

# Demand Response & Smart Grid

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# Outline

- 1 Demand response context
- 2 OpenADR technology demonstration
- 3 Other efforts
  - residential demand response
  - smart grid strategy

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# Why Demand Response (DR)?

## Past obstacles to DR:

- hydro-based power system
- sufficient resources
- little or no demand charges

## Reasons to try DR now:

- resources: future regional marginal resources will change
- distribution: can be targeted to relieve specific areas
- system:
  - ▶ flexibility in overall system
  - ▶ wind integration needs
- research: rapidly evolving technology

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# Demand Response

Two kinds of demand response:

- firm (direct load control)
- non-firm (price response)

Communications, behavior and interactions are important:

- utility: send clear and timely signals
- users: need to know what to do in events
- users: ability to opt-out or override

Automation is a way to make this process more effective

# SCL / BPA Project

Co-sponsored technology demonstration:

- OpenADR technology from Lawrence Berkeley National Labs
- first time outside of California and in a heating climate

Implementation:

- implement technology
- tailor shed strategies for each customer
- *practice* strategies
- measure impacts (metering, surveys)

The goals are to demonstrate technology and understand DR potential, in this climate with realistic customer interactions.

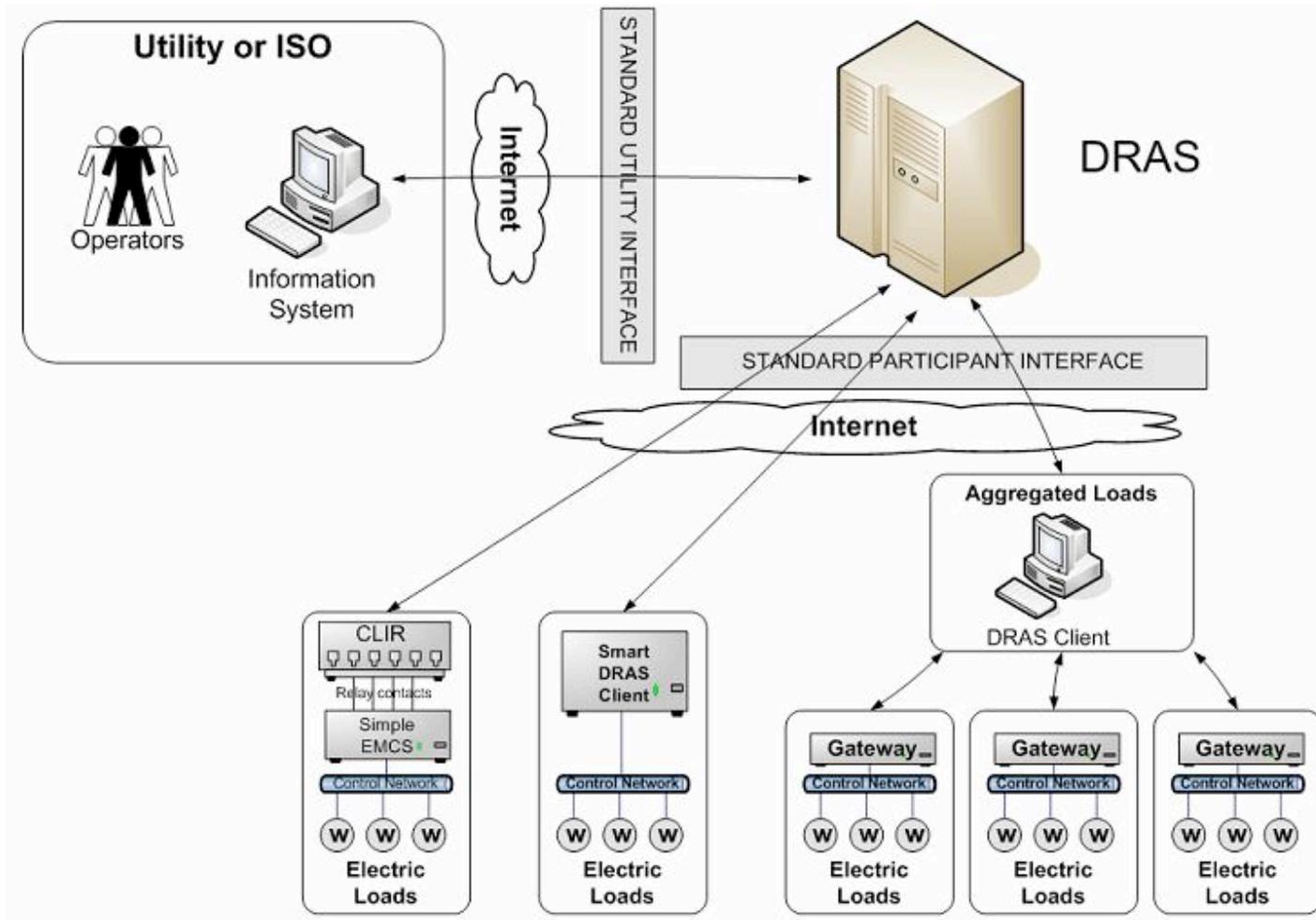
# OpenADR

OpenADR is not actually a demand response *program*.

Communications infrastructure to enable DR:

- price or reliability signal sent via Internet
- communications device to receive signal for each site
- building information system to implement shed strategies

# OpenADR



# Implementation in Seattle

4-6 commercial buildings

- big office, small office, retail, school
- most already have interval meters

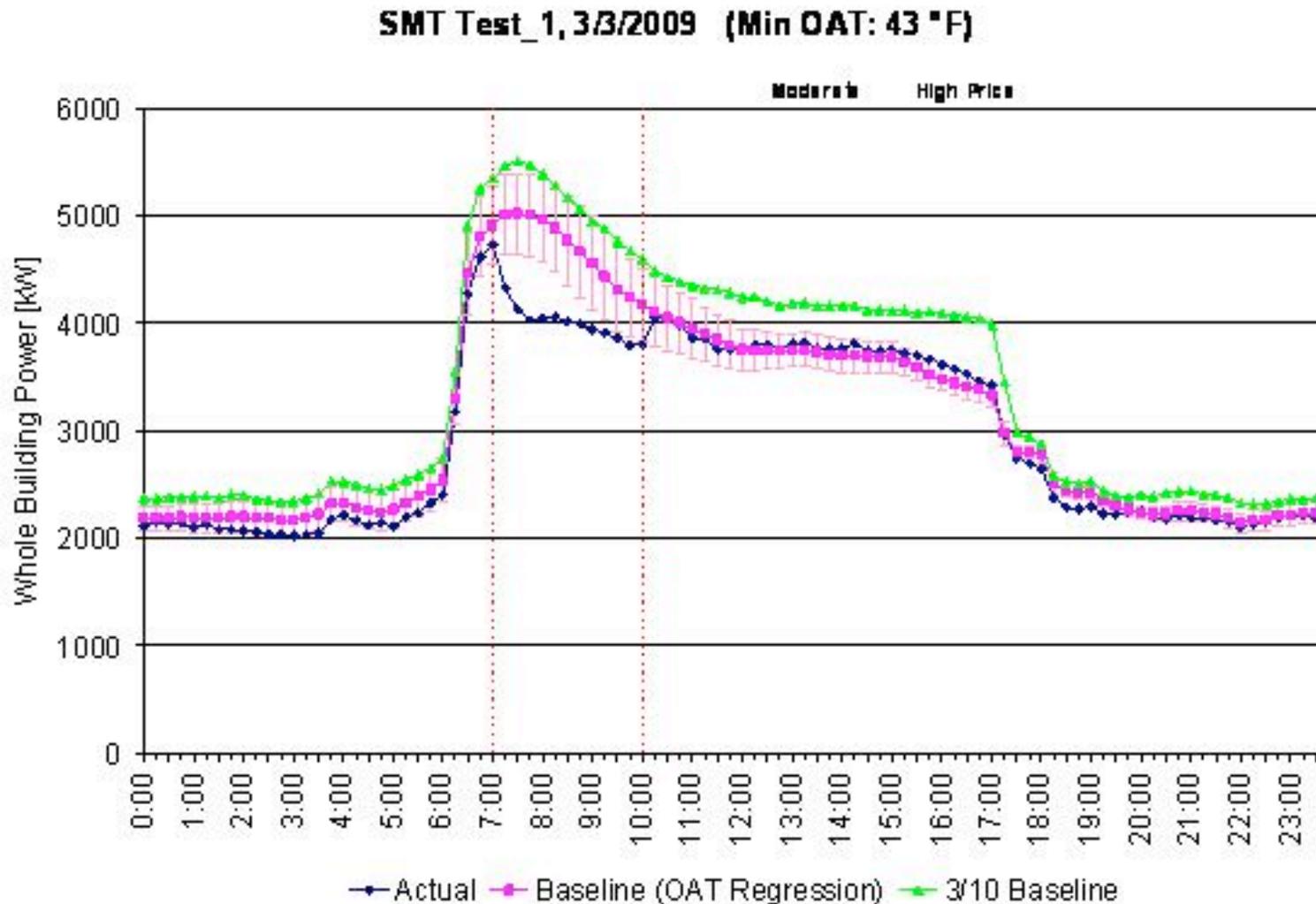
Installed costs per bldg:

DR audit	\$2,000
CLIR box	\$1,500 *
install, configuration	\$20,000 **

Testing:

- two events: day of, day ahead
- heating strategies:
  - ▶ pre-heating
  - ▶ HVAC: fans, VAV boxes
  - ▶ temperature setpoints
- lighting changes

# Preliminary Results



Average 14% drop against weather-normalized baseline.

# Residential Demand Response

Beginning scoping in Q4 of 2009.

AMI efforts are in study phase.

Thinking about how this fits in with other smart grid efforts.

# Smart Grid Efforts

Well-developed roadmap for smart grid efforts

- looking at all aspects of power delivery system
- includes substation automation, customer end-uses
- security is a key concern
- developing business case
- looking for funding

We have identified key geographic areas to focus our efforts

- feeders in residential areas
- downtown network unique to region

Thank you

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