

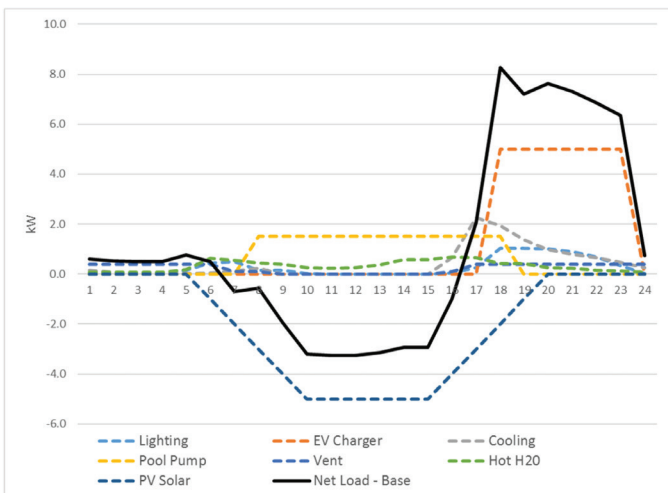


CEC Grant to Drive Practical Applications of Advanced DER Intelligence and Smart Loads

California Energy Commission (CEC) Grant Funding Opportunity GFO-15-311 recognized the need for increased usage of smaller resources in grid management, calling for applied research to assess how such resources respond to price signals. Offering powerful insight into this complex issue, Itron has developed a residential distributed energy resource management system (RDERMS), which has the potential to reduce peak loads, lower grid costs and increase reliability through automated data analytics and web-enabled communication among devices.

With AESc as the project lead and supported by EPC-15-048 grant funding, the project team will deploy the RDERMS system in a 100-home real-world laboratory equipped with the DERs and smart loads of tomorrow, studying practical application of technology and dynamic price strategies.

Figure 1 – Static Tariff Individually Controlled Residential Loads



Residential Solar & Electric Vehicles Present Big Challenges Requiring Bold Solutions

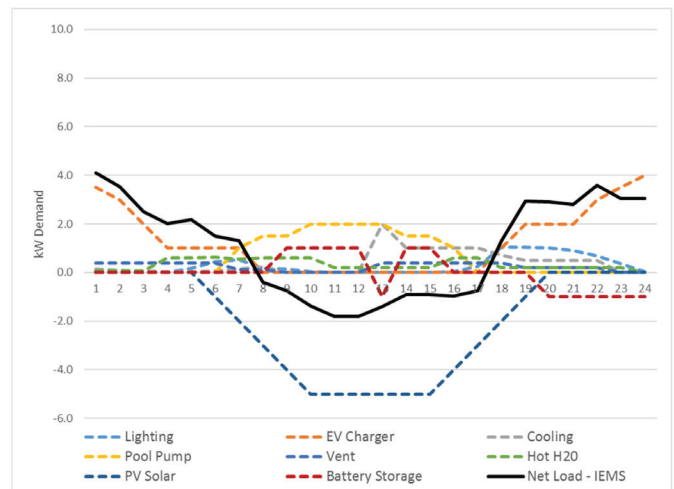
Load volatility and grid reliability challenges are growing in California, in part due to the proliferation of PV solar roofs, electric vehicles and other DERs. Managing this volatility requires innovation and practical applications of technology.

The vision for tomorrow’s grid is well established:

1. Individual homes with distributed intelligence-optimizing smart loads, in concert with on-site renewable power production and on-site energy storage.
2. Load forecasts from millions of homes aggregated & provided to grid operators.
3. Dynamic price signals prompting load profile and price signal iteration to achieve balance.

The EPC-15-0 48 project will study the crucial missing link between smart homes and smart grid, seeking to advance our collective ability to enjoy the benefits of a greener, smarter, more reliable electric grid.

Figure 2 – Dynamic Price Signal Comprehensively Optimized Residential Loads





Technology of Interest

The RDERMS leverages continuously updated information to empower smart, efficient energy use. Its web-connected hub analyzes price and weather data to communicate with end-devices and optimize consumption with the goal of lowest cost to the consumer. The system consolidates day ahead load forecasts – from potentially millions of homes – and facilitates dynamic price signal iteration by transmitting forecasts to a demand clearing house ultimately connected to the grid operator. Thanks to CEC funding, this cutting-edge technology is progressing further toward market adoption at scale.

Results-Driven Intelligence

By optimizing on-site loads and assets in concert, with the goal of achieving the lowest cost to the consumer while collectively responding to price signals intended to drive grid reliability, the technology of interest will lower costs for the consumer and increase grid reliability for the benefit of all stakeholders. This objective represents a true alignment of interests among consumers, solutions providers, utilities, regulators and environmental concerns.

High Potential Impact

Preliminary analysis has shown potential coincident peak load reduction of up to 7.3 GW in California. This potential assessment is based on control of 3 million residences equipped with PV solar roofs, 2.6 million 5kW residential battery storage systems and 1.25 million electric vehicles with smart charging systems.

Knowledge Transfer and Market Transformation

Information collected about price signals, controls strategies, user behavior, and other factors will drive project conclusions, which will be shared with stakeholders. Study findings will also guide strategies to encourage positive market developments. Ultimately, the CEC funding will allow a working model for the technology to be developed - a valuable step forward in advancing energy leadership goals.

A Credible, Capable Project Team

The diverse project team includes technologists and innovators, an investor-owned utility, a leading non-profit sustainable energy advocacy and a Technical Advisory Committee consisting of thought leaders and subject matter experts from throughout the energy industry.

Alternative Energy Systems Consulting

- Prime Contractor, Project Administrative Lead, Technical Advisory Committee Chair

Itron

- Developer of the RDERMS and Lead Technologist

San Diego Gas & Electric

- Dynamic Tariff, Price Signal and IOU Subject Matter Expertise

KnGrid

- Demand Clearing House Technology and Subject Matter Expertise

Center for Sustainable Energy

- Tariff Analytics, Evaluation, Measurement and Verification