

PSE&G Solar 4 All® – Pilot Program

GRID SECURITY / STORM PREPAREDNESS

PSEG Vision

Being a recognized leader for:

People providing
Safe reliable
Economic and
Greener Energy



PSEG

We make things work for you.

Background – Solar 4 All® Pilot Program

- PSE&G is executing a Grid Security/ Storm Preparedness Pilot Program, which originated from the experiences of Superstorm Sandy
- A reliable, resilient Transmission grid remains critical. Program is focused on exploring the important role electric storage could potentially play in enhancing resiliency during grid outages.
- PSE&G received approval for this pilot program under BPU Order Docket No. E012080721, as a segment of its Solar 4 All Extension program

Objective and Framework of S4A Pilot Segment

Objectives:

- Demonstrate the feasibility of providing enhanced reliability and grid resiliency for customer's facilities during prolonged power outages.
- Reduce the impact of solar power integration on the distribution grid.

Framework:

- Project must be grid tied.
- Pilot Program capped at 3 MW-dc Solar.
- Each project to be sized between 100 and 1,000 kw-dc.
- Land or rooftop space is leased from a host site.
- Revenues offset cost of Program (energy, capacity, ancillary markets, and SREC sales).

PSE&G S4A Extension Pilot Projects



Hopewell Valley Central High School

Community Warming Center

Solar Facility: 876 kW-dc

Battery: 580 kWh; Li Ion

In-Service
Dec 2015



Cooper University Hospital

Supports Pediatric Medicines

Solar Facility: 220 kW-dc

Battery: 200 kWh; Li Ion

In-Service
Sept 2016



Caldwell Sewage Treatment Plant

Supports Plant Operations

Solar Facility: 902 kW-dc

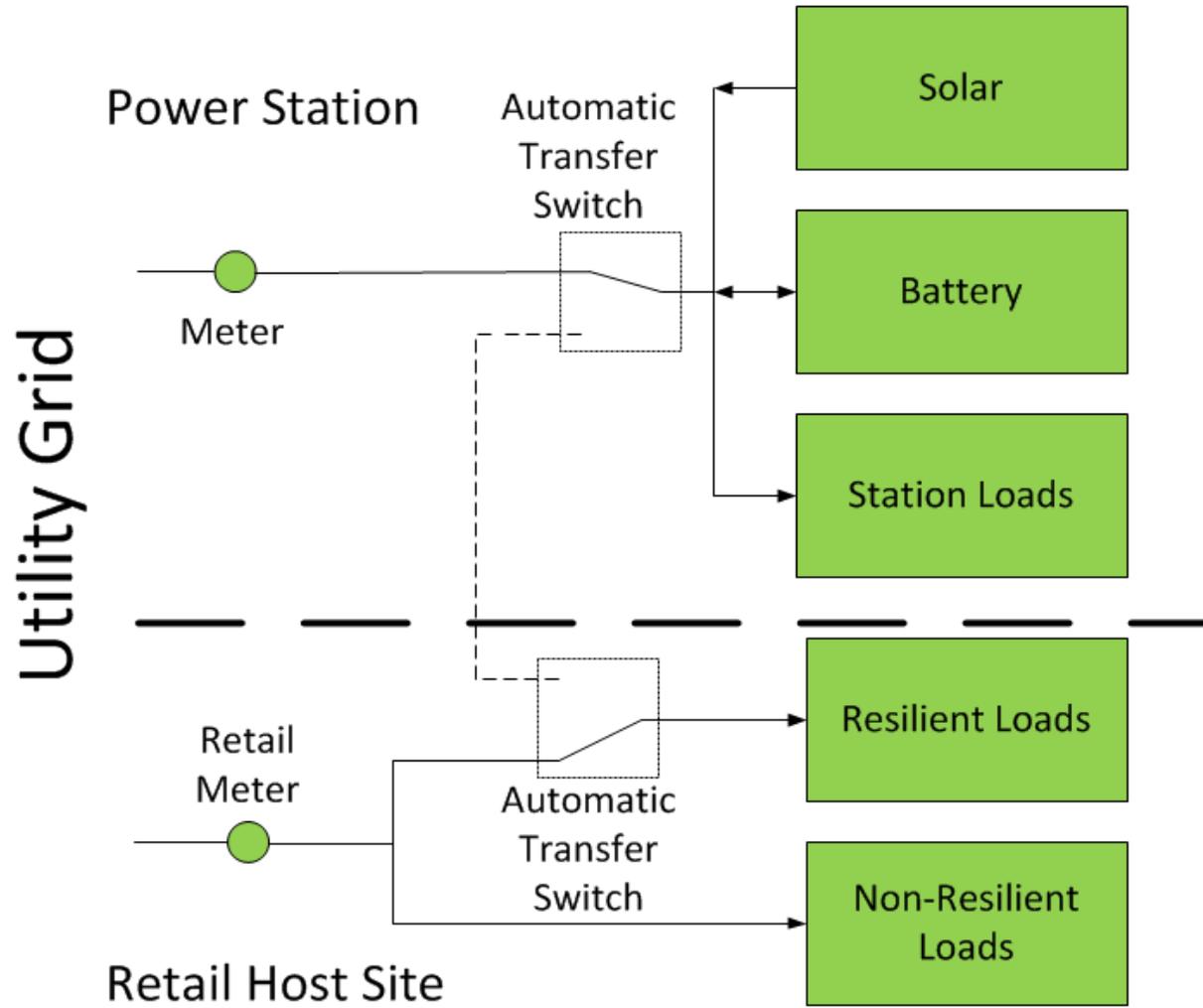
Battery: 1,000 kWh; EOS - Zinc Air

In-Service
Dec 2016

S4A Pilot – Normal Operation

- PSE&G Solar Power Station is connected directly to the grid as a PJM wholesale energy generator.
- Batteries may be charged from solar array and/or utility grid. Batteries are discharged into utility grid.
- Host site is independent of S4A Power Station. Host site obtains utility power via retail interconnection.
- The solar and battery systems are disconnected to the host site. Path to resiliency load has no voltage or current.

S4A Pilot – Normal Operation



S4A Pilot – Grid Outage Resilient Mode

- Solar Power Station AND host site must both be subjected to a grid power outage – low/zero voltage at the grid connection.
- Automatic transfer switches detect loss of grid power and reconfigures for resilient, back up power operation.
- During grid outage operation, solar power is delivered to host's resiliency loads.
- Battery storage is used to support the facility and maintain resiliency loads during prolonged power outages.
- Upon restoration of grid power, operation will automatically return to the Normal Operating mode.

PSE&G Current Situation

The configuration of these solar and storage sites are unique:

- Solar is connected to the grid under normal conditions.
- Energy storage is connected to the grid under normal conditions.
- Resiliency operation can ONLY occur with distribution outage at both the wholesale connection and the host retail connection.
- Resiliency energy is provided as an element of the lease and is not sold to the host site.
- As a result of the resiliency feature of these sites, the battery storage system is not considered an “Energy Storage Resource”.
- Charging the battery is not considered “Station Power”.
- Consequently, charging the battery is considered a retail transaction.

PSE&G Proposed Path

- Rules and Tariff language should not economically penalize projects that include this type of grid outage-based resiliency feature for community benefit.
- In such instances, all sales and purchases of energy for the energy storage should be wholesale transactions

Appendix

Hopewell Valley Central High School



Hopewell Valley Central High School



Hopewell Valley High School

- (2) Dynapower 500 kw Inverters.
- Total of 440-kWh of battery storage
- 882 kw-dc from combined rooftop and parking canopy arrays.
- Resiliency circuit provides backup power to food refrigerators and the gymnasium for a warming station.

Cooper University Hospital



Cooper University Hospital

- (4) Princeton Power 100 kw Inverters.
- 218 kw-dc rooftop solar array
- 200 kWh of battery storage
- Resiliency circuit provides supplemental power to an existing emergency generator to operate refrigerators for pediatric medicines. During Sandy backup power was not provided for these refrigerators and medicine was lost.

Caldwell Waste Water Treatment



Caldwell Waste Water Treatment



Caldwell Wastewater Treatment

- 896 kw-dc ground mount solar array
- 1000 kWh battery storage
- Resiliency provides supplemental power to the emergency generator to operate the wastewater treatment plant during outages. During Sandy, maintaining a reliable supply of diesel fuel was difficult and the wastewater treatment plant nearly lost backup power. Creating a micro-grid with the solar arrays and battery will decrease the fuel consumption of the generator and extend the operation between diesel fuel deliveries.