



# Commercial & Industrial Customer Education: Lessons from Automated Demand Response

CEC Load Management Workshop July 10, 2008

Lawrence Berkeley National Laboratory  
Demand Response Research Center  
<http://drcc.lbl.gov/>

Sponsored by California Energy Commission  
Public Interest Energy Research Program

# Presentation Overview

- **Commercial & Industrial Customer Challenges**
- **Open Automated DR Experiences & Results**
  - Challenges elaborated
- **Lessons Learned:**
  - Standardized DR communication infrastructure, understand Energy Information Systems and Performance Monitoring tools
- **Commercial & Industrial Customer Needs**

# Commercial & Industrial Education Challenges

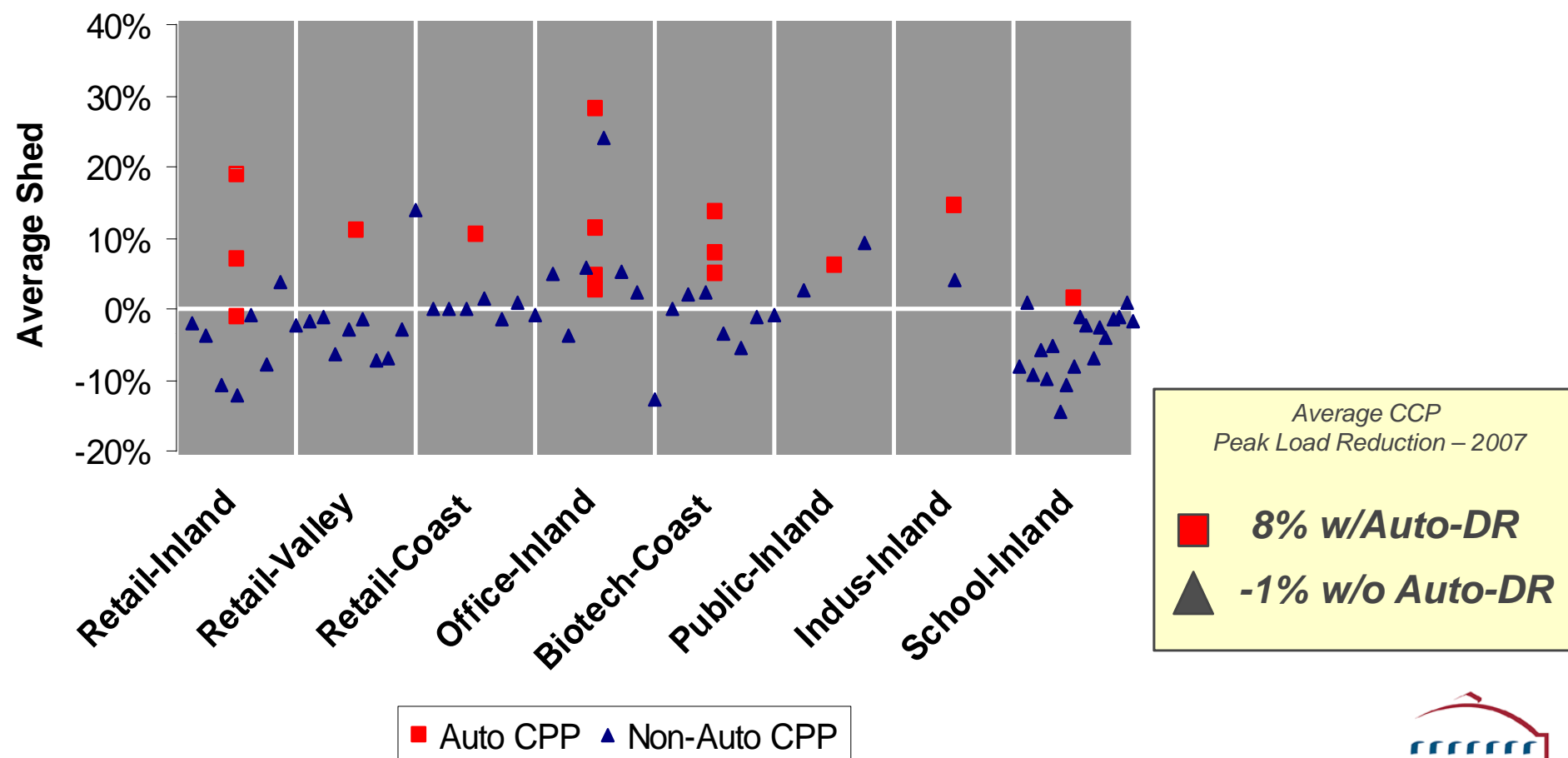
**General Statement:** Most Commercial and Industrial customers lack knowledge on how to minimize energy use, develop DR control strategies, and technical potential due to lack of experience and expertise.

## **Challenges:**

- Complex DR programs, tariffs, and incentive structures hamper development of operational strategies and create barriers to ROI.
- Constantly changing DR options and restrictive participation conditions create uncertainty and risks.
- Separating efficiency and DR can lead to inconsistent investment and operating recommendations.
- Lack of communication and technology standards increases costs, reduces effectiveness, and complicates operations.
- Lack of Energy Information Systems and Performance Monitoring Tools create barriers to operation and investment.

# Auto-DR Results – Manual vs. Automated

- Over six years of research and learning: 2002-2008
  - Field-tests using industry-grade technology to commercialization to present Open Auto-DR communication standards (OpenADR).
  - Full automation = Better response!



# Utility Auto-DR Programs, Baselines, and Rates & Tariffs

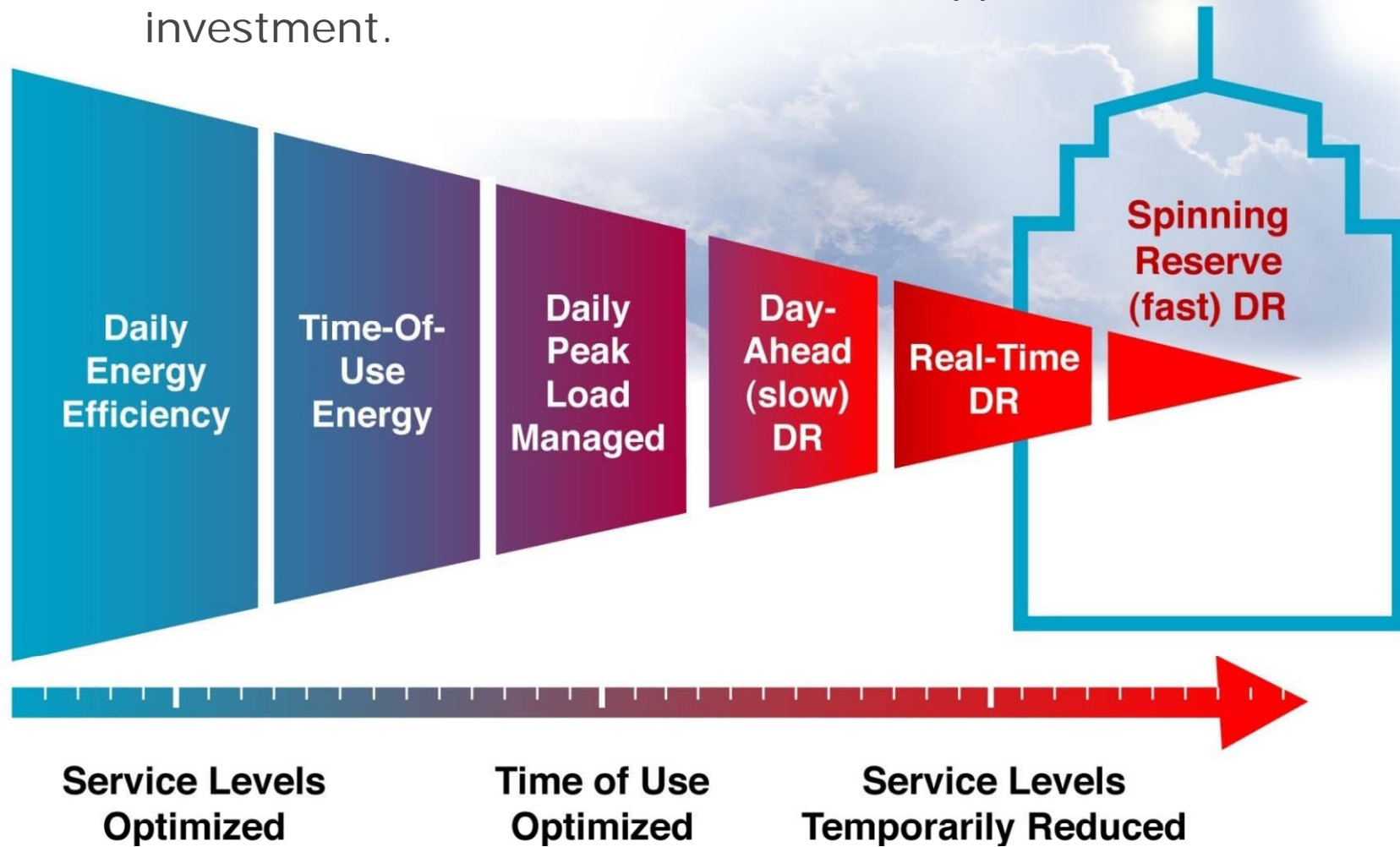
- Programs constantly changing for customer choice become restrictive, difficult to understand and respond – Control strategies and sequence of operations – RTP a solution?
- No clear action-oriented incentives and/or long-term capital investment – Bigger challenge for a large customer.
- Baselines examples:
  - 3-10 Baseline, 3-10 MA Baseline, OAT Baseline
  - “Estimating Demand Response Load Impacts: Evaluation of Baseline Load Models for Non-Residential Building in California”  
Coughlin, K., M.A. Piette, C. Goldman and S. Kiliccote. LBNL-63728. January 2008

**Reference: <http://drrc.lbl.gov/drrc-pubs-auto-dr.html>**



# Understanding Dynamic Control Framework and Energy Value Chain

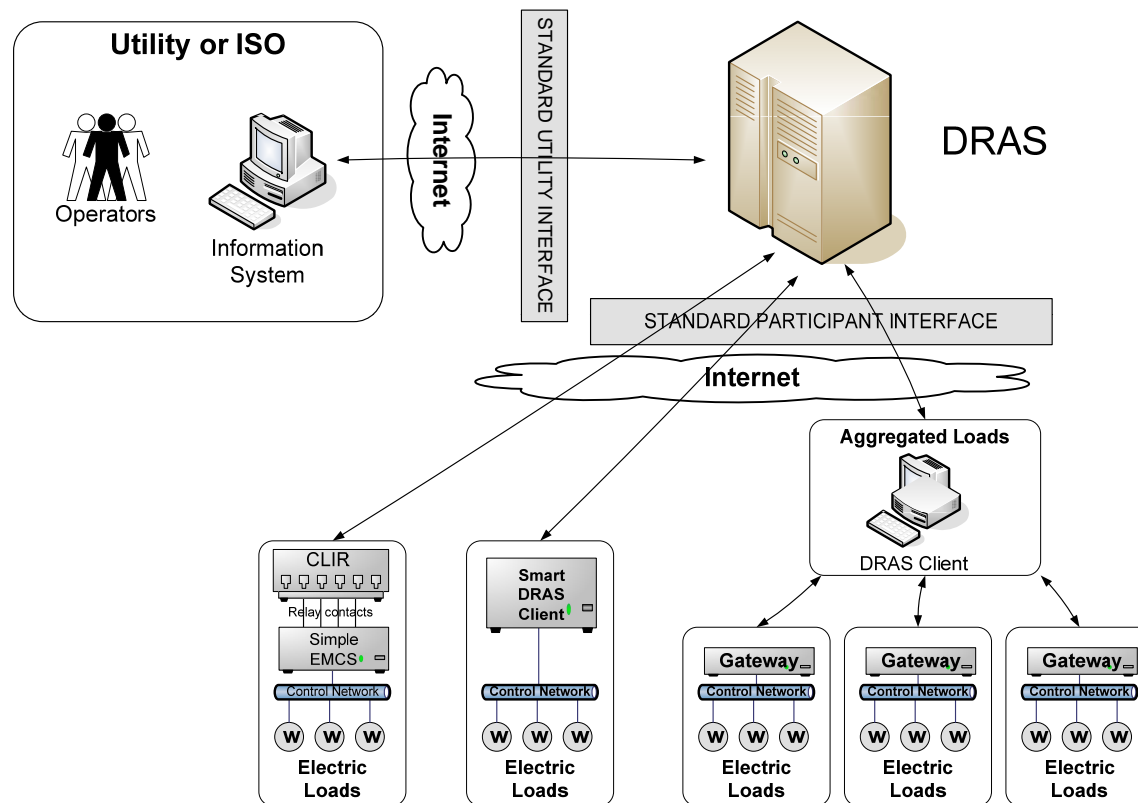
- Disparate utility budgets, goals, and lack of clear action-oriented incentives result in lack of support to customer investment.



# Auto-DR Communication Standards and Technology Integration

- Difficult to understand and proprietary energy systems result in lack of interoperability, effectiveness, and high-costs.
- Customer integration – Individual vs. Aggregated – Chain Retail stores within CA face different rates and technologies.

Reference: <http://drrc.lbl.gov/openadr/>



# Lessons Learned for Standardization and Understanding EIS-PM tools

- Defines minimum fully-automated signals for end-uses – Improved cost and effectiveness
  - Signaling.
  - Automation and End-Use Opportunities
  - Timing of Notification and Strategies
  - Scalable Data Model for Reliability and RTP
  - Industry Open Standards and Translation
  - Ease of Expandability – Need for Feedback
- Goal to move this into Title-24 code in future. E.g. GTA
- Understand and Develop Better Energy Information Systems and Performance Monitoring tools
  - Develop framework to characterize and classify EIS and PM tools for building energy analysis.
  - Evaluate and characterize current products, tools, and systems being used and developed for buildings.



# Commercial & Industrial Education Needs

- Programs and tariffs to provide clear, consistent performance-based incentives for efficiency and DR. Need DR that provide:
  - Customer choice and opportunity
  - Flexibility to adjust response to business needs
  - Capabilities maximizing control system investments by allowing simultaneous participation in both economic and reliability options
- Full integration of efficiency and DR technical support and incentive options.
- Standard, open communication, messaging data models and technology integration
- Industry supported case studies and Energy Information Systems and Performance Monitoring tools to support investment and operational decisions. E.g. InterAct™ by ITRON®
- DR control strategy guides and savings estimation tools for all sectors
  - Current tools cover large commercial guides being developed for industry
  - Research underway on small commercial

More information: <http://drrc.lbl.gov/>