Advanced Metering – Using Advanced Metering to Improve Building Performance

FUPWG Presentation
Energy Division, FMSP
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Training Approach

Think About – Ask yourself…

• What data/info do I want to see?
• What else would be helpful to know?
• Knowing How/When we use energy/water - What can I do?
• Hours of Operation/ Core Bldg Hours
• Tenant Perspective- Impact their needs have on Energy Bottomline - ie Computer Rooms/Data Centers/ OTUtility Requests
GSA Advanced Metering Plan

• **Development of Agency Plan**
  - What are the objectives?
    • Meet mandates
    • How are we going to use Metered Data?
  - Current and Future Metering Needs

• **Agency original plan submitted to DOE in 2006 (Updated every 2 yrs)**
  - Prioritized based on total electricity usage & cost (typically site with most DR opportunities)

• **Current Priorities (Still meet Practibility test)**
  - Covered Facilities (EISA07) – Top Energy Users (196 facil)
  - Sites receiving ARRA Funding
  - Bldgs where Financing Energy Project
  - Bldgs with onsite generation (PV, Cogen, Wind turbines)
  - New Construction
Use of Metering Data (Bldg Perspective)

Energy billing & procurement
- Verifying utility bills
- Tenant energy use (sub metering)
- Identifying best rates
- Participating in demand response programs

Optimize/Review performance
- Diagnose equipment & systems operations
- RETUNING
- Benchmark utility use
- ID potential projects
- ID power quality problems
- Modelling (more adv users)
- On-Site Generation monitoring

Verify project performance

Demand Response Programs
- Monitor actions when response needed
- Measure results
- ID potential savings from DR

Promote energy awareness
Use of Metering Data
(Agency – Enterprise View)

Energy Procurement
- Load Aggregation
- Load Factor
- Participating in demand response programs

Benchmarking
- Baseline comparisons
- Start-Up Comparisons
- Energy/Water intensity
- Trends across similar building types

Verification for Reporting Mandates

Promote energy awareness & Sharing Lessons Learned
CRITICAL POINT--Take Away!!

• Advanced Meters alone **DO NOT SAVE ENERGY/WATER!!**
• Must Have engagement and **TIME** to review data and **ACT**!
• We need to make it **Priority** – Demonstrating possibilities... and **Cost Savings associated with those will get them engaged!!**
Adv Metering Data Flow Diagram
How can Metering Improve my Bldg’s Operation and Efficiency

- Identifying anomalies in usage patterns
- Start up and shut down schedules not matching what should be
- Overtime Utility usage
- Baseload info – comparison to similar sites
- Observing during Load curtailment events
- Watch impact on consumption by adjusting schedules
- Leak detection
- ADVANCED: Modelling/ Power Quality Analysis
How we are ACTUALLY using the Data

• Engaging (Partnering) O&M Staff/ Energy Teams
  – Reviewing trends daily / periodically – asking questions, Why? Should this be occurring?
  – Finding Leaks (Water)
  – Modifying our O&M Specs to require review of data
  – Provides oversight to our O&M, not possible before, especially in remote sites

• Using Report Subscription Capability
  – O&M Staff/ Senior Mgmt

• Making Models to validate suspicions

• Re-Tuning
  – Proper analysis of utility and interval meter data can result in the identification of significant energy savings opportunities and possibly improve overall building operations.
  – Using it with First Fuel Software (Rapid Bldg Assessment)
Advanced Metering - Interaction with PBS Programs

Within FMSP
GSA ION EEM Advanced Metering

Within PBS

RBA – First Fuel
Bld Operations: O&M Template Spec
GSALink
RWA Program
Shave Energy / DOE E4
EnergySTAR PM/LEED EBOM

GSA

gBuild (new RAHD)
GHG Reporting
Asset Business Plan

ABP
Reg 2 – Since Yesterday

What causes difference in baseloads w/ similar bldgs?

Start-Up / Shutdown differences?

Start-Up Spike setting peak for day

What causes difference in baseloads w/ similar bldgs?
– Noticed did not observe a holiday setback for 12/26/2011. Notified Mechanical Contractor (sent copy of trend)
-Holidays were not programmed into the BAS.
-Another Bldg – same thing found in Lighting DDC Controls – by observing trends
- Added a PM into CMMS -- holiday schedule is reviewed yearly against the published federal holiday schedule.
Results:
Savings will coming from Optimizing and Improving Day to Day Operations

Being used already to “Shave” Energy – NCR Night audits
Property mgr at Cotton FB (NH) suspected water leak when he saw these 10 gallon spikes. He showed metering graphs to Mechanical contractor & they began to track it down. Leak was found to be a leaking drain on boiler.
After leak was fixed
A misfiring flushometer was found using the Advanced Metering System.

Conservative estimate of 130 gallons down the drain.

Finding it on day 1 saved GSA hundreds of gallons of water.
Example of Savings Potential

The area in red represents a savings of 75.05 kWh for the three days. This represents a 0.56% reduction in electrical usage for a year.

WA0811
Modelling Tab – Advanced Capabilities
Added 45 FTE's and 200 visitors a day in 20,000 SF with a new tenant (ICE)

Also getting a lot of OT utility requests - 1000 hrs for the year for this customer
Breakthrough Innovation in Remote Meter Data Analytics

1. **MINIMAL DATA INPUTS**
   - Building address
   - 1 yr electric interval meter

2. **FIRSTFUEL METER DATA ANALYTICS**

3. **DEEP BUILDING INSIGHT**

From GSA:
- Local weather data
- GIS Mapping/ Semantic Search

From FirstFuel:
- Annual Electric End-Use per SqFt

- No onsite visits or devices.
- No building simulations or buildings “like” this one
- Unique, accurate analysis on every building.
Follow Up Questions

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