We’ll be starting in just a few minutes….  

Tell us…please send your response to the webinar organizers via the question box:

What topics are you interested in for future webinars?
Taking Control: Best Practices in Energy Data Management & Tools for Success

April 3, 2018
3:00-4:00 PM ET
## Today’s Presenters

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam Guzzo</td>
<td>DOE, EERE</td>
</tr>
<tr>
<td>Adam Jacobs</td>
<td>City of Boston</td>
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<tr>
<td>Mark Campbell</td>
<td>MGM Resorts International</td>
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<tr>
<td>Andrew Carter</td>
<td>Commonwealth of Kentucky</td>
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Take control of your energy data in seven steps

What is the Energy Data Management Guide?

The Energy Data Management Guide is a step-by-step framework for establishing a robust and sustainable energy data management program in the public sector. The user-friendly platform is designed around three central pillars:

- Generate Buy-In
- Build a Solid Foundation
- Hardwire Energy Management

Data-driven decision making is only seven steps away

Generate Buy-In
1. Define the Merits of Tracking Energy Data
2. Align with Organizational Goals

Build a Solid Foundation
3. Create a Central Database
4. Streamline Access to Data
5. Leverage Data Management Tools

Hardwire Energy Management
6. Optimize the Organizational Structure
7. Drive Engagement and Communicate Results

The simple interface enables users to access:
- proven strategies with demonstrated, portfolio-wide energy savings
- data management tools and resources
- customizable templates and worksheets
- relevant examples and case studies from states, local governments, and K-12 school districts

Content for the Energy Data Management Guide provided by the U.S. Department of Energy (DOE). The National Renewable Energy Laboratory developed this web application with support from DOE’s Weatherization and Intergovernmental Programs Office.
Generate Buy-In

Generating buy-in from senior leadership and other key stakeholders is critical to obtain resources and build on initial energy management initiatives in order to establish an energy data management program. It promotes collaboration across the organization as well as with utility companies. It starts with developing a concise business case for the merits of tracking energy data and then perfecting the value proposition by aligning energy data management to the larger organization goals. Buy-in from the beginning paves the way to ultimate success.

Best Practices:
- Invest the time up front to develop and perfect the value proposition for energy data management by tying the effort to larger organizational goals
- Articulate the cost-benefits of energy data management and how it supports more effective energy management and budgeting
- Motivate action by identifying opportunities for aligning on common goals, implementing targeted engagement strategies, building on initial successes, and appealing to a collective desire for excellence in the organization

Define the Merits of Tracking Energy Data

Organizations that have established robust energy data tracking systems report benefits in three areas: energy and cost savings, the ability to set realistic energy reduction goals, and improved control of energy budgets.

Energy and Cost Savings
- Energy savings averaging 2 percent annually
- Data-driven decision-making for improved energy efficiency program management
- Enhanced efficiencies in business operations
- Design and verification of energy efficiency projects and programs
Local Government Spotlight:
City of Gillette, Wyoming

Creating Sustainability in America's Energy Capital
*Information in this Spotlight is based on primary research conducted in 2014*

The City of Gillette, Wyoming is the seat of Campbell County, and the self-proclaimed energy capital of the nation where approximately 30% of U.S. coal is produced. While energy is abundant and relatively low cost, one of the city’s goals is to demonstrate to its citizens, utility customers, and neighboring communities that the city government is a good steward of taxpayer funds and natural resources.

While the city has engaged in various energy efficiency and sustainability efforts over the years, an opportunity to significantly expand these efforts presented itself in 2012, with the launch of the Better Buildings Initiative, part of which encouraged building owners to track energy consumption and reduce energy use in buildings by 20% by the year 2020.

**Approach:** The Sustainability Manager approached the council to propose that the City of Gillette join this national initiative. Building on the city’s goals and principles of fiscal responsibility, the

Capacity to Design and Verify Energy Efficiency Projects

Having data that is easily accessible allows an organization to pull together the requisite energy data for planning energy efficiency projects, designing projects, writing proposals and applying for programs and available incentives. The ability to quantify savings associated with energy conservation measures can complement the measurement and verification of energy consumption and savings obtained through contracts with energy savings companies (ESCOs). In addition, having primary access to data allows organizations to more easily apply and qualify for energy efficiency rebates and grants.

**State Example**

Data analytics is the first of four core strategies that the State of New York is implementing to achieve a 20% energy reduction in energy performance at state-owned and managed facilities through BuildSmart NY. The Smart Analytics approach leverages benchmarking, reporting, data management, social media and sub-metering to help agencies manage their energy use in ways never before possible.

Improved Energy and Cost Savings Setting

An organization can significantly increase its progress towards set goals is critical. For an organization a tangible result that it can public funds. Together, these practices help build a culture of continuous improvement and accountability.
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City of Boston
Local Government Operations - Energy Use

- 67,000 Street Lights (11%)
- 3,500 Fleet Vehicles (24%)
- 315 Buildings (65%)
Sources of Energy Data - the bill

Frequency

- Monthly (...most of the time)

Available Data

- Location/Service Address
- Rate class
- Service period
- Usage
- Cost
  - Commodity/Supply
  - Delivery
    - Demand
    - Efficiency fund
    - Renewables fund
    - Etc.,
 Uses of Energy Data - *the bill*

1. Budgeting

1. Energy Performance

1. Emissions Reporting

1. More Budgeting!
Sources of Energy Data - *TOU meter*

**City Hall - Electric Load**

**Frequency - 2 ways to look at this**

- **Collection interval**
  - 5min, 15min, 30min, 1hr
- **How often you get it**
  - Real-time via 3rd party meter
  - daily, monthly, annually from utility

**Available Data**

- kW
- kWh
- Power Factor
Uses of Energy Data - *TOU meter*

1. Building Schedule

1. Energy Savings M&V

1. Demand Response

1. More Budgeting!
Monthly bill data solution

- A simple, searchable tool
- Utility data is messy...trying to clean it up can make it worse

- Vendor gets the data first, verifies charges, then issues payment report to city
- In first 18 months of $250k contract, city recovered $1.2 million in bill errors/credits (400% ROI)
TOU data solution

Copley - Electric Load

Today

Yesterday

City Hall - Electric Load

Today

Yesterday
TOU data solution

City Hall Electrical Load

- 12/13
- 2,115
- 12/14
- 2,142
- 12/15
- 2,000

City Hall Total
Winter Plaza

12/14
11:45 AM
Demand (kW): 300
TOU data solution

<table>
<thead>
<tr>
<th></th>
<th>JKM 2</th>
<th>JKM1</th>
<th>KENT</th>
<th>MPB2</th>
<th>Old Cleveland</th>
<th>UMANA COGEN</th>
<th>WESTROX 1</th>
<th>WESTROX 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>30.71%</td>
<td>48.26%</td>
<td>42.56%</td>
<td>86.87%</td>
<td>100.00%</td>
<td>65.55%</td>
<td>62.64%</td>
<td>75.41%</td>
</tr>
</tbody>
</table>

- **JKM 2**
  - March 29, 2018

- **JKM1**
  - March 29, 2018

- **MPB2**
  - March 29, 2018

- **UMANA COGEN**
  - March 29, 2018

- **WESTROX 2**
  - March 29, 2018

![Graph showing Cogen Efficiency for each site with data points]

**March 29, 2018 09:00 AM**

- Efficiency = 86%
- Utility Savings = $7.72
Open Data

8 DATASETS FOUND FOR "ENERGY"

- **Central Library Electricity Usage**
  Electric power load at Boston Public Library's Central Branch (700 Boylston Street, in Copley Square) measured every five minutes.
  Modified on March 30, 2018
  606 total views

- **City Hall Electricity Usage**
  Electric power load at City Hall (1 City Hall Square) measured every 15 minutes.
  Modified on March 30, 2018
  385 total views

- **City of Boston Utility Data**
  Monthly utility data for all City of Boston accounts. This data comes from Boston's Enterprise Energy Management System. This software tool serves as the system of record for...
  Modified on March 25, 2018
  285 total views

- **Greenhouse Gas Emissions**
  This dataset represents the annual greenhouse gas emissions produced by the City of Boston from 2005 to 2015. The annual inventory is based on a combination of direct data and...
  Modified on February 8, 2018
  143 total views
Software as a **Service** (SaaS) for Energy Managers

**What is a SaaS contract?**
- A valuable service delivered via cloud-based software
- Vendor = a partner, an extension of your staff

**What isn’t a SaaS contract?**
- A piece of technology that fixes your problems for you
- A silver bullet
Closing Notes

- Leverage existing tools before buying new ones

- Complete a thorough stakeholder needs assessment. Make your tool a solution to other department’s problems… especially if that department pays the bills!

- Dedicate sufficient internal staff time to manage the contract implementation. External contractors don’t know your org structure like you do.

- Pay attention to the staffing part of RFP bid responses. Are they software engineers or energy experts?
Mark Campbell

MGM Resorts International
• 27 Unique hotel offerings
• 740 Acres on the Las Vegas Strip
• 48,000 Total guest rooms and suites
• 400+ Restaurants
• 77,000 Employees
• 3 Million Sq. ft. of convention space

Annual Domestic Energy Consumption: Over 1.1 Million MWh
Outline

- **Green Advantage** program to educate employees
- Energy data management, analytics, and applications at MGM
- Embedding sustainability & continuous improvement into culture
What Can You Do?
Join MY Green Advantage
Get Started Now

Take Action
See how the little things you already do add up — or challenge yourself to try something new! It’s easy to move at your own pace.

Get Inspired
Get help from your colleagues and share tips and photos — it’s easy to learn, ask questions, and stay motivated.

Make an Impact
Rack up points as you make a real-world impact. Complete projects with your team or race for the top of the leaderboard!
MGM Resorts International

MGM Green Advantage

FRIENDLY COMPETITION

EMPLOYEE PARTICIPATION

SIGNIFICANT IMPACT

Last 30 Days

1
MGM Grand Las Vegas
539,026 points

2
Mandalay Bay
474,392 points

3
Beau Rivage
345,374 points

4
Bellagio
278,082 points

5
Circus Circus Las Vegas
194,366 points

6
ARIA Resort & Casino
81,183 points

7
The Signature
32,386 points

8
MGM Resorts Corporate
31,650 points

20,000+
Employees
Signed On

+25 PERCENT
OF TOTAL EMPLOYEE BASE

5,078,100
TOTAL ACTIONS COMPLETED

100,275,090
TOTAL POINTS EARNED

433911 reams of copy paper
or 26,026 trees

Enough fuel to move a 10,000 ton
freight train 183027 miles
or 3,910,729 gal fuel

531 railroad cars of coal worth of
emissions
or 272,438,309 lbs CO2

Enough energy to power New
York City for 116858 seconds
or 203,800,602 kWh energy
AMBITION FOR ENERGY DATA MANAGEMENT AT MGM

- Goal: Offer the leading guest experience while using as little energy as possible

- Corporate Sustainability Division (CSD) responsible for collecting, processing, and distributing a range of data to property teams
  - E.g., electric & gas utilities, sub-metered electricity, flow, temperature, etc.

UPGRADING DATA MANAGEMENT TO DELIVER ON AMBITION

<table>
<thead>
<tr>
<th>Energy</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly utility data, spreadsheets, 2-3 months late</td>
<td>Very little historical data, disparate systems</td>
</tr>
<tr>
<td>Monthly and real-time data, spreadsheet and web-based</td>
<td>Cloud-based historian, ability to correlate energy &amp; building data</td>
</tr>
</tbody>
</table>
DATA DRIVES PROJECTS, THEN AND NOW

- Conduct internal **measurement & verification** and case studies on successful projects
- Evaluate chillers against factory specifications to ensure proper functioning from manufacturer property
- Deliver energy and building data to facility operators at regular cadence
Snapshot: Energy & Building Metrics

Bellagio - Average Casino Zone Temp - AVG: 72.7°F

Bellagio - Chilled Water Supply Temp - AVG: 45.5°F

Bellagio - Total Number of Chillers Running - AVG: 3

Bellagio - kW/ton Performance - AVG: 0.49 kW/tonref

Bellagio - Top 20 Sparks
1. AH02_18
2. AH03_06
3. AH04_07
4. AH02_01
5. AH02_16
6. AH02_14
7. AH03_01
8. AH02_18
9. AH02_13
10. AH02_18
11. AH02_08
12. AH02_08
13. CHX6_EOP
14. AH02_12
15. AH02_13
16. AH02_01
17. AH02_17
18. AH02_11
19. AH02_09
20. AH02_06

Bellagio - 15 Overrides: Det
1. AH01L_I
2. AM107
3. AH107
4. AH106
5. AM106
6. AH02L_I
7. AH24
8. AH23
9. AH33_B
10. AH02_23
11. AH02_18
12. AH22
13. AH21
14. AM11
15. AM02_11
Embedding Sustainability into Company Culture

ACTIVATING OUR EMPLOYEE BASE

- Employees at every level encouraged to submit ideas for all areas of MGM's operations
- Lessons learned and data-driven insights inform continuous improvement projects

“Not everything that counts can be counted, and not everything that can be counted counts.”

ENGAGING LEADERSHIP

- MGM Leadership sets ambitious annual goals for properties focused on energy efficiency
- Progress toward these goals is tracked, reported, and tied to bonuses

2017 Goal of installing over 1 million LEDs
Andrew Carter
Commonwealth of Kentucky
Endeavor to gain a complete understanding of the energy consumed to operate all State facilities...every minute of every day. Create a data rich environment and use that data to reduce the Commonwealth’s footprint.
Historical Background

- KRS 56.782 – Report consumption, cost, and energy-efficiency measures in state government
- CEMCS was created using $3.65M from the federal American Recovery and Reinvestment Act (ARRA).
- CEMCS RFP was awarded in early 2010 to begin development. – 2M ft² pilot 2012
- Current:
  - 10 Agencies
  - ~1350 Accounts
  - 1200+ Buildings
  - 20.9M ft²
  - $34M annual spend in FY17
CEMCS Tools

Utility and BAS Analytics
Utilities

• Utility Bill Entry
  • Manual Entry
  • Electronic Data Interchange (EDI)

• Demand Interval Data
  • Utility Meters
  • Submeters
Building Automation Systems

- Comfort Scores
- Run Times
- Damper Positions
- Diagnostics
Data-based Improvements - CHR

• Measures in progress:
  • Static Pressure Reset from 4 in. WC to 2 in. WC based on cooling requests – up to $46,080/yr
  • Variable Frequency Drives (VFDs) on air handlers - $16,800/yr
  • Revise Schedule from 24/7 to 12 hr - $43,000
• FY09 Electric Cost Allocation - $821,406
• FY17 Electric Cost Allocation - $742,472
• Savings of $78,934 for CHR Building, $148,928 for the CHR Campus (7.1M kBtu reduction)
Data-based Improvements - TCOB

• Measures completed:
  • Reset all unoccupied cooling setpoints to 80, adjust deadbands for all zones (VAV/MIT zones fighting)
  • Recalibrate 104 VAV boxes
  • 24/7 schedule changed to 6AM-6PM
• FY09 Electric Cost Allocation - $827,996
• FY17 Electric Cost Allocation - $704,350
• Savings of $123,646 for TCOB Building, $234,480 for the TCUP Campus (8.7M kBtu reduction)
Data-based Improvements - KSOB

• Measures completed:
  • Replace 185 HW control valve actuators, VAV boxes having trouble maintaining space temperatures – result: fewer heating requests, reduced airflow
  • Reduce HW pump speed during cooling season
  • Standby mode?

• FY09 Electric Cost Allocation - $641,748
• FY17 Electric Cost Allocation - $545,349
• Savings of $96,399 for KSOB Building, $234,480 for the TCUP Campus (8.7M kBtu reduction)

• Total campus utility & cost reduction of 14.2M kBtu & $240,778 per year.
Documentation

• Track your recommendations and projects
KICC - Sequence Review

- $220M+ Renovation
- Worked with design engineers to review and revise drawings and sequences to operate consistent to ASHRAE 36P design standards.
- Plan to review design and control sequences for new construction projects moving forward.
Awareness-based Decisions

• Central Lab Boiler Project-Standard vs. High Efficiency
• Gas Procurement Contract
• Capital Plaza Tower Complex-Energy Costs
Measuring Savings

• Current Statistics from CEMCS Buildings with Baselines
  • FY17 Consumption - 1,538,128,065 kBtu
  • Baseline Consumption - 1,724,202,123 kBtu
  • Energy Reduction – 186,074,058 kBtu
  • FY17 Cost - $26,566,991
  • Baseline Cost - $32,388,356
  • Cost Avoided - $5,821,365

• Savings are generated from ESPCs, CEMCS, and behavioral changes and can add up to significant money.
Welcome to the Kentucky Energy Savings Dashboard

Welcome to the Commonwealth Energy Management and Control System (CEMCS) public dashboard. This dashboard tracks the progress of energy and cost savings initiatives for buildings throughout Kentucky.

The CEMCS is an innovative software application which is integrated to utility company billing, building automation systems and statewide accounting systems.

The data collected from these sources enables the identification of energy-saving opportunities and verification of corrective actions that reduce energy use, and thus allows the Commonwealth to operate as much as 25% more efficiently in integrated facilities.

DataEngine by:

Statewide

Utility Savings

5.5%

On track to meet 2025 goal of 25%

Current energy consumption compared to historic baseline, normalized for variations in weather.

<table>
<thead>
<tr>
<th>Total Buildings</th>
<th>699</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Square Footage</td>
<td>15,046,710</td>
</tr>
<tr>
<td>Total Occupants</td>
<td>26,095</td>
</tr>
<tr>
<td>Total Annual Utility Cost</td>
<td>$31,562,023</td>
</tr>
</tbody>
</table>

Annual Utility Cost Savings

$4,206,593

All utilities (energy + water) compared to historic baseline, weather normalized.

Visit our dashboard!

Kyenergydashboard.ky.gov
Thank You

Questions?

fin.cemcshelp@ky.gov
Additional Resources

- Energy Data Management Guide Fact Sheet
- Better Buildings Solution Center: Energy Data Solutions
- State and Local Solution Center: Access and Use Energy Data
- State and Local Solution Center: Building Energy Use Benchmarking
- City of Boston Open Data Portal: Analyze Boston
- City of Boston Better Buildings Challenge Profile Page
- City of Boston Solution-at-a-Glance
- MGM Resorts International Building Analytics Success Story
- MGM Resorts International Better Buildings Challenge Profile Page
- MGM Resorts International Implementation Model
- Commonwealth of Kentucky Building Analytics Success Story
- Commonwealth of Kentucky Energy Dashboard
This webinar introduces the Better Buildings Financing Navigator 2.0, the latest iteration of DOE's online tool that helps connect organizations with financing for energy efficiency and renewables projects. Join to learn about the new features and key trends in financing.
CONSIDERING ESPC
Thursday, April 12, 2018 | 2:00 - 3:00 PM ET
REGISTER TODAY

IMPLEMENTING ESPC PROJECTS
Thursday, May 10, 2018 | 2:00 - 3:00 PM ET
REGISTER TODAY

ESTABLISHING AN ESPC PROGRAM
Thursday, June 14, 2018 | 2:00 - 3:00 PM ET
REGISTER TODAY

EXPANDING ESPC TO NEW MARKETS
Thursday, July 12, 2018 | 2:00 - 3:00 PM ET
REGISTER TODAY

EVALUATING ESPC RESULTS
Thursday, September 13 | 2:00 - 3:00 PM ET
REGISTER TODAY
2018 Energy Exchange and Better Buildings Summit

August 21\textsuperscript{st}-23\textsuperscript{rd} in Cleveland, OH

Registration is open! Early bird registration ends June 15\textsuperscript{th}

Highlights include:

- Panel sessions and technical trainings (earn CEUs)
- Peer-to-peer discussions
- Ask-an-Expert/FEMP Lounge
- Networking opportunities
- Pre- and post-conference workshops
- Better Buildings Partner sessions
- Building Tours

For more information and to register: 2018energyexchange.com
### Additional Questions? Please Contact Us

**betterbuildingswebinars@ee.doe.gov**

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