Data Science at Stem

Philomathia Forum on Energy and Environment, UC Berkeley, 2017

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About Stem

Intelligent energy storage company operating in the commercial and industrial customer space.

1.3MW 2.5MWH
LBA Park Place

Largest Indoor System
BATTERIES CAN PROVIDE UP TO 13 SERVICES TO THREE STAKEHOLDER GROUPS

- Backup Power
- Energy Arbitrage
- Spin / Non-Spin Reserve
- Frequency Regulation
- Voltage Support
- Black Start
- Distributed Resources
- Demand Charge Reduction
- Time-of-Use Bill Management
- Distribution Deferral
- Transmission Deferral
- Transmission Congestion Relief

Service possible
Service not possible

CUSTOMER SERVICES
ISO/RTO SERVICES
UTILITY SERVICES

The Economics of Battery Energy Storage
Rocky Mountain Institute
http://www.rmi.org/electricity_battery_value
Demand Charges 101

- C & I Customers pay for Energy and Demand
  - Peak Demand Charge
  - Cost per unit (kW) of power
  - Calculated at the period of highest demand (peak)
- "How much" and "when" both matter

\[
E = 500 \text{ kWh} \\
P_{\text{max}} = 25 \text{ kW}
\]
Demand Management
Behind the Meter Storage: On demand resource for the Grid

Aggregation acts as a Virtual Power Plant (VPP) for grid operators during periods of high demand.

Mean State of Charge for Fleet
Stem: On demand resource for the Grid

Renewable Watch - Oahu

April 18, 2017
6:23 PM

Load [MW]

- West Oahu Solar Irradiance
- South Oahu Solar Irradiance
- Central Oahu Solar Irradiance
- East Oahu Solar Irradiance
- Oahu Wind Production
- Gross System Load
- Net System Load

Time

Current Renewable Power Production (by regions)

West Solar MW: 1.03  Central Solar MW: 6.52  Wind MW: 10.85
East Solar MW: 1.55  South Solar MW: 7.25

North Solar Information to be included at a later time.

Information

Renewable Watch shows at a glance the levels of solar and wind power generated on Oahu and how that energy varies throughout the day.

Below are Descriptions of what is currently displayed:

- Net System Load: System Load Served by Hawaiian Electric Company
- Gross System Load: Net System Load + Load Served by Behind the Meter PV
- West Oahu Solar Irradiance: Solar Irradiance [W/m²] measured in West Oahu
- South Oahu Solar Irradiance: Solar Irradiance [W/m²] measured in South Oahu
- Central Oahu Solar Irradiance: Solar Irradiance [W/m²] measured in Central Oahu
- East Oahu Solar Irradiance: Solar Irradiance [W/m²] measured in East Oahu
- Oahu Wind Production: Wind Power Production on Oahu

Renewable Watch - Previous Day

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