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Energy Management Best Practices Guide

For Commercial and Institutional Buildings





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For Commercial and Institutional Buildings

Aussi disponible en français sous le titre : Guide des pratiques exemplaires en matière de gestion de l'énergie – Bâtiments commerciaux et institutionnels

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Natural Resources Canada's Office of Energy Efficiency
Leading Canadians to Energy Efficiency at Home, at Work and on the Road

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Why should you read this guide?

Commercial and institutional facilities across Canada face a common set of barriers that prevent optimal energy performance. By addressing these barriers, this guide presents an opportunity for your organization to make meaningful changes in the way you manage energy – good for your organization, good for consumers and good for Canada as a whole.

You will learn that

- Effective energy management requires a holistic approach that considers actions across eight categories.
- You can improve your energy performance by following a four-step “Plan-Do-Check-Update” road map.
- Adopting best practices will cause sustainable and continuous change that will benefit your organization’s bottom line.

Read on to discover how your organization can improve its energy management practices!

Lower your energy bills.

Minimize your exposure to the risk of rising energy prices.

Take advantage of indirect benefits, including increasing your workforce productivity and strengthening your corporate social responsibility.



Purpose of this guide

Energy management is the continuous process of managing behavioural, organizational and technical change to improve your organization's energy performance.

Using best practices to improve your organization's energy performance produces a more sustainable building that has an extended life cycle. Although this guide focuses on energy management for existing buildings, opportunities exist to incorporate best practices at all stages of your building's life, from the design and modelling phase right through to the end of life – resulting in more sustainable buildings – making both economic and environmental sense.

This guide targets stakeholders in the Canadian commercial and institutional buildings sector and provides information and tools to improve energy management practices.

Energy performance refers to the relationship between energy use and the variables that affect or drive energy use. Drivers can include physical conditions (e.g. floor area), environmental conditions (e.g. heating degree-days) and operational conditions (e.g. occupancy rates). For example, the energy performance for a portfolio of facilities can be assessed by examining energy use per unit floor area (gigajoules per square metre), which allows improvement to be measured even if the portfolio grows in size.

Building Life Cycle



The **commercial and institutional sector** covers a broad range of government functions and commercial services. Facilities that fall within this sector include hospitals, education facilities, shopping facilities, warehouses, offices, laboratories, restaurants, information and cultural facilities, hotels, arts and recreational facilities, and a host of other types.

We encourage you to consider how your organization can benefit from energy management best practices.

Using our energy resources responsibly is a win-win:

It's good for Canadian business, good for Canadian consumers, good for the Canadian economy and good for the environment.

Personnel across your organization will benefit from this guide, including

- senior managers and directors who influence corporate management and priorities
- department managers, real property managers and other staff who are accountable for annual capital and operating budgets and facility operation
- building operators and superintendents who are responsible for maintaining building systems and occupant comfort
- tenants and building occupants
- service providers, whether they perform maintenance, conduct energy surveys and assessments, or undertake retrofit work

Because energy management is a continuous process, this guide will be useful for all organizations in the commercial and institutional sector, from those that have been managing energy for years to those that need a place to start.

Call to action

Energy management is more about change management than engineering. Buildings are dynamic environments that must evolve to maintain the value they provide to their owners and occupants. Effective energy management requires a holistic approach that considers occupant behaviour, organizational structure and the technical aspects of the facility. Managing change in these three areas will result in sustainable and continuous improvements to your organization's bottom line.

The Canadian commercial and institutional sector represents about 766 million square metres of floor space¹ and approximately 12 percent of Canada's secondary energy consumption (energy delivered to end-users).² From 2011 to 2030, commercial building floor space is projected to grow by about 33 percent, and significant numbers of existing buildings will be retrofitted. In 2012 alone, almost \$17 billion were spent on building repair and construction in the commercial and institutional buildings sector.³

To remain competitive in the global marketplace and to align with our American counterparts, the Canadian buildings sector has a duty to use our energy resources responsibly and take up the call to action as a mechanism that will strengthen and enrich our economy for future generations.

¹ Natural Resources Canada, *Survey of Commercial and Institutional Energy use – Buildings 2009*, oee.nrcan.gc.ca/publications/statistics/scieuo9/scieuo_e.pdf

² Natural Resources Canada, *Energy Efficiency Trends in Canada, 1990 to 2010*, oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/trends.cfm?attr=0

³ Statistics Canada, Table 029-0005 – Capital and repair expenditures, by sector and province, annual (dollars), CANSIM, www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=0290005

How to use this guide

This guide has four sections, each with a unique purpose.

Section 1. Business case for energy management. The financial benefits of energy management best practices are compelling. This section explains why you should improve your energy management practices.

Section 2. Energy management road map. There are four core steps (Plan-Do-Check-Update) that every organization can take to improve its energy management practices. This section presents a road map for those steps.

Section 3. Primer on energy management practices. Energy management practices can be grouped into eight equally important categories. This section explains these practice categories.

Section 4. Taking action. This section outlines tangible actions that your organization can undertake and provides resources and tools.

About the Buildings Division

Working under the mandate of Natural Resources Canada's Office of Energy Efficiency, the Buildings Division offers leadership, energy management best practices and capacity building resources for Canada's commercial and institutional sector. Working with stakeholders and allies across the country, we offer tools, resources and information to help further Canada's sustainability mandate.

Energy efficiency, through the responsible use of energy, is good for Canada's businesses and good for Canadian consumers, because it leads to reduced overall energy costs. Becoming a more energy-efficient nation can improve our environment while creating employment and revenue streams that will lead to lasting benefits for the commercial and institutional sector and the Canadian economy as a whole.

Our mission

The Buildings Division's mission is to improve the energy performance of commercial and institutional buildings in Canada. We work with stakeholders to exchange information and provide tools, policies and programs that build awareness and lead to action.

Our vision

Helping Canada's buildings sector to become a world leader

We can help you make your new, existing or federal buildings more energy efficient with such offerings as the Canadian adaptation of ENERGY STAR Portfolio Manager. Guides and training are available to help ensure that your building is compliant with the *National Energy Code of Canada for Buildings 2011*. We can help you make the smart moves to improve your bottom line and contribute to Canada's overarching sustainability goals.

Learn more about the Buildings Division and our energy efficiency offerings by visiting our Web site (www.nrcan.gc.ca/energy/efficiency/buildings/13556) or by contacting us by e-mail at info.services@nrcan-rncan.gc.ca.

SECTION 1

Business case for energy management

Energy management is an attractive investment because it changes your organization's approach to energy in a way that leads to sustained returns. By specifically addressing common problems that affect the commercial and institutional sector, energy management best practices drive important benefits for your organization.

Common problems

In many organizations, energy performance suffers because

- **Investment decisions are made separately from operational decisions.** The benefits of energy savings are not always realized by the person or entity making the investment or the change in operation. For example, many leaseholders are not metered separately and, therefore, are not charged directly for their energy use. This effectively negates the incentive for occupants to change their behaviour in a way that improves energy performance.
- **First cost and non-energy considerations drive investment decisions.** Life-cycle costs are not always integrated into corporate decision-making processes. For example, when a new facility is built or retrofits are done, the initial capital cost and performance characteristics are typically given higher priority than energy-related operational costs.
- **Energy information is incorrect or incomplete.** You cannot manage what you do not measure. For example, many organizations cannot accurately compare energy consumption year by year and do not have the data required to verify energy savings that result from projects that have been implemented.
- **Building personnel lack the awareness, capacity and accountability required to drive energy performance.** There can be a lack of coordination and communication about energy performance between senior management, building operators and occupants. For example, if building operators are not accountable for energy management and are not given the proper training and information about building performance, they are more likely to manage their facility's systems solely to maintain comfort and operational requirements, without considering energy efficiency.
- **Energy performance measures are undertaken on an ad hoc basis.** When energy management activities do occur, they are often informal and lack the direction that a best practice planning process affords. For example, an organization can take advantage of synergies between various energy projects or time-limited support from utilities and government agencies if objectives are well defined and actions are undertaken in a managed fashion.

Benefits of implementing best practices

Organizations that adopt energy management best practices are rewarded in three key ways:

- **Energy and cost savings.** For many decision makers, the most compelling reason to manage energy is that it directly improves the organization's bottom line. When energy management practices are successfully implemented, they can reduce the amount of energy used by an organization significantly. To further improve the business case, many energy management actions can be implemented quickly and inexpensively.
- **Risk mitigation.** Energy-related risks include unexpected cost increases and sudden equipment malfunction or failure, which can lead to occupant discomfort. Minimizing your exposure by reducing your energy consumption is a good business practice.
- **Indirect benefits.** Many energy management actions can lead to improved comfort and a sense of pride and well-being among building occupants. This, in turn, leads to a more productive workforce. You will also be able to demonstrate corporate social responsibility by reducing the environmental and greenhouse gas impact associated with the energy you consume. What's more, you can differentiate yourself from your peers by showcasing your success and being acknowledged for your leadership.

City of Oshawa

Over a three-month period in 2009, and again in 2010, the **City of Oshawa** challenged staff at various city facilities to reduce electricity and natural gas consumption.

Prior to the challenge, maintenance and facility staff received customized **Dollars to \$ense** training from Natural Resources Canada and learned about the benefits of making behavioural and operational changes at their facilities.

Using only no-cost methods, the city **reduced energy consumption by approximately 4,000 gigajoules** compared to the 2008 baseline period and **saved almost \$50,000.**⁴



⁴ The City of Oshawa. March 2011. *Community Centre and Fire Hall Conservation Challenges – 2010 Results*.

SECTION 2

Energy management road map

Energy management practices are grouped into eight equally important categories: commitment, planning, organization, projects, financing, tracking, communication and training.

City of Burlington

The **City of Burlington** is an excellent example of an organization that has developed a best practice energy management plan by following the four-step **Plan-Do-Check-Update** road map and by using a version of the **energy management balanced scorecard**.

Key actions that were identified to improve the city's energy management practices involved **benchmarking** facility energy performance by using the Canadian adaptation of **ENERGY STAR Portfolio Manager**, as well as taking advantage of Natural Resources Canada's **Dollars to \$ense Energy Management workshops**.⁵

Road map

Your organization can improve energy management practices within each of these eight categories by following a four-step process – Plan-Do-Check-Update:

1. **Plan.** Take stock of the current state of your energy management practices, then set objectives and define the actions that will improve your energy performance.
2. **Do.** Follow your plan and begin to take actions that will achieve your desired objectives.
3. **Check.** Monitor the success of each action on an ongoing basis.
4. **Update.** Assess the progress toward your plan by reviewing its contents and making changes at least annually.



⁵ The City of Burlington. March 2013. *Corporate Energy Management Plan*.

Scorecard

The energy management balanced scorecard has been successfully deployed by thousands of organizations trained by Natural Resources Canada over the last decade. It is a planning tool that will help you:

- assess the current state of your energy management practices
- set objectives to improve the state of your energy management practices
- define actions to achieve these objectives

Each of the eight categories of energy management practices can be divided into five practice levels. The lowest level (one) indicates that there is plenty of room for improvement, while the highest level (five) indicates that your organization's operations are aligned with best practices.

It does not necessarily make sense for all organizations to ultimately aim for level five performance in every category. Depending on the number and type of facilities in your portfolio and the size of your organization, level four may suffice for some categories. For example, if your energy consumption and costs are relatively low, aiming for a level four under tracking could be more appropriate.

If your organization is starting out with lower scores, your goal should be to continually move up, level by level, over time. And, where feasible, you should aim to make improvements across all categories simultaneously. This will ensure your organization is optimizing the way it manages energy.



Energy management balanced scorecard

Level	Commitment	Planning	Organization	Projects	Financing	Tracking	Communication	Training
5	An energy policy exists that has clear targets, has the commitment of senior management and is communicated broadly.	A comprehensive energy management plan covers all major practice categories, defines how targets will be achieved and is implemented by all departments with full support from senior management.	Energy management is fully integrated into the management structure with clear delegation of responsibility for energy consumption.	Identification of capital, behavioural, operational and maintenance projects, development of business cases and implementation are ongoing.	Investment criteria, financing mechanisms and commitment to efficiency projects are clearly defined.	An energy accounting system sets targets, forecasts use, monitors use against a baseline and the forecast, and identifies faults. Savings are tracked at a project and system level by using submeters. Performance is benchmarked.	The value of energy efficiency and the performance of energy management are reported and marketed, both within the organization and outside, continuously.	Senior management, building operators and staff or tenants are trained to fully support energy performance.
4	A formal energy policy exists but lacks active commitment from senior management.	All departments are represented on the planning team with some senior management support.	An energy committee is used as the main channel of communications along with direct contact with major energy users.	There is formalized but infrequent identification of energy opportunities, basic business cases and implementation.	Life-cycle costing and/or internal rate of return investment criteria are used.	Facility-level performance is monitored against a baseline and benchmarked by using key performance indicators. Results from major projects are measured.	An ongoing program of staff and tenant awareness exists, and progress is reported through regular publicity campaigns.	Senior management or staff and tenants have received ad hoc training. Building operators are fully trained to support energy performance.
3	The energy policy set by the energy manager, energy committee or equivalent has not been adopted.	Only technical people or technical managers are involved in developing an energy management plan.	An energy manager is in place but has no clear responsibility or authority.	Development of energy savings opportunities is ad hoc and infrequent. There is only selected implementation.	Investments are based on short-term or simple payback criteria only, with no consideration for life-cycle costing.	Facility-level performance is monitored against a baseline by using utility data with ad hoc use of findings. No benchmarking is done.	Staff and tenant awareness is occasional only and ad hoc.	Building operators are trained to maintain major energy-intensive systems.
2	An undocumented set of guidelines or procedures exists.	One person has been delegated to develop an energy management plan.	An energy manager is a part-time responsibility that has limited authority.	Only informal assessments are made with ad hoc resources to identify energy-saving opportunities.	Only low-cost measures are implemented.	Cost reporting is based on utility invoice data. No benchmarking is done.	Only informal contacts are used to promote energy efficiency.	Building operators receive ad hoc training in energy-efficient technologies and practices.
1	No guidelines or procedures exist.	No energy management plan exists.	There is no energy-related responsibility or contact between management, staff and the occupants.	There is no mechanism or resources to identify or develop energy-saving opportunities.	Energy efficiency investments are not pursued.	No energy data are being tracked or benchmarked.	Energy efficiency is not promoted.	There is no energy management or operational training.

SECTION 3

Primer on energy management practices

This section provides a general overview and key examples for each of the eight energy management practice categories: commitment, planning, organization, projects, financing, tracking, communication and training.

Commitment

Most importantly, leadership in energy management needs to come from the top. If the head of your organization is not interested in energy management, why should anyone else be?

To ensure that energy management is more than just an afterthought, it needs to be raised to the same level as corporate financial targets and operating objectives. This will facilitate commitment and buy in from all building personnel within your organization.

Examples of commitment practices

- A formal energy policy or vision statement is endorsed by senior management and publicized widely.
- The policy aligns with your organization's broader corporate goals.

Planning

An energy management plan outlines the objectives for improving the current state of your energy management practices and defines the actions you plan to undertake to achieve these goals.

Your plan should answer the following questions:

- What is your organization currently doing to manage energy?
- What is your vision for improvement?
- How do you plan to accomplish this goal?

The plan should also link each action to performance indicators so that your organization can readily measure whether the change is successful.

Examples of planning practices

- Your organization's vision and targets are clearly stated.
- Objectives are defined for each energy management practice category.
- Actions supporting these objectives are SMART (specific, measurable, attainable, relevant and time-bound).

Organization

Energy management should be fully integrated into your organizational structure. The first action is to assign responsibility for overseeing your organization's energy management plan to a part-time or full-time energy manager. Depending on the size of your organization, it may also make sense to form an energy committee with representatives from each of your operational areas that significantly affect energy use, such as engineering, purchasing, operations and maintenance.

Is your organization structured to support a coherent strategy and lead centralized planning for energy management activities? Together, your energy manager and committee can coordinate efforts across your organization to accomplish this.

Examples of organization practices

- Your energy manager has the technical knowledge to understand and implement the energy management plan, as well as the communication skills required to liaise with other company managers, technical experts, equipment suppliers and building occupants.
- The energy manager role can be scaled up or down as appropriate. The energy manager must devote enough of their time to ensure the plan can be implemented successfully, so depending on the size of your organization, a full-time energy manager may be warranted.
- The energy committee is a group of engaged and motivated individuals that can provide valuable input to integrating energy management into your organization's operations.
- Giving energy performance responsibilities to staff at various levels in your organization facilitates buy in and encourages individuals to take initiative.

Projects

Energy management projects may include capital and retrofit measures, behaviour change initiatives, modifications to the operation of building systems, building maintenance activities, and renewable energy generation.

- When did you last review how your facility's environment is maintained relative to occupant needs?
- Do you have equipment that is running unnecessarily?
- Are retrofit opportunities in your facility being missed?

Assessing opportunities on a systematic and ongoing basis across this full spectrum of project types allows your organization to address these questions.

Examples of projects

- Set up a schedule to recommission your building every few years. By regularly assessing your building's systems, you can improve system performance, extend the lifespan of your equipment, reduce maintenance and repair costs, and enhance the comfort and productivity of building occupants.
- Operate equipment only when needed. The payback for improved scheduling is often almost immediate and can be as simple as documenting steps to shut down equipment – for example, turn off lights when spaces are not being used.
- Set up automated controls to improve the performance of your building systems. Even if your facility has an automation system, you may not be taking full advantage of its capabilities, or your building systems may need to be recommissioned.
- Include procedures to check and maintain equipment energy performance as part of the routine. The primary goal of preventative maintenance is typically equipment reliability and increased service life.
- Adopt a facility energy audit schedule and an energy audit standard to ensure that attractive investment opportunities are not missed.

Financing

Financing refers to the way your organization handles energy management costs. Both the decision-making process and the financing mechanisms need to be formalized.

- Does your organization consider life-cycle costs rather than first costs when making an investment decision?

Financial metrics such as net present value and internal rate of return account for the operational costs associated with new equipment and retrofit projects. This allows your organization to weigh options by assessing their full costs and helps to ensure a level playing field when energy management projects are compared to other uses of your organization's resources.

Examples of financing practices

- Define investment criteria that your organization will use to assess opportunities. For example, you may want to formally commit to undertaking all projects that exceed an internal rate of return of 10 percent.
- Once initial projects are undertaken, consider leveraging early savings by funding future energy management activities with the savings generated from implemented projects. This kind of self-sustaining finance mechanism requires monitoring and tracking savings so that they can be dedicated to future improvements.
- Energy performance contracts can make energy performance achievable if your organization does not have sufficient capital. Upfront costs and associated risks are transferred to a third-party energy service company, and your energy savings are used to pay them back. For more information on energy performance contracts, see www.nrcan.gc.ca/energy/efficiency/buildings/eeefb/contracting/4135.

Tracking

Simply put, you cannot manage what you do not measure. Tracking energy use data will allow your organization to assess the progress of your energy management activities and will provide the basis for setting and revising energy performance targets.

- Do you have a verifiable way of monitoring and verifying energy performance at your facility?
- How does the performance at your facility measure up against your peers?

You can address these questions by using proven techniques and approaches to track and analyze your energy data.

For effective tracking, you need to ensure that all your facility's energy use is captured by energy meters. You can use utility meters to monitor your facility's total energy use and install submeters to track the energy use of specific systems, areas or equipment. Historical energy data can be used to develop baselines for your building, as well as for individual projects. The same data can also be used to benchmark your facility against other similar facilities, which will give you an indication of opportunities for improvement.

Examples of tracking practices

- Use historical energy data and other variables – such as weather, occupancy or production data – to develop an energy baseline for your facility.
- Forecast energy consumption trends based on your planned projects.
- Monitor your actual energy consumption against your baseline and forecast. Variances should be investigated and explained.
- Benchmark your organization's performance by comparing your facilities to other similar Canadian facilities. High facility energy use intensity (energy consumption per square metre per year) compared to facilities of the same type and use often indicates that energy is being wasted and that attractive savings opportunities exist.
- Track project-level savings by using measurement and verification best practices.
- Provide building personnel with continuous feedback on the performance of major plant equipment to assess day-to-day operation.
- If your energy consumption and costs are sufficiently high, install an energy management information system – a system that centralizes energy monitoring activities and allows automatic detection of equipment faults and real-time analysis of baseline and forecast variances.

Energy benchmarking

For the first time in Canada, there is a standard national energy benchmarking system that provides accurate and equitable building energy assessments and data.

Natural Resources Canada's adaptation of the **ENERGY STAR Portfolio Manager** benchmarking tool (www.nrcan.gc.ca/ENERGYSTARPortfolioManager) enables building owners and facility managers to compare their building's energy performance to past performance and to their peers across the country.

Canadian ENERGY STAR performance scores are offered on a progressive basis. Scores for other building types will be added over time. For more information, e-mail info.services@nrcan-mcan.gc.ca.

Communication

Communication involves creating awareness, celebrating successes and identifying behavioural actions that each staff member or building occupant can take.

- Do staff and/or tenants understand why energy management activities are being undertaken?
- Have you leveraged the full value of your energy data by providing timely and useful information to relevant building personnel?

Information about the importance and benefits of undertaking energy performance measures allows internal stakeholders to understand why your team is carrying out these actions. Information can also be communicated with external stakeholders, such as building tenants, equipment suppliers and external advisors, to further advance or promote the importance of what you are doing.

Examples of communication practices

- Motivate and enhance your building operator's performance by providing feedback through monthly reports.
- Generate competition between departments and cost centres or across sites by publicizing details of their energy performance.
- Recognize those individual staff and employee teams who help your organization to fulfill its energy performance goals.
- Develop public relations campaigns that encourage people to turn off equipment at the end of the day.



Training

Training is an essential part of building your organization's overall energy management capacity. Learning objectives might focus on any of the energy management practice categories, depending on the needs of your organization. For example, building operators might require training on the operation and maintenance of building equipment, energy managers may require training on project opportunity identification, and administrative staff may require training on data collection and reporting.

- Do building operators in your organization have the capacity to take full advantage of building automation systems?
- Is your energy manager comfortable performing regression analysis on energy data and effectively assessing the merits of performance contracts?

By undertaking a needs assessment for your organization, you can identify capacity gaps and develop a customized training program.

Examples of training practices

- Building automation systems optimize the energy consumption of buildings. Many of these systems are complex, and building operators may require specialized training to realize the automation system's full benefit.
- Energy managers or members of the energy committee may require training on identifying opportunities, performance contracts, energy data analytics, energy management planning and other energy management best practices to ensure that they can perform their roles effectively.
- Senior management may benefit from an "energy management 101" course that covers the energy management basics, including the business case for energy management, details on financing mechanisms and life-cycle costing analysis.
- Support staff may benefit from training on data collection and reporting.

Natural Resources Canada's **Energy Management Training Primer** provides what you need to know to make training part of your organization's energy management best practices – from overcoming barriers, to developing a business case, to step-by-step guidance on developing a successful training program.

For more information, visit our Energy management training Web pages (www.nrcan.gc.ca/energy/efficiency/buildings/emt/3707) or e-mail info.services@nrcan-nrcan.gc.ca.

For sources of energy management training offered by Natural Resources Canada, as well as other national and international providers of energy management training, visit our Capacity building resources Web pages (www.nrcan.gc.ca/energy/efficiency/buildings/capacity-building-resources/3709).

To keep up-to-date with all our activities, subscribe to *Heads Up: Building Energy Efficiency* (www.nrcan.gc.ca/energy/efficiency/buildings/capacity-building-resources/4193), our monthly energy efficiency newsletter for the Canadian buildings sector.

SECTION 4

Taking action

This section outlines tangible actions that your organization can undertake by walking you through the four-step energy management road map (Plan-Do-Check-Update) and connecting you with resources and tools to help you undertake actions for each practice category.

It refers to the energy management plan template in Appendix A that your organization can use to facilitate your ongoing planning, implementation, monitoring and revision activities. A populated version of the energy management plan template is in Appendix B to serve as an example.

Plan

Parts 1 through 4 of the energy management plan template address the initial planning phase.

Part 1. Energy management plan profile

Provide high-level details on your organization and outline details on the facility, or facilities, affected by the plan.

Part 2. Current state of energy management

Using the energy management balanced scorecard in Section 3, assess the current state of energy management practices at your organization. Consider having key personnel, such as your energy manager and energy committee members, do this by filling out the scorecard independently. Then facilitate a meeting to develop a consensus of your organization's current state.

This assessment should include details on past and current projects. It should also include details on current energy use (if it is available), your energy baseline, as well as your forecast (see the sidebar).

Part 3. Energy management vision

Define your organization's vision and associated targets for improving energy management practices.

Part 4. Energy management objectives

Set specific objectives. Indicate the level that your organization is targeting for each energy management category by using the energy management balanced scorecard.

Measuring energy performance

You cannot manage what you do not measure. To help determine your organization's current state of energy management, consider using ENERGY STAR Portfolio Manager, a free online energy benchmarking tool. The tool can help you identify poorly performing buildings and establish a baseline for measuring improvement. For more information, visit our Energy benchmarking Web pages (www.nrcan.gc.ca/ENERGYSTARPortfolioManager).

Examples of vision statements

- Energy management will be incorporated into all of our organization's activities, including organizational and human resources procedures; capital, operations and maintenance decisions; and financial management and procurement decisions.
- Our organization is committed to treating energy as a resource that must be properly managed, embedding a culture of sustainability into daily operations and decision-making processes, holding staff accountable and responsible for energy management, controlling energy operating expenses, ensuring resources are allocated to enable the actions outlined in this plan, and reviewing and revising the plan on a routine basis.

Targets could be absolute or intensity-based. For example,

- 10 percent reduction in facility consumption over a five-year period
- We are targeting a 10 percent reduction in intensity-based consumption over a five-year period because of expected growth in our facility profile (as a result of additions, new construction and acquisition).

Do

Part 5 of the energy management plan template addresses the actions that you will undertake to achieve your objectives.

Part 5. Energy management actions

Define specific actions that will allow you to achieve your desired level for each energy management practice category. Each action should be linked to a responsibility group, a cost estimate and a targeted completion date.

If you have not already done so, consider undertaking some, or all, of the principal actions outlined below, by practice category. Although this is not a complete list of best practice actions, it will serve as a good starting point for you to consult. If your organization is small, some of these actions may not apply.

The resources listed under each category will provide you with further information and assistance in undertaking these actions.



Commitment

Principal actions	Resources
<ul style="list-style-type: none"> • Review your organization’s mission and strategic business plan. • Develop a vision statement that has clear targets. • Have senior management endorse the vision statement. • Communicate the vision statement broadly throughout your organization. 	<p>See examples of vision statements provided earlier in Section 4.</p>

Planning

Principal actions	Resources
<ul style="list-style-type: none"> • Assess your organization’s current state of energy management. • Establish your energy management vision, and set objectives. • Define specific and measurable actions for improvement. 	<p>See the energy management plan template in Appendix A.</p> <p>See the energy management balanced scorecard in Section 2.</p> <p>Natural Resources Canada’s adaptation of the ENERGY STAR Portfolio Manager energy benchmarking tool can help your organization set targets: www.nrcan.gc.ca/ENERGYSTARPortfolioManager</p> <p>Natural Resources Canada’s <i>Improve Your Building’s Performance: Energy Benchmarking Primer</i>: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/publications/commercial/BenchmarkPrimer_eng.pdf</p> <p>Natural Resources Canada’s Dollars to \$ense Energy Management Planning workshop: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5471</p>

Did you know ...

Energy benchmarking is the key to unlocking untapped savings potential in your organization. In a recent study,⁶ it was demonstrated that buildings that benchmark their energy use on a regular basis tend to reduce their energy consumption by 2.4 percent per year on average.

⁶ United States Environmental Protection Agency, ENERGY STAR Portfolio Manager, *Data Trends: Benchmarking and Energy Savings* (2012), www.energystar.gov/buildings/tools-and-resources/datatrends-benchmarking-and-energy-savings.

Organization

Principal actions

- Hire an energy manager or assign the energy management function to a technically qualified staff member.
- Form an energy committee.
- Define the energy manager's responsibilities and the terms of reference for the committee.

Resources

Canadian Institute for Energy Training's *Association of Energy Engineers Certified Energy Manager* program: www.cietcanada.com/training-and-certification/cem/

Energy management diploma programs offered at various universities and colleges across the country

Building Owners and Managers Association's *Energy Training for Building Operations*: www.bomalearning.com/home2

Projects

Principal actions

- Operate equipment only when needed by documenting steps to shut down equipment on a regular schedule.
- Recommission existing heating, ventilating and air conditioning and building automation systems.
- Adopt a facility energy audit schedule as well as an energy audit standard that internal staff or external service providers are required to follow.

Resources

Natural Resources Canada's *Energy Savings Toolbox*: www.nrcan.gc.ca/energy/efficiency/industry/cipec/5161

Natural Resources Canada's *Recommissioning Guide for Building Owners and Managers*: www.nrcan.gc.ca/energy/efficiency/buildings/research/optimization/recommissioning/3795

Natural Resources Canada's *Dollars to \$ense Recommissioning for Buildings* and *Spot the Energy Savings Opportunities* workshops: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5467 and www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5475

Canadian Institute for Energy Training's *Building Operator Certification* program: www.cietcanada.com/training-and-certification/boc

Natural Resources Canada's *Major Energy Retrofit Guidelines for Commercial and Institutional Buildings* (in development). E-mail info.services@nrcan-rncan.gc.ca for details.

Financing

Principal actions

- Define investment criteria.
- Make procurement decisions based on life-cycle costs and internal rate of return.
- Take advantage of utility and government incentive programs.

Resources

Natural Resources Canada's *Directory of Energy Efficiency and Alternative Energy Programs in Canada*: oe.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm

Natural Resources Canada's *Dollars to \$ense Energy Efficiency Financing* workshop: oe.nrcan.gc.ca/industrial/training-awareness/13213

Did you know ...

Successfully implemented energy management training can deliver energy savings between 4 and 20 percent.⁷

⁷ Krick, Richard. Natural Resources Canada, *Blue Cross Centre* case study: www.nrcan.gc.ca/energy/efficiency/buildings/emt/cases/4185

Tracking

Principal actions	Resources
<ul style="list-style-type: none"> Fully understand the various utility bills for each building and track energy consumption year over year. Develop a performance baseline and forecast energy performance. Benchmark your facilities by using Natural Resources Canada's adaptation of ENERGY STAR Portfolio Manager. Track project-level savings by following the International Performance Measurement and Verification Protocol. 	<p>Using Natural Resources Canada's adaptation of the ENERGY STAR Portfolio Manager energy benchmarking tool, your organization can compare its energy performance against other similar Canadian facilities: www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3693.</p> <p>Organizations can also use the United States Environmental Protection Agency's Target Finder calculator to establish a median energy use target: www.energystar.gov/buildings/tools-and-resources/target-finder.</p> <p>Efficiency Valuation Organization's <i>International Performance Measurement and Verification Protocol</i>— Volume 1: www.evo-world.org/</p> <p>Natural Resources Canada's Dollars to \$ense Energy Monitoring workshop: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5479</p> <p>Natural Resources Canada's <i>Improve Your Building's Performance: Energy Benchmarking Primer</i>: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/publications/commercial/BenchmarkPrimer_eng.pdf</p>

Communication

Principal actions	Resources
<ul style="list-style-type: none"> Provide appropriate energy performance information to senior management, building operators and other appropriate department staff on a regular basis – monthly or quarterly. Increase the visibility of energy performance for all building personnel by developing an employee awareness program. 	<p>Natural Resources Canada's <i>Team Up for Energy Savings Guide</i>: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5167</p> <p>Natural Resources Canada's <i>Implementing an Energy Efficiency Awareness Program</i>: publications.gc.ca/collections/collection_2013/nrcan-nrcan/M144-244-2012-eng.pdf</p>

Training

Principal actions	Resources
<ul style="list-style-type: none"> Undertake a training needs assessment for each relevant facility staff member and develop a customized training program to address your organization's capacity gaps. If your facility has a building automation system, obtain a complete training package specific to that system for the staff that operate and maintain it. 	<p>Natural Resources Canada's Dollars to \$ense Energy Management workshops cover topics that address many of the energy management best practice categories. Custom and specialized, sector-specific workshops are also available: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5461.</p> <p>Natural Resources Canada's <i>Energy Management Training Primer</i> (in development). E-mail info.services@nrcan-nrcan.gc.ca for details.</p> <p>Canadian Institute for Energy Training: www.cietcanada.com/</p> <p>Ontario Power Authority's saveONenergy training incentives: www.saveonenergy.ca/Business/Program-Overviews/TRAINING---SUPPORT.aspx</p>

Check

Part 5 of the energy management plan template addresses the need to monitor the success of your actions on an ongoing basis.

Part 5. Energy management actions

Link each action to performance indicators to quantify success. For example, if your commitment actions are

- develop a vision statement with clear targets
- have senior management endorse the vision statement
- communicate the vision statement broadly throughout the organization

Complementary performance indicators could be

- A vision statement with clear targets exists.
- Senior management has signed an endorsement letter that outlines their commitment to the specific vision statement and targets, as well as the subsequent objectives and actions that will be developed to meet them.
- The chief executive officer has explicitly referenced the vision statement in a quarterly corporate newsletter.

Even if you have determined that your organization has achieved level five for a given category, at a minimum, an annual review will ensure that your improvements are being maintained. In many circumstances there will continue to be room for incremental improvement.

Update

Part 6 of the energy management plan template addresses your commitment to review the plan on a routine basis. By regularly re-assessing objectives and associated actions based on the monitoring process, you will create a continuous cycle of improvement.

Part 6. Plan for continuous improvement

Specify how often you will review the plan; at a minimum, review it annually to sustain your improvement efforts. Responsibility should be assigned, and review and revision procedures should be formalized. The steps involve

- assessing the new state of your energy management practices
- revising your objectives to improve these practices
- defining new actions to achieve these objectives

Conclusion

Managing energy use is a smart business practice. It demonstrates corporate responsibility while helping to improve your bottom line and contribute to the health of our environment.

By reading this guide, you have taken an important first step to a holistic approach to energy management. By recognizing and addressing some of the common barriers to and benefits of implementing energy management best practices, you are prepared to make a sound business case for energy management for your organization.

Energy management best practices provide a solid framework for your energy management strategy – a framework that not only includes traditional technology-based energy performance solutions, but also incorporates organizational and behavioural aspects of energy use.

Your organization's energy management strategy will encompass varying levels of each energy management practice category, including commitment, planning, organization, projects, financing, tracking, communication and training. Knowing where your organization scores on each of these eight elements by using the Plan-Do-Check-Update process will help you map your road to energy management success.

Committing your organization to a best practices approach for energy management facilitates business decisions about equipment, establishes procedures that ensure greater energy and process efficiency, and encourages behaviours that will ultimately save energy and money – good for Canadian business and Canadian consumers.

For more information, visit our Energy management best practices Web pages (www.nrcan.gc.ca/energy/efficiency/buildings/embp/3699) as well as our Resources for energy management best practices Web page (www.nrcan.gc.ca/energy/efficiency/buildings/capacity-building-resources/learnmore/4259).

To keep up-to-date with all our activities, read our *Heads Up: Building Energy Efficiency newsletter* (www.nrcan.gc.ca/energy/efficiency/buildings/capacity-building-resources/4193) or e-mail info.services@nrcan-nrcan.gc.ca.



Resources

Natural Resources Canada

Natural Resources Canada (2003), *Benchmarks and Best Practices for Acute and Extended Health Care Facilities*, [Online], Available: www.nrcan.gc.ca/energy/publications/efficiency/buildings/5985

Natural Resources Canada (2003), *Saving Energy Dollars in Hotels, Motels and Restaurants*, [Online], Available: www.nrcan.gc.ca/energy/publications/efficiency/buildings/6571

Natural Resources Canada (2003), *Saving Energy Dollars in Stores, Supermarkets and Malls*, [Online], Available: www.nrcan.gc.ca/energy/publications/efficiency/buildings/6559

Natural Resources Canada (2001), *Best Practices Guide for School Facility Managers*, [Online], Available: www.nrcan.gc.ca/energy/publications/efficiency/buildings/5945

Natural Resources Canada (2000), *Benchmarking and Best Practices Guide for College Facility Managers*, [Online], Available: www.nrcan.gc.ca/energy/publications/efficiency/buildings/5973

Other resources for energy management best practices

The Conference Board of Canada (2012), *Energy Management in Commercial Buildings: The Value of Best Practices*, [Online], Available: www.conferenceboard.ca/e-library/abstract.aspx?did=4832

International Standards Association (2011), *ISO 50001: 2011 Energy Management Systems Standard* [PDF – 1.3MB] [Online], Available: www.iso.org/iso/iso_50001_energy.pdf

Carbon Trust (2011), *Energy management: A comprehensive guide to controlling energy use*, [PDF – 7.6MB] [Online], Available: <http://www.carbontrust.com/resources/guides/energy-efficiency/energy-management>

The Conference Board Executive action series (2005), *Business & Energy in the 21st Century... Navigating Energy Management: A Roadmap for Business* [PDF – 138KB] [Online], Available: www.energystar.gov/ia/business/guidelines/Navigating_Energy_Management.pdf?dccc-465b

Building Research Energy Conservation Support Unit (2001), *Good practice guide 306: Energy management priorities - a self-assessment tool*, [PDF - 684KB] [Online], Available: https://www.bchydro.com/content/dam/hydro/medialib/internet/documents/power_smart/industrial/carbon_trust_assessment_guide.pdf

Portland Energy Conservation, Inc. (1999), *Fifteen O&M Best Practices for Energy-Efficient Buildings*, [PDF - 1.19MB] [Online], Available: www.energystar.gov/ia/business/15best.pdf

Public Works and Government Services Canada, *The Environmentally Responsible Construction and Renovation Handbook*, [Online], Available: www.tpsgc-pwgscc.gc.ca/biens-property/gd-env-cnstrctn/page-1-eng.html

Energy benchmarking

ENERGY STAR Portfolio Manager: This free, online energy benchmarking tool has been adapted for Canada. [Online], Available: www.nrcan.gc.ca/ENERGYSTARPortfolioManager

Natural Resources Canada's *Improve Your Building's Performance: Energy Benchmarking Primer*, [Online], Available: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/publications/commercial/BenchmarkPrimer_eng.pdf

Energy management training

Dollars to \$ense workshops: Whether it is Energy Management Information Systems, Recommissioning for Buildings, Spot the Energy Savings Opportunities, Energy Monitoring, Energy Management Planning, Energy Efficiency Financing or a combination of these workshops, we will identify the issues related to energy management and sector-specific requirements. [Online], Available: <http://www.nrcan.gc.ca/energy/efficiency/buildings/emt/dollars/4169>

Natural Resources Canada's *Energy Management Training Primer* (in development).
E-mail info.services@nrcan-rncan.gc.ca for details.

Occupant/tenant behaviour

Natural Resources Canada (2012), *Implementing an Energy Efficiency Awareness Program*: all the information you need to get your energy efficiency awareness campaign underway. [PDF – 1.19 MB] [Online], Available: publications.gc.ca/collections/collection_2013/nrcan-nrcan/M144-244-2012-eng.pdf

Additional resources

Diagnostic Agent for Building Operators (DABO™) Software Application, [Online], Available: www.nrcan.gc.ca/energy/efficiency/buildings/research/optimization/3821

ENERGY STAR, Tools and Resources, [Online], Available: www.energystar.gov/buildings/tools-and-resources

ENERGY STAR, *Guidelines for Energy Management*, [Online], Available: www.energystar.gov/index.cfm?c=guidelines.guidelines_index

Natural Resources Canada (2009), *Energy Savings Toolbox – An Energy Audit Manual and Tool*, [Online], Available: www.nrcan.gc.ca/energy/efficiency/industry/technical-info/5421

Natural Resources Canada *RETScreen* clean energy project analysis software, [Online], Available: www.nrcan.gc.ca/energy/software-tools/7465

United States Environmental Protection Agency (2007), *ENERGY STAR Building Upgrade Manual*, Chapter 2. Benchmarking, [Online], Available: www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/comprehensive-approach/energy-star

References

- Association of Energy Engineers *Certified Energy Manager program* offered by the Canadian Institute for Energy Training: www.cietcanada.com/training-and-certification/cem/
- Building Operator Certification program* offered by the Canadian Institute for Energy Training: www.cietcanada.com/training-and-certification/boc
- Building Owners and Managers Association *Energy Training for Building Operations*: www.bomalearning.com/home2
- Commission for Environmental Cooperation (2008): *Green Building Energy Scenarios for 2030*: <http://www3.cec.org/islandora/en/item/2326-paper-1-green-building-energy-scenarios-2030-en.pdf>
- Efficiency Valuation Organization's *International Performance Measurement and Verification Protocol – Volume 1*: www.evo-world.org/
- Natural Resources Canada, Office of Energy Efficiency, *Comprehensive Energy Use Database, 1990 to 2011*: oe.nrcan.gc.ca/corporate/statistics/neud/dpa/comprehensive_tables/list.cfm?attr=0
- Natural Resources Canada's adaptation of ENERGY STAR Portfolio Manager: www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3727
- Natural Resources Canada's Directory of Energy Efficiency and Alternative Energy Programs in Canada: oe.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm
- Natural Resources Canada's Dollars to \$ense Energy Management Workshops: www.nrcan.gc.ca/energy/efficiency/buildings/emt/dollars/4169
- Natural Resources Canada's Energy Management Training Primer (in development).
E-mail info.services@nrcan-nrcan.gc.ca for details.
- Natural Resources Canada's *Energy Savings Toolbox*: www.nrcan.gc.ca/energy/efficiency/industry/technical-info/5421
- Natural Resources Canada's *Implementing an Energy Efficiency Awareness Program*: publications.gc.ca/collections/collection_2013/nrcan-nrcan/M144-244-2012-eng.pdf
- Natural Resources Canada's *Improve Your Building's Performance: Energy Benchmarking Primer*: http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/files/pdf/publications/commercial/BenchmarkPrimer_eng.pdf
- Natural Resources Canada's *Major Energy Retrofit Guidelines for Commercial and Institutional Buildings* (in development).
E-mail info.services@nrcan-nrcan.gc.ca for details.
- Natural Resources Canada's *Recommissioning Guide for Building Owners and Managers*: www.nrcan.gc.ca/energy/efficiency/buildings/research/optimization/recommissioning/3795
- Natural Resources Canada's *Team Up for Energy Savings Guide*: www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5167
- Ontario Power Authority's *saveONenergy training incentives*: www.saveonenergy.ca/Business/Program-Overviews/TRAINING---SUPPORT.aspx
- TdS Dixon Inc. and Posterity Group, *Plan-Do-Check-Revise Checklist*.
- The City of Burlington. March 2013. *Corporate Energy Management Plan*.
- The City of Oshawa. March 2011. *Community Centre and Fire Hall Conservation Challenges – 2010 Results*
- United States Environmental Protection Agency's *Target Finder calculator*: www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder

APPENDIX A

Energy management plan template

Part 1. Energy management plan profile

This energy management plan was developed by the following organization and is current as of the date indicated.

Organization name	
Date	
Key contact information	

Facilities affected by this plan.

Name	Address	Use	Area (square metre)	Year built

Key drivers of energy use at each facility.

System/equipment	Location	Year manufactured/installed	Energy use (gigajoules per year)

Key personnel involved with developing and implementing this plan.

Position	Role

The plan identifies our organization’s current energy management practices, our goals and objectives for improvement, steps to achieve these goals, and a commitment to continually assess progress, review the contents of this plan and revise it as required. Details are presented in the following sections:

Part 2. Current state of energy management

Part 3. Energy management vision

Part 4. Energy management objectives

Part 5. Energy management actions

Part 6. Plan for continuous improvement

Part 2. Current state of energy management

This section presents our organization’s current state of energy management based on an assessment that was completed by using Natural Resources Canada’s energy management balanced scorecard.

Practice category	Level	Description of current practice
Commitment		
Planning		
Organization		
Projects		
Financing		
Tracking		
Communication		
Training		

Details on energy use and key performance indicators are presented in the following table.

Year	Baseline	Current	Target
Electricity (annual)			
cost (\$)			
consumption (GJ)			
Natural gas (annual)			
cost (\$)			
consumption (GJ)			
Fuel oil (annual)			
cost (\$)			
consumption (GJ)			
Other (annual)			
cost (\$)			
consumption (GJ)			
Total (annual)			
cost (\$)			
consumption (GJ)			
Benchmarking			
metric 1: area (m ²)			
KPI 1: (GJ/m ²)			
metric 2:	If applicable		
KPI 2:	If applicable		

Legend: GJ = gigajoule, m² = square metre, KPI = key performance indicator

The following description explains how the baseline data were gathered, including why the baseline year was selected and the assumptions that were made.

The following description explains the methodology used in forecasting energy data, including the assumptions that were made.

Details on past and current projects are presented in the following table.

Past and current projects				
Project	Implementation date	Project cost (\$)	Energy consumption savings (GJ)	Cost savings (\$)
Behaviour				
Operations/maintenance				
Capital and retrofits				
Renewable energy				

Part 3. Energy management vision

Our organization's vision and targets for improving energy management practices are stated in the following table.

Vision	
Target(s)	

Part 4. Energy management objectives

Specific objectives for each energy management practice category are listed in the following table.

Practice category	Objectives
Commitment	
Planning	
Organization	
Projects	
Financing	
Tracking	
Communication	
Training	

Part 5. Energy management actions

Actions associated with each of the objectives in Part 4 are defined by category. Each action is linked to a responsibility group introduced in Part 1 (a cost estimate, a targeted completion date and performance indicators for measuring success).

Commitment				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Planning				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Organization				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Projects					
Proposed actions	Groups/people responsible	Project cost (\$)	Completion date	Projected savings (GJ and \$)	Performance indicators

Financing				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Tracking				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Communication				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Training				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators

Part 6. Plan for continuous improvement

Progress will be monitored by tracking performance indicators for each action. The plan for monitoring progress is described in the following table.

Monitoring frequency	
Responsibility	
Process for tracking performance	
Tools and software used for tracking	

This plan will be reviewed continually to re-assess objectives and actions based on the output of the monitoring process. The plan for undertaking this review is described in the following table.

Review frequency	
Responsibility	
Review process	

APPENDIX B

Sample energy management plan

Part 1. Energy management plan profile

This energy management plan was developed by the following organization and is current as of the date indicated.

Organization name	Company ABC
Date	April 1, 2013
Key contact information	Facilities manager

Facilities affected by this plan.

Name	Address	Use	Area (square metre)	Year built
Head office	1 Main Street	Office	9 300	1995
Shipping and receiving	4 Main Boulevard	Warehouse	4 600	1990
Site office	5 Main Boulevard	Office	1 900	1990

Key drivers of energy use at each facility.

System/equipment	Location	Year manufactured/ installed	Energy use (gigajoules per year)
HVAC	Head office	2000	7 200
Lighting	Head office	1995	1 200

Key personnel involved with developing and implementing this plan.

Position	Role
Facilities manager	Energy manager, energy committee member
President	Endorsement of energy management activities
Management committee	Support and direction to the energy committee
Representative from the management committee	Energy committee member
Representative from engineering	Energy committee member
Representative from purchasing	Energy committee member
Representative from operations and maintenance	Energy committee member
Various service providers	Support to the energy committee

The plan identifies our organization's current energy management practices, our goals and objectives for improvement, steps to achieve these goals, and a commitment to continually assess progress, review the contents of this plan and revise it as required. Details are presented in the following sections:

Part 2. Current state of energy management

Part 3. Energy management vision

Part 4. Energy management objectives

Part 5. Energy management actions

Part 6. Plan for continuous improvement

Part 2. Current state of energy management

This section presents our organization's current state of energy management based on an assessment that was completed by using Natural Resources Canada's energy management balanced scorecard.

Practice category	Level	Description of current practice
Commitment	1	No current policy, guidelines or procedures exist.
Planning	1	No energy management plan exists.
Organization	1	No individual has been assigned specific responsibility for energy.
Projects	2	Projects are undertaken informally. There are no guidelines for evaluating or developing energy efficiency projects.
Financing	2	Only low-cost measures were implemented in the past.
Tracking	2	Energy use is monitored by each facility. Little to no use is made of the resulting data.
Communication	1	There is no active promotion of energy efficiency. There is some awareness of the issue among staff and management.
Training	1	There has been no energy management training.

Energy management balanced scorecard

Level	Commitment	Planning	Organization	Projects	Financing	Tracking	Communication	Training
5	An energy policy exists that has clear targets, has the commitment of senior management and is communicated broadly.	A comprehensive energy management plan covers all major practice categories, defines how targets will be achieved and is implemented by all departments with full support from senior management.	Energy management is fully integrated into the management structure with clear delegation of responsibility for energy consumption.	Identification of capital, behavioural, operational and maintenance projects, development of business cases and implementation are ongoing.	Investment criteria, financing mechanisms and commitment to implement energy efficiency projects are clearly defined.	An energy accounting system sets targets, forecasts use, monitors use against a baseline and the forecast, and identifies faults. Savings are tracked at a project and system level by using submeters. Performance is benchmarked.	The value of energy efficiency and the performance of energy management are reported and marketed, both within the organization and outside, continuously.	Senior management, building operators and staff or tenants are trained to fully support energy performance.
4	A formal energy policy exists but lacks active commitment from senior management.	All departments are represented on the planning team with some senior management support.	An energy committee is used as the main channel of communications along with direct contact with major energy users.	There is formalized but infrequent identification of energy opportunities, basic business cases and implementation.	Life-cycle costing and/or internal rate of return investment criteria are used.	Facility-level performance is monitored against a baseline and benchmarked by using key performance indicators. Results from major projects are measured.	An ongoing program of staff and tenant awareness exists, and progress is reported through regular publicity campaigns.	Senior management or staff and tenants have received ad hoc training. Building operators are fully trained to support energy performance.
3	The energy policy set by the energy manager, energy committee or equivalent has not been adopted.	Only technical people or technical managers are involved in developing an energy management plan.	An energy manager is in place but has no clear responsibility or authority.	Development of energy savings opportunities is ad hoc and infrequent. There is only selected implementation.	Investments are based on short-term or simple payback criteria only, with no consideration for life-cycle costing.	Facility-level performance is monitored against a baseline by using utility data with ad hoc use of findings. No benchmarking is done.	Staff and tenant awareness is occasional only and ad hoc.	Building operators are trained to maintain major energy-intensive systems.
2	An undocumented set of guidelines or procedures exists.	One person has been delegated to develop an energy management plan.	An energy manager is a part-time responsibility that has limited authority.	Only informal assessments are made with ad hoc resources to identify energy-saving opportunities.	Only low-cost measures are implemented.	Cost reporting is based on utility invoice data. No benchmarking is done.	Only informal contacts are used to promote energy efficiency.	Building operators receive ad hoc training in energy-efficient technologies and practices.
1	No guidelines or procedures exist.	No energy management plan exists.	There is no energy-related responsibility or contact between management, staff and the occupants.	There is no mechanism or resources to identify or develop energy-saving opportunities.	Energy efficiency investments are not pursued.	No energy data are being tracked or benchmarked.	Energy efficiency is not promoted.	There is no energy management or operational training.

Details on energy use and key performance indicators are presented in the following table.

Year	Baseline	Current	Target
	2011/2012	To be populated in the next version of the plan.	2018
Electricity (annual)			
cost (\$)	\$329,100	n/a	
consumption (GJ)	9,112	n/a	8,201
Natural gas (annual)			
cost (\$)	\$110,900	n/a	
consumption (GJ)	13,668	n/a	12,301
Fuel oil (annual)			
cost (\$)	n/a	n/a	
consumption (GJ)	n/a	n/a	n/a
Other (annual)			
cost (\$)	n/a	n/a	
consumption (GJ)	n/a	n/a	n/a
Total (annual)			
cost (\$)	\$440,000	n/a	
consumption (GJ)	22,780	n/a	20,502
Benchmarking			
Head office			
metric 1: area (m ²)	9,300	n/a	9,300
KPI 1: (GJ/m ²)	1.5	n/a	1.35
Shipping and receiving			
metric 1: area (m ²)	4,600	n/a	4,600
KPI 1: (GJ/m ²)	1.3	n/a	1.17
Site office			
metric 1: area (m ²)	1,900	n/a	1,900
KPI 1: (GJ/m ²)	1.5	n/a	1.35

Legend: GJ = gigajoule, m² = square metre, KPI = key performance indicator

The following description explains how the baseline data were gathered, including why the baseline year was selected and the assumptions that were made.

Baseline data were compiled by aggregating utility bills for the calendar years 2011 and 2012 and averaging the annual consumption. These data were not corrected for weather or other significant independent variables. Company ABC intends to develop baseline models for each of its three facilities, as indicated in Part 5.

The following description explains the methodology used in forecasting energy data, including the assumptions that were made.

Company ABC is targeting a 10 percent reduction in energy consumption by 2018 compared to its 2011/2012 baseline. Once the baseline models have been developed, the adjusted baseline data can be reported – allowing for the absolute targets to be revised.

Details on past and current projects are presented in the following table.

Past and current projects				
Project	Implementation date	Project cost (\$)	Energy consumption savings (GJ)	Cost savings (\$)
Behaviour				
A corporate communication campaign reminded office staff to turn off office lighting when it is not in use.	2008	Internal labour costs only	Unknown	Unknown
Operations/maintenance				
n/a				
Capital and retrofits				
Lighting retrofits at the shipping and receiving and the site office facilities	2005	\$15,000	228 GJ/year (estimated)	\$8,300/year (estimated)
Lighting retrofits at the head office facility	2007	\$20,000	361 GJ/year (estimated)	\$13,000/year (estimated)
Renewable energy				
n/a				

Part 3. Energy management vision

Our organization's vision and targets for improving energy management practices are stated in the following table.

Vision	Company ABC is committed to treating energy as a resource that must be properly managed, embedding a culture of sustainability into daily operations and decision-making processes, holding staff accountable and responsible for energy management, controlling energy operating expenses, ensuring resources are allocated to enable the actions outlined in this plan, and reviewing and revising the plan on a routine basis.
Target(s)	10 percent reduction in facility consumption by 2018 compared to the 2011/2012 baseline

Part 4. Energy management objectives

Specific objectives for each energy management practice category are listed in the following table.

Practice category	Objectives
Commitment	Level 5 <ul style="list-style-type: none"> • Develop an energy management vision that has clear targets. • Gain commitment from senior management. • Communicate the vision broadly to all staff.
Planning	Level 5 <ul style="list-style-type: none"> • Develop a comprehensive energy management plan that covers all eight energy management practice categories and defines how targets will be achieved. • Achieve full support from senior management for the energy management plan.
Organization	Level 4 <ul style="list-style-type: none"> • Create an energy committee to manage and direct energy management activities.
Projects	Level 4 <ul style="list-style-type: none"> • Undertake formal identification of energy-saving opportunities.
Financing	Level 3 <ul style="list-style-type: none"> • Invest in retrofit and recommissioning activities based on simple payback criteria.
Tracking	Level 4 <ul style="list-style-type: none"> • Monitor facility-level performance against a baseline and benchmark by using key performance indicators. • Measure results from major energy retrofit projects.
Communication	Level 4 <ul style="list-style-type: none"> • Develop a staff awareness program. • Report progress through regular publicity campaigns.
Training	Level 4 <ul style="list-style-type: none"> • Train energy committee members and building operators.

Part 5. Energy management actions

Actions associated with each of the objectives in Part 4 are defined by category. Each action is linked to a responsibility group introduced in Part 1 (a cost estimate, a targeted completion date and performance indicators for measuring success).

Commitment				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Review Company ABC's mission and strategic business plan.	Energy committee	Internal labour costs	Complete	<ul style="list-style-type: none"> A memo report that summarizes key components of Company ABC's business plan and how they relate to energy management was created.
Develop a vision statement that has clear targets.	Energy committee	Internal labour costs	Complete	<ul style="list-style-type: none"> A vision statement exists.
Have senior management endorse the vision statement.	Management committee	Internal labour costs	Complete	<ul style="list-style-type: none"> Senior management signed an endorsement letter that outlines their commitment to the vision statement and targets, as well as the subsequent objectives and actions that will be developed to meet them.
Communicate the vision statement to all staff.	Company ABC president	Internal labour costs	2nd quarter 2013	<ul style="list-style-type: none"> The president explicitly referenced the vision statement in a quarterly corporate newsletter.

Planning				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Assess Company ABC's current state of energy management.	Energy committee	Internal labour costs	Complete	<ul style="list-style-type: none"> The energy management balanced scorecard was used to assess the current state of energy management. Results were reported as part of Company ABC's energy management plan.
Set objectives.	Energy committee	Internal labour costs	Complete	<ul style="list-style-type: none"> The energy management balanced scorecard was used to indicate the practice level Company ABC is targeting for each energy management practice category. Results were reported as part of Company ABC's energy management plan.
Define specific and measurable actions for improvement.	Energy committee	Internal labour costs	Complete	<ul style="list-style-type: none"> Actions were defined for each energy management practice category and linked to a responsibility group, a cost estimate and a targeted completion date. Details were reported as part of Company ABC's energy management plan.

Organization					
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators	
Assign energy management function to the facilities manager.	Management committee	Internal labour costs	4th quarter 2013	<ul style="list-style-type: none"> The management committee revised the facilities manager's job description to include energy management responsibilities. The facilities manager attended Certified Energy Manager training and achieved certification. 	
Form an energy committee.	Facilities manager	Internal labour costs	Complete	<ul style="list-style-type: none"> The facilities manager recruited a representative from the management committee and from the engineering, purchasing, and operations and maintenance departments to form an energy committee. 	

Projects					
Proposed actions	Groups/people responsible	Project cost (\$)	Completion date	Projected savings (GJ and \$)	Performance indicators
Adopt an energy audit standard that external service providers will be required to follow.	Energy committee	Internal labour costs	4th quarter 2013	n/a	<ul style="list-style-type: none"> A memo report was prepared that summarized options for audit standards. An energy audit standard has been chosen.
Recommission existing heating, ventilating, and air conditioning and building automation systems.	Service provider (TBD)	~5,700	Shipping and receiving (4th quarter 2014)	~10 percent savings	<ul style="list-style-type: none"> A request for proposals was issued for recommissioning work at Company ABC's facilities in 2014. A service provider was hired in 2014. Audit and recommissioning work was completed at the shipping and receiving facility in 2014. Audit and recommissioning work was completed at the site office facility in 2015. Audit and recommissioning work was completed at the head office facility in 2016.
		~13,800	Site office (4th quarter 2015)	~10 percent savings	
		~27,900	Head office (4th quarter 2016)	~10 percent savings	

Financing				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Take advantage of utility and government incentive programs.	Energy committee and service provider	Incentive amount TBD	4th quarter 2016	<ul style="list-style-type: none"> • A service provider was tasked to identify applicable incentives and manage the incentive application process. • Available incentives were identified. • Incentive applications were submitted. • The incentives were received.

Tracking				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Develop a performance baseline and forecast energy performance.	Energy committee and service provider	~10,000	4th quarter 2013	<ul style="list-style-type: none"> • A request for proposals was issued for baseline analysis services. • A service provider was hired in 2013 to develop baselines for each of Company ABC's three facilities. • The energy committee has working knowledge of the baseline models and is able to monitor facility performance on a quarterly basis moving forward.
Benchmark the facilities.	Energy committee	Internal labour costs	4th quarter 2013	<ul style="list-style-type: none"> • The office facilities were benchmarked using ENERGY STAR Portfolio Manager. • The warehouse facility was benchmarked by using the United States Environmental Protection Agency's Target Finder calculator. • Benchmarking results were reported to the management committee along with recommended high-level actions for improvement.
Track project-level savings by following the International Performance Measurement and Verification Protocol.	Energy committee and service provider	Part of the recommissioning service provider contract	4th quarter 2017	<ul style="list-style-type: none"> • Monitoring and verification plans were developed for each facility. • First-year savings were reported for each facility.

Communication				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Report energy performance information to the management committee quarterly.	Energy committee	Internal labour costs	Ongoing	<ul style="list-style-type: none"> A memo report that summarizes key information (e.g. key quarterly activities, facility performance compared to the baseline) is submitted quarterly to the energy committee.
Develop an employee awareness program.	Energy committee	Internal labour costs	2nd quarter 2015	<ul style="list-style-type: none"> The <i>Implementing an Energy Efficiency Awareness Program</i> document was reviewed by the energy committee. A meeting was held to identify reasonable actions, including developing a case study that highlights the results of the recommissioning activities at the shipping and receiving facility.

Training				
Actions	Groups/people responsible	Cost estimate (\$)	Completion date	Performance indicators
Do a training needs assessment to reach relevant facility staff and develop a customized training program to address capacity gaps.	Energy committee and management committee	Internal labour costs	4th quarter 2014	<ul style="list-style-type: none"> Specific training needs were identified for energy committee members and building operators.
Send staff to Dollars to \$ense Energy Management workshops.	Energy committee and building operators	TBD	4th quarter 2017	<ul style="list-style-type: none"> The training courses were completed.

Part 6. Plan for continuous improvement

Progress will be monitored by tracking performance indicators for each action. The plan for monitoring progress is described in the following table.

Monitoring frequency	Quarterly
Responsibility	Facilities manager
Process for tracking performance	The facilities manager, with support from the energy committee, will assess the progress made toward stated objectives quarterly by tracking the status of performance indicators for each action.
Tools and software used for tracking	Performance will be tracked by using a Microsoft Excel® spreadsheet.

This plan will be reviewed continually to re-assess objectives and actions based on the output of the monitoring process. The plan for undertaking this review is described in the following table.

Review frequency	Annually
Responsibility	Facilities manager
Review process	The facilities manager, with support from the energy committee, will re-assess the plan's objectives and actions annually. Minor plan corrections will be made annually, while the plan will be revised formally every five years.