VPPs & V2X - Supporting the grid of the future

Leading the Way in Residential Clean Energy

- **~6.5 GW** of installed solar capacity and new annual installs **equal to 1 nuclear plant** per year
- > **1 million** customers; **135,000+** pv+batt. systems
- **2+ GWh** of installed energy storage capacity
- **1 in 5 solar roofs is a Sunrun install**
- **60%** of new solar installs are paired with energy
- **49% of all new battery** installs are Sunrun installs

Largest residential VPP owner-operator in US

- **19 VPPs across country** with **~25,000 customers**
- VPP combined peak output of ~75 MW in ‘24
- CA VPP **larger than ~35 nat. gas peakers in CA**

Pop Quiz:

Which state has the best VPP program?

Any Utility Can Have a VPP, Today

- **MA's ConnectedSolutions is best in class program in the country!**
  - Since 2019, RUN has enrolled batteries and created ratepayer value
  - Cost effective for utilities to operate
  - Produces meaningful benefits for the grid
  - Open to all types of DERs
- **Crawl, Walk, Run Approach**
  - Email dispatch, no DERMs connection
  - Metered at battery inverter - no utility metering
- **Integrate VPPs into utility planning processes**
  - Reflect actual operating characteristics in IRPs
  - Consider Distributed Capacity Procurements

Preventing rolling black-outs in Puerto Rico, reducing grid costs in CA and ISO costs in New England - we are proving the value of VPPs nationwide.

Sunrun & Ford jointly developed the first commercially available V2X system.

Have been deploying systems for years now - primarily for backup power.

BGE V2H Pilot: *The First Customer-Facing V2H VPP in the US*

Project Goals

- Operate in grid parallel, reducing load during peak
- Insights on CX, dispatch, & performance
- Prove V2X can fit into existing and tested VPP

Dispatch / Payment

- Discharge *if EV plugged in*: June 1 to September 30, 2024; M - F (non-holidays); 5 to 9 pm
- $800 per kW/summer, based on actual performance, one participant earned ~$1,700
- Measured at revenue-grade meter in the inverter

Ford/Sunrun Home Integration System (V2X DC)

We proved V2H can reduce a home's energy consumption from the electric grid to nearly zero during the grid's peak hours).

BiDi EVs: Where is the biggest VPP impact? Wherever the kWhs are!

Today, more kWh deployed in EVs (~250 GWh) than in stationary storage (~5 GWh)

By 2030, total capacity of EV batteries could be 2,800 GWh

- At 10% utilization, EVs will rival *all* capacity from stationary storage (resi, C/I, utility)
- OEMs will deliver - and consumers demand - bidi functionality as standard
- No major *technical* barriers to leverage this massive fleet - mostly regulatory / code
- How do we unlock this enormous resource?
  - Slot BiDi EVs into existing VPP programs - like ConnectedSolutions
  - Streamline IX - assume it is the same as stationary storage, identify differences
  - Need commodification of charger and home integration system and cost declines

What could 200,000 bidirectional EVs do for New England?

- Just 1/3rd of their energy could offset region's oil peakers during 8-hour winter peak
  - Avoid 50% of total generation emissions in that window and reduce bills for all
  - New England + NY has roughly 200k EVs on the road today
  - Region has 7 million cars on road - forget 200k - what could 2 million BiDi EVs do?