

# 2030 vision for electric infrastructure

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## A more distributed power system in island, coastal, and remote communities

- Widespread use of onsite renewable energy to yield LOCAL economic, social and environmental benefits
- Solar communities and community microgrids
- A new role for conventional power system components
- Distributed energy for local resiliency
- Electric vehicles
- A trained workforce and informed citizenry

E. O'Neill, A. Irizarry, UPRM

U.S. Department of Energy

ESGC South/Southwest Regional Workshop

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# Boundary conditions in the Caribbean

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**After a disaster you rely on your community**

- Hurricanes & earthquakes
- Humid, hot, corrosive, drought conditions (in some areas), strong/extreme winds (storms)
- Dated, conventional, low-inertia power systems
- Resilience is not valued properly
- Context and solutions are different from continental locations
  - Market pushes unsuitable “solutions”, causing implementation problems, maintenance issues and confusion
  - “Poison the well” effect for other sustainable solutions



Oases of Light deployed after hurricane María  
<https://epics.ieee.org/solar-power-aid-puerto-rico/>

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# Vision for energy storage role

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- Storage for control in microgrids and other distributed applications
- Excess storage could provide frequency control and perhaps some ramp control services
  - Welcomed in a grid with less rotating inertia
- Essential to increase resilience in the Caribbean
  - Community microgrids
  - Emergency energy hubs
  - PR residential cost ~ 20 cents/kWh
  - PV + storage already at grid parity
  - PV + batteries for standalone systems

**Game changer now**

E. O'Neill, A. Irizarry with collaboration from E. Rivera, G. Cosme, E. Parés

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# Energy Storage Gaps

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- Policy, regulatory and business models
  - Must make sense for the Caribbean
- Less cost, more cycles, less maintenance
- Financing
- Battery recycling and maintenance services / market
- Better energy control and monitoring
- Workforce development

- User side considerations
  - Selection, maintenance, safety
  - Citizens are used to “infinite supply of energy”, but will adapt (they always do)



Community leaders during a Solar Communities Colloquium  
Bayamón, Puerto Rico, April 2017.

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