

DR12.25: Irrigation Load Control Pilot Program

Southern California Edison (SCE) engaged BPL Global (BPLG) to provide SCE with an advanced Demand Management solution that would be used to provide operational control, monitoring and management of irrigation loads. SCE desired to demonstrate a solution that was able to operate through BPLG's Connected Energy (CNRG) Demand Management solution interface as well as respond directly to OpenADR commands. The longer term goal of the pilot is to create a solution that is able to provide both capacity and ancillary services to CAISO through the control of irrigation pumps and wells.



BPLG installed direct load control devices that communicated using On-Ramp Wireless infrastructure. The BPLG load control devices were installed on two different pumps at SCE's Tulare Energy Education Center. BPLG scheduled test events with on-site SCE personnel to verify operation of the controlled devices.

BPLG and SCE then conducted a product demonstration session where BPLG ran the system through a series of agreed upon scenarios that demonstrated the ability to fully control the pumps through both BPLG's CNRG software as well as through an OpenADR open source generated command.

In addition, an advanced Farmer Portal was demonstrated to show the advantages generated to the farmer or grower who participates in a load control program with SCE. These benefits include, remote on/off capability, current and historic operating status of controlled devices, and a weather map overlay feature that shows the farmer or grower the current weather conditions at the site location.

The system performed as expected in providing detailed operating information for system, including on/off operating state of each pump, electrical load of each pump while operating and the aggregate load of all devices being controlled by the system. There was also successful demonstration of the OpenADR 2.0 functionality and the capability to control agriculture pumps for demand response.



PROJECT OVERVIEW

Why DR for Irrigation?

California has the largest agricultural industry in the US and is consistently the largest user of irrigation. The growing season also lines up perfectly with the peak energy usage times of May through September. Energy used for pumping water for irrigation presents a good opportunity for demand response and the remoteness of the systems makes it a good fit for Automated DR.

What was done?

BPLG's CNRG Demand Management solution consists of the hardware, software, communications and services that are needed to deliver an end to end irrigation load control pilot project for SCE.

The system was deployed on pumping systems at SCE's Tulare Energy Education Center. This location was convenient and had an On-Ramp Wireless access point installed in close proximity to the candidate sites that offered reliable communications services as well as having local SCE personnel available to monitor and validate system operation. Two pumps were equipped with load control devices.

After installation of the load control devices were installed, the following tests were successfully conducted:

- Use of On-Ramp Wireless communications protocol to demonstrate a simultaneous curtailment event on both pumps
 - o Curtail load for specific period of time with normal restore at end of event
- Use of On-Ramp Wireless to demo curtailment event on each individual pump
 - o Dispatch for specific period of time with normal restore
 - o Dispatch for specific period of time with unplanned cancellation with restore
- Perform curtailment event defined by kW reduction amount
- Demonstrated the functionality of OpenADR 2.0

BPLG successfully completed the above tests to demonstrate the required system functionality as outlined in the SOW, which therefore met the pilot program goals and objectives.

Conclusions

The overall objective of the project was to demonstrate the capability of BPLG's advanced load control technology in anticipation of leveraging the technology as part of a broader program. The BPLG Demand Management solution utilizes a variety of communications backhaul methods (On-Ramp Wireless in this case), responds to OpenADR requests, provides metered metrics at the device level and delivers benefit and value to participating farmers.

The project successfully achieved this objective. In addition, the delivered solution demonstrated added value to farmers and growers through the Farmer Portal. This portal enables the ability for remote on/off control, view of operating state of all participating loads, and geographical overview of devices, including a weather map overlay to provide farmers and growers with current weather at site locations.

Next Steps

- Create and schedule a class/workshop at the Tulare Energy Education Center that conveys program benefits to potential customers.
- Broaden the target audience to others within SCE including stakeholders with OpenADR program interests.
- Investigate location for installation of a cellular communications load control device to compare latency with On-Ramp Wireless.
- Refine the concept of an operating model that allows for the adjusting of controlled load in response to non-spinning ancillary service needs

These Findings are based on the report "Southern California Edison's Irrigation Load Control Program" which is available from the ETCC program website.