Navigating RFPs and Procurement for Energy Management and Information Systems

Smart Energy Analytics Campaign
Lawrence Berkeley National Laboratory
February 19, 2019
Welcome!

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What we’ll cover today

- Overview of Campaign and EMIS Procurement resources
- Featured Speaker: Edna Lorentz, Beaumont Health
- Q&A

smart-energy-analytics.org
Smart Energy Analytics Campaign

- Tech support for EMIS and MBCx
- Publish research on EMIS cost, savings, use
- Recognition Program
- Participation to date
  - 87 organizations, 5500 buildings, 420 million sq ft
  - 100+ supporting partners

smart-energy-analytics.org
Spring Recognition Categories

- Best Practice
- Innovation
- Energy Performance
- Largest Portfolio

Applications due March 31

Recognition in May
Building Analytics Success Story
Stanford University Residential & Dining Enterprises

Just a few years ago, Stanford University’s Residential and Dining Enterprises could not track utility consumption in a meaningful way. With 2,000 utility accounts across three different utility providers and no software to monitor consumption, it was a challenge to manage. Stanford was “just paying the bills,” a scenario that is all too common. This changed when they added hundreds of meters and an energy information system (EIS) to track utilities and locate savings opportunities.

What is an EIS?
An EIS is a combination of software, data acquisition, and communication systems used to store, analyze, and display building energy meter data on an hourly or more frequent basis. EIS is one type of energy management and information system (EMIS).

To get their EIS up and running, Stanford connected all energy, water, and waste data - 963 meters, including 375 electric interval meters. Through this process, they focused on data quality so the meter data could be trusted. Stanford uses their EIS in the following ways:

- Review daily, monthly, and annual energy, water and waste use trends and targets for groups of similar buildings such as dining halls, undergraduate dorms and apartment style residences.
- Track the performance of efficiency projects and behavioral change programs with students.
- Use ‘heat map’ charts to identify periods of unnecessary operation like the heat map function.

By creating a systematic way to review key performance indicators and analytics in the EIS, the university has saved $450,000 across their portfolio.

Driving Action with Data
In addition to energy, water, and waste data, Stanford collects data on the number of meals served in their dining halls, and they decided to bring this data stream into their EIS. Stanford was able to benchmark dining halls against one another and focus their efforts towards lowering consumption at the most energy-intensive locations. Now they track energy cost per meal served on an ongoing basis.

Stanford is also working with students to reduce energy use when the residence halls are unoccupied. During last year’s winter break, they asked students to turn off their thermostats, lights, and appliances, and followed up with residents that didn’t show reduced energy usage. These efforts resulted in a 17% reduction in energy use over three weeks relative to the previous year — a savings of $34,000.

EIS and Asset Management

Nearing completion with the integration of their work order and asset data with their EIS, Stanford will have a view into the relationship between the condition of thousands of energy-consuming assets and their buildings’ overall energy consumption. Through a combination of analytic tools and a sound process for using these tools, Stanford is well on their way to transforming their energy management practices.

The Smart Energy Analytics Campaign is a public-private sector partnership program focused on commercially available Energy Management and Information Systems (EMIS) and monitoring-based commissioning practices. The campaign couples technical assistance with qualitative and quantitative data collection to inform research, development, and field study priorities. Partnering participants are encouraged to share their progress and may receive national recognition for implementations that demonstrate exemplary practices.

smart-energy-analytics.org/success-stories
## Top 5 Issues

### Energy

<table>
<thead>
<tr>
<th>Building</th>
<th>Equipment</th>
<th>Notes</th>
<th>Cost/Qtr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anon Hospital</td>
<td>AHU_6_CAVs</td>
<td>Low Damper Position – opportunity for static pressure reset.</td>
<td>$11,120</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>AHU_11</td>
<td>No supply temp reset. Cooling valve issues.</td>
<td>$7,778</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>AHU_6</td>
<td>No supply temp reset. Cooling valve issues.</td>
<td>$6,163</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>AHU_5</td>
<td>Supply temp lower than setpoint. No supply temp reset. Cooling valve issues.</td>
<td>$5,029</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>AHU_4</td>
<td>Supply temp lower than setpoint. No supply temp reset. Cooling valve issues.</td>
<td>$4,318</td>
</tr>
</tbody>
</table>

### Maintenance

<table>
<thead>
<tr>
<th>Building</th>
<th>Equipment</th>
<th>Notes</th>
<th>Severity Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anon Hospital</td>
<td>AHU_11</td>
<td>Static pressure lower than setpoint. Supply fan speed constant. Return fan speed constant.</td>
<td>6</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>AHU_10</td>
<td>Static pressure lower than setpoint. Supply fan speed constant.</td>
<td>6</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>CAV6_2</td>
<td>Room temp lower than setpoint. Stuck reheat valve.</td>
<td>4</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>CAV5_82</td>
<td>Supply flow lower than setpoint. Stuck reheat valve. – May be sensor error.</td>
<td>4</td>
</tr>
<tr>
<td>Anon Hospital</td>
<td>CAV3_11</td>
<td>Sensor error. Stuck reheat valve.</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Schneider Electric Building Analytics
RFP and Procurement Resources

- **Templates**
  - EMIS Specification and Procurement
  - MBCx Plan

- **Find a Product or Service List**

- **Year 2 Campaign Report**
  - Cost (median and range) by EMIS type
  - Savings (median and range) by EMIS type

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**Fault Detection and Diagnosis Systems (FDD)**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Product</th>
<th>Video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cimetrics</td>
<td>Analytica</td>
<td></td>
</tr>
<tr>
<td>Climacheck</td>
<td>Climacheck Online (RTU)</td>
<td></td>
</tr>
<tr>
<td>Climatec</td>
<td>AxcessEEM</td>
<td></td>
</tr>
<tr>
<td>Connexx Energy</td>
<td>Connexion Platform</td>
<td></td>
</tr>
<tr>
<td>CopperTree Analytics</td>
<td>Kaizen</td>
<td></td>
</tr>
</tbody>
</table>
### RFP Examples from Campaign Participants

Examples available to Smart Energy Analytics Campaign Participants (all examples have been made anonymous)

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIS, FDD, and MBCx service RFP</td>
</tr>
<tr>
<td>EIS only RFP</td>
</tr>
<tr>
<td>EIS hardware RFP</td>
</tr>
<tr>
<td>EIS Vendor Q&amp;A</td>
</tr>
<tr>
<td>FDD RFP with condensed scope for MBCx Services</td>
</tr>
<tr>
<td>FDD only RFP</td>
</tr>
<tr>
<td>FDD only RFP - Interview Questions</td>
</tr>
<tr>
<td>EIS and FDD Scope of Work</td>
</tr>
<tr>
<td>EIS Evaluation Checklist</td>
</tr>
<tr>
<td>EIS Vendor Comparison Matrix</td>
</tr>
<tr>
<td>EMIS Vendor Comparison Matrix</td>
</tr>
</tbody>
</table>
Q&A

Submit your questions through chat icon on lower left of screen

Type your question here and hit Send
RFPs and Guarantees
EMIS and MBCx at Beaumont

Edna Lorenz PE, LEED AP
System Energy Manager
February 19, 2019
About Beaumont Health

Beaumont Health is a not-for-profit organization formed in September 2014 by Beaumont Health System, Botsford Health Care and Oakwood Healthcare to provide patients with extraordinary, compassionate care, no matter where they live in southeast Michigan.

The organization consists of eight hospitals with 3,429 beds, 187 outpatient sites, nearly 5,000 physicians, 38,000 employees, and 3,500 volunteers.
+187 outpatient sites
Why EMIS and Monitoring Based Cx?

• Energy reduction goal: Reduce energy costs of all 8 hospitals by 17% relative to a 2015 baseline, by 2021 while improving patient, family, and medical staff comfort, health, and safety.
  – Use standard ECM identification techniques.
  – Savings are calculated.
  – Only whole building utility data is available to validate savings.
    • Do have electrical interval data
    • Only have monthly gas data
Why EMIS and Monitoring Based Cx?

- We had seen moderate success from utility funded Retro-Cx.
  - Monitoring Based Cx (using a Fault Detection Diagnostic software tool) seemed like the logical next step to ensure persistence of savings.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>% Electric Savings</th>
<th>% Natural Gas Savings</th>
<th>% Overall Savings</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaumont Hospital, Royal Oak</td>
<td>1.3%</td>
<td>5.1%</td>
<td>3.5%</td>
<td>0.29</td>
</tr>
<tr>
<td>Beaumont Hospital, Grosse Pointe</td>
<td>0.7%</td>
<td>1.0%</td>
<td>0.9%</td>
<td>1.13</td>
</tr>
<tr>
<td>Beaumont Hospital, Troy</td>
<td>2.2%</td>
<td>7.5%</td>
<td>5.4%</td>
<td>0.19</td>
</tr>
<tr>
<td>Total</td>
<td>1.4%</td>
<td>5.4%</td>
<td>3.7%</td>
<td>0.28</td>
</tr>
</tbody>
</table>
Why EMIS and Monitoring Based Cx?

- We had been approached by EMIS vendors claiming they could reduce our utility by 10 - 20%!
  - Too good to be true?
  - Would a vendor guarantee this type of savings?
  - What was the timeframe for realizing this type of savings?
  - How much would we have to spend?
  - What services would we be getting and would they meet our energy program needs?
Why an RFP?

- Define the services we wanted to receive.
- Require vendors to specifically address their approach to the services we want.
- Do an apples to apples comparison of the EMIS software vendors and consultants.
- Start to define the terms of a guarantee.
Beaumont Health EMIS and MBCx RFP

• Started with a pilot
  – One hospital from each founding organization
  – 3 year program, plus start up
EMIS RFP Resources

Smart Energy Analytics Campaign

Find a Product or Service

Looking for a specific EMIS tool or MBCx service provider? See below for a full list of Energy Information Systems, Automated System Optimization software, Fault Detection and Diagnosis systems, and MBCx service providers. Can’t find what you are looking for? Let us know and we’ll see how we can help.

EMIS Procurement Specification

The EMIS Specification and Procurement Support Materials are intended to guide you through the specification, procurement, and selection of an EMIS. The package includes a templates for a Request for Proposal, a Technology Specification and an Evaluation and Selection Criteria.

Vendor Product Videos

Several vendors listed in the tables below have supplied us with short videos that give an overview of their product with highlights on key benefits, with a visual demonstration of their screens and displays. Please note that inclusion of these videos is not an endorsement of the vendor’s product by DOE, LBNL or the Organizing Partners of the Smart Energy Analytics Campaign. Guidelines on what to provide in the vendor video can be found here.

Disclaimer: This information was prepared as an account of work sponsored by the United States Government. While this page is believed to contain correct information, nothing is implied regarding the United States Government approval of any of these products, services or processes.
1.9 Reporting and data export

[Describe any desired requirements for reports generated by the technology and data that can be exported from the technology. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will provide year-over-year, month-over-month, week-over-week or day-by-day [specify which] energy, cost, or equipment health and performance reports [specify which]. Reports will be generated for single or multiple sites [specify which] in a format specified by, or acceptable to [name of Owner].

2) The technology will provide users the ability to create and save custom reports.

3) The technology will export reports to the following file formats [specify which].
   a. .pdf
   b. .doc/.docx
   c. .jpg
   d. .xlsx/xls
   e. .html

4) The technology will allow users to export data (all, or selected points or totalizations) to the following file formats [specify which] for use in external tools such as MS Excel and MS Access.
   a. .xlsx/xls
   b. .csv
   c. .xml
   d. ASCII

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**Reporting Considerations**

Take care to plan your reporting needs, based on your organization’s operations and management. Consider, for example:

- Who will receive and access reports? Information content will differ based on roles and responsibilities (e.g., executives vs. operational personnel).
- How will the reports be used based on current business practices?
- What reports are currently used, and how frequently are they generated?
- What data are required to generate new energy or operational reports? Are those data included in your metering plan?
- What user-defined customizable options would you like supported?

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EMIS RFP – Technical Specifications

• Most important technical specification for Beaumont:
  – Normalization of energy consumption
    • Weather
    • Patient days, surgical procedures, admissions, etc...
  – Measurement and Verification
  – Cross sectional and longitudinal benchmarking.
  – Detection of operational faults in systems or equipment
  – Automatic work order generation.
EMIS RFP – Consulting Requirements

• Specified anticipated project phases
  – Phase 1: Strategy and Design
  – Phase 2: Implementation
  – Phase 3: Ongoing Services

• Meeting frequency
  – With building staff
  – At the site vs. virtual
  – With corporate energy management team
EMIS RFP – Consulting Requirements
Phase 1: Strategy and Design

• Annual energy cost reduction goals
• Operational reviews with building staff.
• Design a monitoring strategy.
  – Existing metering
  – Building automation system
• Develop detailed implementation schedule.
EMIS RFP – Consulting Requirements
Phase 2: Implementation

• Connect and configure proposed technology platform.
• Coordinate data flow from the meters and BAS to the proposed technology software platform.
• Work with Beaumont Health IT.
• Fully commission system.
• Begin identification of energy conservation measures.
• Begin implementation of fault detection diagnostics.
EMIS RFP – Consulting Requirements
Phase 3: Ongoing Services

• 3 year term.
• Revise annual energy cost reduction goals at each facility.
• 24/7/365 proactive FDD monitoring and notifications.
• On-going ECM identification.
• On-going benchmarking and energy analysis.
• On-going interaction with consultant to review operational status and performance of facilities and associated equipment.
• On-going training in the use of the proposed technology.
EMIS RFP – Guarantee, Basic Terms

• Guarantees will be money-back and not credit for future services.
• For every dollar short of the annual savings target, Beaumont Heath will be reimbursed dollar-for-dollar.
• Vendor will identify a minimum energy savings equal to their fees on an annual basis.
• Savings from implemented ECMs remain persistent year-over-year (excluding received utility rebates).
• Beaumont Health reserves the right to validate all recommended measures and review calculations, algorithms and assumptions.
EMIS RFP – Guarantee Approval Process For ECMs Regardless of Implementation

- ECM Identified by Consultant
  - Expense Project
  - ROI less than 2 years
    - No impact on regulatory compliance.
    - No impact on patient/doctor thermal comfort
      - Does not count towards guarantee
  - Capital Project
  - ROI less than 4 years
    - No impact on regulatory compliance.
    - No impact on patient/doctor thermal comfort
      - Does not count towards guarantee
- Yes
- Yes
- Yes
- No
- No
- No
- Yes
- Yes
- Counts towards guarantee
Guarantee vs. ESCO

- Guarantee is based on savings **identified** (and validated) instead of savings **realized**.
- Consultant is minimally required to identify savings equivalent to annual software and consulting fees.
- All projects are financed by Beaumont.
- Guarantee language was open for discussion and revision.
RFP – Vendor Response

• RFP was distributed to 9 pre-selected bidders
• 6 responses were received
• Responses were judged based on:
  – Their ability to meet the requirements of the technical specification
  – Experience with similar projects
  – Their response to the guarantee
  – Projected ROI of services based on guaranteed savings
  – Overall cost
## Example Proposal Review Matrix

<table>
<thead>
<tr>
<th>Proposal Evaluation Criteria</th>
<th>Weight</th>
<th>Score</th>
<th>Weighted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>[assign a weight of 1–5]</td>
<td>[assign a score of 1–10]</td>
<td>[score x weight]</td>
<td></td>
</tr>
<tr>
<td>Cost proposal</td>
<td>3</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>Ability to deliver services outlined in scope of work</td>
<td>5</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Followed RFP directions</td>
<td>4</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Provided references</td>
<td>5</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Provided case studies related to healthcare</td>
<td>5</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Ability to deliver additional unspecified capabilities of value</td>
<td>3</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>Qualifications and experience of staff</td>
<td>4</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Proposed guarantee language is in compliance with guarantee language provided by Beaumont</td>
<td>5</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td>Overall quality of the proposal</td>
<td>4</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Local presence, proper staffing</td>
<td>5</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Implementation timeline (Ph. 1 and 2)</td>
<td>4</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>Alternate Services</td>
<td>3</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>379</strong></td>
</tr>
</tbody>
</table>
RFP Financial Analysis: Projected Break Even Analysis

- **Cumulative Costs** = Includes both consulting and software fees + expense for low cost ECMs (ROI = 2 years) + capital for capital ECMs (ROI = 4 years) from September 2018 – February 2022.

RFP Financial Analysis: MBCx Proposal and Estimated Costs Compared to Smart Energy Analytics Campaign Year 1 Results

Smart Energy Analytics Campaign Findings

- Base cost median = $0.04/sq ft
- Annual labor cost median = $0.08/sq ft

Bidder 1 and Bidder 2 Proposals

Industry median implementation costs = $0.120 per SF
Industry median recurring software costs = $0.014 per SF

Grumman Butkus and Associates Contract and Estimated Capital Costs (Costs for Guaranteed Level Savings)

<table>
<thead>
<tr>
<th>Contract Phase</th>
<th>Capital $</th>
<th>Total $/SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0*</td>
<td>$286,584.00</td>
<td>$0.076</td>
</tr>
<tr>
<td>Year 1</td>
<td>$238,382.00</td>
<td>$0.127</td>
</tr>
<tr>
<td>Year 2</td>
<td>$151,187.00</td>
<td>$0.090</td>
</tr>
<tr>
<td>Year 3</td>
<td>$135,986.00</td>
<td>$0.057</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$812,139.00</td>
<td>$0.349</td>
</tr>
</tbody>
</table>

Estimated Year 4 Costs**

Trane Contract and Estimated Capital Costs (Costs for Guaranteed Level Savings)

<table>
<thead>
<tr>
<th>Contract Phase</th>
<th>Capital $</th>
<th>Total $/SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0*</td>
<td>$232,500.00</td>
<td>$0.048</td>
</tr>
<tr>
<td>Year 1</td>
<td>$263,600.00</td>
<td>$0.170</td>
</tr>
<tr>
<td>Year 2</td>
<td>$263,600.00</td>
<td>$0.170</td>
</tr>
<tr>
<td>Year 3</td>
<td>$263,600.00</td>
<td>$0.170</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$1,023,300.00</td>
<td>$0.559</td>
</tr>
</tbody>
</table>

Estimated Year 4 Costs***

*Implementation costs.
The median first year savings, post installation, of the campaign participants who used energy management information software technology was 5% which is equivalent to 1.3 – 2.1x Bidder 1 and Bidder 2 contract guarantee for first year savings.

- Guarantee presented by both bidders is likely to be conservative.
Conclusions

• Proceeding with the RFP process helped Beaumont more accurately compare specific offerings from vendors.

• The guarantee provides peace of mind that Beaumont will recoup their investment over the course of the contract.
Questions
MBCx at Beaumont Today

- Multi-partner contract:
  - Consultant as the prime with two separate software vendors for EMIS and FDD.
- Project kicked off in Q4 of 2018.
- Phase 1 complete and Phase 2 in progress.
  - Completed the initial ECM identification and are in the process of implementing low/no cost measures.
  - Hardware installation and software integration is still ongoing.
For Campaign Participants Only
FDD Peer Group

Data Tagging Standards and Use for EMIS Implementation

March 14th 10 am PST

Featured speaker:
Chris Weyandt, PE, CEM
Ongoing Cx Lead
Lawrence Berkeley National Lab

Chris will cover why data tagging standards are so important to implementing FDD successfully using examples from LBNL’s FDD implementations

Open Invitation

US Dept of Energy hosts:
Better Buildings Summit

July 10-11, 2019
Arlington, VA

Explore emerging technologies and share innovative strategies in energy and water efficiency. A session on EMIS will be included.
Thank you

Interested in joining Smart Energy Analytics Campaign?
Smart-energy-analytics.org

Contact:
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Claire Curtin  cmcurtin@lbl.gov