

The logo for ENGie, featuring the word "ENGie" in a blue, rounded, sans-serif font. Above the text is a blue, curved shape resembling a stylized sun or a wave.

[www.greencharge.net](http://www.greencharge.net)

# ENERGY STORAGE

Balanced and interconnected  
Ontario introduction



A holistic approach

- Overview of Green Charge
- Relevant DER/Dual Participant examples
- NYISO Recommendations



- Experienced provider of commercial energy storage
  - 50+ MWh in projects
  - Interconnected coast to coast
  - 5 years of live operations
- Proven track record of savings
- Industry's first no cost, low risk shared savings model
- Owned by the largest independent power producer in the world - **ENGIE**



ENVIRONMENTAL LEADER PRODUCT OF THE YEAR 2015



ENERGY STORAGE NORTH AMERICA GOLD AWARD 2014 & 2015



GREENTECH MEDIA'S GRID EDGE 20 2015



STEVIE'S AMERICAN BUSINESS AWARDS FINALIST 2015



PLATTS GLOBAL ENERGY AWARDS FINALIST 2015



FIERCE INNOVATION AWARD WINNER 2015



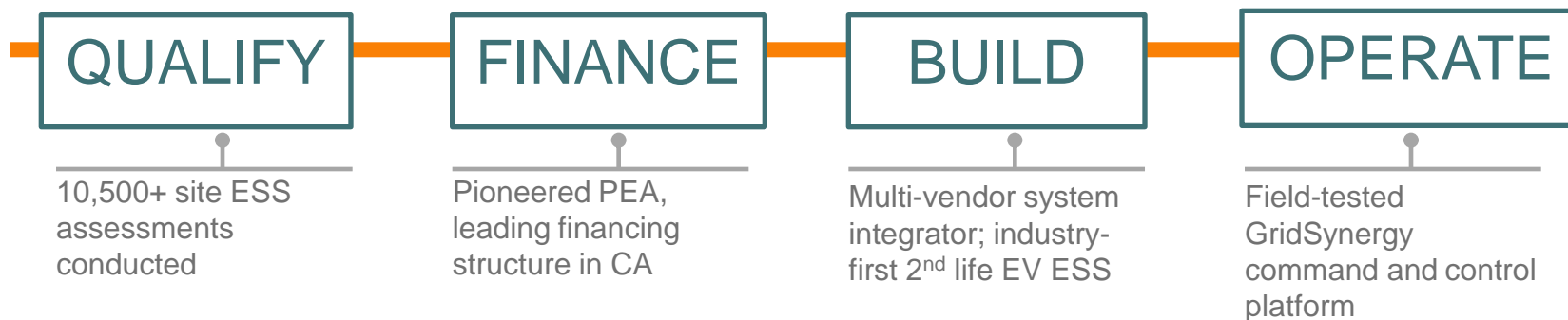
SMART GRID NEWS TOP 15 COMPANIES FINALIST 2015



GLOBAL CLEANTECH TOP 100 COMPANY 2015

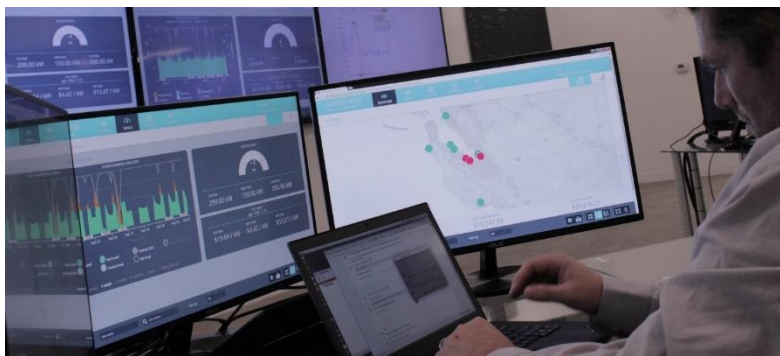
# Green Charge Turnkey Development

## End-to-End Energy Storage Project Developer



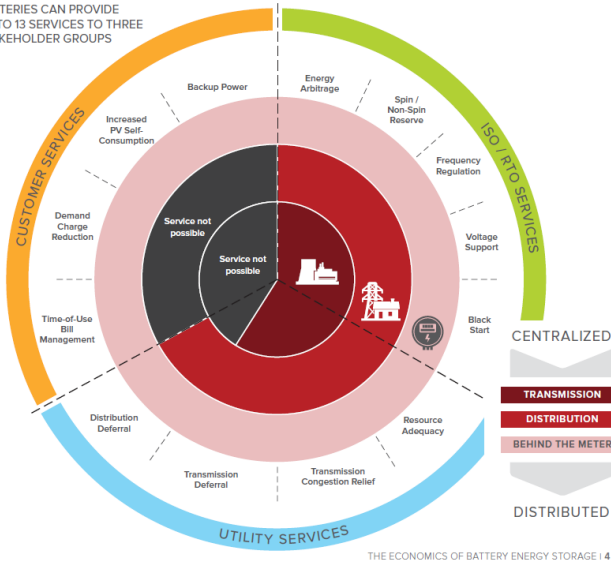
## Network Operations Monitoring

Live performance monitoring to ensure safety and optimal savings and/or revenue generation for systems enrolled in energy markets.

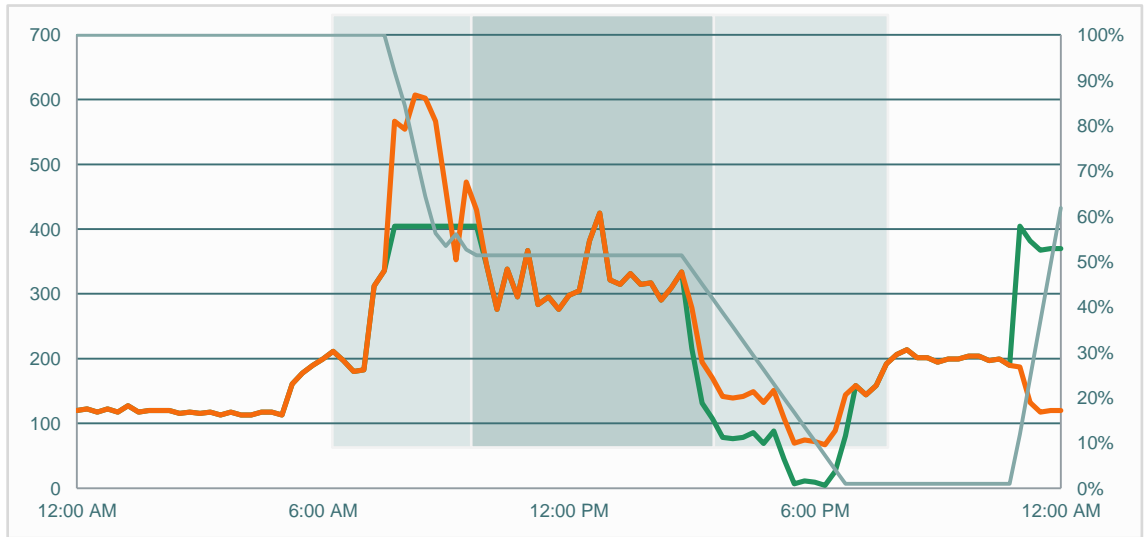


Live Monitoring + Cause and Effect Investigation = Optimized Performance  
Scheduling, Trading and 24 hour Market operations center in ENGIE Houston (IESO,  
PJM, NYISO, ISO-NE)

FIGURE ES2  
BATTERIES CAN PROVIDE  
UP TO 13 SERVICES TO THREE  
STAKEHOLDER GROUPS



High School in CAISO



## DUAL PARTICIPATION/MULTIPLE STREAMS:

- Using intelligent dispatch the same asset can provide more value by maximizing its functions
- Some high value functions such as peak demand management only require a few hours each month or year to capture value
- Energy Arbitrage and Ancillaries can provide lower value but more frequently increasing the utilization of the DER.



## GREEN CHARGE SOLUTION

Create VPP co-located with PV installations to bid into CAISO wholesale day ahead and real time market

Systems

18

VPP Size

1,080kWh

VPP Aggregation and Control



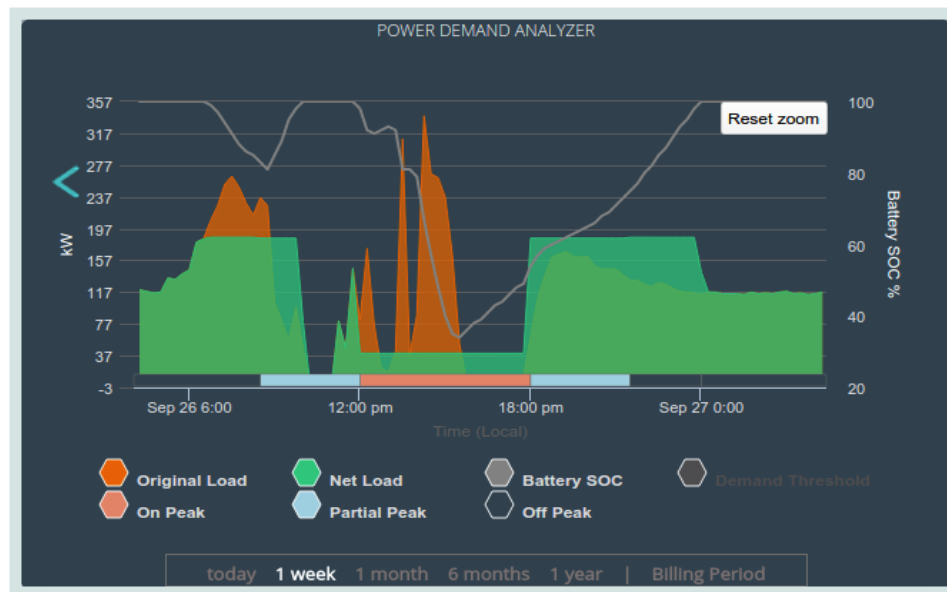
*Green Charge aggregation into single resource for CAISO bidding*

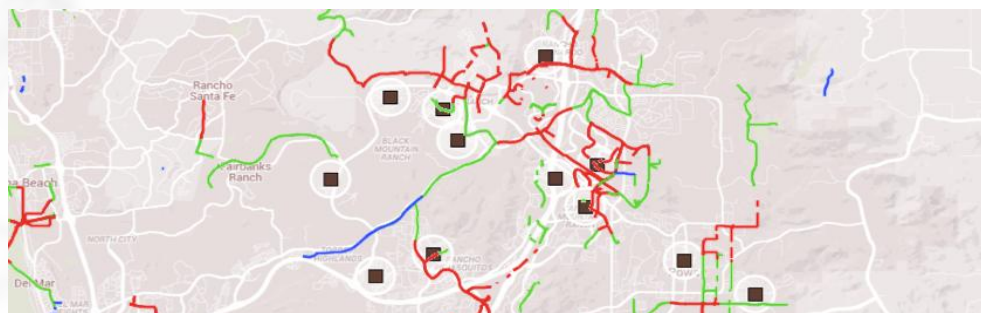


**GridSynergy  
Master  
Command and  
Control**

### EMS Modules:

- Virtual Aggregation
- Peak Management
- ESS Demand Response
- Renewable Firming





## GREEN CHARGE SOLUTION

Create VPP to participate in distribution utility DR program, while reducing site-specific solar intermittency

**Systems**

**30**

**VPP Size**

**14,400kWh**

**VPP Aggregation and Control**



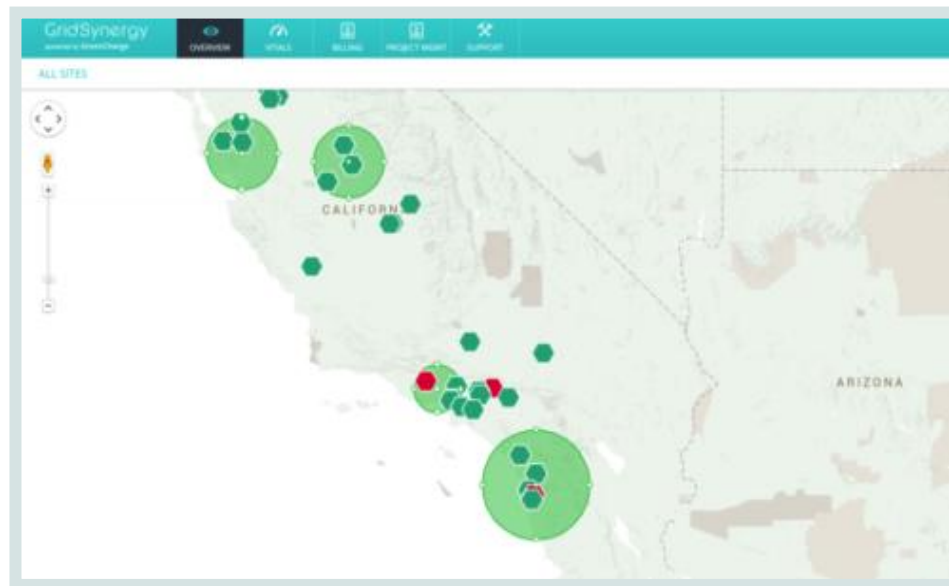
*Green Charge aggregation into single resource for utility dispatch*



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**EMS Modules:**

- Virtual Aggregation (Feeder Level)
- Peak Management
- ESS Demand Response
- Renewable Firming





### Overview

**SUMMARY** | Large scale behind the meter installation in Syracuse, NY. Provide multiple customer values and grid services.

**SIZING** | 1MW/ 1.4MWh.

**FUNDING** | Owned by Lockheed and ENGIE

### DESCRIPTION:

A first of its kind project in NYISO the Lockheed battery provide customer benefits of Utility Peak and Capacity Charge reduction as well as energy arbitrage. In addition the battery will schedule ancillary services into the NYISO regulation market through ENGIE's wholesale desk in Houston.





## GREEN CHARGE SOLUTION

Create Virtual Power Plant (VPP) in targeted circuits to help Con Edison reduce peak demand in key circuits, and accommodate PV and EV charging

### Systems

5

### VPP Size

448kWh

### VPP Aggregation and Control



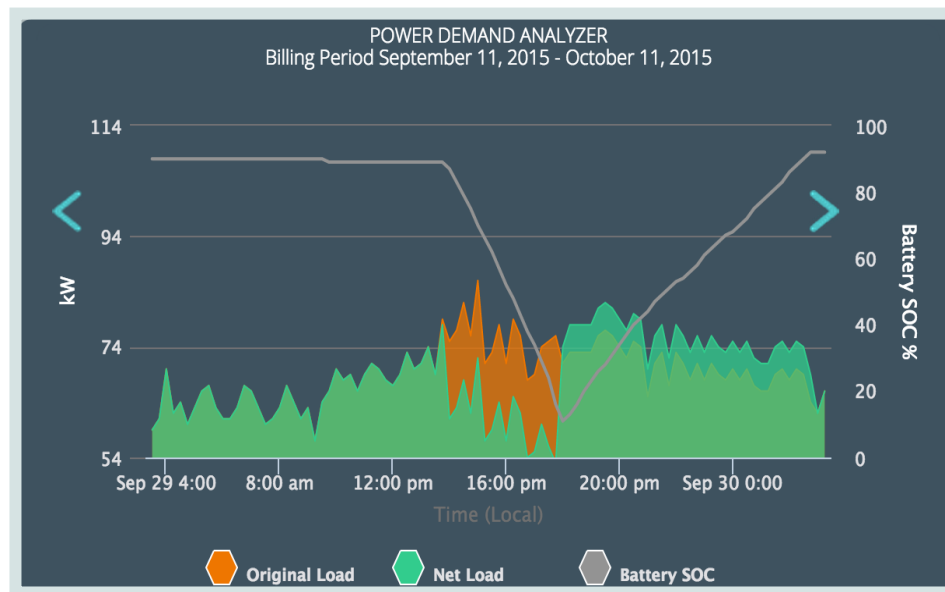
Direct integration into ConEd NOC (ESS, PV, and EV charger)



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### EMS Modules

- Peak Management
- ESS Demand Response
- PV Curtailment
- EV Charger Curtailment



## Background

Consolidated Edison held its first auction for demand response capacity under its Brooklyn-Queens Neighborhood Program, which seeks to cut customer usage to defer a substation investment in New York.

The utility said it awarded contracts that would result in 22 MW of peak demand reductions in 2018, with payments to providers ranging from \$215/kW/year to \$988/kW/year.



## Green Charge Solution

### Green Charge Award

- Secured contracts for 2017 and 2018
- Using multiple sites and 4hr systems
- Dispatch is in the evening 8pm-12pm

In place of a subsidy or incentive a utility distribution system upgrade deferral program provides a competitive market value for distribution level curtailment services

In addition, the customer receives peak demand reduction and other behind the meter benefits

Potential future upside to economics is participation in wholesale market through aggregation of these NYISO located DER Assets

- Green Charge has demonstrated capability to aggregate DERs and participate in Wholesale market activities
- Green Charge has existing portfolio and experience in NYISO market
- To provide best value to the NYISO via DER aggregation/acceleration:
  - Allowance of smaller DERs to aggregate
  - Measuring battery performance directly
  - Reduced cost telemetry requirements
  - SOC considerations for dispatch signal



GreenCharge

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