



PHI Energy Storage Projects



PPRAC Energy Storage Workgroup
October 26, 2017

Battery Energy Storage for Transmission and Distribution Deferral.

- ❖ Energy storage is being considered in conjunction with a transmission construction project that requires equipment outages as the project progresses. The battery would support load during switching to avoid costly alternatives.
- ❖ Distribution System -- investigating Energy Storage Systems as a peak shaving tool to relieve predicted capacity overload on several distribution feeders.



Transmission Deferral



Distribution Deferral

Energy Storage, DER Integration and Microgrid Project

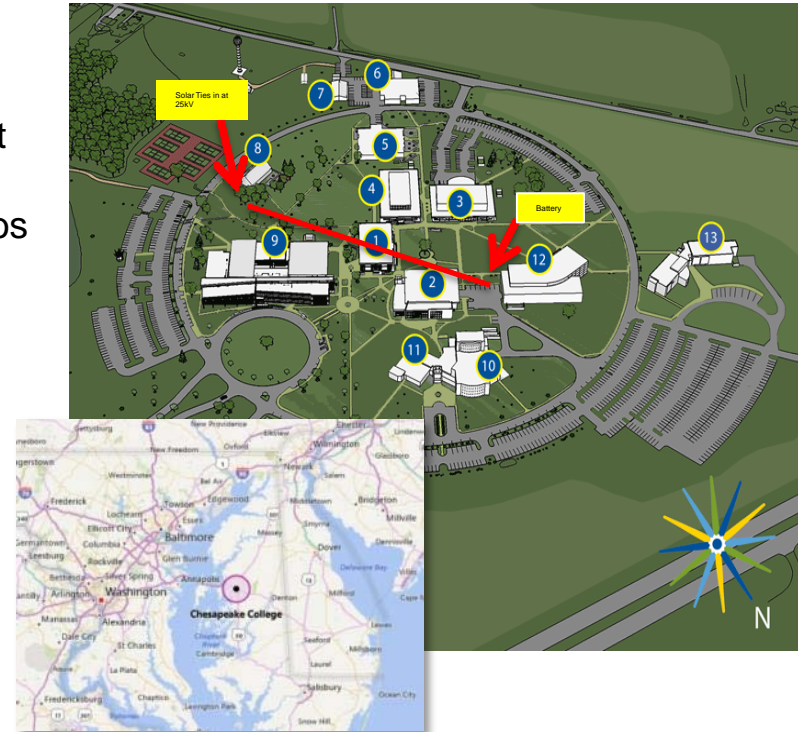
- Started as a solar Distributed Energy Resource DER system on a high penetration substation transformer
- Delmarva applied for, and received, \$250K grant from MEA for installing batteries to support the College critical loads during emergency scenarios and support the electrical grid

PV System

- Size: 2.18 MW DC, 1.76 MW AC
- Installer/Owner: Solar City
- Inverters: Solectria (with smart inverter functions)
- Output from inverter will be 480V then tied to 480/25kV transformer to step up to 25kV
- System is split into a 1,464 kW ground mount array and 300 kW carport with EV charging capability
- In-service date: May 2016

Battery System

- Proposed size is 1 MW, 750kWh (3/4 hr battery)
- Installer/Owner: AF Mensah
- Battery and PV system will have separate inverters for independent operation
- Battery will participate in the PJM Ancillary services market, and can be called on to support the grid
- Electrical interconnection design to be proposed by AF Mensah – during grid outages, the battery will isolate, back up load and recharge from the PV system



Building Loads to Back Up:

2 – Caroline Center

12 – Learning Resource Center

The College has a 25kV system for the campus with switchgear connecting to DPL in Bldg 12

Distance from Solar Tie in at 25kV to where Battery System will be located (shown as red line) is about 2,000'

Next Steps

- Battery to be installed and operational by Fall 2017
- PHI is establishing communication and control to feeder equipment by Fall 2017
- PHI has specified Control System functionality. GE is supplying the controls, to be ready for testing in early 2018
- Run tests for 1-2 years

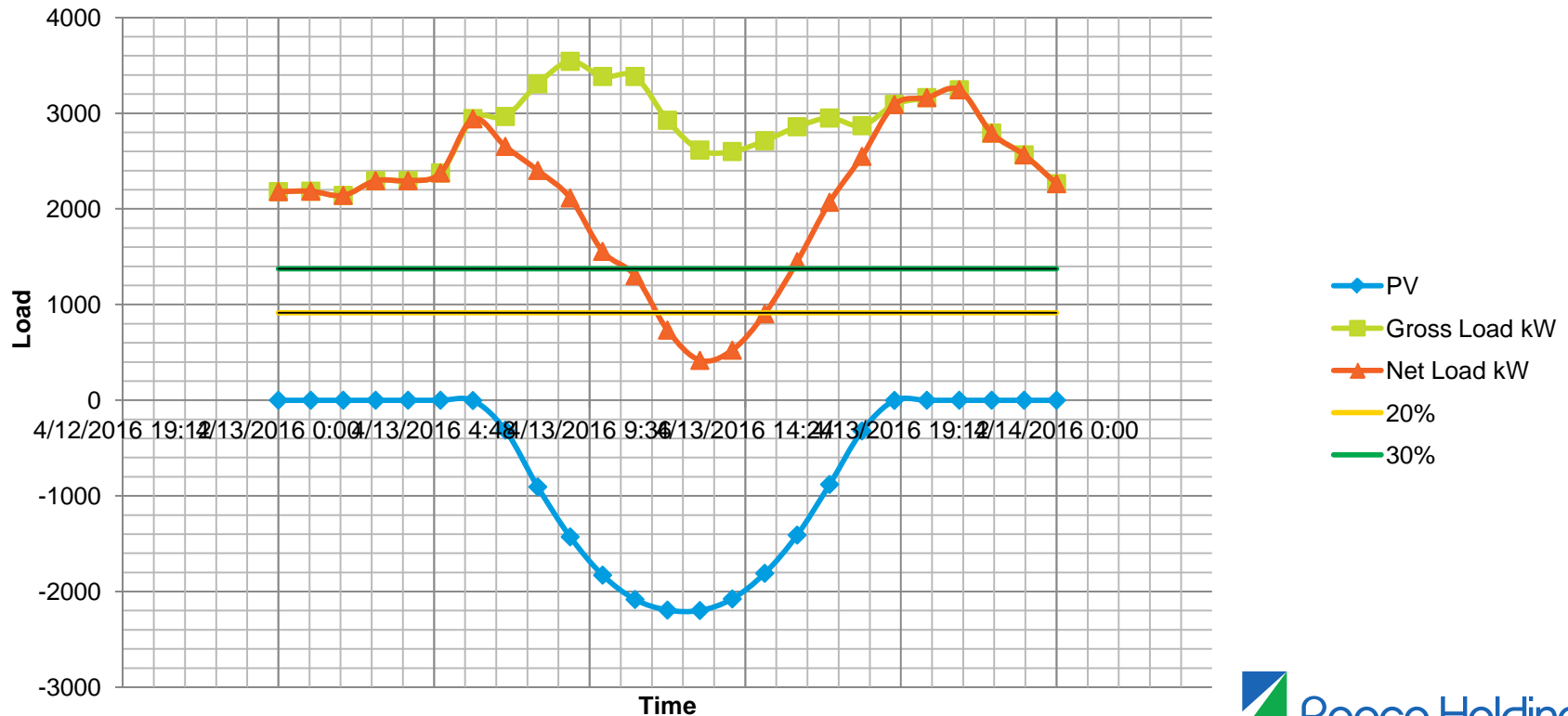


An Exelon Company

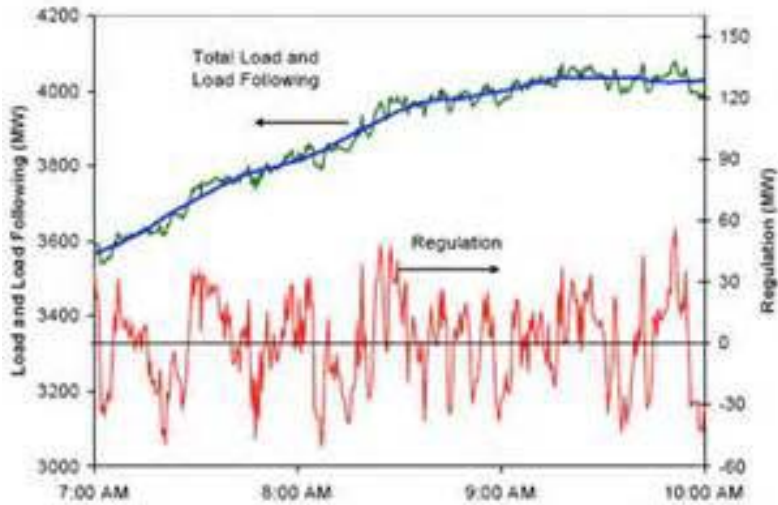
Mitigation Of Reverse Power Flow on Substation Transformers.

- ❖ Install Energy Storage Systems at some substations to prevent reverse power flow on the transformers. The Battery will absorb energy during periods of low loads and high solar output.

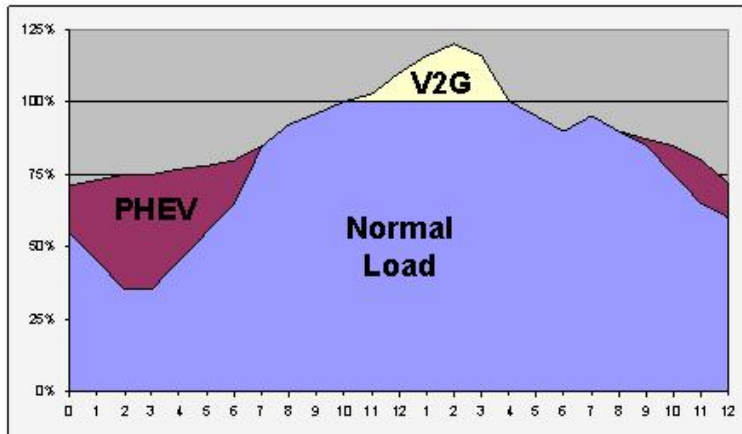
Minimum Load Day



V2G for Frequency Regulation and Load Shifting



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P2PElectric.com

santamarta-florez.blogspot.com

