Opening Remarks

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Agenda

- Vision of A Demand Responsive Future
- Systems Integration Case Study
- What is System Integration?
- How is Systems Integration Achieved?
- Strawman **PCT** (Programmable Communicating Thermostat) **SI** (Systems Integration) **I/F** (Interface)
- Panel & Facilitated Public Discussion
Workshop Purpose

- Support PCT Title 24 standards process
- Define Systems Integration Issues
  - Communications
  - Networks
  - Information exchange
- Define **WHAT** needs to be done
- Provide a Strawman for **HOW** it is done
- Get comments from stakeholders
Background

- California has a peak load problem
- Demand response (DR) solutions can be far less expensive than supply solutions
- A time-dependent system is required
- We are beginning to deploy AMI and time-based load control systems (e.g., PCT) that will need to work together
- Systems integration will be important
Cal ISO Daily Peak Loads
January 1, 2000 - December 31, 2000

Peak Day August 16 - 43.5 GW

Commercial AC
Residential AC
Options

✱ Supply-side solutions to provide for peak demand or system emergencies cost more than demand-side solutions

✱ It doesn’t take much “automated” load reduction to avoid blackouts

✱ Air conditioning is the low-hanging fruit

✱ A real-time control and communications infrastructure is required to support price and emergency signals
Policy Objectives

**Energy Action Plan (EAP)**
- “Implement a voluntary dynamic pricing system to reduce peak demand by as much as 1,500 to 2,000 megawatts by 2007.”

- Loading order has DR in second priority
- 5% peak reduction by 2007
- Dynamic tariffs for large customers
- AMI for smaller customers w/ large loads
Demand Response Definition

- **Demand Response (DR)** is the action taken to reduce load when:
  - **Contingencies** (emergencies & congestion) occur that threaten supply-demand balance, and/or
  - **Market conditions** occur that raise supply costs

- **DR typically involves peak-load reductions**
  - DR strategies are different from energy efficiency, i.e., transient vs. permanent
A Systems Integrated Vision

* Create a **real-time, automated DR infrastructure** that is simple to use and can adaptively respond to changing contingency and market conditions

* A DR infrastructure must **coexist with legacy systems, allow for future technology and tariff improvements**, and have near-, medium-, and long-term benefits to California ratepayers
Assumptions

- Minimum requirements that meet DR objectives but don’t impede the future
- Allow path for incremental upgrades
- Focus on least expensive solutions using today’s technology with a path to future
- Expedite implementations of AMI and signal-responsive load control systems
## Deployment Comparison Between AMI and Load Control Devices

<table>
<thead>
<tr>
<th>System Initiative</th>
<th>Advanced Metering Infrastructure (AMI)</th>
<th>Load Control Devices (e.g., lights, thermostat, pool pumps, EMCS)</th>
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</thead>
<tbody>
<tr>
<td>Market Process</td>
<td>Regulated</td>
<td>Unregulated</td>
</tr>
<tr>
<td>Owner</td>
<td>Utilities</td>
<td>End user (residential, C&amp;I)</td>
</tr>
<tr>
<td>Primary Function</td>
<td>Provide electricity metering &amp; monitoring</td>
<td>Control actions in response to signals: price (market), reliability (contingency, system protection)</td>
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<tr>
<td>Supported Features</td>
<td>• Changing tariffs</td>
<td>• Default control/shed strategies</td>
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<tr>
<td></td>
<td>• New applications</td>
<td>• Manual override switch</td>
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<td></td>
<td>• Inc. upgrades</td>
<td>• Default programming option</td>
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<td></td>
<td>• Net metering</td>
<td>• Remote audit/support</td>
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<td></td>
<td>• Gas &amp; water</td>
<td>• Customer choice</td>
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<tr>
<td>Other Stakeholders</td>
<td>Regulators (rate case)</td>
<td>Utilities (system reliability, incentive programs)</td>
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</tbody>
</table>
In Order to Stay on Schedule

- Clarifying questions only
- Save your comments for the facilitated discussion from 3-4 PM
- Depending on the outcome of the workshop, there may be another workshop next quarter to delve more deeply into specific issues