Better Buildings®
U.S. DEPARTMENT OF ENERGY

Energy Management Information Systems (EMIS) Specification and Procurement Support Materials

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Overview

This package of materials is intended to guide you through the specification, procurement, and selection of an Energy Information System (EIS) or related building energy performance monitoring and diagnostic technology.

This package includes three sections:

1. A Request for Proposals (RFP) Template that can be filled out to create an organization- and project-specific RFP for vendors.
2. A Technology Specification Template that can be tailored to generate owner-driven requirements for technology features and capabilities, metering and integration, maintenance support, and more. The tailored specification should be included in the Scope of Work in Section 3 of the RFP.
3. An Evaluation and Selection Criteria Template, to help you select among multiple competing proposals that satisfy the specification and RFP requirements. The selected criteria should be included in the Evaluation and Selection Criteria in Section 6 of the RFP.

These documents and the process that they outline assume that you have some in-house energy management staff and expertise, and that while you may partially use outside services, you will not completely outsource the ongoing use of the technology to third-party analysis-as-a-service providers. It is expected that the scope of the RFP may include the purchase of software or software as a service, data acquisition and integration, training, and related provisioning services.

Energy Management and Information Systems

Energy Management and Information Systems (EMIS) comprise a broad family of tools and services used to manage commercial building energy use. These technologies include energy information systems (EIS), fault detection and diagnostic systems, benchmarking and utility bill tracking tools, automated system optimization tools, and building automation systems.

While this package can be used to procure any type of EMIS, the template specification lends itself most directly to technologies such as energy information systems with benchmarking and fault detection and diagnostic capabilities.

To learn more about the distinguishing characteristics of different types of EMIS, refer to the classification framework at http://eis.lbl.gov/pubs/emis-tech-class-framework.pdf.

How These Materials Were Developed

The contents of this package was developed using subject matter expertise combined with best-practice examples from leading-edge organizations that have issued RFPs and specifications for Energy Management and Information System (EMIS) technologies within their own portfolios. The material was reviewed by members of the U.S. Department of Energy's Better Buildings Alliance. The authors wish to acknowledge the contributions of:

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How to Use These Materials

- Content that can be directly cut pasted or transferred into your tailored document is shown in plain text.
- Instructions and content that you should customize, fill in, or supply yourself are shown in [*brackets and italics*].
- Any content that is not relevant to your organization or project can be deleted, and additional content can be added.
- Key concepts and pointers are provided in sidebars.
- Definitions:
  - The word "Owner" refers to the name of the organization soliciting proposals and procuring the technology.
  - The word "Proposal" refers to the response of a person, company, or corporation proposing to provide the technology and/or services sought in the RFP.
  - The word "Proposer" means the person, company, or corporation that submits the RFP.
- These are not legally binding documents, and they do not serve as contracts. Legal and executive review is recommended to ensure that appropriate language is included in the documents that you create.

Section 1: Request for Proposals Template

This section of the package contains the template to guide your creation of a request for proposals (RFP) for an energy information system or related monitoring and diagnostic technology. By editing and filling in the template, you will produce a draft RFP for your organization's technology implementation effort.

Request for Proposals

Project: [*Title of project in which the Energy Information System (EIS) or related technology will be implemented*]
To: *[Prospective technology and metering and integration providers]*
From: [*Point of Contact for Organization*]
Date of Issue: [*Date*]

1. Introduction

1.1 Purpose

[Include a brief description of the purpose of this RFP.]

[Name of organization] is soliciting proposals for qualified companies to provide an Energy Information System (EIS), necessary metering and communications hardware, system training, and ongoing maintenance and support. You are invited to submit a proposal in accordance with this Request for Proposals (RFP).

1.2 Background

[Include a description of the project with background information, including but not limited to the following elements:]

Organizational and facilities overview: *[Describe the organization's business services, building types, and portfolio floor area, geographical coverage, number of occupants, building services, typical utility bills, energy saving and performance goals, etc.]*

Project scope: *[Describe the number of sites and floor area included in the technology implementation scope. Include potential plans to further scale the implementation in the future, and associated decision criteria.]*

Project objectives: *[Describe the goals of the project, motivation, and expected technology uses. For example, you might specify that the technology selected as a result of this RFP will be expected to:*

- *Facilitate continuous energy management and increased operational efficiency*
- *Enable the organization to reduce portfolio energy use by X%*
- *Streamline utility payment and accounting, generating labor cost savings*
- *Perform portfolio, building, and system-level energy performance analysis*
- *Track the impact of energy efficiency projects, and measure and verify project and utility cost savings*
- *Track and manage peak demand*
- *Calculate and report greenhouse gas emissions*
- *Produce reports for energy and utility management, operations, and maintenance*
- *Provide public energy dashboards to inform and educate occupants and visitors]*

Project budget: *[Include a not-to-exceed budget, or range, as applicable.]*

2. Schedule of Events

[Include the date for the RFP events]

This RFP will be governed by the following schedule:

Event	Date
Release of RFP	*[Date]*
Optional Proposer's conference	*[Date]*
Last day to submit written questions	*[Date]*
Last day for *[Organization]* to respond to questions	*[Date]*
Proposal due date *Late proposals will not be accepted	*[Time and Date]*
Optional interviews with Proposers	*[Date]*
Notice of intent to award	*[Date]*
Contract award	*[Date]*

3. Scope of Work

[Include a detailed description of the technology and project requirements. For this section of the RFP, you may paste in the specification that you created by filling out the Template Specification, which comprises the second of three sections in this support package. You may also repeat additional information about the project scope, for example, number of sites and floor area. Appendix A contains guidance for you to document existing site characteristics, and the metering and monitoring infrastructure; this is a critical component of the materials that you prepare for potential respondents.]

4. Proposal Format Guidelines

[Describe the required proposal format and contents, and what information they should provide in their response, in what order, and by what date.]

Proposers are to provide the Owner with a thorough proposal according to the following guidelines.

Proposals should use simple language with minimal jargon, and avoid the use of elaborate marketing material beyond that necessary to provide a complete, accurate, and reliable offer. Each Proposal will adhere to the order and content of sections defined below, and each section must be completed in full. Incomplete proposals will not be considered.

1) Cover letter – *[number]* pages, maximum

   Include a cover letter signed by a principal in the company, indicating full contact information (mailing address, telephone number, and e-mail address). The cover letter may also summarize key elements of the proposal, and uniqueness of the proposed technology or response.

2) Summary of qualifications – *[number]* pages, maximum

   Describe the qualifications of the proposing company and project leads, to demonstrate the capability to provide the technology and services required in this RFP. Information shall include:

   a. Company information, including name(main point of contact), address, business type, and website
   b. Description of the company, including:
      - The total number of employees.
      - An overview of all the products and services that the company provides.
      - The number of years that the company has provided the services requested in the RFP.
      - The number of current customers.
      - Experience with alternate funding opportunities such as utility rebate programs, government incentives and grants, and other options.
      - Primary building sectors (office, higher education, hospital, food service, etc.) that the company has worked with in the past.
      - Experience integrating different legacy systems; provide a list of what legacy systems the technology has integrated with.
      - Any other relevant information about the company
   c. Provide at least *[number]* references for customers that have received similar services as those detailed in the RFP. The Owner reserves the right to contact any of the organizations or individuals listed. Information provided shall include:
      - Customer name.
      - Brief description of the scope of products and services delivered, current status, project start and end dates, total project square footage, number of facilities served, facility types, and product and services provided.
      - Primary point of contact for the customer, including name, telephone number, and e-mail address.

Financing EMIS Projects

To learn more about the types of incentives available to offset first costs, consider the ***Regional Guide to EMIS Incentives***, LBNL, 2014: http://eis.lbl.gov/pubs/emis-incentives-guide.pdf. This guide presents a snapshot of programs; contact the program to find out about current offerings.

3) Technology features and implementation plan – *[number]* pages, maximum

Provide a description of the proposed approach and methodology to satisfy the Scope of Work defined in this RFP. This section shall include:

a. A network diagram of the basic system architecture of the proposed technology.
b. A detailed description of how the proposed technology provides the "required" capabilities listed in Scope of Work in Section 3 of the RFP.
c. A detailed description of how the proposed technology provides the "preferred" capabilities listed in the Scope of Work in Section 3 of the RFP.
d. A description of any additional capabilities that may be of interest to the Owner but are not specified as either "required" or "preferred" in the Scope of Work in Section 3 of the RFP.
e. Where applicable, screenshots to clearly illustrate key reporting, visualization, or analysis capabilities.
f. A description of how the proposed technology satisfies the IT requirements listed in the Scope of Work in Section 3 of the RFP.
g. An overview of system compatibility with respect to sensing and control technology provided by others. (See also the integration requirements in the RFP and associated appendices.)
h. For any wireless components, note the number of sensors or channels accommodated in gateway and router hardware.
i. A description of the training and ongoing technical support and maintenance services that will be provided.
j. A detailed project implementation plan, including all tasks and subtasks, durations, milestones, and deliverables. Include project management methods that will be used to ensure that the time schedule will be met.
k. A thorough description of specific responsibilities required of the Owner (e.g., site access, provision of electrical and network diagrams, network access, etc.) in conducting the project.

4) Cost proposal

The cost proposal shall explain the pricing structure for all software, hardware, integration, data commissioning, and other services required for the project. Include an itemized list of all direct and indirect costs (e.g., personnel, travel, supplies, fringe benefits) associated with the implementation of proposed EIS. The proposal shall include the following:

a. Sensing and metering hardware purchase, installation, integration, and commissioning fees (Refer to Section 3 and Appendix A of the RFP).
b. Communication hardware purchase and installation fees. (Refer to Section 3 and Appendix A of the RFP).
c. Software set-up fees (e.g., software configuration, programming, license, training, etc.).
d. Ongoing software fees (e.g., data storage and hosting, maintenance, access, technical support and maintenance, etc.).
e. Any specified technology features or capabilities that add significantly to project costs.
f. Any additional optional or bundled services or fees.

5) Staffing

   Describe the team that will be assigned to the project, with each member's areas of responsibility. Identify lead personnel and include a resume for each lead.

6) Protections and assurances

   Describe the specific measures and protections that the responding company can provide to the Owner to ensure continuity of services in the event of bankruptcy, transfers of ownership, or other disruptions to business-as-usual operations.

5. Proposal Submission and Eligibility

[Describe the RFP procedures, including your organization's point of contact for respondent inquires, submission instructions, modification and withdrawal process, confidentiality, and other procedural details.]

1) Eligibility

   [Include any eligibility requirements or preferences that may apply, considering, for example, foreign vs. domestically owned companies; multi-party joint responses; small businesses; citizenship; and other criteria.]

2) Preparation

   The Proposal content and format must follow the guidelines provided in Section 4, Proposal Format Guidelines, in the RFP.

3) Submission and due date

   [Provide a website, e-mail address, and/or mailing address for the proposal submission; identify whether electronic or paper submissions are preferred or required.]

   Proposals are due by *[insert the time and date from the schedule summarized in Section 2 of the RFP]*. Late Proposals will not be accepted.

4) Inquiries

   Questions about this RFP must be directed in writing, via e-mail, no later than *[insert the time and date from the schedule summarized in Section 2 of the RFP].* Send to:

   [Provide the name and either e-mail address or telephone number for the desired organizational point of contact.]

5) Proposal validity

   Proposals are to be valid for a minimum of *[number of days]* days to allow sufficient time for evaluation and selection, and any unforeseen delays in the review process.

6) Modification and withdrawal

   Any proposal may be modified or withdrawn by written request of the Proposer, provided that the request is received prior to the submission deadline.

7) Right to reject proposals

   This RFP does not commit the Owner to award a contract, pay any costs incurred in the preparation of a response to this RFP, or to procure or contract for services. The Owner reserves the right to accept or reject any or all proposals received as a result of this RFP, to negotiate with any qualified Proposers, or to cancel this RFP in part or in its entirety.

8) Confidential material

   All the proposals will become the property of the Owner. Proposers should not include proprietary or confidential information in their response, unless required to clearly convey the proposed work or technology solution. Financial, commercial, or technical information that is considered confidential should be clearly indicated in the proposal.

9) Terms and conditions

   [In partnership with your organization's legal department or representatives, include specific terms and conditions that will govern the contracting and procurement of the technology and required services, as well as on-site work conducted to complete the project.]

6. Evaluation and Selection Criteria

[Describe how proposals will be evaluated. For this section of the RFP, you may paste in the criteria from the "Evaluation and Selection Criteria" which comprises Section 3 of the support package. You may choose to use a qualitative description, including key criteria, or to include quantitative point and scoring information.]

Appendix A. Existing site characteristics, metering, and monitoring infrastructure

[Describe in detail, the site characteristics, and existing metering and monitoring infrastructure. Proposers can use this information in combination with the Scope of Work in Section 3 of the RFP to understand key aspects of scope, data acquisition and integration, and estimated project costs. You may wish to append spreadsheets, if that is a more convenient format to present the information.

1) *Provide a description of the sites or campuses included in the scope of work, going beyond the level of detail provided in the RFP Introduction. Include relevant details of lighting and HVAC equipment and design, critical loads and services, building floor plans, etc.*
2) *Include a list of existing sensors and meters that are available for integration into the monitoring, diagnostic, and analysis technology.*
    a. *Describe the make, model, and type of meter or sensor, what it measures (e.g., electric demand, steam flow), and the level of measurement (e.g., whole-building, system).*
    b. *Describe for each sensor and meter the associated networking and communication protocols, and where the information is stored.*
    c. *Provide sample historical energy consumption records.*
3) *If you will integrate BAS trend logs, provide the make, model, and vintage of the system, and any centralization or Internet access to the system.*
4) *If you will integrate data from other preexisting monitoring and diagnostic systems, describe the system, and their communication and data storage protocols.*
5) *Include diagrams where possible, given information availability, and considerations of company privacy and confidentiality.]*

Common Communication Protocols for Buildings

- BACnet
- LonTalk
- Modbus
- DALI
- C-Bus
- ZigBee
- Numerous additional proprietary solutions

Section 2: Technology Specification Template

This section of the package contains the template to guide your creation of a specification for an energy information system, or related monitoring and diagnostic technology. This template is intended to provide a structure and content foundation to facilitate an owner-driven process to define technology capabilities.

By editing, adding to, and deleting from the template, you will produce a custom specification based on your organization's specific goals and energy management processes. This specification should be included in the Scope of Work in Section 3 of the RFP. It is recommended that in each section of the specification you indicate and distinguish between **required** capabilities and **preferred** capabilities.

To assist you in defining key requirements and capabilities, the template indicates minimum recommended functionality in **bold** text. Definitions and examples of common visualization and analysis capabilities are provided in Appendix B, and additional resources are provided in Appendix C. A general glossary of terms is also included.

Glossary of Terms

Baseline: A representation of "standard" or typical energy performance, used for comparative purposes. Baseline may be expressed according to a variety of metrics and may account for weather or other independent variables that influence energy consumption.

Benchmarking: Comparing building energy performance to that of similar buildings (cross-sectional benchmarking) or its own historic performance (longitudinal benchmarking). Benchmarking may also be performed at the system or component level.

Building Automation System (BAS): A system that is designed to control building operations and indoor climate.

Communication Protocols: Standardized rules governing the transmission of information between devices. Common protocols for building data include, for example, BACnet, LonTalk, and Modbus.

Cumulative Energy Savings: Sum of the total accrued energy savings or increases over a certain time frame, relative to the baseline.

Degree Day: A measure of the heating or cooling load on a building relative to a "base" outside air temperature (e.g. 65°F). It is commonly calculated as the difference between the mean daily temperature and the "base" temperature.

Demand: The rate of energy use by a particular building or system, i.e., power. Common units of energy demand are kilowatts (kW) for electricity, tons for chilled and hot water, and therms per hour or cubic feet per minute for gas.

Demand Response: Changes in electric usage by customers in response to changes in the price of electricity over time or when system reliability is jeopardized.

Energy Information System (EIS): Software, data acquisition hardware, and communication systems used to store, analyze, and display building energy data.

Energy Management and Information System (EMIS): A broad family of tools and services to manage commercial building energy use. These technologies include, for example, energy information system, equipment-specific fault detection and diagnostic systems, benchmarking and utility tracking tools, automated system optimization tools, and building automation systems.

Energy Savings: A reduction in energy use often quantified by accounting for key factors such as weather or hours of operation.

Greenhouse Gas (GHG) Emissions: The carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) gases released into the atmosphere as a result of energy consumption at the facility.

Measurement and Verification (M&V): The process of using measured data and other operational information to confirm the energy savings from energy efficiency projects. The International Protocol for Measurement and Verification defines four standard M&V approaches.

Peak Load: The maximum load during a specified period of time.

1. Technology Capabilities

1.1 Energy consumption tracking

[Describe the requirements for tracking energy consumption, including details such as the level of measurement (i.e., whole-building, panel-level, or equipment-level submetering), time resolution of data, data input and storage, and data quality assurance. Delete any capabilities that are not required, and edit as needed.]

1) The technology will track and provide views of the following meter points on a sub-hourly (e.g., 15-minute) basis.
    a. Whole-building level: Electricity, gas, water, steam, etc.
    b. Panel submetered level: HVAC, lighting, plug load, etc.
    c. Equipment submetered level: chiller, boiler, cooling towers, pumps, air handlers, etc.
    d. Functional area/zones of building: chiller plant, data center, kitchen, cafeteria, swimming pools, elevator, floors, building wings, etc.
    e. Renewable energy sources: Solar PV, fuel cell, wind, etc.
2) Energy data inputs
    a. The technology will collect interval data directly from remotely readable meters (Electricity, gas, water, steam, etc.) using industry standard communication protocols (e.g. BACnet, Modbus, LonTalk).
    b. The technology will have the capability to consolidate meter readings, to create virtual meter points. In other words, it can add and subtract the readings from multiple meters at the same interval, to produce a calculated time series of energy use.
    c. The technology will be able to upload and store a minimum history of *[number]* years (if available) of energy use or other data from standard spreadsheet or text file formats.
    d. The technology will have the capacity to store at least *[number]* years of data, trended at intervals up to *[minimum time resolution, i.e., 15 minutes or 5 minutes],* for analysis, reporting, and visualization.
3) Data quality checking
    a. The technology will provide data validation to detect quality issues such as gaps, spikes, and flat-lines, and will provide an option or service to automatically fill and/or correct data.
    b. The technology will provide customizable notification schemes *[specify, e.g., work order generation, e-mail, phone, text message, etc., to individual and/or group recipients]* for data quality alerting.
4) Energy costs tracking
    a. The technology will calculate and provide visualizations of real-time (and historic) energy costs using *[specify either site-specific tariffs or estimated (blended) flat rates in $/energy unit]*.

Metering and Submetering

Energy consumption can be measured and tracked at a variety of levels. Whole-building metering can provide a high-level picture of how the building is performing and is a good starting place for organizations just beginning performance tracking. Metering beyond the whole-building level can provide more granular levels of information. It has the potential to offer deeper performance insights and enable greater savings over time, but may increase first costs.

Metering Best Practices: A Guide to Achieving Utility Resource Efficiency provides information on state-of-the-art metering technologies and guidance on how to implement metering: http://www1.eere.energy.gov/femp/pdfs/mbpg.pdf

5) Energy unit conversion
    a. The technology will have the ability to normalize the data according to factors that are known to affect energy consumption, such as floor area, number of occupants, heating degree days, and cooling degree days.
    b. The technology will have the capability to convert, display, and report energy use in equivalent environmental metrics such as *[specify units, e.g., CO_2 equivalent, miles driven in a car, hours of laptop use, etc., and define any desired conversion standards].*

1.2 Energy performance analysis

[Describe any desired requirements for how the technology will analyze interval energy data and provide actionable information. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) Time series load profiling *[see Appendix B for more information]*
    a. The technology will provide plots of at least 24-hour periods of interval energy usage versus time *[specify longer time periods, such as weeks or months, or unlimited, as desired]*.
    b. The technology will provide options to select the time period and data points that are plotted.
    c. The technology will allow multiple user-selected data points to be plotted on a single chart or graph.
    d. The technology will allow users to annotate charts and displays with key events, and will store those annotations.
2) Cross-sectional benchmarking *[see Appendix B for more information]*
    a. The technology will allow the user to create "peer groups" and will rank buildings *[and/or submeters, meters, and equipment]* by a performance index. *[Specify critical indices or metrics for your buildings and equipment such as kBtu per sf, $ per year, kW per occupant, etc.]*
    b. The technology will integrate with the ENERGY STAR Portfolio Manager to automatically produce ENERGY STAR scores for user-selected buildings.
3) Longitudinal benchmarking *[see Appendix B for more information]*
    a. The technology will provide the ability to compare the energy usage *[and/or costs]* in a fixed period (day/week/month/year) for a building, system, or equipment component against past *[and/or predicted]* performance of the same period length.
4) Heat map visualization *[see Appendix B for more information]*
    a. The technology will provide heat maps of energy consumption, color coding the magnitude of the metered energy usage for a user-selected time period of historic data.
5) Baseline energy consumption modeling *[see Appendix B for more information]*
    a. The technology will characterize and predict the typical or expected energy usage based on key drivers such as weather (degree days/outside air temperature), occupancy, time of day/week, and other variables. The baseline will be used for energy savings calculations, near-future load predictions, energy use comparisons, and energy anomaly detection.

6) Energy anomaly detection, fault detection, and alarming *[see Appendix B for more information]*
    a. The technology will identify and flag unexpectedly high or low energy use *[Specify whether this is required at the building, submeter, or equipment level. Also specify whether a baseline model is to be used, as opposed to a simple alarming threshold, and whether thresholds should be user-definable.]*
    b. The technology will detect operational faults in systems or equipment, with root cause information to guide investigation and resolution. *[Specify whether estimated energy impacts of faults are also required, and the key equipment types that should be handled.]*
    c. The technology will provide customizable notification schemes (work order generation, e-mail, phone, text message, or other messaging; individual and group recipients) for anomaly and fault notification.
    d. The technology will provide the ability to track energy anomalies and faults (duration, persistence, etc.) to facilitate response and resolution.
7) Building energy dashboard
    a. The vendor will provide a public-facing configurable dashboard display for occupants and visitors to view owner-defined aspects of energy consumed in the building. *[Specify desired metrics such as energy use intensity, cumulative savings over time, or other performance metrics and trends.]*
    b. The vendor will provide an operator-facing or energy manager-facing configurable dashboard display to view aspects of building energy performance. *[Specify desired metrics and trends.]*
    c. The Proposer will provide all necessary hardware, software, and connectivity for dashboards.

Managing Technology Costs

This template specification includes an extensive array of technology capabilities. Technology vendors may provide a standard offering with additional fees for custom options. Types of capabilities that may increase costs and complexity include:

- User import/upload of data
- Options for user-defined customizable inputs
- Extensive graphic or visualization options
- Extensive integration of system level data, for example from building automation systems or other data bases
- A high degree of customization

To manage technology costs, take care that your specification does not extensively mix capabilities across those typical for a given EMIS type, resulting in a highly custom solution. For example, most interval data analysis technologies such as energy information systems will not provide extensive utility billing management capabilities, or control capabilities.

The ***EMIS Technology Classification Framework*** provides a common reference that can be used to understand key distinguishing factors and core attributes of EMIS technologies: http://eis.lbl.gov/pubs/emis-tech-class-framework.pdf

1.3 Utility billing management

[Describe any desired requirements for how the technology will incorporate and analyze utility billing information. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) Billing data input
    a. The technology will provide the capability to upload utility billing data (i.e., electricity, gas, steam, water) *[Specify associated file formats, such as .csv and .xlsx.]*

   b. The technology will provide the capability to import utility billing data directly from utility providers *[Note specific providers.]*.
2) The technology will record all relevant utility bill details including total usage, cost, credits/adjustments, demand charges, etc.
3) The technology will provide the capability to allocate and totalize utility costs for each calendar month *[as opposed to billing periods, which may not fall within a single month]*.
4) The technology will provide the capability to allocate utility costs to different tenants or occupant groups sharing a building, to enable recharges and tenant billing.
5) Utility bill validation
   a. The technology will identify late, missed, or incorrect bills.
   b. The technology will identify when a payment has been erroneously posted or applied to the wrong account.
   c. The technology will check for energy use, demand, price, and cost to detect potential billing errors.
   d. The technology will automatically notify a designated user when errors are identified.

1.4 Utility budgeting

[Describe any desired requirements for how the technology will forecast future utility costs and conduct a budget/cost comparison. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will provide the capability to forecast future energy use and utility costs for a building and/or entire portfolio using historical consumption, with the option for *[Specify desired inputs such as floor area, space or use type [as in the U.S. Environmental Protection Agency's Portfolio Manager or the Commercial Building Energy Consumption Survey [CBECS]), changes in occupancy, operating hours, and rate escalations. Specify any particular modeling approaches you require for your buildings.]*
2) The technology will chart and report energy costs against budget, indicating surplus/deficit.
3) The technology will include specific utility tariffs for energy cost and demand calculations.

1.5 Demand management

[Describe any desired requirements for how the technology will monitor, analyze, and shed the building peak load. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will provide daily/ monthly/annual peak load monitoring.
2) The technology will provide notification *[specify e-mail, text message, or other messaging]* to an individual and/or group recipients when the demand for critical metered loads passes a threshold *[Specify how the threshold will be defined.]*.
3) The technology will provide the capability to display whether a demand response event is active or pending (or other states), and to visualize and quantify demand responsive load reductions.

1.6 Greenhouse gas (GHG) tracking

[Describe any desired requirements for how the technology will compute and analyze greenhouse gas emissions based on collected energy usage. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will calculate, monitor, and report GHG emissions associated with facility energy use *[Specify any reporting protocols that must be met and whether region-specific emissions factors are required, or if an assumed energy-to-CO_2 conversion factor is sufficient]*.
2) Greenhouse gas calculations will account for on-site renewables, where relevant. That is, calculations will be based on total utility-purchased energy use as opposed to total building energy use.

1.7 Energy efficiency project management

[Describe any desired requirements for how the technology will streamline the energy efficiency project process and evaluate project savings. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will provide the capability to log and track the status of energy efficiency projects (e.g., start, ongoing, finish), and descriptions of measures and expected savings.
2) The technology will provide measurement and verification capabilities in accordance with the International Protocol for Measurement and Verification or other industry standards *[specify any additional requirements such as savings uncertainty or provision of baseline model fitness metrics]*.
3) The technology will provide the ability to express savings as a total, for a given pre- and post-period, or as a running, cumulative aggregated total *[see Appendix B for more information]*.

1.8 Integration with external data sources and building control systems

[Describe any desired requirements for what other data (beyond energy usage) the technology will integrate with. Consider, for example, the following potential capabilities; delete any that are not required, and add and edit as needed.]

1) The technology will integrate with multiple external data sources such as local or on-site weather stations, or third-party weather providers. Degree-days will be automatically calculated and charted for inclusion in year-to-year or month-to-month energy comparisons *[see also Section 1.2 of this template]*.
2) The technology will integrate with building control systems (i.e. HVAC control, lighting control, plug control, etc.)
    a. Where necessary to take advantage of existing metering and sensor data (to verify building performance, energy savings, and respond to demand reduction opportunities), the technology will integrate with the following building control systems: *[note specific building control systems, e.g., Siemens Apogee, JCI Metasys, Schneider TAC, Wattstoopper, etc.].*
3) The technology will integrate with existing meter monitoring systems
    a. Where necessary to take advantage of existing metering data, the technology will integrate with the following systems: *[note specific systems, e.g., Schneider ION, etc.].*
4) The technology will provide options to add new future features such as automated equipment-level fault detection and diagnosis in future *[specify capabilities that may be desired in future technology enhancement]*.

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

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?

2. IT Requirements

2.1 Data storage, backup, and hosting

[Describe any desired requirements for data storage and hosting services; delete any that are not required, and add and edit as needed.]

1) Data archival will use a database (e.g., SQL, Oracle, DB2) *[specify any preferences]* and provide a periodic data backup option (e.g., monthly, quarterly, yearly).
2) The technology will offer sufficient capacity to store all required data (see Section 1.1 of this template).
3) Software hosting *[specify preferred option.]*
    a. Software as a service (SaaS), operated and maintained by a technology provider
    b. On-premise *[specify whether maintenance will be conducted by the technology provider or by the owner.]*

2.2 Security

[Describe any desired requirements for data security; delete any that are not required, and add and edit as needed.]

1) The technology will use industry standard security protocols that comply with the Owner's requirements for privacy and network and system protection.
2) The technology provider will indicate specific security frameworks and certifications that are utilized.
3) The technology must include hardware firewalls, vulnerability scans, and automated patch updates.

2.3 Permissions and access control

[Describe any desired requirements for end-user access to websites, servers, and mobile applications; delete any that are not required, and add and edit as needed.]

1) The technology provider will indicate any limits on the number of users and/or accounts that can be accessed via web browser or mobile web applications.
2) The technology will allow user access and permissions to be constrained to specific buildings, departments, people, etc.
3) Login to the system will require a username and password.
4) The technology provider will indicate how users are authenticated.

2.4 Usability

[Describe any desired requirements for the technology user interface; delete any that are not required, and add and edit as needed.]

1) The technology will condense large amounts of real-time and historical energy usage data into a graphical format that is rich, intuitive, and user friendly.
2) The technology will be accessible through multiple hardware platforms (i.e., smart phone, tablet, PCs or Macs).
3) The technology will support common browsers, including Internet Explorer, Firefox, Chrome, and Safari.

SaaS vs. On-Premise Offerings

Many of today's energy analytics technologies are delivered as software-as-a-service (SaaS) offerings. Depending on the specific software solution or vendor, on-premise, self-hosted solutions may not be available.

On-premise solutions are not hosted "in the cloud" yet can still accommodate remote, off-site access. Server hardware and software, maintenance, and network connectivity are the responsibility of the site, or owner. Data is stored and handled internally, behind any firewalls.

Instead of having the application running on on-site servers with local data storage, SaaS cloud-based applications are widely available. The data must travel over the internet to the cloud provider, yet all storage, maintenance, and hosting is handled by the provider. Common security certifications and programs to validate the level of security provided by cloud-based service include the Federal Information Security Management Act (FISMA) and the ISO 27000 series.

4) The technology will allow creation and storage of custom views for different users or user types. *[This capability might include, for example, color assignment, definition of type and location of charts on the page, inclusion of building photos, etc.; specify which are desired.]*

2.5 Networking

[Describe bandwidth requirements and communication protocols; delete any that are not required, and add and edit as needed.]

1) The technology provider will indicate which protocols their technology is compatible with, including all relevant elements of the system, such as building metering and control communications, databases, web services, and Internet communications.
2) The technology provider will indicate any web browser version dependencies.
3) The technology provider will specify anticipated bandwidth requirements at interfaces within the building monitoring and control networks.
4) The technology provider will address the approach to interfacing with legacy systems and avoiding network overload.

3. Technical warranty, support, and training

3.1 Warranty

[Describe any desired technical warranty, and edit as needed.]

1) The technology provider will include a warranty that will begin after implementation, testing, and commissioning. The duration of the warranty will be at least *[specify a period of time, e.g., two months]*. During the warranty period, all software and services listed will be provided to [*name of Owner*] on a no-charge basis.

3.2 Technical support

[Describe any desired technical support services, and edit as needed.]

1) The technology will provide the following help system for end users:
    a. An online help system that includes comprehensive system documentation
    b. Printed documentation
    c. A service help desk with a guaranteed response time of no more than *[define a period of time, e.g., one day, five hours]*
2) The technology provider will provide a detailed list of technical support and maintenance options.
3) The technology provider will provide estimates of the frequency of software updates during a year and any associated system downtime.

3.3 Training

[Describe any desired training, and edit as needed]

1) The technology provider will offer user training in the following form. Training may include the following options:
    a. Tools and instructional materials in video, electronic format or hard copy
    b. Initial *[number of hours]* hour onsite training programs at each site/campus
    c. Ongoing group training sessions *[frequency, e.g., twice a year]* to update personnel and instruct new staff

4. Testing and commissioning

Prior to hand-off, the technology provider will fully commission all meters, sensors, data acquisition and communications systems, and analytical functions supported by the technology. The provider will document the test and assurances that were conducted, and will make this documentation available to *[name of Owner]*.

Appendix B: Energy Performance Analysis Approaches

This appendix describes many of the analysis approaches that you may wish to specify. Each approach is named, and a short overview is provided, with a description of the analysis approach, information that can be gained from applying it to your data, and representative sample plots.

Energy Performance Analysis

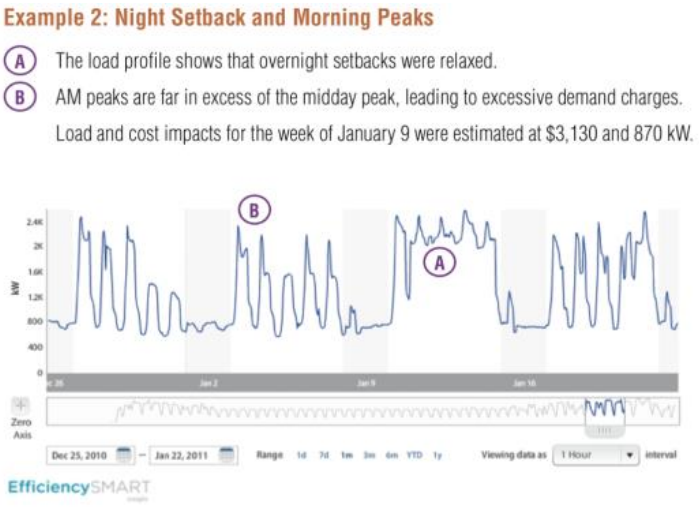
The technical content in this appendix is adapted from the ***Energy Information Handbook: Applications for Energy Efficiency Building Operations***. Jessica Granderson et al., LBNL, 2011: http://eis.lbl.gov/downloads/energy-information-handbook.pdf

1. Time Series Load Profiling

Description: A simple plot of metered energy usage (whole-building or submetered) versus time, with interpretive guidance

Information Gained: when and how much energy is being used; persistence and magnitude of nighttime setbacks, timing of the peak, and weekend shut-down

Sample Plots:



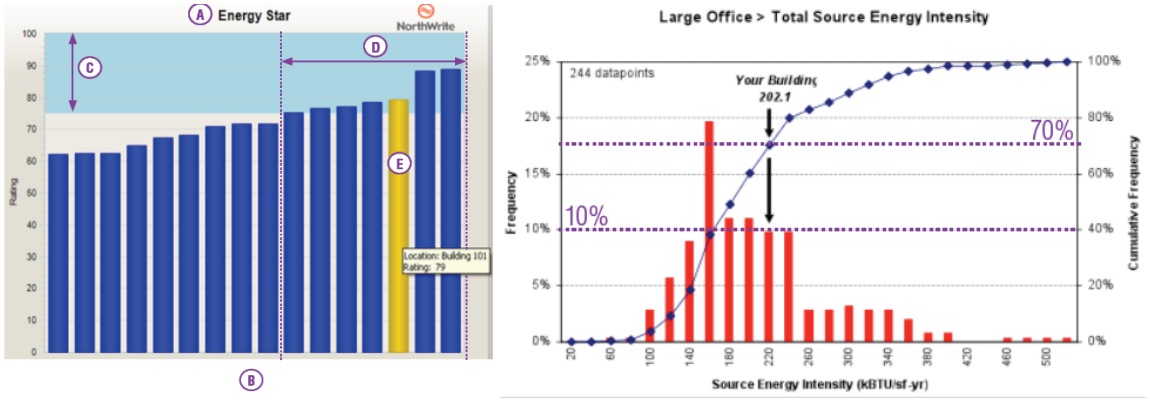
Source: Provided by EnerNOC for use in the Energy Information Handbook.

2. Cross-sectional Benchmarking

Description: Plot of a building/submeter energy usage/index compared relative to a peer group

Information Gained: ranking of buildings in terms of energy usage, whether a building has the potential to improve its energy efficiency, and energy use breakdown for a building

Sample Plots:



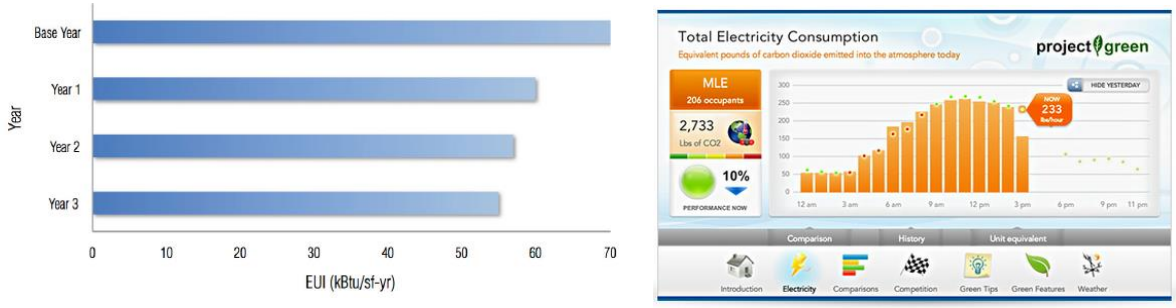
Source: (left) Provided by NorthWrite for use in the Energy Information Handbook; (right) excerpted from the Energy Information Handbook.

3. Longitudinal Benchmarking

Description: Plot of hourly, daily, monthly, or annual usage, usually as a bar chart with or without interpretive guidance (e.g., consumption in Year 3 increased compared to the baseline after two years of decreasing consumption, indicating a possible change in operations or equipment that should be evaluated)

Information Gained: consumption trends and relative magnitude compared to a base period

Sample Plots:



Source: (left) Excerpted from the Energy Information Handbook; (right) Lucid Design Group.

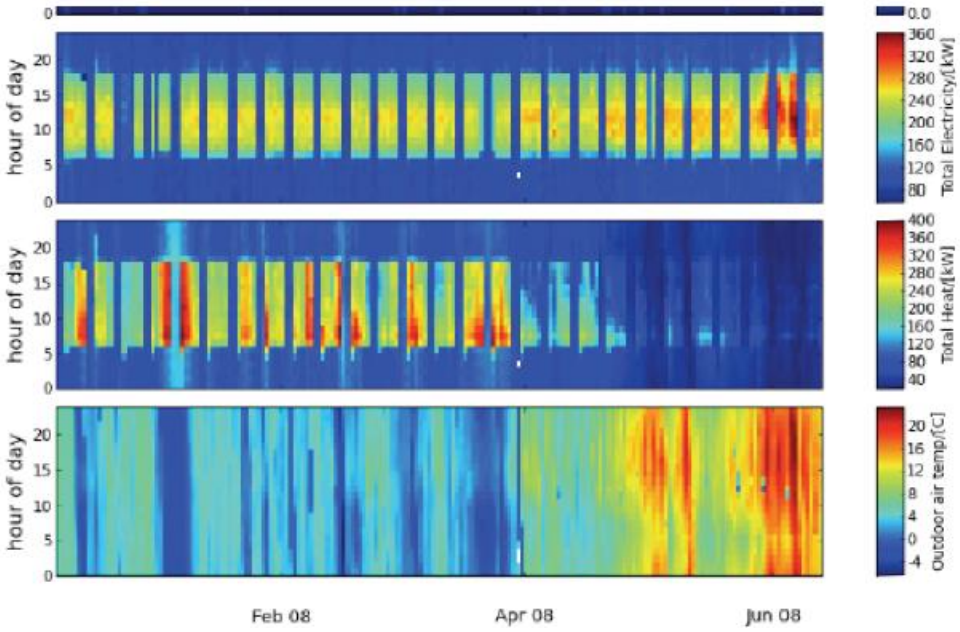
4. Heat Map Analysis

Description: Provides carpet plot or heat map of load and time, with or without interpretive guidance (e.g., winter schedule should be shifted)

- Automated routine to compare load changes to schedule/expectations; or
- A simple visualization with interpretive guidance, intended to reveal “hot spots”

*Information Gained***:** whether loads change correctly based on time of day or month of year, and whether schedules are implemented

Sample Plot:



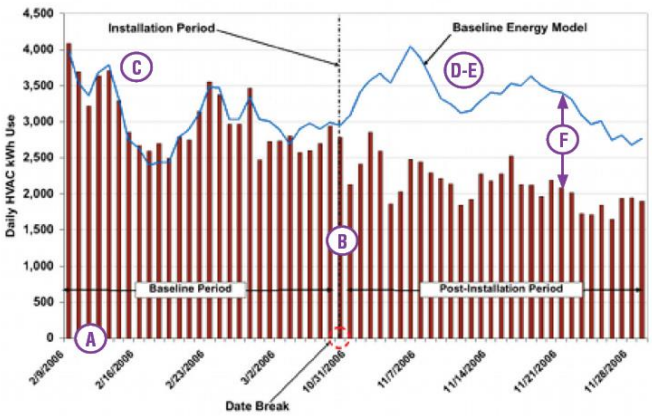
Source: Neumann et al., eds. Results of the project Building EQ tools and methods for linking EPBD and continuous commissioning. Fraunhofer Institute for Solar Energy Systems, Intelligent Energy Europe, 2010.

5. Baseline Energy Consumption Modeling

Description: Provide a mathematical characterization of energy use based on measured historic energy data. Most commonly, the baseline will use a linear regression model. The independent variables of the regression model are those that drive energy use; for example, day of week, time of day, outside air temperature (or cooling/heating degree days), and number of occupants.

Information Gained: It is typically not used independently, but as the fundamental underlying component of advanced analyses such as energy anomaly detection and quantification of project savings.

Sample Plot:



Source: Quantum Energy Services and Technologies (QuEST) provided for use in Energy Information Handbook.

6. Energy Anomaly Detection

Description: Provide automatically abnormal energy consumption identification. The threshold is not typically determined analytically; rather, it is set according to a default value, such as percent different from predicted, which might be adjusted based on the user's experience. Baseline models are usually used to determine projected consumption.

Information Gained: when and how much energy usage is exceeding the reasonable range

Sample Plot:

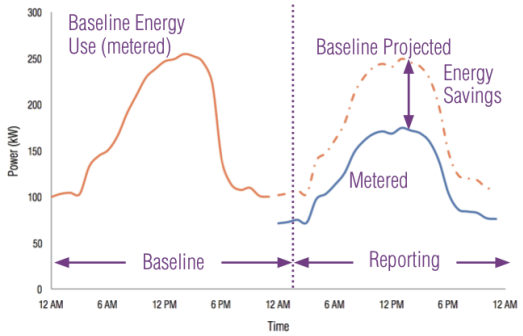
Source: Pulse Energy, provided for use in the Energy Information Handbook.

7. Energy Savings

Description: Qualify the reduction in energy use from the pre-efficiency project baseline to the post-efficiency project energy use. A baseline model that accounts for key energy drivers such as outside air temperature is developed using energy use data before the efficiency project. Project the baseline model into the tracking post-project period to quantify the energy use that would have resulted had no project been conducted. The energy savings is determined by subtracting the energy use from the post-project period from the baseline projected energy use to quantify energy savings.

Information Gained: energy-savings performance of energy conservation measures or efficiency projects

Sample Plot:



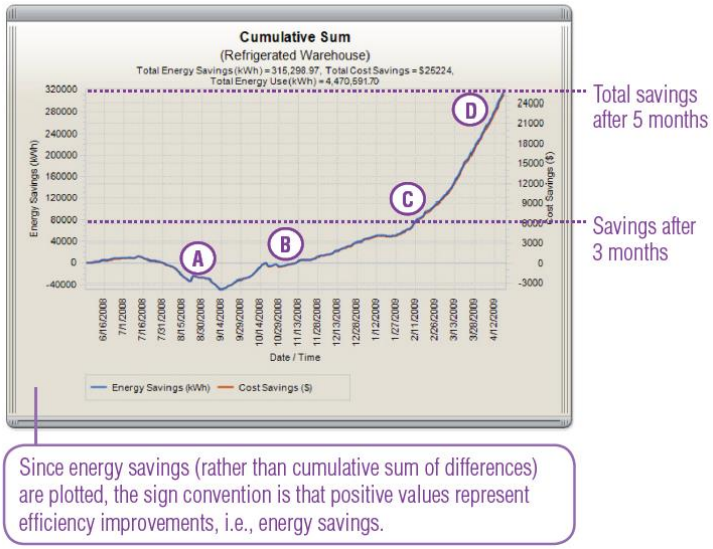
Source: Excerpted from Energy Information Handbook.

8. Cumulative Sum (CUSUM)

Description: Provide CUSUM plot to quantify total accrued energy savings over time and to detect energy waste or performance relative to operational changes. It requires a baseline model and aggregate savings since the beginning of an efficiency project.

Information Gained: energy saving persistence

Sample Plot:



Source: NorthWrite provided for use in the Energy Information Handbook.

Appendix C: Additional resources

The following resources can be used to learn more about EMIS technologies and issues related to their use:

A Specifications Guide for Performance Monitoring Systems, Kenneth L. Gillespie et al., Lawrence Berkeley National Laboratory, 2007, available at: https://old.northcarolina.edu/info/vendors/Performance_Monitoring_Spec_Guide_Version_1_2007-03-23.pdf. Accessed on October 28, 2014.

Advanced Metering and Energy Information Systems, New Building Institute (NBI), 2009, available at: http://newbuildings.org/advanced-metering-and-energy-information-systems. Accessed on October 28, 2014.

Building Energy Information Systems: State of the Technology and User Case Studies, Jessica Granderson et al., Lawrence Berkeley National Laboratory, November 2009, LBNL-2899E, available at: http://eis.lbl.gov/pubs/beis-case-studies.pdf. Accessed on October 28, 2014.

Building Performance Tracking Handbook: Continuous Improvement for Every Building, California Commissioning Collaborative, 2011, available at: http://www.cacx.org/PIER/handbook.html. Accessed on October 28, 2014.

Energy Information Handbook: Applications for Energy Efficiency Building Operations, Jessica Granderson et al., Lawrence Berkeley National Laboratory, 2011, available at: http://eis.lbl.gov/downloads/energy-information-handbook.pdf. Accessed on October 28, 2014.

Energy Information Systems: Technology Costs, Benefits, and Best Practice Uses, Jessica Granderson et al., Lawrence Berkeley National Laboratory, 2013, available at: http://eis.lbl.gov/pubs/lbnl-6476e.pdf. Accessed on October 28, 2014.

Energy Management and Information Systems (EMIS) Technology Classification Framework, Jessica Granderson, Lawrence Berkeley National Laboratory, 2013, available at: http://eis.lbl.gov/pubs/emis-tech-class-framework.pdf. Accessed on October 28, 2014.

Energy Management Systems for Food Service Application, Navigant Consulting, Inc. and Donna Trovalli, 2014, available at: http://www4.eere.energy.gov/alliance/sites/default/files/uploaded-files/ems-guidance-for-food-service-applications.pdf. Accessed on October 28, 2014.

EMIS Crash Course, Jessica Granderson et al., Lawrence Berkeley National Laboratory, 2013, available at: http://eis.lbl.gov/pubs/emis-crash-course.pdf. Accessed on October 28, 2014.

Metering Best Practices: A Guide to Achieving Utility Resource Efficiency, Federal Energy Management Program, U.S. Department of Energy, 2011, available at: http://www1.eere.energy.gov/femp/pdfs/mbpg.pdf. Accessed on October 28, 2014.

Monitoring & Reporting Applications Guide, Energy Trust of Oregon, 2011, available at: http://energytrust.org/library/forms/NBE_MR_Applications_Guide_v01.pdf. Accessed on October 28, 2014.

Regional Guide to EMIS Incentives, Lawrence Berkeley National Laboratory, 2014, available at: http://eis.lbl.gov/pubs/emis-incentives-guide.pdf. Accessed on October 28, 2014.

Submetering of Building Energy and Water Usage, National Science and Technology Council Committee on Technology, 2011, available at: http://www.bfrl.nist.gov/buildingtechnology/documents/SubmeteringEnergyWaterUsageOct2011.pdf. Accessed on October 28, 2014.

Synthesis of EMIS Resources, Lawrence Berkeley National Laboratory, 2014, available at: http://eis.lbl.gov/pubs/synthesis-emis-resources.pdf . Accessed on October 28, 2014

Section 3: Evaluation and Selection Criteria

This section of the package contains content to guide your evaluation of RFP responses and your selection of a technology. It is intended to provide an objective framework and point/scoring process to assess multiple competing proposals that satisfy the scope of work and other RFP requirements. You can use the framework to make a “first cut” and rule out some of the Proposals, or you may base your final selection entirely on the scoring results. For a balanced review, it is recommended that more than one evaluator participate in the scoring activity.

This material can also be included in Section 6 of the RFP, either in part or in total, depending on how specific you wish your RFP guidance to be.

1. Evaluation method

The proposal evaluation will be based on a weighted scoring process, according to the criteria listed in the table below.

[Criteria may be removed or added, depending on the Owner's priorities.

To begin the process, each criterion is assigned a weight that indicates its relative importance; 5 would represent the most important criteria, and 1 would represent the least important. These weights will be set by the primary decision maker, and should be kept fixed for each reviewer.

Then, each proposal is scored by the reviewers. A score is assigned to each criterion in the table, with 10 representing the best response.

A weighted score is calculated for each criterion (row) in the table. The weighted score is equal to the assigned score multiplied by the assigned weight.

The total proposal score is the sum of the weighted scores for each criterion, i.e., the sum of values in the last column of the table.]

Proposal Evaluation Criteria	**Score** *[assign a score of 1–10]*	**Weight** *[assign a weight of 1–5]*	**Weighted Score** *[score*weight]*
Cost proposal			
Compliance with the scope of work			
Ability to deliver additional unspecified capabilities of value			
Qualifications and experience			
Overall quality of the proposal			
Total proposal score			

2. Point-scoring method

[The following considerations may be used in the evaluation and scoring of each proposal.]

[Cost proposal

- *How reasonable are the Proposer's pricing estimates?*
- *How well does the Proposer meet the Owner's financial requirements, considered over both the short-term and the long-term?*
- *How well did the Proposer communicate the pricing structure for the proposed technology and scope of work?*

The Value Proposition for Energy Information Systems

The publication ***Energy Information Systems: Technology Costs, Benefits, and Best Practice Uses*** presents the procurement costs of EIS software from over two dozen organizations, as well as the energy- and cost-saving benefits associated with their use: http://eis.lbl.gov/pubs/lbnl-6476e.pdf.

Compliance with the scope of work

- *How well does the Proposer demonstrate an understanding of the project objectives?*
- *Do the proposed technology and services satisfy the required capabilities and functions defined in the specification?*
- *Do the proposed technology and services satisfy the preferred capabilities and functions defined in the specification?*
- *How well does the technology interoperate, and communicate with other systems?*
- *How well does the proposed technology satisfy the IT and security requirements?*
- *How well do the proposed services and maintenance meet the needs defined in the specification?*
- *Does the proposed technology include capabilities that are considered "best practice" or "state of the art" relative to similar products?*
- *How well has the Proposer demonstrated that they understand the project scope and have a viable plan for successful implementation?*
- *How clear is the description of how required data will be acquired, given your specific site characteristics and existing monitoring and metering infrastructure?*
- *How scalable and expandable is the proposed technology?*

Ability to deliver additional unspecified features of value

- *How well do any additional features or capabilities that were highlighted in the proposal meet the Owner's current needs?*
- *How well do any additional features or capabilities that were highlighted in the proposal meet the Owner's future needs?*

Qualifications and experience

- *Do the proposing company and personnel possess the qualifications necessary to successfully complete the scope of work?*
- *Does the Proposer have a good history of experience with portfolios or sites similar to yours?*
- *Does the Proposer demonstrate strong experience with technology design, provisioning, installation, and commissioning?*
- *Has the Proposer demonstrated timely and successful completion of similar projects, within budget?*
- *How strong are the references that the Proposer has provided?*

Overall quality of the proposal

- *Have all the elements addressed in the Proposal Format Guidelines in Section 4 of the RFP been addressed?*
- *Are the protections and assurances for continuity of services, in the event of disruptions to the Proposer's business as usual operations sufficiently addressed?*

- *Is the writing clear and concise?*
- *Is the proposal content well organized and easy to follow?*
- *Are the technical aspects of the proposal described clearly, with minimal jargon and with a sufficient level of detail?]*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