
Introduction to Energy Management

DTE

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Summary

Energy sources such as natural gas and electricity are critical to the operation of almost any organization and are an important consideration in annual operating budgets. For many colleges and universities, utility costs can be reduced by making minor changes to the way they operate. That said, the business idiom that ‘you can’t manage what you don’t measure’ applies. DTE’s tagline of “know your own power” means you can identify where energy is used at your campus, and in turn, where your energy costs are being accrued. Only then are you able to create management strategies that ensure your facilities conserve and use energy more efficiently.

Integrating energy into strategic planning will allow your university to prioritize energy waste reduction and to control energy costs by changing behaviors, identifying opportunities, and making energy choices that align with industry best practices. We recommended that you make energy management an operational practice right alongside financial, supply chain, and human resource management. By doing so, you will ensure limited resources are used in the most efficient way, to reduce your energy usage. Energy Management Plans certified using standards such as the International Standard Organizations ISO[®] 50001, the Department of Energy’s (DOE) Superior Energy Performance[®], or EPA’s ENERGY STAR[®] building certifications reduce utility costs by 7% (<https://www.energystar.gov/buildings/about-us/how-can-we-help-you/build-energy-program/business-case>) to 12% (<http://energy.gov/eere/amo/business-case-sep>) on average, within the first three years of implementation.

This Introduction to Energy Management, provided as part of DTE’s Strategic Energy Plan program, outlines the basics of energy management, providing you with the knowledge you need to create your plan and its components. In addition to this document, DTE will provide you with other tools and certified energy manager support to ensure you have everything you need to create and execute your Energy Management Plan.

Energy Management

Getting Started

Appendix 1 outlines energy management components and objectives based on ENERGY STAR[®] Guidelines for Energy Management, ISO 50001, and the U.S. Department of Energy’s 50,001 Ready program. To help you to understand each component of the energy management cycle, a step-by-step overview is presented in the Energy Management Overview section below. Two other tools provided as part of DTE’s Strategic Energy Plan program—the Guide to Developing an Energy Management (EM) Handbook and the Energy Management Toolbox—are also discussed below.

Guide to Developing an Energy Management Handbook

Included in the DTE Strategic Energy Plan program is a Guide to Developing an Energy Management Handbook. Handbooks are one tool your university can use to outline energy management activities and to ensure your plan aligns with institutional policies. The guide contains detailed technical considerations and example university energy management plans to help you draft your university’s energy management handbook. The energy management handbook will be the product of university leadership commitment to energy conservation and efficiency and will be the governing document of your Energy Management Program. The handbook should also serve as a guide for all individuals involved in your program. Its purpose is to establish the procedures for setting goals and baselines, tracking energy use,

normalizing data, benchmarking your campus and buildings, analyzing patterns and anomalies in energy usage, and identifying, approving and managing energy efficiency projects at your facilities.

Energy Management Toolbox

The Energy Management Toolbox, provided by DTE through the DTE Strategic Energy Plan program, acts as a centralized spreadsheet which contains best practice scorecards, facility roadmaps, and energy performance metrics. Best practices, specific to colleges and universities, are contained in two scorecards that are used to identify energy waste reduction opportunities in your facilities. The Building Operation and Maintenance Initiatives (BOMI) Matrix contains best practices addressing low to no cost improvements to your buildings' operational and maintenance procedures. Energy Conservation Measures (ECM) Matrix contains best practices within your buildings' systems and infrastructure. Definitions describing the scope of each best practice are also provided. In addition to best practices, the toolbox includes roadmaps for each of your buildings. The roadmaps are used to track active and potential energy efficiency projects, energy consumption, energy cost, and energy reduction targets. Lastly, the performance dashboard provides a campus-wide overview of energy performance metrics, best practice implementation, and project savings. The data contained in the dashboard represents a high-level view of your energy management plan implementation and its effectiveness. Guidelines on using the Toolbox throughout the energy management cycle are described in the Energy Management Overview section below.

Energy Management Overview

Make a Commitment

The central facet of making a commitment is senior leadership support and approval of the program. Letters or memorandums from university leaders enable the university to establish its Energy Management Program and its priorities as well as provide the authority to create energy teams. The energy team is the connection between university leadership and the execution of the university's program. Mapping out the framework of your employees and processes will help you target individuals best suited for energy team roles. The roles and responsibilities of each team member will be determined by your specific organizational structure and available resources. However, it is essential that one person be assigned to oversee the program at the campus level as the energy director. The energy director should be someone who can help establish energy management as a core value. In addition, he or she must understand the role energy management plays in meeting financial objectives and in environmental stewardship. Initially, the energy director will work with high-level management to draft an energy policy and organize the campus energy team. Typical responsibilities of the energy director and energy team members are described in greater detail in the Guide to Creating an Energy Management Handbook. If resources are available, it is recommended you designate energy teams and energy leads at the building-level to help improve the communication and increase the buy-in of staff and students to the Strategic Energy Plan. More suggestions on organizing building-level energy teams can be found in the Guide to Creating an Energy Management Handbook.

Next, you must draft an energy policy. The policy is a formal statement, from top management, of the university's commitment to energy conservation and efficiency. Allow for the periodic evaluation and adaptation of the policy to reflect the changing needs of the university. Finally, link the goals of the policy to the university's larger

organizational strategies and goals. An example energy policy can be found in the Guide to Creating an Energy Management Handbook.

During the commitment phase, you will begin drafting your energy management handbook. As previously stated, an instructional guide is provided, which details university examples and suggested technical information to be included. Use the guide to start drafting your handbook, beginning with your management commitment, energy policy, and energy team structures, roles, and responsibilities.

Assess Performance

Once the university has made a commitment and established energy teams, next it must assess the energy performance of its buildings. Detailed instructions on gathering and evaluating energy and building data can be found in the Guide to Creating an Energy Management Handbook. Start the energy evaluation process by gathering building information—including building name, address, year built, square footage, and monthly energy usage. You may also consider gathering other information relevant to building energy usage, such as average monthly occupancy and weather data. Input information from each facility into the EM Toolbox facility roadmaps. Tracking energy usage data for each facility will allow you to establish a baseline for measuring future savings. When establishing your first baseline, gather utility data from at least the past year of utility invoices to establish monthly and annual baselines. To allow for more variability in your year-to-year usage patterns, you may want to consider averaging monthly usage for multiple years to create your baseline.

Assessing energy performance also means knowing where each of your facilities stand in terms of best practice implementation. This will allow you to easily identify opportunities for improvement. At minimum, university energy teams should perform building walkthroughs and meet with facility personnel annually. During the walkthrough, the energy team will rate the implementation of each ECM and BOMI best practice at each building using the checklist provided in the EM Toolbox. DTE certified energy managers are available to help your energy team perform walkthroughs and evaluate best practice implementation. An in-depth discussion of energy assessments and interviews can be found in the Guide to Creating an Energy Management Handbook.

Using the data collected, the university energy teams can benchmark their facilities against one another and against peer institutions. Metrics in the Performance Dashboard section of the Toolbox will help you to compare your facilities against one another. To utilize metrics, such as energy intensity (i.e., the amount of energy a building uses per square foot or per full time student), your team must understand what drives energy usage at each building. Reviewing information from the site energy evaluations and equipment inventories may help you better understand the energy performance of your facilities. Additionally, it can be helpful to investigate how administrative policies and procedures contribute to variances between buildings. Understanding what makes one building's energy usage or intensity higher than another will be an important aspect of setting the targets for energy reduction. For example, is poor energy intensity driven by equipment performance issues, low equipment efficiency, or variances in building schedules? Suggestions on how to compare your buildings are provided in the Guide to Creating an Energy Management Handbook. The Energy Team should identify the university's high- and low-performing facilities and investigate what factors are leading to the building's performance. Lastly, ensure the energy team communicates its performance findings to all organizational levels. The Guide to Creating an Energy Management Handbook describes commonly used communication tools.

Set Goals

The next step is to create energy reduction goals that are based on current energy performance, benchmarking, and the findings of energy walkthroughs. Most often, these goals are stated as simple objectives, such as a percent reduction of baseline energy usage. It is also important to define them in terms of scope and performance measures. For example, will a 10 percent reduction in baseline be the standard at each facility; or will poor performing facilities have higher reduction goals? Goals must also be defined in terms of their timeline. Ensure university goals include a target date for achievement. Examples are provided in the Guide to Creating an Energy Management Handbook.

Your process for formally setting goals should ensure commitment to goals is organization wide. Each goal should be approved by university leadership. Common goals include overall reduction of annual baseline energy use, energy intensity reduction, or pollution prevented (measured as carbon or emission reductions). Lay out this information in a clear and concise manner in your EM Handbook. Again, the Guide to Creating an Energy Management Handbook provides example goals and detailed guidelines on setting goals. Once approved, enter the goals into each facility roadmap in the EM Toolbox.

Next, the university should evaluate potential projects to implement at each building. In the EM toolbox, choose projects from the facility roadmaps that address best practice deficiencies in the BOMI and ECM matrices. The energy team should first target poor performing facilities, i.e. those with the highest energy intensity and least amount of best practice implementation. Potential projects must fit within the short- and long-term goals of the organization and Energy Management Program. Consider starting with the best practices in the BOMI matrix, as they require little to no cost to implement. Projects which require capital should be evaluated by determining their economic and technical feasibility. When evaluating projects, take advantage of lessons learned from past projects as they are good indicators of future project success. The Guide to Creating an Energy Management Handbook provides greater detail on performing economic and technical project feasibility studies.

Create Action Plan

After deciding to proceed with a project, the energy teams must determine how it will be funded. The Guide to Creating an Energy Management Handbook discusses several financing options. In addition, investigating opportunities to participate in utility rebate programs will help you reduce your project costs. Once approved and funded, input each project—along with its associated cost, timeline and estimated savings—into the EM Toolbox facility roadmap. Update the roadmaps regularly to reflect progress, changes in performance and the shifting priorities of the Strategic Energy Plan.

As the EM Handbook is being written, ensure that the systematic process to create energy projects is well defined. Also, identify roles and responsibilities as part of the project plans. Keep in mind that you may need to assign some responsibilities outside of the energy team. Responsibilities may be assigned at the facility level—to staff in facilities and operations management, engineering, or maintenance; and at the organizational level to staff from finance, human resources, supply management, communication, or environmental health and safety. Identify the communication tools you will use in your Handbook to ensure the successful implementation of best practices.

Implement Action Plan

The first decision you might face during implementation is whether you will use an outside company or dedicate your own staff to project execution. Larger, more complex and costly projects will most likely be managed by an outside engineering or construction firm. Regardless of the outcome of this decision, you should be sure to use the EM Toolbox to manage the progress of any project and ensure it stays within its scope, timeline, and budget. The energy team should track the execution of projects through their EM Toolbox facility roadmaps, by updating usage data, project costs, budgets, and schedules. You should apply for rebates through utility programs before you begin any project. The Guide to Creating an Energy Management Handbook describes the process of applying for rebates under DTE Energy's Energy Efficiency Rebate Program. Rebates may also be available from your other utility providers.

The communication plans in your Handbook will be utilized most frequently during the project execution phase. All employees should be aware of the goals and projects. They should also know their role in achieving the goals. At the facility level, individuals should be aware of energy usage, points of use, and performance scorecards—as well as any construction or electrical work being carried out as part of the plan.

Evaluate Progress

As major energy projects near completion, the energy team should meet regularly to review progress and address any issues inhibiting progress. The team should investigate projects that are behind schedule or over budget. In addition, the energy team should use the data collected in the EM Toolbox to evaluate the effectiveness of projects, once fully implemented. One way to calculate actual savings is to subtract actual energy usage from the previously determined monthly or annual baseline. Keep in mind the actual savings is affected by many factors, including weather, school schedules, or changes to facility processes (if applicable). Changes in these variables—from year to year or month to month—could cause an increase or decrease in energy usage. Ensure the campus energy team understands how each variable contributes to your usage and actual project savings. It may be helpful to create procedures to measure savings, taking factors affecting energy consumption into account. Please see the Guide to Creating an Energy Management Handbook for additional advice on factoring in these variables and normalizing energy use data.

If an anomaly is identified during the evaluation process, corrective actions should be established to prevent future occurrence. It may be necessary to perform internal or external audits to investigate any problems causing setbacks. In your handbook, describe your procedures for assuring and tracking project quality. The energy team should ensure they gather feedback on the effectiveness of projects, factors contributing toward or against goals, and any additional unexpected benefits of the projects.

Recognize Achievements

Energy teams should recognize and communicate success to all organizational levels. Utilize communication tools identified in the your handbook to provide recognition to the best performers. In addition, you may want to consider seeking external recognition from a third party to validate your organization's Energy Management Program. Using the ENERGY STAR® Portfolio Manager® will allow you to automatically receive an ENERGY STAR® score, which if high enough (over 75), could lead to ENERGY STAR® certification of your facilities. You may also want to consider getting ISO® 50001 (<http://www.iso.org/iso/home/standards/management-standards/iso50001.htm>) or LEED™

(<http://www.usgbc.org/leed>) certified through the US Green Building Council®. There are many other partnership programs, performance standards, and achievement awards available for successful Energy Management Programs.

Continuous Energy Improvement

Ensure that all EM Toolbox data is current as you close out the first year and start the second year of your program. At the end of your first year, your EM Handbook should be complete. Lastly, to improve future performance, create a “lessons learned” list for each of your projects and add it to your handbook. The list should consist of the knowledge gained over the course of the project about how project outcomes were addressed or should be addressed in the future.

Potential Barriers to Execution

The energy professionals at DTE Energy are available to provide technical support to you to help with the implementation of your Strategic Energy Plan. This includes support in using and creating your Energy Management Handbook and Toolbox. Lastly, if you choose to use ENERGY STAR® Portfolio Manager® the EP&S team can help you to set up your account and reports.

Appendix 1- Energy Management Components and Objectives

Energy Management Components		
Component	Objectives	Definition
Make a Commitment	Management Commitment	University leadership has expressed its commitment to implementing an Energy Management Program and are aware of their roles and responsibilities.
	Appoint an Energy Director	An empowered organizational leader with university leadership support is appointed.
	Establish Energy Teams	A cross-functional energy team meets regularly with defined roles and responsibilities.
	Institute an Energy Policy	An energy policy statement has been created and approved by university leadership.
	Define Scope and Boundaries	Energy Management Program boundaries are defined and documented.
Assess Performance	Gather and Track Data	Energy sources and uses are defined. Related energy consumption data is accurately collected in a central location.
	Analyze Patterns and Trends	Energy consumption data is analyzed to identify trends, peaks, valleys, and causes. Relevant variables that affect energy consumption are identified along with associated data.
	Performance Indicators	Energy performance metrics have been identified and a process for tracking has been developed.
	Establish Baselines	Organizational energy baselines are established. Base year and metric are defined.
	Benchmark	University buildings performance is compared to other similar buildings (internally/externally).
	Perform Assessments and Audits	Assessments have identified potential energy waste reduction projects.
Set Goals	Estimate Potential Improvement	Estimated savings potential and prioritized energy waste reduction opportunities.
	Establish Goals and Scope	Goals are specific, quantifiable, and include a timeframe for completion.



Energy Management Components		
Component	Objectives	Definition
Create Action Plan	Create a Communication Plan	All organizational personnel have been informed about the energy policy, their roles and responsibilities, and have been solicited for suggestions.
	Define Technical Steps and Targets	After using a documented project selection process, action plans are developed and implemented.
	Determine Roles and Responsibilities	Training needs have been identified, and staff and contractors have been trained as needed to ensure they are qualified for their energy management role.
	Energy Consideration in Design	Energy performance opportunities are considered when designing new, modified, or renovated facilities.
Implement Action Plan	Track and Monitor	Energy consumption, performance indicators, relevant variables, and action plan progress and effectiveness are continually monitored and analyzed.
	Documentation and Records	A process for control plan documents and records is established.
Evaluate Progress	Measure Results	Results are measured to determine energy performance improvement and energy savings. An Energy measurement plan is established and reviewed periodically. The plan organizes and documents monitoring and measurement activities, and ensures they are accurate and repeatable.
	Review Action Plan	Internal audits of the energy management program are conducted. Results and corresponding corrective/preventive action items are reported to university leadership.
	Corrective Actions	Investigate and respond to significant deviations in energy performance and potential issues, taking corrective and preventative actions as needed.
Recognize Achievements	Provide Internal Recognition	Recognition is provided to individuals, teams, and facilities. The university seeks recognition from government agencies, the media, and other third-party organization that award achievement.
	Management Review	University leadership periodically reviews the energy management program and university facility energy performance.

