STEP 2: Assess Performance

Understanding current and past energy use is how many organizations identify opportunities to improve energy performance and gain financial benefits.

Assessing performance is the periodic process of evaluating energy use for all major facilities and functions in the organization and establishing a baseline for measuring future results of efficiency efforts.

Key aspects include:

Data Collection and Management

2.1   **Gather and track data** — Collect energy use information and document data over time.

Baselining and Benchmarking

2.2   **Establish baselines —** Determine the starting point from which to measure progress.

2.3   **Benchmark —** Compare the energy performance of your facilities to each other, peers and competitors, and over time to prioritize which facilities to focus on for improvements.

Analysis and Evaluation

2.4   **Analyze —** Understand your energy use patterns and trends.

2.5   **Technical assessments and audits —** Evaluate the operating performance of facility systems and equipment to determine improvement potential.

Assessing your energy performance helps you to:

- ✓ Categorize current energy use by fuel type, operating division, facility, product line, etc.
- ✓ Identify high performing facilities for recognition and replicable practices.
- ✓ Prioritize poor performing facilities for immediate improvement.
- ✓ Understand the contribution of energy expenditures to operating costs.
- ✓ Develop a historical perspective and context for future actions and decisions.
- ✓ Establish reference points for measuring and rewarding good performance.

2.1: Gather and Track Data

Evaluating energy performance requires good information on how, when, and where energy is being used. Collecting and tracking this information is necessary for establishing baselines and managing energy use.

Organizations of all sizes have established systems for gathering and tracking energy use data. For commercial buildings ENERGY STAR's **Portfolio Manager** tracks energy use over time. In the case of industrial plants, the ENERGY STAR industry specific **Energy Performance Indicator (EPI)** and **Energy Tracking Tool** can be used to track yearly energy use patterns. All or part of data collection and management can also be outsourced. Regardless of what method you use to gather and track data, consider the steps below.

> Appendix 3 has more details on these tools.

Collect data

The data must be complete and accurate because it will be used for analysis and goal setting. Consider the following when collecting energy use data:

- **Determine appropriate level of detail** — The level and scope of data collection will vary from organization to organization. Some may choose to collect data from submeters on individual processes while others may only look at a utility bill.

- **Account for all energy sources** — Inventory all energy purchased and generated on-site (electricity, gas, steam, waste fuels) in physical units (kWh, mMBtu, Mcf, lbs of steam, etc.) and on a cost basis.

- **Document all energy uses** — For the sources identified above, assemble energy bills, meter readings, and other use data.
    - Energy data may reside in the accounting department, be held centrally or at each facility, or can be acquired by contacting the appropriate utilities or energy service providers.
    - Gather at least two years of monthly data or a more frequent interval if available. Use the most recent data available.

> Appendix 4 has more details on normalizing data

- **Collect facility and operational data** — To be able to normalize and benchmark, it may be necessary to collect non-energy related data for all facilities and operations, such as building size, operating hours, etc.

Establish Tracking System

     a. A system for tracking performance can range from a simple spreadsheet to detailed databases and IT systems. In developing an appropriate tracking system for your organization, consider the following:

- **Scope** — The design of your tracking system will be shaped, in large part, by the level and scope of information that will be tracked and the frequency of data collection.

- **Maintenance** — Tracking systems must be easy to use, update, and maintain.

- **Reporting and communicating** — Use tracking systems to communicate energy performance to other parts of the organization and motivate change. Consider developing formats that express energy performance information in ways that are easily understandable across the organization. A good tracking system should make such reporting easy!

Suggestions

- At a minimum, collect data by fuel type at an individual building or facility level
- Collect data from submeters, if possible
- Use actual, not estimated, use data, if possible
- Use data that is current and timely
- Use tracking systems to develop quarterly and annual reports that profile energy performance
- Use tracking systems to allow facilities to compare their performance to their peers
- Use a tracking system offered by ENERGY STAR, such as **Portfolio Manager, Energy Performance Indicators (EPIs),** and industrial **Energy Tracking Tool** to organize data and benchmark against the industry.

2.2: Establish Baselines

Measuring energy performance at a specific time establishes a baseline and provides the starting point for setting goals and evaluating future efforts and overall performance. Baselines should be established for all levels appropriate to your organization.

The main steps involve using the date you've collected to:

- **Establish base year** — Establish a base year or an average of several historical years. Use the most complete and relevant sets of data available. Depending on the type of facility, may want to normalize for weather or other factors.

- **Identify metrics** — Select units of measurements that effectively and appropriately express energy performance for your organization. (e.g. ENERGY STAR benchmark score, Btu/square foot, Btu/ product, etc).

- **Publish results** — Announce performance baselines to facilities, managers, and other key stakeholders in your organization.

> **Appendix 4 has more details on normalizing data**

Suggestions

Some voluntary environmental initiatives have specific baseline years. If your organization is participating in such an initiative, check to see if a specific base year has been established.

If price is not used as a normalizing factor, then be sure to use a source energy accounting method. Otherwise, if your facilities use a combination of fuels, your baseline data may contain errors.

2.3: Benchmark

EPA has made this step easier by providing a national energy performance rating system, currently available for common commercial and institutional buildings and selected industrial plants. The rating system, found in **Portfolio Manager** for commercial buildings and through **Plant Energy Performance Indicators (EPIs),** allows you to compare your performance against similar facilities. Benchmarking can be done in variety of ways. Facility or organizational performance may be benchmarked to:

- **Past performance** — A comparison of current versus historical performance established by a baseline.

- **Industry average** — Based on an established performance metric, such as the recognized average performance of a peer group.

- **Best in class** — Benchmarking against the best in the industry and not the average.

- **Best Practices** — Usually qualitative comparison against certain, established practices considered to be the best in the industry. The ENERGY STAR Energy Program Assessment Matrix is an example of a qualitative benchmarking tool. (See Appendix 1).

The key steps in benchmarking include:
  - o Determine the level of benchmarking (for example — equipment, process line, facility or organizational).
  - o Develop metrics.
  - o Conduct comparisons.
  - o Track performance over time.

Suggestion

ENERGY STAR offers energy performance benchmarks for commercial, institutional, and industrial facilities. ENERGY STAR benchmarks allow you to rate your building's or plant's energy performance to similar buildings nationwide. ENERGY STAR ratings normalize for important physical and operational characteristics as well as weather, to allow for comparisons to be made on a level playing field. All ENERGY STAR benchmarks provide a score on a score on a scale of 1-100. Facilities with a score of 75 or over are eligible for the ENERGY STAR Label.

For commercial and institutional buildings, ENERGY STAR benchmarks are available through **Portfolio Manager,** EPA's web-based energy tracking tool available through the ENERGY STAR web site.

For industrial plants, ENERGY STAR benchmarks are available through sector-specific plant **Energy Performance Indicators** and can be downloaded from the ENERGY STAR web site.

Facilities that earn the ENERGY STAR, on average use about 40 percent less energy than average buildings and plants, without compromising comfort, services, or quality.

More information on ENERGY STAR benchmarking tools can be found in Appendix 2.

2.4: Analyze Data

Analyzing data to determine energy use trends can help an organization gain a better understanding of the factors that affect energy performance and identify steps for reducing energy consumption.

There are a variety of ways data can be analyzed depending upon the needs of the organization. The following analyses provide a starting point:

Quantitative Reviews

- **Develop use profiles** — Identify energy consumption peaks and valleys, and determine how they relate to operations or key events.

- **Compare performance** — Compare the use and performance data of similar facilities in your industry.

- **Assess the financial impacts** — Identify areas of high-cost energy use.

- **Identify data gaps** — Determine areas where more information is needed.

Qualitative Reviews

- **Conduct interviews** — Seek informed opinions from colleagues, specific anecdotes and lessons learned, systems-specific information (e.g., HVAC, lighting, refrigeration), and in-house audits or surveys.

- **Review policies and procedures** — Review organizational policies and operating procedures to determine their impact on energy use.

2.5: Conduct Technical Assessments & Audits

Knowing your organization's baseline energy use and the relative performance of your entire portfolio is only part of the information needed. Periodic assessment of the performance of equipment, processes, and systems will help you identify opportunities for improvement.

Energy audits are comprehensive reviews conducted by energy professionals and/or engineers that evaluate the actual performance of a facility's systems and equipment against their designed performance level or against best available technology. The difference between these is the potential for energy savings.

Appendix 5 discusses resources for assessments

The main steps for conducting technical assessments and audits are:

- **Assemble expert team** — Expertise should cover all energy-using systems, processes, and equipment. Include facility engineers, system specialists, and other support. Outside support may be helpful and provide an objective perspective or specific expertise.

- **Plan and develop a strategy** — Identify and prioritize systems for evaluation, assign team members to tasks, and schedule completion dates for the activities. Use benchmarking results to identify poor-performing facilities whose equipment and systems should be targeted for evaluation.

- **Create final report** — Based on the audit results, produce a detailed summary of actual steps that can be taken to reduce energy use. The report should recommend actions from simple adjustments in operation to equipment replacement. Estimates of resource requirements for completing actions should be included.

Suggestion

Use the ENERGY STAR Service & Product Directory to help you locate energy service providers such as utilities and energy service companies that may be qualified to serve as part of the audit team.