

Prioritizing Demand Response Enablements

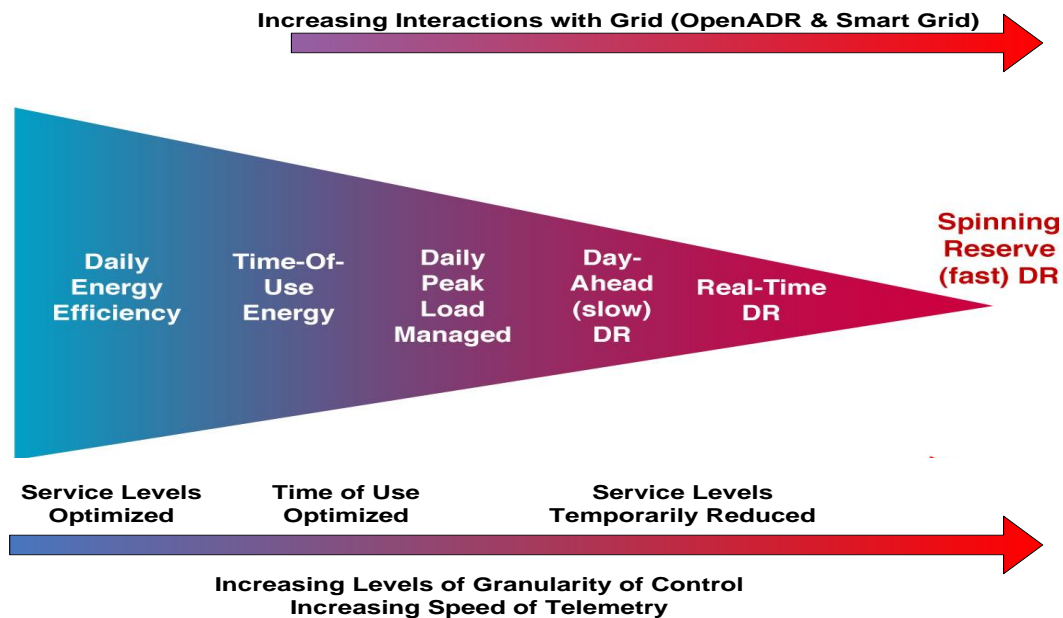
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Context: Demand Response

- DR is moving towards being exercised as a more flexible resource

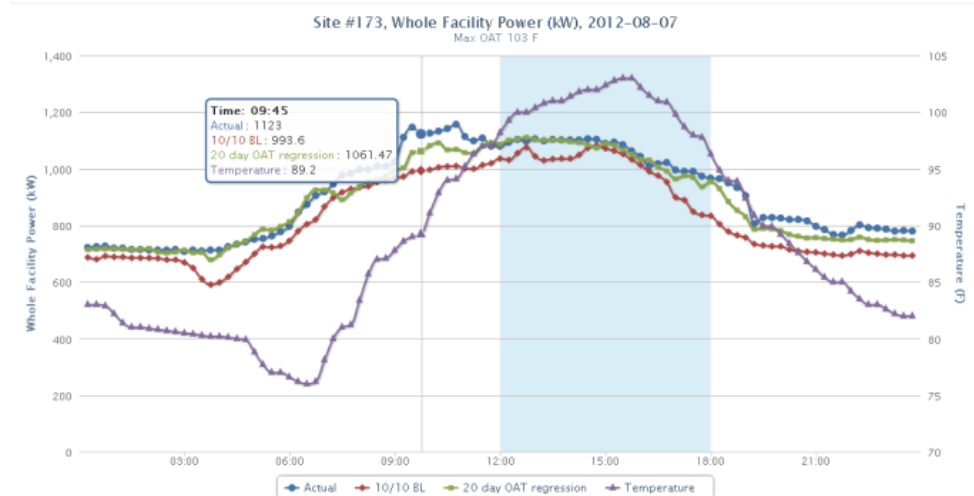


Introduction

- **What metrics are most useful to prioritize DR enablement among buildings?**
- Demand Response critical issues
 - Response time
 - Reliable load reductions
 - Making a financial case
 - Reduce load while maintaining comfort
- Each of these is influenced by properties of building systems

Key Building Characteristics

- Weather Sensitivity
- Load Variability from day to day and over time
- Load Characterization – peak load time and magnitude
- Size and density
- Type of use (e.g., office, retail, cold storage, etc.)



Baseline Options

- Averages from similar days – commonly used by utilities; assumes that recent past information is a good predictor of today's use
- Outdoor air temperature – assumes energy consumption is strongly influenced by weather

Create Baselines

Type: XY Baseline

X/Y Baseline:
 X = Y =

Adjust Baseline

Create Baseline

	Baselines	Adjustment		
		Start Time	End Time	Cap Percentage
<input type="checkbox"/>	10/10 baseline			
<input type="checkbox"/>	20 day OAT regression			
<input type="checkbox"/>	10/10 baseline	10:00:00	13:00:00	

Clear Selected Baselines
Clear All Baselines

Click "Create Event" when finished

Create Event
Cancel

Developments in Baselines

- Compare similar days (e.g. Tuesday load vs. Monday load)
- Load characterization
- Adjustments compensate for energy usage differences outside of event times.

Demand Response Database

- Distinctions made according to
 - building type (typically end use or function),
 - location,
 - footprint,
 - DR strategies,
 - DR program parameters (how often, how long)
- Analysis tools identify load variability between days, weather sensitivity of loads, and range of loads and actual loads shed in response to DR events over time
- Choice of baseline development options

new site

Site Name:

Description:

Floor Area (sqft):

Year Built:

Building Type:

Zip Code:

Utility Territory:

DR Strategy:

HVAC

Lighting

Plug

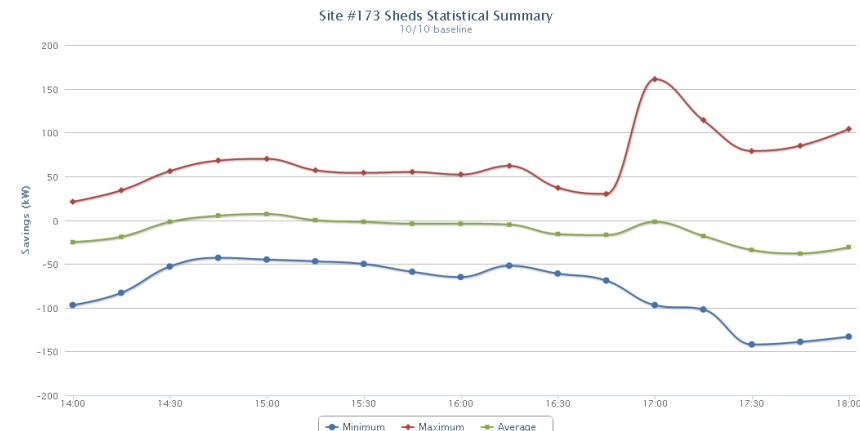
Industrial Process

Agricultural Process

- Hospital
- Large Hotel
- Large Office
- Medium Office
- Midrise Apartment
- Outpatient Health Care
- Primary School
- Quick Service Restaurant
- Secondary School
- Small Hotel
- Small Office
- Stand-alone Retail
- Strip Mall
- Supermarket
- Museum
- Detention Facility
- Manufacture
- Storage
- Hotel
- Office

Demand Response Metrics

- *kW shed* – historically most reported figure of merit but lacks context
- Peak load timing (compared with the timing of DR event)
- Relative measurements
 - W/sq ft
 - % Whole Building Power
- Enablement Costs (\$/kW)
- Peak Load Benchmarking (magnitude & timing)



Conclusions

- Extending analysis previously done only on the shed data may provide insights into more effective Demand Response strategies
- Comparisons of similar energy intensities (W/ft^2) provide a stronger basis on which to develop load reduction strategies
- Benchmarking peak loads provides insight into building performance characteristics that can better identify useful DR strategies