Module 6

Energy efficiency in action
Before we start our training, please find the keys below to our interactive PDF:
Learning objectives

In the previous module, Module 5 – Business case development, we provide an in-depth review of developing a business case for energy conservation measures. Once you complete this module, you should understand:

• The components to selecting and contracting with a vendor.
• How to ensure quality of project installation.
• Implementing project operations and maintenance (O&M) procedures.
• The tenets for a project measurement and verification (M&V) program.
• Monitoring and continuous commissioning.

This is the final module in this series.
Terms to know

**Commissioning agent:**
An agent who works closely with facilities to ensure the energy efficiency project meets the operational requirements.

**ECM:** an energy conservation measure.

**Measurement and verification (M&V):**
The process of planning, measuring, collecting and analyzing data for the purpose of verifying and reporting energy savings within an individual facility resulting from the implementation of ECMs.

**Request for proposal (RFP):**
A business document that announces a project and solicits bids from qualified contractors to complete it.

**Request for information (RFI):**
A business document that collects information about the capabilities of various suppliers.
Energy efficiency in action

The planning is done; this module focuses on ensuring the energy conservation measures are installed correctly and all follow up is planned accordingly.

- **Vendor selection**
  Identify and select the right vendor for your project.

- **Project installation**
  Use rigorous oversight with installation to drive performance and help achieve desired outcomes.

- **Operations and maintenance**
  Prepare and implement effective O&M practices to reduce failure risk and optimize savings.

- **Measurement and verification**
  Facilitate performance evaluation and help tell the story of the installation. Are the predicted savings achieved? How can we report on results?

- **Monitoring and commissioning**
  Continue to monitor ECM performance over time. Identify and implement adjustments needed over time to ensure performance and maximize savings.
Vendor selection and contracting

A quality project begins with a detailed and clearly defined scope of work (SOW) that establishes expectations and holds the vendor accountable.

Use previous reports and documents to guide scope development, working closely with the site facilities management team:

- Implementation roadmaps
- Energy audit reports
- Business case documents

Prepare a scope that includes at least the following content:

Seek to minimize business interruption during installation. Outline associated requirements in scope or contracting documents.

Consider hiring a commissioning (Cx) agent or other third-party verifier for large or complex projects, and incorporate vendor requirements regarding Cx activities into the scope.
Vendor selection and contracting

There are three primary methods used to select and contract with vendors: select an approach that best fits your project and maximizes potential benefits.

• Single vendor via existing network
• Single vendor via referral or research
• Multi-vendor RFP process

Each of these methods will be explored in depth in the next page.
Vendor selection and contracting

<table>
<thead>
<tr>
<th>Vendor Type</th>
<th>Summary</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single vendor via existing network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single vendor via referral or research</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-vendor RFP process</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For informational purposes only. Not legal advice or counsel.*
Vendor selection and contracting

An effective RFP process can foster competition to reduce costs, raise the quality of technical proposals, and improve outcomes.
Project installation quality assurance/quality control

Effective project installation will help optimize benefits and achieve expected savings.

- Designate ownership of installation oversight to business groups and individuals.
- If applicable, engage Cx agent or third-party verifier prior to installation.
- Establish communication protocols between the vendor, site team, and other stakeholders.
- Adhere strictly to all health and safety requirements.
- Schedule work to minimize operational downtime.
- Require the vendor to maintain a log or punch list of issues and actions needed; review the list regularly.
- For larger projects, hold regular check-in calls to discuss progress, issues identified, and decision points.
- Ensure all deficiencies and punch list items are addressed prior to closeout.

Address the following specific items:

- Hazardous waste
- Building permits
- Warranty and service
- Independent inspections
6. Energy efficiency in action

Operations and maintenance

Developing, documenting, and implementing operations and maintenance (O&M) practices will reduce failure risk, enhance performance, and result in a smoother project handoff.
Measurement and verification

Compare the actual savings with predicted savings.

**Measurement and verification (M&V)** is the process of planning, measuring, collecting, and analyzing data for the purpose of verifying and reporting energy savings within an individual facility resulting from the implementation of ECMs.

Savings cannot be directly measured, since they represent the absence of energy use.

In general, to calculate actual ECM savings through M&V:

1. Compare measured use before and after implementation.
2. Make appropriate adjustments for changes in conditions.
3. Apply and document assumptions where needed.

The Measurement and verification process consists of the following steps:

- Define M&V approach
- Develop M&V Plan
- Establish baseline
- Implement M&V plan
- Recalibrate

Properly integrated, each M&V task serves to enhance and improve facility operation and maintenance of savings.
6. Energy efficiency in action

Measurement and verification

Define the best-fit M&V approach to the project.

There are three primary M&V methods used for energy projects, described here. The International Performance Measurement and Verification Protocol (IPMVP) provides detailed guidance for M&V options.

Measure isolation

- Use a set of key parameters specific to the project equipment and operations that may be used to calculate measure-specific savings. Apply and document engineering estimates and assumptions as needed. **IPMVP options A and B**

Whole building performance

- Calculate change in building performance based on comparison of monthly utility data from pre-project and post-project periods. IPMVP recommends this approach only where expected savings >10%. **IPMVP option C**

Modeling or simulation

- Assess performance via an energy model or simulation. Models may measure full building performance and/or measure-specific performance based on available data and model parameters. **IPMVP option D**

For more information on IPMVP visit the Efficiency Valuation Organization at [https://evo-world.org/en/](https://evo-world.org/en/)
6. Energy efficiency in action

Measurement and verification

Define M&V approach
Develop M&V plan
Establish baseline
Implement M&V plan
Recalibrate
Monitoring and continuous commissioning

Performance monitoring and continuous commissioning are needed to support achievement of persistent savings and ensure project success.

<table>
<thead>
<tr>
<th>Functional performance tests</th>
<th>Design and complete functional performance tests (FPTs) for project equipment to assess installation and compare operations to design intent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff survey</td>
<td>Survey FM staff and other key stakeholders to assess implementation and operational successes, challenges, and lessons learned.</td>
</tr>
<tr>
<td>Training</td>
<td>Establish and implement training programs and schedules associated with project equipment.</td>
</tr>
<tr>
<td>Occupant feedback</td>
<td>Track occupant complaints and other feedback associated with project performance. Identify and implement corrective solutions as needed.</td>
</tr>
<tr>
<td>Warranty check</td>
<td>Review equipment condition and operations prior to warranty expiration and follow up to address any identified deficiencies.</td>
</tr>
<tr>
<td>Commissioning tools</td>
<td>Consider electronic commissioning tools that interface with building controls systems to identify issues and correct automatically or dispatch maintenance personnel.</td>
</tr>
</tbody>
</table>
Congratulations! You’ve completed the Energy efficiency training

This module provided best practices on how to effectively implement and evaluate an energy conservation measure. Key takeaways:

• Prepare a detailed and clearly defined scope of work (SOW).

• Choose an approach to vendor selection and contracting that best fits your project. Pursuing a multi-vendor bidding process can foster competition, reducing costs and improving project outcomes.

• Use your existing network and industry referrals to identify potential vendors, and consider issuing a request for information (RFI).

• Consider engaging a commissioning agent or other third-party verifier to support project oversight.

• Designate ownership of project installation oversight activities to specific business groups and individuals, and establish communication protocols across the installation team.

• Hold regular check-ins during installation to discuss progress, issues, and next steps; require the vendor to maintain a project action list to guide calls and document project details.

• Develop, document, and implement project-specific O&M practices.

• Select and implement an M&V approach to evaluate project performance.

• Perform ongoing project monitoring and continuous commissioning to achieve persistent savings.