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U.S. DEPARTMENT OF ENERGY

Overview of Research on Demand Response and Smart Meters at the Demand Response Research Center

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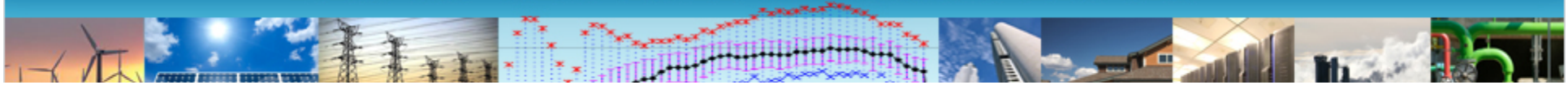
Microgrids Symposium
Evora, Portugal
September 2012

DEMAND RESPONSE RESEARCH CENTER



Presentation Outline

- Introduction to the Demand Response Research Center (DRRC)
- Research Portfolio
- OpenADR
- Smart Meter deployments in California
- Resources

Introduction to the DRRC

Research Areas

1. Energy Technology and Systems Integration

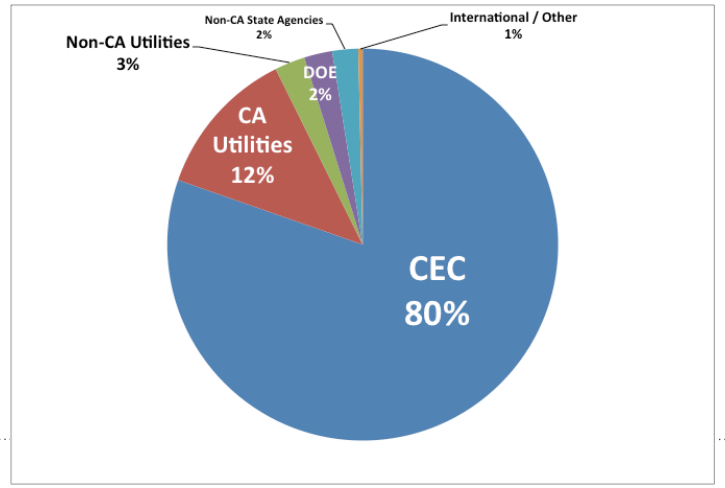
- Valuing Demand Response
- Dynamic Tariffs, Rate Design
- Communications and Telemetry

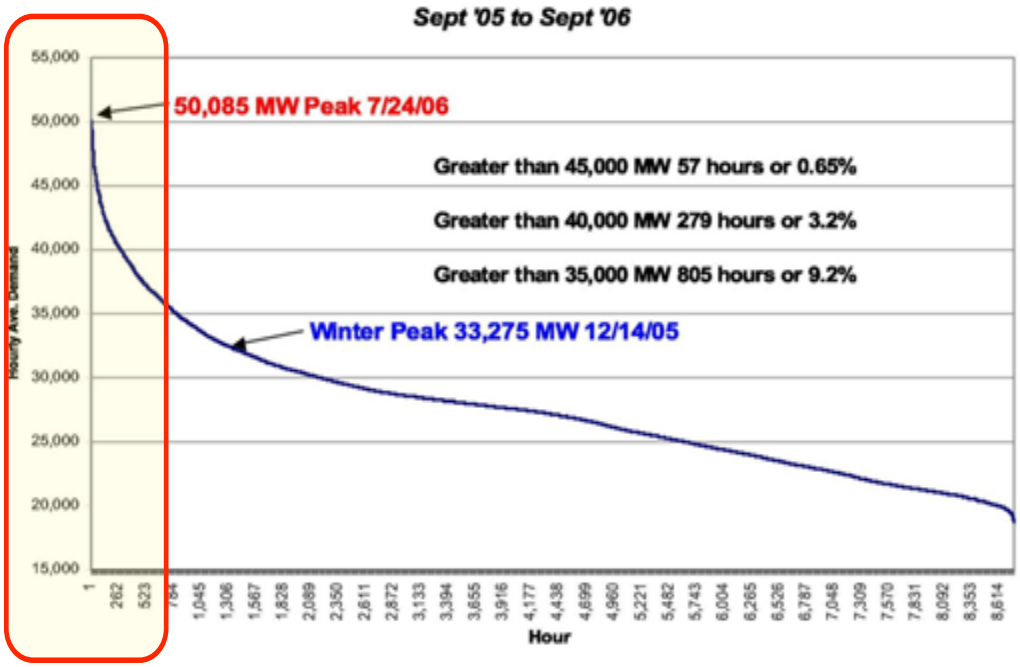
2. Commercial Buildings

- Automation, Communications and Control
- End-Use Control Strategies and Models
- Behavior–response to dynamic tariffs

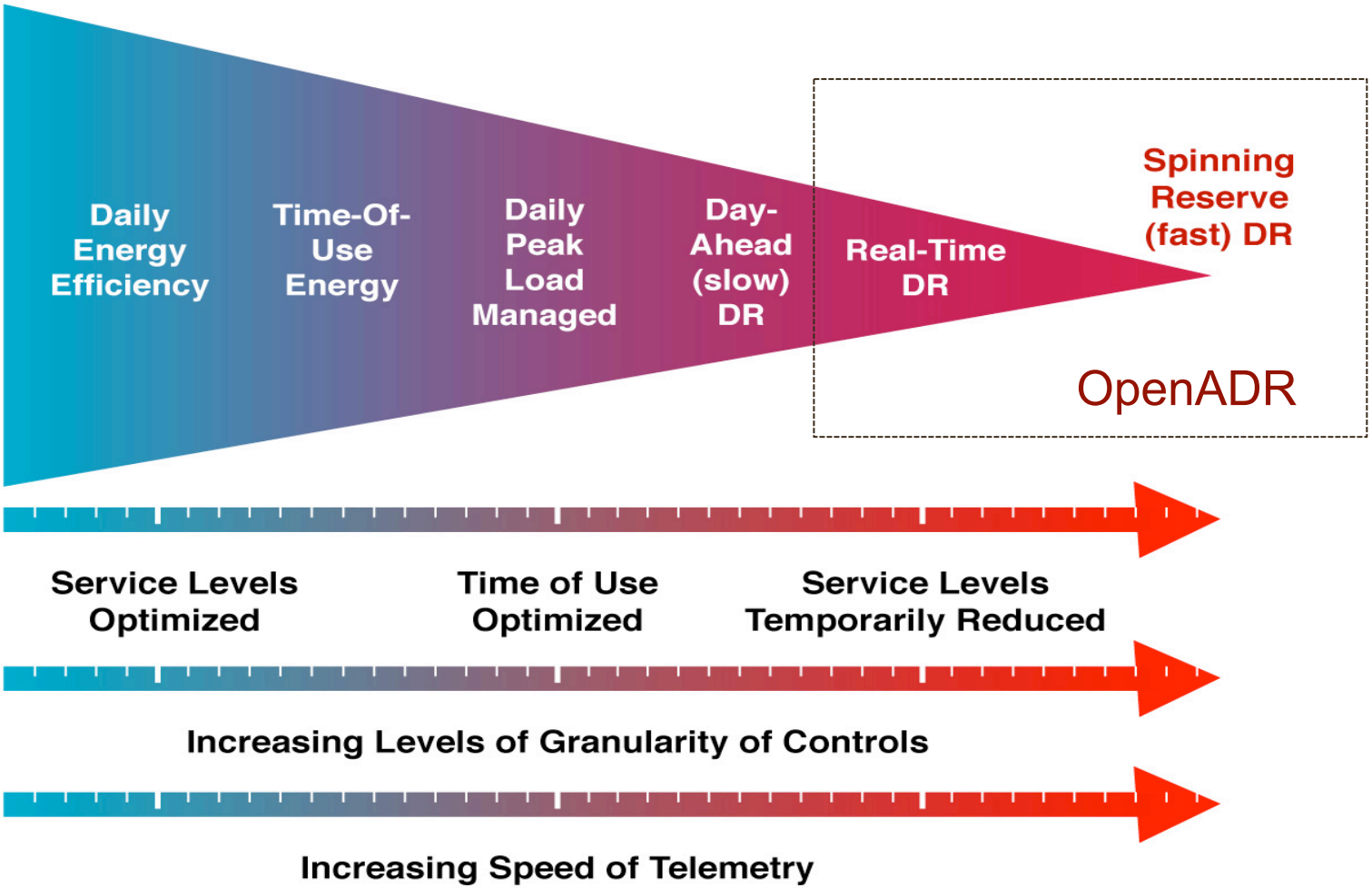
3. Industry

- Automation, End-Uses and Controls



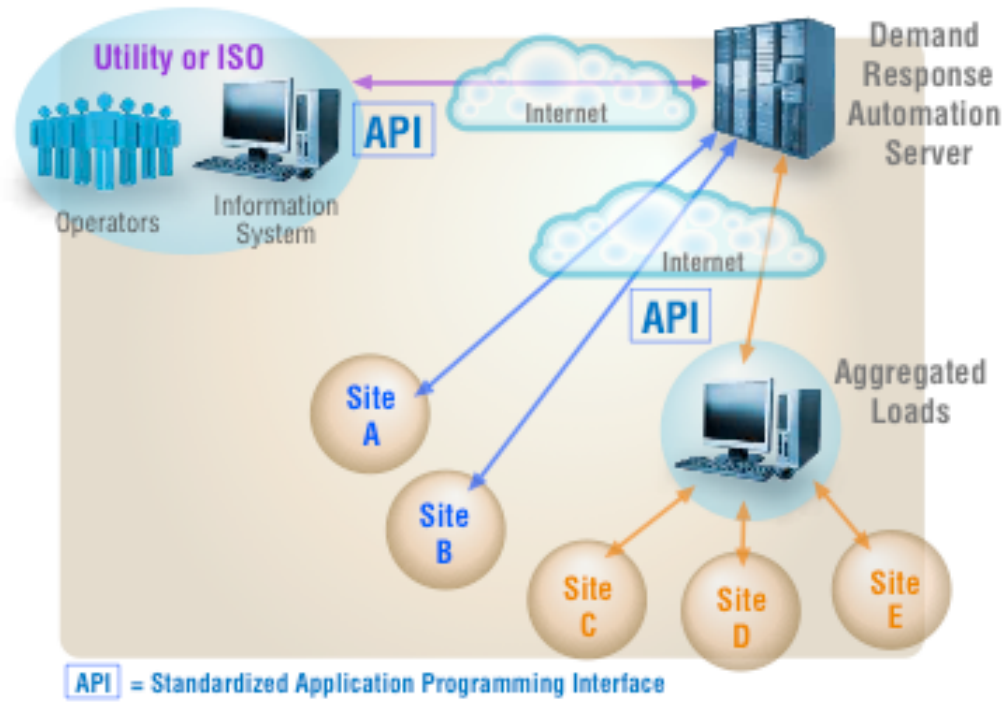


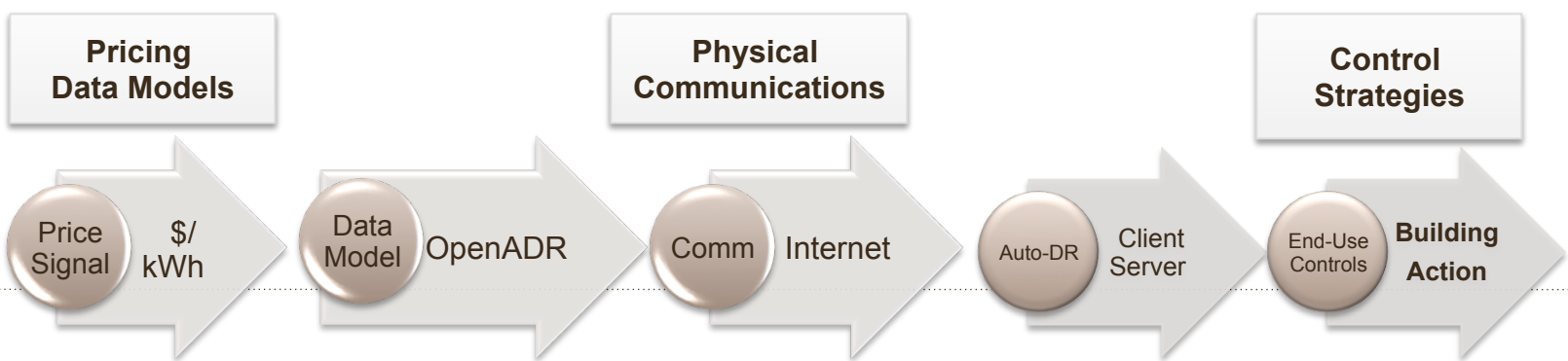
Demand-Side Activities and DR



OpenADR in a Nutshell

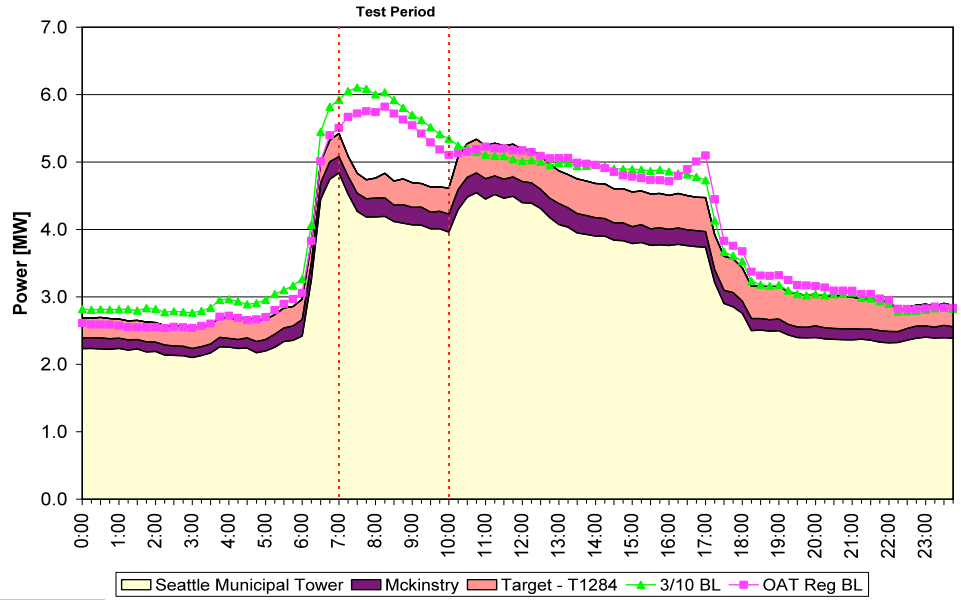
- What is OpenADR?
  - Open Automated Demand Response (OpenADR) provides a non-proprietary, open standardized DR interface that allows electricity providers to communicate DR signals directly to existing customers using a common language and existing communications such as the Internet.



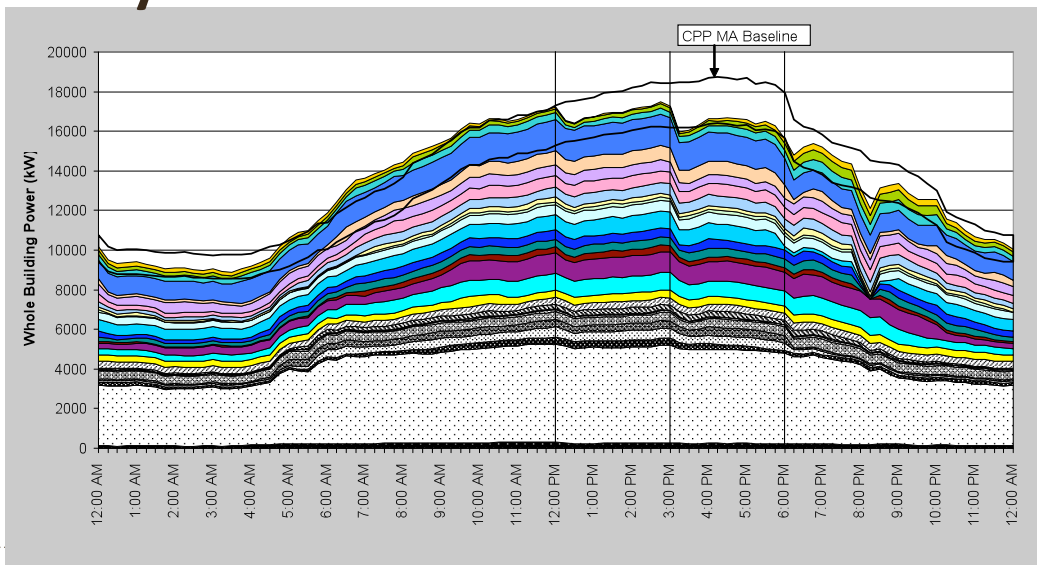


Historic Focus on Seasonal Grid Stress

OpenADR Northwest Test on a Cold Morning



OpenADR Cumulative Shed in July 2008



DR Strategies guide:
http://drrc.lbl.gov/sites/drrc.lbl.gov/files/59975_0.pdf

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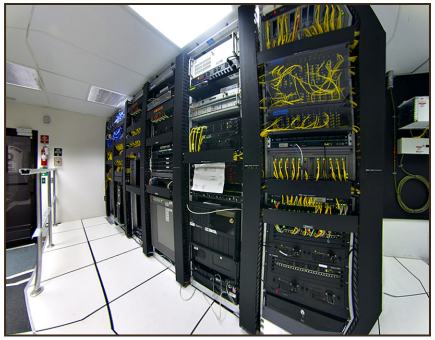
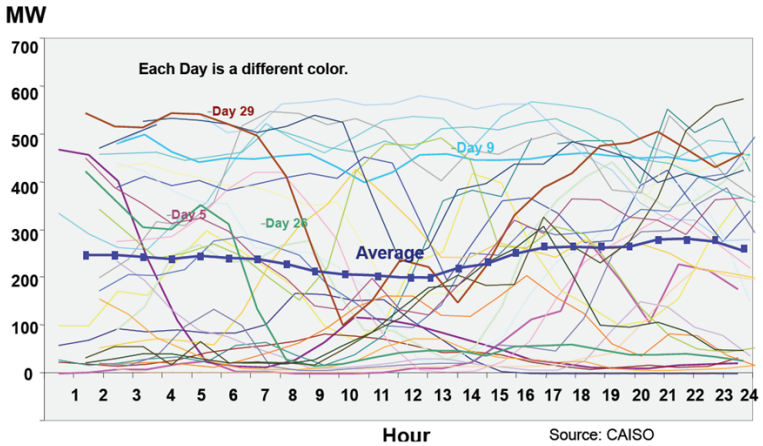
Industrial Demand Response

- **Refrigerated and Frozen Warehouses**
  - **Two case studies completed and** published
  - Strategy Guide in progress
- **Wastewater Treatment Plants**
  - Report published on EE and Auto-DR Potential
  - Two case studies completed, one published
  - More case studies in progress
- **Data Centers**
  - Report published on EE and Auto-DR Potential
  - Additional testing of DR strategies in progress
- **Agricultural Irrigation**
  - Scoping Study on DR potential in progress
- Energy Management
  - Two case studies in progress on the link between energy management and demand response capabilities in industrial facilities



Can DR be used to over come challenges related with the Integration of Renewable Resources (IRR)?

- Challenges:
  - Intra-hour variability
  - Ramping
  - Forecast error
  - Over generation



Goal: Identify communications needs and develop strategies in C&I facilities and test these to address the renewable integration challenges.

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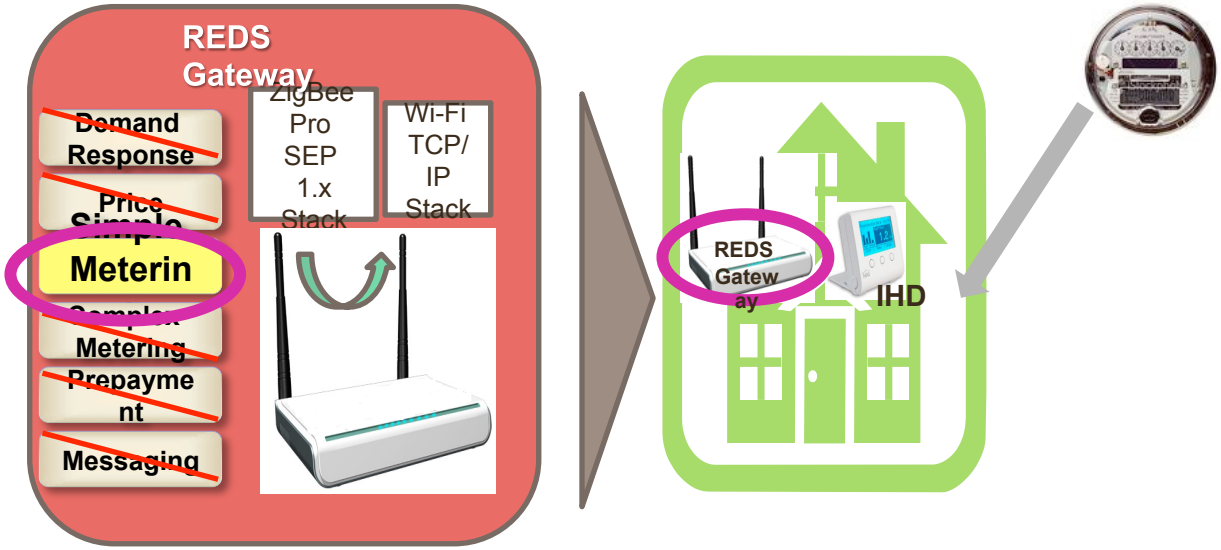
Residential Energy Display Systems and Home Area Network Evaluation



Simple Secure

Issue: Communication protocol selected from Meter to Home is insecure, so that radio is not turned on.

Thank you!

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