy consumption," as required by Law 17-2019 Section 1.5(4)(b). In the approved IRP,[14] PREB determined that energy efficiency programs are always the least cost resource, and that the maximum level of EE deployment should be a core provision of an approved Preferred Resource Plan. Federal funds earmarked for these programs would allow for implementation needed, energy conservation and efficiency.

B. Viability of rooftop solar, BESS, power electronics, and other alternatives

Law 17-2019 directs PREPA to "maximize the use of renewable energy" and, at the same time, "aggressively reduce the use of fossil fuels" and "minimize[e] greenhouse gas emissions..."[15]

PREPA has announced that the first tranche of the renewable energy installations will be legacy power purchase and operation agreements for utility scale, land-based installations, often on agricultural land and/or ecologically sensitive areas. These projects would depend on the existing, vulnerable T&D system that failed after Hurricane Maria and has failed after every other major hurricane in the past 30 years.

The breakdown of energy consumption by group indicates that commercial and residential clients constitute the lion's share of energy demand in Puerto Rico while industrial clients barely consume about 13% of energy generation. The commercial sector consists of sprawling malls and other installations with expansive parking lots and rooftops that can be used to site solar arrays to power operations. Much residential construction in Puerto Rico consists of single-family housing developments known as urbanizations. They are especially expansive and prevalent in the San Juan metropolitan area and can provide the onsite "rooftop resource" referenced in the Department of Energy ("DOE") commissioned studies by faculty at the University of Puerto Rico at Mayaguez ("UPRM"), recommending widespread use of existing structures to site PV installations, which also coincides with the major energy demand center in Puerto Rico.

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[13] Negociado de Energía en vivo, Evidentiary Hearing / CEPR-AP-2018-0001, YouTube (Feb. 6, 2020), https://youtu.be/HO40ImpqKe8?t=3669.

[14] Final Resolution and Order, paras. 634- 635, https://energia.pr.gov/wp-content/uploads/sites/7/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf.

[15] Law 17-2019 Section 1.5(6)(b), Section 1.11(d).

Multiple studies have proven the resiliency of onsite photovoltaic and battery energy storage systems.[16] Renewables and BESS can serve critical loads and provide resilience. PREPA's contractor, Siemens Industry, ultimately acknowledged that renewable resources could be available immediately after a major event (e.g., hurricane, power outage). Therefore, Siemens' original assumption in the IRP that base fossil generation was indispensable was wrong.[17] Siemens's rebuttal testimony acknowledged that the June 2019 draft IRP did not recognize the full value of renewables, stating that solar panels could be certified to withstand major events, and therefore should have been considered to supply critical loads.[18] In December 2019, the Energy Bureau's Energy Storage Study confirmed that "thermal resources are not required to prevent loss of critical loads."[19]

The advantages of rooftop solar are many**,** they include the use of existing rooftops of sprawling housing and commercial developments to avoid further impacts to open spaces, agricultural land and ecologically sensitive areas. Rooftop and onsite solar eliminates the need for large investments in transmission infrastructure. It avoids transmission losses and vulnerabilities. Grid maintenance costs are reduced and impacts to forests ecosystems and vegetation as a result of tree cutting and pruning are minimized. The rooftop solar alternative does not require establishing extensive easements or servitudes on private property while helping to lower temperatures within the structures and providing protection to the buildings. Rooftop solar installations add value to the structures and promote local wealth. Distributed generation on rooftops creates greater reinvestment in the local economy than fossil fuel projects. It enables ratepayers to become producers or 'prosumers' of energy not mere consumers and allows for control by residents and local communities which is particularly important during outages of the main grid as was experienced after Hurricane Maria. Rooftop solar enjoys broad civil society support as opposed to utility scale, land-based installations. The advantages of using the "roof top resource" for photovoltaic energy systems also include avoiding the use of the large quantities of fresh and salt water required by fossil fuel combustion plants, reduction in the discharges of overheated thermal waters to water bodies, reduction of entrapment of marine species by the suction systems of fossil fuel plants, avoiding the impacts of spilled chemicals and other pollutants

[16] *See* National Renewable Energy Laboratory, Distributed Solar PV for Electricity System Electricity, Policy and Regulatory Considerations, https://www.nrel.gov/docs/fy15osti/62631.pdf (last visited Dec. 17, 2020); *See* Eliza Hotchkiss, How Solar PV Can Support Disaster Resiliency, https://www.nrel.gov/state-local-tribal/blog/posts/how-solar-pv-can-support-disaster-resiliency.html (last visited Dec. 17, 2020).

[17] In addition, Siemens did not take distributed storage into consideration. PREPA Response to the Third Discovery Request to PREPA from Local Environmental Organizations, ROI 3.56, p. 36 (Oct. 25, 2019). *See* Attachment 1.

[18] *See* PREPA's Mot. to Submit Corrected Rebuttal Test., Direct Test. of Nelson Bacalao, PH.D. at 7, (Jan. 20, 2020), https://energia.pr.gov/wp-content/uploads/sites/7/2020/01/Corrected-Rebuttal-Testimony-of-Nelson-Bacalao-PH.-D.-in-Support-of-PREPAs-Draft-Integrated-Resource-Plan-CEPR-AP-2018-0001.pdf.

[19] Puerto Rico Energy Bureau, Energy Storage Study For a Renewable and Resilient Island Grid for Puerto Rico at Section 6.1 (Dec. 19, 2019), filed in Dkt. NEPR-MI-2020-0002, https://energia.pr.gov/wp-content/uploads/sites/7/2020/01/NEPR-MI-2020-0002-Estudio-Sistemas-de-Almacenamiento-de-Energi%CC%81a.pdf.

to marine species and vegetation, protection of public health due to a decrease in toxic emissions to air, water and land, decrease in greenhouse gases that promote climate change, among others.

PREB has recognized that renewables and especially distributed renewables have numerous benefits beyond just electric output, such as ancillary services,[20] resiliency benefits, and reduction of transmission and distribution system losses.[21] PREPA's Status Report in the IRP case also acknowledges that distributed renewables have benefits beyond electric output.[22] Rooftop and/or onsite solar coupled with BESS, EE and other programs could provide the resiliency that residents and businesses in Puerto Rico need to save lives. Therefore, we urge the government of Puerto Rico and federal agencies to earmark the FEMA funds for these types of alternatives.

During the technical hearings in the PREPA IRP process, multiple experts provided numerous recommendations that would immediately implement onsite renewables, storage, and energy efficiency programs, and achieve the transformation of Puerto Rico's electric grid to better serve the people of Puerto Rico. Federal funding afforded to PREPA should be earmarked for these types of programs. On the other hand, continued reliance on large, centralized power plants and long, vulnerable South-to-North transmission lines would not promote the resilience of the electricity grid to climate related and other disasters. Hurricane Maria and the seismic events of this year showed the importance of decentralizing the power network. A distributed generation system centered on onsite/rooftop solar will be more resilient and, after an emergency, will allow for prompt restoration of energy services, fulfilling the responsibility of saving lives.

These alternatives stand in stark contrast to the use of billions of dollars in federal taxpayer funds to rebuild and "harden" the existing T&D system and add more fossil fuel generation, especially so-called "natural" methane gas infrastructure. The federal government should work with PREPA to initiate a transparent process for acquisition or procurement of solar equipment and BESS to be installed, operated, and maintained by the dozens of PREPA employees who have been trained in renewable energy technology in conjunction with local contractors and organized communities. These types of investments would create jobs and have greater multiplier effects in the Puerto Rico economy.

As noted in the proposed CDBG-MIT Action Plan; "The advantage of renewables is that while they—like the existing PREPA grid—would require significant investment upfront, they would not have the exorbitant cost of purchasing and importing fuel for those power systems, year

[20] For example, frequency response, operating reserve, and reactive support. See Final Resolution and Order para. 862, pp. 268-269, https://energia.pr.gov/wp-content/uploads/sites/7/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf.
[21] *Id*.
[22] PREPA's Status Report in the IRP case, at 6, recognizing "T&D system loss benefits for DG/storage bids" and "potential for additional resiliency benefits." See PREPA's Presentation of Status Report on the Development of PREPA's Draft Procurement Plan at p. 6 (Sept. 23, 2020), filed in Dkt. NEPR-AP-2018-0001, https://energia.pr.gov/wp-content/uploads/sites/7/2020/10/20200923-PRESENTATION-OF-STATUS-REPORT.pdf

after year. Investment in renewable energy development could create stability not only in terms of reliable energy, but also jobs and environmental factors." (p.158).

The original government estimates for deployment of renewables indicated figures in the order of $4-6 Billion. In the Puerto Rico Disaster Recovery Plan, the Government of Puerto Rico requested $4.2B to $6.2B to increase solar energy generation.[23] The Government should reinstate the original $6 B for rooftop/onsite solar + storage, energy efficiency and similar programs.

While the proposed CDBG-MIT plan acknowledges the extensive damage to the power grid, i.e. transmission and distribution infrastructure as a result of the 2017 hurricanes and the "longer-term timeline on a comprehensive power system overhaul", HUD proposes to make a separate allocation of $1.93B for power grid repairs under a separate Federal Register notice and "has prohibited the use of CDBG-MIT funds for electrical system improvements or risk mitigation until the notice is released." Thus, erroneously underinvesting in rooftop and onsite solar as a first line of defense for Puerto Rico residents and businesses. The proposed "localized energy resilience measures", like rooftop or onsite solar and BESS are seriously underfunded.

Earmarking federal funds for the localized solar + storage through the public utility to carry out a transparent procedure for large scale acquisition of PV and BESS would serve three paramount purposes: 1-provide access to energy resiliency to the lowest income sectors of the population who would not be able to access loans, rebates or leases for solar + storage, 2-provide a uniform procedure through the public utility that would hasten the implementation of rooftop or onsite solar and storage installations and 3- break the cycle of disaster damage, reconstruction, and repeated damage of the vulnerable, centralized T&D system that so often interrupts life-saving electric service.

Rooftop and onsite solar and the other alternatives discussed above provide lifeline stability and strengthening. The investment in rooftop/onsite solar should align with the original estimates as eligible projects in the plan to "foster investment in lifeline infrastructure improvements while creating jobs." (p. 274). However, investment in utility-scale, land-based renewable energy projects implicate a continued reliance on the existing T&D system and would not provide the resiliency benefits of rooftop/onsite renewables and storage. Rooftop solar and BESS would provide "redundant, alternative, and independent power systems", because, as noted in the proposed CDBG-MIT plan; "Billions in federal funding have been expended on repairs yet Island-wide power outages continue to contribute to an unmet need for reliable power." (p. 281). This will continue to be the case because centralized generation and T&D largely carrying power from the large fossil fuel plants in the South to Northern Puerto Rico, primarily the San Juan

[23] *See* Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico, pp. 297 & 318 (Aug. 8, 2018); https://reliefweb.int/sites/reliefweb.int/files/resources/pr-transformation-innovation-plan-congressional-submission-080818_0.pdf (last visited Dec. 17, 2020).

metropolitan area will continue to be impacted by hurricanes and storms, floods, vegetation, wildlife and other hazards.

THE NATIONAL ENVIRONMENTAL POLICY ACT AND THE REGULATORY FRAMEWORK

The National Environmental Policy Act ("NEPA") has two principal objectives: 1) The statute imposes an obligation on proponents to consider every significant aspect of the environmental impact of the proposed action; and 2) It ensures that an agency will inform the public that it adequately considered environmental concerns.[24] NEPA requires agencies to systematically address the environmental impacts of their decisions and prevent overvaluation of economic benefits and undervaluing environmental effects because they may be harder to quantify.

NEPA is a way to address interrelated effects of the actions of different agencies. NEPA mandates the use of all practicable means to foster and promote the general welfare and to create and maintain conditions under which humans and nature can exist in productive harmony.[25] In order to comply with NEPA, federal agencies must:

A. Use a systematic, interdisciplinary approach to insure the integrated use of natural and social sciences and environmental criteria in decision-making.;
B. Identify and develop methods to quantify environmental values so that they can be considered sufficiently along with economic and technical considerations; and
C. Include an impact statement in every report on proposed legislation and other major Federal actions significantly affecting the quality of the human environment. An EIS must include a discussion of the: 1) environmental impact of the proposed action; 2) adverse environmental effects that cannot be avoided if the project is implemented; 3) alternatives to proposed action; 4) the relationship between local short-term uses of the environment and its maintenance and enhancement of long-term productivity; and 5) irreversible and irretrievable commitments of resources which would be involved. The lead agency must make the Environmental Impact Statement ("EIS") and comments made by other agencies available to the public.
…
E. Study and describe alternatives to the courses of action in the proposal which involve unresolved conflicts on use of resources.
42 U.S.C.A. § 4332.

NEPA prohibits segmentation of the environmental analysis of an agency action, agencies may not divide a large project into small actions which don't rise to the level of "significant."[26] The Council on Environmental Quality ("CEQ") requires that "connected actions" must be

[24] "The purpose and function of NEPA is satisfied if Federal agencies have considered relevant environmental information, and the public has been informed regarding the decision-making process." 40 C.F.R. 1500.1(a).
[25] 40 C.F.R. 1500.1(a).
[26] *City of W. Chicago, Ill. v. U.S. Nuclear Regulatory Comm'n*, 701 F.2d 632, 650 (7th Cir. 1983).

considered together in an EIS. 40 C.F.R. § 1501.3. Actions are "connected" if: i) they automatically trigger other actions which may require an EIS; ii) cannot or will not proceed unless other actions are taken previously or simultaneously; and iii) they are interdependent parts of a larger action and depend on the larger action for their justification.[27] A comprehensive EIS is necessary when several proposed actions that will have a reasonably foreseeable environmental trends and plan actions on an area are pending concurrently before an agency. 40. C.F.R. § 1502.15.

NEPA requires mitigation of environmental impacts uncovered in an EIS, S*ee* 40 CFR §1505.3. NEPA is a grant of authority to the agency "as a supplement to its existing authority" to protect the environmental "to the fullest extent possible". 40 CFR §1500.6.

The *NRDC v. Morton*[28] case involved the proposed leasing of submerged federal lands off the coast of Louisiana for oil and gas production. An EIS showed adverse environmental effects of the proposed leases, but the agency approved the transaction. NRDC argued that the agency was required to discuss environmental effects of the alternatives, but the agency argued that no such discussion was needed, only a statement of alternatives. The court held that section 102(2)(C) requires the agency to consider alternatives and evaluate the environmental impact of those alternatives. The court further held that agencies must provide information sufficient to permit a reasoned choice of alternatives and cannot disregard alternatives that don't offer a complete solution to the problem. And agencies must discuss alternatives even if they are outside the agency's authority or if they require legislative implementation.

Courts have voided projects where the agency failed to conduct the careful, coordinated safety and environmental impact review, with robust public participation, set forth by the National Environmental Policy Act. *See*, e.g., *W. Watersheds Project v. Zinke*, 336 F. Supp. 3d 1204, 1212 (D. Idaho 2018)(finding that the Bureau of Land Management's practices had violated NEPA public participation requirements, and that the preclusion of public participation was irreparable harm, sufficient to warrant a preliminary injunction.) In that case, the court granted relief necessary to "remedy for present purposes the harm and hardships caused by BLM's curtailment or preclusion of the opportunity for meaningful public participation. . . which on the present record appears to violate public participation requirements of … NEPA." Id.[29]

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[27] 40 C.F.R. 1501.9(e)(1).

[28] *Nat. Res. Def. Council, Inc. v. Morton*, 458 F.2d 827 (D.C. Cir. 1972).

[29] *See* also *Sierra Club v. Van Antwerp*, 719 F. Supp. 2d 77, 80 (D.D.C. 2010) (partially vacating permit and remanding to agency for NEPA violation); *Humane Soc'y of the U.S. v. Johanns*, 520 F. Supp. 2d 8, 37 (D.D.C. 2007), citing *Am. Bioscience, Inc. v. Thompson*, 269 F.3d 1077, 1084 (D.C. Cir. 2001) ("[V]acating a rule or action promulgated in violation of NEPA is the standard remedy."); *Pub. Emps. for Envtl. Responsibility v. U.S. Fish and Wildlife Service*, 189 F. Supp. 3d 1, 2 (D.D.C. 2016) (reviewing cases and finding vacatur is the standard remedy). If vacatur is an appropriate judicial remedy for a permit issued in violation of NEPA, an order to cease operations at a facility that started operations without any permit must also be an appropriate judicial remedy. *Standing Rock Sioux Tribe v. United States Army Corps of Eng'rs*, 2020 U.S. Dist. LEXIS 117866, *38, __ F. Supp. 3d __, (D.D.C. 2020) (vacating agency permit and ordering that oil pipeline be shut down for failure to comply with NEPA). Indeed, agency failure to follow the requirements of NEPA opens that agency to injunctive relief from a court. See *Realty Income Tr. v. Eckerd*, 564

In the major federal action contemplated in the granting of a historic amount of funds, FEMA should be guided by its administrative procedure known as, "A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action".[30] The Whole Community approach enables residents, emergency management practitioners, community and social service organizations and other stakeholders to collectively understand and assess the needs of communities and determine the best ways to organize and strengthen assets, capacities, and interests to achieve societal security and resilience.

THE ENDANGERED SPECIES ACT

Section 7(a)(2) of the Endangered Species Act requires that all federal agencies ensure that their actions "are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of" their critical habitat. 16 U.S.C. § 1536(a)(2). Federal agencies are required to consult with the U.S. Fish and Wildlife Service (FWS) to ensure that the agency actions comply with the substantive mandates of section 7(a)(2). Id. The ESA's implementing regulations broadly define the scope of agency actions subject to the ESA section 7(a)(2) mandates to include the granting of licenses and permits. 50 C.F.R. § 402.02.

Under ESA Section 9, 16 U.S.C. § 1538(a)(1)(B), it is illegal for any person – whether a private or governmental entity – to "take" any endangered species of fish or wildlife listed under the ESA. By regulation, FWS has made the take prohibition applicable to threatened species. The § 7(a)(2) consultation process assists the action agency in discharging its duty to avoid jeopardy, and also affects the agency's obligation to avoid the take of listed species by providing an incidental take statement that shields the action from liability for take incidental to an otherwise lawful activity so long as that take does not jeopardize the species.

The proposed FEMA funding for the construction of multiple infrastructure projects will adversely affect listed species. Compliance with the procedural provisions of the ESA—making the determination of the effects of the action through the consultation process—is integral to compliance with the substantive requirements of the Act. Under this statutory framework, actions that "may affect" a listed species or critical habitat may not proceed unless and until the federal agency ensures, through completion of the consultation process, that the action is not likely to cause jeopardy or adverse modification of critical habitat. 16 U.S.C. § 1536(a); 50 C.F.R. §§

F.2d 447, 456 (D.C. Cir. 1977) ("[W]hen an action is being undertaken in violation of NEPA, there is a presumption that injunctive relief should be granted against continuation of the action until the agency brings itself into compliance.").

[30] *See* A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action, FDOC 104-008-1 (December 2011), https://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011__2_.pdf (last visited Dec. 17, 2020).

402.14, 402.13; see also 16 U.S.C. § 1536(d). FEMA may not permit any activity to move forward until valid consultation processes are complete for each of the species that may be affected.

Habitat degradation is probably the main trigger for the extinction wave currently being experienced. In addition to ESA requirements, as discussed above, NEPA regulations require federal agencies to study and, when required, disclose in an EIS, significant environmental impacts that may be caused by a federal action, and then "Use all practicable means" to "avoid or minimize any possible adverse effects of their actions upon the quality of the human environment" . . . "to the fullest extent possible." (40 CFR §1500.2). The multiple infrastructure projects to be funded by FEMA present a high risk of significant impacts to endangered species and the environment. The PEA, business as usual approach is what has led to the extinction of many species.

COMMENTS TO FEMA PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

I. The Programmatic Environmental Assessment fails to provide adequate detail of the work proposed.

The PEA states that, "the electric grid includes 2,478 miles of transmission lines, 31,485 miles of overhead and underground distribution lines across the service territory, and 334 substations and transmission centers. (p.63). "All the 2,478 miles of transmission lines and remaining electrical grid infrastructure required survey and repair and 25 percent of all the structures were damaged and temporarily rebuilt" (p.73). Other sources point to 75% of T&D infrastructure damaged by Hurricane Maria.[31] The historic amount of FEMA funding and the proposed infrastructure work would be a massive undertaking, that would involve principally rebuilding, "hardening" and some undergrounding of the existing grid. The PEA presumably proposes to address the impacts of the proposed permanent work on the damaged structures and other infrastructure work. That is not explicitly stated in the PEA.

One of the main shortcomings of the PEA is the total failure to provide specific lists, descriptions, mapping or any other indication of the electric infrastructure grid work that is proposed in each area. The PEA contains generic references to rebuilding, replacement and relocation of multiple transmission and distribution towers, poles, lines, backup generators, substations and similar infrastructure that lacks any information as to the extent, magnitude, number of total miles and areas where the work would be carried out or the potential concentration of work in specific areas. For example, Hurricane Maria made landfall in the Municipality of Yabucoa but there is no information in the PEA that any area in particular, would experience more work projects and related impacts. The environmental impacts of the project alternatives in the PEA are significant, not conducive to mitigation to less than major and merit the preparation of an Environmental Impact Statement ("EIS"). A Finding of No Significant Impact (FONSI) would not

[31] The Puerto Rico Association/College of Engineers and Surveyors determined that the onslaught of Hurricane María in 2017 damaged 2,700 transmission towers and 75% of the distribution circuits. https://www.infraestructura2030.com/comisi%C3%B3n-de-energ%C3%ADa.

adequately address the multiple significant environmental impacts of the extensive infrastructure work proposed.

The PEA contains alarming inaccuracies concerning the Puerto Rico electric system that range from the number of generation sites to percentages of fuels used. For example, the PEA erroneously states that; “Approximately 69% of PREPA’s 5,839 megawatt (MW) generating capacity is from petroleum.” (p. 63).

II. The Programmatic Environmental Assessment fails to adequately consider alternatives to centralized fossil fuel power plants, which could lessen or eliminate the need for expensive transmission system projects.

The principal flaw of the PEA is that it fails to consider viable alternatives to the rebuilding, “hardening” and undergrounding of the existing T&D system. Passing references in the PEA to onsite solar are inadequate as a discussion of onsite solar + storage as a full-blown alternative to centralized long-distance transmission and distribution of electric power. The PEA limits solar installations to backup power at conventional fossil-fueled facilities rather than discuss solar + storage as an alternative in its own right to transform the electric system and avoid the significant adverse impacts of rebuilding or relocation of the T&D system.

As noted in the PEA, “Under the Stafford Act, FEMA has authority to provide funding for cost-effective hazard mitigation and resiliency measures for facilities damaged by Hurricane Maria. Additionally, FEMA is authorized to provide funding to eligible grant Applicants for cost-effective activities that have the purpose of reducing or eliminating risks to life and property from hazards and their effects.” (p.9). More specifically, FEMA may provide funds for “utility system restoration, replacement, upgrade, expansion, redesign, or relocation that can contribute to reducing the potential for future damages.” (p.9). The PEA indicates that it includes projects for; “supplemental power generation, transmission, and distribution facilities, including, but not limited to, wind turbines, solar farms, generators, substations, and power lines; natural gas transmission and distribution facilities”.” (p.11), among others. Clearly, FEMA has the authority to fund onsite or rooftop solar + storage in a way that redesigns and relocates facilities to reduce risks to life from lack of electric service stemming from downed power lines as occurred after Hurricane Maria.

The PEA is contradictory as to additional capacity in the electric system that would result from the proposed work, on the one hand referencing “utility retrofits to accommodate greater capacity” (p.25) and subsequently alleging that “ Due to limiting capacity to pre-Hurricane Maria levels, there would be no additional long-term energy demands on the Commonwealth’s utility networks.” (p.63).

New power generation would include the installation of “combined heat and power systems, rooftop solar, fossil fuel powered standby generators, battery storage, and building energy management systems” and “Associated actions will involve the construction of on-site fuel

storage, installation of transmission and distribution lines, and construction of substations or switch stations." (p.16). The mere reference to different alternatives does not satisfy NEPA requirements. The agency must discuss, explain and provide public information of each alternative. Installation of redundant power sources, including onsite stand-by generation could involve new fuel sources such as highly flammable Liquified "Natural" Gas ("LNG") which would need to be revaporized prior to combustion for power generation.

The references in the PEA to back-up power generation equipment that might decrease air emissions fails to acknowledge that renewables would avoid air pollution and emissions altogether as well as fossil fuel dependency. The benefits of renewables are not discussed as an alternative that would not simply reduce emissions but eliminate air pollution altogether. The proposed fossil fuel generation does not contribute to achieving the renewable energy mandate in the Puerto Rico Climate Change Mitigation Adaptation and Resilience Act or the Energy Public Policy Act. PEA alternatives 2 and 3 are contrary to local law because they will impede or delay the distributed renewable energy goals of Law 17-2019 and the recently approved IRP. Consideration of alternatives must comply with both federal and local law. The viability of alternatives other than those listed in the PEA has been determined in the IRP and local law and must therefore be considered by FEMA in the corresponding environmental document. This PEA fails to address this issue.

The PEA is a highly biased document which cannot serve the purpose of excluding the preparation of an EIS. It not only excludes other viable alternatives as described above, but also fails to consider the environmental effects of the preferred and/ or considered alternatives. Some of those consequences are discussed in Parts I-VIII of these comments. The FEMA funding proposed in the PEA (page 9) is a major Federal action significantly affecting the quality of the environment. Among those effects are the significant negative environmental justice consequences of delaying or eliminating renewable distributed energy options.

The PEA incorporates a faulty procedural approach, a haphazard scheme for the environmental analysis for the vast array of infrastructure work proposed; "In accordance with the procedures documented in Section 1 for implementing this PEA, utility projects that constitute a more substantive action such as a new sewer treatment facility may require a supplement (sic) analysis and a SEA to fully comply with NEPA. For all Action Alternatives, a tiered EA or separate NEPA process may be required if an action's impacts on any resource cannot be mitigated to less than major impacts according to the scale in Section 5. Construction areas, including cleared staging areas and access roads that are greater than five acres for previously disturbed areas that require minimal clearing and up to two acres for undeveloped land requiring clearing, grubbing, or ground disturbance, would be considered on a case-by-case basis to avoid any major impacts to sensitive resources. If a proposed project exceeds the geographical constraints considered for this PEA, it can be evaluated by a FEMA approved specialist for the purpose of determining if its impacts are in alignment with what has been determined herein or if additional NEPA documentation is required." (p. 11). This supplemental analysis and tiered EA scheme is

problematic and doesn't comply with NEPA for a number of reasons: 1-It promotes segmentation of the environmental analysis; 2-Environmental review and consultation with relevant agencies is left entirely within FEMA's discretion; 3-Public access to information is piecemeal and unduly limited; and 4-Public input and informed participation is undercut by the staggered administrative process. Allowing such broad agency procedural discretion would effectively negate an integral environmental analysis and cancel out public input.

The PEA is highly biased and skewed towards replicating the existing centralized T&D system and should not be allowed to block the preparation of an EIS. It not only excludes viable alternatives described in these comments but fails to consider the environmental effects of the preferred and/ or considered alternatives. Some of those consequences are discussed here in Parts I-VI. It must be concluded that the grant funding considered in the PEA (page 9) is a major Federal action significantly affecting the quality of the environment. Among those effects are the inevitable negative environmental justice consequences of delaying or eliminating renewable distributed energy options.

The extent of the electric infrastructure work proposed requires the preparation of an EIS.

The proposed work includes upgrading or rebuilding up to 20 linear miles of pipeline, transmission, or distribution lines per area. Nowhere does the PEA indicate the areas where this extensive work would take place and whether some areas would be more impacted than others. Potential impacts would not be limited to land. According to PREPA, utility poles are installed between 5 and 14 feet below land surface (PREPA 2000). Water tables can be impacted by such excavations at new sites and even at previously impacted sites. Similarly, the installation of underground power lines will undoubtedly have significant environmental impacts. Flooding is by far, the most prevalent source of disaster damage in Puerto Rico according to the proposed CDBG-MIT plan. Undergrounding of infrastructure may aggravate flooding, impact water courses and resources and expose infrastructure to water damage.

Infrastructure realignment or relocation outside existing Rights of Way ("ROWs") will be determined "according to the needs of Subapplicant and engineering recommendations may involve relocation of utilities up to 200 feet from an existing ROW" and "FEMA will evaluate to determine if greater distances are consistent with this PEA on a case-by-case basis." (p.15). Realignment of pipelines or electric powerlines could extend for up to 10 miles. The PEA fails to specify the magnitude and extent of projects that "require replacement or relocation of contiguous portions of the utility to mitigate risk and restore infrastructure." (p.17). Relocation of utilities at greater distances from an existing ROW, could encroach on fence line communities and the environmental impacts could also be significant.

III. The Programmatic Environmental Assessment fails to adequately consider impacts to air, water, species habitats, farmland, and flooding risks.

The PEA fails to consider that the rate of decline of agricultural land in Puerto Rico has accelerated in the most recent period evaluated.[32] In the last five-year period evaluated, agricultural land in Puerto Rico has decreased from 584,987 cuerdas in 2012 to 487,774 cuerdas in 2017 representing a loss of 17%, or an annual average loss of 16,202 cuerdas.[33]

The PEA acknowledges that the projects may involve "changes to topography" but fails to discuss how topographical alterations impact superficial and ground water flows, flood levels and sedimentation of water courses.

The current operations of PREPA's large, centralized fossil fuel powerplants are causing exceedances of the National Ambient Air Quality Standards ("NAAQS"), harming the health of the communities near these plants.[34] According to the PEA, the proposed additional fossil fuel generation would not help to achieve PM_{10} attainment in the municipality of Guaynabo and would have a "negligible impact on SOx for the municipalities of Bayamon, Catãno, Guaynabo, Salinas, San Juan, and Toa Baja". (p.25). The proposed additional fossil fuel generation would impose even more air-polluting emissions and impacts on these communities, whereas customer-sited rooftop solar + storage would remove these impacts. The PEA does not specify which projects or even how many projects involve the permanent installation of generators and would require additional permitting from PREQB and additional studies, a tiered EA or stand-alone EA if emissions exceed NAAQS levels.

Furthermore, the PEA fails to specify the extent and magnitude of "utility retrofits to accommodate greater capacity" (p.25) which would not only increase short-term minor emissions but may exceed NAAQS. These issues are ripe for review now, so a subsequent tiered EA or stand-alone EA for any exceedances of NAAQS would not comply with NEPA.[35] The Puerto Rico Climate Change Mitigation Adaptation and Resilience Act mandates 20% renewable generation by 2022. This requires that all new industrial equipment not merely meet current efficiency standards but rather that the equipment eliminate or decrease emissions.

The PEA fails to acknowledge that noise from realignment or relocation of utilities could impact communities with long-term noise effects.

The PEA notes the significant adverse impacts to water resources from the four thermoelectric power plants that use large amounts of saline (seawater) for cooling, "The instream

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[32] See Attachment 2, Dr. David Sotomayor's *Informe sobre el impacto de la construcción y operación del proyecto Montalva Solar Farm en la zona de la Reserva Agrícola del Valle de Lajas*, October 2020, Montalva Solar Project Environmental Impact Assessment Draft comments, Docket 2020-314865-REA-004636.

[33] 2017 Census by State - Puerto Rico | 2017 Census of Agriculture | USDA/NASS, https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Outlying_Areas/Puerto_Rico/prv1.pdf.

[34] See Attachment 3, October 2019 Testimony of Dan Gutman, Puerto Rico Energy Bureau Docket CEPR-AP-2018-0001.

[35] 40 C.F.R. § 93.158, 40 C.F.R. § 1501.11.

saline withdrawals totaled 2,262 Mgal/d (8,562.6 Ml/d) (Molina-Rivera 2010)" but fails to acknowledge that rebuilding the T&D system will perpetuate these impacts.

The PEA's allegation that, "relocating utilities within a new or expanded ROW would have similar impacts and mitigation measures as those described for Alternative 2" (p.31) and "may have a negligible to minor direct or indirect on impact water resources, including wetlands and waterways; but would have mitigation through Section 401 and Section 404 permitting" (p. 32) is wholly unsubstantiated. The extent of the damages including flow impediment and other adverse impacts to stream and floodplain hydraulics and function cannot be characterized as "moderate". Relocation of utilities in El Yunque National Forest or a Wild and Scenic River and other sensitive ecologic areas require the preparation of an EIS. The sheer magnitude of potential relocation work mandates an EIS.

The PEA erroneously assumes that the implementation of subsequent hydrologic analyses and mitigation measures can avoid the need to discuss significant environmental impacts. The PEA fails to first determine, as a threshold matter whether the projects would have significant impacts. FEMA must specify the number, location, magnitude and extent of projects that will impact wetlands, streams, and other Waters of the United States ("WOTUS"). As these water impacts are ripe for review now, subsequent tiered review would not comply with NEPA standards.[36] The PEA acknowledges that, "certain sites could result in some fill placed within the wetland boundaries during construction" and proposes that, "Where individual projects may impact wetlands, streams, or WOTUS, FEMA would consider further tiered review". (p.34). It is not difficult to envision a scenario where various "individual projects" in the same area could cause significant adverse impacts.

The PEA erroneously and repeatedly alleges that the, "process of relocating utilities within a new or expanded ROW would have the same impacts and mitigation measures as those described for Alternative 2". (p.34). Similarly, the allegation that expanding a ROW including embankment and in-water work that may impact wetlands will have "minor short-term direct or indirect impacts on wetlands" (p.34). lacks credibility and is not remedied by subsequent Section 401 and Section 404 permitting because there would be no previous determination of whether the impacts are significant, can't be mitigated and should be avoided altogether.

The PEA acknowledges that, "some utilities are location-dependent and potentially located within a floodplain, the scope of work of this alternative may have impacts to floodplains. Construction of utilities may result in alteration of the course or magnitude of floodwater." (p.35). Yet nowhere in the PEA is there even an attempt to identify the proposed areas where the utilities would be sited and to determine whether the work proposed would have significant adverse environmental impacts or a discussion of alternatives.

[36] 40 C.F.R. § 1501.11.

The PEA asserts that in cases where the proposed changes to utility infrastructure will impact the floodplain/floodway, "FEMA will apply the 8-Step Process to assess potential impacts and practicable alternatives" and that, "Projects may require a hydrology and hydraulics report to evaluate changes to stream hydraulics in detail and compliance with local ordinance." (p.35). The PEA contains totally unsubstantiated allegations that utility work and changes within floodplains would have "minor impact". If the impacts are significant, an EIS is required.

The PEA fails to substantiate the conclusion that sites that result in additional impervious surfaces with indirect long-term impacts, would only have "minor impacts on floodplains and floodways". (p.36). FEMA should list, describe and map projects in the V-zone or projects that have the potential to increase flood elevations in an EIS, not "on a case-by-case basis to determine whether this PEA applies".

Rooftop solar + storage avoids impacts to floodplains that would be exacerbated by rebuilding utilities with increased footprints resulting in additional impervious area or trenching for placement of underground utilities, potentially impacting nearby floodplains on a long-term or permanent basis. The evaluation of each project using the FIRM panels should be part of the requisite EIS.

It is imperative that FEMA list and map the proposed projects that increase flood elevations to determine the potential significant adverse impacts in each area. A case-by-case or a project by project view, as proposed in the PEA is wholly inadequate.

The PEA erroneously concludes that the proposed work will have, "short-term and long-term negligible to minor adverse impacts to the Coastal Zone Management Area ("CZMA"), associated with upgrading systems that require additional acreage beyond what these systems currently occupy" (p.39), without specifying the specific area or the amount of additional acreage in the CZMA. The October 3, 2018 Federal Consistency Resolution Certificate cannot be used to avoid a NEPA mandated analysis of significant adverse impacts. FEMA acknowledges that realignment or relocation of utilities, will have adverse long-term impacts within the CZMA but rather than determine the extent of the impacts through an EIS, the agency proposes coordination with PRDNER and PRPB at some later time and "limit impacts to the extent possible". (p.39). A determination of the extent and magnitude of the projects in the CZMA that allows for public information and participation is required.

Proposed mitigation of impacts through permit requirements and Best Management Practices ("BMPs") for vegetation clearing would not be beneficial in the case of old growth forests, ecologically sensitive areas, and other ecosystems even with implementation of an approved SWPPP. FEMA must list and map the natural areas that will be impacted and prepare an EIS to analyze significant impacts.

The PEA is ambiguous as to how vegetation impacts will be addressed stating that, "the area would either revegetate on its own or be re-vegetated in accordance with the applicable

permits and SWPPP." (p.40). While acknowledging that, "Deforestation and vegetation clearing exposes areas to invasive species. Relocation of utilities and corresponding ROWs into previously undeveloped areas may cause impacts to additional acreage of vegetation." FEMA cannot exclude public input by subsequently determining that when, "biological impacts are greater than what this PEA includes, FEMA will review those projects on a case-by-case basis to determine appropriate level of NEPA analysis." (p.40). The subsequent, case by case approach shuts out informed public participation. NEPA requires consideration of significant environmental impacts of federal agency actions prior to proceeding.

The PEA provides no basis for the allegation that utility projects in, on, or over land, streams, and reservoirs, embankments and in-water work "would likely result in adverse short-term negligible to minor impacts to the habitat during construction activities", (p.43) and fails to address significant adverse impacts to habitat, wildlife and fish.

Rather than speculate that, "at the programmatic level; the expectation is that landscaped or managed vegetation would occur within the disturbed footprint of many project areas", (p.46). FEMA should determine, list and map the sensitive biological resources in the project areas. FEMA's proposed review of projects for the potential occurrence of threatened and endangered species ("T&E") species and designated critical habitat ("DCH") in the area should be included in an EIS. Attempts to minimize impacts to T&E Species and DCH through the National Pollutant Discharge Elimination System ("NPDES") permitting program and implementation of a SWPPP might not mitigate significant adverse impacts that could have been determined in an EIS.

Allegations in the PEA that realignment or relocation of utilities and corresponding ROWs on undisturbed lands would "have an adverse negligible to minor short-term and long-term impact on the federally-listed endangered, threatened, and proposed or candidate species and their DCH" (p.47). are not credible in the absence of indication of the specific sites.

Each project's scope of work should be included in an EIS to determine potential significant adverse impacts to historic or prehistoric or paleontological archeological resources. The Allowances in the Second Amendment Programmatic Agreement with the Puerto Rico State Historic Preservation Office ("SHPO") executed on November 13, 2019 (FEMA-Puerto Rico SHPO Programmatic Agreement for Section 106 Review, May 2016, Amended April 2018) cannot be used as a subterfuge to avoid NEPA analysis of significant adverse impacts on historic or prehistoric or paleontological archeological resources**.** The PEA acknowledges that, "Destruction or alteration of any site, structure, or object of prehistoric or paleontological importance may occur during construction. (p.52). A subsequent Section106 review process and consultation with the SHPO and "appropriate consulting parties" will not comply with NEPA standards.

IV. The Programmatic Environmental Assessment fails to include adequate public participation measures, especially concerning impacts to environmental justice communities.

Effective public participation requires specific information about realignment in farmland. It is wholly inadequate if FEMA has discretion to "consult with USDA NRCS to avoid, minimize, or mitigate the impacts" (p.21) but does not discuss the potential significant adverse impacts in a public-facing document. The assertion in the PEA that relocation of a utility "would have a minor impact on geology and soils, negligible to minor impacts on prime or important farmland, and no impacts on seismicity" (p.21) is unfounded.

The PEA fails to describe the major projects to be carried out and how they would impact EJ communities. Rebuilding and hardening the existing T&D system would perpetuate South to North transmission and central station fossil fuel plants in Southern Puerto Rico thus cementing air, water and land pollution that have significant impacts on EJ communities and would continue to disproportionately and adversely affect these low income and afro descendent populations.

The PEA indicates that the public information process would include "targeted outreach to environmental justice populations through notices to community organizations." (p.79). Yet, no known environmental justice organizations were contacted or notified of the PEA or the comment period.

As noted in the PEA, Community of Concern ("COC") encompasses any Environmental Justice community that may be disproportionately impacted or overburdened by an action alternative. In Puerto Rico, air quality, commercial and industrial facilities, and land use are considered when analyzing compliance with the Executive Order on Environmental Justice. (E.O. 12,898). The PEA is contradictory, on the one hand erroneously concluding that the percentage of households below the poverty level does not vary a great deal across municipalities or towns in Puerto Rico and subsequently acknowledging variations in racial makeup, income levels, and poverty rates within Puerto Rico. While noting that, "the southeast Municipalities near Arroyo and Yabucoa generally have a higher percentage of black Hispanic population than many other Municipalities", (p.55). The PEA fails to document the high numbers of afro descendant population in Guayama, Salinas and other municipalities where the most contaminating electric power plants are located.[37] The PEA fails to consider the rooftop/onsite solar + storage alternative that could have positive, enduring multiplier effects in EJ communities, the local economy and employment rates as documented in a recent study.[38] The PEA erroneously claims that, "data does not exist to support a claim that the existing level of utility service is causing widespread losses of

[37] U.S. Census Bureau, Quickfacts for Puerto Rico; Municipality of Salinas, (last visited on Dec. 17, 2020). https://www.census.gov/quickfacts/fact/table/PR,salinasmunicipiopuertorico/PST045219.

[38] The Solar Found., Puerto Rico Solar Jobs in 2050, (2020) https://www.thesolarfoundation.org/wp-content/uploads/2020/09/PRSolarJobs.pdf.

employment and reduced access to health services." (p.55). As noted above, the lack of electric service was linked to hundreds of deaths in the aftermath of Hurricane Maria. [39]

The PEA contains an inadequate discussion of risks to public health and safety**.** The characterization of social infrastructure facilities in the PEA is limited to emergency services, schools, and hospitals and omits critical government services. The PEA erroneously equates hardening of the T&D system with resilience. Rooftop and onsite solar provides greater resilience than long distance transmission of energy, particularly South to North transmission. Hardening the existing T&D system would not necessarily make it more reliable "against future disasters". As noted in the first section of these comments, the existing T&D system is inherently vulnerable to hurricanes, storms, vegetation growth and many other hazards. Onsite or rooftop renewable energy generation would provide greater resiliency. Based on the status of Puerto Rico's utility networks, onsite/rooftop solar + storage would result in long-term benefits to the health and safety of Puerto Rico's communities. *The Programmatic Environmental Assessment fails to adequately consider resiliency concerns.* The PEA references recent earthquakes and aftershocks but fails to discuss how seismic activity could impact proposed infrastructure, including impacts to large scale utility solar projects.[40]

Relocation of utilities could have potential significant adverse long-term impacts to public health and safety, particularly the relocation of new fossil generation. The implementation of current codes and standards in proposed work does not rule out the potential for significant adverse or cumulative impacts.

V. The Programmatic Environmental Assessment fails to adequately consider the negative effects of Liquefied Natural Gas facilities.

The PEA proposes converting generation facilities from diesel to "Natural" (Methane) Gas which in its liquid state is a highly flammable material that may pose a hazard to human health and the environment. Burning LNG at multiple facilities throughout Puerto Rico would increase public health risks. Methane gas combustion also emits increased Volatile Organic Compounds (VOCs) such as formaldehyde, benzene, toluene, hexane, and styrene.[41] Renewables avoid the multiple public health and safety risks of fossil fuel combustion including those discussed in the PEA such as fuel releases that increase during disasters. Renewables avoid investments in

[39] Dreisbach, *supra* 7.

[40] See, Attachment 4, Dr. José Molinelli Freytes's report: Deficiencias en el análisis de los impactos geológicos encontrados en la Declaración de Impacto Ambiental del proyecto "Montalva Solar Farm – Guánica – Lajas (Borrador – DIA), October 2020, Montalva Solar Project Environmental Impact Assessment Draft comments, Docket 2020-314865-REA-004636.

[41] Pediatric Environmental Health Specialty Unit (PEHSU), Mount Sinai Medical School, Comments on Draft Aguirre Offshore Gasport Environmental Impact Statement, FERC Dkt. No. CP13-193, at 1-2., in Responses to Comments on the Draft Environmental Impact Statement (document pages CO-65 & CO-66) (Sept. 9, 2014), https://www.energy.gov/sites/prod/files/2015/02/f20/EIS-0511-FEIS-Volume2-Part2-2015.pdf.

secondary containment to prevent releases to the environment from aboveground and underground storage tanks.

The PEA or future EIS must also address the likely upstream and downstream impacts of LNG, including on fracking of natural gas and climate change. The most catastrophic environmental impact of all would be the prolonging of the fossil fuel era with huge LNG investments in North America and worldwide instead of directing those investments to renewable energy resources.

For both an EA or an EIS, the purposes of NEPA require the agency to "consider and disclose" the environmental effects of the actions it certifies. *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 96 (1983). So long as the agency takes a "hard look" at the environmental consequences, NEPA "does not mandate particular results." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). NEPA's "hard look" requires "discussion of the 'significance' of [an] indirect effect, see 40 C.F.R. § 1502.16(b) (2018), as well as 'the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.'" *Sierra Club*, 867 F.3d at 1374 (internal citation omitted).

Indirect effects "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[42] An environmental impact is reasonably foreseeable "if it is 'sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision.'" *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549 (8th Cir. 2003) (internal citations omitted). Implicit in this requirement to analyze foreseeable effects is a duty to engage in "reasonable forecasting." *Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1092 (D.C. Cir. 1973). However, here, FEMA failed to account for the context and intensity of the upstream and downstream emissions impacts resulting from the activities proposed in the PEA.[43]

The indirect effects inquiry is wide-ranging. Specifically, under this standard, courts have required federal agencies to consider the indirect effects of energy-related transportation projects. In Mid States, for example, because a new rail line provided a more direct route from coal mines to power plants, the court held that NEPA required the Surface Transportation Board to consider the downstream impacts of burning the coal. *Mid States*, 345 F.3d at 549 ("[I]t is reasonably foreseeable – indeed, it is almost certainly true – that the proposed project will increase the long-term demand for coal and any adverse effects that result from burning coal."); see also *Border Power Plant Working Grp. v. Dep't of Energy*, 260 F. Supp. 2d 997, 1030 (S.D. Cal. 2003) (air quality impacts of Mexican power plant that would export electricity to the United States over new transmission line were reasonably foreseeable result of constructing transmission line).

[42] 40 C.F.R. § 1508.8(b); see New York v. Nuclear Regulatory Comm'n, 681 F.3d 471, 476 (D.C. Cir. 2012).
[43] 40 C.F.R. § 1508.27.

Accordingly, "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008).

The D.C. Circuit recently ruled in *Sierra Club v. FERC*, 867 F.3d 1357, 1371-1372 (D.C. Cir. 2017), that NEPA required the Federal Energy Regulatory Commission to consider the indirect but reasonably foreseeable impacts of natural gas pipelines which included the downstream greenhouse gas emissions resulting from burning of gas transported by the pipeline in its NEPA review. Although the Commission had claimed that it lacked information regarding the amount of gas that would be burned downstream, the Court found that the agency could "make educated assumptions" about use of gas based on its knowledge of the general capacity of the pipeline. *Sierra Club* at 1374.

Applying *Sierra Club*, federal district courts in other jurisdictions reached similar results. For example, in *San Juan Citizens All. v. U.S. Bureau of Land Mgmt.*, 326 F. Supp. 3d 1227 (D.N.M. 2018), the court rejected BLM's claim that "consumption is not 'an indirect effect of oil and gas production because production is not a proximate cause of GHG emissions resulting from consumption'." *Id.* at 1242. Instead, the court ruled that BLM's "statement is circular and worded as though it is a legal conclusion…[and] it is contrary to the reasoning in several persuasive cases that have determined that combustion emissions are an indirect effect of an agency's decision to extract those natural resources." *Id.*; see also *W. Org. of Res. Councils v. U.S. Bureau of Land Mgmt.*, No. CV 16-21-GF-BMM, 2018 WL 1475470, *13 (D. Mont. Mar. 26, 2018), appeal dismissed, No. 18-35836, 2019 WL 141346 (9th Cir. Jan. 2, 2019) (finding that NEPA requires consideration of environmental consequences of the downstream combustion of the coal, oil and gas resources potentially open to development under agency plan within the NEPA document).

In *San Juan*, the court continued that "it is erroneous to fail to consider, at the earliest feasible stage, 'the environmental consequences of the downstream combustion of the coal, oil and gas resources potentially open to development' under the proposed agency action." *San Juan*, 326 F. Supp. 3d at 1244. Accordingly, the court found that BLM's action was "arbitrary" due to its failure to estimate the amount of greenhouse gas emissions which will result from consumption of the oil and gas produced as a result of the development of wells in the leased areas. *Id*.; see also *Montana Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074, 1097-99 (D. Mont. 2017), amended in part, adhered to in part sub nom. *Montana Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, No. CV 15-106-M-DWM, 2017 WL 5047901 (D. Mont. Nov. 3, 2017); *Dine Citizens Against Ruining Our Env't v. U.S. Office of Surface Mine Reclamation and Enforcement*, 82 F. Supp. 3d 1201, 1213 (D. Colo. 2015), *Dine Citzens Against Ruining our Env't v. U.S. Office of Surface Mining Reclamation & Env't*, 643 F. App'x 799 (10th Cir. 2016).

VI. The Programmatic Environmental Assessment fails to consider the cumulative effect of all potential impacts.

The projects proposed in the PEA are a prime example of how cumulative impacts can result from individual actions over a period. Taken together, various projects in a single area could add incremental cumulative impacts to past and foreseeable future actions. Although the PEA acknowledges that, "The scale of those impacts would depend on the number of projects implemented, the size of the projects, and locality and proximity of the projects" (p.73), no attempt is made to list, describe and pinpoint projects that may overburden specific areas. The cumulative impacts in this case stem from the presumed number of projects proposed such as the large number of transmission and distribution towers, poles and lines and new fossil generation. Although section 5.18.1 of the PEA references the 2,478 miles of transmission lines that required survey and repair and that 25 percent of all the structures were damaged and temporarily rebuilt, the PEA does not specify how many miles of T&D infrastructure would be hardened, undergrounded or otherwise worked on.

Similarly, the PEA states that the USACE installed over 2,300 electric emergency generators in Puerto Rico as part of the recovery efforts (GAO 2018) but does not speak to the siting, capacity or any other detail of the proposed new generation. The environmental analysis in this case should include the joint projects generally referenced in the PEA. The PEA references the magnitude of impacts "described in this PEA" but contains no such description. No basis is provided for the allegation that the Action Alternatives in the PEA "would not result in major cumulative impacts". FEMA funding will enable relocation and numerous actions that involve infrastructure. Impacts can vary widely even for projects that are similar in function, size, and locality to existing systems. For example, emissions, noise, water requirements, fuel storage and processing vary significantly by type of generation.

The cumulative impacts of temporary repairs vary substantially from more permanent arrangements such as undergrounding. Contrary to the allegations in the PEA that, "the initial installation and temporary restoration of the projects on the human environment have already occurred prior to and after Hurricane Maria." (p.74) undergrounding would cause significant adverse impacts to land and potentially water resources. Although the extended timeframe (which is not specified in the PEA) may allow for staggering the projects, cumulative impacts can stem from past, present and foreseeable future work. The PEA acknowledges that multiple simultaneous utility projects within the same watershed will have a cumulative impact to vegetation, water quality, and soil could but for some unspecified reason, FEMA erroneously assumes "that cumulative impacts from the utility projects covered under this PEA would be short-term and less than major." (p.75). In sum, the PEA fails to consider the cumulative impacts of the infrastructure projects.

CONCLUSION

The extensive infrastructure work proposed in the PEA will undoubtedly entail significant adverse environmental impacts. The PEA does not comply with NEPA and the rulemaking process under the APA. The magnitude of the projects and the significant impacts that the FEMA funding

would facilitate, along with the lack of specificity in the PEA regarding the projects that would be developed, impedes an adequate and objective analysis of impacts and alternatives. A programmatic environmental impact statement that discusses alternatives such as onsite, rooftop solar coupled with battery energy storage systems instead of rebuilding the existing electric transmission and distribution system is required.

We therefore respectfully request that FEMA not approve the PEA or issue a FONSI, but rather, draft a full Environmental Impact Statement to correct the inadequacies and legal errors in the environmental analysis for the extensive projects proposed and reconsider its conclusions on the basis of the corrected information.

Please feel free to contact us with any questions.

Sincerely,

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COMMONWEALTH OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE: **REVIEW OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN**	NO. CEPR-AP-2018-0001 SUBJECT: THIRD DISCOVERY REQUESTS

THE PUERTO RICO ELECTRIC POWER AUTHORITY RESPONSES TO THE THIRD DISCOVERY REQUEST TO PUERTO RICO ELECTRIC POWER AUTHORITY FROM LOCAL ENVIRONMENTAL ORGANIZATIONS

TO THE LOCAL ENVIRONMENTAL ORGANIZATIONS:

COMES NOW the Puerto Rico Electric Power Authority and hereby submits responses to the *Third Discovery Request to Puerto Rico Electric Power Authority from Local Environmental Organizations*, dated September 20, 2019. The responses are submitted pursuant to the provisions of Article VIII of Regulation No. 8543, *Regulation on Adjudicative, Notice of Noncompliance, Rate Review and Investigation Proceedings* and also pursuant to the discovery proceedings established in the *Resolution and Order* entered on July 3, 2019.

In San Juan, Puerto Rico, this 25th day of October 2019.

/s Katiuska Bolaños
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COMMONWEALTH OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE: REVIEW OF THE PUERTO RICO ELECTRIC POWER AUTHORITY INTEGRATED RESOURCE PLAN	NO. CEPR-AP-2018-0001 **SUBJECT:** THIRD DISCOVERY REQUESTS

PREPA'S RESPONSES TO LOCAL ENVIRONMENTAL ORGANIZATION'S THIRD SET OF REQUIREMENTS OF INFORMATION

TO: LOCAL ENVIRONMENTAL ORGANIZATIONS
Through:
pedrosaade5@gmail.com
rmurthy@earthjustice.org

FROM: PUERTO RICO ELECTRIC POWER AUTHORITY
Through its Counsel of record

PREPA objects to any Requirement of Information ("ROI") that calls for information or documents that are not in the possession, custody, or control of PREPA.

For ease of reference, the questions and requirements as set forth in the Request are herein transcribed and shown in bold previous to each answer.

Request 1

Our Discovery Request 1.03 requested *"a copy of the USB drive containing PREPA's work papers delivered to the Energy Bureau on June 6, 2019."* On August 8, 2019, PREPA shared a link for a SharePoint site including numerous files, including some workpapers. On August 15th, PREPA provided a response to our Discovery Request 1.03, stating that a SharePoint site would be created. PREPA's response created the implication there might have been additional workpapers, not on the first SharePoint site, responsive to our request. We therefore amend our Discovery Request 1.03 to ask whether PREPA has any additional workpapers, not on the SharePoint site, responsive to 1.03.

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 1 PREPA confirms that all public documents and workpapers are uploaded to the SharePoint site accessible to the intervenors.

Request 2 **PREPA's responses to Local Environmental Organizations' Second Discovery Request were due on September 18th at 3pm, under the Energy Bureau's September 17th Resolution and Order. As of this date, we still have not received those responses, and request them again through this discovery request.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 2 On September 23, 2019 the Puerto Rico Energy Bureau granted an extension of the due date of Local Environmental Organization's Second Discovery Request due date to October 4, 2019, and PREPA submitted its responses by the new due date.

Request 3 **What are the power generation costs reductions from burning methane (natural) gas at the San Juan 5&6 units?**

a) Indicate the assumptions, calculations and reasoning that leads PREPA to conclude that the conversion to gas will result in $150 million in fuel savings (PREPA Resolution 4620, p.2).

b) Will these alleged savings benefit and result in rate reductions to PREPA ratepayers?

c) What is the impact of the Jones/Merchant Marine Act on the projected savings?

d) Provide documents on how the fuel savings were calculated and efforts to obtain a waiver of the Jones/Merchant Marine Act for methane gas and/or "energy commodities".

The following responses were provided by Nathan Pollak Director, Filsinger Energy Partners, and James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Pollak and Mr. Bowe each certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 3 a) The conversion of San Juan Units 5 and 6 to consume natural gas (with diesel fuel to remain available as a backup) will result in fuel cost savings which PREPA has estimated could amount on average to as much as $150 million per year over the five year primary term of the Fuel Sale and Purchase Agreement, dated as of March 5, 2019, between NFEnergía LLC and PREPA (the "FSPA"). Actual savings will vary from this estimate, perhaps significantly, depending on the costs of diesel fuel and of natural gas delivered to the San Juan units, as well as the actual utilization of San Juan Units 5 and 6 over that period.

PREPA has performed a variety of analyses of the potential savings associated with the FSPA. One, completed in early 2019 before the FSPA was approved by the Energy Bureau and the Puerto Rico Financial Oversight and Management Board ("FOMB"), concluded that savings in fuel costs could amount to $750 million over the FSPA's five year primary term. A more fully developed fuel cost savings analysis, which utilizes conservative assumptions relating to future pricing of diesel fuel and natural gas, was subsequently prepared in response to a request from the FOMB; it is summarized in the Excel spreadsheet attached as Exhibit LEO-PREPA_ROI_3_03.xlsx. This analysis, which was performed in January 2019, indicates that under conservative assumptions regarding fuel prices and unit utilization, PREPA can expect to realize fuel cost savings over the five year primary term of the FSPA of approximately $534 million, when comparing the FSPA pricing of delivered natural gas to the forward market price of diesel assuming operation of San Juan 5&6 at comparable dispatch levels. Note that the savings estimated in the Exhibit are based on natural gas and petroleum futures prices as of January 2019; a comparison using futures prices available currently could yield somewhat different results.

Request 3 b) Fuel cost savings will directly benefit PREPA ratepayers by a reduction in the fuel cost component reflected in consumer bills for electric service.

Request 3 c): The savings projected from the displacement of diesel by natural gas supplied under the FSPA assume compliance with the requirements of the Jones Act. That is, the projected savings do not depend on a waiver of the Jones Act provisions that preclude deliveries of LNG lifted from U.S. sources other than through vessels that are U.S. built, U.S. flagged, U.S. owned and U.S. crewed. The Fuel Price specified under the FSPA will not vary with the source of LNG delivered to San Juan Harbor.Request 3(d):

Request 3 d) See responses to items a. and c. above.

In December 2018, PREPA, together with the Governor, Secretary of State and the President of the Economic Development Bank of Puerto Rico, sought from the U.S. Department of Homeland Security and the U.S. Department of Defense a temporary

waiver of the Jones Act that would permit the transportation of LNG on non-coastwise qualified vessels from U.S. domestic sources to points in Puerto Rico for use in the generation of electric energy. On August 30, 2019, the Acting Secretary of the Department of Homeland Security informed the Governor of Puerto Rico that he had determined that "any potential grant of Puerto Rico's request for a waiver of the Jones Act is premature" and that "a waiver of the Jones Act is not warranted at this time." PREPA expects to confer with the Governor and other Puerto Rico officials and stakeholders to determine how best to pursue relief from the provisions of the Jones Act that preclude transportation of U.S.-sourced LNG to Puerto Rico.

Request 4 **What is the estimated total cost of the project for (a) conversion of San Juan units 5 & 6, (b) revaporization, (c) storage facilities, (d) pipeline infrastructure, (e) fuel costs, (f) other costs? What are the associated costs for PREPA modification and/or conversion of the San Juan 5&6 units, regasification, pipelines and any other local service facilities to enable gas combustion?**

The following responses were provided by Jaime A. Umpierre Montalvo, P.E., Head of Engineering and Technical Services Division, Project Management Office, Executive Directorate, Puerto Rico Electric Power Authority, and James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Umpierre Montalvo and Mr. Bowe each certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 4 The conversion of San Juan Units 5 & 6 permitting the use of natural gas is not a PREPA CAPEX project. The conversion works are being performed in accordance with the provisions of the Fuel Sale and Purchase Agreement, dated as of March 5, 2019, between NFEnergía LLC and PREPA (the "FSPA"). Under the terms of the FSPA, NFEnergía LLC is responsible for siting, permitting, procuring, constructing and operating the LNG receiving, storage, and vaporization facilities that will support the delivery of natural gas to San Juan Units 5 & 6, and for contracting for the conversion of those Units so that they can fire natural gas as well as diesel fuel. All costs associated with these activities are borne by NFEnergía and are to be recovered through the charges for natural gas and the Manufacturing Surcharge (approximately $833,333 per month, which amounts to $50 million in total over the contract term) payable under the FSPA. Other than the amount of the Manufacturing Surcharge, PREPA does not possess information as to the specific project costs sought in this ROI, since they are the responsibility of NFEnergía. The estimated aggregate amount of fuel expenditures during

the term of the FSPA (5 years) is expected to be approximately $1.5 billion, depending on market prices of natural gas over the period.

Request 5 **What is the payment structure and terms of the San Juan units 5&6 conversion project, explain the details of the proposed capacity payments (RFP pg. 9, sec. IV).**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 5 The Fuel Sale and Purchase Agreement between the Puerto Rico Electric Power Authority and NFEnergía LLC (the "FSPA") provides for the conversion of San Juan Units 5 & 6 so that they may use natural gas as their primary fuel and for the supply of natural gas delivered to the converted units for a primary term of five years, with options to extend the term by three additional periods of five years. The FSPA is the culmination of a competitive request for proposal ("RFP") process in which PREPA sought proposals for the design, engineering, construction, supply, installation, commissioning and testing works required to make San Juan Units 5 and 6 capable of utilizing natural gas for power generation, and the supply natural gas to the converted units. This RFP was conducted in accordance with Section 205(2)(f) of Act No. 83, and included a form of fuel supply agreement in the RFP documentation.

The FSPA provides for payment each month of a Fuel Price multiplied by the Monthly Nominated Quantity, as well as the Manufacturing Surcharge, applicable taxes, and other charges owed, less the proceeds of any Mitigation Sale or other sale of any excess nomination of gas, less any Carryover Credit. The payment mechanics are discussed in Article XIII and illustrated in Exhibit E of the FSPA, which has been submitted in this proceeding and is publicly available.

NFE has agreed to fund the cost of the new infrastructure at SJ 5&6 in return for PREPA's commitment to pay a Manufacturing Surcharge of approximately $833,333 per month for the five-year initial term of the FSPA. The "capacity payments" to which the question refers are not really capacity payments as such. Rather, they are monthly payments which are intended to permit NFE to recover a portion of the new fuel supply infrastructure and conversion works NFE is funding under the terms of the FSPA. PREPA has negotiated a provision in the FSPA that gives it the right, should funds become available, to pay NFE a lump-sum in lieu of the monthly Manufacturing Surcharge payment. The lump-sum payment is based on the present value of the $50 million in payments, which is approximately $43 million at day-one using a six percent discount rate.

Please note that the FSPA contains not take-or-pay provisions that would require PREPA to pay for gas it does not require, and therefore the total amount that could be expended under the agreement during its primary term could be less than the projected $1.5 billion.

Note as well that the FSPA includes highly flexible Gas nomination procedures that will enable PREPA to match its requirements with available supplies.

Request 6 **Can LNG carriers capable of supplying gas to the San Juan San Juan 5&6 units safely maneuver in the San Juan Harbor Army Terminal?**

a) Please provide a detailed description of any width limitations that may prevent carriers from delivering bulk LNG.

b) Please provide a detailed description of any depth limitations that prevent them from delivering bulk LNG.

The following responses were provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: LNG carriers delivering LNG to the floating storage unit to be docked at Wharves A and B immediately adjacent to the San Juan steam generating plant will proceed through San Juan Harbor to a point seaward of and alongside the floating storage unit docked at Wharves A and B, which lie to the east of and are separate from the Army Terminal. The U.S. Coast Guard has determined that LNG carriers can safely transit this route and deliver LNG to the floating storage unit. Letter of Recommendation issued Sept. 26, 2018 by Captain of the Port, USCG Sector San Juan (attached as Exhibit LEO-PREPA ROI_3_6.pdf).

Request 6 a): PREPA has no information regarding width limitations that could prevent carriers from delivering bulk LNG to the NFE floating storage unit. PREPA notes that under the terms of the FSPA responsibility for delivering natural gas to San Juan Units 5&6 is assumed by NFE, and accordingly it is NFE's responsibility to ensure that the vessels it employs to transport LNG through San Juan Harbor can do so in compliance with harbor constraints and any requirements imposed by the U.S. Coast Guard.

Request 6 b): b. See preceding response.

Request 7 **What is the status of the US Army Corps of Engineers (USACE) San Juan Harbor improvement to widen and deepen the navigation channels in San Juan Harbor?**

deepen the navigation channels in San Juan Harbor?

The following response was provided by Jaime A. Umpierre Montalvo, P.E., Head of Engineering and Technical Services Division, Project Management Office, Executive Directorate, Puerto Rico Electric Power Authority. Mr. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 7 USACE informed PREPA that it is currently in the Preconstruction, Engineering and Design Phase. Award of a construction contract to widen and deepen the harbor is currently scheduled for Spring 2021 but this date is subject to the availability of construction funds.

Request 8 **Can bulk shipments of LNG sufficient to supply the proposed operation of the San Juan 5&6 units be brought into San Juan Harbor prior to the USACE project?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 8 See the response to Request 6 above.

Request 9 **What does the San Juan Harbor Pilot's Association indicate about the minimum channel width required for LNG carriers?**

The following response was provided by Jaime A. Umpierre Montalvo, P.E., Head of Engineering and Technical Services Division, Project Management Office, Executive Directorate, Puerto Rico Electric Power Authority. Mr. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 9 USACE informed PREPA that the project includes a 50-foot widener to both sides of Army Terminal Channel to increase the total width by 100 feet from 350 feet to 450 feet to accommodate larger vessels.

Request 10 **Did Ship simulation confirm the need for construction of east and west flares for the Army Terminal Turning Basin**

to improve turning maneuverability for LR2 Tankers and LNG Vessels?

The following response was provided by Jaime A. Umpierre Montalvo, P.E., Head of Engineering and Technical Services Division, Project Management Office, Executive Directorate, Puerto Rico Electric Power Authority. Mr. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 10: USACE informed PREPA that the project does include eastern and western flares at the southern terminus of the Army Terminal Turning Basin to accommodate larger vessels.

Request 11 **Do vessel operating costs of LNG vessels exceed those of petroleum tankers?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 11 PREPA has not performed any analysis of the operating costs of LNG vessels as compared with the operating costs of petroleum tankers. PREPA notes that such comparisons would be difficult to perform, given the wide range of capacities of LNG vessels and petroleum tankers, the various types of vessels that could be considered “petroleum tankers,” and the variability of operating costs depending on the markets and routes served.

Request 12 **Are safety zone requirements for LNG carriers 300 feet in transit and 150 feet at dock?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 12 Safety zones relative to LNG carriers are established by the U.S. Coast Guard on a case-by-case basis. The Coast Guard has not yet established safety zones that would apply other than on a temporary basis to LNG carriers transiting San Juan Harbor and at dock within San Juan Harbor. PREPA understands that the Coast Guard is considering proposed adjustments to the current safety zone established under

33 C.F.R. § 165.754, "Safety Zone: San Juan Harbor, San Juan, PR". The Coast Guard has received comments on this subject in Docket No. USCG-2019-0460.

In a Federal Register notice issued on September 13, 2019, the Coast Guard announced that it would establish, on a temporary basis, a safety zone for LNG carriers expected to arrive in San Juan Harbor during the period from 12:01 a.m. on August 25, 2019 until 11:59 p.m. on November 15, 2019 that is defined as "all navigable waters one half mile around each Liquefied Gas carrier entering and departing San Juan Harbor and a 50-yard radius around each vessel when moored." Safety Zone; San Juan Harbor, San Juan, PR (notice of temporary final rule), 84 Fed. Reg. 48278, 48279 (Sept. 13, 2019) (attached as Exhibit LEO-PREPA ROI_03_12.pdf).

Request 13 **Is FERC approval being sought for the import of bulk LNG to supply the San Juan plant?**

a) Has there been any application, consultation or request to FERC for LNG shipment to San Juan Harbor?

b) Has FERC responded to any such application, consultation or request?

c) Please provide copies of all documents related to LNG shipments to San Juan Harbor including but not limited to FERC and other government agency files.

The following responses were provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 13 a) No application for FERC authorization for LNG shipment to San Juan Harbor has been filed. PREPA understands that no FERC authorization is required for the siting and operation of the NFEnergía micro fuel handling facility (the "NFE Facility") as it is currently planned and will be configured.

Responsibility for securing all permits required for the construction and operation of the NFE Facility is NFE's under the terms of the Fuel Sale and Purchase Agreement, dated as of March 5, 2019, between NFEnergía and PREPA. PREPA understands that representatives of NFE's affiliate, New Fortress Energy, met with representatives of FERC staff during the fourth quarter of 2017 to discuss the jurisdictional status of what would eventually be proposed as the NFE Facility and the planned provision of natural gas through that facility to San Juan Units 5&6. We have been told that FERC staff representatives concurred with NFE's conclusion that the proposed NFE Facility would not qualify as an "LNG terminal" as that term is defined in the Natural Gas Act and

therefore would not be subject to FERC's LNG facility siting jurisdiction under Section 3 of that Act. PREPA is aware that NFE elected not to seek a declaratory order from FERC confirming this conclusion. PREPA understands that, on the basis of its jurisdictional analysis and its discussion with FERC Staff, NFE saw no need to seek FERC authorization for the siting and construction of the NFE Facility.

In September 2018 PREPA representatives and PREPA's counsel met with FERC staff representatives to discuss issues relating to the potential expansion of the role of liquefied natural gas in the generation of electric power in Puerto Rico. Those discussions covered the possibility of siting a number of LNG facilities at various locations around the island. In the course of those discussions, FERC staff representatives confirmed that they were comfortable with the conclusion that the NFE Facility, as it had been described to FERC staff, would not be subject to FERC's LNG facility siting jurisdiction light of jurisdictional determinations FERC had reached in other proceedings, given the absence of a natural gas transmission pipeline that would take natural gas away from the NFE Facility and the site of San Juan Units 5&6.

Request 13 b) FERC staff has provided the informal guidance described in item a. above.

Request 13 c) Copies of U.S. Coast Guard correspondence and Federal Register notices relevant to the subject of this ROI are attached as Exhibits LEO-PREPA ROI_03_6.pdf and LEO-PREPA ROI_03_12.pdf.

Request 14 **When is operation of the PREPA plants burning methane gas expected to start?**

The following response was provided by Jaime A. Umpierre Montalvo, Head of Engineering and Technical Services Division, PREPA. Jaime A. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 14 San Juan Unit 5 is expected to commence operation on natural gas during the first week of December 2019. San Juan Unit 6 is expected to commence operation on natural gas at the end of January 2020.

Request 15 **What is PREPA's projected annual LNG demand for the San Juan 5&6 units, how was this calculated?**

The following response was provided by Jaime A. Umpierre Montalvo, Head of Engineering and Technical Services Division, PREPA, and Matt Lee, Managing Consultant, Filsinger Energy Partners. Jaime A. Umpierre Montalvo and Matt Lee certify

that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 15 The projected annual demand for natural gas is 25 MMBtu, based on a Capacity Factor of 85% and design fuel consumption of the units (79.6 kpph) at maximum load.

In the ESM Plan, Siemens has modeled the utilization of San Juan Units 5 & 6 (SJ5&6) based on the generation and fuel mix of the existing and proposed fleet. The Long Term Capacity Expansion (LTCE) model incorporates a declining load forecast that assumes population out-migration, increased distributed generation resources, and significant energy efficiency gains. Based on the fixed and variable costs of all potential resources, the LTCE model solved for the right mix of resources to serve the declining load forecast, resulting in the estimated utilization for SJ5&6. The LTCE's modeled results for SJ5&6 indicated an average Capacity Factor of 45% over the next five years (2020-2024), reflecting an average fuel consumption of approximately 12 TBtu per year. This utilization reflects large-scale integration of new generation resources including nearly 1,800 MWs of new PV solar projects and 920 MW of new Battery Energy Storage Systems (BESS).

San Juan Units 5&6 are two of PREPA's most efficient units, with good environmental characteristics. The technology is capable of using cleaner burning, low sulfur fuels like natural gas, and fleet wide statistics indicate the potential for high utilization. Therefore, when PREPA contracted for the supply of natural gas to the units, the contract established a cap of 25 TBtu per year. 25 TBtu per year corresponds to a capacity factor of approximately 85%, and will allow PREPA to provide low sulfur natural gas to SJ5&6 at a level higher than indicated by the LTCE model should circumstances warrant.

Request 16 **Provide a detailed description of the plan for LNG supply to the San Juan 5&6 units.**

a) Who will purchase the LNG, unload, receive, store, gasify, and transfer natural gas to PREPA?

b) Please provide documents that describe the project.

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 16 a) Under the terms of the FSPA, NFEnergía will purchase LNG, unload it, receive it, store it, gasify it, and transfer the revaporized natural gas to PREPA.

Request 16 b) The project defined by the FSPA is described in that agreement, which is a matter of public record. It is further described in the Resolution and Order of the Puerto

Rico Energy Bureau issued in Case No. CEPR-AI-2018-0001 issued on January 25, 2019, and the Resolution and Order and PREPA submissions cited therein.

Request 17 **Please provide a detailed description of the source of LNG for supply to the San Juan 5&6 units**

a) Will the LNG come from the United States?

b) Will the LNG come from Trinidad (585 nautical miles)?

c) Will the LNG come from Nigeria to San Juan (4,435) nautical miles?

d) What are the transportation costs associated with these different sources?

e) Please provide all supporting documentation on the transport of gas to San Juan harbor.

The following responses were provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 17 a) No. Absent a waiver of the Jones Act and given the unavailability of coastwise-qualified LNG carriers, no LNG sourced in the continental United States may be transported to Puerto Rico.

Request 17 b) It is possible that LNG delivered to San Juan Harbor could originate in Trinidad and Tobago. Sourcing of LNG to supply San Juan Units 5&6 under the terms of the FSPA is the responsibility of NFEnergía.

Request 17 c) It is possible that LNG delivered to San Juan Harbor could originate in Nigeria. Sourcing of LNG to supply San Juan Units 5&6 under the terms of the FSPA is the responsibility of NFEnergía.

Request 17 d) Given that the sourcing of LNG to supply San Juan Units 5&6 under the terms of the FSPA is the responsibility of NFEnergía, PREPA has no specific knowledge

of the transportation costs associated with the potential sources of LNG identified in items a. through c. above.

Request 17 e) PREPA has no such documentation, since the sourcing of LNG to supply San Juan Units 5&6 under the terms of the FSPA is the responsibility of NFEnergía.

Request 18 **Is there a limit on the frequency of smaller LNG vessels to San Juan Harbor?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 18 PREPA is not aware of any limit on the frequency with which LNG vessels may transit San Juan Harbor.

Request 19 **What is the status of the proposed conversion of San Juan 5 & 6 units and the micro fuel handling facility? Please provide all supporting documentation, such as status reports.**

The following response was provided by Jaime A. Umpierre Montalvo, Head of Engineering and Technical Services Division, PREPA. Jaime A. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 19 PREPA understands that natural gas will be available through the NFE micro fuel handling facility by the end of November 2019. See weekly update report attached as Exhibit LEO-PREPA ROI_3_19.pdf.

Request 20 **Describe the proposed fuel delivery method for the conversion of the San Juan units 5 & 6 project. Please provide all supporting documentation.**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 20 Under the terms of the Fuel Sale and Purchase Agreement, dated as of March 5, 2019, between NFEnergía LLC and PREPA (the “FSPA”), NFEnergía will deliver liquified natural gas by means of a small LNG carrier that will transit San Juan Harbor to a floating storage unit to be docked at Wharves A and B immediately adjacent to the San Juan steam generating station. LNG will be transferred to that floating

storage unit and will subsequently be delivered to an onshore vaporization facility where the LNG will be revaporized and delivered as natural gas via a plant pipeline and manifold to San Juan Units 5&6, where it will be consumed as fuel. The general layout of the fuel delivery system extending from the floating storage unit to San Juan Units 5&6 is depicted in Annexes B and C to the FSPA.

Request 21 **Why does the conversion of San Juan 5 & 6 units project include both fuel supply and capital improvements in one RFP/contract?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 21 The price PREPA will pay under the Fuel Sale and Purchase Agreement, dated as of March 5, 2019, between NFEnergía LLC and PREPA (the "FSPA")will compensate NFEnergía for both the delivery of natural gas to SJ 5 & 6 and the cost of, and presumably a return on, the capital NFEnergía will commit up front to the conversion of the SJ 5&6 turbines so that they can be fired primarily by natural gas (an amount fixed by the terms of the FSPA to a total of $50 million, to be paid at the rate of $10 million per year for the initial five year term). The principal advantage of this arrangement from PREPA's perspective is that it requires PREPA to make no up-front capital investments at a time when PREPA is in no position to make such investments. That is, the FSPA structure it permits PREPA to pay for the cost of investments it is currently incapable of making over time. Another advantage of the arrangement is that it shifts essentially all risk associated with completion of the conversion and related fuel supply system construction to a third party which is experienced in completing LNG-to-gas delivery projects under circumstances comparable to those the SJ 5&6 conversion project presents. PREPA has concluded that an integrated "turn-key" solution that makes the fuel supplier solely responsible for delivering the turbine conversion project, coupled with a flexible gas supply arrangement, is essential to the SJ 5&6 conversion project's success.

Under the FSPA, NFEnergía has agreed to guarantee cost, schedule, and performance with significant financial penalties in place for failing to deliver at the agreed cost and on time. NFEnergía is highly incentivized to deliver the SJ 5&6 conversion project and the required natural gas fuel supply system on time and on budget, because NFEnergía benefits if the plant is operational and performing as soon as possible, and is penalized if it is not. Therefore, the interests of NFEnergía as both conversion contractor and fuel supplier, and of PREPA as SJ 5&6 owner and fuel consumer, are well aligned. Moreover, the integrated conversion plus fuel supply solution under the FSPA affords PREPA protection from a failure to deliver natural gas through provisions which require NFEnergía to pay to PREPA the difference between the cost of delivered natural gas and diesel. It would be difficult, if not impossible, to obtain such protection without being able

to call upon a single entity to deliver both the conversion works and gas supply. A major disadvantage of decoupling the conversion undertaking from the gas supply elements of the FSPA or any similar integrated solution would be that PREPA would not have the protections against delay or failure to deliver (of either the completed conversion project or delivered natural gas) which the FSPA affords it.

A “gas to power” project requires deep integration of the gas supplier and infrastructure provider to ensure that the fuel supply delivery system functions as expected from a safety, operational, and commercial perspective. Without a single point of responsibility, projects often experience significant delays and cost overruns, and some eventually fail and are abandoned. Where generating facility construction or conversion are separated from the fuel supply element in a gas-to-power project, there is created a “project on project” risk that often renders such projects unfinanceable and thus unachievable. The integrated nature of the FSPA, with the conversion works and the supply of delivered natural gas for the initial five year term being under the control and the responsibility of a single entity, offers PREPA the fundamental advantages of minimizing project delivery risk, shifting from PREPA the burden of financing a capital project up front, and a delivered natural gas price that is very substantially lower than the cost of continuing to consume diesel and lower than the delivered price that could be achieved if the SJ 5&6 conversion undertaking were decoupled from the delivered gas supply arrangement.

Request 22 **Has Mitsubishi confirmed that the units can be converted to burn gas or any other fuel (RFP, pg. 8, sec. 2.0)?**

The following response was provided by Jaime A. Umpierre Montalvo, Head of Engineering and Technical Services Division, PREPA. Jaime A. Umpierre Montalvo certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 22 The model 501F combustion turbines installed at the San Juan Power Station (San Juan Units 5&6) are designed to burn natural gas and are able to burn other types of fuel, such as diesel and propane. Mitsubishi has confirmed that the units can be converted to burn gas, propane and diesel. Works to complete the conversion of San Juan Units 5 & 6 to consume natural gas as well as diesel are underway. Mitsubishi is the contractor responsible for the completion of these conversion works, and is providing emissions and heat rate performance guarantees for unit operation on natural gas.

PREPA purchased the generating facilities incorporated in San Juan Units 5&6 configured to burn only diesel because there was no natural gas available in the San Juan Harbor area at the time the facilities were purchased. PREPA considered use of propane as an alternate fuel potentially suitable for use in San Juan Units 5&6 in 2011. After receiving preliminary hazard evaluations from insurance agencies, PREPA determined not to convert those units to consume propane because the San Juan Power Plant was

not designed and constructed for the use of propane in large volumes and as a result the conversion would entail high risks and would not be cost effective.

Request 23 **What is the status of permitting for the San Juan units 5&6 conversion project and the micro fuel handling facility? List all the federal and Puerto Rico permits required and the status of the permit applications, including application numbers and other identifying information. Provide copies of the permitting files.**

The following response was provided by Jaime A. Umpierre Montalvo, Head of Engineering and Technical Services Division, PREPA, and Matt Lee, Managing Consultant, Filsinger Energy Partners. Jaime A. Umpierre Montalvo and Matt Lee certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 23 The FSPA between NFEnergía and PREPA provides for the delivery of fuel (natural gas) at the San Juan Power Plant boundary. PREPA is not responsible for the design, permitting, construction, or operation of the Micro Fuel Handling (MFH) facility. Therefore, PREPA is unable to provide a list or copies of permits related to the MFH facility. It is PREPA's understanding that NFEnergía has or will soon secure requisite permits for the MFH facility and that the permitting was coordinated through the Puerto Rico Office of Permit Management (OGPe). PREPA understands that NFEnergía has obtained the following permits and authorizations:

1. USCG Letter of Recommendation, 16610, P405-18, September 26, 2018 (Exhibit LEO-PREPA ROI_3_06.pdf)

2. USCG, Department of Homeland Security, Temporary Final Rule (33 C.F.R. Part 165), Docket No. USCG-2019-0686, RIN 1625-AA00 (Exhibit LEO-PREPA ROI_03_12.pdf)

3. Certificación Proyectos Estratégicos, Junta de Planificación Oficina del Gobernador, No. PE-2018-78-002, 4 de mayo de 2018 (Exhibit LEO-PREPA ROI_3_23 Attach 1.pdf)

4. Permiso General Consolidado (PGN) 2018-23860-PGC-003797 (Exhibit LEO-PREPA ROI_3_23 Attach 2.pdf)

5. Environmental Quality Board Construction Permit (Air Permit) PFE-LC-65-0219-0108-II-C (Exhibit LEO-PREPA ROI_3_23 Attach 3.pdf)

6. Authorization of PREPA to present project to OGPE, Autorización y Titularidad 391476 9 de febrero de 2018 (Exhibit LEO-PREPA ROI_3_23 Attach 4.pdf)

PREPA is responsible for the permitting of San Juan Units 5 & 6 (SJ5&6) to allow for the dual-fuel conversion of the units, and PREPA has received the permits necessary to begin the conversion. The key permit for conversion and operation of SJ5&6 is contained in permit number PFE-65-0499-0365-I-II-C, which was issued by the Puerto Rico Department of Natural and Environmental Resources on October 3, 2019. PREPA has also obtained a determination that the proposed SJ5&6 conversion project will not result in significant impacts on the environment. See Ley 141, Evaluación Ambiental, No. 141-19-0193 (attached as Exhibit LEO-PREPA ROI_3_23 Attach 5.pdf).

The conversion of SJ5&6 is not subject to Federal Prevention of Significant Deterioration (PSD) regulations, as the conversion will not result in a "significant increase" in emissions. The United States Environmental Protection Agency (USEPA) has reviewed the PSD Non-Applicability Analysis for SJ5&6, and a copy of USEPA's response is attached for convenience (Exhibit LEO-PREPA ROI_3_23 Attach 6.pdf).

Request 24 **How does the micro fuel handling facility relate to the land-based LNG project?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 24 The micro fuel handling facility is currently being constructed by NFEnergía and will be owned and operated by that entity. The land-based LNG project described in the IRP Main Report is presented as one potential means of supporting receipts of LNG and deliveries of natural gas to both San Juan Units 5&6 and a new gas-fired combined cycle combustion turbine that may be constructed at the existing Palo Seco generating facility site. There is not necessarily any relationship between the two projects. It is possible that a new land-based LNG receiving facility could be developed for the purpose of supplying the San Juan 5&6 generating facilities as well as a new Palo Seco generating facility; if so, this facility might supplant the micro fuel handling facility as the source of natural gas that would be consumed in San Juan Unites 5&6 (in this case, the micro fuel handling facility would presumably remain in place and operational to the support truck and ISO container loading operations for which the micro fuel handling facility was originally developed). It may also be possible that the micro fuel handling facility could be expanded so that it would have the capacity to supply natural gas to San Juan 5&6 and a new Palo Seco generating facility; in this case, the micro fuel handling facility would take on the functions the IRP describes the land-based LNG facility in San Juan Harbor as performing.

Request 25 **Indicate and explain whether the CO2 emission rate in Exhibit 8-21 includes emissions from revaporization / regasification.**

The following response was provided by Matt Lee, Managing Consultant, Filsinger Energy Partners. Matt Lee certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 25: The fuel supply contract between NFE and PREPA is for the supply of natural gas at the San Juan Power Plant boundary. Therefore, emissions associated with regasification for natural gas supplied to SJ5&6 are not included in Exhibit 8-21. Please note that for new combined-cycle gas turbine generators (CCGTs) listed in Exhibit 8-21 and 8-22, it is assumed that regasification will be an integral part of the mass and energy balance for the system. What this means is that inlet air chilling for the gas turbines would provide the energy required for the regasification of natural gas. External energy sources would only be required for start-up and shutdown.

Request 26 **Please provide the estimated change in greenhouse gas emissions, both per MWh and annually, that will result from conversion of San Juan 5 & 6. Please include all emissions from revaporization/regasification in those estimates.**

The following response was provided by Matt Lee, Managing Consultant, Filsinger Energy Partners. Matt Lee certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 26: As presented in the metrics files for the ESM Plan, CO2 emissions associated with natural gas combustion in SJ5&6 are estimated at 852 lbs/MWhr (average 2020 through 2024). As a comparison, the model assumes 1,335 lbs/MWhr of CO2 for diesel fuel-fired CCGTs. Average emissions for CO2 from SJ5&6 were modeled at 667,374 tons per year between 2020 and 2024.

PREPA does not have information related to the design or fuel consumption of the regasification units, as they are part of NFE's MFH facility. Therefore, PREPA is unable to provide CO2 emissions estimates related to regasification.

Request 27 **Does the IRP assume that substantial amounts of renewables cannot be incorporated into the grid without**

new fossil generation? New Combined Cycle Units burning gas?

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 27: Thermal generation is required in PREPA for the following reasons. Thermal generation is necessary in PREPA to:

- Maintain the stability in the system.
- Supply part of the load serving needs in periods where renewable resources fail to provide for the load
- Provide responsive reserves
- Provide generation specific to serving the needs of the mini-grids in the event of a catastrophic event such as a hurricane like Maria.

The question of which thermal generation to select is based on operating capability, locational need and cost. These are expected to change as technology changes but will likely be dictated by generation developers and PREPA.

Request 28 **Provide the documents on the status of conversations with EPA concerning the Mercury and Air Toxic Standards (MATS).**

The following response was provided by Luisette Ríos Castañer, Head Environmental Protection and Quality Assurance Division, PREPA. Luisette Ríos Castañer certifies that, to the best of her information and belief, all answers provided by her herein are true and no false or misleading information has been provided.

Response: Request 28 The Units at each Plant that are subject to MATS are in compliance with the major MATS obligations, as outlined below. PREPA is in negotiations with EPA and the Department of Justice to resolve issues regarding its MATS compliance, and to develop and implement an extensive Clean Air Act Compliance Program.

Aguirre Plant: Units 1 and 2 are subject to MATS.

- Unit 1 is in compliance with the following major MATS requirements: (i) emissions limits imposed for particulate matter (“PM”) and demonstrated through quarterly

performance testing; (ii) fuel moisture content no greater than 1.0 % by weight; and (iii) tune-up practice standards.

- Unit 2 has been out of service since April 8, 2019. Prior to being removed from service, Unit 2 was in compliance with the following MATS requirements: (i) fuel moisture content no greater than 1% by weight; and (ii) Work Practice Standards.

Costa Sur Plant: Units 3, 4, 5, and 6 are subject to MATS.

- Unit 3 (limited use unit) has been out of service since August 2016. ‘

- Unit 4 (limited use unit) has been out of service since December 2016.

- Unit 5 is in compliance with the following major MATS requirements: (i) emissions limits imposed for PM demonstrated through PM Continuous Emissions Monitoring System; (ii) fuel moisture content no greater than 1.0 % by weight; (iii) tune-up practice standards and startup and shutdown work practice standards (hereinafter, “Work Practice Standards”); and (iv) the outages and quality assurance program.

- Unit 6 is in compliance with the following major MATS requirements: (i) emissions limits imposed for PM demonstrated through PM Continuous Emissions Monitoring System; (ii) fuel moisture content no greater than 1.0 % by weight; (iii) Work Practice Standards; and (iv) the outages and quality assurance program.

Palo Seco Plant: Units 1, 2, 3, and 4 are subject to MATS.

- Unit 1 (limited use unit) is in compliance with the following major MATS requirements: (i) heat input-based limit of 8%

annual capacity factor; (ii) fuel moisture content no greater than 1.0 % by weight; and (iii) Work Practice Standards.

- Unit 2 has been out of service since December 2016.
- Unit 3 is in compliance with the following major MATS requirements: (i) fuel moisture content no greater than 1.0 % by weight; and (ii) Work Practice Standards.
- Unit 4 has only been in service for less than a month (May 22-June 21-2019) since 2016. In that short window of operations, Unit 4 was in compliance with (i) fuel moisture content no greater than 1.0 % by weight; (ii) Work Practice Standards; and (iii) the outages and quality assurance program.

San Juan Plant: Units 7, 8, 9, and 10 are subject to MATS.

- Unit 7 (limited use unit) is in compliance with the following major MATS requirements: (i) fuel moisture content no greater than 1.0 % by weight; and (ii) Work Practice Standards.
- Unit 8 (limited use unit) is in compliance with the following major MATS requirements: (i) heat input-based limit of 8% annual capacity factor; (ii) fuel moisture content no greater than 1.0 % by weight; (iii) Work Practice Standards.
- Unit 9 is in compliance with the following major MATS requirements: (i) fuel moisture content no greater than 1.0 % by weight; (ii) Work Practice Standards; and (iii) the outages and quality assurance program.
- Unit 10 has been out of service since March 2016.

Request 29 **What is PREPA's projected annual LNG demand for the Palo Seco plant? Please provide that analysis and all supporting documentation.**

The following response was provided by Peter Hubbard, Manager Siemens PTI EBA. Peter Hubbard certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 29 Several of the scenarios call for a 302 MW F-Class CCGT to be built at Palo Seco by 2025. With a heat rate of 7.25 MMBtu/MWh, the annual fuel

consumption of this F-class unit at Palo Seco at a 100% load factor would be 19.2 Bcf/year or 0.4 MMtpa.

Request 30 **What is the status of the Yabucoa LNG project? Please provide all supporting documentation.**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 30 The Yabucoa LNG project is one of the resource additions included as an option in the Energy System Modernization Plan and the Action Plan that has emerged from the IRP process. As noted in the IRP Main Report, the Yabucoa LNG project (consisting of an LNG receiving facility and a new 302 MW combined cycle gas turbine) would be developed as a hedge against resource development and deployment uncertainties. The basis for this approach is described at Section 1.2 of the IRP Main Report:

Siemens recommends that PREPA proceed with the preliminary permitting and planning activities for the Yabucoa CCGT and the Mayagüez Peaker conversion together with their associated ship-based LNG delivery infrastructure, in addition to the new CCGT at Cost Sur. The intent would be that, prior to making any large contractual commitments for equipment purchase or construction for these projects, PREPA would reassess which combination of these project provide best option for the PREPA system. Proceeding with only the preliminary permitting and planning activities for each of these project preserves PREPA's ability to select either the plan described by ESM, S4S2 or S4S2S9 depending on the future circumstances. Proceeding with the preliminary activities for these projects will provide PREPA approximately two years to three years to allow some of the uncertainties to be resolved and formulate a clearer understanding of the potential need for the projects.

No development activities or requests for information relating to the Yabucoa LNG project have yet been initiated.

Request 31 **What is the status of the Mayaguez LNG project? Please provide all supporting documentation.**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 31 The Mayagüez LNG project is among the resource additions included as an option in the Energy System Modernization Plan and the Action Plan that has emerged from the IRP process. As noted in the IRP Main Report, the Mayagüez LNG project (which would consist of the conversion of 200 MW of existing combustion turbine peaking units to consume natural gas, as well as the development of an LNG receiving facility) would be developed as a hedge against resource development and deployment uncertainties. See the preceding response for an explanation of the rationale underlying this approach.

By Request for Information issued May 30, 2019 (PREPA RFI No. 93156, Natural Gas Supply for Mayagüez Power Plant), PREPA solicited feedback and recommendations from the fuel supply industry for the supply of gasified natural gas for consumption at PREPA's existing Mayagüez Power Plant. PREPA has received eight responses to this Request for Information. It is currently developing a Request for Proposals that will invite project proponents to offer proposals for the development of the required LNG and natural gas infrastructure and the conversion of the existing Mayagüez peaking units.

Request 32 **Please refer to PREPA's answer to PREB-PREPA-04-24:**

a) Has PREPA considered the ability to deliver fuel to gas-fired plants during extreme weather events?

b) Has PREPA considered potential increased costs for delivering fuel to these plants during extreme weather events?

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 32 a) PREPA is aware of the importance of ensuring that natural gas can be delivered to gas-fired generating facilities during extreme weather events. It has contracted for the delivery of natural gas to its Costa Sur and San Juan 5&6 facilities on a firm basis in accordance with nominations PREPA will provide to the suppliers from time to time, and in this way has obligated the suppliers to take such measures as may be required to ensure that adequate quantities of LNG are available in storage adjacent to the Costa Sur and San Juan 5&6 generating facilities to support natural gas use in the generation of power during extreme weather events. In addition, PREPA has maintained the ability to consume diesel or other petroleum-based fuels in the Costa Sur and San Juan Units 5&6 in the event that natural gas becomes unavailable, whether because of adverse weather conditions or LNG facilities upsets. Such diesel supplies will be held in storage at the generating facility sites, or will be delivered to the generating sites from remote storage by pipeline. Deliveries of fuel from local storage or by pipeline is highly unlikely to be interrupted for any sustained period of time by an extreme weather event.

The analyses referenced in the response to PREB-PREPA-04-24 assume that all critical loads within individual Minigrids are covered by thermal resources as a means of ensuring system resilience in the face of extreme weather events (e.g., hurricane or tropical storm conditions, which typically include heavy rain for sustained periods). In such conditions, (i) solar generation resources are likely to be incapable of generating at anywhere close to their rated capacity, and may be damaged in a manner that limits their capability even following the conclusion of the event, (ii) wind generation resources may need to be taken offline and may sustain damage limiting their availability post-event, and (iii) battery energy storage systems are likely to be discharged during and immediately following the event and unavailable as reliable sources of energy for some period thereafter. In such conditions, thermal resources with supplies of fuel available in storage on-site (such as LNG or diesel in tanks at the generating facility site), or for delivery by pipeline from a source of stored fuel, are more likely to be available and capable of serving critical loads during and immediately following an extreme weather event than non-thermal resources, such as solar, wind and battery energy storage facilities. The thermal resources assumed to be available to serve critical loads in the analysis shown at page 2-18 of Appendix 1 will all have on-site or proximate fuel storage or access to fuel storage by pipeline, and therefore (assuming fuel inventories in storage are properly managed) will be able to be dispatched on during and for some period following an extreme weather event while drawing on stored fuel supplies. The operation of these resources during and for some period following an extreme weather event therefore should not be affected by a weather-related interruption in deliveries of natural gas from remote sources of supply..

Request 32 b) PREPA's natural gas supply agreements prescribe commodity prices that are derived from published indices as well as stated delivery cost components. The obligation to deliver natural gas to PREPA's generating facilities in accordance with the gas supply agreements, including the pricing provisions, is the fuel supplier's (Naturgy, in the case of Costa Sur, and NFEnergía in the case of SJ 5&6), and the suppliers bear the cost of delivering fuel to the generating facilities. PREPA's gas supply agreements do not include provisions that would permit the supplier to impose a surcharge or otherwise pass on directly to PREPA increased delivery costs resulting from extreme weather events. PREPA could confront some increase in the cost of fuel consumed in its gas-fired generating facilities in the event it is required switch to diesel or other petroleum fuel because natural gas is temporarily unavailable, whether by reason of adverse weather events or otherwise.

Request 33 **Is PREPA aware of any offtakers who have made commitments to take gas from PREPA's proposed terminals?**

The following response was provided by James F. Bowe, Jr., Partner, King & Spalding LLP. Mr. Bowe certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 33 PREPA is not aware that any offtakers have made commitments to take gas from LNG terminals that may be developed to provide natural gas supply to existing or proposed gas-fired generating facilities in Puerto Rico. PREPA is aware that NFEnergía intends to supply LNG by means of truck and ISO containers from the micro fuel handling facility it is currently constructing; PREPA has no knowledge as to the identity of any entities that may have contracted for supplies of LNG that will be delivered through the NFEnergía micro fuel handling facility.

Request 34

Refer to the New Fortress contract, which includes the following costs for gas:

Fuel Sale and Purchase Agreement NFE Contract Exhibit C - Fuel Price

Unit Cost:

Transitional supply period and months 1-12 of initial contract term of $8.50/MMBtu (base cost)

$7.50/MMBtu for months 13-24 of the Initial Contract Term

$6.50/MMBtu for months 25 until the end of the Initial Contract Term

During any extension term -- an amount per MMBtu to be agreed upon

Unit Fuel Cost: Gas Index Price x 115%=$12 MMBtu Plus *NG

Manufacturing Surcharge $50M $833,000 per month

For the IRP, Siemens modeled natural gas as 115% of Henry Hub plus $4.35 per MMBtu. Please provide a detailed explanation of the difference between Siemens' modeled costs for gas, and the New Fortress Contract's costs for gas.

The following response was provided by Peter Hubbard, Manager Siemens PTI EBA. Peter Hubbard certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 34 The formula of 115% of Henry Hub plus a $4.35/MMBtu adder is based on current contracting practices at Sabine Pass, Freeport LNG, and other Gulf

Coast liquefaction facilities. Many of these existing LNG contracts are based on a 15% adder to the Henry Hub price index, plus an additional tolling fee for liquefaction. Siemens assumed a $2.80/MMBtu tolling fee for liquefaction. Once the LNG is free on board, Siemens assume a $1.00/MMBtu round trip transportation to Puerto Rico, plus $0.55/MMBtu for margin (profit). The 115% Henry Hub + $4.35/MMBtu adder represents a liquid and competitive LNG market price point and assumes that Puerto Rico will be successful in seeking a waiver to the Jones Act. The information provided in this question regarding the New Fortress Energy contract would appear to indicate the commercial price structure is factoring in higher costs and/or risks during the initial few years, compared with a level adder of $4.35/MMBtu for the model.

Request 35 **What is the annual volume of coal combustion residuals and/or Agremax (CCRs) that the AES Puerto Rico plant generates?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 35 Please refer this question to AES.

Request 36 **What is the volume of AES CCRs at the AES plant site?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 36 Please refer this question to AES.

Request 37 **What are the terms of the contract between AES and PREPA as to the CCRs?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 37 Please refer to the AES contract second amendment for the terms of the contract between AES and PREPA as to the CCRs. Copy of the second amendment can be downloaded at:

https://aeepr.com/es-pr/QuienesSomos/Paginas/ContratoIndex.aspx.

Request 38 **Are there any circumstances under which PREPA would be required to pay for the disposal or handling of the AES CCRs?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 38 Please refer to article 20 of the AES contract. Copy of the contract can be downloaded at:

https://aeepr.com/es-pr/QuienesSomos/Paginas/ContratoIndex.aspx.

Request 39 **Blank**

Request 40 **Is the cost of the handling and/or disposal of the CCRs embedded in the AES charge pursuant to the Power Purchase and Operation Agreement (PPOA) between PREPA and AES?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 40 Yes, however, the contract does not specify under which type of charge (Demand or Fixed). PREPA considers this type of charge as a Fixed Expense. It should be covered by the Fixed O&M charge defined in the contract.

Request 41 **Has AES made any attempt to charge PREPA for the handling, disposal of the CCRs?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 41 No.

Request 42 **What are the constituents of the AES CCRs?**

a) Have the constituents of the AES CCRs leached into the groundwater?

b) Does the CCR or Agremax pile at the AES plant site generate fugitive dust?

c) Are there any circumstances under which PREPA would be required to pay or contribute to the cost for the cleanup or remediation of the groundwater contaminated by the CCRs/Agremax?

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 42 Please refer this question to AES.

Request 42 a) Please refer this question to AES.

Request 42 b) Please refer this question to AES.

Request 42 c) No, AES is responsible for these costs.

Request 43 **Has Fluence, the joint venture created by AES and Siemens Industry participated in requests for proposals, requests for qualifications and/or bidding for electric system equipment or services in Puerto Rico? If so, please provide the documents.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting Siemens PTI. Nelson Bacalao certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 43: All Siemens Industry Inc. Power Technologies International (Siemens PTI) personnel engaged in the IRP has stopped any contacts with Fluence in connection with Puerto Rico, hence we ignore if they have or have not participated in any process.

Request 44 **Does Siemens Industry have other contracts with PREPA in addition to the IRP contract? If so, please list them and provide copies.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 44: The information requested is not available at this moment. PREPA will provide the requested information as soon as it becomes available.

Request 45 **Has Siemens Industry participated in requests for proposals, requests for qualifications and/or bidding for electric system equipment or services in Puerto Rico? If so, please provide the documents.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 45: The information requested is not available at this moment. PREPA will provide the requested information as soon as it becomes available.

Request 46 **Does Siemens Industry sell combined cycle electric generation units and other electric industry equipment called for in the draft IRP?**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 46: Combined cycle electric generation units and other electrical industry equipment are products of Siemens Energy which is a sister company albeit separated with fire walls and independent in responses to RFPs and RFQs. Siemens Industry Inc. Power Technologies International (Siemens PTI) personnel engaged in the IRP has severed contact with other sister companies any dealings with Puerto Rico.

Request 47 **Has Siemens or PREPA considered carbon pricing scenarios? If so, provide the documentation.**

The following response was provided by Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Jack Henry certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 47 Carbon pricing was not included in the original scope of work. As a response to questions from the PREB, PREB-PREPA-06-03 requested carbon pricing analysis on three scenarios. The documentation can be found in the response to that ROI.

Request 48 **At the September 4, 2019 Initial Technical Hearing1, Dr. Bacalao explained that PREPA Transmission and Siemens had identified a number of substations with strong transmission capability, that could accommodate additional interconnections for renewable resources.**

a) Please provide that list of substations, with the location of each substation, and the amount of additional MW of interconnection capability each can accommodate.

b) Dr. Bacalao explained that next, Siemens and PREPA conducted mapping, assigning a certain amount of renewable resources to some of these substations. Please provide those mapping documents, and all supporting documentation.

The following response was provided by Jack Henry, PE, Senior Staff Consultant and Nelson Bacalao, PhD, Senior Manager Consulting, Siemens PTI. Jack Henry and Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 48 a) The initial mapping was determined by looking at the getaway at strong buses in the PREPA system. This was done to minimize the number of actual modeling nodes to be used in the IRP. The actual location of new renewable installations is unknown until developers select locations. It should be noted that any location selected by a developer will require impact/facility studies to determine the impacts at the interconnection point and across the system. Any interconnection will need to comply with interconnection standards.

Siemens PTI and PREPA reviewed the list of strong nodes and selected a subset of those nodes which are best suited for resource modeling for the IRP. The list provided shows

the new buses modeled in the PREPA system, where the buses inject power at the high voltage level and how much generation might be injected at those new buses. The new buses modeled include nodes for Distributed Generation (these were modeled at a representative location rather than focusing on actual interconnections at the distribution feeder level), new Renewable Resources and new Thermal resources. Please refer to file LEO-PREPA ROI_3_48 Attach 1.xlsx.

Request 48 b) The mapping of new generation facilities from the LTCE runs was mapped to the generator bus models determined by the Minigrids and then spreading the installations between the generator buses in those Minigrids.

Request 49 **Provide documents concerning the land availability for utility scale renewable energy projects in Puerto Rico considerations mentioned by Mr. Bacalao in his testimony at the Initial Technical Conference.**

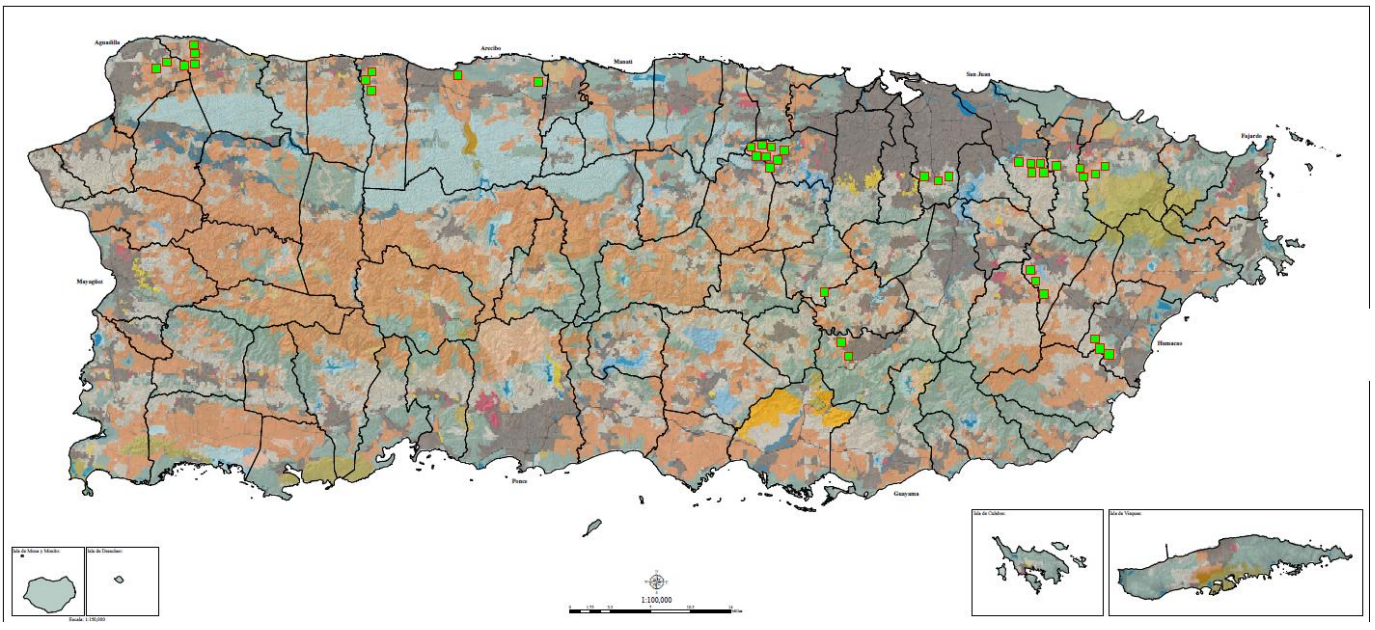
The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 49: We understand that utility scale PV can be located in land designated Rustico Comun, the figure below shows the areas in PR with this zone type (brown) and the table also below indicates that if all this area were utilized more than 58 GW of PV could be installed considering 7.5 Acres per MW. Finally, in the figure below the green rectangles show a potential location of 2,600 MW of PV.

Table 1: Coverage of land by type and amount of PV that could be located

Zona	Descripción	Area M^2	Cuerdas	Acres	MW pv @ 7 Acres/ 1 MW	MW PV @ 7.5 Acres/ 1 MW
AGUA	Agua	102,768,026.32	26,149.63	25,394.51	3,627.79	3,385.93
SRC	Suelo Rústico Común	1,789,114,054.86	455,245.31	442,099.32	63,157.05	58,946.58
SREP	Suelo Rústico Especialmente Protegido	110,728,480.40	28,175.19	27,361.58	3,908.80	3,648.21
SREP-A	Suelo Rústico Especialmente Protegido Agrícola	2,329,417,847.63	592,727.19	575,611.18	82,230.17	76,748.16
SREP-AE	Suelo Rústico Especialmente Protegido Agrícola y Ecológico	53,419,815.97	13,592.83	13,200.31	1,885.76	1,760.04
SREP-AH	Suelo Rústico Especialmente Protegido Agrícola e Hídrico	116,195,201.79	29,566.21	28,712.43	4,101.78	3,828.32
SREP-AP	Suelo Rústico Especialmente Protegido Agrícola y de Paisaje	6,957,529.25	1,770.36	1,719.24	245.61	229.23
SREP-E	Suelo Rústico Especialmente Protegido Ecológico	1,795,065,584.76	456,759.69	443,569.97	63,367.14	59,142.66
SREP-EA	Suelo Rústico Especialmente Protegido Ecológico y Agrícola	29,444,187.17	7,492.16	7,275.81	1,039.40	970.11
SREP-EH	Suelo Rústico Especialmente Protegido Ecológico e Hídrico	611,203,528.92	155,522.53	151,031.55	21,575.94	20,137.54
SREP-EP	Suelo Rústico Especialmente Protegido Ecológico y de Paisaje	194,278,727.46	49,434.79	48,007.28	6,858.18	6,400.97
SREP-H	Suelo Rústico Especialmente Protegido Hídrico	69,650,703.76	17,722.83	17,211.05	2,458.72	2,294.81
SREP-P	Suelo Rústico Especialmente Protegido de Paisaje	44,338,520.35	11,282.07	10,956.28	1,565.18	1,460.84
SU	Suelo Urbano	1,190,638,289.31	302,961.40	294,212.87	42,030.41	39,228.38
SURNP	Suelo Urbanizable No Programado	26,991,811.43	6,868.15	6,669.82	952.83	889.31
SURP	Suelo Urbanizable Programado	41,695,542.29	10,609.55	10,303.18	1,471.88	1,373.76
VIAL	Vial	364,968,247.00	92,867.24	90,185.54	12,883.65	12,024.74

Figure 1: Land Use Map of Puerto Rico (Brown =Rustico Comun)



Request 50 Provide the documentation, including the forecast which shows how Siemens and/or PREPA calculated the cap on customer-owned generation at 1176 MW.

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 50 It is not a cap; it is the final value of the forecast. See response to PREB ROI 1 – 18 – c for further details on the forecasting model.

Request 51 **Provide documentation on any assessments or evaluations of the remaining life, and the operation and maintenance costs to continue operating, PREPA's existing peaking units.**

The following response was provided by Daniel Hernandez Morales, Director of Generation, PREPA. Daniel Hernandez Morales certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 51: There are no useful service life studies on the current fleet of Frame 5 units, as they are already well past their service life as per industry standards. They are being kept in service and maintained due to their need in the electric grid, while their replacement takes place. Please refer to LEO-PREPA ROI_3_51 Attach 1.pdf for an updated report on availability and estimated operation years before their next major overhaul, based on their actual usage per year.

Request 52 Does PREPA plan to establish any program to incentivize customer-owned generation?

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 52 The main incentive for customer-owned generation in Puerto Rico is the Net Metering Program established by Act 114-2007 as amended. It provides significant incentives for customers to install renewable energy systems in their premises.

Act 83-2010, as amended, includes financial incentives for certain types of customer owned generation. The regulations on microgrids and wheeling being worked on by the Puerto Rico Energy Bureau will also incentivize customer-owned generation. PREPA provides regulations addressing interconnection procedures and requirements to cover technical aspects and facilitate the interconnection of such systems.

Request 53 **Are interconnection procedures the same for utility scale renewable energy systems and customer-owned generation? Please explain your response. Explain the PREPA-specific cost for interconnection. How does that compare with rooftop solar and customer self-supply?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 53 Interconnection procedures for utility scale renewable energy systems and customer owned generation are not the same, as there are important differences in capacity, interconnection requirements and modes of operations between these two types of systems. Interconnection requirements for customer owned generation are specified in the corresponding PREPA regulations. Interconnection requirements for utility scale renewable energy systems are established in the corresponding contract.

Request 54 **Please refer to Exhibits 8-37 and 8-38. Provide the estimated annual costs of customer-owned generation and PREPA rates.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 54 The exhibits in reference were designed to perform a comparison of rates, not to estimate the annual costs. Such exercise is beyond the scope of the IRP as it depends heavily on the consumption patterns of each customer.

Request 55 **How was the non-generation (Non-Fuel + Power Purchase) rate calculated at 14.2 cents per kWh in the IRP?**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 55 This value was not calculated in the IRP but it was provided as an estimation of other costs by PREPA's financial advisors. The cost includes the total transmission and distribution costs and administrative charges and hence beyond the values assessed in the IRP.

Request 56 **Does Siemens assume that customer-owned generation will remain connected to the PREPA system?**

a) If so, provide all analysis and documentation supporting that assumption.

b) Did Siemens account for the possibility that customer-owned generation would include storage? If so, please provide all analysis and documentation supporting that assumption.

The following response was provided by Nelson Bacalao, PhD, Senior Manager, Consulting, and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 56 Siemens PTI assumed that customer-owned generation would remain connected to the PREPA system and this is based on the premise that: a) the IRP will result in a reliable and resilient system, b) net-metering will continue for the foreseeable future so customers can use PREPA's system as a zero cost storage; inject the energy during the day and extract it at night with full compensation.

Request 56 a) See response above.

Request 56 b) Conservatively we did not assume any customer owned storage thus ensuring that there would be provisions for this storage at the utility level. Moreover, for

the reasons explained in the response above under the conditions the IRP is to create there would be little incentive for customer owned storage.

Request 57 How much of the existing or proposed energy infrastructure is in flood prone areas?

a) Please provide all documents related to sea level rise, storm surge, or other flooding risk Siemens and/or PREPA reviewed during the preparation of this IRP.

b) Please explain how, if at all, those documents influenced the choice of locations for new power plants and/or the decision to convert existing plants.

The following response was provided by Nelson Bacalao, PhD, Senior Manager, Consulting, Siemens PTI Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Nelson Bacalao and Efran Paredes Maisonet certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 57 This analysis is outside the scope of the IRP. Siting considerations for the proposed energy infrastructure are evaluated as part of the engineering design phase of each new project. As part of the upgrades needed to PREPA's substations, 19 were identified as needing relocation or reinforcement because these were flooded after hurricane Maria.

Request 57a) As stated above, this analysis is outside the scope of the IRP.

Request 57 b) As stated above, this analysis is outside the scope of the IRP.

Request 58 **Provide the PREPA plan to address the Yabucoa plant overloads and information on constraints as a result of two major resources, 302 MW each at Yabucoa and Mayaguez and the reinforcements required in existing system steady state analysis.**

The following response was provided by Yan Du Staff Consultant of Siemens PTI. Yan Du certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 58 The detailed analysis is described in Section 3.5 of the IRP Appendix 1-Transmission & Distribution. To reiterate here:

Contingency analysis was conducted for the unreinforced system. This system represents what is currently existing and operating as PREPA's transmission network. The purpose of this study is to mainly identify any constraints and reinforcements required to relieve those constraints as a result of two major resources, not counting on the investments in the MiniGrids. These units are 302 MW each interconnected to Yabucoa and Mayaguez.

Two power flow cases, bench (without the units) and study (with the units), were created to run the contingency analysis. In study case the new units were dispatched to full capacity, and the generation in the rest of PREPA system was adjusted to maintain the same generation level.

The unit in Mayaguez did not result in any constraints. The unit in Caguas (Yabucoa) results in some overloads. These overloads would not exist considering the reinforced case for MiniGrid operations. Also there is a possible plan in place to reroute one of the two lines from AGUIRRE to AGUAS BUENAS and terminate to AES, thus providing another outlet for AES units, and this would also resolve all the overload issues.

Request 59 **Indicate and explain the status of all the PREPA fleet electric generation plants as to the requirements of the Clean Water Act.**

a) Please also provide the status of the AES Guayama plant's compliance with the Clean Water Act requirements.

b) Please also provide the status of Ecoelectrica's compliance with the Clean Water Act requirements.

The following response was provided by Luisette Ríos Castañer, Head Environmental Protection and Quality Assurance Division, PREPA. Luisette Ríos Castañer certifies that, to the best of her information and belief, all answers provided by her herein are true and no false or misleading information has been provided.

Response: Please refer to PREPA's response to Local Environmental Organization's Second ROI Request 14 for the status of PREPA's generation plants as to the requirements of the Clean Water Act.

Request 59 a) This question should be addressed to AES.

Request 59 b): This question should be addressed to EcoEléctrica.

Request 60 **Please provide an update to Exhibit 4-24, on the status of the CAA nonattainment for SO2 of the generation plants.**

a) What is the compliance status of other air pollutants emitted by the PREPA fleet generation plants?

b) What is the compliance status of other air pollutants emitted by AES and Ecoelectrica?

The following response was provided by Luisette Ríos Castañer, Head Environmental Protection and Quality Assurance Division, PREPA. Luisette Ríos Castañer certifies that, to the best of her information and belief, all answers provided by her herein are true and no false or misleading information has been provided.

Response: Request 60 a) Please refer to PREPA's response to Local Environmental Organization's Second ROI Request 14 for the compliance status of PREPA's plants.

Request 60 b) This question should be addressed to AES and EcoEléctrica.

Request 61 **Explain and provide documentation on the percentage of electric power outages in Puerto Rico that are due to transmission failures.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 61 The information requested is currently not available. PREPA will provide the information as soon as it becomes available.

Request 62 **Explain and provide documentation on the percentage of electric power outages in Puerto Rico that are due to distribution failures.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best

of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 62 The information requested is currently not available. PREPA will provide the information as soon as it becomes available.

Request 63 **Why are none of the PREPA units equipped with Continuous Emissions Monitoring Systems (CEMS)?**

The following response was provided by Luisette Ríos Castañer, Head Environmental Protection and Quality Assurance Division, PREPA. Luisette Ríos Castañer certifies that, to the best of her information and belief, all answers provided by her herein are true and no false or misleading information has been provided.

Response: Request 63 CEMS are installed only at PREPA units where permits or regulations require it – San Juan and Cambalache units.

Request 64 **Is AES equipped with CEMS?**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 64 PREPA understands that AES is equipped with CEMS. Please refer this question to AES for confirmation.

Request 65 **Please provide any information currently in PREPA's possession about the projects awaiting interconnection to PREPA's system. This information should include size, type, timing, interconnecting party, status of interconnection, etc.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 65 The information requested is currently not available. PREPA will provide the information as soon as it becomes available.

Request 66 **Please provide the spreadsheet used to develop Table D.1 of Appendix 4**

The following response was provided by Marcelo Saenz, Senior Consultant, Siemens PTI. Marcelo Saenz certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Appendix 4 of the IRP has Exhibits, not tables. Please clarify or provide title of the exhibit in reference.

Request 67 **Please provide the S4S2B workpaper.**

The following response was provided by Marcelo Saenz, Senior Consultant, Siemens PTI. Marcelo Saenz certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 67 There is no such workpaper; however in the filed workpapers please refer to workpaper titled: S4S2B_Metrics_Base Case SII.xlsx

Request 68 **Please provide the spreadsheets used to develop the capital cost inputs for all new and converted resources modeled in Aurora with all formulas and links intact.**

The following response was provided by Marcelo Saenz, Senior Consultant, Siemens PTI. Marcelo Saenz certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 68: This question is quite wide, however there are filed workpapers that may address these questions; PREPA IRP Solar Wind Storage Costs-Updated CF-Wind-final.xlsm for renewable and PREPA Fossil New Resources 10-9 2018_v6.2.xlsx for new thermal.

Request 69 **Please explain why the NPVs given in "Summary PREPA IRP Cases-06032019" and throughout the IRP are not consistent with the NPVs calculated in the corresponding workpapers for those runs. For example, the "Summary" spreadsheet shows an NPV with and without Energy Not Served of $14,698,161 and $14,431,214, respectively. In comparison, the "ESM_Metrics_Base_SII-mm with action plan tab" shows an NPV of $15,403,559. (All figures are in 000$.) If the difference is due to some additional**

transformation of the system costs please provide that transformation in spreadsheet format with all formulas and links intact.

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 69 As can be observed by following the calculations, the NPV (both with and without the energy not served) are determined in the tab "Production Costs" Looking at that tab we see the following:

	ESM
NPV fuel	5,875,910
NPV Var O&M	358,888
NPV Fixed Costs	8,196,415.27
Total	**14,431,214**

And we also have:

NPV @ 9% 2019-2038 $000	Average 2019-2028 2018$/MWh	RPS 2038	NPV Deemed Energy Not Served MiniGrid Ops $000 (1)	NPV + ENS $000
14,431,214	98.91	66.99%	266,947	14,698,160

So the value in the summary and the ESM document are consistent with the calculated values in the workpapers.

Request 70 **Please list the steps PREPA has taken to reduce non-technical losses and the estimated improvement in those losses resulting from those steps.**

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best

of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 70 The information requested is currently not available. PREPA will provide the information as soon as it becomes available.

Request 71

Models like AURORA are often set up to optimize capacity expansion relative to a market price and subject to optimization constraints like a minimum reserve margin. Meaning that all resources that the model is capable of adding are added if they are "profitable" subject to the constraints on the objective function like the reserve margin. Please answer the following:

a) Did Siemens use AURORA in this manner?

b) If so, what market price did it use?

c) If so, provide that market price and any workpapers used in its development with all formulas and links intact.

d) If not, how would Siemens describe the optimization?

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 71a) The objective that was used is to minimize the present value of the total production costs that includes both amortization of capital costs, fixed and variable O&M and fuel costs, subject to constraints that may be binding, i.e. driving the results and preventing the further reduction on the objective (e.g. meeting the load and the RPS) or not binding and not affecting the objective's minimization (e.g. reserves).

Request 71 b) Not applicable for the methodology used.

Request 71 c) Not applicable for the methodology used.

Request 71 d) See Response 71 a).

Request 72 **Under the ESM, the reserve margin never falls below 53% and is often at least 10 percentage points higher than that. Why did Siemens choose not to retire additional units or exclude the construction of new units so as to make the reserve margin closer to its minimum requirement of 30%?**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 72 As can observed above the optimization was done to minimize the present value of the total costs. Thus, at any point in time the optimization process is assessing the benefits of maintaining unit online (lower variable costs) with the cost of keeping it in service (the fixed costs). If the fixed costs are greater than the benefits the units are retired economically by the model, not by user input. The fact that the reserve was higher than 30% is just indicative that the reserve margin was not a binding constrain.

Request 73 **In Section 8.7.3 of the IRP, Siemens describes the planning reserve margin (PRM) sensitivity analysis (lower PRM) it undertook and concludes *"The LTCE resulting from this optimization had in fact higher levels of reserves reported compared to previous solutions in which the PRM target was set to 30%. This increase in reserve levels despite using lower PRM target is mainly caused by the optimization algorithm that was able to find an slightly better solution in which the PRM again is not a binding constraint and confirmed that it had minimal impact on the overall results."* Please explain why Siemens believe this result would have occurred.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 73 Please see our prior responses on the objectives of optimization and the binding constraints.

Request 74 **Please provide a complete list of the retirements that were forced and those that were economically selected and when as discussed during the September 4th and 5th technical hearings.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 74 This varies by scenario, but it is simple to determine by inspection. All units were retired economically by the optimization process, with the only exception of steam units burning heavy fuel oil (MATS incompliant) that must be retired by the end of 2024, so any unit retired at the end of that year (typically Palos Seco 3 or 4) is by input.

Request 75 **Please confirm that RSA costs are not included in any of the workpapers provided for this IRP.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 75 The RSA was not part of the considerations of the IRP.

Request 76 **Was AES involved in any way or manner in the preparation of the AES Coal Plant Conversion Assessment?**

a) Did PREPA communicate with any AES representative to prepare the Assessment? If so, provide the name and position of each AES representative.

b) Please provide a detailed description of the discussions between PREPA and AES.

c) Please provide all correspondence and information exchanged between PREPA and AES.

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information

and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 76 a) AES was not involved in the preparation of the study. We requested information on any prior studies that AES could have, but none was provided.

Request 76 b) See above.

Request 76 c) See above.

Request 77 **Please refer to Law 17-2019, Section 3(H): *"Every integrated resource plan shall include … PREPA and electric service companies' environmental assessments related to air emissions and water consumption, solid waste, and other factors such as climate change."***

a) Is AES and electric service company as defined in this law?

The following response was provided by Efran Parede Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 77 a) Please refer to the definition of electric service company established in Act 17-2019, Article 1.2 (c).

Request 78 **Does AES Coal Plant Conversion Assessment take into account the cost of the proper disposal of coal ash from the AES Guayama plant? If so, please provide all supporting analysis and documentation. If not, explain why not.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 78 No. This analysis was beyond the scope of the study.

Request 79 **Admit that the early retirement of the AES Guayama coal plant would reduce the volume of coal ash to be ultimately disposed of, compared to retirement in 2027.If anything but an unqualified admission, please provide a detailed explanation.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 79 The early retirement of the AES Guayama coal plant would reduce the volume of coal ash to be disposed of as compared to retirement in 2027.

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Request 80 **Does the Assessment take into account the cost of cleaning the site? If so, please provide all supporting analysis and documentation. If not, explain why not.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 80 No. This analysis was beyond the scope of the study.

Request 81 **Does the Assessment consider the cost of restoration of the ecosystems affected by AES operation? If so, explain how. Provide documentation. If so, please provide all supporting analysis and documentation. If not, explain why not.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 81 No. This analysis was beyond the scope of the study.

Request 82 **Does the AES Coal Plant Conversion Assessment take into account the social cost (i.e. health impacts, groundwater contamination) of AES operation as an economic cost for Puerto Rico and its citizens? If so, please provide all supporting analysis and documentation. If not, explain why not.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 82 No. This analysis was beyond the scope of the study.

Request 83 Does the AES Coal Plant Conversion Assessment take into account the impacts on climate change and its economic costs? If so, please provide all supporting analysis and documentation. If not, explain why not.

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consulting and Jack Henry, PE, Senior Staff Consultant, Siemens PTI. Nelson Bacalao and Jack Henry certify that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 83 No. This analysis was beyond the scope of the study.

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Request 84 **For each run presented in the AES Conversion Assessment in which AES retires in 2020, did Aurora fully optimize the replacement resources? If not, in which scenarios and for which resources were they hardcoded?**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 84 Subject to the limits on installation by year and the peakers for covering critical loads in the MiniGrids, the rest of the additions were selected by the model.

Request 85 **What is meant by the term "ESM w/AES Ret prior fix"?**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 85 It means the ESN case with AES retirement and the “prior fix” is to indicate that this case is the “raw” result from the optimization process that has problems in optimally deploying the storage in the last years of the plan (all dumped in the last year). Sometimes, we make an adjustment by redistributing this last year storage over the prior years in order to minimize curtailment. We confirm the adequacy of the adjustment by confirming a reduction in the present value of total costs.

Request 86 **Please explain why the NPVs in the AES Conversion Assessment do not match up with the NPVs reported in the narrative of the Assessment? Provide a workbook that reconciles the two.**

The following response was provided by Nelson Bacalao, PhD, Senior Manager Consultant, Siemens PTI. Nelson Bacalao certifies that, to the best of their information and belief, all answers provided by them herein are true and no false or misleading information has been provided.

Response: Request 86 We are not sure to what difference and what files this question refers to. However, the NPV & workbook correspondence is as follows:

Table 3 2: S4S2B Base Case and with AES Retirement Costs: S4S2B_Metrics_ (AES retired)_ SII_r4_Smooth.xlsx

Table 3 6: ESM Base Case and with AES Retirement Costs: ESM_Metrics_Base_CEPR_Smooth.xlsx

Table 3 10: S1S2B Base Case and with AES Retirement Costs: S1S2B_Metrics_ Base_CEPR_Smooth.xlsx

Table 3 14: S3S2B Base Case and with AES Retirement Costs: S3S2B_Metrics_Base_CEPR_Smooth.xlsx

Table 3 18: S5S1B Base Case and with AES Retirement Costs

S5S1B_Metrics_Base_CEPR_CCGT_smooth_v2.xlsx

Request 87 Does AES provide 454 or 417 MW of peak capacity?

The following response was provided by Efran Paredes Maisonet, Director of Planning and Environmental Protection, PREPA. Efran Paredes Maisonet certifies that, to the best of his information and belief, all answers provided by him herein are true and no false or misleading information has been provided.

Response: Request 87 AES provides 454 MW of peak capacity (2x227).

Informe sobre el impacto de la construcción y operación del proyecto *Montalva Solar Farm* en la zona de la Reserva Agrícola del Valle de Lajas

Sometido por petición a

Lic. Laura Arroyo

Staff Attorney, Earthjustice

14 octubre 2020

Por

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Agradecimientos

Se agradece el diálogo con A. Irizarry-Rivera (Catedrático UPR-RUM) y A. Vivoni (Portavoz Frente Unido Pro-Defensa Valle de Lajas y A. Vivoni en la revisión del documento.

in Memoriam

Este trabajo está dedicado a la memoria del amigo y colega, Agrónomo Honorario Luis Conty Pérez, quien en vida luchó incansablemente por la preservación y el desarrollo agrícola sustentable del Valle de Lajas.

Tabla de contenido

Resumen ejecutivo

A petición de la organización *EarthJustice*, proveo mi opinión profesional sobre el *Borrador de Declaración de Impacto Ambiental Montalva Solar Farm, Guánica-Lajas* (B-DIA) para la construcción y operación de una facilidad de producción de energía fotovoltaica en los municipios de Guánica y Lajas. En este documento (i) se resumen los antecedentes y situación actual de la energía fotovoltaica en Puerto Rico, (ii) se resume el plan de acción propuesto en el B-DIA, y (iii) se hace un análisis del proyecto desde la perspectiva agrícola-ambiental.

La Autoridad de Energía Eléctrica (AEE) tiene como meta generar la totalidad de la demanda de energía con fuentes renovables para el año 2050. Con tal fin, la AEE se ha embarcado en acuerdos de compra y operación basado en megaproyectos que impactarán terrenos de alto valor agrícola y de alto valor ecológico. Montalva Solar Farm, Guánica-Lajas es uno de esos proyectos.

El proyecto pretende construirse en un conglomerado de parcelas de 2,843 cuerdas actualmente en uso agrícola y descanso (conservación de recursos). La tenencia de tierra es privada. El uso de terreno actual es agrícola y conservación y la cubierta de tierra es de forraje para corte de heno, ganadería de carne y conservación de recursos. El 50% de los suelos en el área están clasificados como *Prime Farmland if Irrigated*, *Soils of Statewide Importance* y *Prime Farmland if Irrigated and Reclaimed* por USDA. Esta clasificación establece entre otros atributos, que los suelos tienen la mejor combinación de propiedades físicas y químicas para producir comida, alimento, forraje, fibra y otros cultivos de importancia económica. Cerca del 30% de los suelos tiene acceso al sistema de riego y están dotado de drenajes para facilitar la producción agrícola como parte del Proyecto del Suroeste, creado en la década del 1950. El riego y drenaje puede ser expandido a otras partes del área propuesta para la construcción. El 53% de los suelos (algunas series San Germán, Pozo Blanco, Aguilita, Aguirre, Fé, Gúánica, Fraternidad y Altamira) son considerados de alta fertilidad y con el manejo adecuado del riego y drenaje pueden ser altamente productivos. El convertir el área, de uno agrícola a uno industrial de producción de energía contribuiría a la ya existente alta tasa de pérdida de terrenos agrícolas y baja proporción de terrenos agrícolas en Puerto Rico. La construcción del proyecto establecería un precedente para que otros terrenos en reserva agrícola u otras áreas con terrenos de alto valor agrícola se utilicen para la construcción de fincas de energía solar fotovoltaica. Todo esto contribuiría a aumentar la dependencia de bienes agrícolas de importaciones de EE. UU y otros países con posiblemente menores restricciones ambientales y fitosanitarias que en Puerto Rico.

El proponente pretende combinar la generación de energía solar con la crianza de ovinos. No se provee un estudio de viabilidad económica, seguridad e integridad de animales, capacidad administrativa de manejo de ese tipo de proyecto por el proponente, especialmente considerando que el mismo se realizará entremezclado y con la presencia de módulos fotovoltaicos, transformadores, y baterías en la zona. Se ha documentado el uso de ovinos en fincas fotovoltaicas para el pastoreo del forraje entre los módulos. Pero, estos no necesariamente tienen un fin comercial para la venta de la carne y subproductos si no para talar las áreas verdes. Para sostener una producción de ovinos, eficiente y rentable, el agro-

ecosistema tiene que ser manejado intensivamente con forraje mejorado, riego, fertilización y otros insumos, y consideraciones de manejo del animal y estudios del mercado.

Como alternativa, se recomienda que se establezca la empresa de producción de ovinos en 1,593 cuerdas del área propuesta siguiendo las recomendaciones del Servicio de Extensión Agrícola de la Universidad de Puerto Rico, Recinto Universitario de Mayagüez. Como alternativa, también, hay cultivos alternos de mayor rentabilidad económica que la producción de forraje y ganadería de carne, que se podrían establecer en la zona. Se recomienda, además, que se establezcan los paneles fotovoltaicos en los techos de estructuras residenciales e industriales en los municipios del suroeste, como, por ejemplo, Guánica, San Germán, Cabo Rojo, Lajas y Yauco, siguiendo las recomendaciones de organizaciones como Queremos Sol Puerto Rico y peritos de la Universidad de Puerto Rico, Recinto Universitario de Mayagüez. La propuesta para la generación de energía en techos está basada en estudios científicos probados y aparenta representar la mejora alternativa de uso de tierra y costo, como alternativa energética para Puerto Rico. De esta manera se estará generando la cantidad de energía propuesta para cumplir con la Política Pública Energética de Puerto Rico y preservando los terrenos agrícolas para garantizar parte de la seguridad alimentaria para esta y futuras generaciones del país.

Basado en un análisis objetivo y científico del proyecto, se rechaza la construcción y operación del proyecto para generar energía solar con módulos fotovoltaicos en terrenos agrícolas de alto valor, dentro y en áreas adyacentes a la Reserva Agrícola del Valle de Lajas.

La Oficina de Gerencia de Permisos (OGPe) en calidad de proponente, ha presentado el Borrador de Declaración de Impacto Ambiental Montalva Solar Farm, Guánica-Lajas (B-DIA)[1]. El mismo fue preparado por Daniel J. Galán Kercadó Gerente Ambiental de Quantum Consulting, LLC a favor de PBJL Energy Corporation para la construcción y operación de una facilidad de producción de energía fotovoltaica con una capacidad de hasta 165 MW AC en los municipios de Guánica y Lajas. En este documento (i) se resumen los antecedentes y situación actual de la energía fotovoltaica en Puerto Rico, (ii) se resume el plan de acción propuesto en el B-DIA, y (iii) se hace un análisis del proyecto desde la perspectiva agrícola-ambiental.

I. Antecedentes y situación actual de la energía fotovoltaica en Puerto Rico

- Entre 2008 y 2012 la Autoridad de Energía Eléctrica (AEE) firmó 68 acuerdos de compra y operación *(PPOA por sus siglas en inglés)*. Entre el 2012 y el presente muchos de los acuerdos se re-negociaron.
- Los proyectos aparentemente se originaron durante la administración gubernamental de 2009 al 2013 y son producto de un proceso expedito ("fast-track") que no contó ni con participación ciudadana ni con una evaluación rigurosa de los impactos directos y a largo plazo para el desarrollo sostenible del país.
- El 19 de junio de 2020, la AEE sometió al Negociado de Energía de Puerto Rico (NEPR) una solicitud de enmiendas a los contratos de compraventa de energía renovable en 16 proyectos no-operacionales para una capacidad proyectada de 579 MW. Entre esos acuerdos estaba el propuesto en este B-DIA, *Montalva Solar Farm* Lajas-Guánica.
- Bajo la ley de Política Pública Energética de Puerto Rico (LPRP 17 del 11 abril de 2019)[2], AEE tiene el mandato de obtener el 40% de su electricidad de recursos no renovables para el 2025, 60% para el 2040, y 100% para el 2050.[3]
- Para el año fiscal 2019, la a energía fotovoltaica a escala comercial se generaba en 7 proyectos en operación o pre-operación para un total de 147 MW.[4], o cerca del 3.9% de la capacidad de consumo de la isla. Actualmente, el proyecto más grande de energía fotovoltaica a grande escala en operación es Oriana Energy, LLC (Yarotek, LLC) en Isabela

[1] Galán Kercadó, D. J. 2020. Borrador de Declaración de Impacto Ambiental. Número de caso en OGPe 2020-314865-REA-004636

[2] http://www.agencias.pr.gov/ogp/Bvirtual/leyesreferencia/PDF/17-2019.pdf.

[3] Autoridad de Energía Eléctrica, SB 1121 Puerto Rico Energy Public Policy Act, p. 23.. Disponible en - https://aeepr.com/es-pr/QuienesSomos/Ley17/A-17-2019%20PS%201121%20Politica%20Publica%20Energetica.pdf.

[4] Puerto Rico Electric Power Authority Integrated Resource Plan, Appendix 3 – Renewable energy project status. Disponible en https://aeepr.com/es-pr/QuienesSomos/Ley57/Plan%20Integrado%20de%20Recursos/PREPA%20Ex.%201.03%20IRP%202019%20Appendix%203%20-%20Renewable%20Energy%20Project%20Status.pdf.

generando 45 MW AC.[5] De aprobarse el Montalva Solar Farm, más que se duplicará la cantidad de energía solar que se produce actualmente.

- La AEE pretende añadir hasta 1,800 MW y 920 MW en almacenaje en baterías para el 2025.[6,7]

II. Resumen de los planteamientos más relevantes del B-DIA según propuesto

1. Aspectos generales

a. El proyecto pretende generar 20 empleos directos o indirectos durante la operación que se espera dure 30 años. Al finalizar el proyecto, se propone desmantelar el mismo siguiendo la reglamentación vigente. (B-DIA, p. 3).
b. El proyecto tiene una inversión de $250,000,000 que incluye los estudios, la compra e instalación de los módulos fotovoltaicos, las medidas de control y protección de los recursos naturales existentes y la construcción de facilidades accesorias (B-DIA, p. 11).
c. El proyecto pretende generar 165 MW AC, o el 4.46% del consumo pico energético de la isla. Actualmente, el PPOA es por 80 MW entre *PBJ Energy Corporation* y PREPA por un plazo de 25 años.
d. El proyecto propuesto está localizado cerca de la carretera 116, barrios Costa y Montalva en los municipios de Lajas y Guánica.
e. La energía generada en el proyecto se interconectará a la red de PREPA mediante una modificación de una línea aérea existente a través de varias fincas de la Reserva Agrícola del Valle hacia el norte conectando con San Germán a una distancia de 7.38 km.
f. El Proyecto propuesto está ubicado en 12 parcelas privadas. El dueño de las parcelas es José A. Acosta.
g. El proyecto propuesto tiene una cabida total de 1,799 cuerdas, de las cuales 1,267 cuerdas serán transformadas de su uso actual, el cual es agrícola, y cubiertos por 165 módulos fotovoltaicos, transformadores, baterías de almacenamiento, estructuras accesorias, caminos y subestaciones.
h. El proyecto pretende ocupar las áreas de las fincas con elevaciones de 4 metros sobre el nivel del mar (msnm) hasta 50 msnm. Los terrenos en elevaciones mayores a 50 msnm no serán utilizados y se mantendrán es su estado actual. (B-DIA, p. 23).

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[5] U.S. Energy Information Administration (EIA). Puerto Rico Territory Energy Profile. https://www.eia.gov/state/print.php?sid=RQ#105

[6] Puerto Rico Energy Bureau, PREPA Resource Planning - An Action Plan for a Greener, More Resilient Puerto Rico (August 2019), p.22.

[7] U.S. Energy Information Administration (EIA). Puerto Rico Territory Energy Profile. https://www.eia.gov/state/print.php?sid=RQ#105

2. Sobre la conversión de uso tierra de uno agrícola a uno de energía renovable.

a. Se propone fomentar el uso agrícola en áreas que no estén impactadas por los módulos fotovoltaicos, caminos y estructuras asociadas. Esta área se estima en 532 cuerdas. El proyecto alega que el mismo protegerá el área contra la expansión urbana (urbanizaciones, industrias, carreteras, etc.) (B-DIA, p. 7) "la cual una vez invade estas zonas las altera sin posibilidad de que se generen beneficios agrícolas". El proyecto alega que el mismo no limitará el área para uso agrícola (B-DIA, p. 7).
b. El proponente alega que las actividades agrícolas (sic. actuales) están limitadas a pastos y crianza de ganado, pero el drenaje es necesario debido a que la humedad del suelo limita el uso de maquinaria agrícola. Pequeñas áreas presentan suelos adecuados para el cultivo, pero la influencia de áreas de humedales adyacentes o la poca profundidad y suelos rocosos limitan el desarrollo de éstos." (B-DIA, p. 24)
c. El área de estudio es considerada en su mayoría como fincas de forraje para corte de heno o pastoreo para la ganadería de carne. En algunas parcelas el forraje el heno está entremezclado con árboles maduros Úcares (*Bucida buceras*), Bayahonda (*Prosopis juliflor*), Acacia (*Albizia lebbeck*), Guamá Americano (*Pithecellobium dulce*), Tamarindo (*Tamarindus indicus*), Guayacán (*Guaiacum officinalis*), y la Zarcilla (*Leucaena leucocephala*) (B-DIA, p. 15-16)
d. El proponente alega que, en el pasado, los terrenos propuestos para el proyecto fueron utilizados extensamente con propósito agrícola, principalmente el pastoreo de ganado. Actualmente continúa utilizándose con este propósito, pero a una escala mucho menor (B-DIA, p.42). La industrialización, y otros factores socioeconómicos y políticos causaron el abandono de la agricultura en gran parte del área. Varios de los problemas que afectaron la producción agrícola local incluyeron la competencia con productos extranjeros, importación descontrolada de productos que podían ser producidos localmente y el uso de terrenos altamente productivos para desarrollos urbanos (B-DIA, p. 42).
e. El proponente alega que "El Proyecto según diseñado es totalmente compatible con las actividades agrícolas existentes y propuestas. Inclusive, facilita el acceso a la finca para dichas actividades." (B-DIA, p. 122; p. 123). "En términos de bienestar social, el Proyecto promueve el empleo local para labores de construcción y mantenimiento y no afecta o limita temporera o permanentemente las oportunidades de trabajo existentes o proyectadas en el área agrícola. Por el contrario, al mejorar la seguridad del predio, el Proyecto previene actividades delictivas en el área y evita los vertederos clandestinos. También, al viabilizar el uso agrícola del predio, el Proyecto induce la creación de empleos agrícolas del área." (B-DIA, p. 123)

3. Sobre los recursos de suelos en el área propuesta

a. El proponente estipula que "…Muchos de los suelos son buenos para cultivar. Suelos en los llanos inundables se encuentran a lo largo de los ríos y arroyos en las llanuras costeras y en valles tierra adentro. Estos suelos generalmente tienen un buen potencial para la agricultura". (B-DIA, p. 24)

b. El proponente menciona que el área que ocuparía el proyecto tiene aproximadamente 54 tipos de suelo. Las series de suelos más comunes son Altamira gravelly clay (AtD) y Fraternidad clay (FrA). Estos suelos están clasificados como suelos no-hydricos, el Altamira graverlly clay no está considerados como "prime farmland" y el Fraternidad clay se considera como "prime farmland: si es irrigado. (B-DIA, p. 24, p. 27-31).
c. El proponente reconoce que cualquier impacto sobre los terrenos que sean clasificadas como *Prime Farmland* tienen que cumplir con *Farmland Protection Policy Act (FPPA) 7.U.S.4201*. (B-DIA, p. 27). La agencia que autorizaría la conversión de uso a uno no-agrícola es USDA-NRCS.

4. Sobre el impacto del proyecto sobre los recursos naturales

a. El proponente reconoce que área es considerada por el Servicio de Pesca y Vida Silvestre de los E.U. (USFWS por sus siglas en inglés), como un Hábitat Crítico para la Mariquita de Puerto Rico, ave endémica y clasificada como en peligro de extinción. Se realizó un censo de aves donde se observaron 14 especies, pero, no se observó Mariquitas (B-DIA, p. 13, p. 17). El DRNA determinó en 2010[8] que el área del proyecto se encuentra fuera del hábitat crítico. (B-DIA, p. 21).
b. Los siguientes sistemas naturales se encuentran dentro del proyecto (acuífero, hábitat crítico, humedales, lago artificial, Reserva Agrícola) y los siguientes se encuentran cerca desde el perímetro del predio (área costanera, arrecifes, bahías, bosque, canal, pozo, refugio de aves, reserva natural). Según el B-DIA, ninguno de los sistemas naturales se afectará significativamente. (B-DIA, p. 33-34; p. 34-40; p. 83-84)

5. Sobre la ordenación legal de uso de terrenos y su relación con el proyecto

a. El proponente alega que, conforme al Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios (RC 2019) con vigencia del 7 de junio de 2019, la instalación de solares fotovoltaicas es cónsona con los objetivos del distrito de calificación A-G, "…pues al momento presente, el predio está prácticamente en desuso agrícola y económico, por lo que ninguna actividad agrícola o económica será desplazada como parte de la acción. Tampoco se contemplan impactos ambientales significativos en el predio bajo estudio ni impactos ambientales que trasciendan los límites del Proyecto." "…se pretende que el proyecto sea evaluado por la Junta Adjudicativa en el proceso de Consulta de Ubicación y por la OGPe para la otorgación de los permisos correspondientes." (B-DIA, p. 44).
b. El proponente alega que los terrenos fueron utilizados extensamente con propósito agrícola, que continúa usándose, pero a una escala menor. Se propone armonizar la creación de energía renovable con el potencial de uso agrícola que tiene la finca,

[8] Borrador de Designación del Hábitat Natural Crítico y Hábitat Natural Crítico Esencial para la Mariquita de Puerto Rico (según mencionado en el B-DIA, p. 21).

recuperando el potencial agrícola y económico del área. La propuesta es realizar una "crianza de ganado ovino en producción ecológica. Los ovinos pastorean en los terrenos del proyecto para mantener la vegetación en niveles razonables a la vez que se benefician de tener áreas adicionales de pastoreo sin costo." (B-DIA, p. 45; p. 71)

c. El proponente utiliza como guía el mapa de calificación del plan territorial del Municipio de Lajas adoptado por la Junta de Planificación el 28 de junio de 2017. En dicho mapa los terrenos en la extensión municipal de Lajas al Sur de la carretera estatal #116 están clasificados como Agrícola de alta intensidad (A.a) y Conservación general (O.g). Los terrenos al Norte de la carretera estatal#116 están clasificados como Agrícola en Reserva Uno (AR-1), según el Mapa de Delimitación y Zonificación Especial para la Reserva Agrícola del Valle de Lajas adoptado por la Junta de Planificación el 19 de junio de 2014. Según el plan de uso de terrenos la zonificación de estos terrenos es suelo rústico especialmente protegido agrícola (SREP-A). (B-DIA, p. 46).
d. El proponente reconoce que parte del proyecto está ubicado en zona inundable (B-DIA, p. 52).
e. El proponente utiliza como base legal el Reglamento Conjunto 2019. La Tabla 6.54 del RC (2019) (p. 348-349) estipula los usos permitidos en Distrito R-G, entre ellos, proyectos de energía renovable. Según el proponente, el uso propuesto es permitido en distrito R-G. (B-DIA, p. 87). Hay 554 cuerdas del proyecto clasificado en Distrito de Calificación R-G (zona de Guánica).
f. La Tabla 6.57 del RC (2019) (p. 358) estipula los usos permitidos en Distrito A-P, entre ellos, proyectos de energía renovable. Según el proponente, el uso propuesto es permitido en distrito A-P. (B-DIA, p. 89). Hay 639 cuerdas del proyecto clasificado en Distrito de Calificación A-P (zona de Lajas).
g. El RC (2019) no autoriza proyectos de energía renovable en Distrito Conservación de Recursos (RC). Hay 80.5 cuerdas calificadas en RC. El B-DIA pretende proponer el mecanismo de consulta de ubicación para el proyecto.
h. El proyecto tiene 325 cuerdas en Reserva Agrícola (B-DIA, p. 94). El proponente alega que…" Si bien es cierto que estas tres fincas están afectadas por la condición de pertenecer a la Reserva Agrícola de Lajas, también es cierto que en el distrito Agrícola Productivo se permiten los Proyectos de Energía Renovable." RC (2019, p. 341.
i. El proponente presenta varias alternativas de desarrollo: (I) No acción; (II) Alternativa de Desarrollo de Un Proyecto Agrícola; (III) Alternativa de Construir un Desarrollo Residencial; (IV) Alternativa de Construir el Proyecto Propuesto, siendo la IV la mejor opción (B-DIA, p. 99-108). El proponente alega que "Esta (sic. IV) alternativa representa una doble solución económica y social que aportaría al cumplimiento de la Política Pública de Diversidad Energética y al desarrollo para fines agrícolas, de agroturismo y para consumo del producto local."

III. Comentarios y análisis relacionados a la acción propuesta

Se evalúo el *Borrador de Declaración de Impacto Ambiental Montalva Solar Farm Guánica-Lajas* (B-DIA), presentado por Daniel Galán Kercadó en representación de *Quantum Consulting LLC*. Se revisaron imágenes visuales de *GoogleEarth* y espectrales de *Sentinel2A* para hacer observaciones de carácter ambiental. También, se hicieron algunas observaciones de carácter agronómico-ambiental mediante los catastros de la Junta de Planificación (JP), recursos de suelo que incluye series y características morfológicas del perfil de las series, (NRCS), clasificación según la Junta de Planificación (2015), calificación según JP (2019), elevación LIDAR y pendiente (USGS,2015-2017), áreas prioritarias de conservación (DRNA, 2008) e hidrografía (CRIM, 2001). La evaluación contenida en esta sección está basada en el mejor juicio profesional y académico del autor principal y de los colaboradores contribuyentes.

Es menester de este servidor como catedrático en la Universidad de Puerto Rico, Recinto Universitario de Mayagüez, Colegio de Ciencias Agrícolas de la (CCA) emitir comentarios sobre este documento. Basado en el análisis realizado se plantea la hipótesis que este proyecto impactará negativamente la producción agrícola local y nacional afectando la integridad de los terrenos agrícolas y la preservación de las reservas agrícolas.

1. Aspectos generales

a. Tenencia de tierra en el área propuesta

> B-DIA: *El Proyecto propuesto está ubicado en 12 parcelas privadas. El dueño de las parcelas es José A. Acosta.*

El B-DIA incorrectamente señala a un solo propietario del área. Nuestro análisis demuestra que el proyecto está ubicado en 15 parcelas privadas repartidas en 17 planos con múltiples propietarios (Figura 1; Cuadro 1) (CRIM, 2020). No sabemos si hubo algún cambio en los últimos meses que no haya sido actualizado en la base de datos del CRIM.

b. Cabida del proyecto

> B-DIA. *El proyecto tiene una cabida total de 1,799 cuerdas, de las cuales 1,267 cuerdas serán transformadas de su uso actual, el cual es agrícola, y cubiertos por 165 módulos fotovoltaicos, transformadores, baterías de almacenamiento, estructuras accesorias, caminos y subestaciones.*

El B-DIA incorrectamente señala un área menor a la que realmente se impactará. Nuestro análisis, basado en las coberturas de la limitación de los predios por el CRIM, demuestra que las 17 parcelas ocupan un área total de 1,120 ha o 2,844 cuerdas (Figura 1). Nos preocupa la magnitud del área propuesta y la real que ocupa el proyecto, porque elimina un área significativa de terrenos en uso actual agrícola. Nos preocupa, además, el intento del proponente de minimizar la cabida del proyecto (2,844 cuerdas calculada por nosotros) de lo que realmente ocuparía (1,706 cuerdas reportadas por el proponente). Aparentemente, el

proponente calcula el área del proyecto basado en el área en terrenos entre 5 y 59 m sobre el nivel del mar (msnm) y no en el tamaño total de los planos.

c. Ubicación del proyecto según la elevación

B-DIA. El proyecto ocupará las áreas de las fincas con elevaciones de 4 metros sobre el nivel del mar (msnm) hasta 50 (msnm). Los terrenos en elevaciones mayores a 50 M no serán utilizados y se mantendrán es su estado actual.

Se realizó un análisis del área que ocuparía el proyecto, basado en la huella descrita en B-DIA. Nuestro análisis demuestra que se propone ubicar las placas fotovoltaicas en áreas menores a 4 m y mayores de 50 msnm (Figura 2). El 26% del área total de 2,844 cuerdas estaría en una altura sobre el nivel del mar de entre 0 y 4 m msnm y 14% estaría en alturas mayores de 50 msnm (Figura 3). El área total que ocuparían las áreas inhabilitadas es un 40% del área o 1,138 cuerdas.

d. Evidencia de tala y remoción de material vegetativo en la zona

En las parcelas 2, 17 y parte de la 4 (Ver Figura 1 para ubicar la zona), se ha talado un área de aproximadamente 30 ha (76 cuerdas) de bosque secundario. Esto se demuestra al realizar una apreciación visual histórica del área, en las imágenes satelitales de *Google Earth* y *Sentinel 2A* (Figura 4A y 4B). La tala-remoción ocurrió entre mayo y agosto de 2020. Se desconoce la razón por la cual esto se ha realizado. La eliminación de la vegetación arbórea podría impactar negativamente zonas aledañas a la zona de interés ya que los árboles estaban ubicados en parte de una zona de amortiguamiento y drenaje por donde discurren parte de las aguas de escorrentía de la zona de interés. Los árboles parecen haber sido muy frondosos con un extenso dosel, lo que evidencia el potencial de productividad que tienen los suelos a pesar de tener un mínimo manejo (o ninguno) de fertilización e irrigación.

La remoción de material vegetativo de la zona fue confirmada mediante un análisis de la imagen Sentinel 2A de NDVI (*Normalized Difference Vegetation Index*) para agosto 2020 (Figura 4B). La imagen demuestra las áreas pardas asociadas con menor vegetación. La zona donde se ha removido la vegetación contrasta con el resto de la zona que todavía mantiene una cubierta vegetal.

2. Sobre la conversión de uso tierra de uno agrícola a uno de energía renovable.

a. Fomentar el uso agrícola

B-DIA. Se propone fomentar el uso agrícola en áreas que no estén impactadas por los módulos fotovoltaicos, caminos y estructuras asociadas. La construcción y operación del proyecto "protegerá el área contra la expansión urbana (urbanizaciones, industrias, carreteras, etc.)…"; "la cual una vez invade estas zonas las altera sin posibilidad de que se generen beneficios agrícolas". El proyecto alega que el mismo no limitará el área para uso agrícola

Al evaluar esta aseveración hay que preguntarse, ¿por qué el proyecto protegerá el área contra la expansión urbana? Se puede interpretar que la presencia de placas fotovoltaicas es tan nocivo o desagradable que evitaría que comunidades se asienten en áreas circundantes. En el B-DIA no se hace mención de la presencia de la comunidad Cuesta Blanca, quien se encuentra entre partes del proyecto, y como esta comunidad potencialmente se puede afectar.

> *B-DIA. Las actividades agrícolas (sic. actuales) están limitadas a pastos y crianza de ganado, pero el drenaje es necesario debido a que la humedad del suelo limita el uso de maquinaria agrícola. Pequeñas áreas presentan suelos adecuados para el cultivo, pero la influencia de áreas de humedales adyacentes o la poca profundidad y suelos rocosos limitan el desarrollo de éstos".*

El B-DIA reconoce que el proyecto ocuparía e impactaría un humedal. Nuestras observaciones en la zona lo corroboran y el análisis de foto aérea demuestra que 97.8 ha (248.9 cuerdas) de humedal estarían impactadas negativamente por el proyecto.

b. Aspectos económicos de la producción agrícola

> *B-DIA. "…En el pasado, los terrenos propuestos para el proyecto fueron utilizados extensamente con propósito agrícola, principalmente el pastoreo de ganado. Actualmente continúa utilizándose con este propósito, pero a una escala mucho menor". "La industrialización, y otros factores socioeconómicos y políticos causaron el abandono de la agricultura en gran parte del área. Varios de los problemas que afectaron la producción agrícola local incluyeron la competencia con productos extranjeros, importación descontrolada de productos que podían ser producidos localmente y el uso de terrenos altamente productivos para desarrollos urbanos".*

Nuestro análisis demuestra que el 34% del área está en producción de forraje para heno, 40% está en pastoreo y 26% está en conservación de recursos (Figura 5), para un área efectiva en producción agrícola de 1,593 cuerdas. Se han hecho algunos estudios agrícola-económicos en la zona. Sotomayor y Pérez Alegría (2011)[9] realizaron un estudio de las actividades y el potencial agrícola en las zonas al este del Valle de Lajas y El Anegado (cerca de 18,000 cuerdas). Comas Pagán (2016)[10] realizó varias proyecciones económicas para el desarrollo del Valle de Lajas. Conty (2018) proveyó datos empíricos sobre el valor de la producción agrícola de Guánica y el Valle de Lajas. Para el 2018, la aportación económica

[9] Sotomayor-Ramírez, D. and L. Pérez-Alegría. 2011. An assessment of agricultural activities in the eastern portion of the Lajas Valley Agricultural Reserve, within Lajas and Guánica municipalities. Universidad de Puerto Rico, Mayagüez, Estación Experimental Agrícola, Manuscrito sin publicar. 16 pp, con apéndices. Disponible en: http://academic.uprm.edu/dsotomayor/Reprints_SummaryReports.htm.

[10] Comas Pagán. 2016. Plan de Reserva Agrícola Valle de Lajas 2016. Estado Libre Asociado de Puerto Rico, Departamento de Agricultura. 65 p. con anejos

($/cuerda) fue de $478, $480, y $8,213 para heno, ganado de carne, y cultivos hortícolas, respectivamente (Conty, 2018). Comas (2016) realizó estimados basado en la implementación de tecnología y fertilización, aumentando la proyección a $1,657/cuerda para la producción de heno, $946/ccuerda para la producción de ganado de carne y $19,200/cuerda para cultivos hortícolas (promedio de varios cultivos). El área en conservación de recursos no se considera debido a que posiblemente son suelos poco profundos, los suelos tienen exceso de sales para crear alguna limitación para la producción agrícola o existe la presencia de humedales, y el área efectiva agrícola se realiza en 1,820 cuerdas. Nuestro análisis demuestra que el valor agrícola anual en heno y ganadería en la zona es de $872,574 y basado en las proyecciones de Comas Pagán (2016) podría alcanzar $2,207,575 (Cuadro 2). Nuestro estimado es que actualmente hay 289 ha (734 cuerdas) con acceso directo al sistema de riego del Valle de Lajas. Si se convirtieran las 734 cuerdas en forraje y ganado que actualmente tienen riego, a la producción hortícola (productos de aproximadamente 120 días) restando esa área del área en ganadería y forraje el estimado, las proyecciones podrían alcanzar a entre $6,549,634 y $15,344,546 (Cuadro 2). El Plan de Desarrollo Reserva Agrícola Valle de Lajas de Comas (2016) demuestra proyecciones económicas para la Reserva Agrícola del Valle de Lajas basado en escenarios reales y proyecciones científicas para distintas empresas agrícolas tales como frutales, granos, forraje, hortalizas, farináceos, caña de azúcar, acuicultura, leche y novillas de reemplazo para vaquerías, ganado bovino, pequeños rumiantes, y otras empresas agrícolas. Dicho documento es actualmente la política pública del Departamento de Agricultura y la Oficina para el Desarrollo del Valle de Lajas. El alcance total de las proyecciones estimadas se resume según

Renglón	
Ingreso bruto agrícola	$94.65 M
Empleos directos actuales	640
Empleos indirectos actuales	1,600
Incremento en empleos directos futuros	473
Incremento en empleos indirectos futuros	1,183

y demuestra el potencial agrícola de todo el Valle de Lajas (Comas Pagán, 2016) basado en un análisis científico económico confiable.

c. Proyecto de crianza de ovinos como alternativa

B-DIA. El proponente propone un proyecto de crianza de ovinos como una alternativa agrícola para la zona.

El uso agrícola propuesto es la producción de ovinos. No se provee un estudio de viabilidad económica, seguridad e integridad de animales, capacidad administrativa de manejo de ese tipo de proyecto por el proponente, especialmente considerando que el mismo se realizará entremezclado y con la presencia de módulos fotovoltaicos, transformadores, y baterías en la zona. Se ha documentado el uso de ovinos en fincas fotovoltaicas para pastoreo del forraje entre los módulos. Pero, estos no necesariamente tienen un fin comercial para la venta de la carne y subproductos si no para la tala de áreas verdes. Para sostener una producción de ovinos, eficiente y rentable, el agro-ecosistema tiene que ser manejado

intensivamente con forraje mejorado, riego, fertilización y otros insumos, y consideraciones de manejo del animal y estudios del mercado.

La implementación de un proyecto de crianza de ovinos va mucho más allá que simplemente poner dichos animales en los predios con módulos fotovoltaicos. Al no presentar un estudio de viabilidad económica se entiende que el uso, que se le darán a los ovinos, será netamente para mantener los predios libres de malezas y no necesariamente para una producción de carne de cordero (entiéndase ovinos de 12 meses de edad o menos), la cual sería la que tendría viabilidad económica agropecuaria. Un ovino que se alimente de forrajes naturales de la zona no podrá llegar a un peso de sacrificio considerable o económicamente viable en el tiempo que se recomienda para obtener una calidad de carne aceptable.
Para la crianza de ovinos para carne se hace necesario un manejo de forrajes mejorados los cuales no serían cien por ciento viables en áreas donde los módulos le proveen sombra a los forrajes ya que el crecimiento y calidad disminuye, además, el manejo de forrajes especializados requieren sistemas de riego, fertilización y talas periódicas para su manejo lo cual se dificultarían por la presencia de los módulos. Además, no se proveen datos de cuál será el manejo que se le darán a dichos ovinos en cuanto a resguardo y protección ya que son animales muy susceptibles al ataque por perros y a ser robados.

Los comentarios en la B-DIA que, "*Bajo este modelo ganaderos ovinos locales pastorean en los terrenos del proyecto para mantener la vegetación en niveles razonables a la vez que se benefician de tener áreas adicionales de pastoreo sin costo*", reafirma que el interés del proyecto es mantener las áreas limpias de malezas que afecten las placas fotovoltaicas mas no un interés genuino por una producción agropecuaria. Y, aunque sea un pastoreo libre de costo para los ganaderos, no va a ser costo efectivo ya que se tienen que movilizar los animales dos veces al día (en la mañana a los predios de las placas y en la tarde de regreso a sus fincas donde tiene los ranchos para el resguardo de los animales) y, peor aún, que esa movilización sea para alimentar a sus ovejas con forrajes nativos y no forrajes mejorados.

La producción de carne de cabra y ovejas en Puerto Rico ha tendido a ser una de carácter doméstico/artesanal. Las personas que producen estos animales lo hacen sin fines comerciales y en caso que se lleve a la compra/venta, la misma no constituye el negocio principal del productor. El sector ha carecido de una organización para lograr una eficiente intensificación de la producción y mercadeo del producto. La producción del sector de pequeños rumiantes fue estimado (2013-2014) en 147,000 lb para un valor (ingreso bruto agrícola) de $462,000. Nótese que el IBA para el ganado vacuno para la misma fecha fue estimado en $23.1M.

La empresa de producción de pequeños rumiantes para leche y carne tiene mucho potencial para desarrollo en el Valle de Lajas. Se estima que hay cerca de 45 productores dedicando cerca de 500 cuerdas de terreno. La producción de estos en el área sin la construcción y operación de energía fotovoltaica sería una excelente alternativa para incrementar el valor de este rubro en Puerto Rico.

La industria de pequeños rumiantes contrasta con la industria de carne de res en Puerto Rico, el cual representa el 2.5% del ingreso bruto agrícola de la Isla, produciendo $21,997,000, según datos preliminares del Departamento de Agricultura para el año 2016/17 (DAPR, 2019).

La producción local para el 2017 fue de 110,280 QQ de carne lo que representa el 8.86% del consumo total de la isla. En la zona suroeste del país hay alrededor de 510 fincas en donde se cría ganado según datos del Censo 2018. El 22% de las fincas productoras de ganado se encuentran en esta región. El mercado de carne de res de calidad ha tomado auge. Los clientes se interesan por saber el origen de los alimentos que consumen. El concepto de la finca a la mesa toma mayor notoriedad. Esto brinda la oportunidad de desarrollar y promover productos innovadores, de mayor calidad. Con la adopción de nuevas tecnologías aplicadas a la producción de forrajes y mejoramiento genético del hato la región Suroeste tiene la oportunidad de aumentar su producción, garantizando la seguridad alimentaria de Puerto Rico y mejorar la calidad de vida de los ganaderos.

Una crianza de ovinos para carne no va de la mano con un proyecto de módulos fotovoltaicos. Dicha crianza sería mucho más apropiada en terrenos libres de módulos, con siembras de forrajes mejorados y manejo intensivo de riego y manejo de nutrientes, donde la atención sea completa para la producción agropecuaria, la cual mantendría protegidos los terrenos agrícolas, el suelo, humedales, flora, fauna y donde se creen alternativas reales a favor de la seguridad alimentaria.

d. Pérdida de terrenos agrícolas en Puerto Rico

La protección y preservación de los terrenos agrícolas en Puerto Rico es de especial importancia. Puerto Rico tiene un área total de 2.271 millones de cuerdas[11] y un área en terreno agrícola de aproximadamente 487,775 cuerdas (192,037 ha) (USDA-NASS, 2017)[12]. Al comparar a Puerto Rico con países homólogos en términos de población, área o localización geográfica tales como Costa Rica, Cuba, República Dominicana y Jamaica, estos países tienen un área total que es 5.6, 11.7, 5.4, 1.2, veces la de Puerto Rico, respectivamente. El área dedicada a la agricultura en estos países es mucho mayor (x veces en paréntesis) que en Puerto Rico con Costa Rica (9.2), Cuba (33), República Dominicana (12.1), Jamaica (2.3). El porcentaje del área total dedicada a la agricultura de todos estos países es de al menos 40% mientras que en Puerto Rico tiene un 22% del área dedicado a la agricultura. Al comparar con 29 países-territorios homólogos del Caribe y Costa Rica, Puerto Rico ocupa el escalafón número sexto en área dedicada a la agricultura, pero el un-décimo en términos proporcionales del área total dedicada a la agricultura (área agrícola/área total). Este cuadro pone en precariedad la seguridad alimentaria de Puerto Rico y le resta competitividad ante otros países. En resumen, Puerto Rico tiene un área agrícola pequeña y una proporción relativamente pequeña del área total dedicada o separada para la agricultura.

Otro aspecto es la alta tasa de pérdida de área agrícola en Puerto Rico, y la pérdida gradual de competitividad económica agrícola con países homólogos en el Caribe y Centro América. El área en tierras agrícolas (área en fincas) en Puerto Rico se ha reducido

[11] Basado en proyección métrica NAD1983

[12] USDA-NASS. 2017 Census of Agriculture. Disponible en https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Census_by_State/Puerto_Rico/index.php.

gradualmente a través de los años, y en el último quinquenio evaluado ha cambiado de 584,987 cuerdas en 2012 a 487,774 cuerdas en 2017 para una pérdida de 17%, o una pérdida anual de 16,202 cuerdas

Es preocupante el patrón de desvalorización de los terrenos agrícolas en Puerto Rico ante la importancia de generar energía eléctrica barata. El área que potencialmente ocuparían los proyectos de energía verde y su ubicación es preocupante. Estimado del 2018, demuestra que hay al menos 11 proyectos en operación o pre-operación para un total de aproximadamente 273 MW. Sotomayor-Ramírez et al. (2015)[13] describieron el impacto negativo de las turbinas eólicas en los terrenos de alto valor agrícola en a zona agrícola de Santa Isabel.

Actualmente, el Negociado de Energía de Puerto Rico (NEPR) está impulsando 16 proyectos de energía renovable de placas fotovoltaicas. Muchos de estos proyectos están ubicados en zonas llanas y costeras y de altor valor agrícola. Solo se puede especular sobre el área total que ocuparían estos proyectos. El área que ocupan las fincas por unidad de megavatio (MW) generado varía según la tecnología. Ong et al. (2013)[14] determinaron que para fincas de más de 20 MW el promedio de área ocupada en forma directa es de 7.2 acres/MW AC) y el área total de 7.9 acres/MW AC. Basado en el plan del NEPR de generar 590 MW-AC, la huella del impacto de la construcción y operación de los 16 proyectos fotovoltáicos podría llegar a 5,650 acres y muchos de estos en terrenos de alto valor agrícola.

La construcción de este proyecto propuesto y otros en planificación, podría provocar un escenario similar a lo acontecido en Puerto Rico en la década de 1990 a 2000. En ese periodo la población aumentó en un 8.2% y se construyeron más de 100,000 unidades de vivienda en zonas suburbanas aumentando la cubierta urbana en zonas agrícolas en más de un 10% (Parés-Ramos et al. 2008)[15]. Es preocupante que dueños de grandes extensiones de tierras agrícolas podrían convertir estas tierras a megaestructuras para genera energía solar impactando negativamente la huella agrícola en la isla y exacerbando la ya problemática alta tasa de pérdida de terrenos agrícolas en la isla.

e. Importancia de la agricultura en la economía de Puerto Rico

La agricultura tiene un rol muy importante en la economía de Puerto Rico. Por ejemplo, el Ingreso Bruto Agrícola para el 2014 fue de $965.4 millones. La agricultura contribuye a la creación de empleos directos e indirectos en otros sectores de la economía debido al efecto multiplicador. Por otra parte, la agricultura aporta a la seguridad alimentaria de la isla al reducir

[13] Sotomayor Ramírez, D., R. Rodríguez Pérez, I. Pagán Roig. 2015. Terrenos agrícolas y energía renovable: Caso de estudio Pattern Energy Inc. en Santa Isabel. 2015. Revista de Administración Pública. 45: 1-27. Volumen especial bajo el tema “La Administración Publica de la Energía: Clave para la Sostenibilidad Puertorriqueña".

[14] Ong, S., C. Campbell, P. Denholm, R. Margolis, G. Heath. 2013. Land-use requirements for solar power in the United States. National Renewable Energy Laboratory. U.S. Department of Energy. Technical Report 6ª20-56290.

[15] Parés-Ramos, I. K., W. A. Gould, and T. Mitchell Aide. 2008. Agricultural abandonment, suburban growth, and forest expansion in Puerto Rico between 1991 and 2000.. *Ecology and Society* **13**(2): 1.

la dependencia de importaciones de alimentos. Este es un factor de gran importancia en Puerto Rico donde aproximadamente el 85% de los alimentos son importados, lo cual aumenta la vulnerabilidad ante los desafíos ambientales. Aun así, cada día vemos más proyectos de inversión que comprometen la actividad agrícola en toda la isla. Expansión urbana, construcción de hoteles, y desarrollo de turbinas eólicas y placas solares son algunos ejemplos de proyectos que han reducido a diferentes escalas las oportunidades agrícolas en Puerto Rico.

Actualmente el municipio de Lajas se encuentra rezagado en varios aspectos socioeconómicos. Por ejemplo, según los datos del Censo (2019), la tasa de participación laboral en el municipio es la más baja dentro de todos los municipios a su alrededor. El porcentaje de habitantes con grado de bachillerato o mayor también es el más bajo en su región. Esto pudiera explicar porque la mediana de ingresos del hogar se encuentra entre las más bajas dentro de todos los municipios a su alrededor. Ciertamente es un municipio que, a pesar de generar ingresos por turismo, sigue siendo desventajado en la región suroeste.

Un proyecto de energía fotovoltaica podría dar la impresión que no afecte las propiedades del suelo, relativo a otros usos de terreno. Sin embargo, desarrollar un proyecto de grande escala en la región compromete de todas formas la salud del suelo, y la flora y fauna al eliminar plantas y árboles. Además, este tipo de proyecto compromete el crecimiento económico, debido a que reduce los terrenos disponibles para desarrollo agrícola de esta y futuras generaciones, lo cual es crucial en esta región con menos acceso a oportunidades de empleos y menos ingresos.

En el 2015-2016, la agricultura aportó $11.3M en Lajas y $7.8M en Guánica (Conty, 2018), lo que corresponde a entre 1 a 1.5% al ingreso total agrícola del país. El ingreso bruto agrícola puede aparentar ser mínimo, pero este solamente considera el valor en la finca y no considera el efecto multiplicador del valor añadido del producto agrícola ni el de la generación de empleos. En Lajas y Guánica la agricultura puede aportar hasta un 10% del ingreso total municipal, lo que hace que estos municipios dependan principalmente de la agricultura y del turismo. Los principales cultivos en Lajas son el heno, piña y ganado de carne y en Guánica son ganado de carne y hortalizas. Garantizar el área en terrenos agrícolas en la zona de Lajas y Guánica equivale a preservar parte de la economía y el lugar de trabajo de cientos de empleos directos e indirectos.

3. Sobre los recursos suelos en el área propuesta

a. Recursos de suelos en la zona

B-DIA. "…Muchos de los suelos son buenos para cultivar. Suelos en los llanos inundables se encuentran a lo largo de los ríos y arroyos en las llanuras costeras y en valles tierra adentro. Estos suelos generalmente tienen un buen potencial para la agricultura".

B-DIA. El área que ocupa el proyecto tiene aproximadamente 54 tipos de suelo. Las series de suelos más comunes son Altamira gravelly clay (AtD) y Fraternidad clay (FrA). Estos suelos están clasificados como suelos no-hydricos, el Altamira graverlly clay no

está considerados como "prime farmland" y el Fraternidad clay se considera como "prime farmland: si es irrigado.

Coincidimos en que el proyecto se pretende construir en los mejores suelos agrícolas de Puerto Rico. Nuestro análisis demuestra que en la zona de interés hay 20 series de suelo, de los cuales algunos tienen más de una fase (Figura 6; Cuadro 3). El 41% del área en suelos (estimada en 999 ha o 2,538 cuerdas) pertenece a los órdenes Vertisol y Mollisol. El 47% del área en suelos pertenece al orden Aridisol y el 17 % del área pertenece a Inceptisol y Entisol.

Los Vertisoles y Molisoles son suelos son de la más alta fertilidad en cuanto a sus propiedades químicas. Los suelos poseen una alta capacidad de intercambio catiónico, pH neutral a alcalino, alto porcentaje de saturación de bases, alto contenido de materia orgánica, buena disponibilidad de nitrógeno y fósforo, textura franca a franco-arcillosa y estructura friable.

Algunos de los Vertisoles pueden tener una textura más pesada ya que posee arcillas expandibles que tienden a ser pegajosas cuando el suelo está muy húmedo y forma grietas cuando el suelo se seca[16], y merecen una atención especial en cuanto a las operaciones de labranza y preparación de terreno para la siembra. Los Molisoles ocupan grandes extensiones de tierra en el sur de EE. UU para la producción de granos y a nivel mundial ocupan áreas de importancia agrícola para la producción de cultivos agronómicos como el trigo, maíz, arroz y soja. Los Molisoles tienen un horizonte superficial muy fértil (conocido como epipedón mólico) debido a la adición de materiales orgánicos de gramíneas y vegetación asociada. Los Molisoles son entre los suelos más importantes y productivos para la producción agrícola en EE. UU y a nivel mundial.

Los Aridisoles se caracterizan por un horizonte superficial (capa superior) de color claro con bajo contenido de humus, por las condiciones del suelo seco durante la mayor parte del año, y por una acumulación alta de arcillas, sales solubles o sodio. Estos suelos pueden ser muy productivos con el manejo adecuado. Evidencia de esto es que gran parte de las hortalizas que se producen en Puerto Rico, ocurre en la zona agrícola de Guánica en Aridisols (ejemplo, suelo Guayacán).

Algunos Inceptisoles y Entisoles pueden tener algunas limitaciones en cuanto a la presencia de carbonato calizo y porque tienden a ser un poco menos profundo que otros. No obstante, estos suelos pueden ser tan productivos como otros en zonas adyacentes con el manejo e implementación de tecnología adecuada.

Los terrenos donde se ubican los suelos son de la más alta fertilidad. Nuestro estimado de que un 53% son de alta fertilidad. Nuestro estimado es que cerca de 30% de los suelos o 761 cuerdas, ya tienen infraestructura de riego con acceso al canal de riego del Valle de Lajas. Otras áreas pueden ser dotados con la debida infraestructura para la captación de agua de lluvia para riego o para conectarse al sistema de riego de la Reserva Agrícola del Valle de Lajas. Los suelos llanos con pendiente moderadas con infraestructura de riego facilitan la mecanización de las actividades agrícolas. Debido al alto costo de la mano de obra, la mecanización y automatización de las actividades agrícolas son de vital importancia ahora y en

[16] H. Eswaran, P.F. Reich, in Encyclopedia of Soils in the Environment, 2005. Hillel, D. (editor).

el futuro. En resumen, las características geomorfológicas, infraestructura agrícola, y características físico-químicas permiten que los suelos sean altamente fértiles y la mayoría del área de muy alta productividad. Es importante que no se pierda ni una pulgada de estos suelos ya que son de alto valor.

b. Área clasificada como *Prime Farmland*

B-DIA. "…cualquier impacto sobre los terrenos que sean clasificadas como *Prime Farmland* tienen que cumplir con *Farmland Protection Policy Act (FPPA) 7.U.S.4201*.

Nos preocupa que se reduzca el área de terrenos agrícolas identificados como *Prime Farmland*[17]. Según el catastro de suelos publicado por el Servicio de Conservación de Recursos Naturales (USDA-NRCS), El 50% del área en suelos están clasificados como *Prime Farmland*, *Farmland of Statewide Importance*, o *Prime Farmland if Irrigated and Reclaimed* (Figura 7). La alta fertilidad de los suelos junto con las condiciones climáticas de la zona así le permiten esa clasificación. La poca precipitación de la zona permite menor potencial de lixiviación de nutrientes, menor erosión, menor pérdida de nutrientes por escorrentía, y menor humedad relativa el cual permite mejor control de fitosanitario de patógenos. Las experiencias de este servidor y estudios realizados con colaboradores, estudiantes y agricultores demuestran que los terrenos donde se ubicará el proyecto son de alto valor agrícola y se pueden considerar como entre los mejores suelos de Puerto Rico, debido a la combinación de las propiedades físicas, químicas y biológicas (USDA, 2020)

c. Potencial de productividad agrícola de la zona

Se tomaron imágenes Sentinel 2A para la zona para el 15 agosto 2020. En dichas áreas se identificaron las áreas: A- Finca Bayer; B – Humedal; C - Área agrícola de alta productividad; D – Área agrícola del Anegado que tiene acumulación transitoria de agua durante eventos de tormenta; E – Area vegetal removida entre julio y agosto 2020.

En la imagen en color natural (*True Color*) (Figura 8-I), se demuesra el área de interés y la vegetación creciendo en la zona. La imagen en falso color (*False Color*) (Figura 8-II) permite observar el efecto de la vegetación actual, área en suelo desnudo (sin vegetación por arado y

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[17] *USDA. 2020. " Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent."*
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_01405".

actividad agrícola), área de acumulación mayor de agua en el suelo y área donde hay remoción de vegetación reciente. La imagen de NDVI (*Normalized Difference Vegetation Index*) (Figura 8-III) demuestra las áreas verdes de mayor crecimiento vegetativo y acumulación de biomasa. En el área C y D, hay menor vegetación posiblemente por acumulación excesiva de agua en el perfil. Se observa la ausencia de vegetación en los suelos desnudos en A y en la comunidad Cuesta Blanca. En la imagen de humedad del suelo (Figura 8-IV), se observan las áreas C y D con mayor humedad en el suelo. El área E se observa con mayor humedad en el suelo posiblemente por la ausencia de vegetación (que existía) previo a junio 2020. Este breve análisis demuestra que la zona donde se pretende construir y operar el proyecto de energía fotovoltaica tiene tan alta productividad como el resto del Valle de Lajas.

d. Compatibilidad entre el proyecto y actividades agrícolas

B-DIA. "El Proyecto según diseñado es totalmente compatible con las actividades agrícolas existentes y propuestas. Inclusive, facilita el acceso a la finca para dichas actividades." "En términos de bienestar social, el Proyecto promueve el empleo local para labores de construcción y mantenimiento y no afecta o limita temporera o permanentemente las oportunidades de trabajo existentes o proyectadas en el área agrícola. Por el contrario, al mejorar la seguridad del predio, el Proyecto previene actividades delictivas en el área y evita los vertederos clandestinos. También, al viabilizar el uso agrícola del predio, el Proyecto induce la creación de empleos agrícolas del área.".

El proyecto propuesto no es compatible con la actividades actuales de producción de forraje para producir heno y para la ganadería de bovino (carne). Se realizó un análisis del área ocupado por los módulos fotovoltaicos, basado en la Finca Oriana en Aguadilla/Isabela. Dicha facilidad está dividida en dos áreas de 35 ha cada una para un total de 70 ha (Figura 9). El material vegetativo debajo de los módulos ocupa un 51% del área, por lo que dicha área reduciendo la actividad fotosintética de las gramíneas y otra vegetación arbustiva creciendo, limitando grandemente la producción vegetal. Observaciones visuales hechas por este servidor en fincas solares así también lo demuestran. El restante del 49% del área, aquella franja entre los módulos solares, posiblemente tenga algunas reducciones en duración diaria de radiación solar. Nuestro estimado es que la franja vegetativa tiene un ancho de 10 pies, lo cual podría sostener algún tipo de actividad agrícola pecuaria de muy baja intensidad. Esto, porque no se contempla la aplicación de insumos externos (riego y fertilización) para incrementar la producción vegetal (rendimiento) por lo que la productividad animal se espera que sea relativamente baja.

4. Sobre el potencial impacto en los recursos naturales

Al momento, parece haber escasa información científica para evaluar todos los impactos que pueden tener la construcción, operación, expansión de infraestructura de transmisión y decomisión de las instalaciones centralizadas a grande escala (*utility-scale solar energy*, USSE) como la propuesta en la Finca Montalva, sobre los recursos naturales y los terrenos agrícolas

(Cook et al. 2013[18]; Turney y Fthenakis, 2011[19]; Hernandez et al. 2013[20]). Esto incluye el potencial para la compactación y erosión durante la construcción, efecto sobre la población y diversidad de vida silvestre, modificación de los procesos hidrológicos del suelo (Figura 11). No obstante, la información existente sugiere que las fincas solares pueden tener un impacto negativo sobre el exceso de escorrentía, las tasas de erosión y sedimentación en cuerpos receptores. Los paneles fotovoltaicos son impermeables, la precipitación que cae sobre su superficie viaja hacia el extremo inferior del panel y cae libremente sobre la superficie del suelo. Cada panel produce una escorrentía en magnitud igual a la precipitación recibida; siendo descargada en su extremo de menor elevación como un flujo concentrado. Esta acción convierte los eventos de precipitación, especialmente los de mayor magnitud, en unos de alta intensidad con alto poder erosivo sobre el suelo. La lluvia que antes del panel se distribuia en un área permeable igual a la superficie del panel, ahora caería sobre una superficie impermeable y luego al suelo de manera concentrada a lo largo del extremo de menor elevación sobre el terreno, convirtiendo un evento de menor impacto en uno de hasta más de 1,000 veces más intenso (L. Pérez-Alegría, comunicación personal)[21]. Como es de esperarse, la impermeabilización aparente del terreno, no solo cambia el patrón de movimiento de la escorrentía superficial sino que: i) puede producir un aumento de hasta 73% del flujo máximo de escorrentía dependiendo de la cobertura del terreno debajo del panel, ii) reducir el tiempo de concentración y iii) aumentar en 10 veces o más la energía cinética de la escorrentía aumentado el poder de erosión y socavación del suelo (Cook y McCuen, 2013)[22]. Por tales razones, un proyecto de tal magnitud como el propuesto en la Reserva Agrícola va a aumentar el potencial de exportación de sedimentos y como consecuencia, aumentar la entrada de nutrientes en las aguas receptoras de la costa sur oeste de Puerto Rico.

Según Hernández et al. (2013) los USSE pueden fragmentar el hábitat de vida silvestre y servir de barrera migratoria. En áreas de escases de agua, los proyectos de USSE como el propuesto pueden tener conflicto con los usuarios para uso doméstico y agrícola en áreas con precipitación limitada, como ocurre en la zona Lajas-Guánica. En el Valle de Lajas, el agua para consumo humano y agrícola se originan del agua que se mueve del este al oeste a través del canal de riego al norte del Valle de Lajas. Según Hernandez y otros, estos riesgos no pueden ser minimizados y estos sugieren la instalación de USSE en tierras ya degradadas. Existe la necesidad de encontrar sitios alternos de forma tal que se minimicen los impactos sobre la producción agrícola y sus terrenos.

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[18] Cook, L.M., R.H. McCuen. Hydrologic response of solar farms. J. Hydrol. Eng. 2013.18:536-541.

[19] Turney, D., V. Fthenakis. 2011. Environmental impacts from the installation and operation of large-scale solar power plants. Renewable and Sustainable Energy Reviews. 15: 3261-3270.

[20] Hernandez, R.R. et al. 2013. Environmental impacts of utility-scale solar energy. Renewable and Sustainable Energy Reviews. 29: 766-779.

[21] Usando solo un panel PV de 250 watts de 61.3inx41.2in. El modulo de 1MW producirá energía erosive aún mayor.

[22] Cook L.M. and R.H. McCuen, 2013. Hyrologic response of solar farms. J. Hydrol. Eng., 18:536-541.

Hernandez et al. (2015)[23] evaluaron el impacto de proyectos de energía solar sobre los cambios en la cubierta de tierra y áreas protegidas. En el estado de California solamente el 15% de las instalaciones estaban localizadas en áreas "combatibles" o adecuadas, según criterios ambientales y agrícolas. Coinciden Hernandez y otros que la ubicación de instalaciones USSE en áreas ya impactadas por actividad humana (o suelos degradados y de menor productividad agríola), reduce la oportunidad de que ocurran impactos ambientales adversos y a la vez que se puedan cumplir las metas de producción de comida para futuras generaciones.

Dahlin et al. (2011)[24] sugieren que la demanda energética de EE. UU se puede satisfacer sacrificando el 11% del área total en cultivos (o 101.4 x 10^6 ha). Esto es equivalente al área del estado de California. Una propuesta como esta no tiene sentido ya que el área agrícola en EE. UU se está reduciendo aproximadamente 2% por año y existe la necesidad de duplicar la producción de bienes agrícolas en al menos 40% para el año 2050.

Ifft et al. (2018)[25] describieron como los desarrolladores de las facilidades en el estado de Nueva York tienen distintas perspectivas en cuanto a la localización para las fincas solares. Los sitios más atractivos para la instalación de los megaproyectos son en fincas agrícolas, atraídos por la calidad de los terrenos, y al envejecimiento de los agricultores, balance de ingresos-deudas de los dueños de fincas (*landowners*), y la promesa de grandes ganancias de dinero para los tenedores de los terrenos al cederlos para la actividad. En ese estado se ha reconocido la participación y envolvimiento de la ciudadanía en el proceso de toma de decisiones como uno de los factores más importantes para poder hacer evaluaciones responsables del impacto de los megaproyectos.

Los estados de EE. UU. tienen diferentes políticas en cuanto a la localización de fincas solares y su impacto en terrenos agrícolas. Por ejemplo, California tiene como política favorecer el desarrollo de energía solar en terrenos que no son hábitat valioso de vida silvestre, áreas abiertas o agrícolas (Ifft et al. 2018). Solamente terreno agrícola del más bajo valor (*non-prime agricultual land*) puede ser convertido a desarrollo solar y con impuestos adicionales. En Carolina del Norte se reconoce que la transición de uso de tierra agrícola producción solar es muy atractivo para el propietario debido a que los pagos por los contratistas son mayores que el ingreso agrícola (NC-State Cooperative Extension)[26]. Uno de los aspectos a considerar es como la incentivos y créditos de impuestos, y tecnología cambian con el tiempo resultando en tecnología obsoleta que acaba siendo abandonada en poco tiempo. Esto presenta un dilema muy interesante para Montalva Solar Farm. ¿Qué pasaría si por alguna razón la finca solar se abandona en pocos años? ¿Puede la finca solar ser decomisada a un bajo costo, quién lo pagará

[23] Hernandez, R.R. y otros. 2015. Solar energy development impacts on land cover change and protected áreas. PNAS. 112 (44) 13579-13584

[24] Dahlin et al. 2011 , citado por Hernandez et al. 2013.

[25] Ifft, J. T. Grout, D. Kay, D. Budgen, F.Kay, D. Lane, C. Rondem, R. Stedman, J. Sward, M. Zhang. 2018. Large-scale solar information and research needs for New York State. Community and Regional Development Institute, Cornell University. Cardi Reports/Issue 18/Mayo 2018.

[26] NC-State Cooperative Extension. Considerations for transferring agricultural land to solar panel energy production. Disponible en: https://craven.ces.ncsu.edu/considerations-for-transferring-agricultural-land-to-solar-panel-energy-production/.

y podrá revertirse a su estado original? El estado de Massachussets prohíbe la instalación de fincas solares en localizaciones que resulta en una pérdida significativa de terrenos de valor agrícola o recursos naturales, prefiriendo la instalación en techos de estructuras (MEOEEA, 2014)[27].

Parte de uno o varias de las fincas agrícolas están en una zona clasificado como humedal. La conversión de humedal a agrícola ocurrió posiblemente muchos años atrás cuando esto se permitía, pero la tierra agrícola actualmente está protegida como "prior converted wetland" (PCW). Con la instalación de la finca solar, se estaría convirtiendo tierra agrícola PCW a un uso industrial. Tampoco queda claro como se manejará aspectos tales como uso de tierras en PCW, debido al abandono temprano de la finca solar o al final de su vida útil.

5. Sobre la ordenación legal de uso de terrenos y su relación con el proyecto

El proponente utiliza como guía el mapa de calificación del plan territorial del Municipio de Lajas adoptado por la Junta de Planificación el 28 de junio de 2017 y el Reglamento Conjunto de 2019 (RC, 2019)[28]. El uso de RC 2019 es cuestionable, pero es menester de los peritos en asuntos legales dilucidar la legalidad de dicho documento.

En el RC2019 (Tomo VI, Capítulo 6.1) se establecen y definen las diferentes tipologías de calificación de suelos para establecer usos y distritos de calificación uniformes (RC, 2019). En el RC 2019 (Equivalencias Distritos de Calificación) se modificaron todas las calificaciones relacionadas y relevantes a la agricultura que existían en el RC 2010[29]. Por ejemplo, la calificación Agrícola General Dos, Agrícola General Tres y Agrícola General Cuatro (A-2, A-3, A-4, respectivamente) y Agrícola en Reserva Dos (AR-2) se convierten en Rural General (R-G). La calificación Agrícola Productivo (A-1) y Agrícola en Reserva Uno (AR-1) se convierten en Agrícola Productivo (A-P). Además, las calificaciones agrícolas se unificaron con otras que no guardan relación con la agricultura (como por ejemplo Terrenos Urbanizables, U-R) con la calificación A-P. La agrupación de calificaciones específicas, en donde previamente se han reconocido sus características particulares y su respectivo valor intrínseco, dentro de calificaciones más amplias, desvaloriza aquellas calificaciones que son importantes para distinguirlas y podría permitir usos que ahora no son permitidos. En dicho documento no hay criterios o justificación científica que sirva para justificar los mencionados cambios.

Las Reservas Agrícolas han sido creadas mediante legislación, comenzando con la creación de la Reserva Agrícola del Valle de Lajas (Ley 277 del 20 de agosto 1999). Estas Reservas responden a una política especial y de cuidado por parte del estado, por el valor

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[27] MEOEEA. 2014. Model zoning for the regulation of solar energy systems. Disponible en: https://www.mass.gov/files/documents/2016/08/nc/model-solar-zoning.pdf.

[28] Reglamento Conjunto para la Evaluación y Expedición de Permisos relacionados al Desarrollo, Usos de Terrenos y Operación de Negocios" o como el "Reglamento Conjunto 2019". Disponible en: https://jp.pr.gov/Reglamentos/Reglamento-Conjunto-2019.

[29] *Reglamento Conjunto de Permisos para Obras de Construcción y Usos de Terreno*s (Reglamento Conjunto 2010).

especial agropecuario y para la seguridad alimenticia que representa esta zona y para el disfrute para la presente y futuras generaciones. Se entiende que el RC (2019) no puede ir por encima de la Ley 277, la cual establece que los terrenos dentro de la Reserva Agrícola del Valle de Lajas son para uso exclusivo agrícola.

Otro aspecto de importancia en el RC 2019 es que La Junta Adjudicativa podrá autorizar los usos no atendidos ministerialmente vía consultas de ubicación en Reservas Agrícolas, Naturales o Áreas de Planificación Especial. Entre los criterios a considerarse en Reservas Agrícolas, Naturales, Plan Sectorial o Áreas de Planificación Especial, se establece que la parte interesada debe demostrar que tiene la capacidad de operar el uso juiciosamente y que la operación del uso resulta conveniente y adecuada al interés público, a base de varios criterios (once de ellos), entre los cuales, el #2 establece que "No se afecta la integridad ecológica de la Reserva Agrícola, Natural o del Área de Planificación Especial, y que no ocasione peligro a los recursos naturales, históricos, culturales y agrícolas existentes." Esta aseveración es demasiado liberal y no les da suficiente protección a los terrenos agrícolas de Puerto Rico para evitar que sean convertidos a usos urbanos u otros de carácter no-agrícola.

IV. Recomendaciones y conclusiones

Existe un plan de desarrollo agrícola para la Reserva Agrícola del Valle de Lajas, donde se proveen proyecciones económicas en al menos once empresas agrícolas (Comas-Pagán, 2016). El estudio provee análisis científico detallado que incluye planes de acción y estrategias para ser implementados. Se sugiere que se visite dicho plan como alternativa para las actividades agrícolas que actualmente se están realizando. Basado en la opinión profesional de este servidor, se recomienda que se establezca la empresa de producción de ovinos en 1,593 cuerdas de la finca siguiendo las recomendaciones del Servicio de Extensión Agrícola de la Universidad de Puerto Rico, Recinto Universitario de Mayagüez. Como alternativa, también, hay cultivos alternos de mayor rentabilidad económica que la producción de forraje y ganadería de carne, que se podrían establecer en la zona.

La necesidad de aumentar la proporción del consumo energético de Puerto Rico con fuentes de energía renovable para reducir la dependencia de combustibles fósiles, reduciendo así el impacto ambiental, contribuyentes al cambio climático, y reducir el costo de energía está ya estipulado y aceptado por la comunidad científica, académica y hasta el público en general. La generación de energía fotovoltaica es una alternativa viable. Hay varios estudios que demuestran la viabilidad de la instalación de placas solares en techos de estructuras ya existentes y micro-redes comunitarias y que su beneficio económico y ambiental es mayor que el de la instalación en grandes extensiones de terreno (Irizarry-Rivera et al. 2009[30]; O'Neill-

[30] A.A. Irizarry Rivera, J.A. Colucci Ríos, E. O'neill Carillo, "Achievable Renewable Energy Target's For Puerto Rico's Renewable Energy Portfolio Standard, Final Report to the Puerto Rico´s Energy Affairs Administration, November, 2009 (contract number 2008-132009).

Carrillo et al. 2017[31]; O'Neill-Carrillo e Irizarry-Rivera, 2019[32]; Aponte et al. 2017[33]; Queremos Sol, 2019[34]; Irizarry-Rivera-Agustín, 2019[35]) como la propuesta en *Montalva Solar Farm*. Testimonios de experto, estudios, y análisis publicados por académicos y científicos de la Universidad de Puerto Rico y la participación de grupos comunitarios, así lo demuestran (ver citaciones). La inversión de $250 M se podría utilizar para lograr que la energía para ser generado se haga en techos de estructuras en la zona suroeste de Puerto Rico, e incentivar la actividad económica orientada a los pequeños rumiantes y ganadería de carne de res en el suroeste de Puerto Rico

[31] O'Neill-Carrillo, E. A. Irizarry-Rivera, I. Jordán, R. Cintrón. 2017. The long road to community microgrids. IEEE Electrification Magazine. Dec. 2018. P. 6-17.

[32] O'Neill-Carrillo, E. y A. Irizarry-Rivera. 2019. How to Harden Puerto Rico's grids against hurricantes. 42: Specctrum IEEE.org. 7 p.

[33] Aponte, E.E., E. O'Neill-Carrillo, E.I. Ortíz-Rivera, M. Castro-Sitiriche, L. Orama-Exclusa, A. Ramírez-Orquín, A. Irizarry-Rivera. 2019. Letter to Hon. Judge Laura Taylor Swain, on behalf of University of Puerto Rico Professors regarding the vision for a sustainable energy future for Puerto Rico.

[34] Queremos Sol. 2019. Sostenible, local, limpio. Ver. 3. Queremossolpr.com Disponible en: https://www.queremossolpr.com/.

[35] Irizarry-Rivera, A. 2019. Expert Report of Agustín Irizarry-Rivera Pursuant; PROMESA Title III - No. 17 BK 3283-LTS and PROMESA Title III - No. 17 BK 4780-LTS. United States District Court for the District of Puerto Rico. 24 p.

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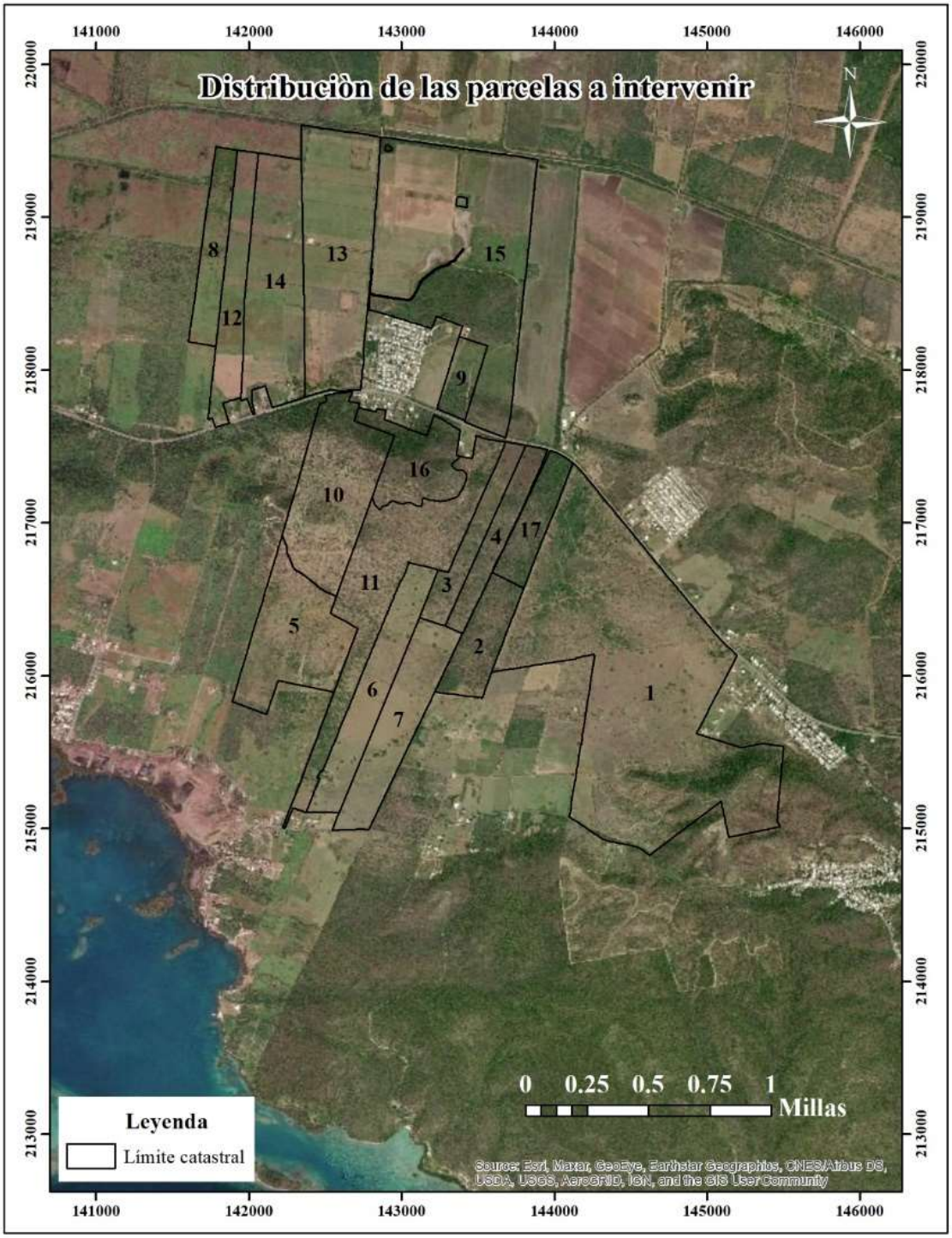
Sotomayor Ramírez, D., R. Rodríguez Pérez, I. Pagán Roig. 2015. Terrenos agrícolas y energía renovable: Caso de estudio Pattern Energy Inc. en Santa Isabel. 2015. Revista de Administración Pública. 45: 1-27. Volumen especial bajo el tema "La Administración Publica de la Energía: Clave para la Sostenibilidad Puertorriqueña".

USGS (2003) Mapa digital de acuíferos de Puerto Rico. Recurso electrónico disponible en: http://www.gis.pr.gov/

USGS (2015-2016) Modelo de elevación digital de Puerto Rica, LIDAR a 1 metro de resolución espacial. Recurso electrónico disponible en: https://coast.noaa.gov/htdata/raster2/elevation/PR_USGS_DEM_2015_8654/

Figuras y cuadros

Figura 1. Parcelas identificadas en el área de construcción.



Cuadro 1. Detalles de las parcelas que componen el área en construcción (ver Figura 1) (CRIM, 2020). Nótese pueden haber varios catastros asociados a la misma parcela.

Parcela	----------Detalles----------	
Parcela 1	Catastro: 428-000-004-01-027 Parcela: 428-000-004-01 Procedencia: 428-000-004-01 Dueño: RODRIGUEZ VARGAS ALFREDO Dirección física: SECTOR MAGUEYES, GUANICA Cabida escritura: 0.00 m2 Área de mapa: 3,493,554.71 m2	Catastro: 428-000-004-01-901 Parcela: 428-000-004-01 Procedencia: 428-000-004-01 Dueño: RAMIREZ ACOSTA JOSE B Dirección física: BO MONTALVA CARR 116, GUANICA Cabida escritura: 3,215,845.10 m2 Área de mapa: 3,493,554.71 m2
Parcela 2	Catastro: 406-000-008-03-000 Parcela: 406-000-008-03 Procedencia: 406-000-008-03 Dueño: SOTO ALMODOVAR INES Dirección física: E11 CARR 325 URB VALLE TANIA, GUANICA Cabida escritura: 234,251.24 m2 Área de mapa: 241,833.46 m2	
Parcela 3	Catastro: 406-000-003-05-000 Parcela: 406-000-003-05 Procedencia: 406-000-003-05 Dueño: RAMIREZ TIO LAURA DEL ROSARIO Dirección física: KM.HM 4.3 CARR 324 BO COSTA, LAJAS Cabida escritura: 195,851.33 m2 Área de mapa: 200,259.66 m2	
Parcela 4	Catastro: 406-000-003-35-000 Parcela: 406-000-003-35 Procedencia: 406-000-003-35 Dueño: RAMIREZ TIO FERNANDO Dirección física: KM.HM 4.3 CARR 324 BO COSTA, LAJAS Cabida escritura: 175,688.43 m2 Área de mapa: 204,637.61 m2	
Parcela 5	Catastro: 406-000-007-25-000 Parcela: 406-000-007-25 Procedencia: 406-000-007-25 Dueño: RAMIREZ TIO LAURA DEL ROSARIO Dirección física: KM.HM 9.0 CARR .116 BO COSTA, LAJAS Cabida escritura: 925,017.29 m2 Área de mapa: 517,259.44 m2	
Parcela 6	Catastro: 406-000-008-22-000 Parcela: 406-000-008-22 Procedencia: 406-000-008-22 Dueño: RAMIREZ ACOSTA JOSE B Dirección física: KM.HM 7.4 CARR 324 BO COSTAS, LAJAS Cabida escritura: 359,709.29 m2 Área de mapa: 390,708.10 m2	

Parcela	----------Detalles----------	
Parcela 7	Catastro: 406-000-008-23-000 Parcela: 406-000-008-23 Procedencia: 406-000-008-23 Dueño: RAMIREZ TIO ALBERTO Dirección física: KM.HM 7.4 SEC LOS HORNOS BO COSTAS, LAJAS Cabida escritura: 383,330.94 m2 Área de mapa: 427,184.13 m2	
Parcela 8	Catastro: 406-000-002-02-000 Parcela: 406-000-002-02 Procedencia: 406-000-002-02 Dueño: TORRES VDA PIETRI ISIDRA Dirección física: KM.HM 9.0 CARR .116 BO COSTA, LAJAS Cabida escritura: 54.00 m2 Área de mapa: 232,942.34 m2	
Parcela 9	Catastro: 406-000-003-41-000 Parcela: 406-000-003-41 Procedencia: 406-000-003-39 Dueño: RAMOS CRUZ CARLOS Dirección física: KM.HM 14.4 CARR 116 BO COSTAS, LAJAS Cabida escritura: 98,259.75 m2 Área de mapa: 109,341.63 m2	
Parcela 10	Catastro: 406-000-002-07-002 Parcela: 406-000-002-07 Procedencia: 406-000-002-07 Dueño: RODRIGUEZ SANABRIA LUIS ANGEL Dirección física: KM.HM 14 CAMNO LA CEIBA BO SABANA YEGUAS, LAJAS Cabida escritura: 0.00 m2Área de mapa: 611,705.11 m2	Catastro: 406-000-002-07-001 Parcela: 406-000-002-07 Procedencia: 406-000-002-07 Dueño: SUCN JUAN JOSE ORTIZ SANTANA Dirección física: KM.HM 14 SEC CUESTA BLANCA BO COSTAS, LAJAS Cabida escritura: 687,661.03 m2Área de mapa: 611,705.11 m2
Parcelas 11, 15 y 16	Catastro: 406-000-003-42-000 Parcela: 406-000-003-42 Procedencia: 406-000-003-39 Dueño: RAMIREZ ACOSTA JOSE B Dirección física: KM.HM 14.4 CARR 116 BO COSTAS, LAJAS Cabida escritura: 2,045,650.08 m2 Área de mapa: 2,534,223.76 m2	
Parcela 12	Catastro: 406-000-002-04-000 Parcela: 406-000-002-04 Procedencia: 406-000-002-04 Dueño: RAMIREZ TIO LAURA DEL ROSARIO Dirección física: BO COSTAS, LAJAS Cabida escritura: 490,394.76 m2 Área de mapa: 306,410.49 m2	
Parcela 13	Catastro: 406-000-002-07-001	Catastro: 406-000-002-07-002

Parcela	----------Detalles----------	
	Parcela: 406-000-002-07 Procedencia: 406-000-002-07 Dueño: SUCN JUAN JOSE ORTIZ SANTANA Dirección física: KM.HM 14 SEC CUESTA BLANCA BO COSTAS, LAJAS Cabida escritura: 687,661.03 m2 Área de mapa: 845,307.41 m2	Parcela: 406-000-002-07 Procedencia: 406-000-002-07 Dueño: RODRIGUEZ SANABRIA LUIS ANGEL Dirección física: KM.HM 14 CAMNO LA CEIBA BO SABANA YEGUAS, LAJAS Cabida escritura: 0.00 m2 Área de mapa: 845,307.41 m2
Parcela 14	Catastro: 406-000-002-25-001 Parcela: 406-000-002-25 Procedencia: 406-000-002-05 Dueño: RAMIREZ TIO LAURA DEL ROSARIO Dirección física: REM CARR.116 KM13.3 BO COSTAS, LAJAS Cabida escritura: 817,049.47 m2 Área de mapa: 869,126.96 m2	
Parcela 17	Catastro: 406-000-003-07-901 Parcela: 406-000-003-07 Procedencia: 406-000-003-07 Dueño: RAMIREZ ACOSTA JOSE B Dirección física: KM.HM 9.0 CARR .116 BO COSTA, LAJAS Cabida escritura: 727,122.15 m2 Área de mapa: 211,727.57 m2	Catastro: 406-000-003-07-000 Parcela: 406-000-003-07 Procedencia: 406-000-003-07 Dueño: RAMIREZ SOTO ZORAIDA Dirección física: E11 CARR 325 URB VALLE TANIA, GUANICA Cabida escritura: 175,295.39 m2 Área de mapa: 211,727.57 m2

Figura 2. Identificación de áreas < 4m, entre 4 y 50 m y > 50m.

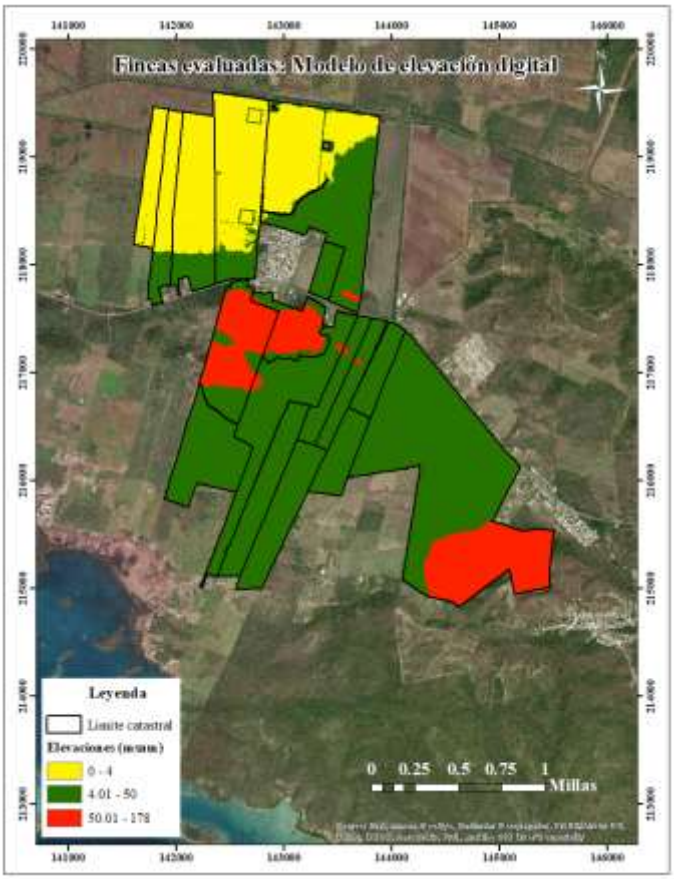


Figura 3. Distribución del área en la finca según tres clasificaciones de altura

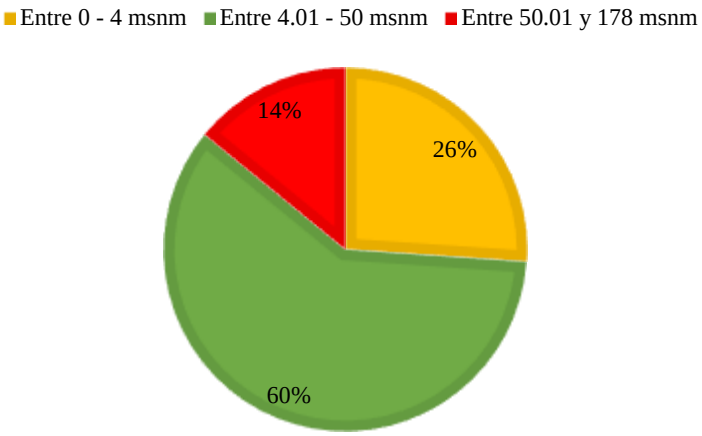


Figura 4A. Imágenes satelitales entre 1993 y 2020 evidenciando la vegetación en la zona en el recuadro (parcelas, 2, 4 y 17; ver Figura 1).

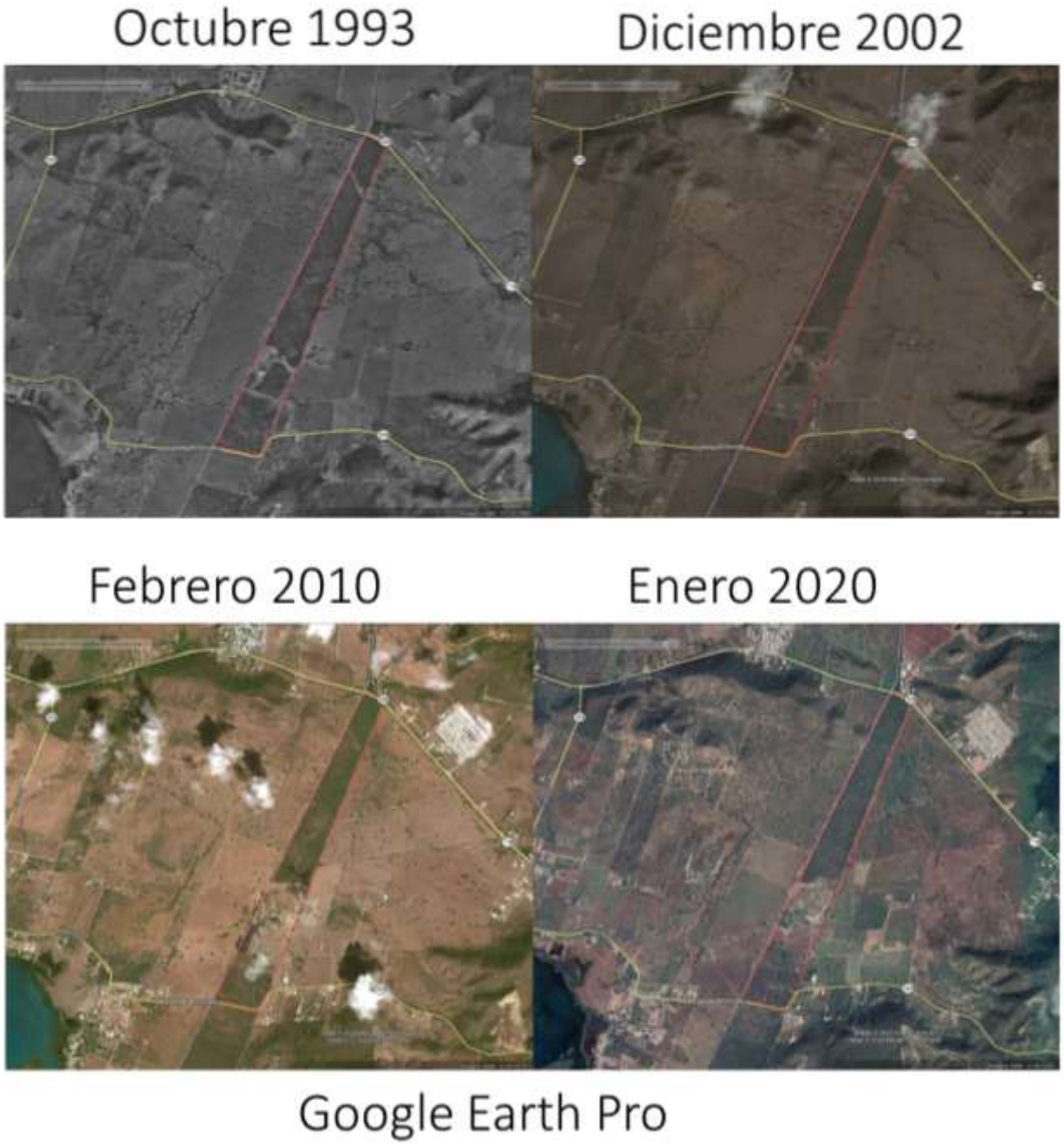
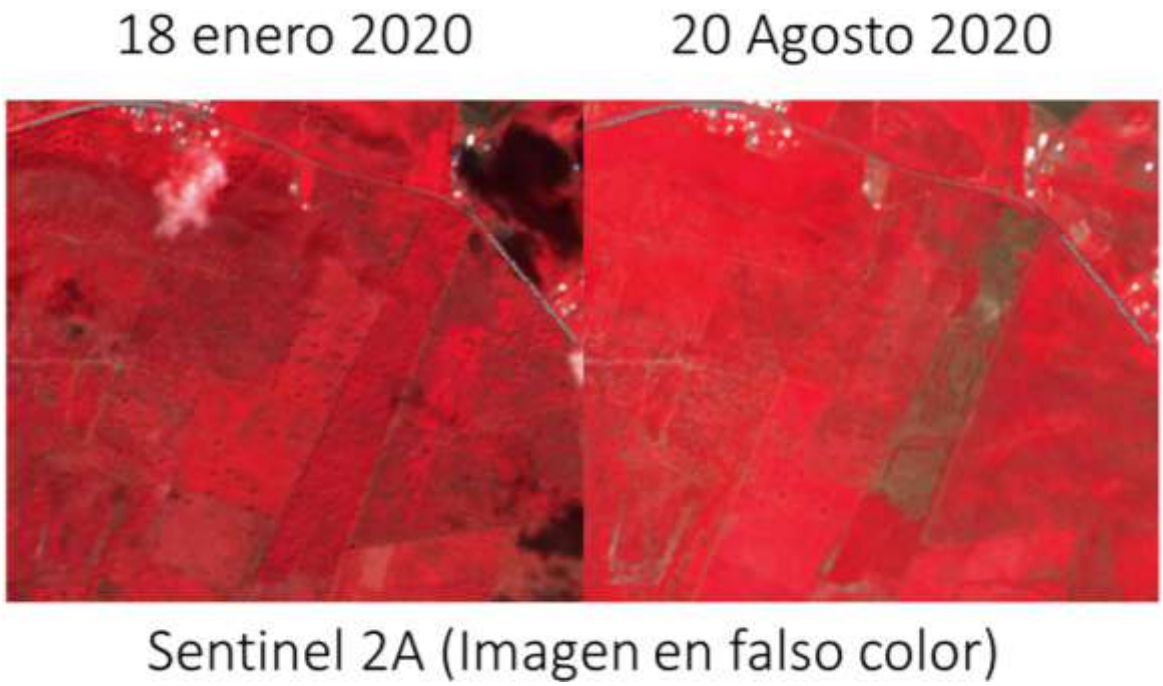


Figura 4B. Imágenes satelitales Sentinel2A en enero 2020 (antes de la remoción vegetativa) y agosto 2020 (posterior de la remoción vegetativa) en las parcelas 2, 4 y 17; ver Figura 1. Evidencia la remoción de vegetación en la zona está en color pardo en contraste con el color rojo de la vegetación.



Cuadro 2. Resumen de las proyecciones económicas anuales para las empresas agrícolas en la zona.

	Conty 1 Valor	Comas 2	Conty 3 Valor	Comas 3	Conty 4	Comas 4
	$/cuerda)	$/cuerda)	----------$----------			
Cultivo						
Forraje (heno)	$478	$1,657	$326,557	$1,130,938	$150,963	$522,819
Cultivos	$8,214	$19,200			$6,028,814	$14,092,800
Ganado	$480	$946	$546,017	$1,076,109	$369,857	$728,927
Total			$872,574	$2,207,048	$6,549,635	$15,344,547

1 – Basado en datos empíricos de Conty (2018)
2 – Basado en proyecciones económicas de Comas-Pagán (2016)
3 – Basado en el área que ocupa cada empresa
4 – Considerando que el 50% del área en forraje y ganado vacuno se convierta a cultivo de alto valor.

Figura 5. Ubicación de empresas agrícolas en la zona de construcción.

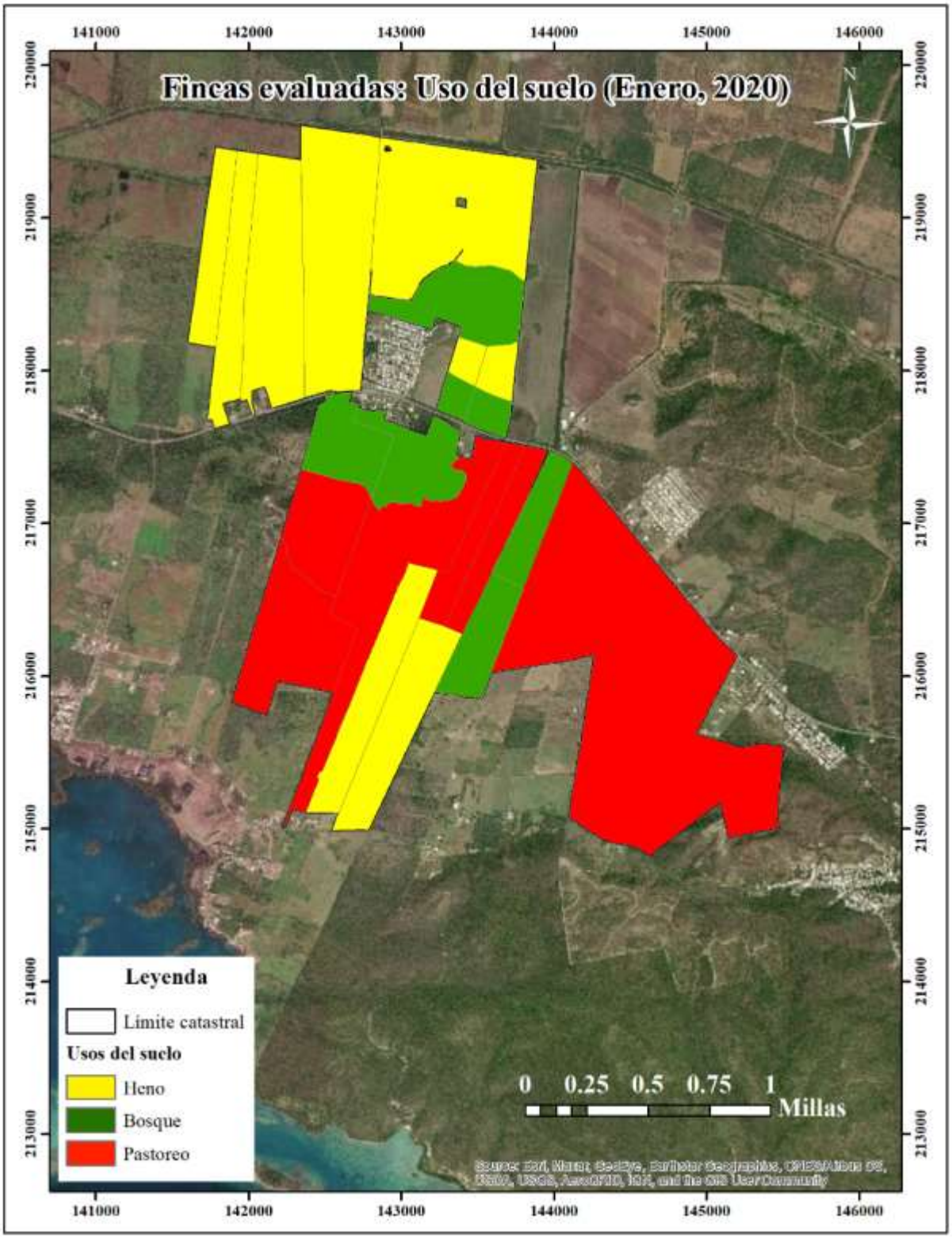
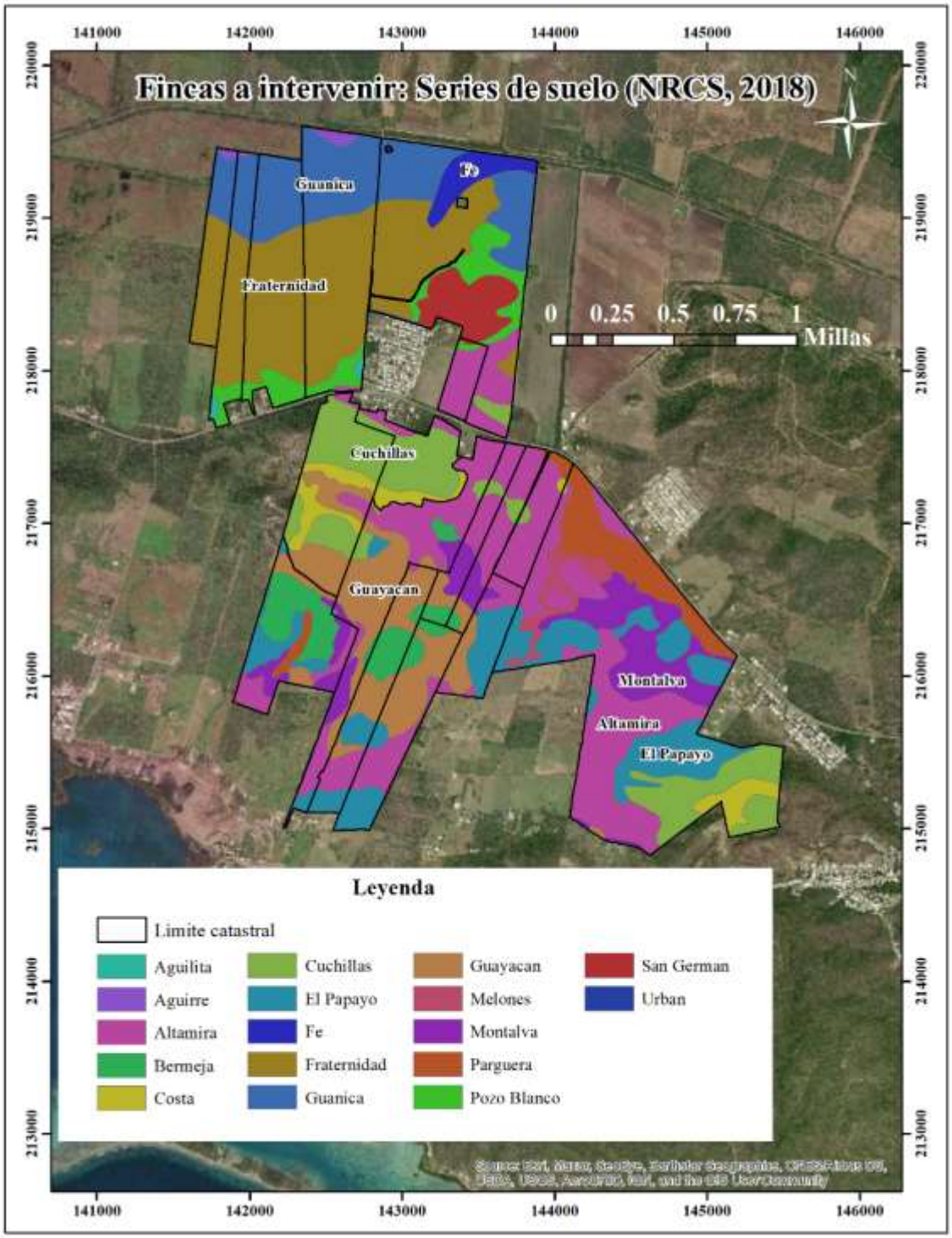


Figura 6. Series de suelos en el área de construcción propuesta.



Cuadro 3. Descripción taxonómica y área que ocupan los suelos en el área de construcción propuesta.

Serie	Orden	Suborden	Grupo	Subgrupo	Familia	Área (ha)	Área (%)
Urban	-	-	-	-	-	0.75	0.08
Aguilita	Mollisols	Ustolls	Calciustolls	Aridic Calciustolls	Coarse-loamy, carbonatic, isohyperthermic	1.58	0.16
Aguirre	Vertisols	Aquerts	Epiaquerts	Sodic Epiaquerts	Very-fine, smectitic, isohyperthermic	3.38	0.34
Melones	Vertisols	Torrerts	Calcitorrerts	Chromic Calcitorrerts	Fine, smectitic, isohyperthermic	12.00	1.20
Fe	Vertisols	Usterts	Haplusterts	Sodic Haplusterts	Fine, smectitic, isohyperthermic	13.72	1.37
San German	Mollisols	Ustolls	Haplustolls	Lithic Haplustolls	Clayey-skeletal, mixed, superactive, isohyperthermic	23.10	2.31
Costa	Entisols	Orthents	Torriorthents	Typic Torriorthents	Clayey, carbonatic, isohyperthermic, shallow	25.99	2.60
Pozo Blanco	Mollisols	Ustolls	Calciustolls	Aridic Calciustolls	Fine-loamy, mixed, superactive, isohyperthermic	32.49	3.25
Bermeja	Aridisols	Cambids	Haplocambids	Typic Haplocambids	Loamy, mixed, active, isohyperthermic, shallow	36.89	3.69
Parguera	Aridisols	Argids	Calciargids	Typic Calciargids	Clayey-skeletal, carbonatic, isohyperthermic	37.30	3.73
Montalva	Vertisols	Torrerts	Haplotorrerts	Typic Haplotorrerts	Fine, mixed, superactive, isohyperthermic	65.55	6.56
Cuchillas	Inceptisols	Udepts	Dystrudepts	Typic Dystrudepts	Loamy, mixed, active, isothermic, shallow	93.57	9.37
El Papayo	Aridisols	Cambids	Haplocambids	Typic Haplocambids	Clayey, mixed, superactive, isohyperthermic, shallow	94.22	9.43
Guayacan	Aridisols	Calcids	Haplocalcids	Typic Haplocalcids	Fine-loamy, mixed, superactive, isohyperthermic	94.52	9.46
Guanica	Vertisols	Aquerts	Calciaquerts	Typic Calciaquerts	Fine, smectitic, isohyperthermic	95.81	9.59
Fraternidad	Vertisols	Usterts	Haplusterts	Typic Haplusterts	Fine, smectitic, isohyperthermic	165.77	16.59
Altamira	Aridisols	Calcids	Haplocalcids	Typic Haplocalcids	Coarse-loamy, carbonatic, isohyperthermic	202.38	20.26
					Total	999.02	100.00

Figura 7. Distribución de área en suelos según Farmland Classification (USDA).

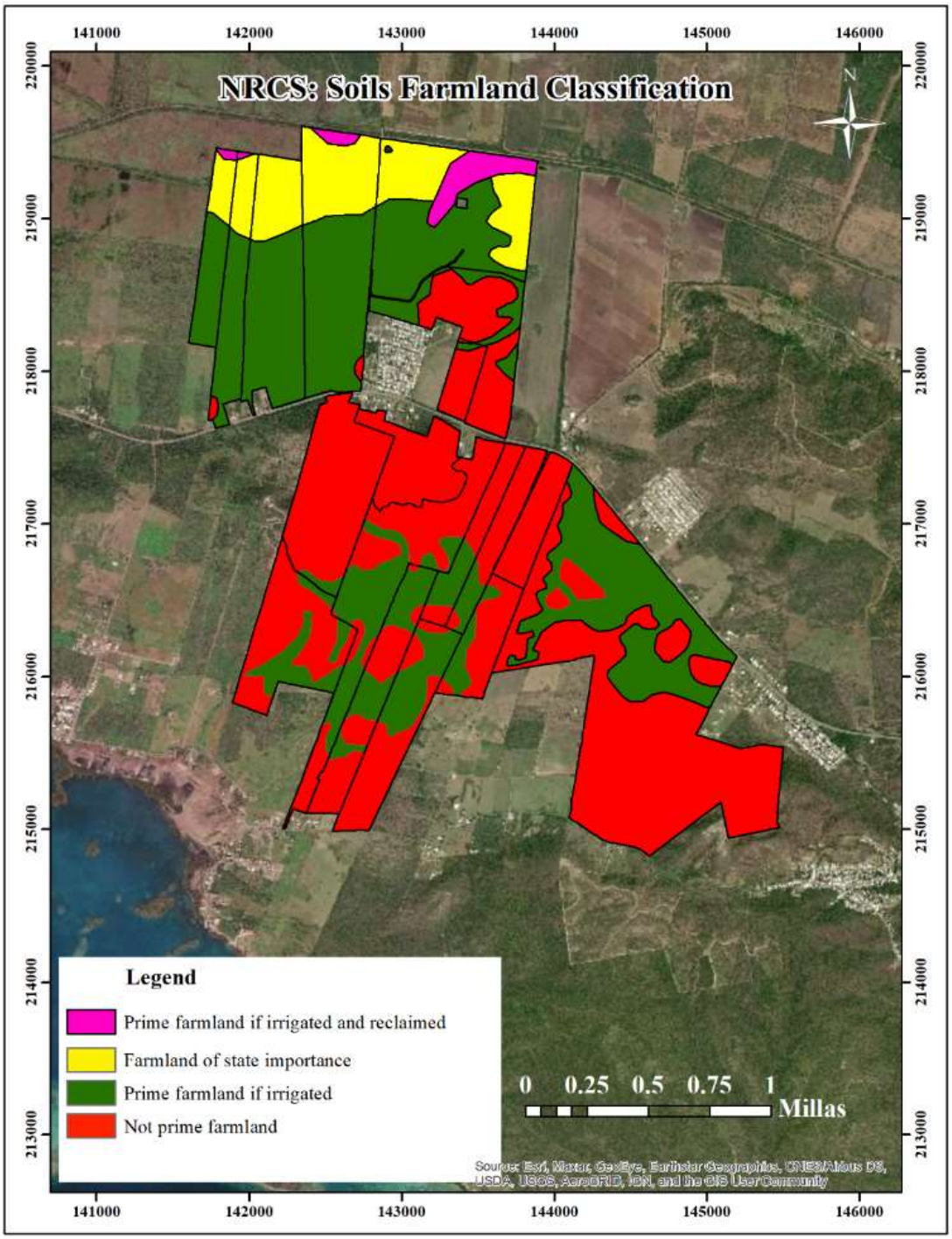


Figura 8. Imágenes satelitales de la zona demostrando la productividad de los suelos en (I) color natural; (II) falso color; (III) NDVI; (IV) humedad del suelo. Las áreas marcadas son: A- Finca Bayer; B – Humedal; C - Área agrícola de alta productividad; D – Área agrícola del Anegado que tiene acumulación transitoria de agua durante eventos de tormenta; E – Área vegetal removida entre julio y agosto 2020.

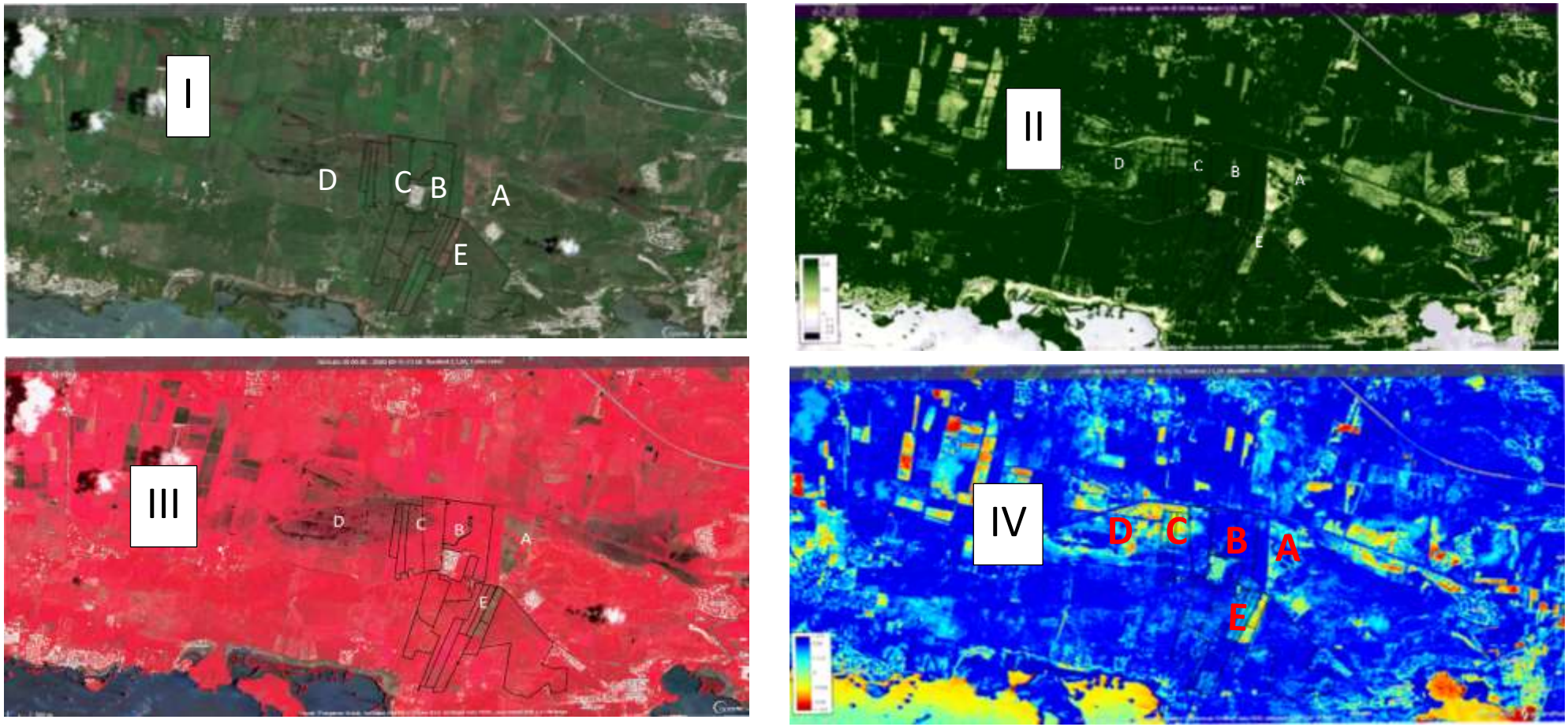


Figura 9. Esquema representativo de áreas de suelo cubierta por los módulos solares, en las facilidades de energía fotovoltaica Isabela.

Figura 10. Fincas con acceso a riego.

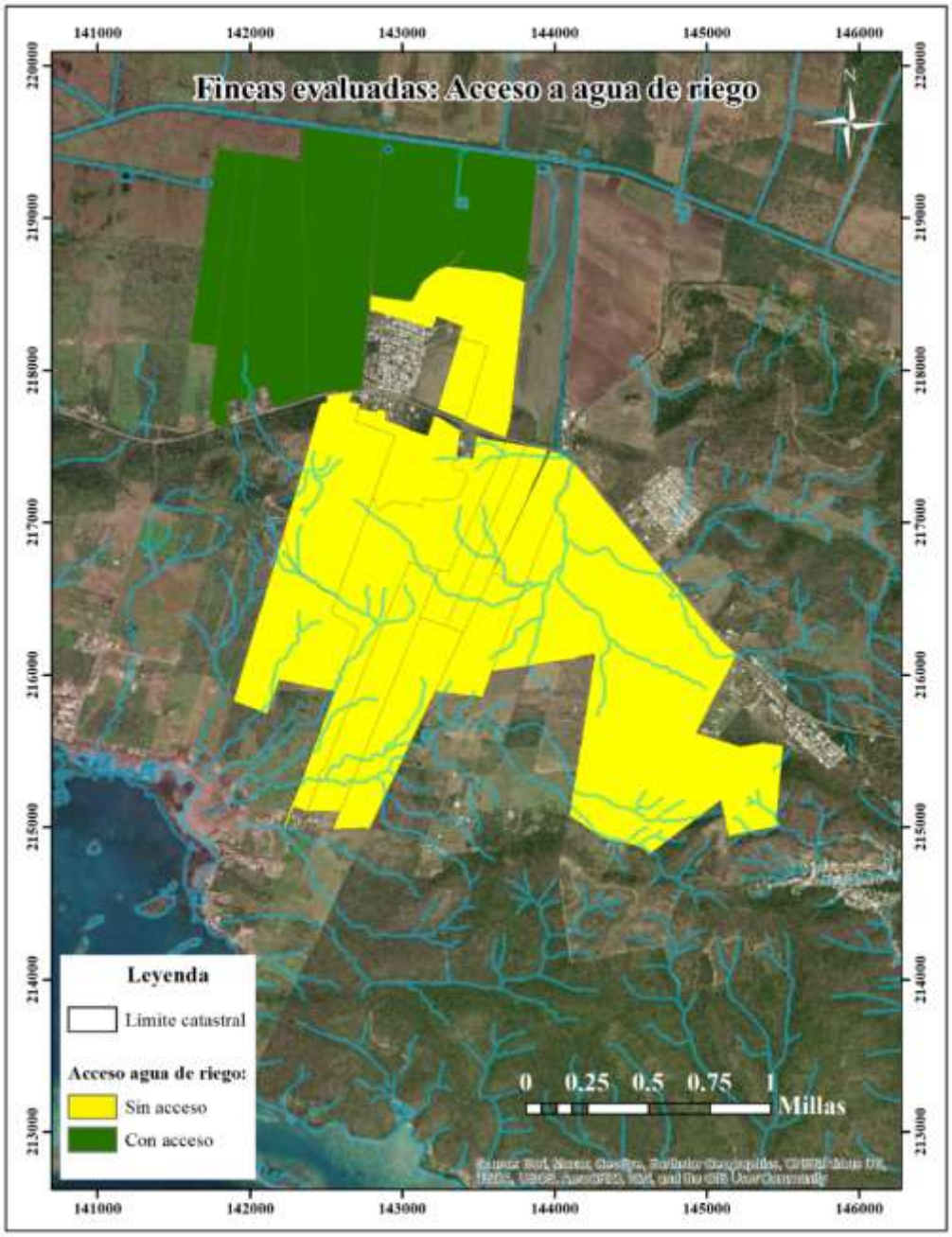
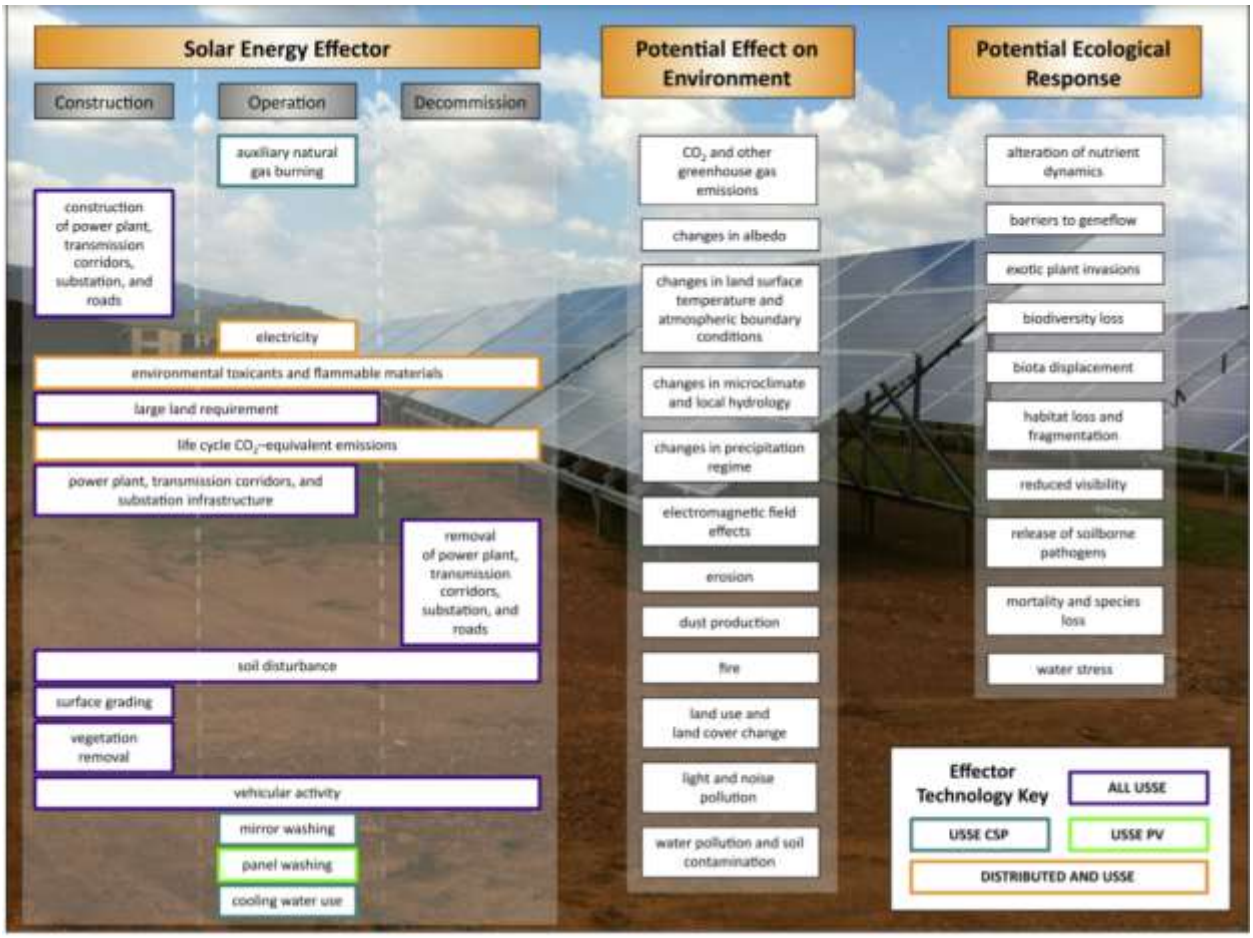


Figura 11. Posibles impactos de las fincas solares sobre el medioambiente (reproducido de Hernandez et al. 2013).



GOVERNMENT OF PUERTO RICO
PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE:	CASE NO.: CEPR-AP-2018-0001
Review of the Puerto Rico Electric Power Authority Integrated Resource Plan	

EXPERT TESTIMONY OF DANIEL GUTMAN

ON BEHALF OF LOCAL ENVIRONMENTAL ORGANIZATIONS

Comité Diálogo Ambiental, Inc., El Puente de Williamsburg, Inc. -Enlace Latino de Acción Climática, Comité Yabucoeño Pro-Calidad de Vida, Inc., Alianza Comunitaria Ambientalista del Sureste, Inc., Sierra Club and its Puerto Rico chapter, Mayagüezanos por la Salud y el Ambiente, Inc., Coalición de Organizaciones Anti-Incineración, Inc., Amigos del Río Guaynabo, Inc., Campamento Contra las Cenizas en Peñuelas, Inc., and CAMBIO Puerto Rico, Inc.

I. Introduction and Qualifications

Q: Please state your name, position, and business address:

A: My name is Daniel Gutman. I am a consultant in environmental analysis of air pollution. My business address is 407 West 44th Street, New York, New York l0036.

Q: On whose behalf are you testifying in this proceeding?

A: I am testifying on behalf of the following organizations: Comité Diálogo Ambiental, Inc., El Puente de Williamsburg, Inc.- Enlace de Acción Climática, Comité Yabucoeño Pro-Calidad de Vida, Inc., Alianza Comunitaria Ambientalista del Sureste, Inc., Sierra Club, Inc. and its Puerto Rico chapter, Mayagüezanos por la Salud y el Ambiente, Inc., Coalición de Organizaciones Anti Incineración, Inc., Amigos del Río Guaynabo, Inc., Campamento Contra las Cenizas en Peñuelas, Inc. CAMBIO PR, Inc.

Q: Please summarize your qualifications and work experience.

A: In more than a dozen matters, I have provided expert analysis of the harmful impacts of emissions from utility projects on human health. I have testified before administrative agencies as an expert, on behalf of the Environmental Protection Agency (EPA) and local environmental organizations. I hold a Bachelor of Science degree from the Massachusetts Institute of Technology and a Master of Science degree from the University of Illinois. My resume is attached as Exhibit A.

Q: What is the scope of your testimony?

A: I have been asked to review the air quality surrounding the major power plants in Puerto Rico and the implications of continued operation of the Puerto Rico Electric Power Authority (PREPA) power plants for air quality and public health.

II. PREPA's Violations and Health Impacts from Emissions at Puerto Rico's Fossil Fuel Power Plants

Q: What are the conclusions of your review?

A: My review indicates that if the current power plant output and fuel type are maintained in the future, then the area surrounding the Puerto Rico Electrical Power Authority (PREPA) power plants at Costa Sur, San Juan, and Aguirre will fail to comply with the Environmental Protection Agency's (EPA) 2010 sulfur dioxide National Ambient Air Quality Standard (NAAQS). The 2010 NAAQS sulfur dioxide standard was based on new health research that established for the first time a causal relationship between respiratory morbidity and short-term sulfur dioxide concentrations (75 FR 35525). Therefore, my review indicates that continued operation of these plants will cause harmful health impacts to Puerto Ricans living nearby.

Q: Considering the importance of compliance with the 2010 sulfur dioxide standard, what are your views for PREPA's preferred plans in the Integrated Resource Plan (IRP)?

A: Because of the expense and difficulty of either adding pollution control equipment or cleaner fuel, the best way for Puerto Rico to comply with the 2010 sulfur dioxide standard is for PREPA to move away from generation in fossil fuel power plants and toward generation from non-

polluting sources. PREPA's preferred plans, the Energy System Modernization Plan (ESM) and Scenario 4, invest too many resources into fossil fuel generation, and not enough in non-polluting sources.

Q: Please explain the air quality standards that PREPA must meet.

A: The Clean Air Act sets up a regulatory framework whose main purpose is protection and enhancement of air quality. To achieve this purpose, the Clean Air Act encompasses broad authority for EPA to evaluate health effects of air pollutants, set ambient air pollution standards, set emission standards for both new and existing equipment, and require states to submit plans to control air pollutants (or have EPA adopt its own plan).

Under §108 of the Clean Air Act, EPA issues "air quality criteria" to control certain air pollutants that are widespread in the human environment, largely because they are emitted whenever fuel is burned. These include sulfur dioxide, carbon monoxide, nitrogen oxides, particulate matter, ozone, and lead. Under §109 of the Clean Air Act, EPA has set National Ambient Air Quality Standards (NAAQS) "requisite to protect the public health" for each of these pollutants, which apply wherever the public is exposed. States submit plans under §110 to achieve NAAQS by dates set by EPA. Plans can include mechanisms such as state regulation of fuel type, required permits for major polluters (Clean Air Act, §172), economic incentives, etc. Since ambient concentrations are proportional to emissions, the purpose of the plan is to reduce emissions enough to meet ambient standards. EPA typically helps the states by setting emission standards for equipment, providing research on effectiveness of control techniques, providing guidance on developing a plan, and many other activities.

Q: Why are these air quality standards especially important in Puerto Rico?

A: In 2010, EPA adopted a stricter NAAQS for sulfur dioxide (75 FR 35520). This is particularly relevant in Puerto Rico, where power plants emit significant levels of this toxic chemical. The new standard is primarily designed to limit short-term high concentrations of sulfur dioxide that cause breathing problems. Short-term peaks of sulfur dioxide cause constriction of bronchial passageways and respiratory symptoms in susceptible populations, which include children, older adults, those with pre-existing respiratory disease, those who spend time exercising outdoors, persons of lower socio-economic status, and asthmatic individuals. Notably, the prevalence and severity of asthma is higher among Puerto Ricans (75 FR 35527). The health data, epidemiological, human exposure, and other data on the relationship between short-term sulfur dioxide exposure and adverse respiratory effects is convincing enough for the relationship to be characterized as causal, the "strongest finding" that EPA can make (75 FR 35520 [2010]).

Q: How does EPA determine compliance with standards in Puerto Rico?

A: EPA set a one-hour limit of 75 ppb (parts per billion) for sulfur dioxide, based on a three-year average of the 99th percentile daily maximum sulfur dioxide concentrations in an area. A short-term standard at the level adopted by EPA will reduce longer-term sulfur dioxide concentrations as well. Consequently, EPA eliminated its previous 24-hour and yearly average standards at the same time as it adopted a one-hour standard.

EPA recognized that violations of the 2010 sulfur dioxide standard could be expected near large facilities that burn oil or coal and emit more 2,000 tons of sulfur dioxide per year. EPA accordingly determined that areas near those facilities are of special concern. Prior to submitting a plan to meet the 2010 sulfur dioxide standard, air agencies must first determine whether their air is in

attainment or non-attainment with the standard. While air agencies could characterize their air quality using an existing air quality monitoring network, Puerto Rico's network apparently does not meet minimum standards for data collection. Consequently Puerto Rico characterized its air primarily using computer modeling, in accordance with EPA regulations (40 CFR §51.1203).

Q: Are PREPA's power plants in compliance with air quality standards?

A: No. In 2016, the Puerto Rico Environmental Quality Board (EQB) found that the areas around four PREPA power plants are likely in violation of the 2010 sulfur dioxide NAAQS—including the Aguirre, Costa Sur, San Juan, and Palo Seco plants. The EQB projections, based on actual sulfur dioxide emissions during the years 2013-15, are shown in the table below.[1]

Table 1. Summary of the Puerto Rico 1-hour SO_2 Designation Modeling Results, 2016.

Emission Sources with SO_2 emissions at or above 2,000 tpy	Name of geographical area	Maximum impact area (radius in kilometers)	1-Hour SO_2 Design Value ($\mu g/m^3$)	1-hour SO_2 NAAQS ($\mu g/m^3$)
PREPA Aguirre	Guayama-Salinas	5.4	232	196*
PREPA Costa Sur	Guayanilla	7.0	1,046	
PREPA San Juan	San Juan	3.6	343	
PREPA Palo Seco	San Juan	2.7	207	

* For sulfur dioxide, 196 $\mu g/m^3$ is equivalent to 75 ppb.

The EQB is expected to submit to EPA its Implementation Plan for achieving compliance with the 2010 sulfur dioxide standard later this year.[2] PREPA has three difficult options to achieve compliance, if it wishes to keep these plants running:

[1] Letter from EQB to EPA, December 19, 2016. A true and accurate copy of this letter, with Puerto Rico 1-Hour SO2 Designation Modeling Results including Appendix A, is attached as Exhibit B.

[2] See "Status of SIP Required Elements for Puerto Rico Designated Areas," at https://www3.epa.gov/airquality/urbanair/sipstatus/reports/pr_elembypoll.html.

- Lower the sulfur content of the oil burned at PREPA's power plants
- Install emission control equipment, or
- Reduce the maximum power generated.

Q: Can control equipment be effectively applied in Puerto Rico?

A: A previous study by Puerto Rico's Intersectoral Committee on Environmental Compliance and Energy Alternatives (ICECEA), convened by the Governor of Puerto Rico, found that three of the four power plants do not have the space for control equipment and that, in any case, the cost of installing and operating the equipment would have the effect of increasing the cost of electricity, making control equipment "not a viable compliance alternative."[3] The study also determined that using a lower sulfur fuel, for example one containing 0.3% sulfur instead of the current 0.5% sulfur, "is not an option, as it would increase energy costs significantly and would not comply with emission limits for contaminants imposed by new federal regulations."[4]

[3] ICECEA, Report on the Necessary Measures to Comply With New EPA Regulations, and the Conversion to, and Use of Natural Gas in, the Northern Power Plants 13, June 15, 2012, http://www.gdb.pr.gov/documents/FINAL-InformeCICAAEGobernador-English-firmado.pdf
[4] *Id.*.

According to the ICECEA report:

> As part of our evaluation, both the EQB and PREPA used dispersion models in order to determine the generating units' maximum emission levels. Both agencies agreed that in order to meet NAAQS compliance, [PREPA] must burn liquid fuel with a sulfur content of 0.1 percent per weight or less. This would imply that PREPA would be burning diesel in all of its combustion units. Currently, this fuel is only utilized in the most efficient combined cycle units, since its high cost is not economically feasible for use in other units. Increasing the use of No. 2 diesel fuel in turn increases the cost of fuel purchases.[5]

Furthermore, PREPA's current fuel risks exacerbating its non-compliance with the 2010 sulfur dioxide standard. Two power plants in Puerto Rico, the Aguirre and Palo Seco plants, are operating substantially below capacity, as shown in Table 2. If operations at either plant increase in the future without adding pollution control equipment or reducing the sulfur content of the fuel, sulfur dioxide emissions, and therefore sulfur dioxide concentrations, will increase above those projected in Table 1.

Table 2. Large SO_2 Sources in Puerto Rico.

Emission sources with SO_2 emissions at or above 2,000 tons/year	**Name of geographical area**	**SO_2 Emissions (tons/yr)**				**Average Emissions as % of Allowable**
		Allowable*	**2013**	**2014**	**2015**	
PREPA Aguirre	Guayama-Salinas	30,038	9,641	9,261	9,585	32%
PREPA Costa Sur	Guayanilla	11,506	6,975	8,337	9,323	71%
PREPA San Juan	San Juan	7,787	5,308	5,136	6,064	71%
PREPA Palo Seco	San Juan	17,344	5,701	3,128	2,979	23%

∗ Exhibit B, Puerto Rico 1-Hour SO2 Designation Modeling Results, Appendix A.

[5] *Id.*

Q: What would happen if current emissions levels were maintained?

A: If current emission levels are maintained in the future, areas surrounding the Palo Seco plant will comply with the 2010 sulfur dioxide NAAQS, while areas surrounding the other plants will continue to be in non-compliance. Modeling results show that the Palo Seco area did comply with the sulfur dioxide concentration standard in 2014 and 2015, but that the three-year average was pushed above compliance due to higher plant emissions in 2013, as shown in Table 3. If sulfur dioxide emissions from Palo Seco are maintained at the 2014-15 level, the surrounding area will eventually comply with the standard, which is based on a three-year average.

Table 3. Puerto Rico 1-hour SO_2 Designation Modeling Results, 2013–15.[6]

Emission sources with SO_2 emissions at or above 2,000 tons/year	**Name of geographical area**	**SO_2 Concentrations (µg/m³)**			**1-hour SO_2 NAAQS (µg/m³)**
		2013	**2014**	**2015**	
PREPA Aguirre	Guayama-Salinas	236	226	233	196*
PREPA Costa Sur	Guayanilla	1,003	1,037	1,098	
PREPA San Juan	San Juan	316	325	387	
PREPA Palo Seco	San Juan	263	172	185	

* For sulfur dioxide, 196 µg/m³ is equivalent to 75 ppb.

If the current power plant output and fuel type are maintained in the future, then the area surrounding the PREPA Palo Seco power plant is the only area that can comply with EPA's 2010 sulfur dioxide NAAQS. Areas surrounding the other major PREPA power plants—Costa Sur, San Juan, and Aguirre—will not be able to achieve compliance with that important health-based standard.

[6] Exhibit B, Puerto Rico 1-Hour SO2 Designation Modeling Results, Appendix A.

Because of the expense and difficulty of either adding pollution control equipment or cleaner fuel, the best way for Puerto Rico to comply with the 2010 sulfur dioxide standard is for PREPA to move away from generation in fossil fuel power plants and toward generation from non-polluting sources, as required by the recent Climate Change Mitigation, Adaption and Resiliency Law signed by Governor Ricardo Rosselló.[7] The requirements of this law should be reflected in Puerto Rico's forthcoming Implementation Plan for achieving the sulfur dioxide NAAQS.

Q: What has been PREPA's history in terms of compliance with sulfur dioxide standards?

A: PREPA has a history of poor compliance or non-compliance with federal air and water quality regulations governing its power plants. Prior to 1999, PREPA allowed virtually uncontrolled emissions of sulfur dioxide mist from its power plants, polluting nearby air and creating health problems for nearby residents.[8] A 1999 consent decree between PREPA and EPA, modified in 2004, addressed those failures in part by restricting the sulfur content of fuel burned at PREPA's facilities. Subsequent to the consent decree PREPA has apparently engaged in a scheme to falsify tests of fuel quality required by the consent decree.[9]

Provisions of the consent decree are incorporated into Title V air permits issued by the EQB. In addition to the sulfur content of fuel, these provisions include several aimed at ensuring proper maintenance and optimum operating conditions of the Aguirre power station. Title V of the Clean Air Act was adopted in order to consolidate the issuance and enforcement of permits under the authority of one agency (42 USC Chapter 85, subchapter V). Given PREPA's previous bad

[7] See Governor Ricardo Rosselló Signs Historic Climate Change Bill," May 23, 2019, available at http://prfaa.pr.gov/governor-ricardo-rossello-signs-historic-climate-change-bill/.
[8] Mary Williams Walsh, "At Puerto Rico's Power Company, a Recipe for Toxic Air, and Debt," New York Times, February 16, 2016, available at https://www.nytimes.com/2016/02/16/business/dealbook/at-puerto-ricos-power-company-a-recipe-for-toxic-air-and-debt.html.
[9] *Id.*

behavior, it is important that one agency, in this case the EQB, has oversight and enforcement authority over all activities covered by the Title V permit, including those provisions added as a result of the 2004 consent decree.

In particular, among PREPA's large power plants, PREPA's Aguirre power complex emits the most sulfur dioxide, while the Palo Seco power plant emits the least, as shown in Table 2 above. The area around the Aguirre plant does not comply with the 2010 sulfur dioxide NAAQS, as shown in Table 3, above.[10] Palo Seco is the only plant that could meet the 2010 sulfur dioxide standard while using the current fuel—0.5% sulfur oil. Consequently no modifications should be allowed to PREPA Aguirre's Title V permit that may dilute EQB's enforcement authority, since any such modification could hamper enforcement by EQB and weaken compliance with conditions of the permit, making the existing violation of the 2010 sulfur dioxide NAAQS worse and endangering the health of nearby residents.

Q: What other pollutants are emitted by PREPA's power plants?

A: Sulfur dioxide is only one of the pollutants emitted from PREPA's power plants. Emissions of other criteria pollutants are shown in Table 4, below. Of particular concern are emissions of nitrogen oxides, which contribute to formation of ozone (80 FR 65292 [2015]). and emissions of particulate matter—PM_{10} and $PM_{2.5}$—which exacerbate asthma symptoms and adversely impact respiratory function, especially of children, in the short term and increase death rates, especially of the elderly, in the long term (78 FR 3085 [2013]).

[10] The PREPA Aguirre Power Complex also does not comply with its Clean Water Act (CWA) permit. See https://echo.epa.gov/detailed-facility-report?fid=110000307800#pane3110000307800.

Table 4. Criteria Pollutants Emitted by PREPA Power Plants in 2014 (tons/year).[11]

Emissions Source	Carbon Monoxide	Nitrogen Oxides	PM 10	PM 2.5	Sulfur Dioxide	VOC
PREPA Aguirre	6287,08669	85199,26495				
PREPA Costa Sur	3278,89787	66778,33630				
PREPA San Juan	1,0704,087	4682824,90340				
PREPA Palo Seco	2082,40723	01673,12532				

A review of monitoring data that the EQB submits to EPA shows that EQB's monitoring program is substandard. Most EQB monitors fail to collect sufficient data to even determine whether areas of Puerto Rico meet federal air quality standards. Sometimes when EQB monitors do collect sufficient data, they show what should be violations of the federal standard. For example, in 2016, EQB ozone monitors showed violations of the federal one-hour ozone standard in Bayamón, Cataño, and Juncos municipalities. Unfortunately EPA revoked the one-hour ozone standard in 1997 believing that a new, lower 8-hour standard would protect against both short-term (1–3 hours) and medium-term (6–8 hours) exposures (62 FR 38856 [1997]). In Puerto Rico this appears not to have been the case. Consequently, emissions of nitrogen oxides from PREPA's fossil fuel power plants continue to pose a health hazard for island residents.

[11] EPA, Enforcement and Compliance History Online (ECHO) Air Pollutant Reports, available at https://echo.epa.gov/.

Q: What emissions are the comparable emissions for the AES Puerto Rico and EcoElectrica power plants?

A: Emissions for the AES and EcoElectrica power plants are shown in the Table 5.

Table 5. Criteria Pollutants Emitted by Other Power Plants in 2014 (tons/year).[12]

Emission Source	Carbon Monoxide	Nitrogen Oxides	PM 10	PM 2.5	Sulfur Dioxide	VOC
AES Puerto Rico	861	1,729	402	100	245	7
EcoElectrica, L.P.	204	311	49	49	0	7

Q: Does this conclude your testimony?

A: Yes.

[12] EPA, Enforcement and Compliance History Online (ECHO) Air Pollutant Reports, available at https://echo.epa.gov/ and EPA emission factors, AP-42, at https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors.

CERTIFICATION

I, Daniel Gutman, CERTIFY that the contents of my testimony are known to me and are the truth according to the best of my abilities and reasonable knowledge. The technical and operational aspects included in the testimony are based on information that has been gathered in good faith; but I cannot guarantee the truthfulness of information gathered from third parties.

Daniel Gutman

Daniel Gutman, M.S.

Before me, the undersigned Notary Public, personally appeared Daniel Gutman, who acknowledges that the above is true this day of October 23, 2019 in New York, NY.

( )Personally known OR

(X)Identification Document provided Driver's License.

JONATHAN JAMES SMITH
NOTARY PUBLIC-STATE OF NEW YORK
NO. 02SM6335228
QUALIFIED IN NEW YORK COUNTY
MY COMMISSION EXPIRES 01-04-2020

Notary Public Name, Signature, Seal

Jonathan James Smith
New York City, NY

Apostille

(Convention de La Haye du 5 Octobre 1961)

1. Country: United States of America

   This public document

2. has been signed by **Milton Adair Tingling**

3. acting in the capacity of **County Clerk**

4. bears the seal/stamp of the **county of New York**

Certified

5. at New York City, New York

6. the 23rd day of October 2019

7. by Deputy Secretary of State for Business and Licensing Services, State of New York

8. No. NYC-1357280

9. Seal/Stamp

10. Signature

STATE OF NEW YORK ★ DEPARTMENT OF STATE ★

EXCELSIOR

Whitney A. Clark

Whitney A. Clark

Deputy Secretary of State for Business and Licensing Services

Apostille (REV: 09/25/12)

Form 1

State of New York
County of New York } *ss:*

No. 618501

I, Milton Adair Tingling, Clerk of the County of New York, and Clerk of the Supreme Court in and for said county, the same being a court of record having a seal, **DO HEREBY CERTIFY THAT**

JONATHAN JAMES SMITH

whose name is subscribed to the annexed original instrument has been commissioned and qualified as a NOTARY PUBLIC.....
and has filed his/her original signature in this office and that he/she was at the time of taking such proof or acknowledgment or oath duly authorized by the laws of the State of New York to take the same: that he/she is well acquainted with the handwriting of such public officer or has compared the signature on the certificate of proof or acknowledgment or oath with the original signature filed in his/her office by such public officer and he/she believes that the signature on the original instrument is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand and my official seal this
23rd day of October, 2019

Milton Adair Tingling

County Clerk, New York County

Daniel Gutman
407 West 44th Street
New York, New York l0036
212 586-3888

Education:

Massachusetts Institute of Technology Cambridge, Massachusetts	B.S., Physics June, l964
University of Illinois Urbana, Illinois	M.S., Physics February, l966

Summary of Consulting Experience:

Environmental Protection Agency

Chief analyst for the United States Environmental Protection Agency on traffic and environmental impacts of Westway, a highway proposed for Manhattan. Responsible for preparing cross-examination of State Department of Transportation witnesses and for developing and presenting EPA's direct testimony during administrative hearings.

Environmental Defense Fund
Scenic Hudson

Analyzed the local impact of increased sulfur dioxide emissions due to the proposed conversion to highsulfur coal of Orange and Rockland's Lovett and Danskammer, and the conversion to coal of Con Edison's Arthur Kill and Ravenswood power plants for presentation at administrative hearings.

The Municipal Art Society
STAND
The ATURA Coalition
Committee to Preserve Brighton Beach and
Manhattan Beach

Conducted traffic and air pollution analyses of several major development projects in New York City, including the Coliseum Redevelopment, Metrotech, Atlantic Terminal, and Brighton Beach projects.

Union of Concerned Scientists

Analyzed the potential for accidental releases of radioactive gases reaching New York City from the nearby Indian Point nuclear reactor.

Environmental Defense Fund
Natural Resources Defense Council

Provided technical analysis and evaluations of EPA regulations concerning all sulfur dioxide emitting facilities, as well as those specifically applying to copper smelters.

Association to Save the Hutch
Montgomery Township, New Jersey
Elizabeth and East Brunswick, New Jersey

Provided analyses of the air pollution and traffic impacts of the proposed expansions of the Hutchinson River Parkway, Route US 206 through Montgomery Township, and the New Jersey Turnpike.

Port Authority of New York and New Jersey

Evaluated the impacts of diesel particulates and carbon monoxide due to a proposed busway connecting the Holland and Lincoln tunnels just outside New York City.

Environmental Defense Fund

Investigated the environmental impacts of both toxic and non-toxic emissions from waste-to-energy resource recovery plant proposed for New York City for presentation at administrative hearing.

Citizens for Westpride

Analyzed traffic, air pollution, noise, sewage disposal, and zoning and density with respect to both a massive development proposed by the Trump Organization for a disused rail yard on the West Side of Manhattan, and a number of other projects in the immediate area.

The Parks Council
The Municipal Art Society
The Regional Plan Association

Devised a smaller-scale, more civic-minded alternative to the Trump project, based on relocating a portion of the West Side Highway in order to extend Riverside Park. Evaluated the air pollution and noise impacts of the relocated West Side Highway and investigated various noise control techniques. Known as Riverside South, this alternative was ultimately embraced by the developer and approved by the City.

The Municipal Art Society
Beekman Hill Association

Studied potential air pollution impacts of Con Edison's Waterside power plant in New York City on a proposed very tall, nearby building.

Environmental Defense
New York Lawyers for the Public Interest

Analyzed air quality impacts of diesel emissions from a proposed waste transfer station on nearby residential areas as part of an administrative hearing. Developed legal and technical arguments to require an air quality analysis of fine particulate matter (PM 2.5).

East River Environmental Coalition
Manhattan Community Board #3

In connection with an application by Con Edison to add two electric and steam generators to the East River power plant, analyzed air quality impacts, focussing on fine particulate matter, evaluated noise impacts, helped develop alternative proposals, analyzed the air quality and land-use impacts of the alternatives, and represented client groups in administrative hearings.

Natural Resources Defense Council
Coalition Helping Organize a Kleaner Environment
Borough President of Queens, New York

In connection with applications by Keyspan, SCS Astoria, Orion Power, and the New York Power Authority to add power plants in the Astoria section of New York City, analyzed air quality impacts, focussing on fine particulate matter, analyzed the air quality impacts of the alternatives, and represented client groups in administrative hearings.

Adirondack Communities Advisory League

Presented testimony in administrative hearings regarding impacts of toxic air emissions from a proposed landfill in Ava, New York.

Greenpoint/Williamsburg Waterfront Task Force
Borough President of Brooklyn, New York

In connection with an application by TransGas Energy to add power plants in the Greenpoint/Williamsburg section of New York City, analyzed air quality impacts, focussing on fine particulate matter, analyzed the air quality impacts of the alternatives, and represented client groups in administrative hearings.

Hell’s Kitchen Neighborhood Association

Prepared a major zoning and land use plan for the West Side of Manhattan between 30th and 42nd streets as an alternative to City-sponsored plan.

Exhibit B

COMMONWEALTH OF
PUERTO RICO
Environmental Quality Board

December 19th 2016

MRS. JUDITH A. ENCK
REGIONAL ADMINISTRATOR
USEPA -REGION 2
290 BROADWAY
NEW YORK NY 10007-1866

Dear Mrs. Enck:

PUERTO RICO'S MODELING RESULTS FOR THE 2010 PRIMARY S02 NAAQS RECOMMENDATION FOR NON-ATTAINMENT AREAS DESIGNATION

As required by Title 40 of the Code of Federal Regulations, Section 51.1203(d)(3), Air Agencies shall conduct and submit to the EPA Regional Office the Modeling Analysis for Emission Sources with $S0_2$ emissions on or above 2,000 tons per year (tpy), for its associate area and nearby area. Air Agencies shall conduct and submit Modeling Analysis on or before January 13th 2017.

PREQB performed a 1-hour S02 Designation Modeling Analysis for the following geographical areas of the Commonwealth of Puerto Rico: Guayama-Salinas, Guayanilla and San Juan. Table 1 summarizes Modeling Results.

Table 1. Summary of the Puerto Rico 1-hour S02 Designation Modeling Results.

Emission Sources with S02 emissions on or above 2,000 tpy	Name of Geographical area	Maximum impact area (radius in kilometers)	1-Hour S02 Design Value (µg/m3)	1-hour S02 NAAQS (µg/m3)
PREPA Aguirre	Guayama-Salinas	5.4	232	196
PREPA Costa Sur	Guayanilla	7.0	1,046	
PREPA San Juan	San Juan	3.6	343	
PREPA Palo Seco	San Juan	2.7	207	

According to the modeling results, the S02 emissions of the four facilities included in the study do not comply with the 1-hour S02 NAAQS of 196 $\mu g/m^3$.

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EQB
Environmental Quality Board
Commonwealth of Puerto Rico

Based on the Modeling Results, PREQB recommends to EPA the designation of Guayama-Salinas, Guayanilla and San Juan as Non-Attainment Areas for the 1-hour S02 NAAQS, and the designation of Unclassified/Attainment Area for the remaining geographical areas of the Commonwealth of Puerto Rico.

If you have any question, please, feel free to contact the PREQB's Air Quality Manager at (787)767-8181 x-3269, or Mrs. Lucia Fernandez, Chief of the Air Monitoring, Validation & Data Management Division at (787)767-8181 x-3254.

Cordially,

Weldin Ortiz-Franco
Chairman

Enclosure: *Puerto Rico I-hour S02 Designation Modeling Results*

c Mr. John Filippelli, CASO Director
Mr. Richard Ruvo, EPA Air Program Branch Director
Mrs. Carmen Guerrero, CEPD Director

Exhibit B

COMMONWEALTH OF
PUERTO RICO
Environmental Quality Board

PUERTO RICO 1-HOUR SO_2 DESIGNATION MODELING RESULTS

PUERTO RICO ENVIRONMENTAL QUALITY BOARD
AIR MONITORING, VALIDATION & DATA MANAGEMENT

SEPTEMBER 2016

EQB
ENVIRONMENTAL QUALITY BOARD
COMMONWEALTH OF PUERTO RICO

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List of Acronyms

DRR	Data Requirements Rule
NAAQS	National Ambient Air Quality Standards
SO_2	Sulfur Dioxide
PPB	Parts Per Billion
EPA	Environmental Protection Agency
EQB	Environmental Quality Board
PREPA	Puerto Rico Power Electric Authority
SO2TAD	SO_2 NAAQS Designations Modeling Technical Assistance Document

Introduction

This document presents the modeling results for the designation of the 2010 1- hour SO_2 NAAQS in Puerto Rico. In June 2010, the EPA promulgated the new 1-hour primary SO_2 NAAQS of 75 parts per billion (ppb), which is met at an ambient air quality monitoring site, when the 3-year average of the 99th percentile of 1-hour daily maximum concentrations does not exceed 75 ppb.

According to the 40 CFR Part 51, Data Requirements Rule (DRR)[1] for the 2010 1-hour SO_2 Primary NAAQS signed on August 10 2015, EPA is promulgating a rule directing state and tribal air agencies to provide data to characterize current air quality areas with large sources of SO_2 emissions (2,000 tons per year or more) to identify maximum 1-hour SO_2 concentrations in ambient air. The final rule set a process and timetable for agencies to either establish ambient monitoring sites or conduct air quality modeling and submit the air quality data to EPA.

On January 2016, EQB submitted EPA a list of the sources with SO_2 emissions over 2000 tons/yr. EQB determined three areas in Puerto Rico that have SO_2 sources with emissions over 2,000 tons/yr. The areas are San Juan, Guayama-Salinas and Guayanilla. The sources in San Juan area with SO_2 emissions over 2,000 tons/yr are PREPA San Juan and PREPA Palo Seco. In Guayama-Salinas area is PREPA Aguirre and in Guayanilla is PREPA Costa Sur.

EQB decided to characterize the air quality in the areas with SO_2 emissions sources over 2,000 tons/yr with dispersion modeling. The air quality model for the analysis is AERMOD, with three years of meteorological data and three years of actual SO_2 emissions, as recommended in the SO_2 NAAQS Designations Modeling Technical Assistance Document (SO2TAD)[2]. On July 2016, EQB submitted to EPA the Puerto Rico 1-Hour SO_2 Designation Modeling Protocol[3] for its revision and approval. After that, EQB started the modeling process for the 1-hour SO_2 standard designation.

Emission Inventory

The emission inventory used for the study was three years of SO_2 actual emissions data, from the years 2013 to 2015. EQB followed the recommendation in the SO2TAD of using the three most recent available years of SO_2 actual emissions. EQB used the SO_2 actual emissions certified data, submitted annually by PREPA.

This report is revised by the Inspection and Compliance Division of the Air Quality Area, to determine conformity with the air quality permit and regulations.

[1] Data Requirements Rule for 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS). 40 CFR Part 51.
[2] SO_2 NAAQS Designations Modeling Technical Assistance Document, USEPA. August, 2016.
[3] Puerto Rico 1-Hour SO_2 Designation Modeling Protocol. Environmental Quality Board. Air Quality Area. July, 2016.

The PREPA emission report presents the annual SO_2 actual emissions for the emission points of PREPA facility. For a complete information about the emission inventory, please refer to the modeling protocol document. A copy of the emission inventory table is in Appendix A.

Background Concentration

For the 1- hour SO_2 background concentration, EQB used the less conservative "first tier" approach recommended in the SO2TAD of the 1- hour SO_2 background concentration based on the monitored design value for the most recent 3-year period, regardless of the years of meteorological data used in the modeling. EQB have SO_2 air quality monitors in the vicinity of San Juan area, but are source oriented, for that reason they are not representative of the nearby sources impacts.

EQB determined more adequate use a regional site monitor that is impacted by similar natural and distant man-made sources. EQB selected the data from the Guayama SO_2 monitor to be used as background concentration for San Juan area. This background concentration is from the years 2010-2012 and also will be used in Guayama-Salinas and Guayanilla area. The concentration background is the most recent 3-year period design value for 1- hour SO_2 and the value is 58 $\mu g/m^3$ (22 ppb).

This background concentration will be used in Guayanilla because EQB does not have a SO_2 monitor in this municipality and the most representative air quality monitor for the area is the Guayama monitor. This background concentration is not source oriented and is impacted by similar natural and distant man-made sources. The concentration background data is in Appendix B.

Model

The model used for the SO_2 designation modeling is AERMOD. This model is the preferred recommended by EPA for air quality modeling studies. The version used is the most recent or 15181. The default options will be selected for each run. The urban option will be used in San Juan because the facilities are in an urban environment.

The input data for PREPA emission points is for the EQB emission inventory and the SO_2 actual emissions is from the PREPA annual emission reports. The emission sources inside the facilities are point sources (boilers and gas turbines) and actual stack height data will be used. The parameters for each emission point source and their coordinates were from the information provided by the facilities in their construction permits.

The AERMOD model output options MAXDAILY, MAXDCONT and MXDYBYYR output options will be selected to calculate the model 1-hour SO_2 design value. Background concentration[4] will be added to the 1-hour SO_2 model design value for the comparison with the NAAQS.

Meteorology

The SO2TAD recommends the most recent three years of meteorological data for the designation modeling, to allow the modeling to simulate a monitor. The SO2TAD also recommends that the meteorological data will be concurrent with the years of the actual SO_2 emissions used in the designation modeling. EQB will use three years of site-specific data, in the three areas of the designation modeling.

The three years of meteorological data are not concurrent with the three years of SO_2 actual emissions data, but EQB addressed this using the recommendation in the Section 7.4 Use of Older Meteorological Data[5] of the SO2TAD. The three years data periods were manually changed (change of the year on AERMET output files) as if these were the 2013 to 2015 data period.

The meteorology for the San Juan model is from the years 2007-2009, in Guayama-Salinas the meteorological data is from 2001-2003 and in Guayanilla is from 1991-1993. All this data was collected on-site. Full meteorological reports with the methodology used to process the data are available in the modeling protocol document[6].

Receptors

Two receptor grids were used in each run of the 1-hour SO_2 designation model. The receptor grids considered populated areas and places where is feasible to place an air quality monitor. Discrete receptors across the facility fenceline were used in all modeling cases.

The first receptor grid is a 250 meters of space to determine the facility maximum impact radius. This is an exclusionary grid used to determine where is the SO_2 maximum impact. A refined grid of 50 meter of space was used in the area of maximum impact concentrations, to determine compliance with the 1- hour SO_2 NAAQS. Discrete receptors were placed at the facility fenceline in all modeling runs. For complete information about the receptor grids, please refer to the modeling protocol document.

[4] See Air Quality Monitoring Design Value Report in Appendix B.

[5] Section 7.4: Use of Older Meteorological Data. SO_2 NAAQS Designations Modeling Technical Assistance Document, USEPA. August, 2016.

[6] Puerto Rico 1-Hour SO_2 Designation Modeling Protocol. Environmental Quality Board. Air Quality Area. July, 2016.

Model Results

The model results for the four emission sources in the modeling study are presented below. The 1-hour SO_2 NAAQS is represented by the model design value, which is calculated using the three years average of the 4th highest of the daily maximum. EQB used the following methodology to determine the SO_2 design value for each emission source in the study.

Separate modeling runs for each facility by year of meteorological and actual emissions data were performed to determine the SO_2 4th highest of the daily maximum by year. The modeling runs for each facility have the same receptor network and emission point parameters data, the only data that changes in each run is the SO_2 actual emissions and the concurrent meteorological data.

For each modeling run, the 4th highest value was determined using the MAXDAILY file. The SO_2 design value for each facility in the study is the three years average of the 4th highest. The SO_2 background concentration was added to this design value.

EQB used separate model runs because the receptor networks are extensive and this complicate the evaluation of the output files. The MAXDCONT file was used to determine the contribution of each facility emission point to the design value. Modeling runs output files are in the Appendix C and electronic copies of the MAXDAILY, MAXDCONT and MXDYBYYR files will be provided. The SO_2 designation modeling results are presented below.

A. PREPA San Juan

The model results for PREPA San Juan are presented in the next tables. The 1-hour SO_2 design value is above the NAAQS of 75 ppb or 196 µg/m^3. The maximum results impact area is approximately 3.6 km radius. The 4th highest for each modeling run, plus the background concentration and the SO_2 design value for PREPA San Juan are presented in Table 1. The Table 2 presents the modeling results by emission point or MAXDCONT output file data.

Commonwealth of Puerto Rico\Puerto Rico Environmental Quality Board
1-Hour SO_2 Designation Modeling Results

Table 1: PREPA San Juan 1-Hour SO_2 Modeling Results

Year	Coordinates (m)		SO_2 Concentrations µg/m^3			
	East	North	4th Highest Model Result	Background Concentration	Total Concentration	1-Hour SO_2 Design Value
2013	805450	2039622	258	58	316	343
2014	805550	2038922	267		325	
2015	805550	2038922	329		387	

Table 2: PREPA San Juan 1-Hour SO_2 Modeling Results by Emission Point

Year	4th Highest SO_2 Model Concentrations µg/m^3						
	SJ5/6	Boiler7	Boiler8	Boiler 9	Boiler10	Background Concentration	Total Concentration
2013	0.89787	64.81184	52.32642	66.97350	72.74486	58	315.75449
2014	0.21331	88.40702	108.53339	53.99018	15.75475		324.89865
2015	0.33223	99.65805	82.97753	144.13036	2.33466		387.43283

The modeling scenario with the highest SO_2 concentrations was 2015 and therefore have the maximum impact area with a radius of 4.1 km. The maximum impact area for 2013 and 2014 was approximately 3.4 km radius. The Figures 1-3 showed the modeling results isopleths and the 1-hour SO_2 4th highest concentration by year of data.

Figure 1: PREPA San Juan 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2013

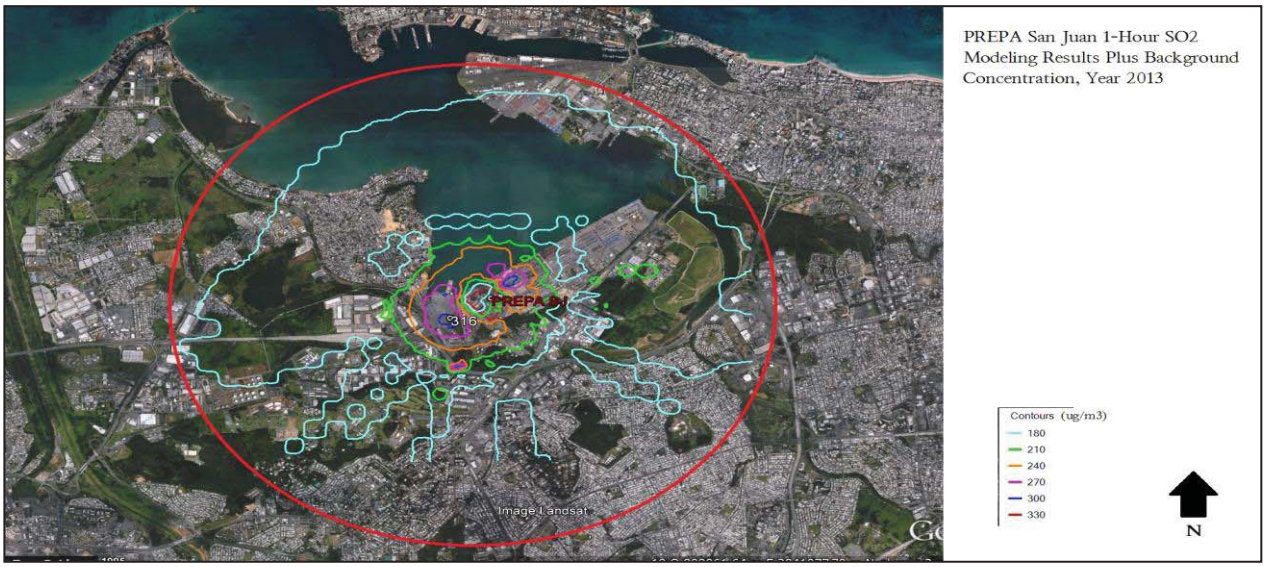


Figure 2: PREPA San Juan 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2014

Figure 3: PREPA San Juan 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2015

B. PREPA Palo Seco

The model results for PREPA Palo Seco are presented in the following tables. The 1-hour SO_2 design value is above the NAAQS of 75 ppb or 196 µg/m^3. The maximum results impact area is approximately 2.7 km radius. The 4th highest for each modeling run, plus the background concentration and the 1-hour SO_2 design value for PREPA San Juan are presented in Table 3. The Table 4 presents the modeling results by emission point or the MAXDCONT output file data.

Table 3: PREPA Palo Seco 1-Hour SO_2 Modeling Results

Year	Coordinates (m)		SO_2 Concentrations µg/m^3			
	East	North	4th Highest Model Result	Background Concentration	Total Concentration	1-Hour SO_2 Design Value
2013	800700	2043072	205	58	263	207
2014	800700	2043072	114		172	
2015	801550	2042022	127		185	

The SO_2 modeling results for 2013 data are over de 1-hour SO_2 NAAQS, the other years are below the standard. The three years average of the 4th highest is above the 1-hour SO_2 NAAQS. The next table presents the modeling results by the emission points of PREPA Palo Seco.

Table 4: PREPA Palo Seco 1-Hour SO_2 Modeling Results by Emission Point

Year	4th Highest SO_2 Model Concentrations µg/m^3								
	PS1	PS2	PS3	PS4	GT1	GT2	GT3	Background Concentration	Total Concentration
2013	38.50191	32.42061	29.33763	104.71084	0.00286	0.00532	0.00407	58	262.98324
2014	30.88408	34.61644	0.000	48.33751	0.03621	0.07657	0.07159		172.0224
2015	43.25716	47.47828	27.54117	8.59734	0.00056	0.09414	0.07945		185.0481

The modeling results for year 2013 were the highest and the maximum impact area have approximately 2.7 km radius. The modeling results for 2014 and 2015 were below the 1-hour SO_2 NAAQS. Figures 4-6 showed the modeling results isopleths and the 1-hour SO_2 4th highest concentration by year of data.

Figure 4: PREPA Palo Seco 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2013

Figure 5: PREPA Palo Seco 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2014

Figure 6: PREPA Palo Seco 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2015

C. PREPA Aguirre

The following tables presents the model results for PREPA Aguirre. The 1-hour SO_2 design value is above the NAAQS of 75 ppb or 196 µg/m^3. The 4th highest for each modeling run, plus the background concentration and the SO_2 design value for PREPA Aguirre are presented in Table 5. The Table 6 presents the modeling results by emission point or MAXDCONT output file data.

Table 5: PREPA Aguirre 1-Hour SO_2 Modeling Results

Year	Coordinates (m)		SO_2 Concentrations µg/m^3			
	East	North	4th Highest Model Result	Background Concentration	Total Concentration	1-Hour SO_2 Design Value
2013	792100	1988250	178	58	236	232
2014	790750	1988000	168		226	
2015	791500	1986500	175		233	

The SO_2 modeling results for PREPA Aguirre are over de 1-hour SO_2 NAAQS. The three years average of the 4th highest is 232 ug/m^3 and is above the 1-hour SO_2 NAAQS. The next table presents the modeling results by each emission point of PREPA Aguirre.

Table 6: PREPA Aguirre 1-Hour SO_2 Modeling Results by Emission Point

Year	4th Highest SO_2 Model Concentrations µg/m^3						
	AG1	AG2	CC1	CC2	AGGT	Background Concentration	Total Concentration
2013	92.42972	85.24826	0.08780	0.21629	0.00038	58	235.98245
2014	60.94587	106.07054	0.25548	0.35438	0.00489		225.63116
2015	81.81814	91.93863	0.76722	0.49448	0.02302		233.04149

The modeling results for year 2013 were the highest and the maximum impact area extends approximately 5.4 km from the source. The modeling results for 2014 and 2015 were also above the 1-hour SO_2 NAAQS and the maximum impact areas extends from the source, 5 and 4.7 km, respectively. Figures 7-9 showed the modeling results isopleths and the 1-hour SO_2 4th highest concentration by year of data.

Figure 7: PREPA Aguirre 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2013

Figure 8: PREPA Aguirre 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2014

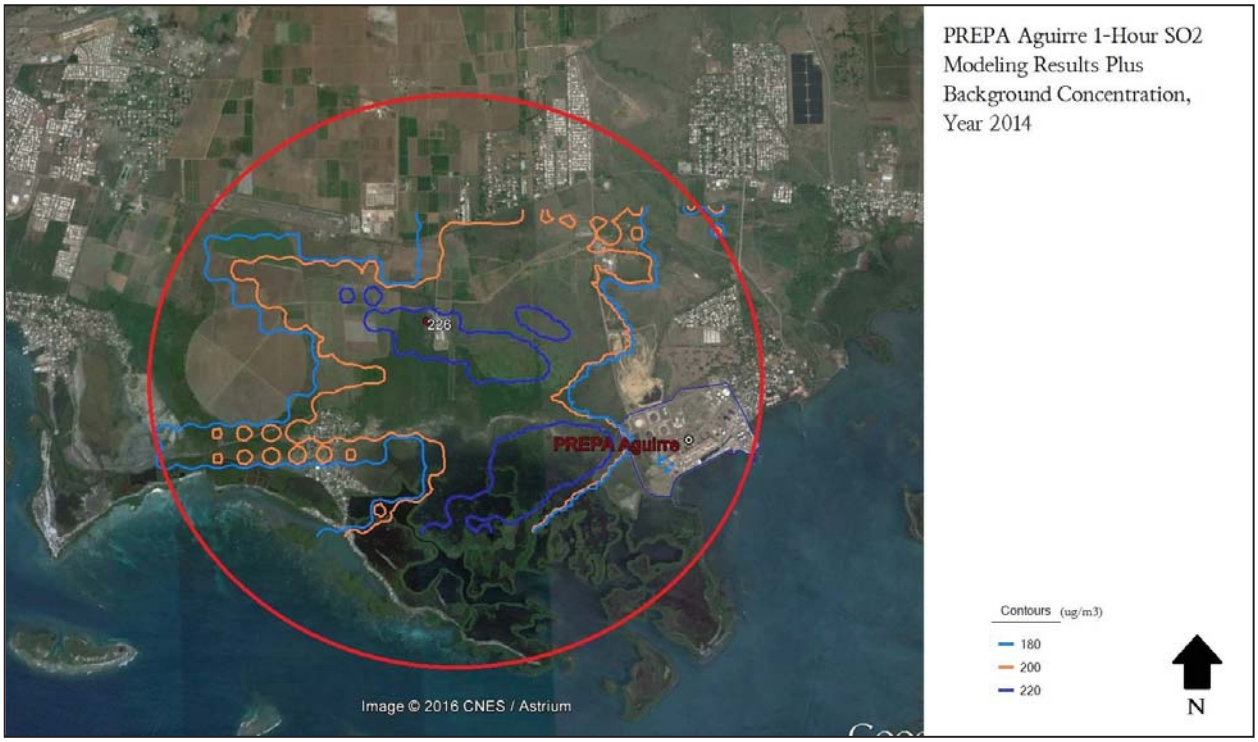
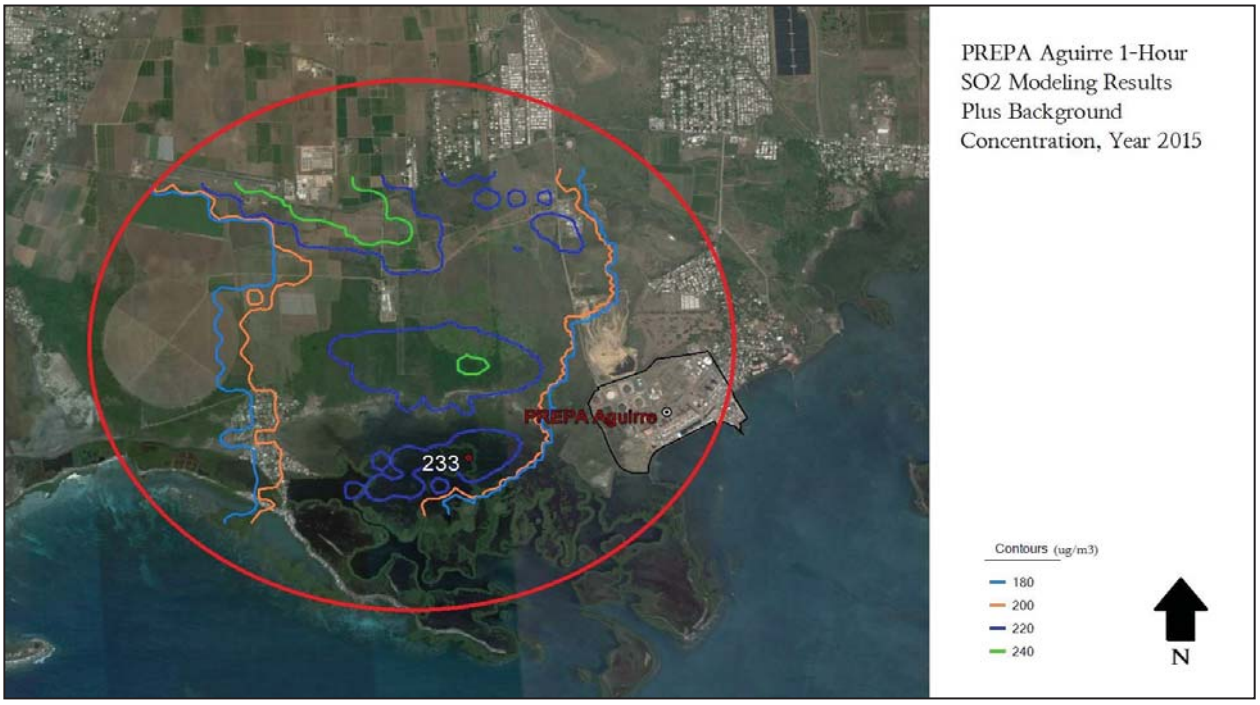


Figure 9: PREPA Aguirre 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2015



D. PREPA Costa Sur

The following tables presents the model results for PREPA Costa Sur. The 1-hour SO_2 design value is above the NAAQS of 75 ppb or 196 µg/m^3. The 4th highest for each modeling run, plus the background concentration and the SO_2 design value for PREPA Costa Sur are presented in Table 7. The Table 8 presents the modeling results by emission point or MAXDCONT output file data.

Table 7: PREPA Costa Sur 1-Hour SO_2 Modeling Results

Year	Coordinates (m)		SO_2 Concentrations µg/m^3			
	East	North	4th Highest Model Result	Background Concentration	Total Concentration	1-Hour SO_2 Design Value
2013	738250	1994900	945	58	1003	1046
2014	735250	1994800	979		1037	
2015	737400	1995750	1040		1098	

The SO_2 modeling results for PREPA Costa Sur are over de 1-hour SO_2 NAAQS. The three years average of the 4th highest is 1046 µg/m^3 and is above the 1-hour SO_2 NAAQS. The next table presents the modeling results by emission point of PREPA Costa Sur.

Table 8: PREPA Costa Sur 1-Hour SO_2 Modeling Results by Emission Point

Year	4th Highest SO_2 Model Concentrations µg/m^3						
	SC3	SC4	SC5	SC6	PB1	Background Concentration	Total Concentration
2013	3.74367	0.99801	303.53343	636.15715	0.10537	58	1002.53763
2014	0.0	0.0	515.76028	463.07010	0.00757		1036.83795
2015	17.03536	1.70005	511.64441	509.33306	0.00074		1097.71362

The modeling results for year 2015 were the highest and the maximum impact area extends approximately 7 km from the source. The modeling results for 2014 and 2015 were also above the 1-hour SO_2 NAAQS and the maximum impact areas extension from the source were also 7 km. Figures 10-12 showed the modeling results isopleths and the 1-hour SO_2 4th highest concentration by year of data.

Figure 10: PREPA Costa Sur 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2013

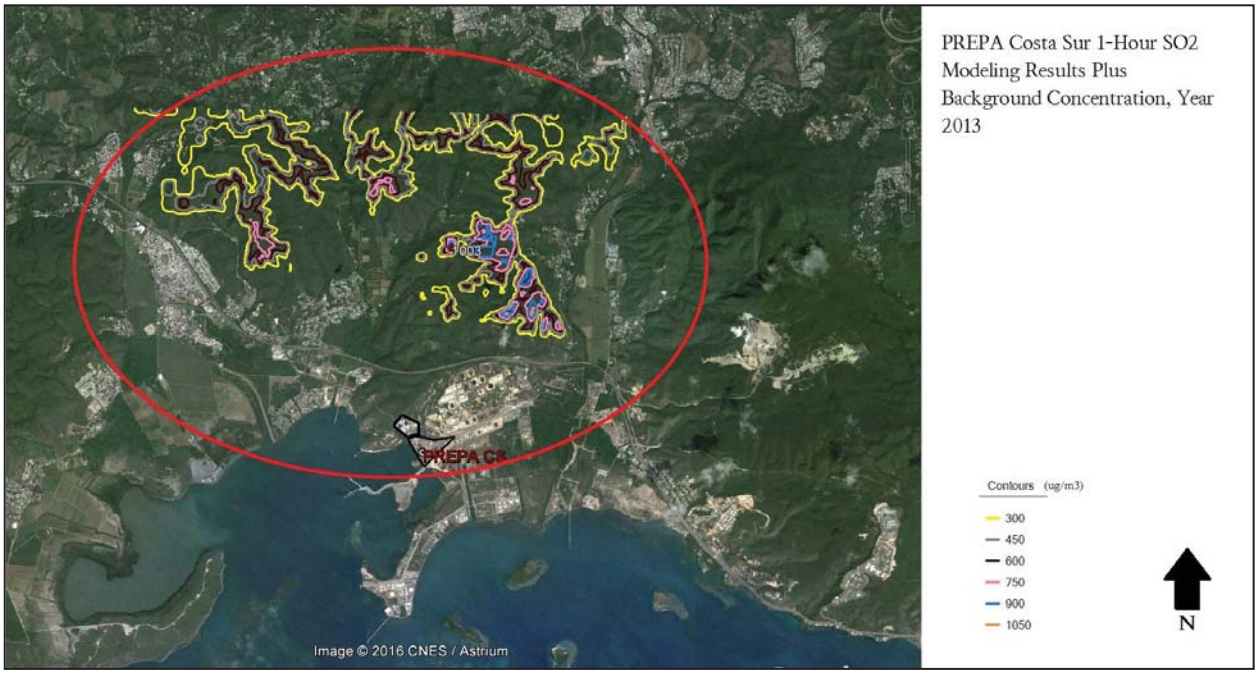


Figure 11: PREPA Costa Sur 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2014

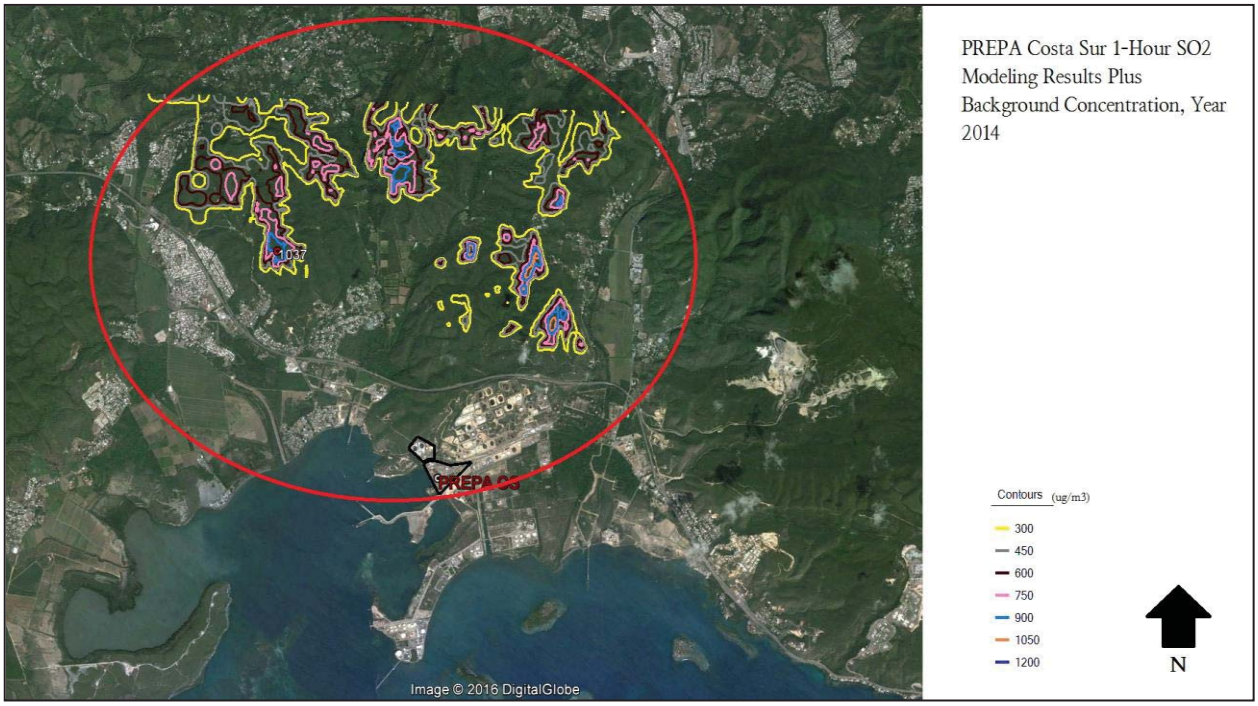
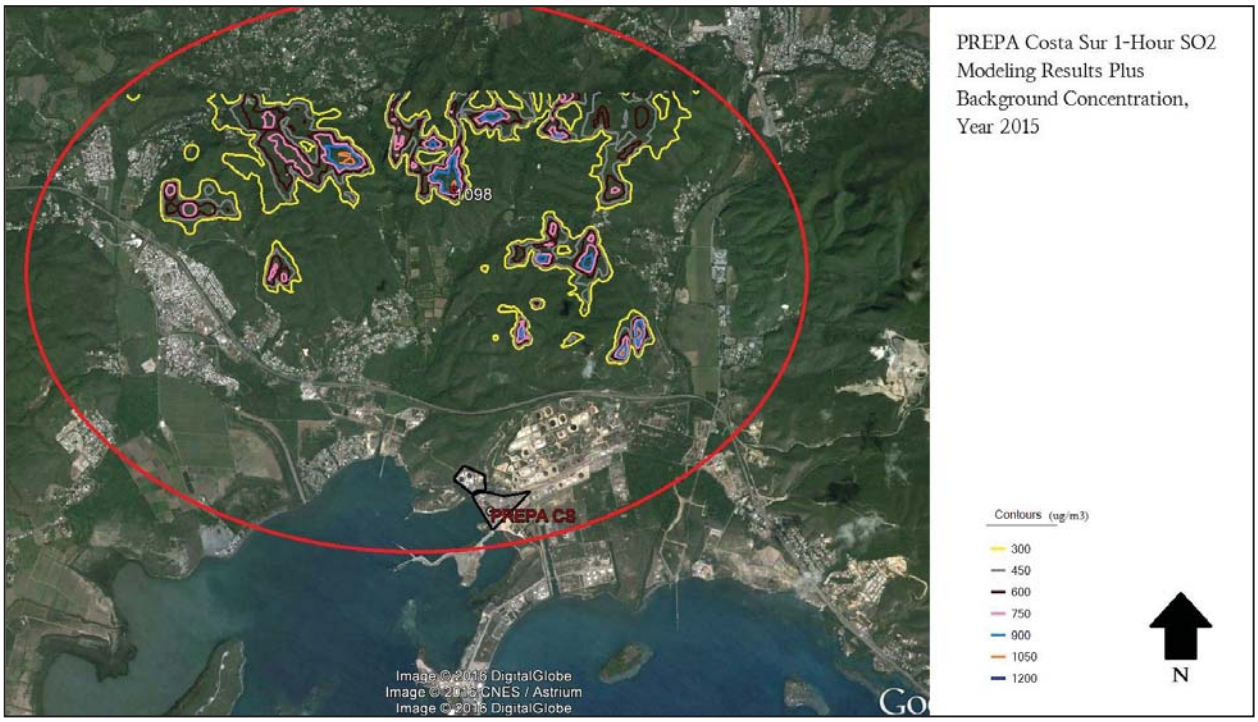


Figure 12: PREPA Costa Sur 1-Hour SO_2 Modeling Results Plus Background Concentration, Year 2015



Conclusion

According to the modeling results, the SO_2 emissions of the four facilities in the study do not comply with the 1-hour SO_2 NAAQS of 196 µg/m^3. The facility with the highest results was PREPA Costa Sur in Guayanilla, with the 1-hour SO_2 design value of 1046 µg/m^3. The facility with the lowest results was PREPA Palo Seco in San Juan area, with the 1-hour SO_2 design value of 207 µg/m^3. The model concentration results in all the areas under the study are above the 1-hour SO_2 NAAQS of 196 µg/m^3.

I. APPENDIX A: Emission Inventory for the 1-Hour SO_2 Designation Model

Commonwealth of Puerto Rico\Puerto Rico Environmental Quality Board
1-Hour SO_2 Designation Modeling Results

Emission Inventory for the 1-Hour SO_2 Designation Model

PUERTO RICO SO2 DESIGNATION EMISSION INVENTORY

Emission Unit	Address Physical/Postal	Municipality	SCC	Model Point ID	UTM East	UTM North	Control Equipment	Control Efficiency %	Actual Emissions (ton/yr) 2013	2014	2015	Stack Height (m)	Stack Diameter (m)	Stack Exit Velocity (m/s)	Stack Temperature (K)
PREPA San Juan															
HRSG 5&6	Mercado Central Ave, Zona Central Ave, PR-28, San Juan, PR PO Box 364267 San Juan, PR 00936-4267	San Juan	2-01-001-01	5|6	805942	2040125	n/a	n/a	360.45	250.2	362.31	85.6	5	29.2	422
Boiler 7			1-01-004-04	BOILER7	805971	2040146			1188.6	1446.8	1487.10	53.5	1.8	28.028	408.15
Boiler 8			1-01-004-04	BOILER8	805991	2040156			928.6	1657	1199.80	53.5	1.8	28.028	408.15
Boiler 9			1-01-004-04	BOILER9	805832	2040053			1339.8	1333.78	2971.20	55.2	1.8	29.46	408.15
Boiler 10			1-01-004-04	BOILER10	805813	2040043			1490.2	448	534.0	55.2	1.8	29.46	408.15
								Total	**5307.65**	**5135.78**	**6063.91**				
PREPA Palo Seco															
Palo Seco 1	Road 165, Km 3.8, Toa Baja PO Box 364267 San Juan, PR 00936-4267	San Juan	1-01-004-04	PS1	801146	2043049	n/a	n/a	1033.90	809.45	1012.66	53.5	2.5	27.46	430
Palo Seco 2			1-01-004-04	PS2	801116	2043049			854.10	839.15	1127.85	53.5	2.5	27.46	430
Palo Seco 3			1-01-004-04	PS3	801096	2043049			811.80	0.00	629.08	64.3	2.4	26.6	420
Palo Seco 4			1-01-004-04	PS4	801036	2043049			3000.00	1448.80	2203.18	64.3	2.4	26.6	420
Power Block 1			2-01-001-01	PSGT1	801017	2042968			0.19	1.90	0.02	12	2.9	19.19	783
Power Block 2			2-01-001-01	PSGT2	800987	2042968			0.38	4.32	3.48	12	2.9	19.19	783
Power Block 3			2-01-001-01	PSGT3	800967	2042968			0.31	4.40	3.08	12	2.9	19.19	783
								Total	**5700.68**	**3128.02**	**2979.36**				
PREPA Aguirre															
Boiler AG1	Road PR-3, Km 152.3, Salinas PO Box 364267 San Juan, PR 00936-4267	Salinas	1-01-004-04	AG1	795822	1987168	n/a	n/a	4992	3353	4472.33	75.9	2.5	58.6	422
Boiler AG2			1-01-004-04	AG2	795473	1987108			4623	5865	5025.10	75.9	2.5	58.6	422
Gas Turbines CC1-1 to CC1-4			2-01-001-01	CC1	792355	1986905			6.41	16.5	50.5	17.8	2.4	69.3	491
Gas Turbines CC2-1 to CC2-4			2-01-001-01	CC2	793106	1986822			19.51	26.3	35.4	17.8	2.4	69.3	491
AGGT2-1, 2-2			2-01-001-01	AGGT	793381	1987227			0.001	0.354	1.89	12.2	2.9	40.9	777
								Total	**9640.951**	**9261.154**	**9585.22**				
PREPA Costa Sur															
Boiler SC-3	Road 127, Guayanilla PO Box 560580 Guayanilla, PR 00656-0580	Guayanilla	1-01-004-04	SC3	773815	1991827	n/a	n/a	46.7	0	238.60	62.8	2.2	30.2	430
Boiler SC-4			1-01-004-04	SC4	773828	1991811			12.51	0	26.56	62.8	2.2	30.2	430
Boiler SC-5			1-01-004-04	SC5	773843	1991749			2188.72	4382.95	4572.5	75.9	3.2	30.8	422
Boiler SC-6			1-01-004-04	SC6	773856	1991724			4726.06	3953.48	4505.34	75.9	3.2	30.8	422
Power Block 1			2-01-001-01	PB1	773898	1991808			1.31	0.11	0.01	12	2.9	40.9	777
								Total	**6975.3**	**8336.54**	**9323.01**				

Deficiencias en el análisis de los impactos geológicos encontrados en la Declaración de Impacto Ambiental del proyecto "Montalva Solar Farm – Guánica – Lajas" (Borrador – DIA)

Preparado por el Dr. José Molinelli Freytes, geomorfólogo

El propósito de este escrito es presentar la opinión pericial del Dr. José Molinelli Freytes en torno a las serias deficiencias que presenta el análisis geológico del "Borrador de la Declaración de Impacto Ambiental – Montalva Solar Farm – Guánica – Lajas".

Uno de los elementos fundamentales que debe incluir una DIA es la evaluación detallada de los impactos que tendrán las acciones propuestas en el ambiente natural y antropogénico así como el impacto de dichos ambientes en el proyecto mismo. La evaluación debe considerar éstos impactos recíprocos a corto, mediano y largo plazo.

Primero se presentarán las deficiencias, en la información geológica, que contiene la DIA, y se enfatiza el que solo se presenta información muy limitada y de carácter descriptivo. Tampoco considera las implicaciones que pueda tener dicha geología en el proyecto. Luego se consideran las deficiencias que presenta el mapa geológico, que al excluir la geología que circunda el proyecto, lo considera como un sistema aislado que no interactúa con el ambiente geológico aledaño.

En segundo término se aborda la ausencia total de un análisis comprensivo de los peligros geológicos inducidos por terremoto en el área propuesta. A pesar de que el proyecto propuesto está en el margen, tectónicamente activo, de la micro-placa en que está Puerto Rico, no se hace mención alguna del peligro sísmico y el riesgo significativo que presenta para el proyecto. Se establecen las bases para demostrar la necesidad crítica de evaluar el riesgo sísmico identificando las principales zonas sismogénicas en la región de Puerto Rico, las fallas activas que discurren por la zona del proyecto y el incremento en el riesgo sísmico como consecuencia de los eventos que han estado ocurriendo en el suroeste de Puerto Rico desde diciembre de 2019.

Deficiencias en la información geológica que presenta la DIA.

Con respecto a las deficiencias en la información geológica cabe destacar el que no se presentan, discuten, o analizan los impactos del proyecto en el ambiente geológico ni el impacto de los procesos geológicos, que a pesar de iniciarse fuera de los límites físicos del proyecto, pueden impactarlo significativamente.

Estos incluyen la erosión acelerada, las escorrentías, los movimientos de masa incluyendo flujos de tierra, deslizamientos y despeños así como la actividad sísmica y los peligros geológicos inducidos por terremotos.

Para comenzar, en la DIA se incluyen solo dos páginas, la 31 y 32, con información meramente descriptiva, con segmentos mal traducidos del idioma inglés, proveniente de los mapas geológicos del USGS. Esta traducción hace incomprensibles segmentos completos de la narrativa descriptiva de la geología del proyecto.

Se trata la geología como si el área del proyecto fuera un sistema aislado del resto del ambiente. Presenta un mapa geológico que solamente muestra la geología del área específica de las fincas en que estará enclavado el proyecto. Esto impide examinar como los cambios en la continuidad geológica pueden impactar el proyecto así como evaluar sus consecuencias e impactos en el sentido más amplio.

Específicamente impide comprender y analizar cartográficamente el contexto geológico del proyecto y evaluar el impacto, que las áreas aledañas a las fincas puedan tener en el proyecto propuesto. Por ejemplo, puede haber procesos geológicos que se originen fuera del área del proyecto que impacten significativamente el mismo. Este sería el caso de movimientos de masa incluyendo despeños, flujos detríticos, flujos de tierra y deslizamientos de diverso tipo además de erosión acelerada, cambios hidrológicos y otros que pueden originarse fuera del proyecto pero que pueden impactarlo.

Una de las deficiencias mayores es la ausencia crasa de un análisis de las consecuencias que puede tener la geología y los procesos geológicos en el proyecto. Una DIA debe analizar las implicaciones de la geología que se describe en los mapas geológicos en el contexto del proyecto que en este caso es de la Finca Solar de Montalva. Por ejemplo, a continuación se presentan las descripciones de las cuatro formaciones y/o depósitos geológicos identificados dentro del proyecto según aparecen en las páginas 31 y 32.

"*Las siguientes formaciones geológicas están presentes en el predio (véase Figura 7."*
"Formaciones Geológicas): Kpa, Caliza Parquera: De edad cretáceo superior, consiste en caliza, volcánica y volcanoclásticas relacionadas."

El limitarse a copiar información de los mapas geológicos de forma muy resumida, sin interpretarla, en cuanto a lo que significa dentro del contexto del proyecto de la Finca Solar, no contribuye al logro de los objetivos y metas de la DIA. ¿Qué significa en términos del proyecto la presencia de la "caliza Parguera y el que esté relacionada a rocas volcánicas y volcanoclásticas? ¿Presenta rasgos de la topografía cárstica? ¿Hay depresiones cerradas que afecten el drenaje y la dirección de las escorrentías pluviales?

"Kpob, Basalto Olivino: Flujos gruesos de lava masiva acolchonada de color oscuro-verdoso- grisácea que contienen plagioclase, clinopiroxeno y ortopiroxeno."

¿Qué significa en términos del proyecto la presencia de "almohadillas lávicas basálticas (incorrectamente traducidas como "acolchonadas") con las mineralizaciones indicadas? ¿Puede presentar limitaciones para las

excavaciones o cimentaciones? ¿Cuán meteorizada están y cuáles son sus implicaciones dentro del proyecto?

"Qa, Aluvión, Depósitos Cuaternarios: Valle de relleno y depósitos de flujos en masa relacionados con los episodios de precipitación intensa. Arenas poco consolidadas y sedimentos asociados a los sistemas de drenaje activos y pendientes de las colinas."

El aluvión Cuaternario ocupa la mayor parte del proyecto. ¿Qué implicaciones tiene para el proyecto de placas solares el que se ubique en un "valle de relleno" que al presente está recibiendo sedimentos de las áreas colindantes? ¿Cuál ha sido la magnitud y frecuencia de estos eventos considerando las lluvias más intensas y la precipitación máxima probable durante la vida útil del proyecto? ¿Qué implicaciones tienen los "sistemas de drenaje activos" que desaguan directamente en el área del proyecto? ¿Por qué no se incluyeron en el mapa geológico las áreas colindantes al proyecto si tienen un efecto directo en él? ¿A qué profundidad está el nivel freático en los terrenos aluviales, cuánto fluctúa durante el año hidrológico, cuáles son sus niveles máximos y mínimos y qué implicaciones tiene para el proyecto? ¿Cuál es el espesor o grosor del depósito aluvial y cuál es su potencial de amplificación de ondas sísmicas? ¿Hay lentes de arena con potencial de licuación?

"Tjd, Formación Juana Díaz: Se compone de arenisca conglomerática, conglomerados, arenita lítica calcárea y caliza en menor proporción; de estratos medianos a maciza con un espesor mayor a los 300 metros. La mayor parte del área del proyecto está compuesta por la formación geológica Qa."

¿Qué significa en términos del proyecto la presencia de la "Formación Juana Díaz" y el que consista de arenisca, conglomerados y caliza? ¿Presenta rasgos de la topografía cárstica con cavidades por disolución? ¿Hay depresiones cerradas que afecten el drenaje y la dirección de las escorrentías pluviales?

Estás son solo algunas de las consideraciones geológicas que debieron ser analizadas en la DIA en lugar de meramente copiar y pegar la información de una mapa geológico sin sentido analítico alguno por lo que no cumple con el propósito esencial de una DIA. En otras palabras una DIA es un instrumento de análisis del impacto ambiental de un proyecto y del ambiente en el proyecto y no la recopilación de información que no se analiza dentro del contexto del proyecto.

Consideraciones en torno al peligro de terremoto en el área del proyecto.

Es inaudito que el borrador de la DIA del proyecto "Montalva Solar Farm – Guánica – Lajas" que conlleva una inversión ascendente a unos 250 millones de dólares no consideré el peligro sísmico que amenaza a dicho proyecto ni su impacto en el área que dependerá de la energía que éste produzca.

A continuación se expondrá la importancia de analizar el contexto sísmico, los peligros geológicos inducidos por terremoto que pueden impactar al proyecto y los asuntos que deben ser considerados, analizados y discutidos en la DIA incluyendo las serias limitaciones que presenta dicha amenaza en la ubicación propuesta para dicho proyecto.

A nivel macro. Puerto Rico y las Isla Vírgenes constituyen un bloque tectónico complejo que actúa como una micro-placa que yace entre la placa del Caribe y la placa de América del Norte. Esta se mueve esencialmente hacia el este a una razón promedio de dos centímetros al año.

Mientras tanto la placa de América del Norte se mueve hacia el oeste rozándose con la microplaca de PR y las Islas Vírgenes. Dicho margen está dominado por procesos de subducción oblicua, a medida que va adentrándose hacia el manto terrestre a lo largo del sistema de la trinchera de Puerto Rico. La convergencia de dicha placa bajo Puerto Rico alcanza uno 160 kilómetros de profundidad y es la causante de sismos de foco llano e intermedio en la región de Puerto Rico.

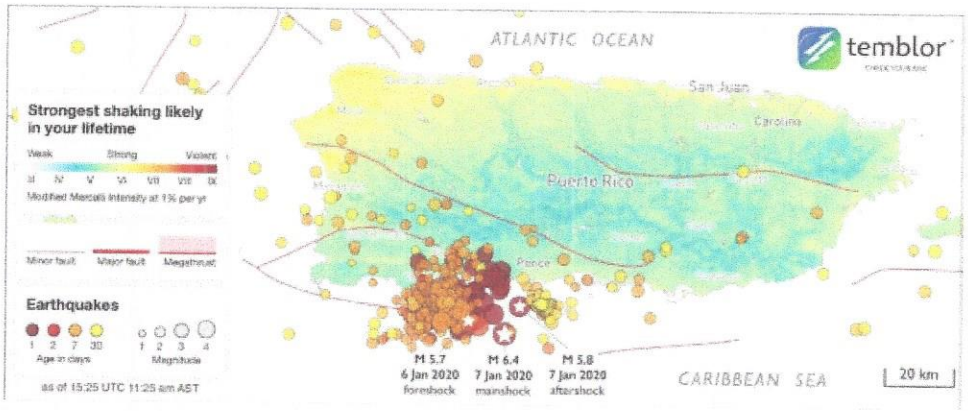
En esta zona sismogénica ocurrió el sismo de 2 de mayo de 1787 que pudo haber alcanzado una magnitud de unos 8 grados en la escala Richter siendo dicho evento el de mayor magnitud que se ha documentado en la historia de Puerto Rico Afectó fuertemente la porción septentrional de Puerto Rico quebrando porciones de las murallas del Castillo San Felipe del Morro y San Cristóbal. En la región sur también se sintió muy fuerte afectando la iglesia de la Guadalupe en Ponce.

Al oeste de Puerto Rico, un sistema de fallas discurre hacia el sur de la trinchera pasando por el Cañón de la Mona. Éste constituye una fosa tectónica, producto de fuerzas tensionales creada por el movimiento diferencial entre las placas. Dicho movimiento crea un efecto rotacional, "en contra de las manecillas del reloj", en la microplaca de Puerto Rico y las Isla Vírgenes. Fue en el Cañón de la Mona el epicentro del terremoto de San Fermín el 11 de octubre de 1918 que tuvo una magnitud aproximada de 7.3 grados. Vino acompañado de un tsunami que causó la muerte a más de 40 personas y se sintió muy fuerte en la región oeste incluyendo el área de Lajas y Guánica donde se sintieron intensidades de VII en la es la Rossi-Forel.

Específicamente la región suroeste ha estado muy activa desde hace décadas. En el 1987 un sismo de 4.8 grados quebró las columnas cortas de la Escuela Superior de Boquerón que acababa de ser construida al igual que la Segunda Unidad Llanos Tuna del mismo área. Numerosas viviendas sufrieron daños estructurales en paredes y columnas. La actividad sísmica con foco muy cerca de la superficie estuvo asociada a la falla de Boquerón que discurre por el sur del Valle de Lajas y que está asociada al sistema de la falla de Punta Montalva en Guánica donde ha ocurrido una porción significativa de la actividad sísmica que sigue impactando el área desde fines de diciembre de 2019.

Miles de sismos han ocurrido en los municipios costeros desde Cabo Rojo hasta Juana Díaz desde fines de diciembre de 2019. El área del proyecto entre Guánica y Lajas fueron impactadas significativamente. Los eventos sísmicos más significativos ocurrieron el 29 de diciembre con magnitud de 5.0, el de 5.7 del día de Reyes que causó el colapso de numerosas casas construidas sobre columnas particularmente en el área de Guánica y el de la madrugada del 7 de enero que alcanzó una magnitud de 6.4 y que vino acompañado de una réplica de 5.8.

El siguiente mapa proveniente del escrito titulado "La secuencia sísmica del invierno de 2019 -2020 en PR que ha mantenido a la población en alerta" preparado por A.M. López, K.S.Hughes y E. Vanacore fue publicado en el portal "temblor". Muestra la ubicación de los principales sismos que han ocurridos a principios del año en curso.

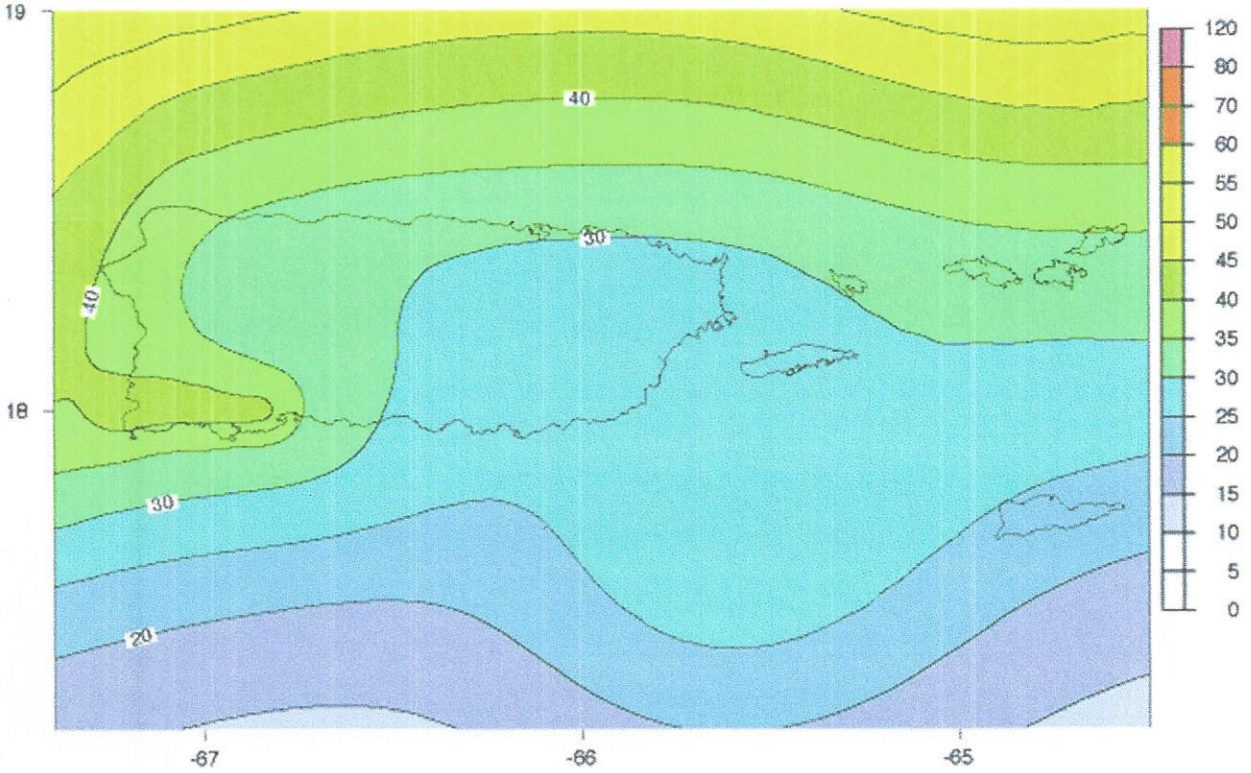


Éste muestra claramente la intensa actividad sísmica en el área del proyecto propuesto. Ésta se mantiene activa en el área y se proyecta que se mantenga por varias décadas. Cómo consecuencia del sismo de 6.4 hubo desplazamientos verticales y laterales a través de la región suroeste. Se estima que el área de máximo desplazamiento vertical negativo ocurrió en un punto al sur de la Bahía de Guayanilla donde se estimó un hundimiento de unas 7 pulgadas. La intensidad sísmica en el área alcanzó VIII en la escala MMI.

Otra zona de potencial sismogénico es la Fosa de Muertos, al sur de Puerto Rico, que al presente no ha mostrado actividad significativa pero que podría generar un sismo fuerte, si estuviera almacenando energía elástica, como consecuencia de la interacción entre la Placa del Caribe y la micro-placa de Puerto Rio y las Islas Vírgenes.

Hay que mencionar la presencia las fallas en tierra que forman parte del sistema meridional de fallas que discurre desde Aguirre cruzando diagonalmente a través del interior montañoso central hasta salir por Rincón. Este sistema ha mostrado enjambres sísmicos en el pasado y no se puede descartar la posibilidad de un evento significativo. De manera similar, pero con potencial sísmico más bajo, es el sistema septentrional de fallas que se extiende desde el norte de Humacao hasta un área al sur del carso donde se oculta bajo las calizas de edad Terciaria que yacen sobre esta.

Otra estructura sismogénica que resulta de las fuerzas tensionales entre las placas que interactúan en la región de Puerto Rico y las islas Vírgenes es la Fosa de Anegada ubicada al sudeste de Vieques y el noroeste de la isla de Santa Cruz. Aquí se produjo el sismo de las Islas Vírgenes que ocurrió el 18 de noviembre de 1867. Tuvo una magnitud de unos 7.3 grados y produjo un tsunami. Este sismo se sintió con una intensidad de VI en la escala Rossi-Forel en la región de Guánica y Lajas.



1.0-sec spectral acceleration (%g) with 2% probability of exceedance in 50 years from all modeled sources.

El mapa de arriba proviene del USGS - C.S. Muller, A.D. Frankel y E.V. Leyendecker que prepararon una de las primeras versiones del "Seismic Hazard Maps for Puerto Rico and the U.S. Virgin Islands" y que necesita ser actualizado a la luz de los eventos sísmicos del año en curso en el suroeste de Puerto Rico. . Muestra la aceleración sísmica que tiene 2% de probabilidad de ser excedida en los próximos 50 años, proveniente de las distintas fuentes sismogénicas que podrían afectar el área de estudio. Se presenta como ejemplo del tipo de análisis que tiene que considerar la DIA, sobre todo después de los eventos de enero pasado ,que han aumentado las probabilidades de sismos destructivos en términos de magnitud, frecuencia y peligros geológicos inducidos por terremoto.

No es el propósito de este escrito el presentar un análisis completo de las zonas sismogénicas en la región de Puerto Rico sino demostrar lo crítico que es incluir en la DIA un análisis de la amenaza que presenta la actividad sísmica en el proyecto propuesto.

El área donde se pretende ubicar al proyecto se caracteriza por el alto peligro sísmico que presentan las fallas activas del sur del Valle de Lajas, Punta Montalva y otras que se desconocían y cuya presencia fue revelada por los eventos de los últimos 10 meses. Es importante comprender que eventos sísmicos similares podrían volver a ocurrir al igual que eventos mayores aunque con probabilidad menor.

Eventos sísmicos iguales o mayores que los ocurridos el 7 de enero de 2020 deben ser evaluados y considerados con mucho rigor en la DIA así como el desplazamiento de la actividad sísmica hacia Guánica, Lajas y Cabo Rojo ya que sismos similares a los pasados ocurrieran más cerca o en la misma área del proyecto los impactos serían potencialmente mayores.

En resumen deben identificarse todas las zonas sismogénicas que pueden impactar al área del proyecto de forma significativa. Debe incluir un análisis probabilístico de la magnitud y frecuencia de los eventos sísmicos incluyendo la nueva secuencia que se inició en diciembre de 2019 que incluye directamente el área propuesta para la "Finca Solar. También se deben establecer las aceleraciones sísmicas y desplazamientos que podrían impactar el área del proyecto así como sus consecuencias.

Amplificación de ondas sísmicas:

Otro de los peligros que tienen que ser considerados es la amplificación de ondas sísmicas. Debido a que la mayor parte del proyecto está ubicado sobre depósitos aluviales que progresivamente han ido rellenando el Valle de Lajas es esencial que se considere el fenómeno de amplificación de ondas sísmicas.

Esto es necesario debido a que estos lugares pueden hacer que el sismo se sienta más fuerte y que su duración sea mayor. Esto ocurre porque las ondas símicas reducen su velocidad y aumentan su amplitud cuando viajan a través de materiales blandos, saturados de agua y de gran espesor. En otras palabras, estos lugares tienden a vibrar más fuerte y por más tiempo que aquellos que son rocosos y rígidos por lo que los daños potenciales al proyecto podrían mayores.

> Durante mucho tiempo se ha reconocido que diferentes lugares ubicados a la misma distancia epicentral experimentan grandes variaciones en la distribución de daños debido a la influencia de las condiciones geológicas locales en el movimiento del suelo.

Las características de los sedimentos aluviales, su profundidad o grosor, contenido de agua, las propiedades geotécnicas del material aluvial no consolidado, la topografía del basamento rocoso bajo el manto aluvial, la geometría de los depósitos y las rocas subyacentes pueden modificar los movimientos del suelo cambiando el contenido de amplitud y frecuencia del movimiento. Estas áreas sufren aceleraciones sísmicas mayores por lo que tiemblan más fuerte y por mayor tiempo que en lugares rocosos.

Licuación:

De igual manera, en las áreas aluviales, donde hay materiales arenosos, de edad geológica reciente, de tamaño mediano a fino y saturados de agua puede ocurrir el fenómeno de licuación. Cuando ocurre el terreno se comporte como si fuera arena movediza haciendo que las estructuras ubicadas sobre estos se hundan parcialmente o que sufran asentamientos diferenciales a medida que el agua es expulsada a la superficie. Dicho fenómeno ocurrió en numerosos lugares costeros y aluviales en los municipios de Guánica, Lajas, Guayanilla, Peñuelas y Ponce como consecuencia de los sismos del 6 y 7 de enero del año en curso.

Cuando estos materiales arenosos experimentan el efecto de las ondas sísmicas los mismos tienden a compactarse causando un aumento en la presión del agua que satura los poros en el suelo. Esto es causado por la transferencia de carga de partículas del suelo al agua que ocupa los poros.

Ésta puede drenar hacia afuera y reducir la presión pero, si se restringe, la presión del agua en los poros puede elevarse y alcanzar una fuerza similar a la que ejerce el peso de la columna del suelo sobre la capa arenosa subyacente. En estas condiciones, durante un corto período de tiempo, el suelo podría sufrir grandes deformaciones y comportarse como un fluido en lugar de como un sólido.

Cualquier estructura, relleno o terraplén ubicado en suelo licuado sufrirá deformaciones. Estos pueden accionar flujos laterales del suelo al perder toda su resistencia a los esfuerzos cortantes. Además, pueden ocurrir asentamientos diferenciales y la expulsión de arena a la superficie. El asentamiento de arena es causado principalmente por el componente de cizallamiento horizontal del movimiento.

Las condiciones geológicas que favorecen la licuación incluyen la presencia de lentes de arena saturada y potencialmente licuable. Ésta debe ser porosa, bien diferenciada de acuerdo con el tamaño de sus partículas. Generalmente constituyen formaciones lenticulares que están confinadas por capas de baja permeabilidad . El confinamiento de agua en los poros por capas impermeables por encima y por debajo del lecho licuable, y la proximidad del lente de arena a la superficie (50 pies o menos) son factores favorables.

La licuación ocurre principalmente donde las arenas se han depositado en los últimos 10,000 años y donde el nivel freático yace a menos de 10 metros de la superficie. Es importante señalar que los depósitos de aluvión donde, está ubicado la mayor parte del proyecto, son cónsonos con estas características que favorecen la licuación.

En Puerto Rico, la licuación se observó en las tierras bajas de Rincón y Añasco durante el terremoto del 11 de octubre de 1918, donde agua y la arena fue expulsada a la superficie a través de numerosas grietas longitudinales en terrenos aluviales. Éste fenómeno ocurrió en zonas donde la intensidad del terremoto (escala Rossi-Forel) fue de VII o mayor.

En resumen, los factores principales que propician la licuación incluyen temblores que produzcan intensidades mayores V o VI en la escala MMI, la presencia de materiales arenosos sueltos, de edad geológica reciente, ubicados cerca de la superficie y que

estén saturados por agua. Éstas condiciones pueden estar presentes en los terrenos aluviales del proyecto y no han sido evaluadas en la DIA.

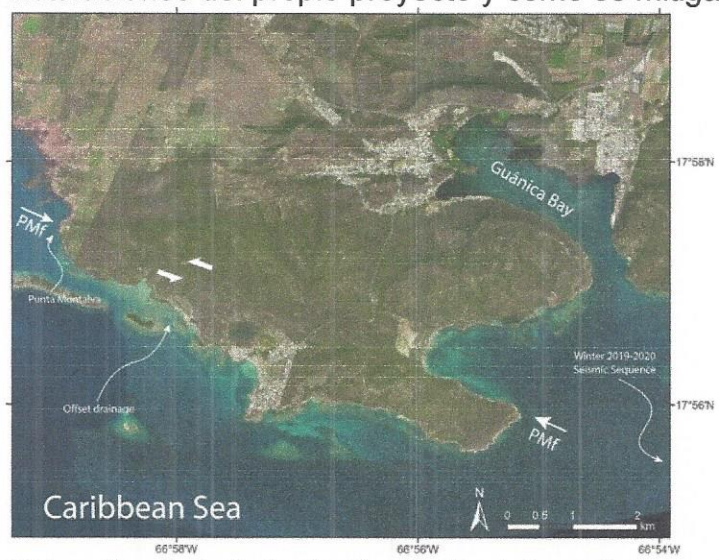
La ubicación del proyecto propuesto dentro de materiales geológicos susceptibles a la licuación del terreno así como la amplificación de ondas sísmicas sin una evaluación geotécnica detallada de los peligros potenciales, plantea una deficiencia grave en términos de los peligros geológicos inducidos por terremoto en el lugar seleccionado.

Esto es particularmente crítico luego de los terremotos de enero pasado que revelaron un grado de peligro sísmico mucho mayor que el que se tenía anteriormente. De hecho, al presente se considera que el sistema de fallas del sur del Valle de Lajas y de la falla de Punta Montalva son parte del margen de placa que bordea la micro-placa de Puerto Rico y las Islas Vírgenes.

Dentro de este contexto es muy importante evaluar el potencial de ruptura del terreno en caso de que afloren las fallas geológicas a la superficie. El sistema de la falla Punta Montalva discurre justamente al sur del proyecto. Ramificaciones asociadas a dicha falla podrían aflorar en el proyecto.

Al igual que la mayoría de los sistemas de fallas de Puerto Rico éstas se caracterizan por ser de corrimiento lateral izquierdo. Esto significa que de ocurrir un movimiento lateral a lo largo de una falla en la superficie, el área del proyecto podría desplazarse hacia el oeste, a lo largo de la parte norte de la falla, mientras la parte al sur de la falla que se movería hacia el este. Esto causaría roturas y desgarres en las instalaciones del proyecto propuesto ubicadas directamente sobre la falla.

Hay que evaluar el potencial de fallas subsuperficiales que estén ubicadas bajo el proyecto y que eventualmente puedan aflorar corto y mediano plazo durante la vida útil del proyecto. Dicha consideración requiere establecer sus consecuencias en las instalaciones del propio proyecto y cómo se mitigarían sus efectos.



Ubicación de la falla de Punta Montalva a lo largo del borde sur del proyecto "Montalva Solar Farm. Imagen tomada de "temblor" del informe de A. López referenciado al principio.

Deficiencias en el análisis de los impactos geológicos encontrados en la Declaración de Impacto Ambiental del proyecto "Montalva Solar Farm – Guánica – Lajas" (B – DIA)

Opinión pericial del José Molinelli Freytes Ph. D.

Resumen de conclusiones principales:

1. La DIA no cumple su propio propósito, ni los objetivos de la ley que lo requiere, al no identificar, evaluar, ni considerar las implicaciones de los impactos geológicos que son críticos para éste proyecto.

2. La amenaza que presentan los peligros geológicos, fueron ignoradas en la DIA, a pesar de que deben ser parte esencial para la determinación de la viabilidad del Proyecto, en el lugar propuesto, por la seria amenaza que presentan al mismo.

3. Los peligros inducidos por terremoto son críticos para determinar la viabilidad del Proyecto y deben ser evaluados y analizados rigurosamente.

4. Éstos presentan un alto riesgo para el Proyecto debido a que pretenden ubicarlo en el mismo margen tectónico de la micro-placa de Puerto Rico e Islas Vírgenes con la placa del Caribe. A lo largo del mismo hay sistemas de fallas geológicas activas como la del Sur del Valle de Lajas y la de Punta Montalva en Guánica que discurren por la porción sur del Proyecto. Esto significa que el Proyecto puede estar expuesto al efecto de terremotos fuertes muy cercanos y hasta en el Proyecto mismo.

5. Otras fallas, desconocidas hasta el momento se han activado tanto en la parte terrestre como marina de los municipios Lajas, Guánica, Guayanilla, Peñuelas y Ponce.

6. El margen tectónico está muy activo, en pleno desarrollo y ha producido miles de sismos durante los últimos diez meses. Los más fuertes de 5.7, 5.8 y 6.4 se han sentido fuertemente a través de toda la Isla siendo muy destructivos en la region suroeste, particularmente entre Lajas y Ponce. En Guánica y Guayanilla los daños fueron mayores causando daños de diverso grado incluyendo serias afectaciones estructurales y hasta el colapso de escuelas, centros gubernamentales, Iglesias, comercios, viviendas, carreteras y autopistas y plantas de generación de energía entre otros.

7. Pueden haber eventos similares o más fuertes en esta región por lo que la DIA deberá considerar los escenarios más críticos "worst case scenario" para el Proyecto.

8. Esto conlleva la determinación de la aceleración, duración, magnitud y frecuencia de eventos sísmicos que pueden impactar el área del Proyecto desde distintas fuentes sismogénicas.

9. Específicamente los terremotos, no solo pueden causar daños por las vibraciones que producen sino que pueden causar la licuación del terreno y amplificar las ondas sísmicas de acuerdo a las características de los depósitos aluviales que nunca fueron determinadas y evaluadas en la DIA.

10. La licuación es común en los terrenos aluviales (Qa) como los que ocupan la mayor parte del Proyecto. Éstos pueden tener lentes de arena, de tamaño mediano a fino,

estar saturadas por agua y tener poca cohesion por lo que durante un sismo pueden fluidizarse haciendo que el terreno pierda su capacidad de carga y se convierta en algo similar a la arena movediza. Esto podría causar asentamientos diferenciales en el terreno y hundimientos de porciones de las instalaciones del sistema propuesto.

11. La amplificación de ondas sísmicas es característica de terrenos aluviales profundos, saturados por agua y constituido de materiales no consolidados como el "Qa" que domina el área del Proyecto. Estos materiales geológicos reducen la velocidad de las ondas sísmicas al disminuir la longitud y aumentar su amplitud. Esto causa que los terrenos vibren más fuerte y por más tiempo incrementando el potencial de daño a la infraestructura alli ubicada.

12. Otro peligro significativo es el potencial de ruptura y desplazamiento diferencial de la superficie del terreno como consecuencia del afloramiento de una falla geológica en el área del Proyecto. El hipocentro de gran número de sismos ha ocurrido a pocos kilómetros de la superficie y hay que evaluar dicho potencial dentro del Proyecto por su ubicación en el margen de placa y la activación de nuevas fallas subsuperficiales que eran desconocidas hasta el presente. De ocurrir dicha ruptura porciones del Proyecto pueden desplazarse lateral o verticalmente en direcciones opuestas causando rupturas y desgarres en las estructuras e instalaciones del Proyecto.

13. La información geológica, que contiene la DIA, presenta información limitada a dos páginas. Solamente es de carácter descriptivo y está mal traducida del mapa del mapa del que provino. No considera las implicaciones que pueda tener dicha geología en el proyecto. El mapa geológico se limita solo al área específica del proyecto excluyendo la geología circundante como si lo considerara un sistema aislado que no interactúa con el ambiente geológico aledaño.

14. Dado el alto nivel de peligro sísmico del área donde se quiere ubicar el Proyecto es inconcebible que no se mencione en la DIA. La consideración rigurosa y detallada de estos peligros es indispensable para cumplir con los requisistos de la DIA.

15. Al no considerar los peligros geológicos pone en riesgo no solo la inversion de $250 millones sino la funcionalidad de las áreas industriales, comerciales, residenciales y de servicio que serán servidas por la energía que aquí se genere.

Preparado por José Molinelli Freytes Ph.D.
Geomorfólogo
29 de octubre de 2020

Exhibit 2

Institute for Energy Economics and Financial Analysis
IEEFA.org

14900 Detroit Avenue, Suite 206
Lakewood, OH 44107
216-712-6612
staff@ieefa.org

October 13, 2021

Deanne Criswell
FEMA Administrator

Brenda Mallory
Council on Environmental Quality

Gina McCarthy
White House National Climate Advisor

Gretchen Sierra-Zorita
White House Office of Intergovernmental Affairs

Cc: Congressman Grijalva and members of the House Natural Resources Committee

To Whom It May Concern:

I am writing to express my concern with the pending use of billions of dollars of FEMA funds for Puerto Rico's electrical system. Puerto Rico's plan is bad economic and fiscal policy and makes a mockery of the Biden administration's climate policy goals of decarbonizing the nation's electricity sector by 2035.

The Puerto Rico government has proposed a 10-year plan to use over $14 billion in FEMA funds to rebuild essentially the same centralized grid that failed during Hurricane Maria. The plan earmarks $0 of federal funds for renewable energy. The CEO of PREPA testified to Congress on October 6th in support of using federal funds for new imported liquefied natural gas (LNG) projects.

Professional technical studies support the rapid deployment of rooftop solar and storage as the best way to provide resiliency to households, dramatically reduce the island's dependence on fossil fuels, and lower and stabilize electric rates – at a lower capital cost than the poorly designed plan made by PREPA, the Island's utility.[1] The Puerto Rico Energy Bureau has also questioned the level of proposed transmission and distribution system spending by PREPA. PREPA never showed that its proposed investments in system hardening were cost-effective

[1] Vila Biaggi, Kunkel and Irizarry Rivera. We Want Sun and We Want More. March 2021; EE Plus. Puerto Rico Distribution Modeling. March 2021; Energy Futures Group. Puerto Rico Distributed Energy Resource Integration Study. February 2021; Telos Energy. Puerto Rico Distributed Energy Resource Integration Study. December 2020.

relative to other alternatives.[2] The sad history of spending billions and having nothing to show for it in Puerto Rico is about to be repeated.

Since 2018 PREPA and the Financial Oversight and Management Board (FOMB)[3] have identified an expansion of renewable energy as the linchpin to Budget balance for the authority. The current fuel budget made up of coal, oil and natural gas must be replaced or Puerto Rico's economy will continue to be held captive to market volatility and price spikes. This year alone price spikes in natural gas and oil have driven four electric rate increases.

Puerto Rico's current path of rebuilding the centralized grid and privatizing the island's power plants will prolong the island's dependence on fossil fuels, which is the leading cause of rising electric rates. Four years after Hurricane Maria, Puerto Rico continues to generate more than 95% of its electricity from fossil fuels; although the transition to renewable energy has been identified in formal budget and energy plans as a central part of the solution, next to no progress has been made. The federal funds available in this moment represent the best, and only, opportunity for Puerto Rico to realize this vision. I urge your offices to work together to ensure that this opportunity is not wasted.

I have been in and around government program and finances since the 1970's. If this plan goes forward in its current form Puerto Rico is guaranteed a newly built, poorly equipped and outdated grid, a permanent fiscal crisis and rising electricity rates.

Sincerely,

Tom Sanzillo
Director of Financial Analysis
Institute for Energy Economics and Financial Analysis
tsanzillo@ieefa.org

[2] Puerto Rico Energy Bureau. Final Resolution and Order. Case No. CEPR-AP-2018-0001. August 2020. P. 229.
[3] (FY 2018 p. 52)

Exhibit 3

RAÚL M. GRIJALVA OF ARIZONA
CHAIRMAN

DAVID WATKINS
STAFF DIRECTOR

BRUCE WESTERMAN OF ARKANSAS
RANKING REPUBLICAN

VIVIAN MOEGLEIN
REPUBLICAN STAFF DIRECTOR

U.S. House of Representatives
Committee on Natural Resources
Washington, DC 20515

October 25, 2021

Deanne Criswell
Administrator
Federal Emergency Management Agency (FEMA)
500 C St SW
Washington, DC 20024

Dear Ms. Criswell,

Puerto Rico is currently experiencing an energy crisis with life-threatening consequences for its more than three million residents. Despite paying nearly twice as much for electricity compared to stateside residents, Puerto Ricans continue to be burdened by regular power outages and other service disruptions due to the territory's fragile and mismanaged electrical infrastructure.[1] As you know, more than $9.4 billion in federal recovery funds have been assigned by the Federal Emergency Management Agency (FEMA) to rebuild Puerto Rico's power grid following a series of natural disasters in recent years.[2] However, residents and elected officials in Puerto Rico have expressed concerns that current plans to utilize these funds fail to invest in renewable energy alternatives like rooftop solar and battery storage, which experts have found could significantly increase Puerto Rico's generation potential and help offset the currently unstable grid.[3] I am requesting that FEMA, as the entity responsible for providing these funds and reviewing proposals so that they meet standards set by federal and local law, commit to working with all relevant parties to direct federal funds towards expanding Puerto Rico's rooftop solar and battery storage capacities at amounts sufficient for meeting the goals outlined in the "Puerto Rico Energy Public Policy Act."

In an effort to decrease Puerto Rico's reliance on imported fossil fuels to generate electricity and increase its share of cleaner renewable energy, Puerto Rico's legislature enacted the "Puerto Rico Energy Public Policy Act" in May of 2019.[4] This law, in part, requires increasing the percentage of the island's energy that is generated by renewable sources to 40% by 2025, 60% by 2040, and

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[1] U.S. Energy Information Administration (EIA). *Puerto Rico Territory Energy Profile*. *https://www.eia.gov/state/print.php?sid=RQ*. Updated October 21, 2021. According to the EIA, the average cost in cents/kWh in Puerto Rico compared to the United States was about 1.45 times higher for "Residential" electricity, about 1.93 times higher for "Commercial" electricity, and about 2.37 times higher for "Industrial" electricity for the July 2021 period.

[2] Federal Emergency Management Agency (FEMA). *FEMA Explains Processes for Island's Power Grid Projects.* Sept. 22, 2021. *https://www.fema.gov/press-release/20210922/fema-explains-processes-islands-power-grid-projects*

[3] Sigrin, Ben, and Mooney, Meghan. *Rooftop Solar Technical Potential for Low-to-Moderate Income Households in the United States*. National Renewable Energy Laboratory. NREL/TP-6A20- 70901. 2018. *https://www.nrel.gov/docs/fy18osti/70901.pdf*.

[4] See: "Puerto Rico Energy Public Policy Act" [Act. No. 17 of April 11, 2019]. Office of Management and Budget, Government of Puerto Rico. *https://bvirtualogp.pr.gov/ogp/Bvirtual/leyesreferencia/PDF/2-ingles/17-2019.pdf*.

100% by 2050.[5] However, Puerto Rico's current energy production falls far short of even the lowest and nearest of those goals. In fiscal year 2020, only 2.3% of Puerto Rico's electricity came from renewable sources, including just 1.4% from solar.[6]

Despite a clear need for significant and immediate investment in renewables to meet Puerto Rico's energy goals, recent actions from island authorities have impeded such investments. For example, the Financial Management and Oversight Board (FOMB) of Puerto Rico recently rejected 16 utility-scale solar energy projects.[7] The Puerto Rico Electric Power Authority (PREPA) claimed this decision was "unjust" and would result in the "deterioration of the working relationship" between the organizations.[8] However, PREPA's own 10-Year Infrastructure Plan initially failed to reserve federal funds for bolstering renewable energy and storage, and instead called for these funds to be put towards hardening the centralized grid and developing new natural gas infrastructure.[9] Although PREPA intends to solicit more bids for projects focused on renewables, this process has been repeatedly delayed.[10]

These decisions and delays have hindered Puerto Rico's ability to transform its electrical system and are in direct opposition to President Biden's objective to invest in clean energy and promote environmental justice nationally.[11] According to a March 2021 report, achieving 75 percent distributed renewable energy generation in 15 years is possible by equipping all Puerto Rican homes with 2.7 kW photovoltaic panels and a 12.6 kWh battery backup, in addition to solar installations at commercial sites like parking lots.[12] Doing so would not only cut imported fossil fuel costs from approximately $1.4 billion annually to $430 million annually, but it could also

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[5] SB 1121 Puerto Rico Energy Public Policy Act, p. 23, accessed August 2021. The law also requires the closing of all coal-fired electrical generation by 2028.

[6] U.S. Energy Information Administration (EIA). *Puerto Rico: Territory Profile and Energy Estimates.* https://www.eia.gov/state/analysis.php?sid=RQ. Updated November 19, 2020. According to the EIA, only 0.3% of Puerto Rico's electricity came from solar power in fiscal year 2015, making it the fastest-growing source of renewable energy in Puerto Rico. Puerto Rico also has 19 hydroelectric generating plants, but electricity generation varies significantly from them and some are more than 100 years old.

[7] Financial Management and Oversight Board. Public Meeting Documents. *Selection of 150MW of renewable, non-operational PPOAs.* Feb. 26, 2021.

[8] Fajardo, Rosario. *FOMB and Prepa Clash Over Renewable Energy Agreements.* The Weekly Journal. Aug. 26, 2020. https://www.theweeklyjournal.com/business/fomb-and-prepa-clash-over-renewable-energy-agreements/article_5aa49532-e71a-11ea-8ebc-47ff7e65c17e.html

[9] Puerto Rico Electric Power Authority (PREPA) & Federal Emergency Management Agency (FEMA). *PREPA 10-Year Infrastructure Plan.* Updated March 2021. https://aeepr.com/es-pr/Documents/20201207_PREPA%2010-Year%20Infrastructure%20Plan_vF.pdf

[10] Government of Puerto Rico, Public Service Regulatory Board, Puerto Rico Energy Bureau (PREB). *Request for Extension of Time to File Updated Procurement Plan Required by December 8, 2020 Resolution and Order.* Apr. 30, 2021. https://energia.pr.gov/wp-content/uploads/sites/7/2021/05/Request-of-the-PREPA-for-Extension-of-Time-to-Fi.pdf

[11] The White House. Presidential Actions. *Executive Order on Tackling the Climate Crisis at Home and Abroad.* Jan. 27, 2021. https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/

[12] M. Vila Biaggi, Ingrid. Kunkel, Cathy. A. Irizarry Rivera, Agustín. *We Want Sun and We Want More: 75% Distributed Renewable Generation in 15 Years in Puerto Rico Is Achievable and Affordable*. CAMBIO PR & Institute for Energy Economics and Financial Analysis (IEEFA). March 2021. p. 2. https://ieefa.org/wp-content/uploads/2021/03/We-Want-Sun-and-We-Want-More_March-2021.pdf

bring the total system cost down to 15 cents/kWh by 2035.[13] However, the report notes that this progress is only possible when supported by federal funds, like the $9.4 billion assigned by FEMA to upgrade and modernize Puerto Rico's power grid.

As was discussed at an oversight hearing hosted by the House Committee on Natural Resources on October 6, 2021, committing these funds for renewable energy sources like rooftop solar would also reduce the existing gap in access to solar between high- and low-income households in Puerto Rico.[14] A December 2020 report found that low-to-moderate income households, which make up 50% of the local population, spend disproportionately more on energy but are less likely to adopt solar compared to higher-income households.[15] The report also found that Puerto Rico has 435% more rooftop generation potential than electric consumption among all residential buildings, and 570% more generation potential among low-to-middle income buildings exclusively.[16] Policies that further consider and address these inequities in access to rooftop solar among residents of varying income levels are needed, but immediate progress can be made through the largescale use of federal funds to finally take advantage of Puerto Rico's significant rooftop solar and storage potential.

Additionally, the Committee applauds the recent decision from FEMA and the Department of Energy (DOE) to carry out a study to examine methods for achieving Puerto Rico's goal of building an energy system entirely based on renewables. This study is an answer to requests from many interest groups on the island engaged in resolving Puerto Rico's energy troubles and its findings will be extremely valuable to the objective of transforming Puerto Rico's energy system. I encourage FEMA and DOE to provide ample focus to the benefits of rooftop solar and battery storage within the scope of this study and I reiterate the importance of utilizing federal funds from FEMA to develop and expand these renewable energy sources.

Puerto Rico requires immediate action to mitigate its energy crisis. It is unacceptable that consumers are forced to endure recurring blackouts and increased rates while the bureaucracy that operates Puerto Rico's electrical infrastructure continues to delay and deter progress on building a new system that harnesses the island's massive potential for renewables. I respectfully request that FEMA help us realize a new energy future for Puerto Rico by ensuring that the funds reserved for upgrading the power grid include robust and specific investments in rooftop solar and storage at levels that facilitate 40% generation from renewables by 2025 and, ultimately, 100% renewable generation by 2050.

Thank you for considering this request and I welcome the opportunity to engage with you and others further on this subject. Please contact Ivan Robles with the Committee's Office of Insular

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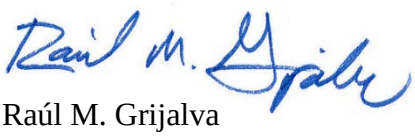
[13] Ibid, p. 17.
[14] House Committee on Natural Resources, 117th Congress. House Committee Hearing. *Puerto Rico Electric Power Authority (PREPA) Post-Implementation of the LUMA Transmission and Distribution Contract.* Oct. 6, 2021. *https://www.congress.gov/event/117th-congress/house-event/114107*
[15] Sigrin, Ben, and Mooney, Meghan. *Rooftop Solar Technical Potential for Low-to-Moderate Income Households in the United States*. p. 2. *https://www.nrel.gov/docs/fy18osti/70901.pdf*.
[16] Ibid, p. 12.

Affairs at Ivan.Robles@mail.house.gov or 202-794-0961 if you have any questions about this request.

Sincerely,



Raúl M. Grijalva
Chair
House Committee on Natural Resources

Frente Unido Pro-Defensa del Valle de Lajas
Apartado 3138, Lajas, Puerto Rico 00667
granambiente@gmail.com
http://www.granambiente.com

23 de diciembre de 2021

William O. Rodríguez Rodríguez, Esq.
Secretario
Departamento de Vivienda de Puerto Rico
Plan de Acción de Red de Energía - CDBG (pr.gov)
https://cdbg-dr.pr.gov/iframes/PublicCommentsIFRM.html

Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico

Estimado Sr. Rodríguez:

Estos Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico ("Borrador del Plan de Acción") se presentan a nombre del Frente Unido Pro-Defensa del Valle de Lajas. Nuestra organización es una sin fines de lucro registrada en el Departamento de Estado desde el 1995. Llevamos más de 25 años trabajando en la defensa de los terrenos de valor agrícola en el Valle de Lajas y en todo Puerto Rico. En el 2017 nuestra organización fue galardonada con el Premio a la Solidaridad que otorga el Miranda Foundation. Nos solidarizamos con los comentarios que se desglosan abajo.

En resumen, nuestra organización entiende que la energía renovable es necesaria para el país y para el desarrollo de la agricultura y que se debe desarrollar sin impactar negativamente los terrenos agrícolas que todavía tenemos en Puerto Rico. Este asunto es uno estratégico para el país, pues importamos cerca de un 85% de lo que consumimos en alimentos y en los últimos 60 años hemos perdido cerca de un 70% de los terrenos en uso agrícola (de acuerdo a los últimos datos del Censo Federal Agrícola). Si el Plan de Acción persigue como objetivo apoyar soluciones resilientes relativas a la producción de energía, la respuesta no puede ser reestablecer la infraestructura que se vino abajo luego del huracán María. La respuestra lógica es facilitar sistemas de producción de energía basados en placas fotovoltaicas en los techos de las casas con bancos de baterías en los hogares de comunidades de bajos y medianos ingresos. Esta opción implica decentralizar la producción y distribución de energía en el país. El ejemplo de la "finca solar" en Humacao es evidencia de que los proyectos de energía renovable a escala industrial no representan una opción resiliente. Dicho proyecto quedó dramaticamente destrozado luego del huracán.

Según el Borrador del Plan de Acción, la mayoría de los fondos para el sistema eléctrico se asignarían al Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1) con un presupuesto de $ 1,055,811,031 que irían para reconstruir los postes, torres, cables y otros componentes del sistema centralizado de transmisión y distribución de energía eléctrica que conecta las grandes plantas de generación de energía a base de la quema de combustibles fósiles, principalmente

ubicadas en el sur de Puerto Rico con las y los abonados. Otros fondos irían al Programa para la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2) al que se le asignarían $ 760,595,149 para proyectos que alegadamente no se prevé que sean financiados por otras fuentes federales o locales.

El Borrador del Plan de Acción adolece de nueve fallas principales; 1.- niega la capacidad de la energía renovable, especialmente sistemas solares ubicados en techos o cercanos al lugar de consumo y los sistemas de almacenamiento de energía (baterías) para proporcionar un servicio eléctrico confiable, resiliente y costo-efectivo y retrasa el uso de estas opciones, 2.- perpetúa el sistema de transmisión y distribución que mantiene la dependencia a largo plazo en las plantas de generación de energía a base de la quema de combustibles fósiles, 3.-incumple con el Plan Integrado de Recursos ("PIR") emitido por el Negociado de Energía, 4.-no aporta significativamente a lograr los mandatos de porcientos de energía renovable establecidos por ley requeridos en el 2022 y 2025, 5.-asume erróneamente que los fondos de FEMA no se pueden utilizar para la energía renovable distribuida (sistemas solares ubicados en techos y baterías), 6.-hecha a perder la oportunidad de lograr la justicia social y ambiental a través del acceso de comunidades de bajos y medianos ingresos a las energía renovable distribuida (sistemas solares ubicados en techos y baterías), 7.-no cumple con las disposiciones ambientales, sobre cambio climático y control de inundaciones, 8.- crea presión para el aumento de las tarifas eléctricas, 9.-es vago, ambiguo e impreciso y no informa al público sobre aspectos claves del plan, lo que niega la participación pública efectiva.

La cantidad histórica de fondos de HUD y FEMA asignados para el sistema eléctrico de Puerto Rico deben invertirse en sistemas solares en techos o cercanos al lugar de consumo y alternativas similares para proveer acceso a la resiliencia energética a los sectores de bajos y medianos ingresos que salvará vidas y aportará para lograr la justicia ambiental y climática. La justicia social requiere que la resiliencia energética no se limite a las personas de altos ingresos que puedan adquirir estos equipos. La viabilidad futura de Puerto Rico depende de que estos fondos se utilicen para el promover el desarrollo económico endógeno.

Estamos dispuestos a colaborar con ustedes en el desarrollo de un Plan que verdaderamente considere opciones resilientes en torno a la producción de energía en Puerto Rico. Si tal y como se establece en el Plan "**[l]a energía sigue siendo el factor más amplio y más importante para el futuro de la Isla"** es necesario apoyar opciones recilientes que permitan la producción descentralizada de energía ubicando placas fotovoltaican en los techos de los hogares de comunidades de bajos y medianos ingresos. Invertir dinero y recursos en otras opciones pertuaría los mismos errores con las mismas consecuencias que nos han hecho sufrir por décadas. Esta es una oportunidad de hacer algo verdaderamente distinto, resiliente y conducente a una justicia social verdadera.

Atentamente,

C. Alfredo Vivoni, Portavoz

info CDBG

From: Gerardo Sánchez <gsanchez262@gmail.com>
Sent: Thursday, December 2, 2021 8:54 AM
To: info CDBG
Subject: Re: Boletín Informativo Noviembre 2021 - CDBG-DR

Saludos

Seria prudente el analizar la viabilidad de incentivar las familias puertorriqueñas para la compra de energía verde(placas solares) ya que utilizando este incentivo las familias podrán realizar la compra de este equipo y el exceso de energia se podría reutilizar para darle soporte a la autoridad de energía logrando tener mas estabilidad energética y monetaria.
En una segunda fase se puede contemplar el impacto de incentivar baterías renovables para lograr una mayor estabilidad tanto de la energía eléctrica y las familias puertorriqueñas.

Gerardo Sánchez Piñeiro

> On Dec 1, 2021, at 8:59 PM, info CDBG <infocdbg@vivienda.pr.gov> wrote:

BOLETÍN IN

C

COMIENZA EL PROCESO
PARA LA OPTIMIZACIÓN DE LA RED ELÉCTRI

Tras la caída del sist
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El curso hacia la inve
la red eléctrica, consi
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El pasado 21 de octub
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sobre el desarrollo del
al Departamento de l
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www.cdbg-dr.pr.gov, a
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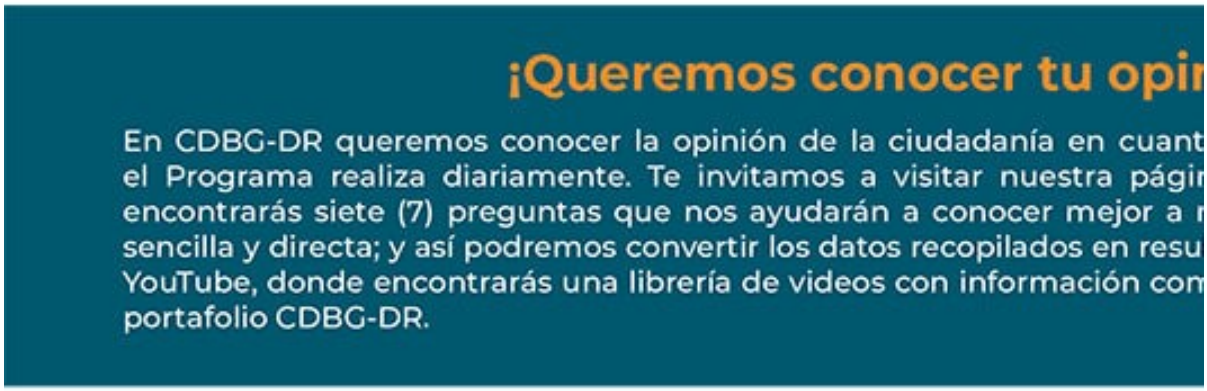

hispanicfederation

PUERTO RICO OFFICE
667 Calle La Paz
Suite 201
San Juan, Puerto Rico 00907
Phone: 787.417.7700

NATIONAL HEADQUARTERS
55 Exchange Place, 5th FL
New York, NY 10005
Phone: 212.233.8955
Hotline: 1.866.HF.AYUDA

23 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario
Departamento de la Vivienda de Puerto Rico
w.rodriguez@vivienda.pr.gov
infoCDBG@vivienda.pr.gov

Re: Comentarios al Plan de Acción para la Optimización de la Red Eléctrica en Puerto Rico

Estimado secretario Rodríguez Rodríguez:

El 22 de junio de 2021, el Departamento de la Vivienda Federal (HUD, por sus siglas en inglés) publicó la asignación de $1,932,347,000 ($1.93 mil millones) para la optimización del sistema eléctrico de Puerto Rico (86 FR 32681)[1]. Conforme lo requiere la asignación federal, el 8 de noviembre de 2021, el Departamento de la Vivienda de Puerto Rico (Departamento de la Vivienda) presentó el Plan de Acción para la Optimización de la Red Eléctrica en Puerto Rico (Plan de Acción). Ante esto, Hispanic Federation presenta oportunamente los siguientes comentarios al Plan de Acción.

Hispanic Federation[2] es una organización sin fines de lucro fundada en el año 1990 en el estado de Nueva York de los Estados Unidos, con el objetivo de apoyar y empoderar a las comunidades e instituciones hispanas a través de iniciativas en las áreas de educación, salud, inmigración, participación cívica, desarrollo económico, ambiente, entre otras. Durante años, la organización ha abogado por los derechos de los puertorriqueños y otras comunidades hispanas a nivel federal, estatal y local. Actualmente, la organización cuenta con oficinas en cinco estados, Washington, D.C. y luego del paso del Huracán María estableció operaciones permanentemente en Puerto Rico.

[1] Federal Register: Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Disaster Recovery Grantees; Electrical Power Systems in Puerto Rico and the U.S. Virgin Islands, https://www.federalregister.gov/documents/2021/06/22/2021-12934/allocations-common-application-waivers-and-alternative-requirements-for-community-development-block

[2] Hispanic Federation, https://hispanicfederation.org/about/mission_and_history/

Al día de hoy, Hispanic Federation ha obligado más de 42 millones de dólares en sobre 130 iniciativas y grupos sin fines de lucros alrededor de Puerto Rico enfocadas en las áreas de recuperación, vivienda, agricultura, salud mental, energía, entre otras. Respecto al área de energía renovable, Hispanic Federation ha trabajado en colaboración con organizaciones sin fines de lucro locales para desarrollar decenas de proyectos de energía solar con el fin de proveer seguridad energética a las comunidades y pequeños negocios. Hoy en día, hemos obligado aproximadamente 5 millones de dólares en proyectos de energía solar basados en techos o cerca de la carga que han demostrado su capacidad para responder ante emergencias. Por ejemplo, durante la pasada tormenta tropical Isaías y el pasado terremoto de enero de 2020, el 100% de nuestros proyectos completados se mantuvieron con energía a pesar de las fallas en el sistema eléctrico del archipiélago que compone Puerto Rico.

Hispanic Federation promueve una política pública holística en donde los esfuerzos de recuperación y mitigación consideren áreas altamente relacionadas como vivienda, planificación, energía, agricultura, ambiente, desarrollo económico y salud, entre otras. Por esto, exhortamos al Departamento de la Vivienda a utilizar nuestros comentarios al Plan de Acción para los Fondos CDBG-DR sometidos recientemente para la Séptima Enmienda Sustancial. Hispanic Federation tiene el compromiso de defender los principios básicos de justicia, transparencia, participación ciudadana real, sostenibilidad y la protección de derechos fundamentales.

Marco legal y contexto energético en Puerto Rico

Reconocemos el esfuerzo y trabajo realizado por el Departamento de la Vivienda en el Plan de Acción para resumir la historia y situación actual del sistema eléctrico de Puerto Rico antes y después del Huracán María. Más de 3,000 puertorriqueños murieron después del huracán durante el apagón más largo en la historia de la nación. La fuerte dependencia de la Autoridad de Energía Eléctrica de Puerto Rico (AEE) en una red centralizada de combustibles fósiles creó un escenario de alto riesgo que ni el gobierno federal ni el local pudieron manejar después del desastre. Por lo tanto, crear un sistema energético descentralizado y resiliente en Puerto Rico no se trata solo del clima, es literalmente una cuestión de vida o muerte.

La Ley 17-2019, mejor conocida como la Ley de Política Pública Energética de Puerto Rico, según enmendada, **requiere alcanzar un mínimo de 40% de integración de renovables en el año 2025**; 60% en el 2040; y 100% en el 2050. A su vez, requiere alcanzar una meta de treinta por ciento (30%) de eficiencia energética para el año 2040.

La Ley 57-2014, requiere que la AEE prepare un plan integrado de recursos (PIR) que, entre otras cosas, considere todos los recursos razonables para satisfacer la demanda de los servicios eléctricos durante un período de veinte (20) años. El 24 de agosto de 2020[3], el Negociado de Energía de Puerto Rico (NEPR) aprobó un PIR que, entre otras cosas, ordenó a la AEE integrar un mínimo de 3,500 MW de energía fotovoltaica solar para el año 2025. Además, reconoció el valor inherente de las fuentes de energía distribuidas a pequeña escala en las formas de microrredes, almacenamiento en baterías y fotovoltaico solar en ubicaciones individuales o agregadas como parte crítica para asegurar la resiliencia en Puerto Rico.[4]

Notificación de HUD de asignación de fondos ("Allocation Notice")-Registro Federal 86 FR 32681

La notificación federal de asignación de los $1.93 mil millones de fondos CDBG-DR establece que estos fondos son una oportunidad única y significativa para mitigar los riesgos de desastres en el sistema eléctrico, mejorar la confiabilidad, resiliencia, eficiencia y sostenibilidad de la red. Además, requiere que los fondos sean utilizados para atender las necesidades de las poblaciones vulnerables, las clases protegidas, las comunidades desventajadas y beneficiar a las familias de bajos y medianos recursos. A su vez, exige que se demuestre cómo los planes atenderán los efectos del cambio climático.

La notificación federal establece que, por lo menos, el 70% de los fondos de subvención asignados para el sistema de energía eléctrica, sin incluir los costos de planificación y administración, debe utilizarse para:

- Ofrecer por lo menos al 51% de los residentes de ingresos bajos y moderados del recipiente una tarifa de electricidad subsidiada por debajo de lo que se cobra a otros clientes residenciales o una tarifa de electricidad más baja de la cobrada antes de completar la implementación de las mejoras al sistema de energía eléctrica mediante los fondos CDBG-DR; o
- Mejorar de manera cuantificable la confiabilidad del sistema de energía eléctrica en las áreas de ingresos bajos y moderados que son primordialmente residenciales. Entre otras cosas, la sección V.A.8.c. (ii) de la notificación federal dispone que para documentar el cumplimiento con este criterio del objetivo nacional, los procesos y políticas del Departamento de la Vivienda deberán proveer para la cuantificación de mejoras a la confiabilidad del sistema en áreas

[3] Negociado de Energía de Puerto Rico, "*Final Resolution and Order on the Puerto Rico Electric Power Authority's Integrated Resource Plan*". https://energia.pr.gov/wp-content/uploads/sites/8/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf
[4] Id. at page 227.

residenciales de ingresos bajos o moderados **utilizando estándares legales pertinentes, tales como los establecidos en la Ley 17-2019**.[5]

Además, con la nueva actividad elegible aprobada por HUD conocida como **''mejoras al sistema de energía eléctrica"** se le permitirá a la AEE la adquisición, construcción, reconstrucción, rehabilitación o instalación de facilidades, mejoras u otros componentes que se llevan a cabo para ampliar, actualizar, reforzar o mejorar la rentabilidad, confiabilidad, eficiencia, sostenibilidad o viabilidad económica a largo plazo del sistema de energía eléctrica, lo que incluye actividades para aumentar la resiliencia del sistema de energía eléctrica a futuros desastres y enfrentar los impactos del cambio climático.

Una de las alternativas más eficaces para cumplir con estos objetivos y la definición de mejoras al sistema de energía eléctrica es la instalación de sistemas solares con almacenamiento basados en los techos de los usuarios. La energía generada por esos sistemas generaría un ahorro directo a los residentes de estos proyectos sin representar una carga económica para los clientes no subsidiados debido a que se eliminaría el costo del combustible fósil que actualmente utilizan las plantas generatrices. Utilizar como recurso la generación solar nos daría control sobre los costos del kWh evitando las variaciones por factores externos. A su vez, estos proyectos pueden inyectar energía a la red eléctrica, logrando ahorros adicionales para el consumidor que la genere.

Respecto a mejorar la confiabilidad del sistema de energía eléctrica en las áreas de ingresos bajos y moderados que son primordialmente residenciales, estos proyectos han demostrado ser una alternativa real para lograrlo. El Plan de Acción utiliza parámetros cuantitativos y definiciones de confiabilidad como sugiere el "North American Electric Reliability Corporation" para analizar el impacto de las inversiones federales en el sistema eléctrico. Compartimos el mismo interés del Departamento de la Vivienda en que se desarrolle un sistema eléctrico fiable, estable y resiliente que reduzca los índices de Duración Promedio de las Interrupciones en el Sistema (SAIDI, por sus siglas en inglés), los Índices de Duración Promedio de las Interrupciones para los Clientes (CAIDI, por sus siglas en inglés) y los índices de Frecuencia Promedio de las Interrupciones (SAIFI, por sus siglas en inglés) para las comunidades en Puerto Rico.

El uso de estas definiciones nos puede ayudar como país a tener un sistema eléctrico más confiable. Además, permite evaluar los proyectos presentados conforme a datos

[5] Federal Register: Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Disaster Recovery Grantees; Electrical Power Systems in Puerto Rico and the U.S. Virgin Islands, a la pág. 32693.
https://www.federalregister.gov/documents/2021/06/22/2021-12934/allocations-common-application-waivers-and-alternative-requirements-for-community-development-block

o hechos de efectividad. Por ejemplo, en nuestra experiencia con proyectos de energía solar basado en techos con almacenamiento durante los terremotos en el sur y la tormenta tropical Isaías, **los valores de SAIDI, CAISI y SAIFI fueron cero para cada uno de ellos**. Esto demuestra la capacidad de confiabilidad y resiliencia de estos proyectos comunitarios. Inclusive, en su mayoría, estos proyectos son interconectados a la red eléctrica de Puerto Rico lo cual los hace idóneos para satisfacer la definición de "mejora al sistema de energía eléctrica" presentada en este Plan de Acción.[6]

Informes Claves

El Plan de Acción cita varios informes claves con recomendaciones para integrar en el desarrollo de un sistema eléctrico robusto, confiable y resiliente. Entendemos la importancia de realizar análisis técnicos para desarrollar un sistema energético con las cualidades que satisfagan las necesidades de las personas en Puerto Rico. Coincidimos en que los seis informes que se identificaron son claves y aportan una perspectiva importante, pero a su vez creemos que se deben considerar otros informes claves realizados por expertos que han trabajado con el sistema eléctrico del archipiélago durante décadas. Es por esto que compartimos los siguientes estudios para que se integren al Plan de Acción:

- **Achievable Renewable Energy Targets[7]**
    - Entre otras cosas, este estudio establece que si utilizamos el 50% del total de área de los techos residenciales de Puerto Rico para integrar placas fotovoltaicas a la red estaríamos generando aproximadamente 17,500 millones de kw/h anuales, lo que satisface un alto porciento de la demanda energética residencial del archipiélago de Puerto Rico. Conforme a un informe de la anterior Oficina Estatal de Política Pública Energética, para el año 2015 la demanda energética residencial se estimó en 17,235 millones de kw/h anuales.[8]

[6] Aunque el Plan de Acción dice que se regirá por el Código Eléctrico Nacional 2020, recomendamos utilizar la versión NEC 2017, ya que esta es la adoptada en Puerto Rico.

[7] Irizarry Rivera, A., O'Neill Carrillo, E., & Colucci Ríos, J. (2009), Achievable Renewable Energy Targets For Puerto Rico's Renewable Energy Portfolio Standard, Final Report, at page 5-52, https://www.uprm.edu/aret/docs/Ch 5 PV systems.pdf

[8] Estado de Situación Energética de Puerto Rico, Informe Anual 2015, Oficina Estatal de Política Pública Energética, a la pág. 25, https://inesi.upr.edu/informe-anual-del-estado-de-situacion-energetica-de-puerto-rico-2015/

- **Queremos Sol: Estudio de Integración de Recurso Solar Distribuido en Puerto Rico[9]**

    - Este estudio usó datos de la AEE para desarrollar un modelo de sistema eléctrico basado en energía renovable al 2035, según propone Queremos Sol. El estudio encontró que "una red eléctrica con generación distribuida basados en sistemas fotovoltaicos en techos de casas y comercios y almacenamientos puede operarse con seguridad y confiabilidad de servicio, ahorraría costos y estabilizaría precios de la tarifa de electricidad"[10]. En particular, el estudio modeló una penetración de hasta 75% de energía renovable en la red y estos fueron algunos resultados:

        - Se puede lograr un 100% de resiliencia en el hogar con sistemas solares en los techos de 2.7 kW y baterías de 12.5 kWh. Esto reducirá la vulnerabilidad del hogar y la comunidad después de huracanes.
        - Es rentable utilizar $ 9.6 mil millones en fondos federales para implementar este plan, lo que reduciría costos del sistema eléctrico a menos de 15 centavos / kWh para 2035.
        - Puerto Rico podría lograr 75% de energía renovable en 15 años y gastar solo $ 430 millones anuales en combustible. En el 2019 y 2020 los costos de combustible superaron los $1.4 mil millones.

Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1)

Este programa está diseñado para cubrir la partida de costos no federal de la asignación de aproximadamente $10.5 mil millones de FEMA para el proyecto a nivel Isla de la AEE bajo la estrategia FAASt. Reiteramos la importancia de que los fondos asignados bajo el ER1 no sean destinados como un pareo automático de los planes de la AEE sin evaluar su cumplimiento con la política pública energética.

Conforme a la notificación federal de asignación de fondos, el Departamento de la Vivienda sólo puede utilizar los fondos como pareo ("match") de actividades que satisfagan la definición de mejoras al sistema eléctrico. A su vez, conforme al registro federal, estos fondos tienen un término de seis (6) años para su utilización.

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[9] HOME | Queremossol (queremossolpr.com)
https://cambiopr.org/solmastechos/

[10] Id.

Es de suma importancia que todas las inversiones federales, estatales y privadas sean cónsonas con el PIR y la Política Pública Energética declarada en la Ley 17-2019. Según mencionado, la Ley 17-2019 tiene un mandato de lograr alcanzar la meta de 40% de generación de energía renovable para el año 2025. **Estando esta meta a menor plazo que el término para utilizar estos fondos, su administración debe asegurar el cumplimiento de esta. De lo contrario podríamos llegar al año 2025 y estar en incumplimiento con la ley.**

Según propuesto, el Plan Decenal de la AEE **carece de proyectos concretos de generación de energía renovable para lograr la meta legal de integrar 40% de energía renovable a la red eléctrica para el año 2025.** El plan decenal de la AEE está en claro incumplimiento con la Ley 17-2019. Ante dicho incumplimiento, el Departamento de la Vivienda debe condicionar cualquier pareo de fondos a un plan que incluya proyectos concretos para lograr la integración de 40% de energía renovable en la isla para el año 2025.

En el PIR el Negociado de Energía aprobó sólo $911 millones para la red de distribución; sin embargo, el plan decenal de la AEE proyecta que harán una inversión de $4,191 millones. A su vez, el Negociado de Energía aprobó hasta $2,000 millones para las líneas de transmisión; sin embargo, el plan decenal de la AEE estima una inversión de $3,842 millones en dichas líneas. Las inversiones propuestas por la AEE en la red de transmisión y distribución pueden perpetuar un sistema centralizado de energía y no lograr el cumplimiento con la Ley 17-2019. En lugar de invertir tanto dinero en líneas de transmisión vulnerables, se debe invertir en proyectos concretos que permita maximizar la integración de energía renovable a la red.

Entendemos la importancia de fortalecer la red eléctrica a corto, mediano y largo plazo para poder proveer el sistema eléctrico que las personas en Puerto Rico anhelan, pero estas inversiones se deben hacer de manera organizada y sostenible. Estamos ante una oportunidad única de tener un sistema eléctrico de vanguardia y no quedarnos en el mismo sistema eléctrico diseñado en el siglo pasado que evidenció sus grandes fallas durante el Huracán María. El Cambio Climático es una realidad y apostarle al mismo sistema centralizado sería un riesgo muy alto. Es por esto que reiteramos que la AEE y el Departamento de la Vivienda **deben priorizar la instalación de energía solar basada en los techos con almacenamiento para aumentar la resiliencia en las comunidades sin impactar terrenos agrícolas, reservas naturales, ni áreas ecológicamente sensitivas. El Departamento de la Vivienda debe condicionar todo pareo de fondos al cumplimiento con las metas de la Ley 17-2019**.

Programa de Confiabilidad y Resiliencia Energética (ER2)

El Programa de Confiabilidad y Resiliencia Energética (ER2) propone atender las necesidades de las comunidades al financiar proyectos que no se anticipa que reciban fondos de otras fuentes federales o locales. Al igual que recomendamos al Plan de Acción CDBG-MIT, el Departamento de la Vivienda debe priorizar las comunidades que son de mayor vulnerabilidad energética y de difícil acceso luego de un desastre o fenómeno atmosférico. A su vez, reiteramos que estos fondos deben utilizarse para maximizar la integración de energía renovable con baterías, en techos.

Según estructurado, el programa excluye a las organizaciones sin fines de lucro como solicitante elegible. Sin embargo, el programa permite que negocios con fines de lucro soliciten. En particular, el Plan de Acción explica que a las organizaciones que deseen implementar instalaciones de producción de energía renovable y almacenamiento de base comunitaria, la agencia les ofrece oportunidades de financiamiento bajo el Programa CEWRI, en el Plan de Acción CDBG-MIT. Nótese, que el programa CEWRI cuenta con una asignación limitada de $500 millones versus los $1.9 mil millones asignados a este Plan de Acción.

Nótese además, que el tercer sector fue la red de apoyo primaria después del Huracán María. Varias organizaciones sin fines de lucro, incluyendo Hispanic Federation, han logrado implementar proyectos de energía renovable que promoverán la resiliencia en futuros desastres. Por esto, es sumamente importante que se incluyan a las entidades sin fines de lucro y/o comunitarias como solicitantes elegibles bajo este Plan de Acción. Es inaceptable que el tercer sector quede totalmente excluido de la posibilidad de recibir fondos para formar parte de la optimización de la red eléctrica. Inclusive, excluir al tercer sector sería contrario al objetivo de atender las necesidades de las comunidades.

El programa ER2 presenta una cantidad mínima de adjudicación por proyecto de $10,000,000. Hispanic Federation ha trabajado proyectos de energía renovable que oscilan entre $30,000 a $1 millón. El proyecto más costoso que hemos trabajado es una micro red de $1 millón en un centro de salud, instalando la capacidad máxima de paneles solares en el techo y 458kwh de almacenamiento en baterías, sin incluir en el costo de un generador de redundancia. Esta oscilación en costo demuestra que limitar las adjudicaciones a un mínimo de $10,000,000, podría ser contraproducente al excluir proyectos necesarios para lograr una verdadera resiliencia energética en el país. Recomendamos que esta partida se disminuya significativamente. Además, es importante aclarar quiénes serán los dueños de estos proyectos una vez sean desarrollados. Entendemos que los proyectos deben responder al interés público y no el privado.

Equipo de Consultoría Técnica sobre Energía (TCT)

El Plan de Acción establece que el Equipo de Consultoría Técnica sobre Energía (TCT) se compone principalmente de agencias federales. Ante la oportunidad única que representan estos fondos para el futuro energético de Puerto Rico, recomendamos incluir profesionales en el área de desarrollo de proyectos de energía renovable, proyectos solares en techos, ambientalistas, representación ciudadana, la academia, entre otros, para la evaluación de los programas, guías y proyectos sometidos bajo este Plan de Acción.

Participación Ciudadana y el rol del Comité de Asesoría Ciudadana (CAC)

Recomendamos que el Departamento de la Vivienda permita que el Comité de Asesoría Ciudadana verdaderamente pueda asesorar y levantar las voces de las comunidades más vulnerables en el desarrollo de los programas y guías de este Plan de Acción. En particular, los funcionarios encargados de desarrollar los programas y guías deben hacer un esfuerzo proactivo para integrar las voces de la comunidades vulnerables y otras partes de interés en la toma de decisiones a través del CAC.

Conclusión

El Plan de Acción para la Optimización del Sistema Eléctrico presentado por el Departamento de la Vivienda reconoce la necesidad apremiante de resiliencia que hay en nuestras comunidades. Luego de presentar una radiografía del sistema eléctrico de Puerto Rico solo nos queda plantear la necesidad de construir algo diferente a lo que teníamos al momento del paso del Huracán María, ya que ese sistema viejo, obsoleto y basado en energía fósil centralizada le costó la vida a miles de personas en el archipiélago. Es por esto que presentamos las siguientes recomendaciones para alcanzar la resiliencia que anhelan nuestras comunidades:

- El Plan de Acción debe asegurar el acceso a energía solar resiliente y asequible a las familias y comunidades más vulnerables y de escasos recursos conforme al objetivo nacional federal que rige la asignación de fondos.
- El Departamento de la Vivienda no debe aceptar de forma automática un pareo de fondos al Plan Decenal propuesto por la AEE. Según propuesto, el Plan Decenal de la AEE carece de proyectos concretos de generación de energía renovable para lograr la meta de integrar 40% de energía renovable a la red eléctrica para el año 2025. Esto, según lo requiere la Ley 17-2019, Ley de Política Pública Energética de Puerto Rico. Por esto, el plan decenal de la AEE está en claro incumplimiento con la ley. Ante dicho incumplimiento, el Departamento de la Vivienda debe condicionar cualquier pareo de fondos a un plan que incluya proyectos concretos para lograr la integración de 40% de energía renovable en la isla para el año 2025.

- El Plan de Acción debe priorizar la integración de sistemas de energía solar con almacenamiento en techos, descentralizados y protegiendo terrenos agrícolas y de alto valor ecológico.
- El programa ER2 debe disminuir la adjudicación mínima de $10,000,000 y aclarar quiénes serán los dueños de estos proyectos una vez sean desarrollados. Entendemos que los proyectos deben responder al interés público.
- Se debe permitir a las entidades sin fines de lucro y comunitarias solicitar los fondos ER2.
- Se debe ampliar el Equipo de Consultoría Técnica sobre Energía para incluir profesionales en el área de desarrollo de proyectos de energía renovable, proyectos solares en techos, ambientalistas, representación ciudadana, la academia, entre otros.
- El Departamento de la Vivienda debe permitir que el CAC pueda asesorar y levantar las voces de las comunidades más vulnerables en el desarrollo de los programas y guías de este Plan de Acción.

Cordialmente,

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CNE
Puerto Rico's Think Tank

Center for a New Economy
San Juan + D.C. + Madrid

Hon. William Rodriguez
Secretary
Puerto Rico Housing Department
606 Ave. Barbosa Juan C. Cordero Building
9th Floor
San Juan, PR 00917

Dear Secretary Rodriguez:

I am writing on behalf of the Center for a New Economy ("CNE"), Puerto Rico's only non-partisan, non-profit think tank, to endorse the comments submitted by the Puerto Rico Energy Justice collaborative ("PREJ") regarding the proposed "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan" ("Action Plan") and to submit a few comments of our own.

CNE has been analyzing and studying the Puerto Rico electric system since 2005. Since then we have published numerous research papers and policy briefs about Puerto Rico's electric system, have testified in various public hearings before the U.S. Congress and the Puerto Rico Legislative Assembly, and have actively participated in the search for innovative solutions to our energy problems.

The congressional appropriation of approximately $2 billion in Community Development Block Grant – Disaster Recovery ("CDBG-DR") funds for the modernization of Puerto Rico's electric system presents a once in a generation opportunity to improve the island's aging energy infrastructure. Specifically, Puerto Rico has an opportunity to engage in what the economic development literature is called "leapfrogging" by integrating world-class, cutting-edge technology into our electric system.

In addition to endorsing the comments submitted by PREJ, we also believe the current draft of the Action Plan could be improved in the following areas:

- **The Action Plan Should Focus on Grid Flexibility** – According to a 2018 report from the U.S. Department of Energy: "To better enable system recovery and/or black start restoration, there might be operational benefits for segmenting the transmission system into smaller portions. While this would be done out of necessity following a large-scale event, there could be some advantages to pre-selecting which segments

are likely able to survive a future event, and proactively plan for segmenting the transmission system accordingly. These portions of the system would be identified to include a mix of generating assets, including black-start capable units, along with appropriately sized load, so that when the distribution system is undergoing restoration activities, and enough load would be present to constitute minimum generation capabilities, stable portions of the system could be energized and maintained prior to the longer transmission lines being repaired and energized. These portions of the system could then be re-energized with each other later in the restoration process."[1] We recommend the Action Plan be amended to include this "pre-segmentation" strategy.

- **Maximize Distributed Energy Generation from Renewable Sources** – In terms of generation, the designers of the new electricity system should consider that large centralized generation facilities with investment recovery cycles of more than thirty years are increasingly a thing of the past. Today, there are renewable generation solutions with storage technologies to provide some base load, reserves, other auxiliary services, and additional load at peak hours at very competitive costs. The Action Plan should be amended to encourage new investment in distributed energy generation from renewable sources.
- **Include All Social Costs When Evaluating Traditional Fossil Fuel Generation** – It is important to point out that when comparing the cost of traditional generation alternatives with the cost of renewable energy solutions, it is imperative to include the "all-in" costs associated with traditional generation — which are not just the cost of the fossil fuel but also the social costs as well: the cost of environmental pollution, the cost of medical treatment for asthma, other respiratory problems, eye and skin diseases, and the cost of premature deaths caused by cancer and other diseases directly or indirectly caused by emissions of pollutants.[2] We recommend the Action Plan be amended to include this full cost-benefit analysis when considering funding for new traditional fossil fuel generation facilities.

We appreciate the opportunity to take part in this important public process and we are available to answer any question that you or the members of your staff may have with regard to this important matter.

Respectfully submitted,

Sergio M. Marxuach Colón
Policy Director
Center for a New Economy

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[1] Energy Resilience Solutions for the Puerto Rico Grid, US Department of Energy, June 2018, pp. 22 – 23.
[2] See, for example, Nicholas Z. Muller, Robert Mendelsohn, and William Nordhaus, "Environmental Accounting for Pollution in the United States Economy," *American Economic Review*, vol. 101, (August 2011): 1649-1675.

Universidad Interamericana de Puerto Rico
Oficina del Presidente

15 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario
Departamento de la Vivienda
Avenida Barbosa 606
San Juan, P.R. 00923

Estimado secretario Rodríguez Rodríguez:

Reciba de mi parte un saludo cordial. Le escribo para endosar el documento de Justicia Energética con comentarios extensos sobre el propuesto *Action Plan* bajo el programa CDBG-DR sometido por el *Puerto Rico Energy Justice Collaborative*. La Universidad Interamericana de Puerto Rico como institución está comprometida con apoyar e insertarse en el tema de justicia energética para todos los puertorriqueños y puertorriqueñas, y más aún en estos momentos en que Puerto Rico cuenta con los fondos federales para hacer una verdadera transformación de nuestro sistema eléctrico. Es el momento para repensar la manera que todos concebimos que debe generarse la electricidad en el País, considerando que somos una isla que recibe tanta luz solar anualmente y cuenta con las mejores mentes científicas e instituciones educando a los futuros ingenieros e ingenieras eléctricos que pueden reformular cómo generamos, almacenamos y distribuimos energía de una forma justa y accesible.

Indudablemente estamos en un punto crítico de inflexión y debemos tomar todas las medidas a nuestro alcance para construir un sistema eléctrico robusto, pero tomando en cuenta principalmente a los consumidores que cada vez tienen que pagar más cuando su servicio se ve interrumpido con mayor frecuencia. El rol de la academia en este momento debe ser de enlace para compartir información con todos los actores principales para juntos crear un verdadero plan que tenga como meta primordial bajarle el costo de luz a los consumidores, y dejar a un lado la generación de electricidad con métodos que crean tanta contaminación, como lo son el petróleo y el carbón, que al día de hoy siguen siendo los que mayormente utilizamos en Puerto Rico.

Como indica el *Puerto Rico Energy Justice Collaborative* en sus comentarios públicos al *Puerto Rico Electrical Power System Enhancement and Improvements Action Plan* del programa CDBG-DR, este es el momento preciso para repensar cómo el sistema eléctrico del País puede ser una herramienta para erradicar la pobreza y traerles justicia energética a los consumidores. Además, en sus comentarios indican que el Negociado de Energía de Puerto Rico (PREB, por sus siglas en inglés) debe ser parte clave del *Action Plan* para que el mismo cuente con el insumo del regulador creado por la Ley 57-2014, ya que es un ente independiente y especializado que tiene el peritaje necesario para poder ejecutar una verdadera

transformación del sistema eléctrico del País. No solo esa agencia reguladora tiene una visión a larga escala, pensando en un futuro con un sistema más fuerte a nivel de las generatrices de energía, pero pueden contribuir a la creación de un proceso más ágil y sencillo para que prosumidores puedan generar energía en sus propias casas en un periodo de tiempo mucho más corto, así bajando el costo de luz de miles de puertorriqueños y puertorriqueñas. Es claro el mandato de la Ley 17-2019 de incluir al Negociado de Energía como ente regulador y fiscalizador que genera la política pública en el tema de energía de Puerto Rico y su inclusión en el *Action Plan* es imprescindible.

El Decano de Ingeniería del Recinto de Bayamón de la Universidad Interamericana, el Ing. Javier Quintana, quien se ha desempeñado por años en este entorno, y este servidor estamos comprometidos con el desarrollo de programas académicos que investiguen la generación de energía limpia y también con implementar proyectos de energía solar en todos nuestros recintos. Luego del Huracán María, todos aprendimos que nuestro paradigma energético había cambiado, y que teníamos que juntos transformar nuestro sistema de energía para crear un País más resiliente, y como institución estaremos disponibles para seguir concientizando a la ciudadanía mediante nuestros programas académicos, talleres y foros que regularmente tenemos en nuestros recintos. Endosamos todos los comentarios sometidos por *Energy Justice Puerto Rico* sobre el CDBG-DR *Puerto Rico Electrical Power System Enhacement and Improvements Action Plan* y seguiremos colaborando en el futuro con este tema para continuar creando un sistema verdaderamente justo y asequible para todos.

Cordialmente,

Manuel J. Fernós
Presidente

Hon. William O. Rodríguez Rodríguez
Secretary
PR Department of Housing (PRDOH)
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary Rodríguez:

Puerto Rico Energy Justice Collaborative Public Comments on PRDOH Proposed CDBG-DR "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"

I am pleased to submit the "Energy Justice for Puerto Rico Public Comments" on PRDOH Proposed CDBG-DR "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan" (Action Plan) draft, published on November 8, 2021. As it is well known, PRDOH is the recipient and administrator of CDBG funds; as such, it serves as the entity responsible for administering the funds and developing an Action Plan that will be submitted to the U.S. Department of Housing and Urban Development (HUD). PRDOH initiated the process to obtain the approval of the Action Plan. Therefore, the Action Plan was subject to a public hearing and published as a draft. As part of the approval process, PRDOH opened a public comment period as an opportunity for citizens and other stakeholders to actively participate, ensuring that their concerns, recommendations, and points of view are considered on the development of the Action Plan as per HUD regulations.

Energy Justice for Puerto Rico (EJPR) is a local non-profit organization recently organized as an independent entity from Instituto de Competitividad y Sostenibilidad Economica de Puerto Rico (ICSE). As a former program of ICSE, EJPR has accumulated extensive policy development experience and participation in regulatory proceedings in the energy sector. As one of its goals, EJPR seeks to guarantee the optimal use of state and federal funds for Puerto Rico's immediate and long-term energy needs. EJPR has reviewed the proposed Action Plan published by PRDOH.

The proposed Action Plan, as presented for public comments now, has failed to recognize the Puerto Rico Energy Bureau's (PREB) critical role in Puerto Rico's energy sector and does not comply nor aligns with the 2020 Integrated Resource Plan (IRP) and Act 17-2019 goals, the energy public policy of Puerto Rico. Therefore, the Action Plan must be significantly amended to fully comply with the local, legal, regulatory, planning and development framework as required by HUD. Consequently, EJPR submits the "Puerto Rico Energy Justice Collaborative Public Comments" regarding the current Action Plan.

In summary, EJPR comments focuses on the following topline recommendations to prioritize short term solutions:

1. **Compliance with Act 17-2019:** PRDOH must fully engage ad integrate the PREB into the Action Plan.
2. **Focus on Distributed Energy Resources & Lowering Energy Bills:** Support ongoing PREB efforts to advance a regulated electricity market, increasing access to distributed energy resources to underserved and low &-moderated income communities, while assuring compliance with existing public policy and energy efficiency and renewable portfolio mandates 2025 and beyond.

3. **Public Participation Process**: Incorporate PREB stakeholder engagement process, include mechanisms and funding to support public participation and implement a bottom-up planning process.
4. **Leverage the Private Sector:** Incorporate commercial/technical capacity and financial resources and create public-private sub-grantee channels to maximize total program investments and deliver more affordable solutions increasing Public Interest impact.
5. **Expertise & Staff for Effective Program Management:** Ensure that the PRDOH, the DDEC, and PREB have well-coordinated expert consultants, trained staff, and other resources to complete the Action Plan and to administer program guidelines and grants with robust public participation and private sector investment.

EJPR firmly believes that integrating these PREB/Act17-2019 inputs and recommendations will assure the Action Plan further achieves Puerto Rico's immediate and long-term goals for the energy sector while strengthening the roles of the prosumer and the private sector in Puerto Rico's energy transformation to eradicate energy poverty.

EJPR has played a leading role in building working/educational alliances and collaborations with important members of the private sector that supports EJPR institutional mission and work to transform Puerto Rico's energy system. These private sector entities recognizes the importance of optimal use of CDBG-DR funds to transform Puerto Rico's centralized and inefficient grid into a distributed, green resilient, efficient and affordable energy system that will guarantee a sustainable livelihood. Therefore, the following EJPR allies from the private sector had endorsed EJPR "Puerto Rico Energy Justice Collaborative Public Comments" and had prepared endorsement letters that will be submitted as annexes along with our comments:

1. Puerto Rico Manufacturers Association (PRMA)
2. Pontificia Universidad Católica de Puerto Rico (PUCPR)
3. Universidad Interamericana de Puerto Rico (uipr)
4. ESI-Energy
5. Center for a New Economy (CNE)
6. Food Marketing, Industry and Distribution Chamber (MIDA)

The EJPR Movement invites PRDOH to collaborate jointly to align the Action Plan with Act 17 and the PREB which will render a positive outcome for energy consumers and the public interest in line with HUD National Objectives.

_____

Waleska Rivera
President of the Board
Energy Justice for Puerto Rico

Annex, Comments to PRDOH Action Plan

CÁMARA DE MERCADEO, INDUSTRIA Y DISTRIBUCIÓN DE ALIMENTOS

December 20, 2021

Hon. William O. Rodríguez Rodríguez
Secretary of Housing
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary,

I am writing to you as executive vice president of The Food Marketing, Industry and Distribution Chamber (MIDA) and on behalf of its board of directors, in response to the draft Puerto Rico Electrical Power System Enhancement and Improvements Action Plan (the "Plan").

MIDA is a private non-profit organization, composed of over 250 members in the food industry supply chain in Puerto Rico, from agro-industrial production to retail. For our members, as well as for every consumer, the availability of an efficient, resilient and cost-effective energy service is paramount.

Unfortunately, the island's energy market has historically lacked good public governance, well-regulated investment and competitive infrastructure. Potential investors that require affordable and reliable electricity are unconvinced there is a PREPA/LUMA credible plan to lower energy costs that will not be affected by the ongoing fiscal and economic crisis, future natural disasters, or the painstakingly slow, conflicted and costly FEMA/PREPA reconstruction fund management.

For the draft Action Plan to enable affordable, resilient and reliable energy that also brings back competitive business investments to Puerto Rico it must comply with the Public Energy Policy of Puerto Rico. Act 17-2019 and the Puerto Rico Energy Board (PREB) regulations require public participation and programs that leverage much needed distributed energy efficiency and resiliency to both the customers and the overall grid. To achieve a real long-term transformation, Puerto Rico Department of Housing (PRDOH) and HUD must include a public participation process coordinated with ongoing PREB proceedings that brings together the best knowledge and resources of the private sector, with the energy programing and regulatory capacity of local authorities. By complying with established local energy policies and agency programming we can make sure that private sector resources, consultants and trained personnel are included in the development of the Plan for the best use of private and public available funds, for lowering energy costs and improving resiliency for underserved communities in all of Puerto Rico.

Therefore, we concur with the statements of noncompliance of the current draft Plan and the recommendations made on December 15th by the Energy Justice movement for community development and request open public participation in its development process.

We are confident the PRDOH will accept these MIDA and Energy Justice for Puerto Rico (EJPR) recommendations for Plan compliance with our energy policy. The importance and seriousness of these

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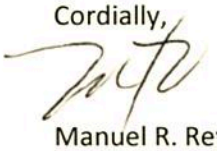
whole-community energy market transformation matters cannot be overlooked given the historic opportunity for HUD and PRDOH to truly build back better.

MIDA is convinced we can build back better with a Plan and guidelines for the short and long-term lowering of cost and disaster mitigation risks, if we allow public participation and properly use the private and government resources. Coherently completing the Plan with guidelines that comply with PREB approved programs is an opportunity to rebuild economic well-being for all with leading environmental and social governance resources that the EJPR and our members can bring to the table.

Cordially,



Manuel R. Reyes Alfonso
Executive VP

INDUSTRIALES
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Yandia Pérez
Executive Vice President

December 21, 2021

Hon. William O. Rodríguez Rodríguez
Secretary of Housing
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary,

I am writing to you as executive vice president of the Puerto Rico Manufacturers Association and on behalf of its board of directors, in response to the draft Puerto Rico Electrical Power System Enhancement and Improvements Action Plan (the "Plan").

The Puerto Rico Manufacturers Association (PRMA) is a private non-profit organization established in 1928, composed of about 1,000 members in the manufacturing and service industries in Puerto Rico dedicated to the strengthening and development of our local industry through advancement of the competitiveness of our members. We also pride ourselves on working with the local and federal government to develop programs that sustainably improve our local economy promoting a climate for industrial development.

The island's energy markets traditionally lack good public governance, well regulated investment and competitive infrastructure. Neither local nor federal agencies have been able to convince investors that require affordable and reliable electricity there is a PREPA/LUMA credible plan to lower energy costs that will not be affected by the ongoing fiscal and economic crisis, future natural disasters, or the painstakingly slow, conflicted and costly FEMA PREPA reconstruction fund management.

For the draft Action Plan to enable affordable, resilient, reliable energy that also brings back manufacturing and competitive business investment it must comply with the Public Energy Policy of Puerto Rico. Act 17 and PREB proceedings guarantee a public participation and programs that leverage much needed distributed energy efficiency and resiliency to both the customers and the overall grid. To achieve a real long-term transformation, Vivienda and HUD must include a public participation process coordinated with ongoing PREB proceedings that brings together the best knowledge and resources of the private sector, with the energy programing and regulatory capacity of local authorities PREB and DDEC. Ensuring in this manner compliance with established local energy policies, and agency programming – we insure private sector resources, consultants and trained personnel are included in the Plan for the best use of private and public available funds, in lowering energy costs and improving resiliency for underserved communities and all of Puerto Rico.

In this context, we advocate for and endorse the statements of actual draft Plan noncompliance and recommendations made by the Energy Justice movement for community development and the action plan of the Disaster Recovery Fund (CDBG-DR) be considered and implemented by the Puerto Rico Department of Housing.

We make ourselves available to work hand in hand in this and any other initiative that promotes the sustainable development of Puerto Rico. We trust that the PRDOH leadership will accept these PRMA and Energy Justice for Puerto Rico (EJPR) recommendations for Plan compliance with our energy policy. The importance and seriousness of these whole-community energy market transformation matters cannot be overlooked given the historic opportunity for HUD and PRDOH to truly build back better.

PRMA is convinced we can build back better with Plan and guidelines for short and long-term lowering of cost and disaster mitigation risk, if we get the participation and best use of private and government resources right. Coherently completing the Plan for guidelines that both transforms blight and hopelessness along with PREB approved programs for all of Puerto Rico communities is an opportunity to rebuild economic well-being for all with leading Environmental and Social Governance resources the PRMA, EJPR, and our members can bring to the table.

Regards.

Yandia Pérez

Executive Vice President

Hon William O. Rodríguez Rodríguez, Secretary
PR Department of Housing (PRDOH)
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary Rodríguez:

This letter addresses a private citizen's assessment of certain aspects, mostly of the technical nature, assessed from the general purview of PRDOH's most recent CDBG-DR Electrical Systems Enhancements & Improvements Action Plan ("Plan") as published in its website[1] dated November 08th, 2021. After careful reading of said Plan two major items, one succinct and one not-so, garner considerable concern:

1. The Plan invests in a lot of "TED talk®" specific to Microgrid's ("MG") their use and intended investments, *but*:
    a. an inescapable lack of detail on which Party -be it the utility or operator or central government or the impacted community- is truly chartered to propose *or* trace the physical boundaries or limits of an MG, keep in stride that inevitably *many* MG's will transcend municipal boundaries, comingle local and federal beneficiary's and even interconnect to *other* MG(s),
    b. Law 17 clearly states that MG's are subject to the ultimate scrutiny of the PREB, however:
        i. under the guise of "clearing up" "FEMA vs HUD funding overlaps", the Plan enumerates a series of terms initially classified as "functional" but afterwards renames[2] as "component groups" thus
        ii. appearing to integrate but then artificially *segregating and distancing* fundamental elements integral to MG's (T&D, substations, other sources of power, enabling tech, etc.) but then
        iii. singlehandedly establishes PRDOH set "a threshold for fungibility between (said) components",

    Clarity is direly needed and requested. The above creates unnecessary confusion and false parallels between what clearly are policy issues, funding topics and technical matters, all of which the PREB is equipped to quickly identify and address in ordinary proceedings.

    Confusion serves no MG project, its beneficiaries nor PRDOH for that matter: the sole party to gain from a lack of clarity is the Island's longstanding utility and its subrogated T&D operator, with all that entails.

…continued, next page

[1] https://cdbg-dr.pr.gov/en/download/power-grid-action-plan-effective-on-november-8th-2021/?ind=1636429118063&filename=2021%2011%2004_Energy%20Action%20Plan%20Draft_PRDOH%20Compliance%20Review_EN_110821.pdf&wpdmdl=22999&refresh=61c225179a88f1640113431
[2] Page 110 of the Plan

2. When Table 12's Metering Infrastructure Project is segregated, a clear and overwhelming capital *inclination* in favor of the Vieques and Culebra municipalities is clearly evidenced:
    a. These two jurisdictions, comprising 1.8% of the total acreage of the Territory are allocated at least 400% *more* capital per square kilometer than the remaining 98.2% of the Territory,
    b. If population instead of land mass is taken into consideration, that cost/impact ratio climbs to 2,200% in favor of 0.3% of the population,

    Fellow citizens could perhaps construe as if hoteliers and luxury property developers lead the charge on a spend of over $24,000 of public funds for each *one* of the 10,611 registered residents of those two municipalities [versus] the $1,094 allocated for the *other* 3,183,339 residents of the other seventy-six municipalities:

Municipality	Municipality Area (Sq-km)	Table 12, Page 72 Capital Allocation	Capital Allocation per Sq km
Vieques	135 Sq-km	$ 256,870,000	$1,556,788/Sq-km
Culebra	30 Sq-km		
Big Island (76 Municipalities)	9,104 Sq-km	$ 3,485,000,000	$382,799/Sq-km

	PREPA Clients	Table 12, Page 72 Capital Allocation	Capex per Client
Metering Project	1,500,000 Clients	$ 569,400,000	$380/client

However, in my more reserved and optimistic opinion, Table 12 is *precisely* the main reason why the PRDOH Energy Plan needs to be *deeply* revised: The Plan **lacks an objective cost/benefit analysis providing Taxpayers or Beneficiaries an upfront, proportionately rationalized or "per unit" view of energy-related resiliency funding allocations, hence true impact goals cannot be properly measured or assessed**.

In summary, this revision of the energy related portion of PRDOH's Plan reveals succinct but detrimental energy policy confusion or misalignments as well as evidently dislocated planning lacking rational cost-vs-impact "benefit" analysis. Confusion, dislocation and skewed outlays undercut what is otherwise intended as PRDOH's measured, equitable and impactful recovery and resiliency CDBG-DR investment allocations.

Above stated, as part of a broader deep-dive assessment, I also support and endorse Puerto Rico Energy Justice Collaborative Public Comments on PRDOH Proposed CDBG-DR "*Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"* previously submitted to your attention on December 15th, 2021.

Submitted December 22, 2021
Nestor O Rivera Galguera PE
CIAPR Lic 17719
riverane@icloud.com

PONTIFICIA
UNIVERSIDAD CATÓLICA
DE PUERTO RICO
PRESIDENCIA

wwwpucpr.edu

21 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario de la Vivienda
Apartado 363188
San Juan, PR 00936-3188

Estimado señor secretario Rodríguez Rodríguez:

La Pontificia Universidad Católica de Puerto Rico, institución creada en el 1948, con recintos en las ciudades de Ponce, Mayagüez y Arecibo, está comprometida por su misión institucional con la conservación de nuestros recursos esenciales y la protección de la casa común. Esto incluye la eficiencia en la producción y manejo de los servicios energéticos. Como señala el Papa Francisco en su carta encíclica *Laudato si*:

> "… se ha vuelto urgente e imperioso el desarrollo de políticas públicas para que en los próximos años la emisión de dióxido de carbono y de otros gases altamente contaminantes sea reducida drásticamente, por ejemplo, reemplazando la utilización de combustibles fósiles y desarrollando fuentes de energía renovable. En el mundo hay un nivel exiguo de acceso a energías limpias y renovables. Todavía es necesario desarrollar tecnologías adecuadas de acumulación. (…) También ha habido algunas inversiones en formas de producción y de transporte que consumen menos energía y requieren menos cantidad de materia prima, así como en formas de construcción o de saneamiento de edificios para mejorar su eficiencia energética." (Núm. 26)

Con estos principios como guía apoyamos que los fondos CBDG destinados a la recuperación de la resiliencia energética de Puerto Rico sean utilizados, mayoritariamente, para proyectos de energía distribuida, siguiendo los parámetros de política pública establecidos en la Ley 17 de 2019 y en el plan de recursos integrados (IRP, por sus siglas en inglés) propuestos por el Negociado de Energía. En general, estos mandatos Ley 17, regulados en procesos participativos en el Negociado, incluyen la necesidad que el mejor uso de recursos federales, estatales y privados logren un sistema eléctrico resiliente, confiable, a costos justos accesibles con energía y prosumidores interconectados en una red abierta y transparentemente regulada con imparcialidad, equidad y solidaridad.

Esto es cónsono, además, con las guías del gobierno federal para añadir resiliencia en el nivel más cercano a los consumidores para reducir los riesgos al sistema. Retomando los lineamientos del Papa Francisco sobre este tema es pertinente señalar su aval a este tipo de iniciativas:

> "En algunos lugares, se están desarrollando cooperativas para la explotación de energías renovables que permiten el autoabastecimiento local e incluso a la venta de excedentes. Este sencillo ejemplo indica que, mientras el orden mundial existente se muestre impotente para asumir responsabilidades, la instancia local puede hacer una diferencia. Pues allí se puede generar una mayor responsabilidad, un fuerte sentido comunitario, una especial capacidad de cuidado y una creatividad más generosa, un entrañable amor a la propia tierra, así como se piensa en lo que se deja a los hijos y a los nietos." (Núm. 179)

Según sabemos, el Departamento de la Vivienda y Desarrollo Urbano federal (HUD, por sus siglas en inglés) ha determinado que los fondos para las mejoras energéticas post-María constituyen un componente crítico de la recuperación y la resiliencia sistémica ante la probabilidad de eventos futuros. Esto incluye la posibilidad de programas que promuevan proyectos de alto interés público a través de todo el archipiélago, localizados en espacios públicos y privados, apalancando de manera óptima servicios y recursos privados. Igualmente, aquellos que reducen costos vía eficiencia energética y acercan la producción y el consumo a lugares, entidades y comunidades que generen menor dependencia de sistemas centralizados, de distribución a distancia y por cables expuestos a las inclemencias del clima, deben tener preferencia pues son, en efecto, más sostenibles y resilientes. Por ello, entendemos que entidades como la Universidad deben ser consideradas para este tipo de proyectos. La Universidad, en sí misma, es un ecosistema propio de convivencia educativa y social, incluso de vivienda, de provisión de servicios directos a la comunidad interna y externa y de apoyo, como entidad intermedia, a la gestión entre gobierno e individuos en distintos niveles. La recuperación tras los huracanes, los terremotos y la pandemia, ha demostrado lo esencial de estos ambientes, no solo por su valor en el proceso educativo, sino también como ente de servicios. Entendemos que ello es viable dentro de la definición amplia que HUD ha hecho de mejoras al sistema y que así debe entenderse en cuanto a nosotros y a otras entidades y comunidades con características similares.

Le exhortamos a tomar en consideración los elementos aquí planteados y que en la asignación de los fondos CBDG – DR se sigan los parámetros esbozados en la Ley 17 de 2019 y el plan de uso de recursos, en armonía con los principios de eficiencia energética y sostenibilidad que, como asunto de justicia social y ecología integral en el cuidado de unos y otros y de convivencia adecuada con la casa común que habitamos, ha propuesto el Papa Francisco.

Quedamos a sus órdenes y confiamos en su pronta acción sobre este particular.

Cordialmente,

Jorge Iván Vélez Arocho
Presidente

INDUSTRIALES
PUERTO RICO
MANUFACTURA ■ SERVICIO ■ COMPETITIVIDAD ■

Yandia Pérez
Executive Vice President

December 21, 2021

Hon. William O. Rodríguez Rodríguez
Secretary of Housing
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary,

I am writing to you as executive vice president of the Puerto Rico Manufacturers Association and on behalf of its board of directors, in response to the draft Puerto Rico Electrical Power System Enhancement and Improvements Action Plan (the "Plan").

The Puerto Rico Manufacturers Association (PRMA) is a private non-profit organization established in 1928, composed of about 1,000 members in the manufacturing and service industries in Puerto Rico dedicated to the strengthening and development of our local industry through advancement of the competitiveness of our members. We also pride ourselves on working with the local and federal government to develop programs that sustainably improve our local economy promoting a climate for industrial development.

The island's energy markets traditionally lack good public governance, well regulated investment and competitive infrastructure. Neither local nor federal agencies have been able to convince investors that require affordable and reliable electricity there is a PREPA/LUMA credible plan to lower energy costs that will not be affected by the ongoing fiscal and economic crisis, future natural disasters, or the painstakingly slow, conflicted and costly FEMA PREPA reconstruction fund management.

For the draft Action Plan to enable affordable, resilient, reliable energy that also brings back manufacturing and competitive business investment it must comply with the Public Energy Policy of Puerto Rico. Act 17 and PREB proceedings guarantee a public participation and programs that leverage much needed distributed energy efficiency and resiliency to both the customers and the overall grid. To achieve a real long-term transformation, Vivienda and HUD must include a public participation process coordinated with ongoing PREB proceedings that brings together the best knowledge and resources of the private sector, with the energy programing and regulatory capacity of local authorities PREB and DDEC. Ensuring in this manner compliance with established local energy policies, and agency programming – we insure private sector resources, consultants and trained personnel are included in the Plan for the best use of private and public available funds, in lowering energy costs and improving resiliency for underserved communities and all of Puerto Rico.

In this context, we advocate for and endorse the statements of actual draft Plan noncompliance and recommendations made by the Energy Justice movement for community development and the action plan of the Disaster Recovery Fund (CDBG-DR) be considered and implemented by the Puerto Rico Department of Housing.

We make ourselves available to work hand in hand in this and any other initiative that promotes the sustainable development of Puerto Rico. We trust that the PRDOH leadership will accept these PRMA and Energy Justice for Puerto Rico (EJPR) recommendations for Plan compliance with our energy policy. The importance and seriousness of these whole-community energy market transformation matters cannot be overlooked given the historic opportunity for HUD and PRDOH to truly build back better.

PRMA is convinced we can build back better with Plan and guidelines for short and long-term lowering of cost and disaster mitigation risk, if we get the participation and best use of private and government resources right. Coherently completing the Plan for guidelines that both transforms blight and hopelessness along with PREB approved programs for all of Puerto Rico communities is an opportunity to rebuild economic well-being for all with leading Environmental and Social Governance resources the PRMA, EJPR, and our members can bring to the table.

Regards.

Yandia Pérez

Executive Vice President

INDUSTRIALES
PUERTO RICO
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Yandia Pérez
Executive Vice President

December 21, 2021

Hon. William O. Rodríguez Rodríguez
Secretary of Housing
Puerto Rico Department of Housing
PO Box 21365
San Juan, PR 00928-1365

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I am writing to you as executive vice president of the Puerto Rico Manufacturers Association and on behalf of its board of directors, in response to the draft Puerto Rico Electrical Power System Enhancement and Improvements Action Plan (the "Plan").

The Puerto Rico Manufacturers Association (PRMA) is a private non-profit organization established in 1928, composed of about 1,000 members in the manufacturing and service industries in Puerto Rico dedicated to the strengthening and development of our local industry through advancement of the competitiveness of our members. We also pride ourselves on working with the local and federal government to develop programs that sustainably improve our local economy promoting a climate for industrial development.

The island's energy markets traditionally lack good public governance, well regulated investment and competitive infrastructure. Neither local nor federal agencies have been able to convince investors that require affordable and reliable electricity there is a PREPA/LUMA credible plan to lower energy costs that will not be affected by the ongoing fiscal and economic crisis, future natural disasters, or the painstakingly slow, conflicted and costly FEMA PREPA reconstruction fund management.

For the draft Action Plan to enable affordable, resilient, reliable energy that also brings back manufacturing and competitive business investment it must comply with the Public Energy Policy of Puerto Rico. Act 17 and PREB proceedings guarantee a public participation and programs that leverage much needed distributed energy efficiency and resiliency to both the customers and the overall grid. To achieve a real long-term transformation, Vivienda and HUD must include a public participation process coordinated with ongoing PREB proceedings that brings together the best knowledge and resources of the private sector, with the energy programing and regulatory capacity of local authorities PREB and DDEC. Ensuring in this manner compliance with established local energy policies, and agency programming – we insure private sector resources, consultants and trained personnel are included in the Plan for the best use of private and public available funds, in lowering energy costs and improving resiliency for underserved communities and all of Puerto Rico.

In this context, we advocate for and endorse the statements of actual draft Plan noncompliance and recommendations made by the Energy Justice movement for community development and the action plan of the Disaster Recovery Fund (CDBG-DR) be considered and implemented by the Puerto Rico Department of Housing.

We make ourselves available to work hand in hand in this and any other initiative that promotes the sustainable development of Puerto Rico. We trust that the PRDOH leadership will accept these PRMA and Energy Justice for Puerto Rico (EJPR) recommendations for Plan compliance with our energy policy. The importance and seriousness of these whole-community energy market transformation matters cannot be overlooked given the historic opportunity for HUD and PRDOH to truly build back better.

PRMA is convinced we can build back better with Plan and guidelines for short and long-term lowering of cost and disaster mitigation risk, if we get the participation and best use of private and government resources right. Coherently completing the Plan for guidelines that both transforms blight and hopelessness along with PREB approved programs for all of Puerto Rico communities is an opportunity to rebuild economic well-being for all with leading Environmental and Social Governance resources the PRMA, EJPR, and our members can bring to the table.

Regards.

Yandia Pérez

Executive Vice President

Hon William O. Rodríguez Rodríguez, Secretary
PR Department of Housing (PRDOH)
PO Box 21365
San Juan, PR 00928-1365

Dear Secretary Rodríguez:

This letter addresses a private citizen's assessment of certain aspects, mostly of the technical nature, assessed from the general purview of PRDOH's most recent CDBG-DR Electrical Systems Enhancements & Improvements Action Plan ("Plan") as published in its website[1] dated November 08th, 2021. After careful reading of said Plan two major items, one succinct and one not-so, garner considerable concern:

1. The Plan invests in a lot of "TED talk®" specific to Microgrid's ("MG") their use and intended investments, *but*:
    a. an inescapable lack of detail on which Party -be it the utility or operator or central government or the impacted community- is truly chartered to propose *or* trace the physical boundaries or limits of an MG, keep in stride that inevitably *many* MG's will transcend municipal boundaries, comingle local and federal beneficiary's and even interconnect to *other* MG(s),
    b. Law 17 clearly states that MG's are subject to the ultimate scrutiny of the PREB, however:
        i. under the guise of "clearing up" "FEMA vs HUD funding overlaps", the Plan enumerates a series of terms initially classified as "functional" but afterwards renames[2] as "component groups" thus
        ii. appearing to integrate but then artificially *segregating and distancing* fundamental elements integral to MG's (T&D, substations, other sources of power, enabling tech, etc.) but then
        iii. singlehandedly establishes PRDOH set "a threshold for fungibility between (said) components",

    Clarity is direly needed and requested. The above creates unnecessary confusion and false parallels between what clearly are policy issues, funding topics and technical matters, all of which the PREB is equipped to quickly identify and address in ordinary proceedings.

    Confusion serves no MG project, its beneficiaries nor PRDOH for that matter: the sole party to gain from a lack of clarity is the Island's longstanding utility and its subrogated T&D operator, with all that entails.

…continued, next page

[1] https://cdbg-dr.pr.gov/en/download/power-grid-action-plan-effective-on-november-8th-2021/?ind=1636429118063&filename=2021%2011%2004_Energy%20Action%20Plan%20Draft_PRDOH%20Compliance%20Review_EN_110821.pdf&wpdmdl=22999&refresh=61c225179a88f1640113431
[2] Page 110 of the Plan

2. When Table 12's Metering Infrastructure Project is segregated, a clear and overwhelming capital *inclination* in favor of the Vieques and Culebra municipalities is clearly evidenced:
    a. These two jurisdictions, comprising 1.8% of the total acreage of the Territory are allocated at least 400% *more* capital per square kilometer than the remaining 98.2% of the Territory,
    b. If population instead of land mass is taken into consideration, that cost/impact ratio climbs to 2,200% in favor of 0.3% of the population,

    Fellow citizens could perhaps construe as if hoteliers and luxury property developers lead the charge on a spend of over $24,000 of public funds for each *one* of the 10,611 registered residents of those two municipalities [versus] the $1,094 allocated for the *other* 3,183,339 residents of the other seventy-six municipalities:

Municipality	Municipality Area (Sq-km)	Table 12, Page 72 Capital Allocation	Capital Allocation per Sq km
Vieques	135 Sq-km	$ 256,870,000	$1,556,788/Sq-km
Culebra	30 Sq-km		
Big Island (76 Municipalities)	9,104 Sq-km	$ 3,485,000,000	$382,799/Sq-km

	PREPA Clients	Table 12, Page 72 Capital Allocation	Capex per Client
Metering Project	1,500,000 Clients	$ 569,400,000	$380/client

However, in my more reserved and optimistic opinion, Table 12 is *precisely* the main reason why the PRDOH Energy Plan needs to be *deeply* revised: The Plan **lacks an objective cost/benefit analysis providing Taxpayers or Beneficiaries an upfront, proportionately rationalized or "per unit" view of energy-related resiliency funding allocations, hence true impact goals cannot be properly measured or assessed**.

In summary, this revision of the energy related portion of PRDOH's Plan reveals succinct but detrimental energy policy confusion or misalignments as well as evidently dislocated planning lacking rational cost-vs-impact "benefit" analysis. Confusion, dislocation and skewed outlays undercut what is otherwise intended as PRDOH's measured, equitable and impactful recovery and resiliency CDBG-DR investment allocations.

Above stated, as part of a broader deep-dive assessment, I also support and endorse Puerto Rico Energy Justice Collaborative Public Comments on PRDOH Proposed CDBG-DR "*Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"* previously submitted to your attention on December 15th, 2021.

Submitted December 22, 2021
Nestor O Rivera Galguera PE
CIAPR Lic 17719
riverane@icloud.com

From: Vidalina Rivera
To: info CDBG
Date: Thursday, December 23, 2021 9:31:51 PM

Energía renovables es lo mejor y todos los ciudadanos tengamos alcance

23 de diciembre de 2021

Departamento de Vivienda
Gobierno de Puerto Rico

RE: COMENTARIOS PÚBLICOS SOBRE EL PLAN DE ACCIÓN CDBG-DR PARA LA OPTIMIZACIÓN DE LA RED ELÉCTRICA DE PUERTO RICO

Desde hace poco más de 70 años, el pueblo residente de Puerto Rico ha tenido una agencia que se ha encargado del sistema energético de la isla. Fuimos un país pionero en tener un sistema de calidad e innovador. En su inicio, el sistema impacto positivamente la cotidianidad de la vida de todos, así como contribuyó al acelerado proceso de desarrollo industrial, residencial y económico.

Entre los aspectos innovadores se encontraba el incluir y crear embalses para la generación de energía eléctrica. Poco a poco, y según las necesidades se fue transformando y la Autoridad de Fuentes Fluviales de Puerto Rico (1941) se fue convirtiendo en la Autoridad de Energía Eléctrica (AEE) y la Autoridad de Acueductos y Alcantarillados (AAA). Que conste, la AAA también necesita una restructuración de su estructura organizacional y administrativa. Todos los que nos servimos del servicio de agua potable hemos visto un "sutil" y constante aumento en la factura desde el 2013.

Con el surgir de costos más accesibles de diversos combustibles, se fue dejando a un lado el mantenimiento y uso de los embalses para la producción energética. Hoy podemos entender que esto ha sido un error. Durante las décadas de los años 1980, 1990 y 2000, el sistema eléctrico de Puerto Rico se convirtió en uno a emular por otros países, en especial de islas caribeñas adyacentes a nosotros. No obstante, durante ese mismo periodo de tiempo, muchos podemos analizar históricamente, el cómo se abusó de privilegios otorgados a los empleados de la AEE en sus convenios colectivos. Fuimos testigos de una unión que llegó a beneficiarse económicamente. De la utilización por políticos de esta agencia pública como bastión de sus respectivos partidos y para acomodar a sus familiares ganando sueldos altos, muchos sin preparación académica relacionada. Todo esto afectó grandemente la eficiencia y eficacia de la AEE.

Para completar, luego del 2000, no se proyectó los cambios climáticos, económicos ni sociales a nivel local ni global. La dejadez en la falta de mantenimiento del sistema se convirtió en la norma que nunca debió ocurrir. Muchos fuimos testigos de como algunos empleados de la AEE desprestigiaban la agencia con actos de negligencia y corrupción. Los gobiernos de entonces intentaron lidiar con la situación creando organismos gubernamentales paralelos, los cuales se ha comprobado no son funcionales y deberían ser eliminados. Ejemplo de esto es la Administración de Energía Eléctrica y la Junta de Gobierno de la AEE. Ambos organismos solo perpetúan la falta de correcta administración y hacen que los procesos de restructuración sean más burocráticos e irónicamente menos fiscalizados.

Desde el 2007, algunos hemos podido documentar la constante falta del servicio eléctrico y considero que todos los que nos servimos del servicio hemos visto las constante alzas en el costo energético, así como la inclusión de absurdos en la factura, solo para justificar la ineficiencia administrativa y organizacional de la AEE. En el 2016, vivimos apagones generales por más de 2 días, que afectaron a todos los residentes de Puerto Rico. Esa era la llamada de alerta para que se trabajara con el sistema y se comenzara con un plan de mantenimiento agresivo, sin embargo, así no se hizo. Otro aspecto que socavó grandemente la credibilidad ante los ojos de los ciudadanos lo fue las excusas absurdas que nos dieron para justificar el mal servicio eléctrico.

Con el paso de los huracanes Irma y María, con menos de 2 semanas de diferencia en el 2017, los puertorriqueños comprobamos la falta de mantenimiento, la fragilidad del sistema, lo altamente burocrático de los procesos de compra, etc. Vivo en un área completamente urbana, con el sistema eléctrico soterrado y estuve 5 meses sin servicio eléctrico. Decidí pasar ese tiempo sin un generador de energía eléctrica. Preferí asegurarme que mis padres estuvieran bien en su residencia. Fueron 5 meses en los cuales maldije todos los días a la AEE. Durante ese tiempo continué exponiendo la realidad de una agencia que dejó de ser útil, proactiva y eficiente hace cerca de 17 años atrás.

Con todo lo antes expuesto, es difícil pensar que a nadie más se haya percatado de lo mismo. Es irónico creer que a nadie se le ocurrieran alternativas costo eficientes para mejorar sustancialmente el sistema y su calidad. Es insostenible admitir que se abrieron las puertas para que compañías de servicio energético solar se establecieran en la isla, sin medir las consecuencias económicas que eso le iba a traer a todos los que pertenecían en el sistema tradicional de la AEE.

Hemos perdido la oportunidad de volver a ser pioneros a nivel global, convirtiendo a Puerto Rico en la primera isla con producción solar a un 100%. No obstante, aun estamos a tiempo para lograr esto. La alternativa es bastante sencilla, vamos a certificar a peritos electricistas y "linemen" de LUMA para que sean instaladores de servicios solares. Los procesos económicos y crediticios de las compañías solares son arbitrarios y no todos cumplen con los mismos para hacer el cambio de servicio. Por otra parte, muchas son de dudosa reputación y tienen procesos adversos legales en los tribunales y otras agencias estatales como DACO. También tenemos que considerar que los costos son sumamente onerosos. ¿Entonces, porque no ofrecer el sistema a los propios clientes de la AEE-LUMA y convertirlos en socios del sistema? La agencia ya tiene todos los datos del cliente, podría establecer un acuerdo de pago a largo plazo (10, 15, 20 o 25 años) y así asegurarse que ese ingreso se quede en las arcas de la misma por largo tiempo. Tiempo que será utilizado para ir reduciendo la parte administrativa y aumentando la de servicio y mantenimiento. Esta idea pudiera iniciar en todas las urbanizaciones con controles de acceso y aquellas que sean más definidas en términos de infraestructura. Cada residente interesado deberá presentar copia de las escrituras de la propiedad, como único requisito para hacer el cambio. La AEE-LUMA pueden incluir otros extras como baterías, seguro y mantenimiento preventivo cada 6 meses, al paquete que elija el cliente. Todos estarían con medición neta y continuarían siendo clientes activos, aportando al

sistema. Mi 2do grupo para trabajar serían los comerciantes y centros comerciales. Es de todos conocido que los costos energéticos han estrangulado a los comerciantes, muchos de los cuales han tenido que cerrar sus negocios debido a la fluctuación absurda en los costos energéticos. El tener un sistema energético estable, tanto en su servicio – producción, como en su pago mensual, hace más óptima la proyección económica, crecimiento y desarrollo. El 3er grupo para trabajar debería ser los hoteles y paradores. Puerto Rico es bastante atractivo turísticamente. No obstante, si nos comparamos con otros países del archipiélago caribeño, no contamos con el famoso atractivo de los hoteles con ofertas "all inclusive". Nuevamente, un factor importante para que esto no ocurra, es el costo energético, entre otros que son manejables. Con estos 3 grandes grupos cobijados bajo el sistema solar, Puerto Rico tendría cerca de un 75% de consumo solar. De esta forma sería más fácil estabilizar la producción eléctrica y atajar otros servicios y necesidades. Esta debería ser la visión a futuro que deberíamos estar buscando de forma colectiva.

Otros aspectos a trabajar serían la eliminación de todos los subsidios al pago del servicio de energía eléctrica. Se debe iniciar un nuevo proceso de solicitud y evaluación de los reclamantes de este privilegio. El mismo debería estar condicionado solamente a ciertas condiciones de salud y debería estar ampliamente documentado. Debemos eliminar las tarifas estandarizadas en todos los residenciales públicos y hacer el cambio a contadores remotos en dichos lugares. Si el residente no paga, simplemente se desconecta de forma remota. Se le debe otorgar a todos los que permanezcan en el sistema de la AEE-LUMA un plazo de 2 meses previo a recibir una alerta de suspensión de pago. Todo plan de pago debería establecerse con un mínimo del 25% del total de la deuda e incluir un cargo mínimo mensual por estar en este. También se debe atender los casos de robo del sistema. Sabemos de comunidades invadidas que tienen el servicio. Todos deberíamos cumplir con las leyes y reglamentos aplicables. No hace lógica el invadir y tener un servicio sin tener escrituras de la propiedad que certifiquen la titularidad. Comprendo que estos últimos temas son sensibles y quitan votos de las masas. Pero debemos tener personas, en todas las esferas del gobierno, con voluntad para hacer lo correcto.

En adición, deberíamos considerar el cambio de sistemas fósiles como combustibles a fuentes de energía más limpias. Puerto Rico es fértil para la energía térmica, así como la eólica. Deberíamos regresar a la utilización de los embalses para generar energía eléctrica. Cambiar y actualizar las plantas de generación debería ser una prioridad, tanto las que pertenecen al gobierno como las privadas. Estoy consciente que LUMA estará mejorando las subestaciones y líneas de transmisión y distribución. Las resiliencia y optimización de estos conceptos del proceso energético debería ser prioridad nacional. Para esto, tanto FEMA como COR3, deberían de convertirse en facilitadores y no fiscalizadores de las propuestas que se estarán presentando. El hacer más ágil (no confundan ágil con fácil) el que estos proyectos se lleven a cabo debería ser la prioridad para todos, incluyendo las agencias reguladoras estatales y federales de permisos y todos los componentes envueltos.

Puerto Rico ha tenido la dicha de no volver a vivir un huracán devastador en 3 años, pero no estamos exentos. La lentitud en todos los procesos que han envuelto el "Disaster Recovery" solo hacen que estemos más expuestos y vulnerables a eventos catastróficos futuros.

Solo he expuesto algunos de mis puntos de vista con relación al tema de epígrafe. Definitivamente puede escribir mas en detalle cada una de las ideas y otras que no tuve tiempo de condensar en este memorial explicativa. Espero que las mismas sean consideradas.

Atentamente,

Glenda Viera
Residente del municipio de Río Grande
787-526-7887
glendaviera@gmail.com

Colegio de Ingenieros y Agrimensores de Puerto Rico

OFICINA DEL PRESIDENTE

23 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario
Departamento de la Vivienda
Avenida Barbosa 606
San Juan, P.R. 00923

Asunto: **Ponencia del CIAPR**
Plan de Acción de Recuperación de Desastre para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico

Estimado secretario Rodríguez Rodríguez,

Reciba un cordial saludo de parte del Colegio de Ingenieros y Agrimensores de Puerto Rico (en adelante el "CIAPR" o el "Colegio"). A continuación, se presentan los comentarios del CIAPR con relación al Plan de Acción de Recuperación de Desastre para el Uso de Fondos CDBG-DR para la Optimización del Sistema Eléctrico de Puerto Rico presentado por el Departamento de la Vivienda para comentarios públicos durante el mes de noviembre de 2021.

Por disposición de su ley orgánica, Ley 319 del 15 de mayo de 1938, según enmendada, el CIAPR es asesor del Gobierno en asuntos relacionados a la ingeniería y agrimensura en Puerto Rico. El CIAPR es una corporación cuasi-pública sin fines de lucro constituida hace 80 años para agrupar a los profesionales con derecho a ejercer la ingeniería y agrimensura en Puerto Rico para una defensa común de los ciudadanos a través de un ejercicio responsable y ético de nuestras profesiones. Por tal razón, la misión primaria del Colegio es la seguridad, salud y vida de los ciudadanos. Promovemos el desarrollo de la ingeniería y la agrimensura fomentando la ética y la excelencia en la práctica profesional en beneficio de los colegiados y el pueblo de Puerto Rico. Además, nos pronunciamos responsablemente en asuntos de interés público, promoviendo el progreso cultural, científico y tecnológico en las disciplinas de sus colegiados y el mejoramiento energético y ambiental de la sociedad, a tenor con los nuevos estándares mundiales de desarrollo sostenido, entre otros.

PO Box 363845 San Juan PR 00936-3845
Tel. (787) 758-2250, ext. 201 • presidente@ciapr.org

Colegio de Ingenieros
y Agrimensores
de Puerto Rico

El CIAPR, durante sus ocho décadas, ha demostrado su compromiso con la isla, no solo con el desarrollo de los profesionales que agrupa, sino también con diversas iniciativas que incluyen participación en proyectos gubernamentales que entendemos son de beneficio para nuestro pueblo. Contamos con un caudal de talento integrado por ingenieros y agrimensores, profesionales, con su preparación académica, experiencia y siempre a la vanguardia en lo que se refiere a estudiar, evaluar y recomendar nuevas tecnologías que sean viables en mejorar el bienestar público y que fomenten el desarrollo económico de nuestra Isla.

A finales del año 2020 el CIAPR presentó el documento Infraestructura 2030 (www.infraestructura2030.com). Este documento fue desarrollado por docenas de expertos organizados en ocho comisiones especializadas que evaluaron los problemas de la infraestructura existente en Puerto Rico y presentaron recomendaciones para reconstruir nuestra Isla de forma planificada y coherente. En el documento se recogió la visión del CIAPR y se presentó un mapa de ruta sobre la reconstrucción urgente y sostenible que debe realizarse en la infraestructura esencial de Puerto Rico en los próximos 10 años. Entre las áreas de infraestructura identificadas para ser atendidas de forma prioritaria se incluyó la infraestructura de energía eléctrica. Entre las recomendaciones presentadas por el CIAPR para atender los problemas de la infraestructura eléctrica, entendemos que las siguientes son pertinentes para el establecimiento de prioridades para la asignación de fondos CDBG-DR y cualquier otro fondo adicional:

1) Con carácter de emergencia dar mantenimiento a la Infraestructura existente para garantizar una operación del sistema eléctrico que sea confiable y con un servicio de calidad mientras se completa la transición energética.

2) Transformar la red de distribución eléctrica en una red inteligente que permita mayor visibilidad y control de su operación.

3) Atender los riesgos asociados a la operación y control de la red eléctrica para garantizar una operación confiable de un sistema eléctrico de tamaño pequeño y aislado como el de Puerto Rico con niveles de penetración de fuentes intermitentes y de almacenamiento como las que propone el Plan Integrado de Recursos.

4) Fomentar prioritariamente, las fuentes renovables distribuidas para descongestionar la red efectivamente, reducir las pérdidas técnicas, mejorar la confiabilidad del servicio eléctrico y recuperar el servicio rápidamente luego de desastres naturales.

5) Adoptar políticas gubernamentales para fomentar agresivamente el uso de vehículos eléctricos en Puerto Rico y desarrollar un modelo de transportación colectiva e individual mediante la utilización de estos vehículos.

6) Desarrollar los proyectos adoptados mediante el Plan Integrado de Recursos aprobado por el Negociado de Energía en agosto del 2020.

7) Fortalecer la infraestructura eléctrica para dar confiabilidad al sistema eléctrico en aquellas áreas dónde se encuentren establecidos o puedan establecerse clústeres industriales asociados al desarrollo económico del país.

Según el Plan de Acción para la Optimización de la Red Eléctrica el Departamento de la Vivienda desarrolló una evaluación de las necesidades no satisfechas para guiar el uso de los fondos CDBG-DR para mejoras al sistema eléctrico. Tomando como base las recomendaciones del CIAPR para mejorar la infraestructura eléctrica de Puerto Rico entendemos que las siguientes necesidades identificadas como no satisfechas en el Plan de Acción para la Optimización de la Red Eléctrica se le debe asignarse prioridad para la asignación de fondos CDBG-DR a las siguientes:

1) Infraestructura de Medición Avanzada
2) Reemplazo del Centro de Control Energético con nuevo sistema de manejo de energía
3) Microrredes de Vieques y Culebra
4) Cable submarino de Vieques y Culebra
5) Uso de generación distribuida en la AAA, según aprobado por el negociado de energía de Puerto Rico para necesidades energéticas de plantas de filtración de agua no tratada y estaciones de bombeo y plantas de tratamiento de aguas usadas y desagües de descarga.
6) Uso de energía solar en sistemas de agua potable que no pertenecen a la AAA
7) Microrredes que Benefician la Resiliencia Comunitaria para Puerto Rico identificadas por el laboratorio nacional Sandia del Departamento de Energía
8) Microrredes renovables o hibridas para dar servicio a áreas específicas en Puerto Rico, según aprobadas por el negociado de energía de Puerto Rico.
9) Sistema de generación distribuida que incluyan soluciones solares residenciales y comunitarias, comerciales e industriales

Colegio de Ingenieros
y Agrimensores
de Puerto Rico

Con respecto a los sistemas de generación distribuida que incluyan soluciones solares residenciales y comunitarias es importante considerar que Puerto Rico actualmente tiene una población cuyas vidas dependen de su conexión al sistema eléctrico. Esta situación se evidenció durante el paso del Huracán María en el 2017. Por tal razón, recomendamos se desarrolle un programa de ayuda gubernamental que facilite el acceso a equipo de energía auxiliar de reserva para personas vulnerables con necesidad económica que dependen de la electricidad para operar aparatos médicos. Además, en el caso de as microrredes se debe considerar un desarrollo dirigido a la instalación de sistemas confiables y diversificados de energía auxiliar de reserva en facilidades que ofrezcan servicios y funciones esenciales para la supervivencia, la continuidad de la salud y seguridad pública y la recuperación luego de un desastre. Ejemplo de estas instalaciones lo son: hospitales, escuelas, égidas, estaciones de bomberos y policía, sistemas de suministro de agua, plantas de tratamiento de aguas usadas, estaciones de bombeo y presurización de combustible, comunicaciones, centros comunitarios y refugios de emergencia, entre otros.

Gracias por la oportunidad de aportar con nuestros comentarios.

Cordialmente,

Ing. Juan F. Alicea Flores, PE
Presidente

JFAF

info CDBG

From: Haydee Castro <haydee77822@gmail.com>
Sent: Friday, November 12, 2021 8:52 AM
To: info CDBG
Subject: CommunicationCDBGq

Eh conocido por otras personas que la inplatacion d red Eléctrica a sido exito y se a beneficiado tantos hogares puertorriqueños. Y yo no e tenido la dicha d disfrutar este beneficio y que 2020, radique una guerella a la autoridad AEE,# wrss729143 por un problema que tengo en servicio eléctrico d poste , siento que mi vida y mi familia estamos en peligro, bajones d Luz contantes , daños enceres temo que mi casa se encienda por un n corte circuito. Esperó que esa implantación llegue a los hogares que se nesecite. Att Haydee M Castro .

info CDBG

From: Isabel Nieves <inieves@miaguadilla.com>
Sent: Wednesday, November 10, 2021 10:07 AM
To: info CDBG
Subject: Informacion sobre areas con problematias en Aguadilla
Attachments: areas con problemas de luz en aguadilla.docx

Saludos,

Adjunto información sobre áreas con mayor problemáticas en el Pueblo de Agudilla y un proyecto de soterrado que se encuentra pendiente por terminar.

De necesitar información adicional no dude en contactarme.

Cordialmente,

Isabel Nieves Cruz, PPL
Director
Office of Urbanism and Land Use
Municipality of Aguadilla

inieves@miaguadilla.con
(787) 891.1005 x2096
P.O. Box 1008 | Aguadilla, PR 00605-1008
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Clínica de Asistencia Legal

20 de diciembre de 2021

William O. Rodríguez Rodríguez, Esq.
Secretario
Departamento de Vivienda de Puerto Rico
Plan de Acción de Red de Energía - CDBG (pr.gov)
https://cdbg-dr.pr.gov/iframes/PublicCommentsIFRM.html

Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico

Estimado señor Rodríguez:

Estos Comentarios al Plan de Acción CDBG-DR para la Optimización del Sistema Eléctrico ("Borrador del Plan de Acción") se presentan en nombre del Lcdo. Pedro J. Saadé de la Clínica de Asistencia Legal de la Escuela de Derecho de la Universidad de Puerto Rico.

Según el Borrador del Plan de Acción, la mayoría de los fondos para el sistema eléctrico se asignarían al Programa de Distribución de Costos para la Rehabilitación y Reconstrucción de la Red Eléctrica (ER1) con un presupuesto de $ 1,055,811,031 que irían para reconstruir los postes, torres, cables y otros componentes del sistema centralizado de transmisión y distribución de energía eléctrica que conecta las grandes plantas de generación de energía a base de la quema de combustibles fósiles, principalmente ubicadas en el sur de Puerto Rico con las y los abonados. Otros fondos irían al Programa para la Fiabilidad y la Resiliencia de la Energía Eléctrica (ER2) al que se le asignarían $ 760,595,149 para proyectos que alegadamente no se prevé que sean financiados por otras fuentes federales o locales.

El Borrador del Plan de Acción adolece de nueve fallas principales; 1.- niega la capacidad de la energía renovable, especialmente sistemas solares ubicados en techos o cercanos al lugar de consumo y los sistemas de almacenamiento de energía (baterías) para proporcionar un servicio eléctrico confiable, resiliente y costo-efectivo y retrasa el uso de estas opciones, 2.- perpetúa el sistema de transmisión y distribución que mantiene la dependencia a largo plazo en las plantas de generación de energía a base de la quema de combustibles fósiles, 3.-incumple con el Plan Integrado de Recursos ("PIR") emitido por el Negociado de Energía, 4.-no aporta significativamente a lograr los mandatos de porcientos de energía renovable establecidos por ley requeridos en el 2022 y 2025, 5.-asume erróneamente que los fondos de FEMA no se pueden utilizar para la energía renovable distribuida (sistemas solares ubicados en techos y baterías), 6.-hecha a perder la oportunidad de lograr la justicia social y ambiental a través del acceso de comunidades de bajos y medianos ingresos a las energía renovable distribuida (sistemas solares ubicados en techos y baterías), 7.-no cumple con las disposiciones ambientales, sobre cambio

climático y control de inundaciones, 8.- crea presión para el aumento de las tarifas eléctricas, 9.- es vago, ambiguo e impreciso y no informa al público sobre aspectos claves del plan, lo que niega la participación pública efectiva.

La cantidad histórica de fondos de HUD y FEMA asignados para el sistema eléctrico de Puerto Rico deben invertirse en sistemas solares en techos o cercanos al lugar de consumo y alternativas similares para proveer acceso a la resiliencia energética a los sectores de bajos y medianos ingresos que salvará vidas y aportará para lograr la justicia ambiental y climática. La justicia social requiere que la resiliencia energética no se limite a las personas de altos ingresos que puedan adquirir estos equipos. La viabilidad futura de Puerto Rico depende de que estos fondos se utilicen para el promover el desarrollo económico endógeno.

Atentamente,

Lcdo. Pedro J. Saadé Lloréns
Abogado-profesor

Energy Justice
Puerto Rico

Puerto Rico Energy Justice Collaborative
Public Comments on PRDOH Proposed CDBG-DR
"Puerto Rico Electrical Power System Enhancement and Improvements Action Plan"

"Cheap (solar) energy should be one of Puerto Rico's big comparative advantages"
Joseph Stiglitz
CNE Growth Policy Summit, December 2021

Submitted On December 15, 2021

Introduction

For the first time in the history of the Community Development Block Grant – Disaster Recovery (CDBG-DR) program an Action Plan has been developed for the transformation of a jurisdiction-wide electricity system. The Puerto Rico Department of Housing (PRDOH) has made a good effort in drafting the CDBG-DR "Puerto Rico Electrical Power System Enhancement and Improvements Action Plan" (Action Plan). However, the failure of the PRDOH to fully include the Puerto Rico Energy Bureau (PREB) in the drafting process generated an Action Plan that does not comply with the 2020 Integrated Resource Plan (IRP) and Puerto Rico's energy policy, as set forth in Act 17-2019. The U.S. Department of Housing and Urban Development (HUD) Federal Register Notice FR–6261–N–01 requires the proposed Action Plan to be drafted in compliance with this local legal, regulatory, planning and development framework. For this reason, the current Action Plan must be significantly amended to further the achievement of Puerto Rico's immediate and long-term goals for the energy sector, and economic renewal opportunities for 3.2 milliion Americans:

(i) Providing reliable, accessible, and affordable electricity to all consumers; and
(ii) Supporting Puerto Rico's longer-term march toward transforming its centralized electricity grid into a sustainable, resilient, and distributed energy system.

Grounding this Massive Opportunity in Puerto Rico's Existing Energy Policy & Vision

To ensure that these critical goals are accomplished it is essential to ground the CDBG Energy Action Plan in Puerto Rico's vision for the transformation of its energy system, as articulated in the 2020 PREB approved IRP and the Act 17 goals for energy efficiency and generation from renewable sources. With some adjustments, the CDBG Action Plan can jumpstart the implementation of Puerto Rico's long-term energy transformation. The objectives of Energy Justice for Puerto Rico (EJPR) are to enhance the draft Plan so that it complies with local statutory and regulatory requirements and to help Puerto Rico become a model of environmental and social governance in building back better at the national and global levels.

Energy Justice for Puerto Rico (EJPR)

EJPR is a local Puerto Rico non-profit organization dedicated to education about issues affecting the energy sector and to promoting the coordination and collaboration of consumers and prosumers with government and other non-governmental organizations. We coordinate broad public participation in PREB and government decision-making processes and advocate for the effective implementation of Puerto Rico's energy policy. We also seek to guarantee the optimal use of state and federal funds for Puerto Rico's immediate and long-term energy needs, while leveraging private participation and resources.

The EJPR Board of Directors, fellows, and staff are expert educators, researchers, and public interest policy actors. The EJPR's policy development and advocacy experience commenced with the development of the Puerto Rico Act 57-2014 energy regulation framework and continued with the landmark energy transformation policy of Act 17-2019. We also participated in the PREB process to modify the Puerto Rico Electric Power Authority's (PREPA) IRP in 2020.

EJPR played a leading role in building a private sector consensus to develop a comprehensive Puerto Rico energy policy that brought together prior laws and several energy efficiency and distributed energy programs into one coherent law (Act 17). These resources worked with the Institute for a Competitive and Sustainable Economy of Puerto Rico (ICSE) - Rocky Mountain Institute (RMI) in a *Public Collaborative for Puerto Rico's Energy Transformation* in 2018 and also participated in the Blue Ribbon committee drafting Act 17-2019. Based on this policy development experience and participation in PREB regulatory proceedings, we present the following comments to the PRDOH regarding the current Action Plan.

Recommendations for Improving the Action Plan

1. **Compliance with Act 17-2019:** The most important change needed in the Action Plan is to ensure that its proposed program, budget, and project funding guidelines comply with the existing mandates for Puerto Rico's energy sector transformation under Act 57-2014, Act 17-2019 and the 2020 IRP. Under these laws the PREB plays a critical role in the transformation of Puerto Rico's energy system through planning and oversight. The PREB has the primary responsibility to promote regulate, monitor, and enforce the energy public policy of the Government of Puerto Rico, and is essential to ensuring the successful and timely implementation of the Action Plan. The current draft of the Action Plan does not appear to fully reflect this reality. We recommend the PRDOH fully engage and integrate the PREB into the Action Plan to guarantee the coherent and consistent use of state, federal and private electrical system resources and to protect the public interest consistent with FR–6261–N–01.

2. **Prioritizing Short Term Solutions that Support Long Term Transformation:** The Action Plan should focus on short-term solutions that serve the public interest while also advancing the long-term goal of transforming Puerto Rico's energy future.

    - **Utilizing 55% of Action Plan Budget on Centralized Utility Infrastructure is a Wasted Opportunity:** The potential allocation of 55% of the Action Plan budget to pay the non-federal cost share of FEMA's Accelerated Award Strategy (FAASt) will primarily support the rehabilitation of the PREPA/LUMA centralized utility grid. According to the PREPA-FEMA 10 Year Plan Proceeding (NEPR-MI-2021-0002), the large number of projects for a centralized utility grid would take up to 10 years to complete, which would leave Puerto Rico's citizens, energy users, and energy customers without a fully operational electric grid and with relatively higher energy costs for an unreasonably long period of time. This allocation would effectively waste a once in a lifetime opportunity for Puerto Rico to leverage federal funds to implement a modern, efficient, and resilient distributed energy resources (DER) model. The PREPA-FEMA 10 year capital infrastructure plan, dated March 2021, includes approximately $700 million in PREPA funds that could be used for paying a significant portion of the cost-sharing, freeing up CDBG funding for DER electrical system improvements.

- **Focus on Lowering Energy Bills & Increasing Energy System Reliability:** Energy stakeholders island-wide recognize that the most pressing short-term public needs are to lower energy bills and to increase the energy system's reliability. Unfortunately, allocating more than half of the Action Plan budget to rebuild a centralized utility grid will do little to address these needs. Instead, the Action Plan should fully integrate the energy policy principles of transparency, equity, justice, efficiency, and resiliency set forth in our existing energy laws and regulations. To accomplish this, Action Plan investments must focus on kick-starting and advancing PREB regulated electricity markets; energy efficiency and demand response programs; and ramping up distributed energy resources, while leveraging private sector participation. In this manner the Action Plan will best align with all of Puerto Rico's energy policy mandates: to achieve 40% renewable energy generation and a 10 % increase in energy efficiency by 2025; an additional 30% increase in energy efficiency by 2040; and the longer term objective of 100% renewable energy generation by 2050.

- **Emphasize End Users:** Action Plan funds must be targeted to projects, programs and initiatives located close to the end users and energy consumers/prosumers. The current FEMA and PREPA 10-year plan focuses on traditional centralized utility improvements in transmission and distribution infrastructure distant from consumer locations and does not incentivize shorter-term private sector co-investments in resilient near-the-meter risk mitigation projects. Distributed energy program funds can be used directly by eligible subrecipients, such as the PREB, the Energy Office of the Department of Economic Development and Commerce (DEDC), key municipalities and agencies, NGO's and non-profit entities to implement DER projects across the island, to execute demand response and peak demand mitigation initiatives, and eventually to deploy more complex solutions such as mini and micro grids, and rooftop solar and battery storage systems close to the consumer/prosumer location. The PRDOH should also incorporate the feedback from the Sandia Lab study into the draft Action Plan. One option for financing these projects is to create a well-planned and regulated private sector credit facility with a matching fund program for co-investments.

- **Prioritize Underserved, Disadvantaged and Low- & Moderate-Income Communities:** It is also critical that significant CDBG funds be assigned to NGO's that promote efficiency and DER programs for underserved and disadvantaged low- and moderate-income communities with unmet energy service needs. This would fully align the Action Plan with HUD's National Objectives of benefitting low- and moderate-income persons and meeting the particularly urgent energy needs of underserved disadvantaged communities through cooperatives close to the consumer.

- **A Distributed Energy Model Can Lower Cost and Increase Sustainability & Resilience:** Adapting the Action Plan to support a distributed energy resources grid model would encourage usage of high efficiency devices; improve the responsiveness, resiliency and sustainability of the system; and reduce the demand for energy from centralized generators, assuring policy compliance with energy efficiency and renewable portfolio

mandates for 2025 and beyond. This, in turn, means less fossil fuel pollution, a leaner transmission and distribution (T&D) system, which would avoid the need for expensive, inefficient, and outdated grid hardening projects, and lower energy costs across the grid, enabling an economically viable long-term energy distribution model.

3. **Public Participation Process:** For the Action Plan to truly enable the transformation of Puerto Rico's energy sector, public participation in its development and execution needs to go well beyond the limited public hearing and public comment process executed by the PRDOH to date.

    - **Fund Substantive Public Participation:** The Action Plan must include robust mechanisms and funding to support the substantive and ongoing public participation in this process. This is critical to ensuring optimal planning for the use of CDBG-DR resources, for ensuring prompt regulatory compliance, and for the timely execution of mitigation projects.

    - **Incorporate the PREB's Stakeholder Engagement Process:** Currently, the PREB's decision making framework presents the most cost-effective opportunity for meaningful, timely, and broad consumer and private sector stakeholder participation in the transformation of Puerto Rico's electricity system and PRDOH should leverage it within the Action Plan. No other Puerto Rico government institution has the legal and technical capabilities required to make this Action Plan a success.

    - **Pursue a Bottom-Up Planning Process:** The current Action Plan leaves little room for disadvantaged, underserved, and vulnerable communities to actively participate in the planning process and access funds to meet their specific needs. EJPR recommends implementing a bottom-up federal and state agency program coordination approach, with the PREB leading coordination and preliminary approvals within the Action Plan's program planning process to ensure proactive inclusion for priority funding. The combination of adopting a bottom-up planning approach with priority access to funds for projects that address the unmet needs of vulnerable and underserved low-moderate income communities can become a powerful mechanism for empowering economically distressed areas.

4. **Fully Leverage Private Sector Short and Long-Term Capacity:** To maximize the Action Plan's capacity to bring about Puerto Rico's energy transformation it is essential to encourage private sector participation to increase total program investments and maximize public interest impact. Wherever possible, federal funds should complement and reinforce the use of private funds, primarily by making the approval and use of private funds affordable to low- and moderate-income consumers and communities. The Action Plan can help increase the capacity of the private sector in providing and financing green energy solutions behind and near the meter that FEMA's central grid funding is unable to reach.

    - **Revolving Loan Funds:** The incorporation of revolving loan funds within the Action Plan under CDBG-DR guidelines is a valuable tool, to allow middle and higher-income

consumers to contribute according to their capacity to further energy efficiency and to promote the deployment of DER's island wide. In this model, funds approved for communities and organizations can be recovered through affordable energy fees resulting from the operation of energy projects, thus creating a positive cash flow that will return to the original recipient to be reused for other eligible economic development activities as provided by CDBG-DR regulations.

- **Involve Private Financial Institutions:** Private financial institutions should be invited to participate in the formulation of revolving loan funds and/or energy project loan guarantee models. These financial institutions can employ their financial expertise and capital to expand the programs that address unmet needs funded under the Action Plan. Besides regular banks, the Action Plan could engage banking cooperatives and Community Development Financial Institutions in Puerto Rico. By adopting an integrated approach with private financial institutions, federal funds may expand the benefits to reach more beneficiaries thus increasing the reach of the appropriation.

- **Green Energy Funds, Competitive Microgrid Auctions, Municipal/COOP Energy Efficiency lending** are part of Puerto Rico's institutional distributed energy resources programs. With federal agency and PREB coordination, these various more agile public-private sub-grantee channels of distribution can deliver more affordable solutions than typical FEMA or PRDOH procurement bureaucracy.

5. **Expertise & Staff for Effective Program Management:** Ensure that the PRDOH, the DDEC, and the PREB have well-coordinated SME consultants, trained staff, and other resources to execute the Action Plan and to administer program guidelines and grants with robust public participation and private sector investment.

Mitigating Risks with a Transformative Vision

The recommended adjustments to the Action Plan presented here are essential to mitigate the risk of overreliance on the central generation-transmission-distribution model of the fragile and costly PREPA/LUMA grid, whose improvement is a longer-term project. These recommendations seek to initiate the transformation of the electricity system based on immediately available and affordable distributed, endogenous, clean, renewable energy solutions that ensure lower electricity bills, grid-load, and greater equity as the foundations for grid reconstruction. To accomplish this, the Plan requires additional and ongoing public engagement to integrate energy efficiencies, self-generation, customer storage, demand response and a Mini/Micro Grids ecosystem. The Action Plan can optimally enable a paradigm shift, now occurring among the wealthier PREPA rate payers, opening the door to a society-wide interconnected consumer that produces and stores clean energy (called "prosumers"), to vastly increased resiliency, and to the creation of local wealth with broad-based electrical system co-ownership.

Conclusion

Finally, the Action Plan can be a call to robust citizens and private entities to seek short and long-term solutions for disaster risk mitigation – an example of best Environmental and Social Governance practices. A joining of forces to eradicate energy poverty across the islands, is the first step to rebuilding a sustainable livelihood. PREB public proceedings, in Spanish, with expert technical help that elicits citizen participation with accessible language, is the best locally available process to complete the approval of the Action Plan pursuant to Act 17.

The CDBG funding appropriation recognizes all of Puerto Rico was greatly impacted, and that federal agency coordination and assistance in transforming our energy future is very important. Prior White House and executive government studies and longstanding congressional inquiry and testimony attest to the importance of transforming Puerto Rico's monopolized centralized grid model to a distributed, efficient, green, competitive system, with affordable sustainable energy, in turn, supporting the fiscal rebuilding of Puerto Rico.

To make that possible the PRDOH must include the PREB as both the principal expert stakeholder in the Action Plan approval process, as well as the critical non-partisan authority in the development and implementation of guidelines to ensure its alignment with Act 17 and the 2020 IRP. The PREB public policy implementation leadership, and ongoing distributed energy program proceedings make it the best possible convener for public participation to ensure the Action Plan's implementation of Puerto Rico's energy transformation takes into account and protects the broad interests of all consumers and prosumers.

With these proposed PREB/Act 17 inputs, the PRDOH, the U.S. Department of Housing and Urban Development, and the government of Puerto Rico will assure the Action Plan includes optimal investment of private sector resources in alignment with the public interest.

"We cannot eradicate poverty in Puerto Rico without eradicating energy poverty injustice first"

The Energy Justice for Puerto Rico Board Members

December 23rd, 2021

Hon. William Rodríguez

Secretary
Department of Housing
Commonwealth of Puerto Rico

RE: SESA-PR COMMENTS TO CDBG-DR ELECTRICAL POWER RELIABILITY AND RESILIENCE PROGRAM (ER2) ACTION PLAN

To the Honorable Secretary:

Comes now, the Puerto Rico Solar Energy Industries Association Corp., d/b/a/ Solar and Energy Storage Association of Puerto Rico (hereinafter, "SESA") the non-for-profit association that represents Puerto Rico's solar and energy storage industries. SESA advocates for solar and storage technologies at all scales as a central and lifesaving solution to the energy needs of Puerto Rico, promotes public policy that benefits the growth of these industries, brings awareness and understanding of these technologies to both government policymakers and the public, and facilitates collectively beneficial collaboration within the industry. SESA, as expert in solar plus storage policy has been deeply involved in Puerto Rico's post Hurricane María path towards a more resilient, solar powered present and future based on 100% renewable energy. As such, we have proudly assisted in the local, bipartisan legislative process that produced the watershed Puerto Rico Energy Public Policy Act of 2019, Act 17 of 11 April 2019 (hereinafter, Act 17), which unequivocally focused Puerto Rico policy on jumpstarting and accelerating renewable energy provision from today's meager 3% to 100%. *Inter alia*, Act 17 increased Puerto Rico's renewable

portfolio standard (RPS) to a minimum of twenty percent (20%) by 2022, forty percent (40%) by 2025, sixty percent (60%) by 2040 and one hundred percent (100%) by 2050, and created an energy efficiency target of thirty percent (30%) by 2040. Act 17 clearly emphasizes the role of distributed generation ("DG", meaning rooftop and other solar systems located on or near homes and businesses), an enhanced role for "microgrids" at all scales, and facilitates interconnection for larger, industrial scale systems. SESA-PR was also a central stakeholder to ratify and cement these altruistic policies in the Puerto Rico Energy Bureau's *Integrated Resources Plan Final Resolution and Order* of August 24th, 2020.[1]

SESA presents herein its comments on the Puerto Rico Housing Department's (Vivienda) proposed Action Plan for the Electrical Power Reliability and Resilience Program (ER2) CDBG-DR Action Plan.

1. Introduction & General Comments

Puerto Rico's electricity system was badly hit by hurricanes Irma and Maria of 2017, particularly the vulnerable transmission and distribution lines that deliver power from distant centralized fossil-powered generators, resulting in the longest power blackout in US history. That experience demands a bottom-up, distributed energy focused paradigm as Puerto Rico rebuilds a truly resilient and modern energy system.

Science has established that an estimated 4,645 excess post-María deaths "is likely to be conservative", and that the increased use of "support that is dependent on electricity" was among the "primary cause[s] of sustained high mortality".[2] Also, renowned researchers & scholars from

[1] https://energia.pr.gov/wp-content/uploads/sites/7/2020/08/AP20180001-IRP-Final-Resolution-and-Order.pdf.

[2] Kishore N, Marqués D, Mahmud A, et al., 2018, *Mortality in Puerto Rico after Hurricane Maria*, N. England J Med., www.nejm.org/doi/full/10.1056/NEJMsa1803972. There is also "a strong positive association between […] the length

UPR-Mayagüez have established that this level of suffering and death need not occur ever again, as "[a]n investment of $3,500 million [in solar+storage] for the last 500,000 homes that were reconnected would have reduced the [post María] blackout size by two thirds and the length of the blackout by 78%."[3]

The economic impact of power blackouts, while secondary to loss of life, has also been overwhelming and ongoing. Economic forecasts estimated economic damage of up to $159 billion caused by Hurricanes Irma & Maria.[4] More recently, in just the first two weeks of September 2021, ongoing unpredictable blackouts cause over $1 million in economic damage to large commercial businesses in Puerto Rico alone. [5]

After Hurricane María, and as per HR 1892, the Bipartisan Budget Act of 2018 (hereinafter, BBA 2018), Sec. 21210,[6] the Governor of Puerto Rico submitted to Congress the report named "*Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico*" (hereinafter "*PR Disaster Recovery Plan*")[7] describing "the Commonwealth's 12 and 24-month economic and disaster recovery plan". The PR Disaster Recovery Plan, as per BBA Sec. 21210, defines:

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of time without electricity…on average, households went 84 days without electricity…83% of households were without electricity for this entire time period." Id.

[3] M. Castro-Sitiriche, J. Gómez, Y. Cintrón, *The Longest Power Outage, María and Energy Poverty, Proceedings of the 8th International Conference on Appropriate Technology*, Benin, 2018, http://www.appropriatetech.net/media/attachments/2019/06/20/8th-icat---policy-standards-ethics.pdf#page=36. *See also*, M. Castro-Sitiriche, *Household Emergency Preparedness, Decentralized Community Power for Puerto Rico, Call to Action, Puerto Rico Policy Brief*, INESI, COHEMIS (UPR), https://inesi.upr.edu/wp-content/uploads/2019/06/EnergyPolicyBriefHousehold2019mar.pdf.

[4] https://www.usatoday.com/story/news/2018/12/04/hurricane-maria-economic-impact-puerto-rico/2209231002/

[5] https://www.elforodepuertorico.com/perdidas-millonarias-en-el-comercio-tras-los-apagones/

[6] BBA 2018, www.congress.gov/115/plaws/publ123/PLAW-115publ123.htm.

[7] https://recovery.pr/documents/prtransformation-innovation-plan-congressional-submission-080818.pdf.

> "(1) […] the priorities, goals, and expected outcomes of the recovery effort for the Commonwealth [...] including […] (C) **Health**[…], (F) ***electric power*** systems and grid restoration; (G) **environmental** issues […] (H***) other infrastructure systems […] (2) […] consistent with […] (C) actions […] necessary to mitigate vulnerabilities to future extreme weather events and natural disasters and increase community resilience***[…]".[8] (Emphasis provided.)

As such, via BBA 2018, Congress appropriated 28 billion dollars for necessary expenses related to disaster relief, long-term recovery, restoration of infrastructure and housing, economic revitalization, and mitigation in the most impacted and distressed areas resulting from a major declared disaster that occurred in 2017, and of such amounts allocated to Puerto Rico grantees affected by Hurricane María close to $2,000,000,000 to provide enhanced or improved electrical power systems. Note that CDBG funds are specifically authorized by statute to finance certain rehabilitation activities, including: "the conservation of the Nation's scarce energy resources, improvement of energy efficiency, *and the provision of alternative and renewable energy sources of supply".*[9]

That everyone's number one priority must be saving lives should be an unquestioned truth. In terms of CDBG-DR, that would mean that saving lives should be the programmatic and budgetary priority, and more so in ER2, which is designed for energy resiliency. **All** these congressionally approved federal monies been must be deployed as intended, so that Puerto Rican *families and businesses are spared from having to relive, over and again, the nightmare that was Hurricane María.*

The 2022 hurricane season will be here in a blink of an eye, and congressionally appropriated monies for energy resiliency have not yet flowed in any significant way. There has also been firm projections that it will take many years for the power grid itself to be rebuilt, with

[8] *Supra*, note 3.
[9] 42 US Code §5301(c)(9), www.law.cornell.edu/uscode/text/42/5301.

another hurricane at least as devastating as Maria being more progressively more likely each year. In October of 2021, the CEO of the private grid operator, LUMA, assured the public that it will take “no less than a decade” for the power system to be rebuilt.[10]

This unprecedented situation merits that an unprecedented focus of these monies must be designed and deployed as soon as possible to focus first on facilitating solar & storage systems to provide power directly to homes, businesses and critical facilities during ongoing inevitable brownouts and blackouts, while also facilitating overcoming any roadblocks to large-scale energy storage and renewable energy coming online to help diminish Puerto Rico’s persistent brownouts and blackouts.

It is of utmost importance that the federal Department of Housing and Vivienda work hand-in-hand to finish the finalization of this Action Plan and move forward with all remaining steps so that this important support is deployed as soon as possible. In the name of saving our economy and our lives, thank you for taking into consideration our specific expert comments and guidance below.

[10] https://www.elnuevodia.com/noticias/locales/notas/el-principal-oficial-ejecutivo-de-luma-energy-asegura-que-la-restauracion-final-del-sistema-electrico-podra-tomar-una-decada/

II. Specific Comments: ***The best way forward***

a. The Puerto Rico Energy Bureau, the commonwealth's local energy regulator, has mandated that over 1,500MW of energy storage and more than 3,750MW of new renewable energy generation be deployed and online by 2025. This is in compliance with Puerto Rico's Act 17-2019, which requires rapid transition from 3% to 40% renewable energy by 2025, and is directly aligned with President Biden's Climate Goals.

b. The CDBG-DR allocations under comment today require grantees to address the provision of '*enhanced electrical power systems*'. This term must, in line with Puerto Rico's needs and reality, mean focused investment in radically increasing grid "hosting capacity" for renewable energy resources (the grid's ability to integrate the massive amount of renewables needed and required per Puerto Rico law). This must include replacement of and enhancements to all feeders, wires, poles, substations and other equipment at the distribution level of the electric grid's infrastructure, designed explicitly to facilitate the ability of all local homes, businesses and critical facilities to bring renewable solar and storage online. Enhanced electrical power systems must also include investments in electrical systems that ameliorate technology challenges which are currently prohibiting the deployment of large-scale renewables on the timeframe needed. This should include the addition of substantial energy storage, upgrades needed for existing generation to enhance their ability to respond to additions of large amounts of renewable energy to the grid, upgrades to towers and wires and other equipment needed to facilitate solar, wind, and other large-scale renewables coming on line, and any other technology enhancements needed to increase hosting capacity of renewables

up to the 3,750MW of renewables and 1,500MW of battery storage required by Puerto Rico law and IRP to be deployed by 2025.

c. $0 of the $1.9b allocated for enhanced electricals power systems should be used for matching funds. However, if any amount must unavoidably be used for matching funds, it should only be based on realistic projections of what FEMA funds would actually get deployed *over the next 6 years*, since this is the timeframe within which this tranche of funding must be fully spent. When estimating the amount of matching funded needed only over the next 6 years, we urge keeping in mind that the trend of the extremely slow pace of FEMA fund deployment over the last 4 years is likely to continue for the next few years as well. In short, $1 billion of these CDBG-DR funds would support $10 billion in FEMA funding, and it is impossible that $10 billion in FEMA funding would get deployed over the next 6 years, thus if it's not possible to avoid spending any of this tranche of funds on matching funds, we urge that much less than the $1 billion preliminarily budgeted of these $1.9b should be used for matching funds, as it's absolutely impossible that enough projects would occur over the following 6 years to merit a need for $1 billion in matching funds.

d. Deployment model for all programs should be flexible: *ie* the Action Plan should specifically state say that they are under either the Direct or Subrecipient models, so that some or all of the funding can be managed by the Green Energy Trust, the Department of Economic Development (DDEC), or other qualifying entities potentially capable of deploying funding quickly.

e. Funding amounts should be budgeted clearly. The draft Action Plan states that potentially around 80% of the non-matching portion of this should go to incentives for Microgrids. If that's the intention, then the amounts should be clearly budgeted.

f. Available funds should be focused on accelerating distributed solar + storage - meaning funding all or a portion of such projects directly, and/or funding infrastructure upgrades needed to accelerate distributed solar + storage integration, as mentioned in above section "b", and any other truly required grid upgrades to accelerate large scale renewables and storage.

III. Conclusion

It is SESA's sincere hope that Vivienda will jumpstart the efficient, well designed & administrated disbursement of all these critical energy-resiliency funds, including implementation of our expert advice. Thank you for the opportunity to submit these comments.

Sincerely,

[signed]

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PONTIFICIA
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PRESIDENCIA

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21 de diciembre de 2021

Hon. William Rodríguez Rodríguez
Secretario de la Vivienda
Apartado 363188
San Juan, PR 00936-3188

Estimado señor secretario Rodríguez Rodríguez:

La Pontificia Universidad Católica de Puerto Rico, institución creada en el 1948, con recintos en las ciudades de Ponce, Mayagüez y Arecibo, está comprometida por su misión institucional con la conservación de nuestros recursos esenciales y la protección de la casa común. Esto incluye la eficiencia en la producción y manejo de los servicios energéticos. Como señala el Papa Francisco en su carta encíclica *Laudato si*:

> "… se ha vuelto urgente e imperioso el desarrollo de políticas públicas para que en los próximos años la emisión de dióxido de carbono y de otros gases altamente contaminantes sea reducida drásticamente, por ejemplo, reemplazando la utilización de combustibles fósiles y desarrollando fuentes de energía renovable. En el mundo hay un nivel exiguo de acceso a energías limpias y renovables. Todavía es necesario desarrollar tecnologías adecuadas de acumulación. (…) También ha habido algunas inversiones en formas de producción y de transporte que consumen menos energía y requieren menos cantidad de materia prima, así como en formas de construcción o de saneamiento de edificios para mejorar su eficiencia energética." (Núm. 26)

Con estos principios como guía apoyamos que los fondos CBDG destinados a la recuperación de la resiliencia energética de Puerto Rico sean utilizados, mayoritariamente, para proyectos de energía distribuida, siguiendo los parámetros de política pública establecidos en la Ley 17 de 2019 y en el plan de recursos integrados (IRP, por sus siglas en inglés) propuestos por el Negociado de Energía. En general, estos mandatos Ley 17, regulados en procesos participativos en el Negociado, incluyen la necesidad que el mejor uso de recursos federales, estatales y privados logren un sistema eléctrico resiliente, confiable, a costos justos accesibles con energía y prosumidores interconectados en una red abierta y transparentemente regulada con imparcialidad, equidad y solidaridad.

Esto es cónsono, además, con las guías del gobierno federal para añadir resiliencia en el nivel más cercano a los consumidores para reducir los riesgos al sistema. Retomando los lineamientos del Papa Francisco sobre este tema es pertinente señalar su aval a este tipo de iniciativas:

> "En algunos lugares, se están desarrollando cooperativas para la explotación de energías renovables que permiten el autoabastecimiento local e incluso a la venta de excedentes. Este sencillo ejemplo indica que, mientras el orden mundial existente se muestre impotente para asumir responsabilidades, la instancia local puede hacer una diferencia. Pues allí se puede generar una mayor responsabilidad, un fuerte sentido comunitario, una especial capacidad de cuidado y una creatividad más generosa, un entrañable amor a la propia tierra, así como se piensa en lo que se deja a los hijos y a los nietos." (Núm. 179)

Según sabemos, el Departamento de la Vivienda y Desarrollo Urbano federal (HUD, por sus siglas en inglés) ha determinado que los fondos para las mejoras energéticas post-María constituyen un componente crítico de la recuperación y la resiliencia sistémica ante la probabilidad de eventos futuros. Esto incluye la posibilidad de programas que promuevan proyectos de alto interés público a través de todo el archipiélago, localizados en espacios públicos y privados, apalancando de manera óptima servicios y recursos privados. Igualmente, aquellos que reducen costos vía eficiencia energética y acercan la producción y el consumo a lugares, entidades y comunidades que generen menor dependencia de sistemas centralizados, de distribución a distancia y por cables expuestos a las inclemencias del clima, deben tener preferencia pues son, en efecto, más sostenibles y resilientes. Por ello, entendemos que entidades como la Universidad deben ser consideradas para este tipo de proyectos. La Universidad, en sí misma, es un ecosistema propio de convivencia educativa y social, incluso de vivienda, de provisión de servicios directos a la comunidad interna y externa y de apoyo, como entidad intermedia, a la gestión entre gobierno e individuos en distintos niveles. La recuperación tras los huracanes, los terremotos y la pandemia, ha demostrado lo esencial de estos ambientes, no solo por su valor en el proceso educativo, sino también como ente de servicios. Entendemos que ello es viable dentro de la definición amplia que HUD ha hecho de mejoras al sistema y que así debe entenderse en cuanto a nosotros y a otras entidades y comunidades con características similares.

Le exhortamos a tomar en consideración los elementos aquí planteados y que en la asignación de los fondos CBDG – DR se sigan los parámetros esbozados en la Ley 17 de 2019 y el plan de uso de recursos, en armonía con los principios de eficiencia energética y sostenibilidad que, como asunto de justicia social y ecología integral en el cuidado de unos y otros y de convivencia adecuada con la casa común que habitamos, ha propuesto el Papa Francisco.

Quedamos a sus órdenes y confiamos en su pronta acción sobre este particular.

Cordialmente,

Jorge Iván Vélez Arocho
Presidente

GOBIERNO DE PUERTO RICO
DEPARTAMENTO DE LA VIVIENDA

PUBLIC COMMENTS REPORT

Signatory Name	Entity Type	Entity Name	Source	Comment
Jasmin Rivera	Individual/ Individuo		Web Page	Orgullosa de mi Puerto Rico y de la rama pobre, es de suma necesidad e importancia la ayuda para nosotros los individuos, para el medio ambiente y aunque no se vea, hasta para el gobierno sería de gran alivio económico y de calidad ambiental.
julio nieves	Private Sector/ Sector Privado	tsunami restaurant y Monsoon restaurant	Web Page	fondos huracan maria
Ametza I Delgado	Private Sector/ Sector Privado	ENERGIARENOVABLE2050LLC	Web Page	Saludos. Favor de enviar documentación sobre DECRETO de ENERGIA VERDE ya aprobados. Gracias. A sus órdenes !!!
janelys rodriguez	Individual/ Individuo		Web Page	000
Mariangelly Jusino Rodriguez	Individual/ Individuo		Web Page	Me gustaría comprar mi primer hogar
Triana P. Vázquez	Individual/ Individuo		Web Page	Solicitud de ayuda para primera compra de casa.
Giankarlo Luna Padilla	Individual/ Individuo		Web Page	Solicitud para ayudas a primera compra de casa.
Sugerencia Agilizar Procesos	Private Sector/ Sector Privado	LISA SPICKERS - Perito Electricista Lic 12254	Web Page	Actualmente, el procedimiento para que los contratistas eléctricos (peritos electricistas y/ó ingenieros) podamos presentar CERTIFICACIONES ELÉCTRICAS ante el operador de la Red Eléctrica, AEE/LUMA ó cualquier otro que pueda surgir, es uno obsoleto y no es eficiente. Las Certificaciones Electricas realizadas por los contratistas eléctricos (Peritos Electricistas y/ó Ingenieros) están regidas por el Reglamento para las Certificaciones Electricas. Este documento oficial, es parte esencial para los procesos necesarios en la prestación de servicios a los clientes de la red eléctrica, mayormente por los servicios en los que concierne a la interacción con la red eléctrica. Desde hace muchos años, este proceso se ha vuelto uno complicado, tedioso y sobretodo lento, para atender los problemas que confrontan los clientes en su servicio eléctrico. Una herramienta muy útil es crear una aplicación móvil para agilizar la comunicación e interacción entre los contratistas eléctricos (peritos electricistas y/ó ingenieros) con el personal del operador de la red eléctrica. La aplicación móvil además de ser el enlace entre el contratista eléctrico y el operador de la red eléctrica, servirá como recolector de datos. Los datos recopilados en este proceso, nos ayudarán a tener métricas reales sobre la cantidad de Certificaciones Eléctricas, por región, por pueblo, e incluso hasta por alimentador.
Javier Rúa-Jovet	Non Government Org/ Organización No Gubernamental	Solar + Energy Storage Association of PR	Web Page	Question / Proposal: 1. How can you be budgeting $1 billion in matching funds of this budget (which says it has to be spent within 6 years), for FEMA projects that will take drastically longer than 6 years? 2. SESA requests that 100% of these funds go to their intended purpose, and none of them to matching funds. 3. In the alternative, if some of these funds must go to matching funds, then SESA requests that $0 be budgeted for matching funds for projects that would be outside the 6-year timeframe of this budget. Javier Rúa-Jovet Chief Policy Officer

Sheila Algarín Algarín	Individual/ Individuo		Web Page	Hola: Mis preguntas y comentarios son: 1) AEE y LUMA han sido muy ineficientes en manejar las querellas sobre postes eléctricos significativamente inclinados como consecuencia de los Huracanes Irma o María después de cuatro años. ¿Tienen un plan o planifican crear e implementar una estrategia para enderezar o reemplazar los postes eléctricos significativamente inclinados o a punto de caerse en áreas residenciales urbanas en el Plan de Acción sobre la Optimización de la Red Eléctrica de Puerto Rico ? 2) El gobierno no ha dicho al público si LUMA va a ser o no responsable legalmente sobre daños a residencias o residentes causados por caídas de postes eléctricos significativamente inclinados que pueden caerse bajo un efecto sísmico o por otro motivo. ¿Discutirán eso en el Plan de Acción sobre la Optimización de la Red Eléctrica de Puerto Rico? Atentamente, Sheila Algarin Algarin Residente de San Juan
Nicolas Billeaud	Private Sector/ Sector Privado	DexGrid	Web Page	With the technology available today and the proper setup, microgrids for the communities have become a real option. CDBG must be engaged with these communities, from the bottom-up, and through a transparent, coordinated model. It starts with centralizing the development of the infrastructure and the deployment of generation and storage assets at the local level, through businesses, manufacturers, associations and municipalities. It happens with a software based application that models the microgrid development, coordinating all participants through the same interface. Onboarding users and ensuring electricity operations is made possible also at the software level for flexibility, security and accessibility of all services and opportunities. DexGrid is a local company that enables and coordinates this bottom up approach. Both the private and public sectors have an important role to play in providing reliable and accessible electricity to the communities. https://dexgrid.io/en/index.html
Jessenia Rivera Vázquez	Individual/ Individuo		Web Page	SOLICITAR PARA LA COMPRA DE MI PRIMER VIVIENDA.
Yvette Mercado Zambrana	Individual/ Individuo		Web Page	Necesito ayuda urgente
Juan Carlos Martinez	Government Entity/ Entidad Gubernamental	CDBG	Web Page	Saludos. Nesecitamos que los fondos para energía renovable sean para los que también trabajamos, no solo para población vulnerable, todos queremos alguna igualdad relativa, aunque no sea de igual proporción. Yo también quisiera un sistema de energía renovable.
Luis a Muriel Castro	Individual/ Individuo		Web Page	Creo que el plan que ustedes están presentando es la ruta correcta para el futuro energético de la isla ofreciendo a las comunidades vulnerables el sistema y / o aportando aquellos que puedan pagar algo un 70 /80 % del costo según las necesidades claro esta que el dinero destinado por el gobierno Federal y el estudio realizado por ustedes da para la instalación en todos los hogares en Puerto Rico PR Gracias por su gestión a favor del pueblo
Mariana	Individual/ Individuo		Web Page	Desconozco el plan a detalle. Pero deberían comenzar a utilizar y promover la energía renovable tanto a empresas como a individuos. Deberían optimizar el sistema para evitar daños al recibir sobrantes de energía renovable. Además debe utilizar energía de gas natural, entre otros. Evitar la dependencia del petróleo.
Cindy Ivelisse Montes Rivera	Individual/ Individuo		Web Page	A ver si sige la ayuda de la luz y del agua
Kelly Perez Martínez	Individual/ Individuo		Web Page	Bn tardes aun no se a cuanto yo tengo derecho de los fondos por vivienda y ahora yo vi que le hiban a dar una ayuda de 60,000 mas de lo quedaban anteriormente mi numero de celular 7872130509 para que se comuniquen conmigo y me puedan brindar mas informaciin de la misma gracias anticipadas
Mariano	Government Entity/ Entidad Gubernamental	CDBG	Web Page	Gracias por su ayuda
Ernesto Torres	Individual/ Individuo		Web Page	Pues en el barrio el tuque hay muchos postes que enderezar creo que el plan de mejoras está muy bien

Dario Rolando Martin	Private Sector/ Sector Privado	PIRAMID-ALL	Web Page	Estimados ofrezco mi proyecto de Casa PIRAMID-ALL Básicamente es una casa piramidal, de gran resistencia al sismo y huracanes , eficiente, inteligente (domotica) y auto abastecida con energía renovable (Solar + Eólica + Termo solar).- También tiene cargador de energía para vehículos eléctricos, próximos a llegar al mercado. Esta casa es ideal para: desarrollos urbanos residenciales auto sustentables , Vivienda Social, Eco Aldeas, zona aisladas o conectada a la red eléctrica, zona cordillerana , rural , semi urbana, islas , cabañas, hotel rural y otros.- Es muy útil para la Generación Distribuida y a los nuevos Prosumidores.- Puede producir energia y estar ON/OFF GRID , de cualquiera de las dos forma, va a estar colaborando con la Optimización de la Red Electrica de Puerto Rico ya que puede aportar energia a la red ON GRID o descongestionarla OFF GRID Este proyecto lo tengo patentado y aprobado en USA y en otros paises. Si es de su interes , no duden en comentarme. Me gustaria mucho colaborar con Puerto Rico Saludos PIRAMID-ALL Ing. Dario R. Martin La Pampa - Argentina +5492996330083 https://www.piramidall.com dariormartin@gmail.com
luis aviles valentin	Individual/ Individuo		Web Page	AHORRANDO, hay varias formas de ahorrar y que nos sobren chavos.1- tenemos cientos de cuentas por cobrar. 2- se pierde mucha energia en focos prendidos diariamente ,en edificios carreteras, . 3- no a los subsidios. que todo el mundo pague como buen hijo de vecino.4- y por ultimo el robo de luz como atajarlos, que vamos a esperar a esa gente que se roba la luz dia a dia y no se hace nada.vamos a trabajar, ponga el gobierno a poner de su parte.5- vamos hacer una red de internet atravez de energia electrica y vendamosla a un precio mas comodo que la competencia. y por ultimo qu el gob. le ponga un arbitrio por llamadas a los telefonos que tanto se usan. y resolvemos dos problemas en uno.
RICARDO TIRADO MAYSONET	Government Entity/ Entidad Gubernamental	DEPT.DE LA FAMILIA	Web Page	MEJORAR LAS RED O EL SISTEMA ELÉCTRICO P.R.
Antonio L Ramirez	Government Entity/ Entidad Gubernamental	mil novecientos ochenta y dos	Web Page	Lo mejor es buscar la forma de darle energía solar , por lo menos un sistema básico , para cuando se bella la luz tener por lo menos un sistema que respalde, a lo que luna arregla y restablece la energía, pero no todos podrán obtener energía renovable.
Jasmin L Rivera	Individual/ Individuo		Web Page	Es de importancia la inversión, más es de gran utilidad para cada hogar que pueda obtener el plan de acción. Yo incapacitada, con varias condiciones de salud y equipos médicos seria afortunada de hacer un sueño realidad. Éxito y que sean de gran ayuda y viabilidad en este proyecto.
Adalberto Veraes Hernandez	Individual/ Individuo		Web Page	Que se mejore cada día en servicio más efectivo e rápidos
Jacqueline Rivera Morales	Individual/ Individuo		Web Page	Deben de ofrecer ayudas para adquirir una vivienda o terreno para las personas de escasos recursos y mayores como yo
Dolly Rios Ortiz	Individual/ Individuo		Web Page	Buscar inisiativas que puedan ayudar al pais a mejorar la Res Electrica de PR
Maritza107133	Government Entity/ Entidad Gubernamental	Maritza Mercado	Web Page	Solicitud documentos adjuntos
Mary Ann Rios Huertas	Individual/ Individuo		Web Page	Deben de darle mas mantenimiento a las a sistema de luz
Allan Cintr'on Salichs	Private Sector/ Sector Privado	Med Centro, Inc.	Web Page	Not for profit healthcare organizations that are part of the emergency response system of Puerto Rico should be accounted for and prioritized in the plan.
Noel Pagan Vega	Private Sector/ Sector Privado	Pagan Construction Corp	Web Page	Necesitamos un robusto sistema eléctrico y placas eléctricas para nuestro negocio
Noel Pagan Vega	Private Sector/ Sector Privado	Pagan Construction Corp	Web Page	Placas solares
Wanda Morales	Non Government Org/ Organización No Gubernamental	Taller Industrial para Personas con Impedimentos de Coamo, Inc.	Web Page	Entiendo que ya es necesario que se reevalue la red electrica de nuestro pais. Pero no solo pensando en los que viven en la zona urbana sino los de la zona rural, que enocasiiones viven en lugares donde solo en ocasiones de desastres pensamos como reparar o mejorar. Si mejorar la realidad para la zona rural su plan de red electrica podria funcionar.

Carlos Gonzalez Hernandez	Non Government Org/ Organización No Gubernamental	Productora Angeles-del-fin, Inc. (PADF)	Web Page	La optimización de la red eléctrica de Puerto Rico es una prioridad de suma urgencia por las dificultades extremas que enfrentamos con el paso de los huracanes, los altos costos del servicio y las constantes interrupciones y vulnerabilidad del sistema. Estas situaciones, provocaron a su vez, otras circunstancias muy difíciles que han podido culminar en tragedias, perdidas de vida y estancamiento socio-económico. Creemos firmemente que las organizaciones sin fines de lucro de base comunitaria, están capacitadas para administrar, supervisar y velar por el mantenimiento y continuidad de este beneficio para toda la ciudadania. Claro esta, con la ayuda de las entidades gubernamentales y el apoyo de la empresa privada. Somos PADF, como entidad sin fines de lucro, necesitamos ayuda para la rehabilitación y reestructuración del Centro Resiliente Croma Creativo Comunitario en San Lorenzo (escuela en desuso por concepto de alquiler). Somos PADF (industria creativa de base comunitaria 501c3 con proyectos de prevención, educación, capacitación, rehabilitación y empoderamiento, con artes teatrales, audiovisuales, música, folklore y talleres interactivos como modalidades de impacto). Esta optimización tendrá un efecto multiplicador en las comunidades vulnerables. Se pueden establecer proyectos de justicia social, telecomunicaciones, tecnología, albergue, distribución de alimentos, gestiones para resolver asuntos de primera necesidad, capacitación vocacional y laboral, servicios académicos, salubristas, nutricionales y creativos, así como autogestión para el emprendimiento y empoderamiento colectivo. El espacio que presentamos, puede ser la base para funcionar como eje de micro redes en la region. En términos de movilización, también es necesario el contar con vehículos eléctricos y todas las alternativas posibles para minimizar el impacto de contaminación y aumentar las posibilidades de recuperación individual y colectiva. Muchas bendiciones para todo el equipo de trabajo. Por Puerto Rico y por nuestra gente.
Francisco Rivera	Individual/ Individuo		Web Page	Que SE ultilise El dinero en placas solares en ves de arreglar lo que ya no sirve. Aparte de que ASE daño Al Medio ambiente
Nelson Agosto	Individual/ Individuo		Web Page	Saludos No se si se trata de la red eléctrica pero mi comentario es acerca de la producción de energía. Entiendo que gobierno debe suplir las placas a los hogares y vendernos la energía a un precio accesible para la población. El problema es que dejan que los grandes intereses dejen al pueblo al acceso de energía limpia y costo efecto. Según vendian la energía de la quema de combustible atraves de la AAE, lo debe hacer atraves de placas solares. Montar fincas de placas para reforzar el servicio. Además en los baños de Coamo se puede estudiar de que forma existe la posibilidad de convertir esa energía termal en energía eléctrica como lo hace Suiza ᴄʜᴏ Suecia sᴇ Gracias, Nelson Agosto
Jacqueline Rivera	Individual/ Individuo		Web Page	Comentarios sobre el plan de acción para los fondos CDBG Necesito que ofrezcan ayudas para las personas mayores como yo y que no tienen ningún tipo de ingresos.
Sherley E. Figueroa	Individual/ Individuo		Web Page	Hola creo que la optimacion de red electrica se debe empezar con las comunidades de personas mayores de 60 años entre calles y viviendas yo por ejemplo donde vivo se va la luz por demasiadas horas. Me encantaria tomaran mi comentario en consideracion Att Sherley E Figueroa
Zulaika	Individual/ Individuo		Web Page	Excelente Trabajo Y Están Ayudando Como Es Necesario A Cada Miembro De P.R. Así Mismo Deberían Hacer Con Las Placas Solares Para Los De Bajos Recursos..Muchas Gracias..Dios Les Bendiga Mucho..
Berky Rodríguez	Government Entity/ Entidad Gubernamental	Duenos de hogares/ clase media baja	Web Page	Los Duenos de hogar de clase media trabajadora. Necesitamos ayuda y orientaciones para pagar hipotecas. Los servicios de luz y agua siguen en aumento. Es dinero que es cada día más imposible pagar Necesitamos la oportunidad de préstamos al 0% Para finalmente saldar hipotecas. Gracias.
Iván A Gómez-Blassino	Individual/ Individuo		Web Page	Quisiera subsidio para la compra de sistema de paneles solares. Gracias.
Haydee	Individual/ Individuo		Web Page	Yo, espero que este proyecto sea variable al cosumidor y se pueda lograr el objectivo d reducir pérdidas a hogares con el problema d voltaje en las casas d nuestra comunidades.
Suheily Gonzalez	Government Entity/ Entidad Gubernamental	Municipality of Ciales	Web Page	The Initiative consists of creating a renewable energy based microgrid where (1) all the critical facilities, businesses and NGOs located in the downtown area of Ciales can be connected to an efficient system through (by) underground electric power lines, and (2) creating community-based renewable energy microgrids in all wards to cover all household units in Ciales. This Project has been included in the approved 2021 Mitigation Plan for the Municipality of Ciales.
Edwin Pabón	Private Sector/ Sector Privado	Joe's Home Center Inc	Web Page	Ya es hora de que el Gobierno de Puerto Rico empieze a implementar un sistema eléctrico basado en placas solares u otros que sean de beneficio para la isla.

Suheily González Lozada	Government Entity/ Entidad Gubernamental	Municipio de Ciales	Web Page	Saludos: Adjunto propuesta para Micro Red eléctrica para desarrollar el futuro del Municipio de Ciales como pueblo resiliente del siglo 21. Espero que sea considerado para dichos fondos. Feliz Navidad a todos y próspero año nuevo. Respetuosamente; -- Suheily Gonzalez Lozada Directora Programas Federales Municipio de Ciales Tel. 787-871-2288 suheily.gonzalez@ciales.pr.gov
Maribel Hernandez	Non Government Org/ Organización No Gubernamental	Cooperativa Hidroeléctrica de la Montaña	Web Page	Los aspectos técnicos más críticos para mejorar es el estado pésimo de las plantas de generación de electricidad y el uso de combustible fósil para generar la mayoría de la electricidad en Puerto Rico. El mal estado de las líneas de distribución y sus subestaciones hacen el servicio de energía aún más frágil. Es vital aumentar servicio provisto por generación distribuidas utilizando fuentes renovables. Urge la descentralización de la red eléctrica para mejorar el servicio de electricidad. Puerto Rico requiere un sistema de distribución capaz de aceptar más generación distribuida de fuentes renovables, incluso factores como control de frecuencia y voltaje usando baterías y bancos de capacitadores. Además, la red en Puerto Rico debe tener la habilidad de seccionarse en regiones. Es decir, el sistema y el esquema regulatorio debe estar organizado para agilizar la creación e incorporación de proyectos de energía renovable mientras la red de distribución es capaz de mantener control de frecuencia y flexibilidad de crear microrredes cuando sea necesario. En vez de enfocar exclusivamente en los elementos técnicos, es importante resaltar los aspectos gubernamentales que son impedimentos para mejorar la resiliencia de Puerto Rico. Puerto Rico merece una Autoridad de Energía Eléctrica que es más responsivo, incluso la permisología para interconexión y medición neta, y no un impedimento al progreso. La Cooperativa Hidroeléctrica de la Montaña está impulsando sus proyectos para la Cordillera Central. Estos proyectos son los siguientes: 1. Hidroenergía Renace: Proyecto que consiste en la adquisición, renovación y reactivación de las tres plantas hidroeléctricas construidas en la década de 1940 ubicadas cerca de los embalses Caonillas y Dos Bocas. El proyecto prevé la renovación de estas unidades con la última tecnología del siglo XXI para generar una capacidad máxima de electricidad estimada de 50 megavatios por hora una vez en funcionamiento en vez de los 6 megavatios por hora que ocasionalmente genera. 2. Resiliencia Energética Fotovoltaica Comunitaria (ReEnFoCo): Proyecto que consiste en la instalación de 20 megavatios de sistemas fotovoltaicos de techo con almacenamiento ubicadas en intersecciones estratégicas en la región enfocado en suplir las necesidades de pequeños negocios, centros de comunidad (incluyendo iglesias) y algunos bolsillos de residencias remotas. En su primera fase del proyecto "ReEnFoCo" tiene como objetivo mejorar la vida de los residentes en la región mediante la instalación de 5 megavatios de sistemas fotovoltaicos de techo. 3. Microrred de la Montaña: Proyecto que culmina en la creación de la primera microrred intermunicipal en Puerto Rico que combina generación de plantas hidroeléctricas y sistemas fotovoltaicas para alimentar nuevas líneas de 38 kilovoltios y baterías ubicados cerca de subestaciones. Estos proyectos fortalecerán la generación, transmisión y distribución de la red en los pueblos de Adjuntas, Jayuya, Lares y Utuado y los ciudadanos podrán acceder a energía resiliente en caso de un desastre. Parte de los requerimientos para acceder a los fondos de CDBG-DR es haber tenido la experiencia manejando fondos federales durante 5 años previos. Este requisito limita a organizaciones que surgieron tras el paso del Huracán María. En caso de los fondos CDBG-DR para la optimización de la red eléctrica de Puerto Rico, sugerimos que este requisito se atempere certificando el haber planificado y ejecutado proyectos comunitarios de energía. Sugerimos además documentación de que están certificados como compañía de servicio eléctrico por el Negociado de Energía de Puerto Rico.