SolarCity

Distributed Energy Resources

February 2017

Solutions for Leveraging DERs in Grid Planning and Operations

(1) **Deploy Distributed Energy Resources (DERs)**

- SolarCity provides customizable solar plus energy management solutions for residential, commercial & industrial, and government customers.

(2) **Aggregate DERs for Grid Operator Control**

- SolarCity's *Distributed Grid Services* product aggregates DERs that offer benefits to the utility, end customers, and wholesale markets.

(3) **Utilize DERs for Grid Services and Wholesale Participation**

- *GridLogic* is SolarCity's DER dynamic control platform, enabling individual asset and aggregated portfolio control.

SolarCity

Distributed Energy Resources

Smart Energy Home solution deployed in Hawaii

SOLAR PANELS

Solar panels capture energy from the sun and convert it to electricity to power your home.

HOME GATEWAY

The gateway allocates energy to maximize self-supply.

NEST LEARNING THERMOSTAT

The thermostat learns what temperature you like and builds a schedule around yours.

BATTERY

The battery stores your excess solar energy production for later use.

MYSOLARCITY APP

See how much energy you're importing from the grid compared to how much is being self supplied.

SMART WATER HEATER

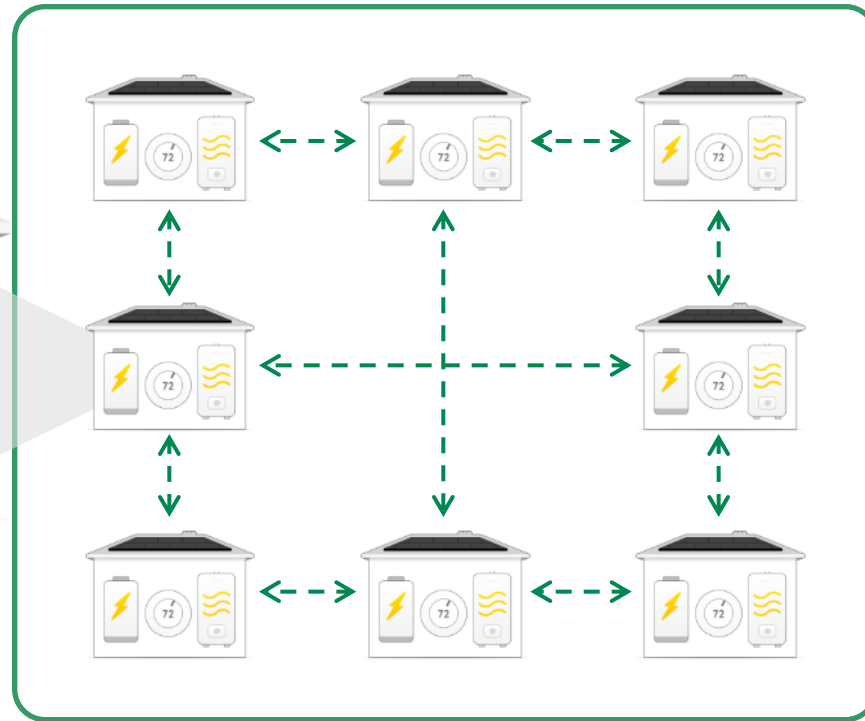This uses excess solar production to heat hot water for your home.

SolarCity

Grid Services via DER Aggregation
Utilize portfolios of DERs to provide grid services
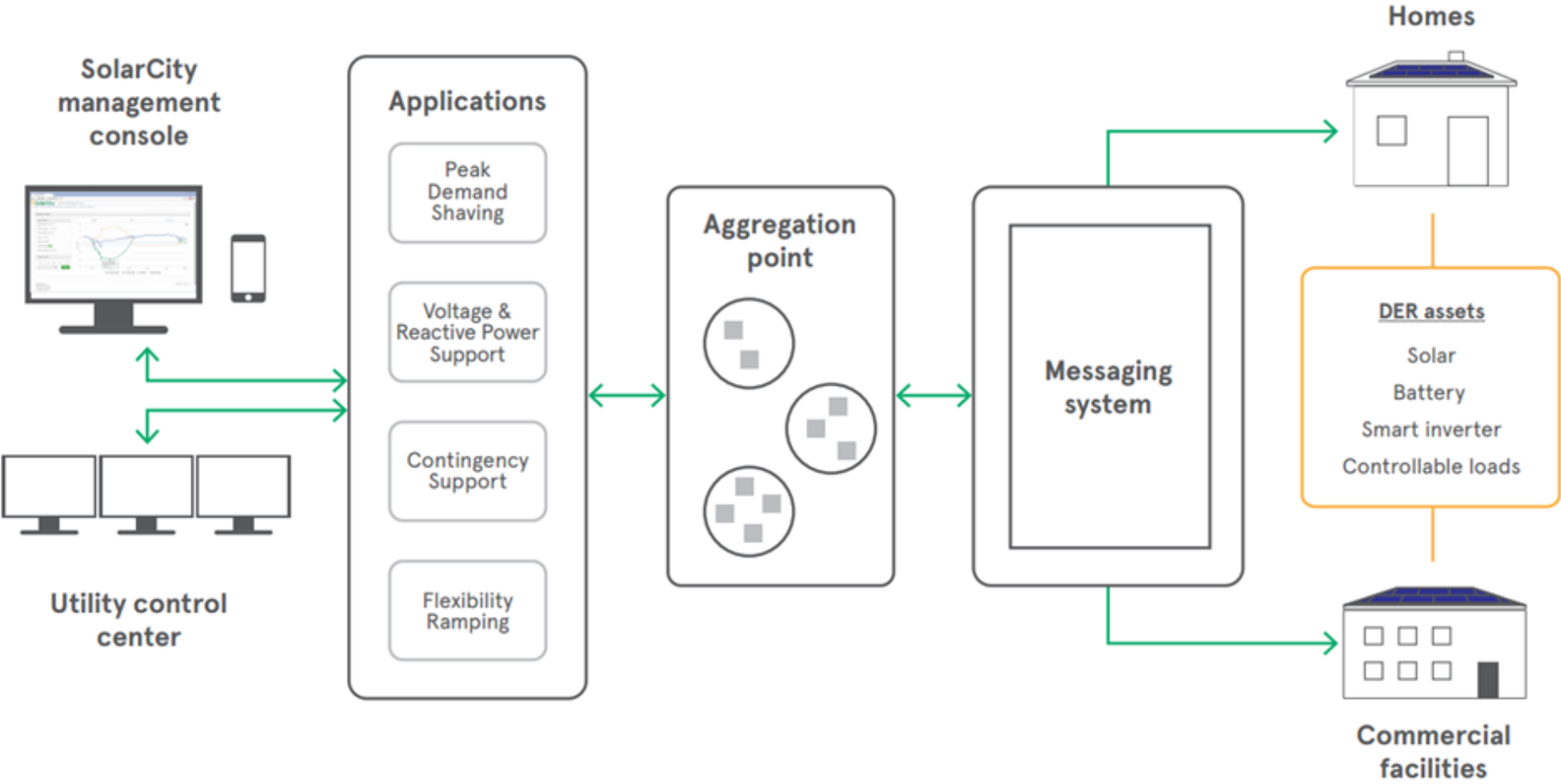
Distributed Energy Resources (DERs)

Aggregated DER Portfolios

Grid Services

Demand Response

Flexible Ramping

Dynamic Capacity

Contingency Support

GridLogic Control System Architecture

Multi-Use Applications

Overview

Customer

- Time of use savings
- Solar self-consumption
- Demand charge reduction
- Reliability / Backup power
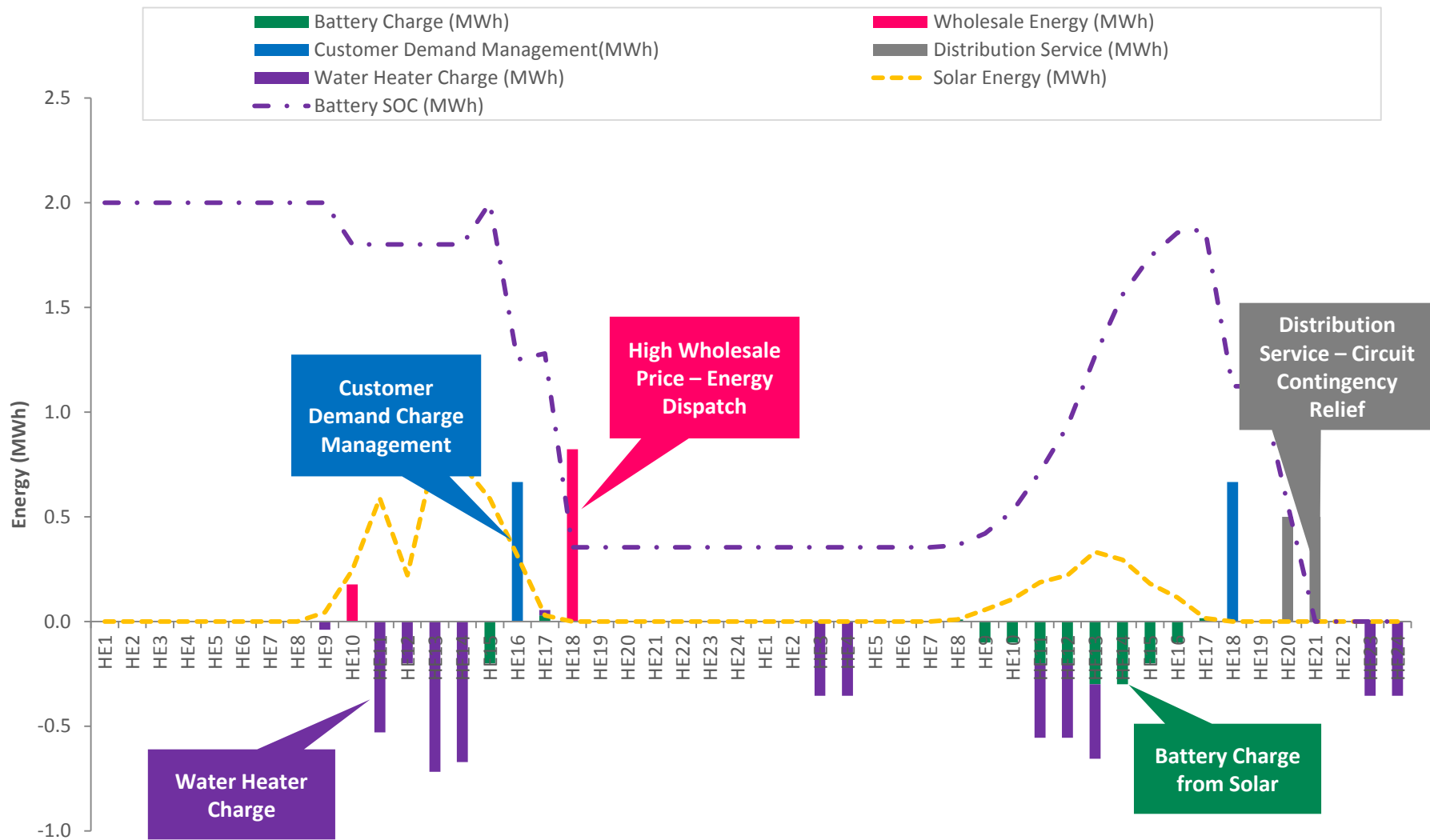
Utility

- Transmission and Distribution deferrals
- Grid services
  - Voltage support
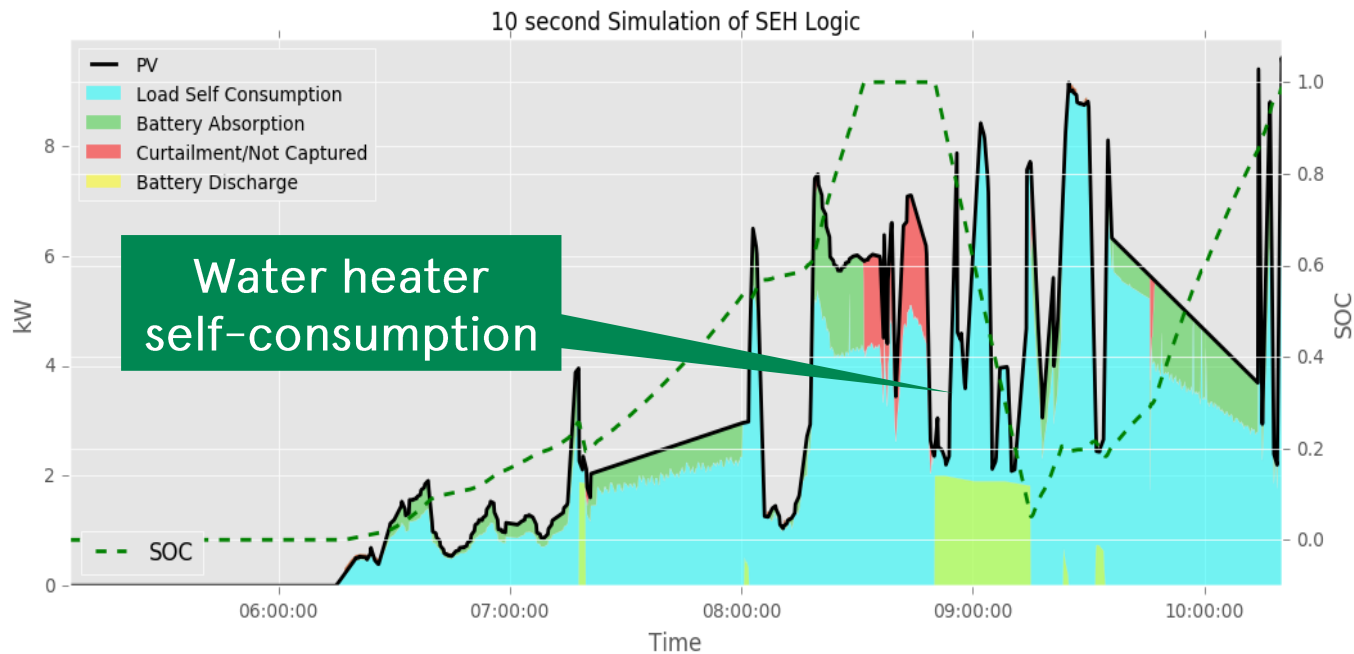 - Reactive power support
  - Capacity
  - Contingency

Wholesale

- ISO Market Participation
  - Energy
  - Ancillary services
  - Capacity

Sample Dispatch Profile
Customer + Wholesale Energy + Distribution Service

Fast Response DER Control

10 second Simulation of SEH Logic

Legend:
- PV
- Load Self Consumption
- Battery Absorption
- Curtailment/Not Captured
- Battery Discharge
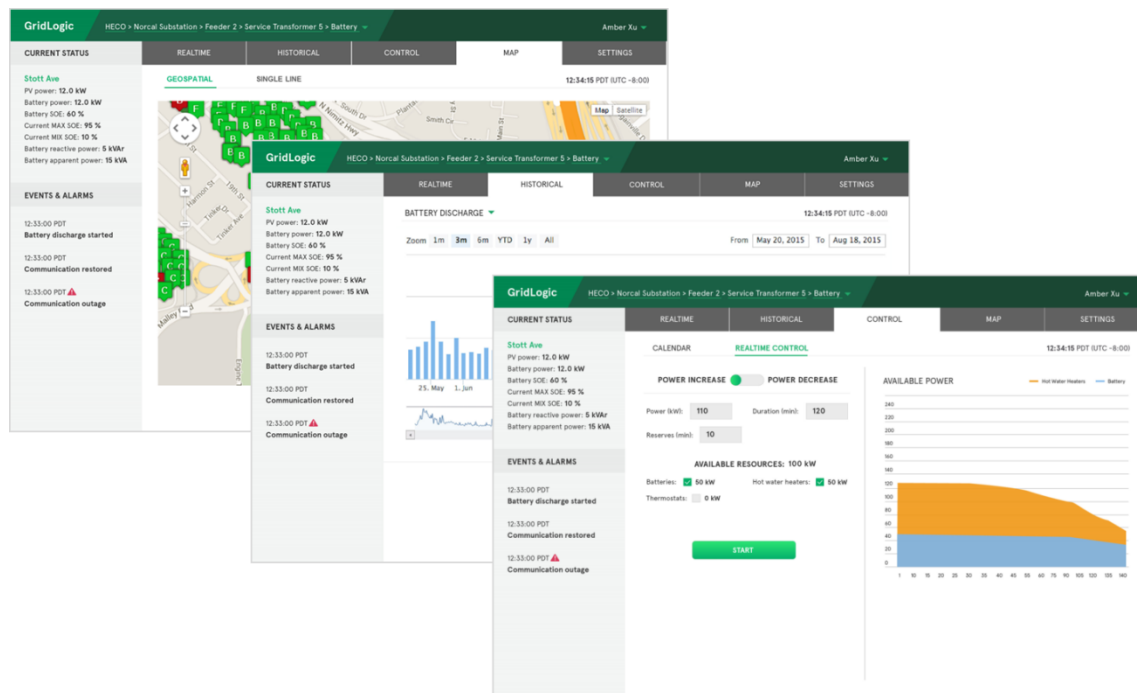- SOC

Water heater self-consumption

- Load flexibility enables higher utilization and value creation
- Control logic makes decisions at each control time step (i.e. 4-10 sec) to dispatch the water heater and battery storage

GridLogic User Interface
DER Control Platform

Demos (click to start):

- Real-time Control

- Scheduling an Event

- Smart Inverter Operations

- Historical Data

Q & A

SolarCity

Thank you