Automated Demand Response: Changes in Title 24

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Presentation Outline

- Basics on automated demand response
- Intent of Title 24 language
- Specific content of Title 24
- Future Directions
**Example of Automated Demand Response Communications**

**Signaling** - continuous, 2-way, secure messaging system

**Client-server architecture** - uses open interfaces to allow interoperability with publish and subscribe systems

**Current system** - uses internet available at most large facilities or broadcasting points.

**Hardware retrofit or embedded software** - many clients fully implemented with existing XML software

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**Pricing Data Models**

- Price Signal \$/kWh
- Data Model

**Physical Communications**

- OpenADR
- Comms Internet

**Control Strategies**

- Auto-DR
- Client Server
- End-Use Controls
- Building Action
Intent of Automated DR Communication

• Reduce costs to equip buildings to be DR ready
• Code language phrased to:
  – *Provide guidance* to architects, engineers, vendors, and contractors as they specify, design and build systems in future (i.e., so they understand *intent* of code).
  – *Prevent code language* that could become *irrelevant* or counterproductive due to changes in DR signal standards that may occur over the next several years.
Demand Responsive Controls – Lighting and Automation

- In buildings > 10,000 ft², total lighting power shall be capable of being automatically reduced by a DR signal by at least 15%
  - Lighting reduction shall be uniform
  - Non-habitable spaces do not count towards this requirement
  - Spaces < 0.5 w/ft² shall not count towards total power
- Per 130.5(e) DR controls and equipment shall be capable of receiving and automatically responding to at least one standards-based messaging protocol
Auto-DR Background to 2013 T24 Language
(SECTION 122 – REQUIRED CONTROLS FOR SPACE-CONDITIONING SYSTEMS)

• (h) **Automatic Demand Shed Controls.** HVAC systems with DDC to the Zone level shall be programmed to allow centralized demand shed for non-critical zones as follows:
  
  1. The controls shall have a capability to remotely setup the operating cooling temperature set points by 4 degrees or more in all non-critical zones on signal from a centralized contact or software point within an Energy Management Control System (EMCS).
  
  2. The controls shall have a capability to remotely setdown the operating heating temperature set points by 4 degrees or more in all non-critical zones on signal from a centralized contact or software point within an EMCS.
  
  3. The controls shall have capabilities to remotely reset the temperatures in all non-critical zones to original operating levels on signal from a centralized contact or software point within an EMCS.
  
  4. The controls shall be programmed to provide an adjustable rate of change for the temperature setup and reset.
Proposed Code Language (possible future compliance manual)

- Proposed language for “standards-based message protocol”

Standards-based messaging protocol shall conform to 2-way communication and is a nationally recognized open communication standard (from U.S. Smart Grid Interoperability Panel)* with a testing and certification program and a supporting authority.

- Note:
  - Acceptable standards may include OpenADR (Open Automated Demand Response) and ZigBee Smart Energy Profile.
  - Mutli-speak
  - ZigBee Smart Energy Profile is defined by the following industry alliance: [http://www.zigbee.org/Standards/ZigBeeSmartEnergy/Overview.aspx](http://www.zigbee.org/Standards/ZigBeeSmartEnergy/Overview.aspx)
Next Steps/Discussion

1. Compliance: Evidence of a T24 "compliant" device or system (i.e., OpenADR certified client gateway or feature on EMCS).

2. Implementation - specific considerations
   - How does the county or city code official check?
     - Code compliance check tools?
   - How do we educate/train the market for adoption?
Industry Alliances Support Certified Devices

- **OpenADR Alliance**

- **Zigbee Alliance – Smart Energy Profile**

*Standardize*

The interface between electricity markets and customers.

*Automate*

Customer response to fluctuating energy prices and grid instability.

*Simplify*

Your energy future & maximize the value of your DR capacity.

ZigBee®

Control your world
OpenADR Progress

Research initiated by LBNL/CEC

OpenADR 1.0 Commercialization
(PG&E, SCE, and SDG&E)

Official OpenADR specification (1.0)
by LBNL/CEC*

1. Anytime DR Pilots
   - Wholesale markets
   - International demonstrations
   - Dynamic pricing, renewables

2. All end-use sectors

2002 to 2006

2007

2008

2009

2010

2011

2012

Over 250 MW automated in California

National outreach with USGBC

1. OpenADR Standards Development
   - OASIS (EI TC), UCA, IEC

2. NIST Smart Grid, PAP 09

EI 1.0 standards
- OpenADR profiles

OpenADR 2.0 specifications
- Products, commercialization
- International standards (IEC)

Certification/Testing (v2.0)
Future Directions

- Help educate code officials
- Help ensure compliance
- Address the duck curve

**Less Steep:** reduces need for fast starting and ramping resources

**Lower Peak:** reduces need for peaking generation capacity

**Less Deep:** less risk of over-generation; better utilization of existing resources

*Note, this curve is being updated, it is used here to represent how we should look at what we are trying to accomplish.*