Prioritizing Demand Response Enablements

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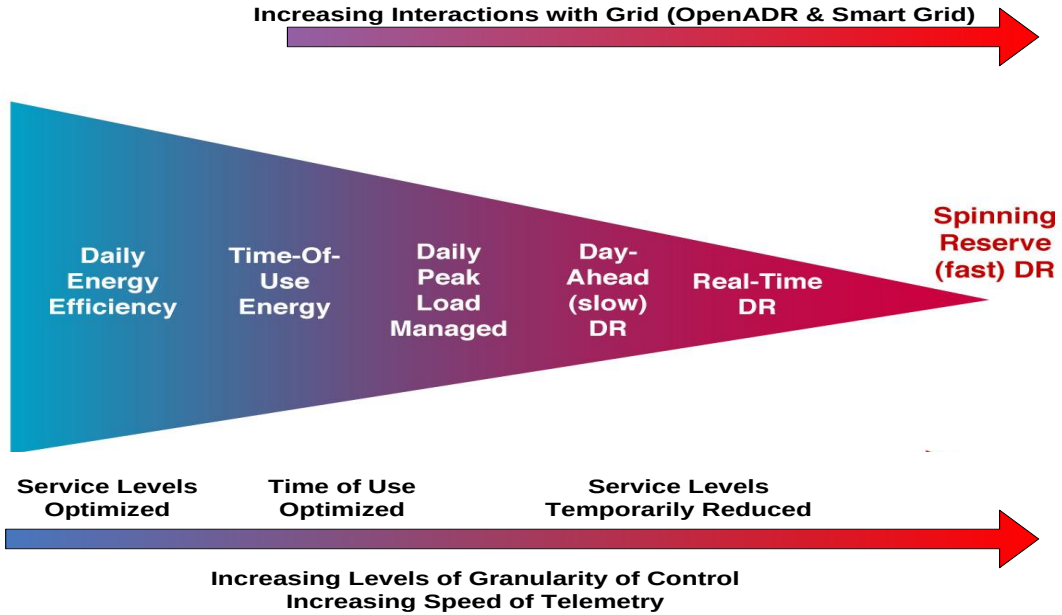
Context: Demand Response

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



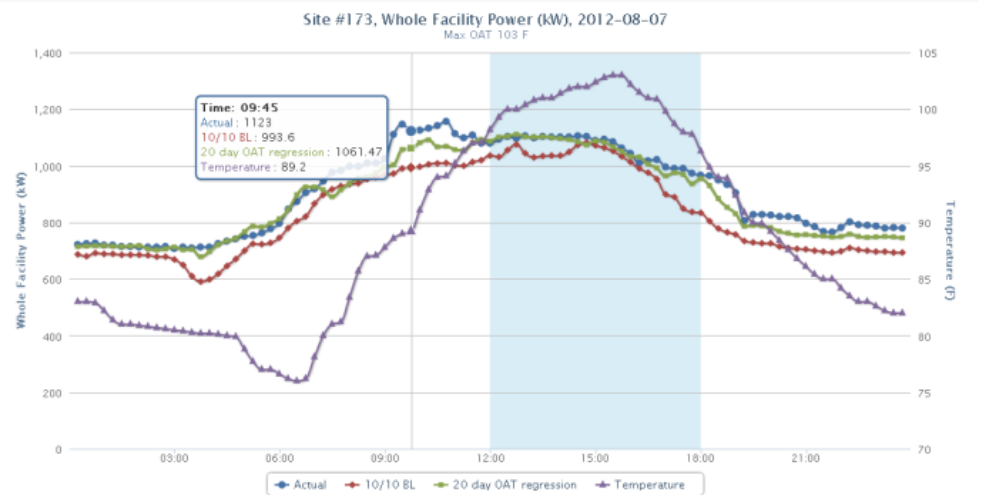
Introduction

- **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

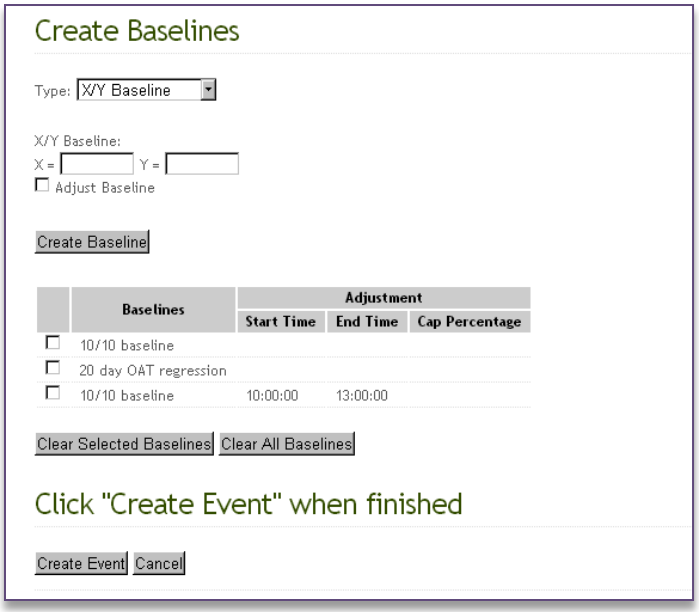
Key Building Characteristics

- 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

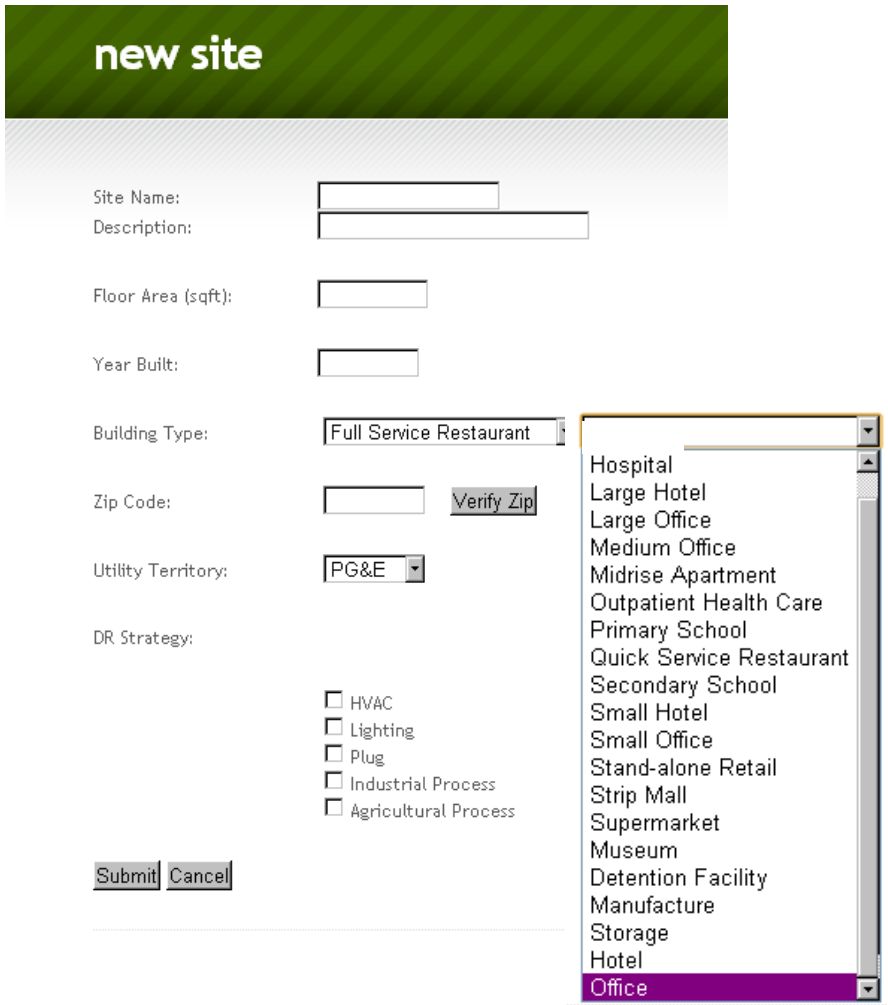


Developments in Baselines

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

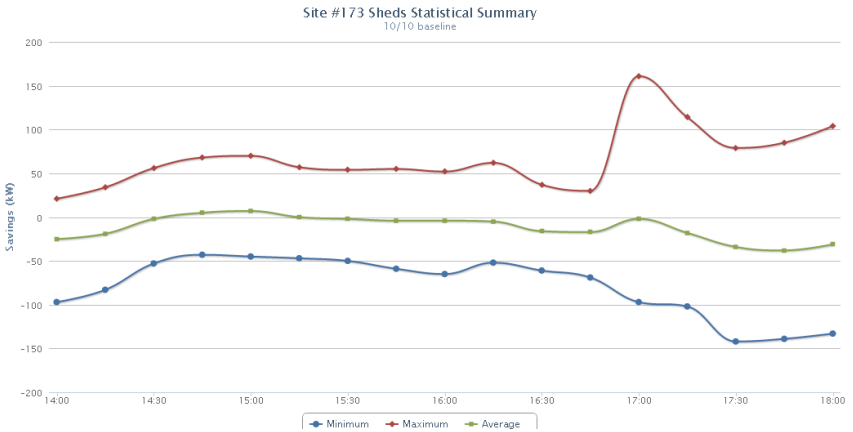
Demand Response Database

- 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



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