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16046

Available for licensing in some
fields

Available Technologies

Transactive Control Demand Response

SUMMARY

Researchers at PNNL have developed a novel demand response system that is based on a bi-directional “transactive” response approach. This system determines the optimal operation for smart loads and utility devices based upon consumer preferences and location-specific grid health parameters.

With the electric grid being increasingly stressed with intermittent renewable energy sources and the electrification of personal transportation, utilities and grid operators are considering ways to use demand as a resource, rather than only considering additional generation and transmission. Researchers at PNNL have developed a demand response technology based on a locational marginal price (LMP) that is generated by comparing consumer usage preferences to real-time price information for generation and transmission. This information is used in a location-specific, 5-minute double auction to return a price to the customer’s home or building energy management system, enabling an economic decision by the consumer on when to operate the appliance or load.

This transactional-control demand response system was tested in PNNL’s landmark Olympic Peninsula Smart Grid Demonstration Project that proved the ability and willingness of customers to respond to real-time price information. More significantly, the system demonstrated a remarkable ability to control system demand peaks and create a stable and predictable load profile for the utility. PNNL’s patent-pending transactional demand response system allows this process to occur down to the feeder level, leaving the decision making up to the consumer, rather than the utility.

ADVANTAGES

- * Minimizes the need for new generation & transmission capacity
- * Allows grid operators a way to manage demand on peak days
- * Mitigates wholesale price spikes by leveling demand
- * Utilizes demand for ancillary services



STATE OF DEVELOPMENT & AVAILABILITY

Software tested and demonstrated in the Olympic Peninsula Smart Grid Demonstration Project. Currently being demonstrated on the two largest smart grid demonstration projects in the U.S. The technology is available for licensing in all fields of use.

Technology Portfolio(s)

- » Electric Utility Operations
- » Smart Grid Devices

Potential Industry Applications

- » Energy & Utilities

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