

## Honeywell International, Inc.

### *Full-Scale Implementation of Automated Demand Response*

#### Scope of Work

Honeywell International, Inc. (Honeywell) worked with Southern California Edison (SCE), Pacific Gas and Electric Company (PG&E), and San Diego Gas and Electric (SDG&E) to demonstrate, on a utility program scale, commercial acceptance of automated demand response (autoDR). Honeywell provided a turnkey utility-style program effort to sign up and implement technology for commercial and industrial customers whose average electric load exceeds 200 kilowatts (kW). Large-scale customer adoption of autoDR enables partner utilities to initiate and automatically execute customized load shedding and other strategies in response to peak load event notifications or price signals. Honeywell provides all aspects of customer delivery for the autoDR program, including customer audits, installation of customer-sited automated load control devices, and recommendations for optimal demand response strategies.

#### Objectives

This project coincides with the California utilities' adoption of critical peak pricing (CPP). CPP is a mandatory tariff for new large commercial customers. The project aimed to address obstacles to effective participation in demand response programs and secure load shed during demand response events.

#### Deployed Smart Grid Technologies

- **Advanced electricity service options:** New enabling technologies have enhanced existing SCE, PG&E, and SDG&E demand response programs. The project deployed control systems that integrate with existing energy management, data logging, alarming, scheduling, and network systems to provide customers with tools for optimal responses to demand control events and time-based rates. The control systems are equipped with Internet connectivity to communicate with a demand response automation server (DRAS) and provide web serving capability for supporting energy management system operations. The DRAS responds to demand response event signals from the California Independent System Operator (CAISO) and sends commands over the Internet to the control systems, which respond by automatically adjusting designated equipment including lighting, air conditioning, ventilation, and refrigeration. The project involved the installation of autoDR systems for 320 facilities ranging from retail stores to manufacturing plants.
- **Shadow meters:** The project included deployment of pulse interface boxes, or "shadow meters," to complement the energy management functionality of the control systems. The shadow meters collect electricity use data at predetermined intervals and provide the data in real time to facility operators so that they can take additional

#### At-A-Glance

**Recipient:** Honeywell International, Inc.

**State:** California

**NERC Region:** Western Electricity Coordinating Council

**Total Project Cost:** \$22,768,726

**Total Federal Share:** \$11,384,363

**Key Partners:** Pacific Gas and Electric Company, San Diego Gas and Electric, and Southern California Edison

**Project Type:** Customer Systems

#### Equipment

- 505 Energy Management Systems - Implementation and Load Shed Verification Completed at 320 sites
  - Web-Connected Control Systems
  - Shadow Meters

#### Time-Based Rate Programs

- Time of Use
- Critical Peak Pricing
- Peak-Time Rebate
- Real-Time Pricing

#### Key Benefits

- Reduced Operating and Maintenance Costs
- Deferred Investment in Generation
- Reduced Greenhouse Gas Emissions

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actions to reduce peak loads or otherwise optimize the level and timing of electricity use. The metering data is used for demand response market settlements with CAISO.

- **Time-based rate programs:** Existing time-of-use rates and other pricing options were offered in conjunction with SCE's existing flat and tiered rates. Other pricing options included the Summer Advantage Incentives program (CPP) and real-time pricing.

**Realized Benefits**

- **Reduced operating costs:** Savings were substantial for participating customers. A manufacturing facility in Torrance, California, received more than \$75,000 in bill credits for its participation in 11 demand response events in 2012 and 2013. One participating food distributor reduced its monthly electricity bills from \$50,000 to \$35,000 and its monthly power consumption by 25%.
- **Reduced electricity consumption and deferred investments in electricity generation:** Honeywell enrolled 65 customers, involving 320 sites, with control of more than 52 megawatts of curtailable electricity demand. Curtailing demand enables utilities to defer investment by reducing load instead of adding generation capacity.

**Lessons Learned**

- During the recruitment phase, Honeywell found that ideal customers fall into three categories: (1) customers whose operations make it possible for them to curtail demand without affecting performance, (2) customers whose systems are easy to automate for demand response, and (3) customers who already manually participate in demand response.
- Water districts that operate large pumping stations and have flexibility to shift demand from on- to off-peak periods are well-suited for autoDR and were found to be among the most ideal customers.
- Honeywell found that most customers have developed their own energy management priorities and strategies. For example, many commercial customers value heating and cooling highly and are not interested in total curtailments. However, they are willing to change set-points, turn off some chillers, and change air handler speeds.
- Manufacturing and industrial customers present some unique challenges for autoDR because they often face complex decisions about trade-offs in productivity and performance in exchange for demand curtailment incentives.
- Continuous follow-up with customers is necessary to ensure greater participation during the beginning of each demand response season. Personnel turnover at customer locations can create an issue when previously trained personnel are not on hand to operate and fully participate in autoDR events.

**Future Plans**

- Honeywell continues to implement and verify the load shed capability of 185 sites initiated as part of this project (estimated completion date December 31, 2015).
- Future plans include activities aimed at lowering system development and implementation costs. Honeywell also plans to find new ways to lower hardware and software costs. As part of the project, the company reduced the cost of the autoDR gateway by 50%, but further reductions are needed to improve cost-effectiveness and enable wider adoption.
- Going forward, the company plans to focus marketing efforts on the most attractive customers for autoDR systems, including water-pumping facilities, big box retailers, and large manufacturing plants.

**Honeywell International, Inc.** *(continued)*

- As utilities change incentive structures for their customers, Honeywell needs to expand its capabilities and offerings to make the system attractive to a broader array of customers.

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