Solar + Batteries: A Resiliency Solution

NARUC Resilient DER Workshop

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sunrun

Battered by Storms: Vulnerable, Outdated Energy Infrastructure

Puerto Rico: Hurricane Maria

Hurricane Maria caused the longest blackout in U.S. history.

Vox

9 months after Hurricane Maria, thousands of Puerto Ricans still don't have power

The grid is in worse shape than it was before Hurricane Maria.

Florida: Hurricanes Andrew & Irma

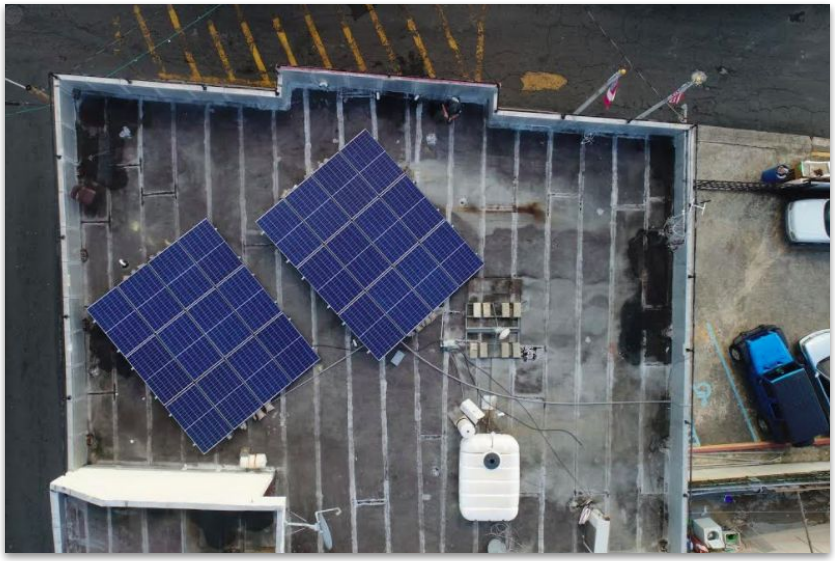
Hurricanes repeatedly leave Floridians in the dark

Tallahassee Democrat.

PART OF THE USA TODAY NETWORK

City saw nearly 100 percent power outage after Hurricane Michael hit

Distributed Solar + Batteries Bringing Rapid Recovery and Relief



Oct, 12th 2017

Solar+Batteries Installed

Sunrun and partners installed solar and batteries on a local fire station in one day, offering 24/7 power to critical equipment.

Sept 20th, 2017

Disaster Strikes

Hurricane Maria makes landfall in Puerto Rico, leading **near 100% power loss** for the island.

Today

Solar+Battery Solution

Sunrun is rebuilding a more resilient grid by installing solar and battery systems on fire stations and homes across the island.

Distributed Solar + Batteries Increases Resiliency for Customers and the Grid

Sunrun delivers home solar and battery services to thousands of households with Brightbox. These batteries can be aggregated as a grid resource.

- Operational when T&D lines are damaged
- Less likely to result in widespread outages
- Clean, affordable backup power for the customer
- Reduces need to harden T&D costs and to use dirty peaker plants
- Helping to address imbalances or congestion.
- Home solar and battery storage can be located at the most valuable grid locations, where energy is consumed.

Grid Services: Sharing the Value of Home Solar + Batteries

T&D System

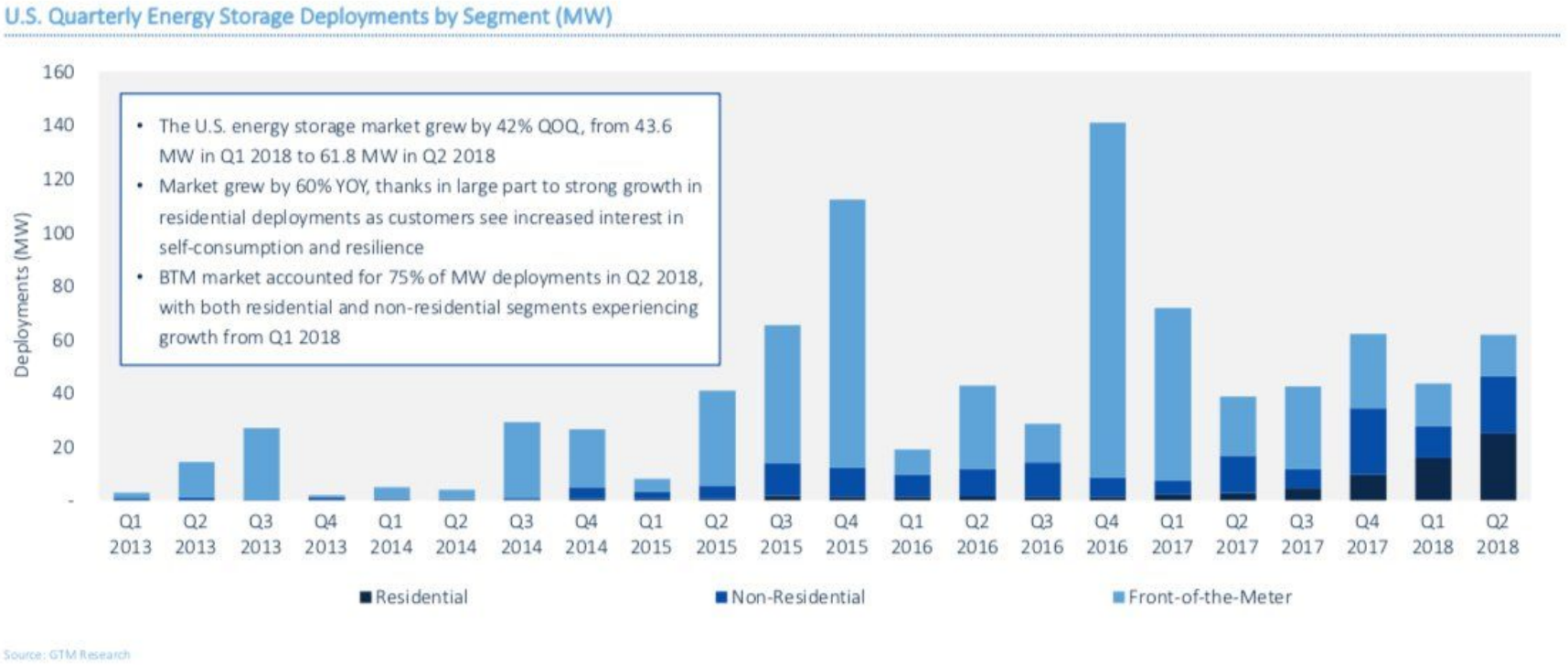
- Firm solar for peak capacity
- End-of-feeder distribution grid deferral value
- Voltage/reactive power
- Reduce transmission / capacity charges
  - CAISO plan will save $2.6 billion in transmission costs by using rooftop solar and efficiency resources
  - In New England, DG solar was credited for reducing wholesale power costs by nearly $20 million during a heat wave

Wholesale & Retail

- Capacity service
- Fast, firm, flexible demand response/peak shaving

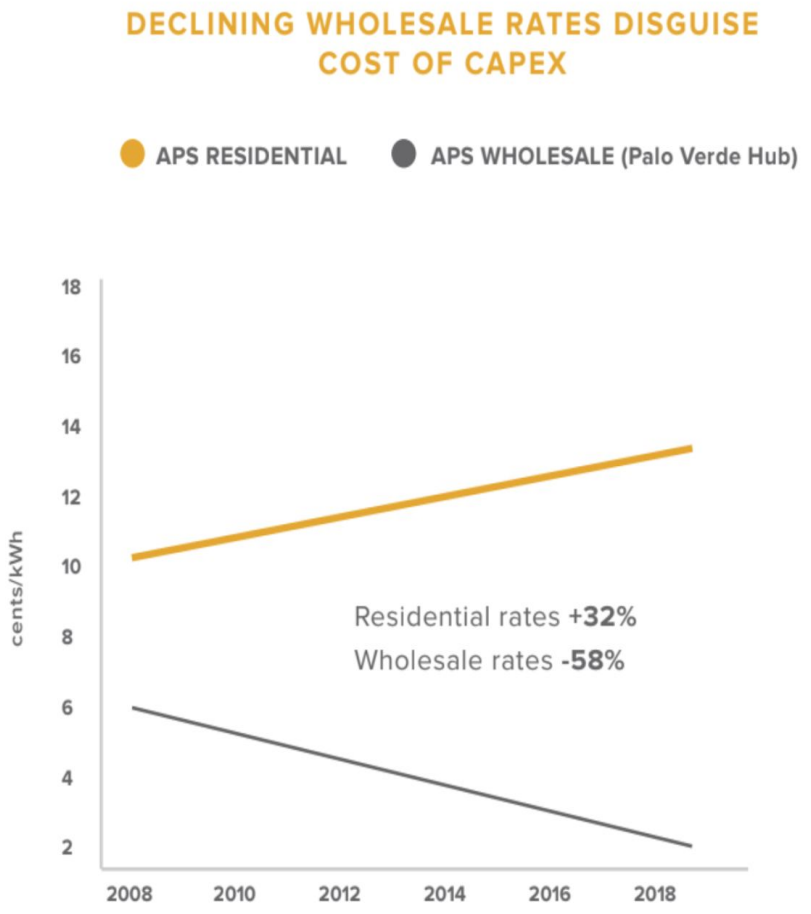
Residential Storage Deployment Leading the Charge

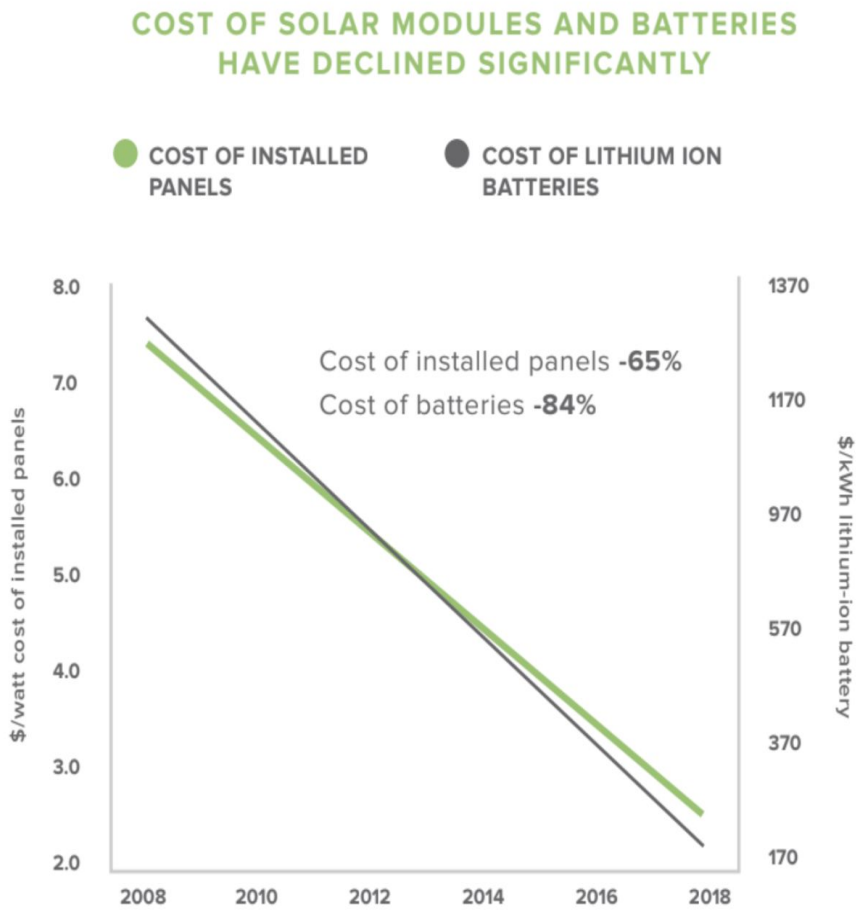
From Q2 2017 to Q2 2018, home battery storage deployment grew 10x and outpaced all other storage deployment.



Source: GTM Research

The Costs of Distributed Solar + Batteries Continues to Fall





Utilities are Proposing Multi-Billion Dollar Grid Modernization and Hardening Investments

New Jersey: $4 Billion *PSEG's "Clean Energy Future" Plan*

Washington DC: $851 Million *Pepco's Capital Grid Project proposal*

California: $2.7 billion *Southern California Edison*

Florida/North Carolina/ South Carolina: $25 Billion Duke's *Power Forward plan*

... Before committing billions of dollars to reinforce the old grid, we should explore opportunities for integrating distributed resources and grid services.

Regulatory Foundational Elements to Enable Solar Plus Storage Solutions

- Support fair compensation for residential solar, which fuels batteries.
- Create incentives for home batteries. (CA SGIP, NY, MA, NV)
- Streamline interconnection and metering processes. (i.e., Puerto Rico)
- Offer tariffs that allow customers to provide services to make the grid more resilient.
- Find win-wins for utilities & competitive companies through shared savings mechanisms (i.e., New York).

Use the Power of Competition to Diversify the Grid

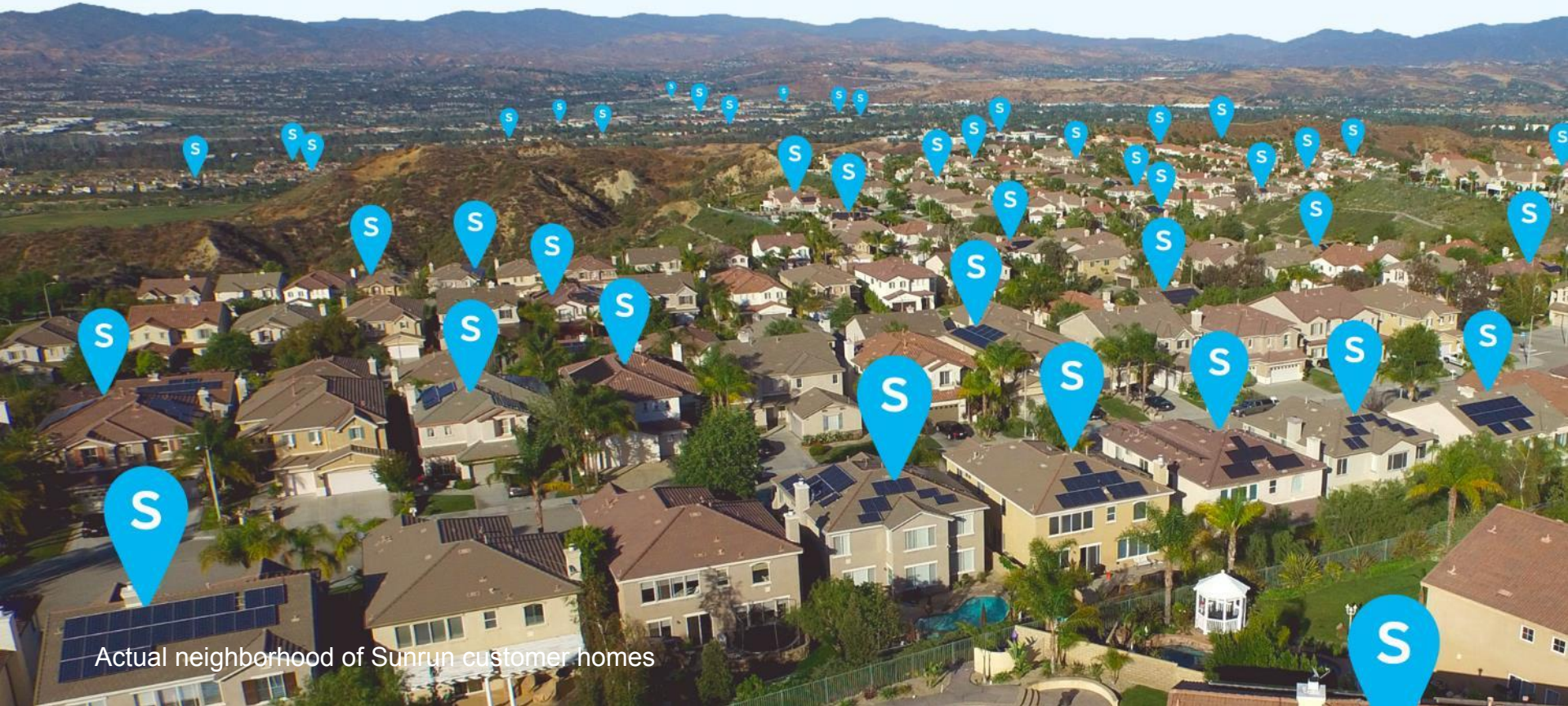
- Allow the competitive free market to deliver innovation and affordability.
  - Enable mechanisms such as “Bring Your Own Device” tariffs (VT, MA, RI).
  - No need to put risk onto the rate base with utility owned programs.
  - Allow competitive providers to aggregate, manage and dispatch DERs.
- Enable participation as demand response resources (CA DRAM).
- Direct utilities to consider competitive non-wires alternatives (CA; NY).
- Allow full participation in wholesale markets to harness full value of solar plus batteries. (NE ISO; CAISO)

Epilogue: Puerto Rico Putting People at the Center of its Clean Energy Transformation

The Public Energy Policy Act of Puerto Rico - Senate Bill 1121 - commits the island to 100% clean energy.

The bill requires the transition to clean energy to include ***distributed generation, like home solar and batteries for greater resilience and reliability.***

CREATING A PLANET RUN BY THE SUN



Actual neighborhood of Sunrun customer homes


Thank You!