

Virtual Power Plants for Electric Cooperatives

Member-site and Large-scale Battery Storage with Stem



AI and Software Transform VPPs

With the rapid adoption of renewable energy and battery storage, virtual power plants (VPPs) will be far more prominent and dynamic than in the recent past. Electric cooperative utilities can capitalize on the aggregate power of resources - including C&I energy storage systems and electric vehicles (EV) charging stations - and build a fast, flexible grid with software and artificial intelligence (AI) that can rapidly adapt to the needs of their members.

Member-Sited DERs Make VPPs More Intelligent

The difference between a VPP and a more traditional, point-to-point demand response (DR) program is key. A VPP means the aggregator is responsible for delivering a contracted amount of energy or service to the grid. It's the aggregator's job to choose which resource will be activated and how much to ask from each. The off-taker or utility wants to know which resources participated, putting the onus on the aggregator to both deliver and report.

In comparison, previous DR program technology is not equivalent to VPPs because they were made of simpler agreements between end customers and utilities. When the DR signal was dispatched, the end user responded; it was a one-to-one relationship between participating customers and the utility. VPPs, however, provide more sophisticated control between the utility and customers' Distributed Energy Resources (DERs), deciphering which customer doesn't have any energy to give from its on-site resources and which customers do when events are called. VPPs deliver the amount of resources to the utility that it needs, having solved for the complexity of all those disparate customer situations with an extra layer of intelligence.

Software Optimizes for Peak Demand Charge Reduction

Co-ops and their members have a lot to gain from strategic selections of VPPs beyond just keeping efficient operations and low energy costs. To enhance those benefits,

Why Co-ops Choose Stem

- Peak shaving to lower energy costs
- Resilience and backup power
- Renewable energy integration
- Grid stabilization
- Transmission and distribution (T&D) deferral
- Wholesale market participation

Co-op Benefits

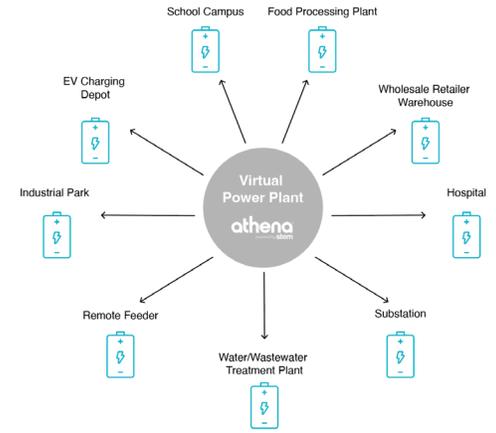
- Single interface to manage distributed assets
- Top-tier battery suppliers
- More efficient and economical use of distribution system against grid peaks
- Allows for optionality with ownership structures
- Enables proactive solution offering to members, especially large energy users
- Less GHG emissions than peaker plants

Member Benefits

- New, automated revenue streams from VPP participation
- Lower energy costs overall
- No disruption to operations – “set and forget”
- Better value from onsite solar
- Enhanced energy resilience if battery provides backup power

artificial intelligence AI-driven VPPs are the next step in the evolution of distributed battery storage programs.

Stem's best-in-class AI-driven energy software, Athena®, drives success for VPPs by optimizing the economic and operational trade-offs necessary for successful program participation. Athena optimizes for peak demand charge reduction to ensure peak shaving with lower energy costs, resilience and backup power, renewable energy integration, grid stabilization, and more.



Why Partner with Stem?

We're playing a key role in helping co-ops get projects to the finish line through our extensive experience in storage development efforts, supply chain strength, technical and economic analysis, as well as construction and permitting support to achieve optimized revenues in the market.

For co-ops located in an ISO market, Stem works with electric cooperatives to size energy storage projects, register the systems with independent system operators (ISO), and develop and submit optimized bids into day-ahead and real-time energy markets as well as ancillary services markets.

Entire Lifecycle Support for Co-ops

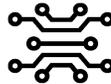
Stem's VPP Solution

Stem's expertise, networks, and dedicated support makes energy storage easy.

Design



Strategy & Professional Services Consulting



System Design & Engineering

Deploy



Stem Partner Network

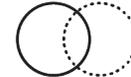


Deep Supplier Relationships

Operate



Athena® Revenue Optimization



Dedicated 24/7 Support Team

Project Highlights



Stem VPP realizes more than 30% greater monthly energy savings

Electrodes Holdings LLC's 345MWh portfolio with Stem operates as a VPP, providing controllable capacity to the local utility. Optimized software operation of the fleet delivers energy savings to customers, on-demand capacity to the utility, and economic returns to Electrodes while supporting California's clean energy transition.

Location: Southern California

Customer Sites: 86, serving 25 commercial & municipal customers

Total ESS Capacity: 345MWh

Solutions: Energy Storage, Utility Bill Optimization, Demand Response

To learn more about Stem's solutions for Electric Cooperatives, visit <https://www.stem.com/customers/co-ops/>.

