



Enabling Technologies to Support DR - Key Projects at the Demand Response Research Center

California Energy Commission

DOCKETED

13-IEP-1F

TN # 71289

JUN 17 2013

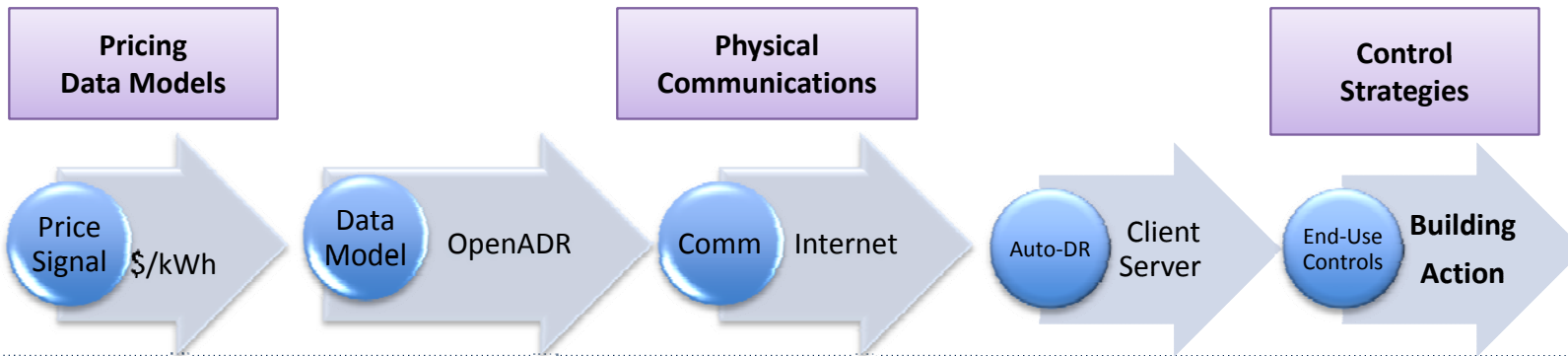
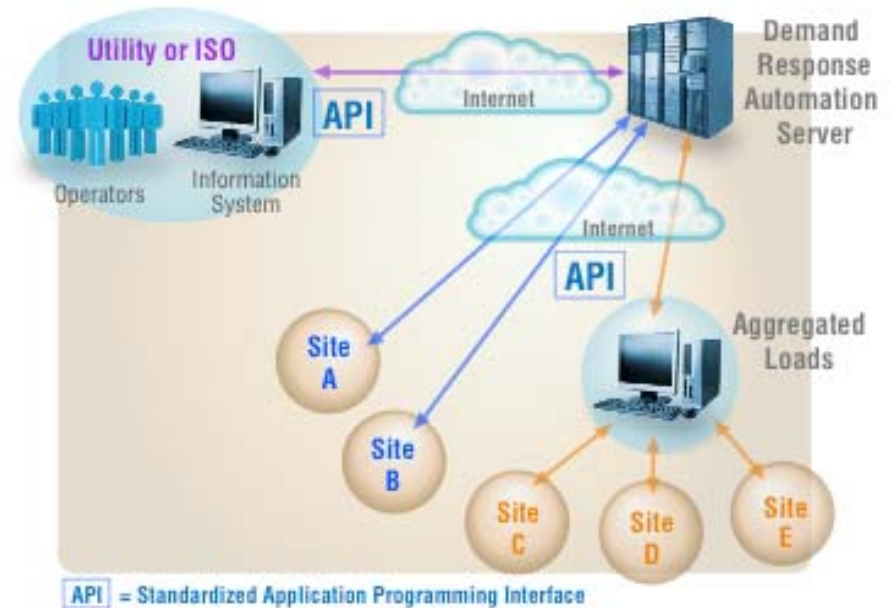
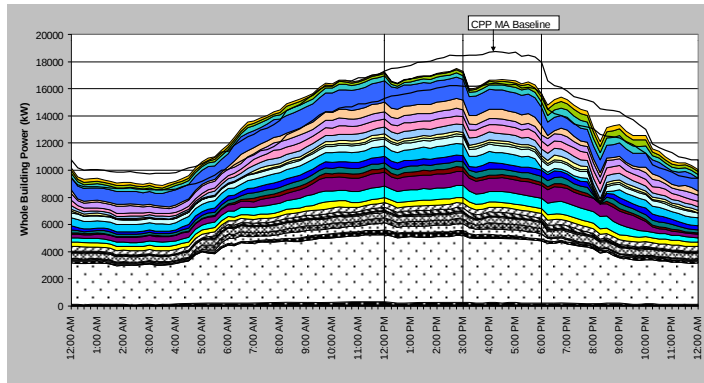
IEPR Workshop – DR Challenges and Opportunities

Mary Ann Piette

Director, DRRC, Lawrence Berkeley National Laboratory

Open Automated DR Fundamentals

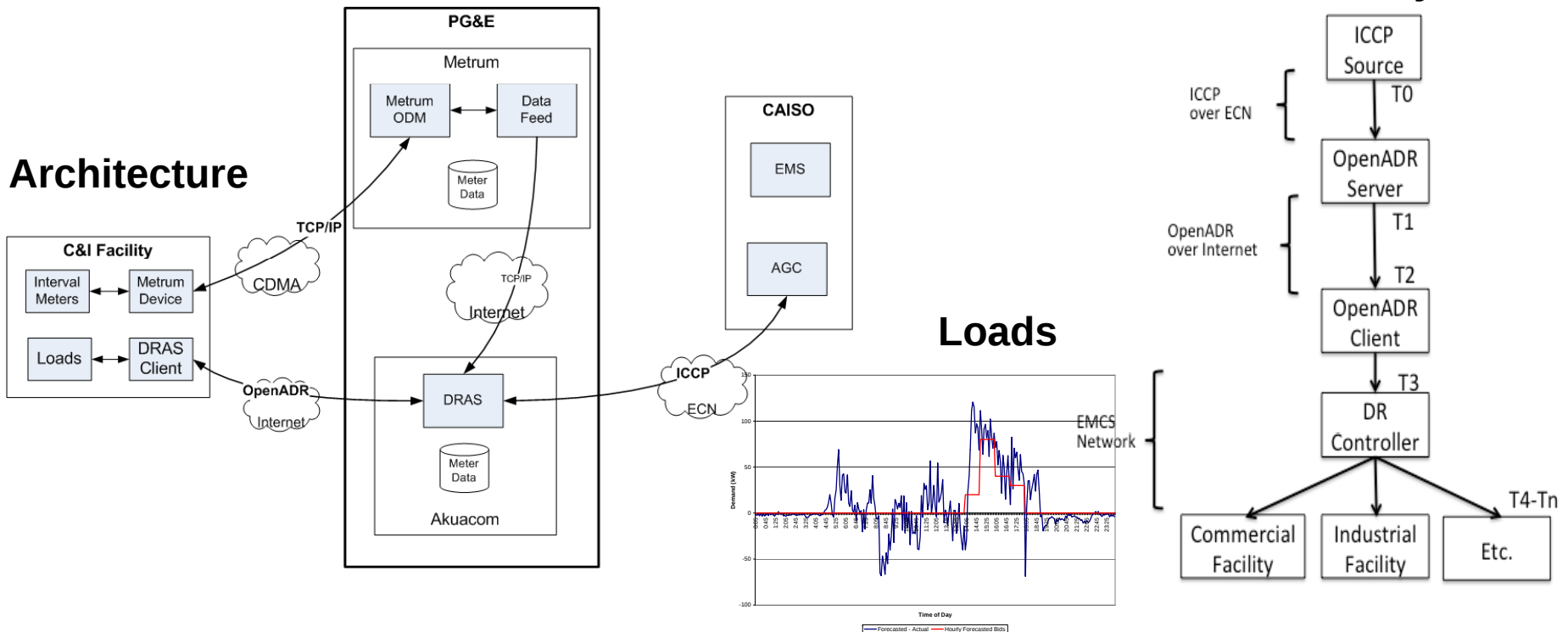
- Goal – lower cost of automation, enable investment and ensure interoperability
- Allows electricity providers to communicate DR signals directly to existing customers
- Uses common XML language and existing communications such as the Internet
- Multiple time scales of control, used for 10 years



Advanced Applications- Using Demand-side Resources for Grid Reliability with DR and Microgrids

Fast DR – Evaluating how loads can act like generators

- Development of communication, control and telemetry requirements
- Understanding markets and market participation rules
- Research concepts supported with field tests



Future - Linking Building and Grid Simulation Tools

Potential of DR in California and Dispatch Models

LOADS



Residential



Municipal



Commercial

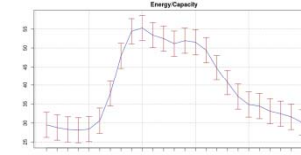
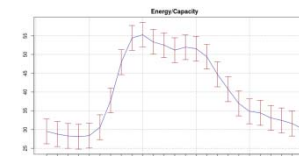
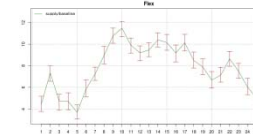
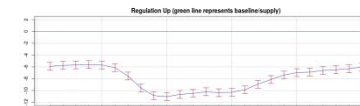
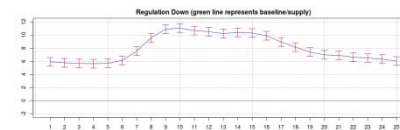


Agricultural

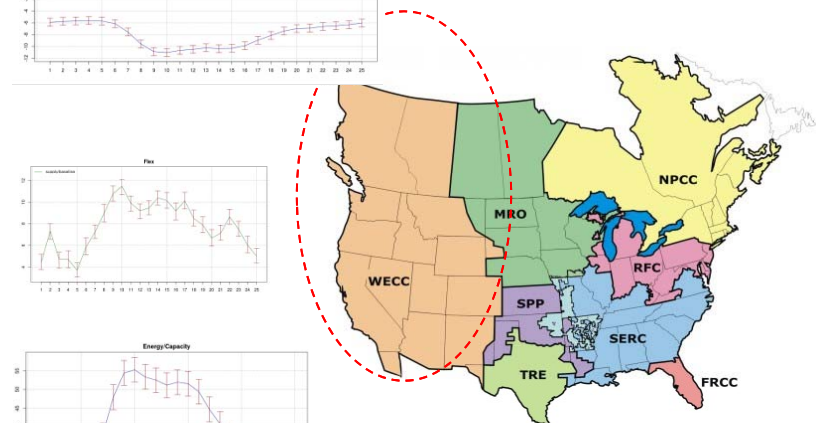
FLEXIBILITY FILTER

Response Parameters
Flexibility range (reg up, reg down, both)
Speed of Response
Store, Shift or Shed
Load response to products
Size of Response
Controllable
Sizing of Resource
Min and max daily consumption requirements
Cycling Rate Impacts (wear/tear)
Impacts on Overall Response
Rebound/Recovery Issues
Charge/Discharge
Independence
How to Predict
Predictable or Variable (daily, seasonal, geographic)
Time or Operational dependence
How it Participates
Individual or Aggregated

ANCILLARY SERVICES PRODUCTS

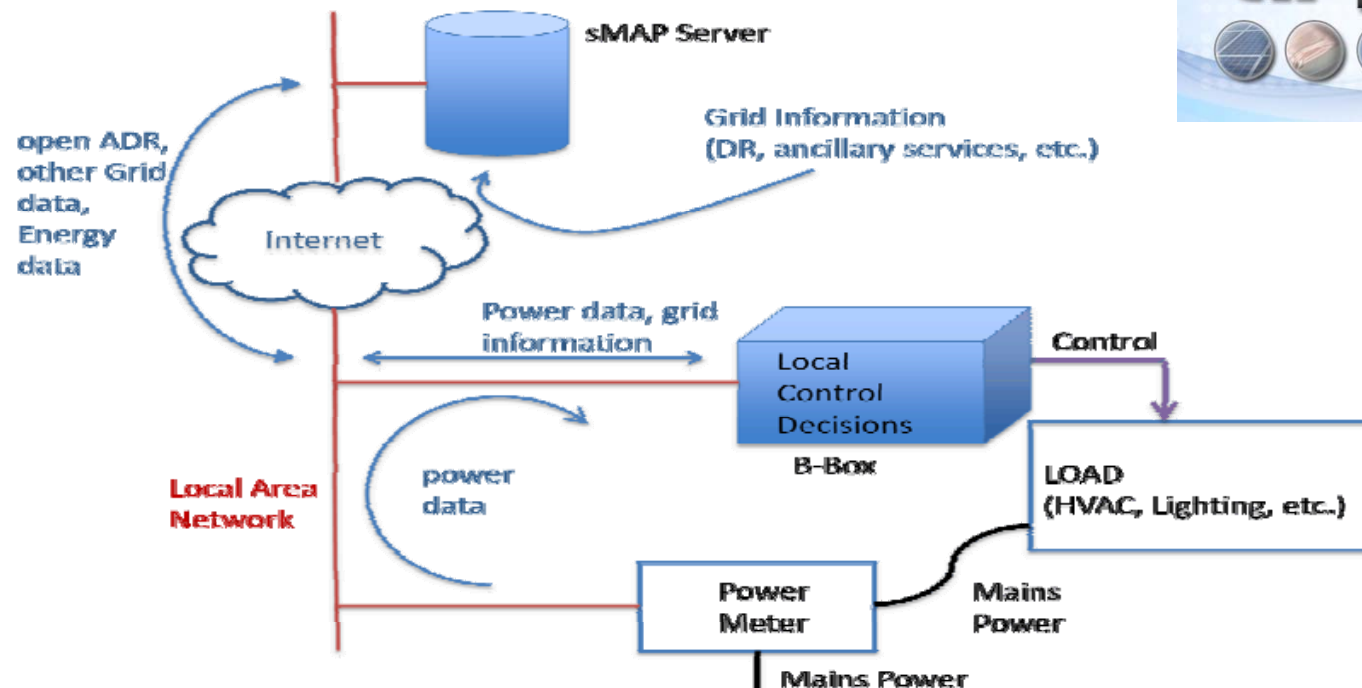


MODELS



CEC – DOE ARPA-E Project – Evaluating Cost of Telemetry and Accuracy of Forecasts

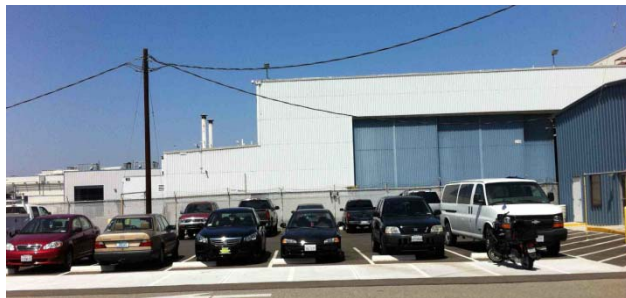
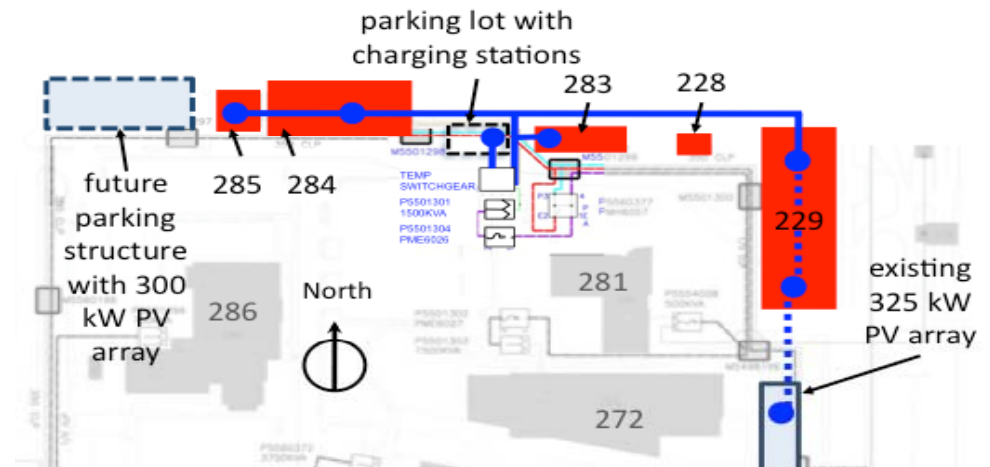
- Evaluate telemetry requirements, kW meters, communications, alternative technologies to lower cost of equipment
- Current RIG requires customization (\$10-\$25k)
- Developing new methods to better forecast loads and DR
- Current proof of concept \$800 + labor
Target: \$200 retail cost, self install



DOD Los Angeles Air Force Base Project

Los Angeles Air Force Base demonstration of vehicle-to-grid (V2G) capabilities

Exploring using OpenADR* for V2G communications



* OpenADR is a Smart Grid Standard for DR developed by the DRRC

Summary – Communication, automation and information technology can support fast DR and an expanding set of demand-side options and rate designs.

Need to expand pilots, evaluate customer value, business models and market design to accelerate deployment

Panel Speakers

- **Barry Haaser, OpenADR Alliance**
- **John Dilliot, UC San Diego**
- **Jacqueline DeRosa, Customized Energy Solutions**