

INTRODUCTION

The mining industry in Canada, as a leading sector in the Canadian Industry Program for Energy Conservation (CIPEC), has committed itself to work voluntarily towards the stabilization of greenhouse gas emissions at 1990 levels by the year 2000, as part of Canada's National Action Plan on Climate Change. Reducing energy consumption is one clear path to achieving this goal. Many Canadian organizations could reduce energy costs by 25% to 35% and realize a return on investment which is equal to, or greater than, other investments they currently make. Yet few organizations take advantage of the opportunities to reduce energy waste.

This Energy Efficiency Planning Guide has been prepared to assist organizations in the development and execution of a long-term energy efficiency plan. While every organization is unique in terms of planning practices, the planning principles, management practices, and communications techniques outlined in this manual are generally applicable.

This Guide is designed for:

- senior managers who are responsible for everyday corporate priorities and management;
- middle managers who have operational or facility management accountability; and
- project managers, energy managers, or energy efficiency planning team leaders.

The Guide is organized into six planning steps, as summarized in the flow chart at the end of this chapter:

- Senior Management Commitment, obtaining executive-level support for energy efficiency in general and within the context of VCR Tier II reporting requirements, appointing an EE Champion.
- Getting Started, identifying participants in the planning process, assessing barriers and opportunities, assigning responsibility.
- Setting Targets, measuring current performance, identifying and prioritizing energy efficiency opportunities, setting achievable targets.
- Support & Monitor, designing an energy monitoring system and integrating energy management into a continuous improvement strategy.
- Implement & Report, developing and presenting the action plan.
- Communicate & Train, marketing the plan internally, changing corporate culture vis-à-vis energy efficiency, and providing staff training.

OBSTACLES TO ENERGY EFFICIENCY

Analyzing obstacles to energy efficiency often reveals opportunities that can be addressed in the EE Plan. Typical obstacles include the following:

- Lack of company commitment to energy efficiency
- Lack of information on actual energy use and the opportunity for savings
- A view that everything possible has been done.
- Lack of key human resource expertise on energy efficiency
- Competition with other operational plans for scarce financial resources and time commitments
- No delegation of accountability for energy usage and efficiency planning

PLANNING OPPORTUNITIES

Planning opportunities that correspond to these obstacles include the following:

- Increase the commitment of top management to energy planning.
- Develop and implement an energy efficiency policy
- Plan a comprehensive communications strategy to achieve company-wide buy-in
- Introduce energy accounting and reporting by cost centre.
- Use a more sophisticated investment appraisal technique.
- Assign accountabilities for energy use.
- Provide energy efficiency training.

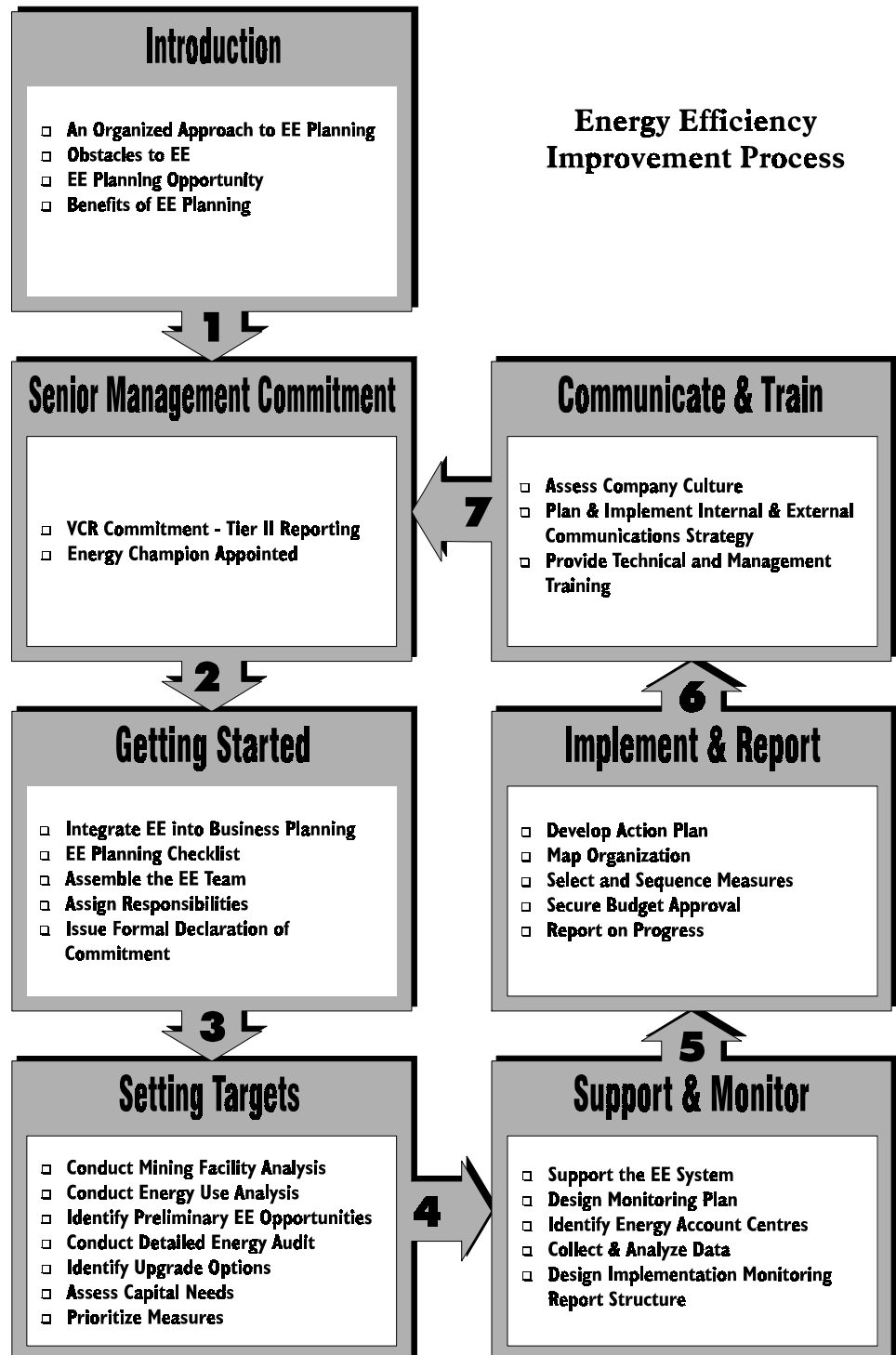
IS IT REALLY WORTH THE EFFORT?

Energy efficiency planning is based on the application to energy management of the same sound business practices used for finance, production, marketing, human resources and administration. Integrating the energy efficiency plan into the organization's facilities engineering, management and services processes and procedures is an effective mechanism for achieving and sustaining energy savings.

Consider these positive impacts of energy efficiency planning and implementation:

- Reduced production and operating expenses,
- Improved competitive position and higher profitability,
- Positive impact on the environment,
- Stimulation of local economy through investment in energy efficiency.

The steps contained in this planning guide will help your organization to reap the benefits of energy efficiency improvement.



SENIOR MANAGEMENT COMMITMENT

As the first step, it is essential to gain the commitment of the most senior members of the management team. Senior managers influence the energy management process by the following:

- Approving capital expenditures and allocating resources to acquire the skills, equipment, controls, processes, monitoring systems needed to achieve energy efficiency goals.
- Incorporating the EE plan into the culture of the organization.
- Selling the plan, both inside and outside the organization.
- Encouraging and rewarding success.
- Setting performance targets, “stretch goals” for the reduction of energy consumption.

Obtaining executive buy-in to energy efficiency will require:

- a clear, concise and comprehensive action plan;
- a convincing description of the benefits of reducing energy waste that fit company goals, supported by case studies from other mining sector operations; and
- application to the organization's specific circumstances regarding procurement, financing, human resources and other related issues.

Specific elements of the senior management commitment are:

- to proceed with the development of the plan;
- to develop a formal energy efficiency policy;
- to secure the required human and financial resources and authority to proceed;
- to appoint and empower a champion;
- to file the necessary letters of commitment with the VCR Office ; and
- to establish a procedure for action plan approval, progress reporting, and celebrating success.

The Energy Efficiency Champion

These elements will likely involve a sequence of interactions with senior management, beginning with approval in principle to proceed with the development of a preliminary action plan, based on the initial argument for action or commitment of resources.

As a demonstration of corporate commitment to energy efficiency planning, senior management should appoint and empower an energy efficiency champion. As in ISO 9000 Quality Registration and ISO 14000 Environmental Registration programs, the “EE Champion” should be a specific management representative who has accountability for ensuring requirements are established, implemented and maintained, and for reporting on performance to top management. Line management is fully responsible for implementing the energy efficiency program.

The EE Champion:

- is the organization's 'mover, shaker and motivator';
- communicates and implements EE policy;
- has the authority to deal with all stakeholders on related issues; and
- leads the EE team in planning and implementing the energy efficiency strategy.

The profile of the EE Champion should include:

- strong interpersonal, motivational and communication skills ;
- ability to coordinate, promote and facilitate change ; and
- diplomacy.

The EE Champion should report directly to senior management, and be capable of handling the following tasks:

- Leading the development and implementation of the plan.
- Raising and maintaining energy efficiency awareness throughout the organization.
- Formulating an investment program for reducing energy waste.
- Reporting on energy consumption and the impact of energy efficiency measures.
- Co-ordinating the identification and implementation of cost-effective energy efficiency measures.
- Identifying energy-related training needs and developing a long-term training strategy.

THE INTEGRATED APPROACH

The most successful approach to achieving energy efficiency savings is to manage energy use just as other resources are managed. Energy management should be integrated into the day-to-day business functions of all operating units in ways that are pertinent to their roles - plant engineering, health and safety, personnel, purchasing, accounting, and so on. In the mining industry, there is a logical fit between environmental management and energy management; the energy management plan may be regarded as a component of the environmental management plan. The energy management plan should be incorporated into short and long-term company planning.

ASKING THE RIGHT QUESTIONS – ENERGY EFFICIENCY PLANNING CHECKLIST

Before proceeding with the plan, the organization should address some key issues that will affect the scope and nature of its energy efficiency programs. This can be done with the aid of the following checklist, providing a perspective on the objectives of the organization and the business environment in which the organization must operate.

- **The Benefits:** What does the company want from its energy efficiency action plan - for example, cost reduction; competitive advantage; energy efficiency stewardship; or local job creation?
- **Financing:** Does the company have access to capital for upgrade projects? Lack of access need not be a barrier to implementing an action plan. Mechanisms such as energy, performance contracting, where energy savings fund the investment, and strict adherence to low cost/no cost or housekeeping strategies, may allow cash-poor organizations to mount aggressive energy efficiency plans.
- **Procurement:** Is a plan in place to use only the most energy efficient motors and fans as replacement units?
- **Risk Management:** Does the company need guaranteed savings programs to allow access to capital?
- **Terms & Conditions:** Will the company be allowed to retain energy savings? Within the departments that created them? Is there a minimum investment threshold that must be met? Contract length restrictions?
- **Training:** Will the company fund the training that is required for facility operators and managers, or can it be funded through energy savings?
- **Organizational Issues:** Will the company have access to staff required to plan and implement, and can sufficient time and resources be dedicated to the process in light of other priorities?
- **Communications:** Does the company have established mechanisms to motivate employees, enlist the support of external stakeholders and celebrate success?
- **Operating Budget Requirements:** Will the company allocate sufficient operating budget to fulfill the requirements of the action plan?

ASSEMBLE THE TEAM

The planning team is responsible for the development and implementation of the plan. Because the degree to which energy waste is eliminated will depend on their effectiveness and commitment, team members should be chosen with care. It is essential to identify the key players in energy management to ensure that their input is included in the setting and achieving of energy reduction targets. Here are some guidelines for development of the action plan team:

- It should be led and chaired by the EE Champion, empowered by senior management to act as the coordinator and leader.
- Membership should include individuals with skill and experience in each key functional area of action plan activity (e.g. personnel responsible for production, physical plant, maintenance, quality control, communications, human resources and financing).
- Representatives from each major energy-consuming department or section within each facility should be team members.
- Anyone who can contribute to achieving the objectives of the action plan, even when such involvement is required only on a temporary basis (e.g. personnel responsible for energy efficiency programs, health and safety), should be made aware of the action plan team and be available to join or assist the team, as required.

In determining the composition of the team, choices may need to be made regarding which operating units to include. Factors to consider in making these choices include:

- In terms of line management, a single unit within a particular department has the shortest chain of command and may also offer a certain "esprit de corps" and economy of scale.
- However, dispersed locations with responsibilities delegated among sections may be more useful in the longer term as a way of integrating energy efficiency across your company's activities.

Additional low-cost support for staff assigned to the planning team may be found through the federal "On-site" jobs program (see Appendix). Employees are available for a term of six months through a cost-sharing arrangement with the federal Employment Insurance program.

ASSIGN RESPONSIBILITIES

While the planning team is responsible for developing and managing implementation of the energy efficiency plan, all managers in the organization have related roles. Analysis of company roles may reveal gaps and overlaps in terms of energy efficiency responsibilities, and these should be addressed in the development of the energy management organization. The company may also wish to incorporate energy management into formal job descriptions, and reflect this in performance goals, objectives and appraisals. The assignment of roles and accountabilities will usually require senior management involvement.

Accountability Structures

In some companies, cost centres are able to retain all or some of the savings realized through energy efficiency planning, which can then be utilized to fund other activities. This is a powerful incentive to manage energy use. In other cases, savings flow to the bottom line. In this case, the planning team needs to make managers aware of the corporate benefits of energy efficiency, such as contributing to the overall goals of the organization.

Here are some guidelines for assigning accountability for energy use:

- Assign an energy budget to the end-use operating unit, and require the budget holder to operate within the energy allocation.
- Assign responsibility for the coordination of energy efficiency information flow to the action plan team leader.
- Assign responsibility for formulating, implementing and monitoring energy policy to the action plan team, with accountability to top management.

FORMAL DECLARATION OF COMMITMENT

Launch the energy efficiency program with a formal declaration of commitment from the CEO in the form of an Energy Efficiency Policy Statement. This formal written statement can be used as:

- A public expression of the company's commitment to energy efficiency; and
- A working document to guide energy efficiency planning.

Here are some guidelines to follow when formulating and issuing the energy efficiency policy statement:

- Reflect the company's specific activities, commitments and priorities.
- Establish a clear connection between the energy philosophy and the corporate plan.
- Consult with all parties affected in the drafting of the energy philosophy document.
- Spell out the main benefits that can be realized when the whole organization complies with the philosophy.
- Identify the role of the planning team.

The dissemination of the Policy Statement is a key element of the communications strategy, addressed later in this guide.

ESTABLISH PRELIMINARY TARGETS

To accelerate the activities of the action plan team, some preliminary targets should be set, based on technical information already available. Targets should be set in familiar energy units and expressed in easily understood, practical terms such as:

- Overall reduction in energy costs or energy intensity (e.g. 20% overall, 30% energy use per tonne of product).
- Reduction in greenhouse gas (GHG) emissions (e.g. tonnes of CO₂ emissions).
- Stimulation of local economy (e.g. number of local jobs).
- Technical competency and training of key staff.

These preliminary targets will help to verify for staff and external parties the company's commitment to reducing energy waste. The final action plan will revisit these targets, in light of additional information, with strategies for implementation, measurement and communication.

The setting of achievable targets involves the determination in detail of the current situation, and the identification of opportunities for energy reduction. The following steps are recommended.

MINING FACILITY AND EQUIPMENT ANALYSIS

This is an information base concerning plant and site structures and their use by the company. It will likely include the following data:

- Identification and description of the mining facilities and equipment.
- The age and remaining useful life of the mining facilities and equipment.
- The current and future number of occupants in the mining facilities and equipment.
- A summary of current and deferred maintenance practices and major renovations.
- The normal operating hours for each mining facility.
- Billing history for water.
- A listing of energy and water efficiency improvements undertaken during at least the previous 24 months.
- An inventory of major equipment in the mining facilities, including equipment size and capacities.
- An assessment of the condition of energy consuming equipment and systems.
- A listing of contractors currently servicing the mining facilities and equipment, including the types and duration of service agreements.
- Drawings and plans of energy systems and structures.
- A listing of special occupant requirements if different from normal mining facilities standards.
- A listing of known hazardous materials within the mining facilities.

ENERGY USE ANALYSIS

This analysis answers the following questions:

- For what purposes is energy used?
- When is energy used?
- How much energy is used?
- What does our energy cost?

The energy use profile that results will become the baseline from which potential energy savings can be estimated and progress in reducing energy waste can be measured. Energy bills for at least the previous 24 months should be analyzed with regard to:

- location of use (e.g. mine, processing plant, warehouse, office);
- energy type (e.g. gas, electricity);
- demand and consumption patterns and charges; and
- application (e.g. mine shaft ventilation, pumping, conveyance systems, lighting, process operations).

Depending on the degree of detail needed, and the availability of sub-metered energy use data, further analysis beyond billings and consumption records may be necessary, and this may include the installation of additional metering equipment. It may also involve the development of a detailed energy use inventory that includes counts of systems and devices (e.g. motors, pumps, light fixtures) and their rated loads.

The energy use profile and inventory should be kept up-to-date by regular reconciliation of energy use to billings, and by incorporating changes to load inventories arising from energy efficiency upgrade projects, installation of new energy consuming assets, and changes in facility use or production rates.

Measure the discrepancy between the organization's current energy use and the performance expectations dictated by industry standards or best practices.

PRELIMINARY ASSESSMENT OF ENERGY SAVING OPPORTUNITIES

Without energy efficiency opportunities, there will be no action plan. The identification of those opportunities is not a simple matter, however. Specific training on Energy Management Opportunities may be required if the planning team is to play a role in this phase of plan development (see Appendix for some sources of training).

A preliminary assessment can be done by the action plan team as a “walk-around” audit of the physical plant. The identification of opportunities can be done in more detail as the action plan is developed by soliciting the input of those who know the plant best - the operators and managers of each unit. Commercial energy auditing software is available to assist with the data collection and analysis, and training on energy auditing may be helpful. External consultants energy firms, energy service companies and some utilities can help do a preliminary audit, or a more detailed one at a later stage.

The identification of savings opportunities will usually involve the following steps:

- Review maintenance procedures for all key energy consuming systems.
- Investigate opportunities for equipment replacement with more efficient technology.
- Review energy purchasing strategies to ensure that billings are in accordance with contracted rates, and to identify opportunities for savings under different rate structures.
- Review operating schedules with attention to loads that can be rescheduled to avoid peak demand charges.
- Investigate “fuel switching” and cogeneration opportunities.
- Review purchasing policies and service agreements for opportunities to build in energy efficiency standards.

CONDUCT A DETAILED ENERGY AUDIT

A detailed energy audit will help you identify specific measures that can be taken to reduce energy use. It builds on the data obtained in preliminary assessments to provide a sound basis for action planning. It may also confirm current energy use statistics and result in a more reliable baseline.

Detailed energy audits should cover the plant as a whole, and all energy consuming systems. The output of an energy audit normally includes reconciliation of energy billings, analysis of demand and consumption patterns, proposals for improvements in operating procedures and capital equipment upgrades, and a detailed estimate of all costs and savings associated with each upgrade option.

MAKE A DETAILED LISTING OF UPGRADE OPTIONS

There are two major ways to realize energy savings:

- low cost/no cost “housekeeping” and operational measures (e.g. off-peak scheduling of mine-shaft pumping, progressive load shedding, etc.); and
- capital upgrades.

Housekeeping Measures

In most plants considerable savings can be achieved at low or no cost by improving maintenance procedures. For example, detecting and repairing leaks in compressed air systems, regularly cleaning filters in air handling systems, lubricating pumps and motors, keeping light fixtures clean, and so on, will yield measurable savings.

Capital Upgrades

Investment in new equipment is the most obvious source of energy savings - high efficiency plant lighting and motors, variable speed drives, computerized controls - are examples of technologies that can significantly reduce energy waste.

Developing an Options List

When the energy audit results are available the Energy Efficiency Plan team can select and combine bundles of capital upgrade projects that best meet the objectives of the plan

If sufficient capital is available, the company could undertake the entire options list immediately. However, “bundling” of measures helps to justify the scheduling of implementation over two or more capital budget periods, provides for ongoing plant operations during the retrofit, and enables contractors to achieve installation and construction efficiencies.

HOW MUCH CAPITAL DO YOU NEED?

The final selection of energy upgrade options for the first year of the plan, and viable options for future years, can be done easily if an estimated capital allowance has been established first. In many companies, energy efficiency upgrade investments must compete with other capital investment options being considered.

One quick method for determining the magnitude of the total capital investment required to upgrade the EE of existing assets is to establish a percentage by which you would like to reduce energy costs, multiplying total energy costs by that percentage and then dividing that answer by an ROI percentage acceptable to the company.

$$\text{Capital Requirements} = \frac{(\text{Desired \% reduction in energy costs} \times \text{Total energy costs})}{\text{Desired return on investment}}$$

For example, if the annual energy costs are \$800,000 and the Energy Efficiency Plan team has set a 35% reduction goal and a 12.5% ROI, the capital investment range would be \$2,240,000 ($(\$800,000 \times 35\%) / 12.5\% = \$2,240,000$). Based on a five years planning horizon, the annual capital investment budget would be \$448,000 ($\$2,240,000 / \text{five years} = \$448,000$).

SET PRIORITIES AND SEQUENCES

Targets based on no-cost or low-cost measures that yield energy savings should be the first to be set and achieved in the program. Success with these measures will add momentum and credibility to the larger effort, and help to justify capital projects.

Once a basic capital budget has been established, the Energy Efficiency Plan team can review the preliminary options established earlier. Initially, select individual upgrades, or bundles of upgrades that meet the established ROI criteria, and fall within the capital budget. Keep in mind that by bundling high ROI options with lower ROI options you can achieve the established ROI criteria and increase the value of real dollar savings over the life of the assets.

SUPPORT THE ENERGY EFFICIENCY SYSTEM

In order to manage energy consumption, to sustain energy savings, and to verify for external and internal reporting the level of savings being achieved, a monitoring system needs to be designed and implemented. The degree of documentation required should not be any different than that supporting other business functions, but there needs to be purpose to the design of the system.

MONITORING PLAN

Monitoring is a management technique that enables the company to control energy use. Its essential elements are:

- measuring energy consumption by defined Energy Accountability Centres (EAC);
- relating EAC consumption to production and other pertinent factors ;
- setting targets for reduced EAC consumption;
- comparing EAC consumption with the targets and reporting variances; and
- identifying units that need audits or corrective action.

This management approach will also enable the company to

- target efficiency initiatives to achieve maximum benefit;
- have more confidence in baseline energy consumption data;
- compare the results of implemented energy efficiency measures with projected or guaranteed performance; and
- report energy improvements to senior management.

Designing the Monitoring System

The implementation of a monitoring system at a mining or processing site requires:

- the identification of EACs (e.g. department, unit operation, mine site);
- the installation of additional metering and sub-metering to record by EAC variables such as run time, production rates, energy consumption;
- a data collection and analysis procedure;
- and, if necessary, data analysis software.

Commercial monitoring software and hardware systems are available, and consulting firms that specialize in monitoring and control systems can supply needed expertise.

Identifying EACs

The integrity of the monitoring system depends largely on the selection of EACs. Criteria that apply include:

- the potential energy savings justify the cost of sub-metering;
- it is feasible to measure energy consumption;
- there is evident ownership of the EAC;
- production rate can be measured; and
- there is congruence with other company reporting.

Data Collection Protocol

Decisions need to be made regarding the frequency and mechanism of data collection.

In regard to frequency, too much or too little data can result in an ineffective system. In most mining operations, a weekly reporting period is appropriate as it enables energy consumption reporting to be integrated with other weekly production reports. However, circumstances may dictate other or additional periods:

- batch processing operations may best be monitored on a batch-by-batch basis; and
- energy intensive processes may best be monitored on a shift-by-shift basis, with weekly summary reports.

In regard to mechanism, four alternative methods of data collection are available:

- monthly utility invoices, although this will usually aggregate a number of EACs;
- manual data collection from sub-meters on purpose-designed forms, and manual entry to computer;
- data logger collection at metering points with automatic down-loading to computer; and
- fully automatic data reading and input to computer.

These alternatives need to be analyzed with respect to:

Analysis and Reporting

The analysis of monitoring data is a relatively complex process, and it is greatly assisted with the use of available software. The selection of an appropriate package should look for:

- ability to handle large volumes of data;
- ease of customization and modification;
- graphics capability;
- ability to edit old data;
- automatic data entry capability;
- user-defined output formats;
- ability to check input data; and
- ability to write data outputs in industry standard formats.

Hardware requirements obviously depend on the software selected, but usually a dedicated PC of contemporary business design is sufficient.

ASSEMBLE THE TEAM



An action plan is simply a list of tasks, with allocated responsibilities and deadlines. More complicated projects, even though requiring more sophisticated planning, can usually be broken down into phases consisting of simple task lists.

As in any other project management exercise, the energy efficiency action plan should:

- state clear objectives for the project;
- identify targets or milestones to achieve the objectives;
- identify a project manager and team;
- specify budget and resource requirements; and
- provide a structure for progress reporting.

Objectives and targets will have been established from the foregoing opportunities identification and target setting activities.

Mapping the Organization

In the creation of the energy efficiency planning team, thought will have been given to roles and responsibilities. At the action planning stage, a higher level of detail is required, and should include:

- people in the company who have responsibility for energy management in some form;
- those parts of the company that use energy;
- the main activities that account for energy use; and
- gaps in the allocation of energy management responsibilities.

This information can be usefully tabulated by identifying the user group, manager responsible, the main activities occurring in the group, hours of operation, and the forms of energy used. When summarized for the whole company, this database will enable the planners to assign roles and responsibilities for the various measures to be implemented.

Selecting Energy Saving Measures

Deciding which opportunities are going to be exploited, and in what sequence, is a process for which there is no simple formula. Typically, the action plan team in consultation with all stakeholders will need to prioritize measures for implementation in light of:

- cost-benefit analysis and ROI criteria;
- technical feasibility;
- age of equipment and planned replacement schedules;
- impact on production capability and scheduling; and
- opportunities for bundling of short and long-term payback measures.

Budget Approval

In those cases in which additional resources are required to execute the project, it will be necessary to make a budget proposal as would be the case with any other project, particularly where capital expenditures are involved.

PROGRESS REPORTING

Once the energy reduction program has been initiated, it is important to conduct regular reviews, file progress reports, and make necessary adjustments to the objectives, targets and deadlines in view of changing priorities and circumstances. For example, changes in fuel or power rates may alter the priorities or cost-benefit of specific measures. As well, significant production rate changes, the addition of new production facilities or termination of others, need to be incorporated into baseline data and projections.

Reporting in terms of ongoing management of energy use has been discussed in the context of the monitoring function. In addition to performance reports generated by the operating units involved, the company will likely have other periodic reporting needs. These may include annual or biannual reports to senior management and/or Board of Directors and annual update reports to the VCR Office.

Internal Reporting

Internal reports on energy efficiency activities of the company will serve the following purposes:

- demonstrate management commitment to the VCR program;
- deal with concerns and questions about VCR and energy efficiency issues; and
- raise awareness of VCR energy efficiency policies, objectives, targets, and programs.

Information to be communicated includes energy management system performance, audit reports and management reviews. Other factors to consider include:

- Report the company's performance relative to its cost and savings targets, with explanations for variances.
- Update the reference year to the most recent past year to provide year-to-year comparison and to set future energy reduction targets.
- Track the performance of a project where performance guarantees were made by equipment suppliers or contractors.

VCR Office Reporting

After the initial letter of participation and baseline report has been filed with the VCR Office, the expectation is that yearly updates or progress reports will be filed. These should set achievable targets within the context of the original commitments.

ENERGY TRAINING AS AN INTEGRAL PART OF THE ENERGY MANAGEMENT STRATEGY

Energy management is not a purely technical function. The success of the action plan, indeed the successful development of the plan, depends on employee attitudes and competencies. The human resources considerations of the energy management plan should be fully integrated with the technical aspects, rather than being viewed as a “nice to do” activity added on after the technical work has been done.

There is a direct payback from training investments. Experience with industrial companies suggests that 3% to 15% of energy use can be saved by no-cost measures derived from new knowledge and heightened awareness. An investment of 1% of the company’s annual energy bill will support a training and communications program built around the company’s culture , operational needs and community relationships.

Company Culture

Every company has a culture—“the way things are done around here”—that reflects the corporate vision, values and behavior. The extent to which energy is valued as a resource to be managed is part of the culture. The motivation to “buy in” to EE measures by those who can affect savings depends on their having answers to questions like:

- What is energy?
- What is the company’s energy policy?
- What is the company’s energy use profile?
- What does energy cost the company?
- What is the potential saving through the energy management strategy?
- Why is it important to save energy?
- Why should I—as an individual—bother?

Employee awareness programs and resources have been developed. (See Appendix.) Areas that can appeal to employees’ personal values include:

- environmental issues—the role that energy reduction plays in mitigating climate change due to greenhouse gas emissions;
- company competitiveness—the contribution to the “bottom line” that energy efficiency makes, and its impact on company success, job retention, etc.;
- recognition and rewards—the encouragement of energy efficiency ideas and behaviours by providing public recognition and financial incentives; and
- the home—the application of energy saving principles, with the concomitant benefits, to the employees’ own homes.

The Company in the Community

The reporting of company activities and progress on energy efficiency to the VCR Office is only one element of an external communications strategy. There is also an opportunity to communicate the “good environmental citizenship” being demonstrated by the company to enhance its community relations.

Operational Training

A wide range of technical and management skills and knowledge may need development in support of plan development and implementation. Subject areas in which training may be required include:

- energy efficiency opportunities identification;
- energy auditing;
- system-specific technical training;
- monitoring and targeting methods;
- energy management planning; and
- project financial analysis.

DEVELOPING THE TRAINING PROGRAM

There are six basic steps to the development of a training program:

1. analyzing training needs;
2. developing learning objectives;
3. defining training content;
4. selecting appropriate training methods;
5. delivering the training; and
6. evaluating training outcomes.

Each of these steps involves methodology that goes beyond the scope of this guide. However, it is important to note that, like any other business function, there is a right way to do it. Depending on the company's approach to training and its resources, the development of the program may be done internally or with the assistance of external training providers.

Scope of Training

The questions that need to be answered in defining the scope of training—both for awareness and operational outcomes include:

- What needs can or cannot be met by training?
- How much should be spent on training?
- What training is essential?
- What would be the best use of resources?

Timing of Training

One of the benefits of integrating training with the other elements of the action plan is that the timing of awareness, technical, and management initiatives can be coordinated with the other activities.

Training Options

Once training needs and participants have been identified, delivery options need to be considered. Possibilities that should be explored include:

- customized, on-site programs using external training providers or internal trainers;
- packaged, short workshops or courses available in the marketplace;
- on-the-job training;
- academic courses at the diploma or degree levels; and
- individual study, open learning programs.

All options have advantages and disadvantages, and there are examples of all types available in Canada (see Appendix).

TRAINING RESOURCES

Natural Resources Canada has invested in the development of a variety of training and communications resources to assist Canadian companies with their energy efficiency initiatives. Training providers include:

- community colleges, for comprehensive trades and diploma level programs;
- Canadian Institute for Energy Training (CIET);
- equipment suppliers, for system-specific instruction; and
- energy service companies, for project-specific training.

Information on these programs and services can be obtained from Carol Buckley, at:

Natural Resources Canada
 580 Booth Street
 18th Floor
 Ottawa, ON K1A 0E4
 Tel: (613) 996-5958
 Fax: (613) 947-4121
carol.buckley@es.nrcan.gc.ca

CIET PROGRAMS

Some of the training needs referred to in this Guide can be met through CIET programs, including:

- electrical and thermal energy management opportunities workshops;
- energy auditing workshops;
- system-specific technical workshops;
- monitoring, targeting and reporting workshops;
- energy management planning workshops;
- customized, contract training services; and
- TEMOL (Training in Energy Management Through Open Learning) Program.

Information on these programs and services can be obtained from Doug Tripp, in care of:

CIET
 P.O. Box 21007
 150 First Street
 Orangeville ON L9W 4S7
 Tel. 1-800-461-7618
 Fax 519-942-3555
 Email: doug@headwaters.com