

Boricua Energy Justice: The Problem with Gridy Solutions

Infrastructure as Destiny: Resilience, Innovation and Equity,
AEG Thought Summit 2022, 23 de febrero de 2022

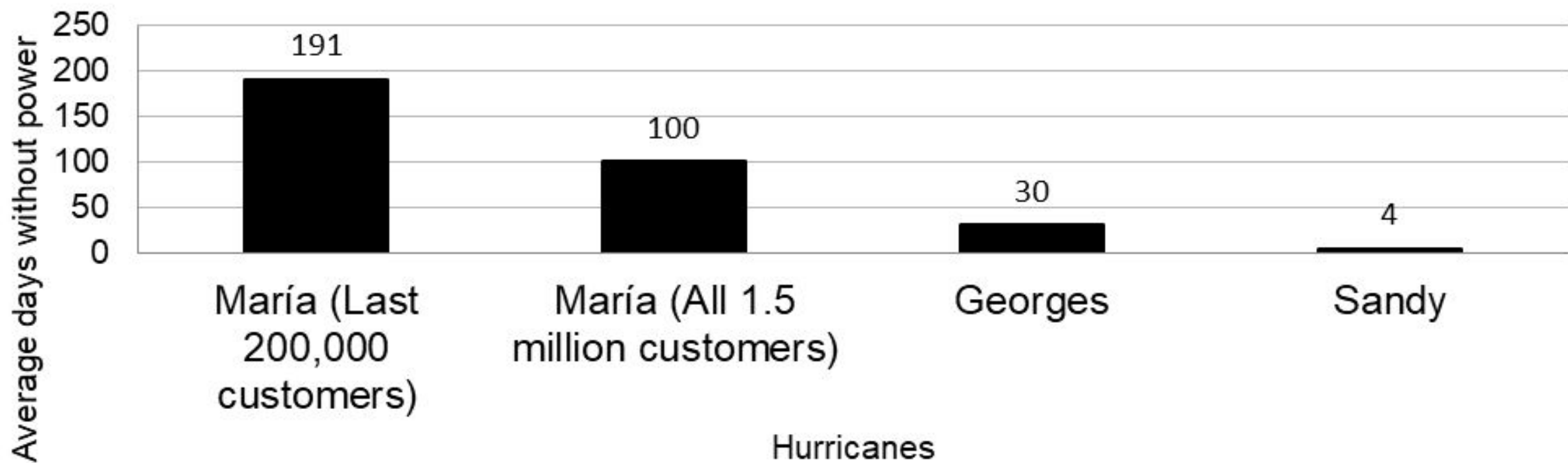
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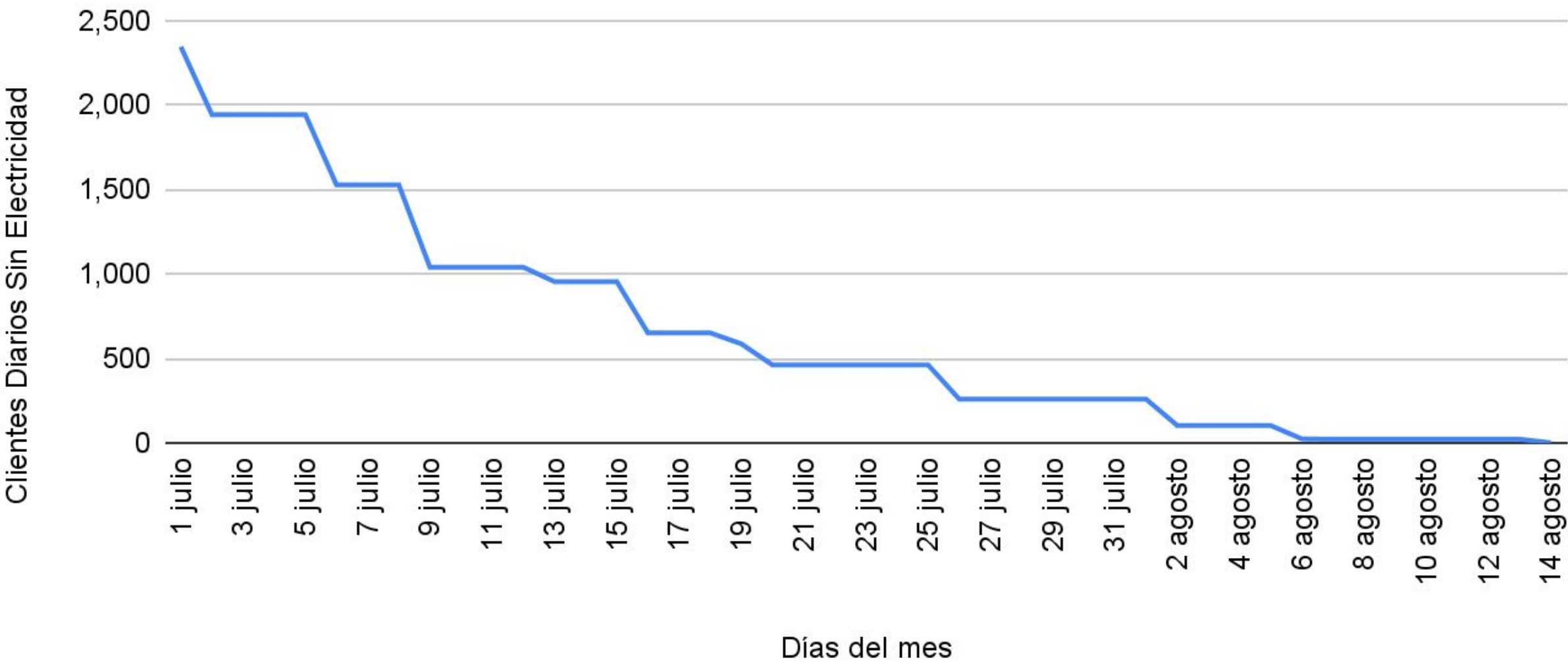
Photo Credit: Thermal image captured by the MODIS on NASA's Terra satellite

https://eoimages.gsfc.nasa.gov/images/imagerecords/91000/91004/maria_tmo_2017263_lrg.png

Average Days Without Power after Hurricanes

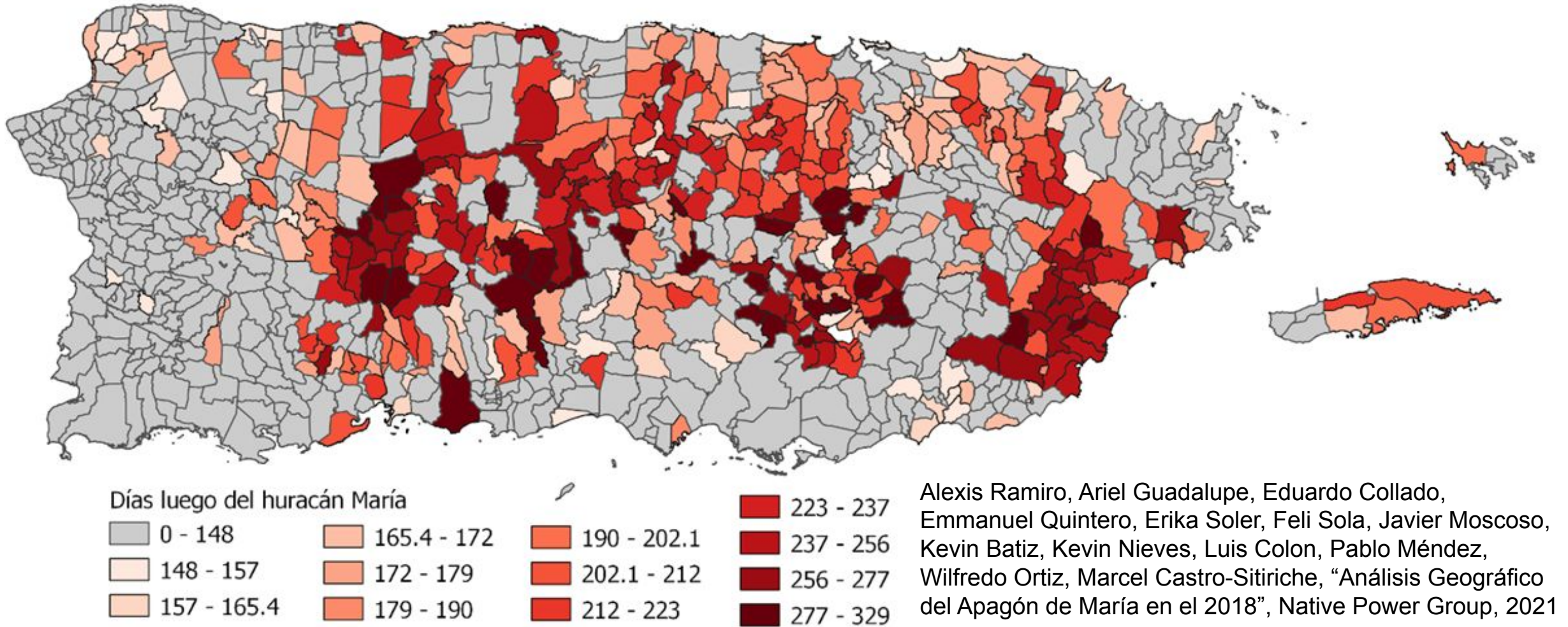


Cientes Diarios Sin Electricidad: julio y agosto 2018

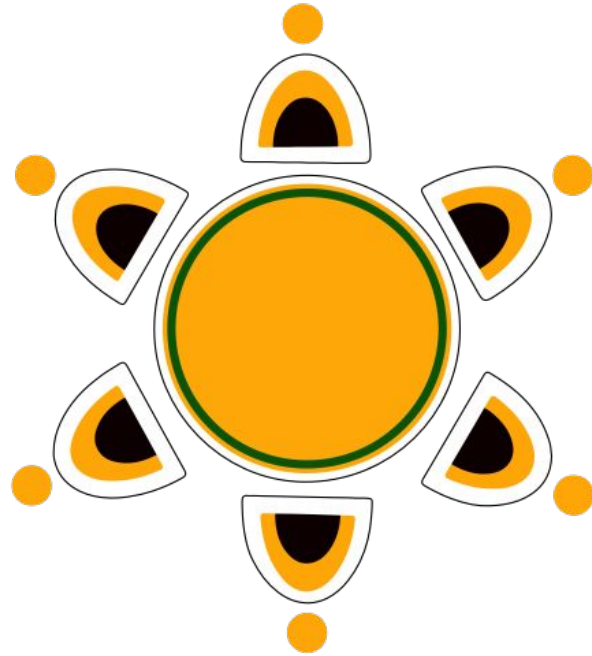


M. Castro-Sitiriche, "Boricua Energy Justice", **Infrastructure as Destiny: Resilience, Innovation and Equity**, AEG Thought Summit 2022, February 23, 2022. Source: <https://www.energy.gov/ceser/downloads/hurricanes-nate-maria-irma-and-harvey-situation-reports>

Comunidades con hogares que se reconectaron a la AEE desde febrero hasta agosto 2018



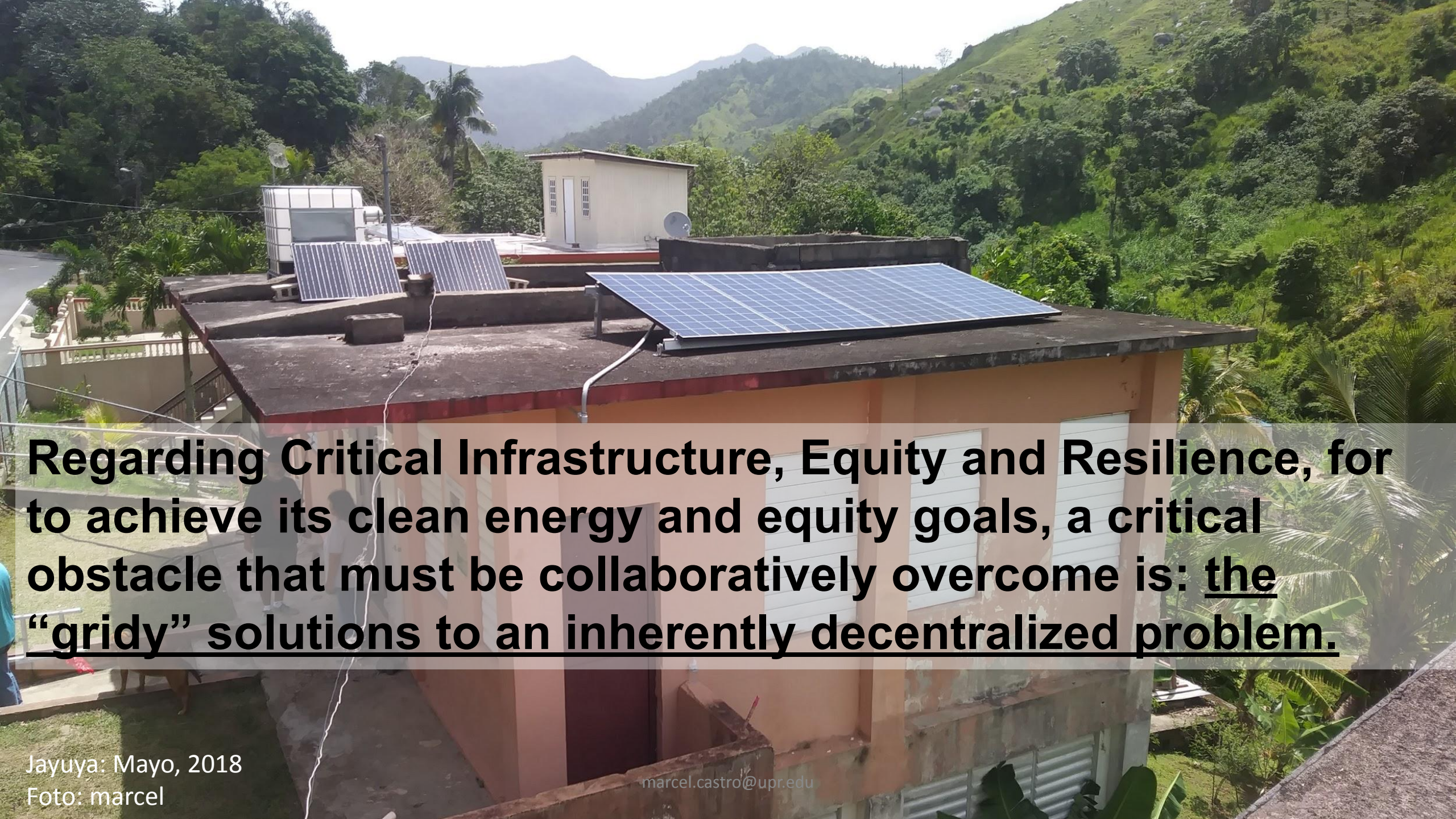
Barrio Eléctrico



Oasis de Luz



Fotos de: <https://www.barrioelectrico.com/>
Jayuya: Mayo, 2018. Foto: marcel



Regarding Critical Infrastructure, Equity and Resilience, for to achieve its clean energy and equity goals, a critical obstacle that must be collaboratively overcome is: the “gridy” solutions to an inherently decentralized problem.

CAN DISTRIBUTED SOLAR ADVANCE A JUST AND SUSTAINABLE ENERGY TRANSITION FOR COMMUNITIES IN PUERTO RICO?

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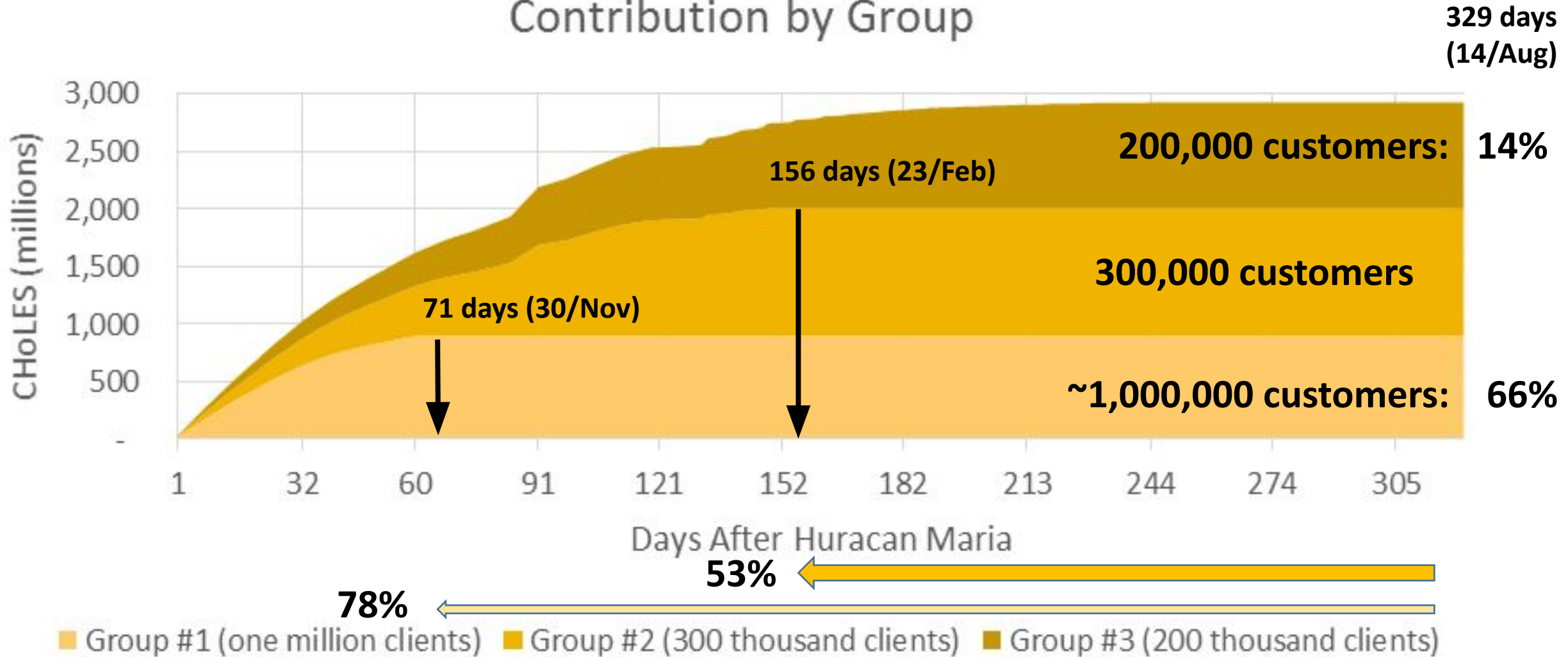
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<http://cohemis.uprm.edu/solar2020/>

Additional Slides for Q&A

Customer Hours of Lost Electric Service (CHoLES) Contribution by Group



Fincas Solares y los Techos

Puerto Rico Decentralizado

Small Solar Rooftop: 200,000 houses (by 2020)

- Cost per household: \$7,000: (Solar PV: 2 kWp, Battery: 10 kWh)
- 200,000 residential clients with houses (20%)
 - Capital Investment Need: \$1,400 million
 - Solar PV Capacity: 400 MW
 - Energy Storage Capacity: 2 GWh
 - Annual Energy Production (4 SPH): 584 million of kWh
 - 9% of residential energy consumption (Sept. 2016 – Aug. 2017)
 - 3% of total energy consumption (Sept. 2016 – Aug. 2017)

Source: M. Castro-Sitiriche, J. Gomez, Y. Cintron, “The Longest Power Outage, María and Energy Poverty”, International Conference on Appropriate Technology, November, 2018.

500,000 houses by 2025

- Cost per household: \$7,000: (Solar PV: 2 kWp, Battery : 10 kWh)
- 500,000 residential clients with houses (50%)
 - Capital Investment Need: \$3,500 million
 - Solar PV Capacity: 1 GW
 - Energy Storage Capacity: 5 GWh
 - Annual Energy Production (4 SPH): 1,460 million of kWh
 - 22% of residential energy consumption (Sept. 2016 – Aug. 2017)
 - 8% of total energy consumption (Sept. 2016 – Aug. 2017)

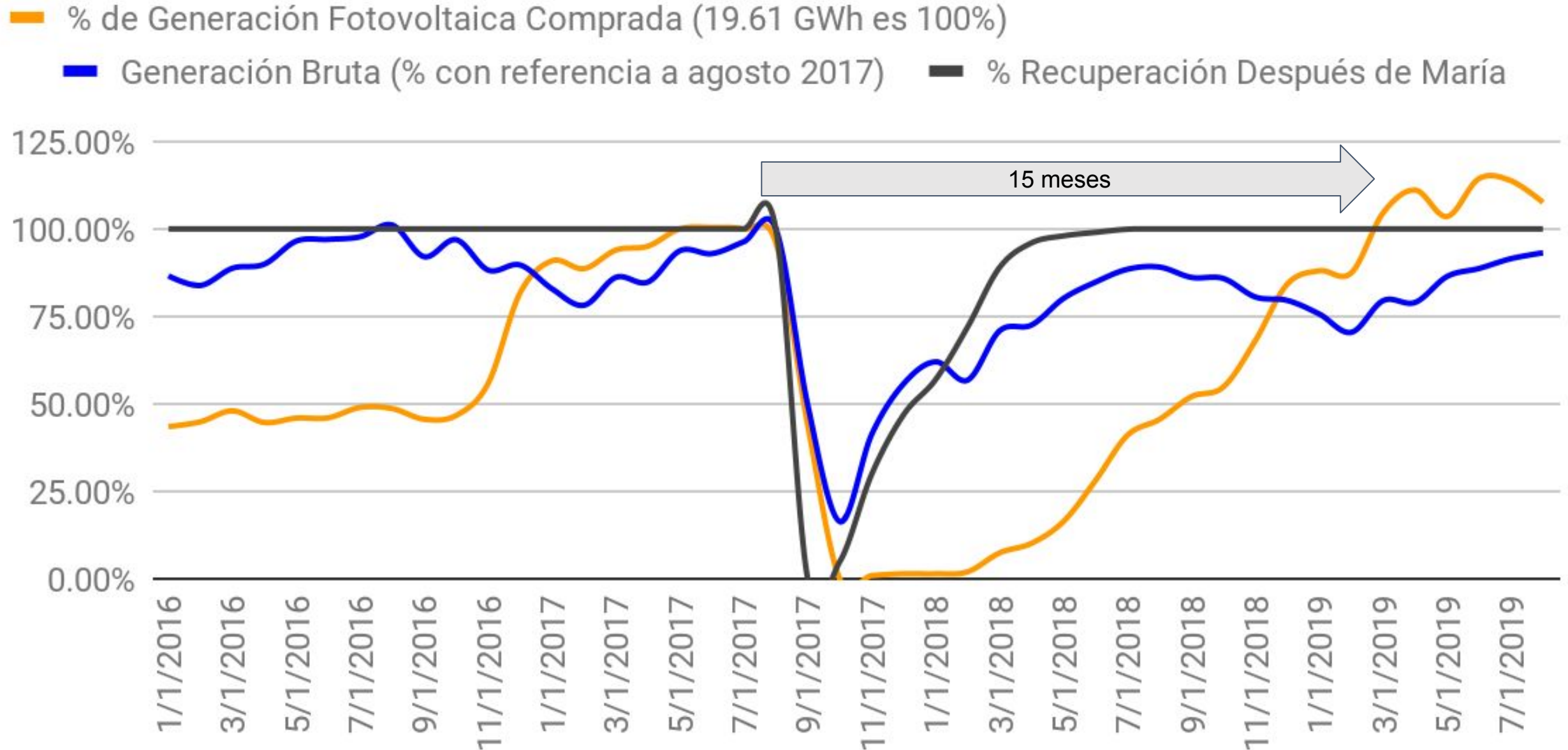
Source: M. Castro-Sitiriche, J. Gomez, Y. Cintron, “The Longest Power Outage, María and Energy Poverty”, International Conference on Appropriate Technology, November, 2018.

1,000,000 houses by 2035

- Cost per household: \$7,000: (Solar PV: 2 kWp, Battery : 10 kWh)
- 1,000,000 residential clients with houses (100%)
 - Capital Investment Need: \$7,000 million
 - Solar PV Capacity: 2 GW
 - Energy Storage Capacity: 10 GWh
 - Annual Energy Production (4 SPH): 2,920 million of kWh
 - 45% of residential energy consumption (Sept. 2016 – Aug. 2017)
 - 17% of total energy consumption (Sept. 2016 – Aug. 2017)
 - **One third contribution for the 50% target for 2035**

Source: M. Castro-Sitiriche, J. Gomez, Y. Cintron, “The Longest Power Outage, María and Energy Poverty”, International Conference on Appropriate Technology, November, 2018.

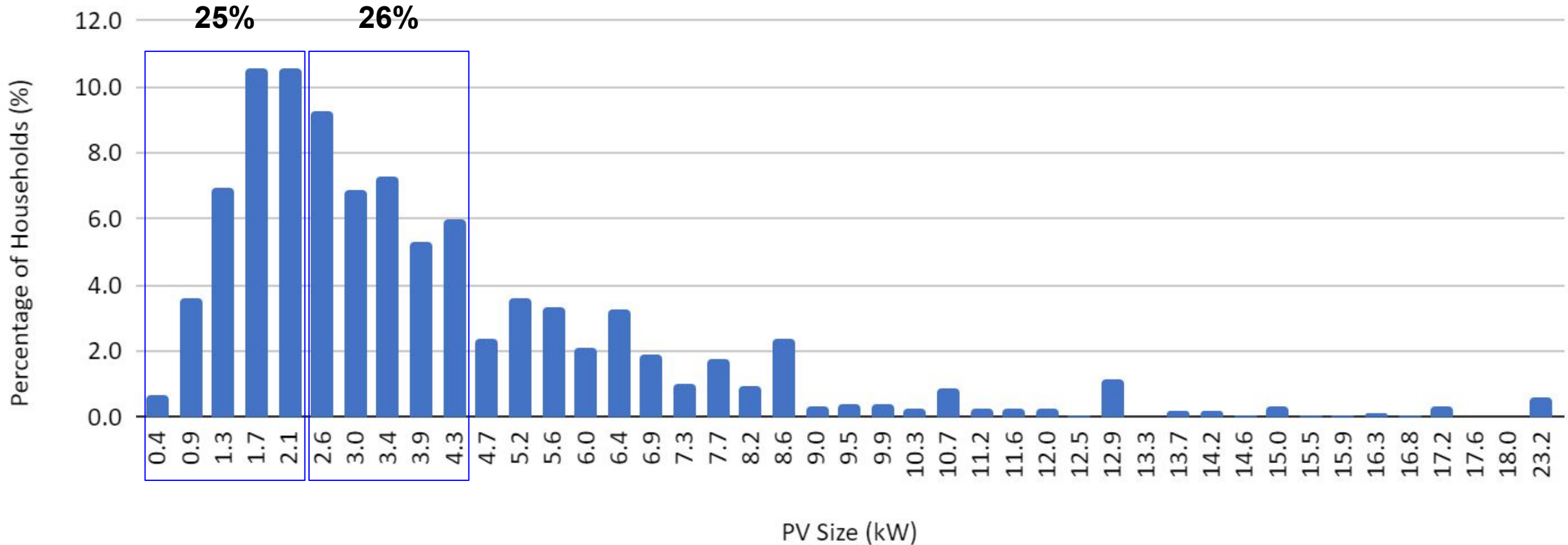
Recuperación después del Huracán María



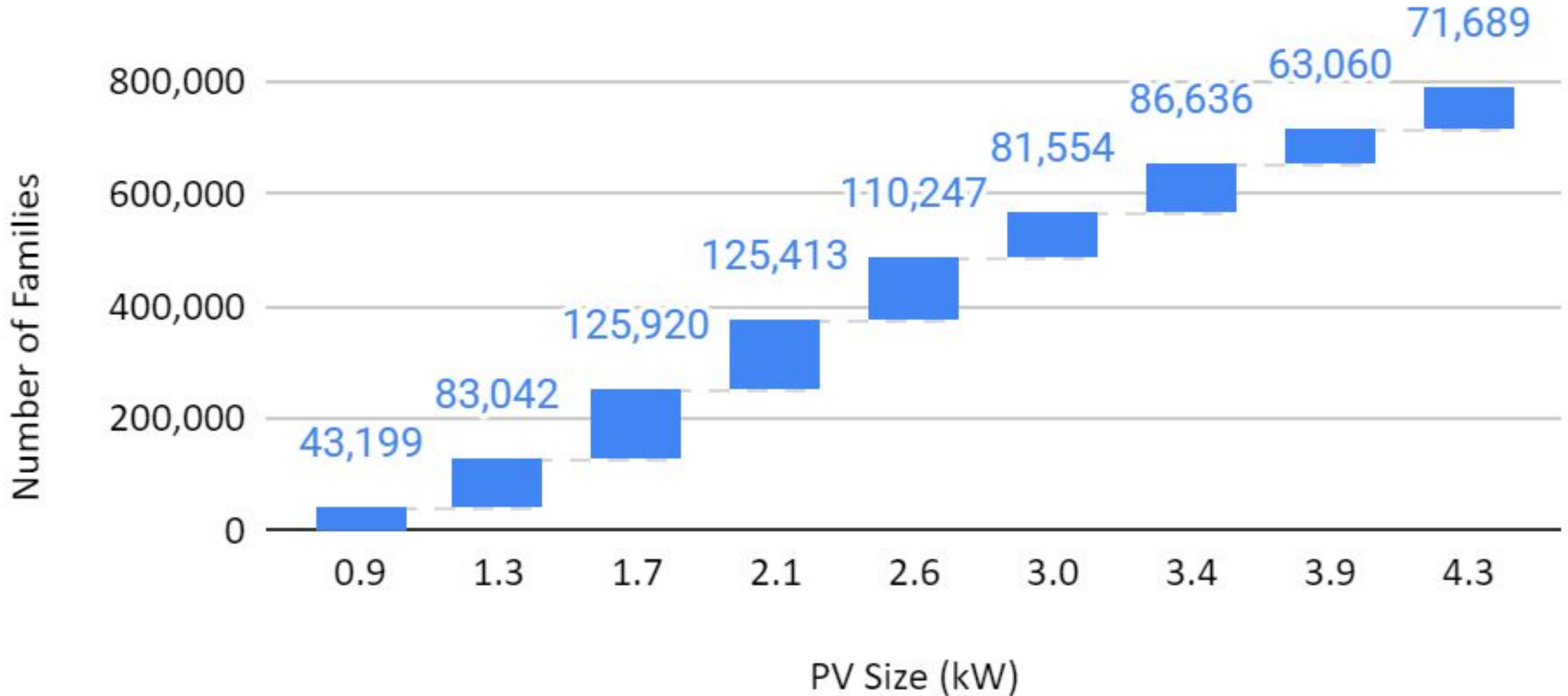
Punto Importante:

- **Fincas solares grandes no contribuyen luego de un huracán como solar PV en techos.**

Percentage of Households With Specific PV System Size Needs



Number of Families with PV Size Needs



M. Castro-Sitiriche, "Clean Energy Boricua", Webinar: Can solar rooftop help the transition to clean energy in Puerto Rico? December 17, 2020.

Acknowledgement: Census ACS data management was done by Hector Cordero from CUNY Baruch-MSPIA.

Puntos Importantes:

- **25% de hogares necesitan un sistema PV de 2 kW o menos.**
- **Potencial (ingreso < 30%) es $\frac{3}{4}$ del consumo residencial.**

385,000 hogares necesitan 2 kW de PV o menos

Hogares con ingresos por debajo del 30% AMI tienen un potencial de generación solar en techos (4.8 TWh anual) que es más del 75% de la demanda residencial anual en el 2019 (6.1 TWh)