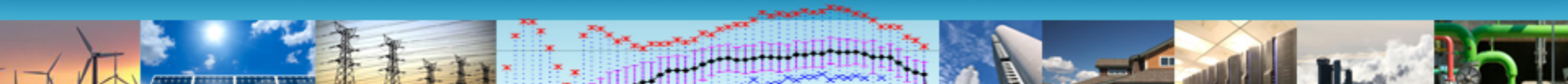
Building Codes and OpenADR

OpenADR Alliance Member Meeting, June 18 and 19, 2014

Moderator: Rish Ghatikar, Lawrence Berkeley National Laboratory
Panelists:
David Hungerford, California Energy Commission
Amanda Gonzalez, Energy Solutions
Mark Lyles, New Buildings Institute



Session Objectives and Panelists

- Building codes will help drive demand for DR/AutoDR certified products and standardization.
- This session will cover the key building codes: California Title 24 (T24) and International Green Construction Code (IgCC) and recent developments on the LEED program

- **Amanda Gonzalez:** Project Manager at Energy Solutions and a member of Energy Solutions Codes and Standards (C&S) and AutoDR Program Implementation teams. She manages Federal appliance standards cases for the California Investor Owned Utilities, and has worked on various Title 20 and Title 24 measures in California. Her area of focus is in exploring ways DR can be incorporated into building codes and appliance standards.
- **David Hungerford:** Leader DR and behavioral research areas at the California Energy Commission's Energy Research and Development program. David also serves on the Appliance Standards Regulatory Advisory Committee to the U.S. Secretary of Energy. David formerly served as Special Advisor to Commissioners Arthur Rosenfeld and Anthony Eggert.
- **Mark Lyles:** Project Manager at New Buildings Institute and involved in the IgCC activities. Mark's diverse experience includes the energy analysis of high performance buildings and extensive research on the design and construction of low energy buildings. Mark is integrally involved in the research and promotion of Zero Net Energy Buildings as well as the technical and design development of key design resources and tools.

Intent of Automated DR in Building Codes

Automated Demand Response (AutoDR) enables buildings to reduce electric demand upon the receipt of a remote signal from an electric utility, Independent System Operator (i.e., CAISO) or the designated Curtailment Service Provider/Aggregator (CSP) with no human in the loop.

- **Purpose:**
  - Provide guidance to architects, engineers, vendors, and contractors as they specify, design and build systems in the future (i.e., they understand the intent of the code).
  - Prevent code language that could become irrelevant or counterproductive due to changes in AutoDR signal standards that may occur over the next several years.
  - Enable AutoDR measures to multivariate utility and wholesale DR markets signals.

Definitions from California 24 Code Language

SECTION 100.1 – DEFINITIONS AND RULES OF CONSTRUCTION

DEMAND RESPONSE is short-term changes in electricity usage by end-use customers from their normal consumption patterns. Demand response may be in response to:

a. changes in the price of electricity; or

b. participation in programs or services designed to modify electricity use

   i. in response to wholesale market prices or

   ii. when system reliability is jeopardized.

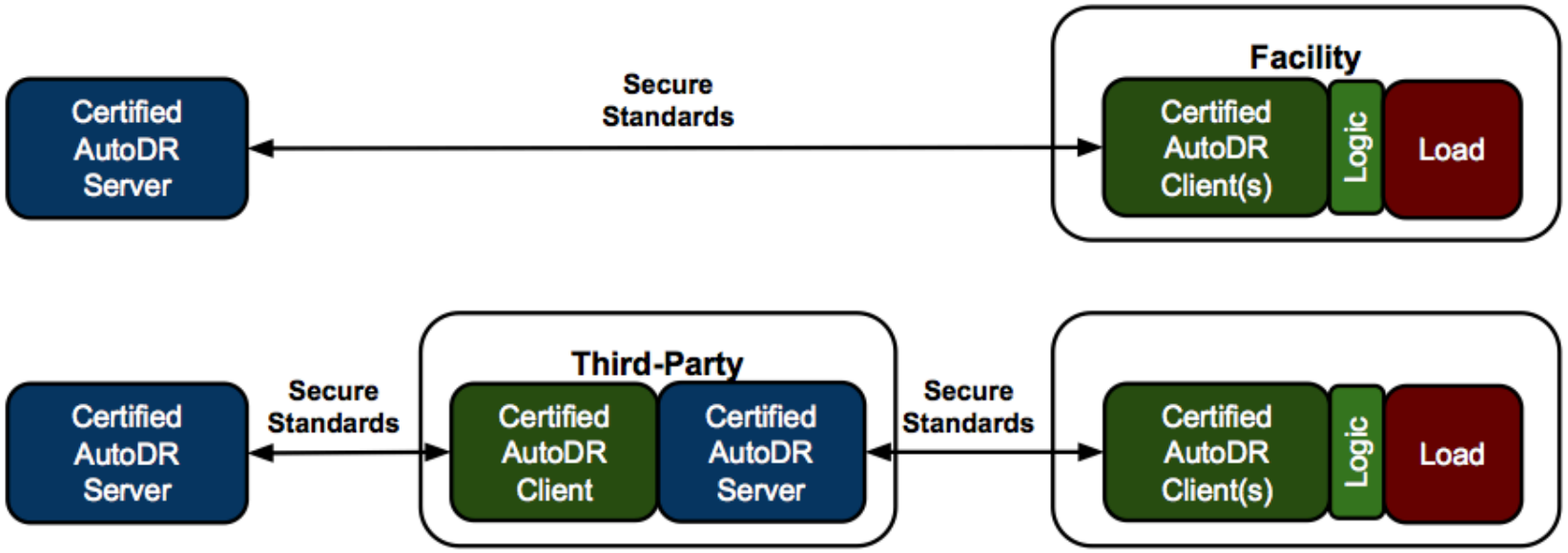
DEMAND RESPONSE SIGNAL is a signal sent by the local utility, Independent System Operator (ISO), or designated curtailment service provider or aggregator, to a customer, indicating a price or a request to modify electricity consumption, for a limited time period.

DEMAND RESPONSE PERIOD is a period of time during which electricity loads are modified in response to a demand response signal.

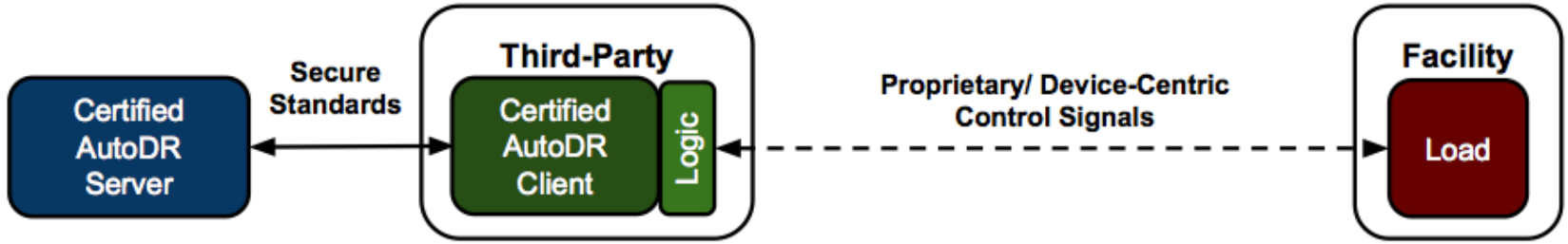
DEMAND RESPONSIVE CONTROL is a kind of control that is capable of receiving and automatically responding to a demand response signal.

ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) is a computerized control system designed to regulate the energy consumption of a building by controlling the operation of energy consuming systems, such as the heating, ventilation and air conditioning (HVAC), lighting, and water heating systems, and is capable of monitoring environmental and system loads, and adjusting HVAC operations in order to optimize energy usage and respond to demand response signals.

Examples of Communication Architectures*



Standards-based Communication between Certified AutoDR Server and Clients (***Top**: Direct communication between DR service provider's AutoDR server and facility's AutoDR client; **Bottom**: In-direct communication, through a third-party, AutoDR server and facility's AutoDR client.*)



Standards-based Communication between Certified AutoDR Server and Third-party AutoDR Client; Proprietary or Device-Centric Controls Signals between Third-party and Facility loads

* Gonzalez A., H. Hauenstein, G. Ghatikar, and P. Eilert; Codes & Standards Opportunities for Demand-Side Smart Grid Deployment; Submitted to the Proceedings of the ACEEE Summer Study on Energy Efficiency in Buildings. Pacific Grove, CA (pending publication).

BERKELEY LAB

Panelists

1. **David Hungerford**: California Title 24 Building Codes and AutoDR
2. **Mark Lyles**: IgCC and Communication Standards
3. **Amanda Gonzalez**: Building Codes and Communication Standards