AI-Driven Storage: Engaging Customers in System Peak Solutions

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Stem Overview

Stem operates the world’s smartest and largest digital energy storage network

Founded: 2009
Headquarters: Millbrae, CA
Employees: 140+
Operations In: CA, HI, NY, TX, MA, Japan, ONT
Pipeline & Installed: 800+ sites, 200+ MWh
Installed: 350 sites, 3.5M+ device hours
8 utility contracts: 350 MWh
Project Finance: $500 MM

Distinguished Honors & Awards

SEPA Power Player 2017: Innovative Partner of the Year
Stem’s Solution Components

Athena™ Artificial Intelligence
Automatically controls when energy storage charges and discharges to optimize timing, maximize savings, and create virtual power plants.

Energy Storage Systems
Modular options for all facility sizes and locations. Batteries from leading global manufacturers.

Medium indoor 132 kW modules
Small indoor 18 kW modules
Large outdoor Scalable from 100 kW to 5+ MW
• Stem is currently monetizing 7 of the 13 energy storage value streams as identified by the Rocky Mountain Institute in their report “The Economics of Battery Energy Storage”

• In the future, Stem intends to co-optimize and stack these revenue streams as well as expand the scope of available offerings and services

• Only behind-the-meter solutions can address all 13 value streams
Athena AI continuously optimizes demand reductions for customers while minimizing use of stored energy.

Net outcome: >80% of VPP aggregate energy is available for grid services.

Diversity in customer load shapes, locations and storage equipment.

Serving both Customers and the Grid
VPPs – Leveraging Vast Networks of Storage Systems

- Stem’s network of storage systems can be dispatched as a single, “Virtual Power Plant” for additional utility or grid services
- Cloud-based AI software automatically optimizes each system to preserve customer benefits while providing support to the grid
- Software decides which systems can respond and for what duration, without intervention
- Machine learning and vast amounts of data allow software to learn from each event and re-optimize for future event responses, enhancing value
In 2017 CA Grid Needed Flexibility, Fast Response

Reliability and Resilience Needs
> Unprecedented heat waves
> Ongoing wildfires disrupting transmission
> Southern CA gas supplies

Stem’s VPPs are working
> Wholesale market since 2014
> 700+ dispatches over 3 years
> Hundreds of real-time market calls – no manual intervention

“That’s awesome. Wish all “DR” would respond like this!” – CAISO Staff

On August 28, 2017 Stem simultaneously dispatched 14 VPPs (over 100 systems)
Partnering for Greater Customer & Grid Benefits

Customer Benefits

- Site peak reduction = lower customer demand charges
- Coincident peak contribution reduction = lower cap tag (or PLC) charge

Grid Benefits

- Private sector equipped and engaged to help NY realize 2030 50% Clean Energy Standard and GHG reduction goals
- Customer sited energy storage is a platform on which NY can build addition grid supporting programs
Benefits for New York

Engaging Consumers in Grid Mod, Higher RE, GHG Goals

Empower Energy Consumers
Distributed storage activates energy consumers and is the fastest and cheapest way to solve distribution-level challenges.

Enable Renewable Energy
Keeping the grid stable at high penetration levels of wind and solar enables widespread reliance on renewables.

Increase Grid Efficiency
Relieving the strain on the grid during peak times reduces the need for “peaker” plants and increases utilization rates.
Policy Recommendations

• Fully compensate storage for peak demand reduction value
  ➢ Rates, tariffs, customer programs
    ▪ Local DR programs include BTM storage
    ▪ Cap tag/PLC
    ▪ VDER should credit non-exported value and should improve value if charged from onsite solar

• Encourage BTM storage in more utility NWA procurement (e.g. BQDM)

• Set robust MW and BTM expectations in REV Earnings Adjustment Mechanisms (EAM)
  ➢ Could be achieved through either tariffs or procurements

• Set short-term bridge incentive to help fulfill 1.5 GW landmark storage target