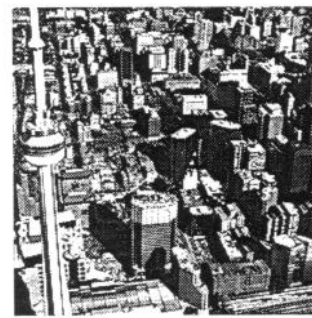
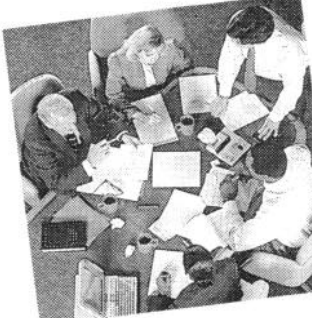
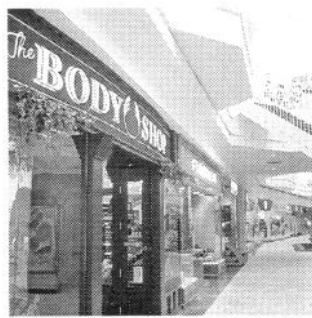


E N E R G Y E F F I C I E N C Y



ENERGY MANAGEMENT PLANNING - AN OVERVIEW

Part of the Efficiency and Alternative
Energy Program

Un élément du Programme de l'efficacité
énergétique et des énergies de
remplacement



Natural Resources
Canada

Ressources naturelles
Canada

Canada

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Table of Contents

Introduction

1. Getting Started

2. The Planning Team

3. Building the Planning Framework

4. Developing the Action Plan

5. Managing the Tendering Process

6. Implementing the Plan

7. Keeping it Going

Appendix A: NRCan Products & Services

Appendix B: Energy Efficiency Matrix

Appendix C: Energy Efficiency: A Management Priority

Introduction

This document presents a plan that can help organizations formulate a logical step-by-step process to implement energy-efficiency projects in their facilities. Energy efficiency can generate many economic and environmental benefits, not only for your organization, but also for the community as a whole.

This plan has evolved out of experience. For more than 20 years, Natural Resources Canada (NRCan) has been promoting energy efficiency in Canada. Currently, NRCan is working with organizations in all sectors of the economy to meet the challenge of stabilizing greenhouse gas emissions at 1990 levels by the year 2000.

Over the last five years, NRCan has developed and delivered the Federal Buildings Initiative (FBI), an innovative program that gives the federal government new instruments to implement energy-efficiency projects in spite of significant fiscal restraint.

FBI is based on the use of service contracts with energy management firms. These companies provide all project requirements, including capital, risk guarantees, engineering and training services. The project is financed by the resulting energy savings.

The success of the FBI approach has attracted a great deal of attention across the country. Governments at all levels, publicly funded institutions such as hospitals and universities, and many private companies have shown interest in the FBI model and the substantial savings and other benefits it offers.

There is more to FBI than simply installing new equipment. It is a new systematic approach to energy efficiency that encourages you to take a comprehensive view of your facilities. It effectively integrates energy efficiency into the daily culture of the organization. This necessarily involves everyone in the organization as well as external stakeholders. The more people who support it, the better it works.

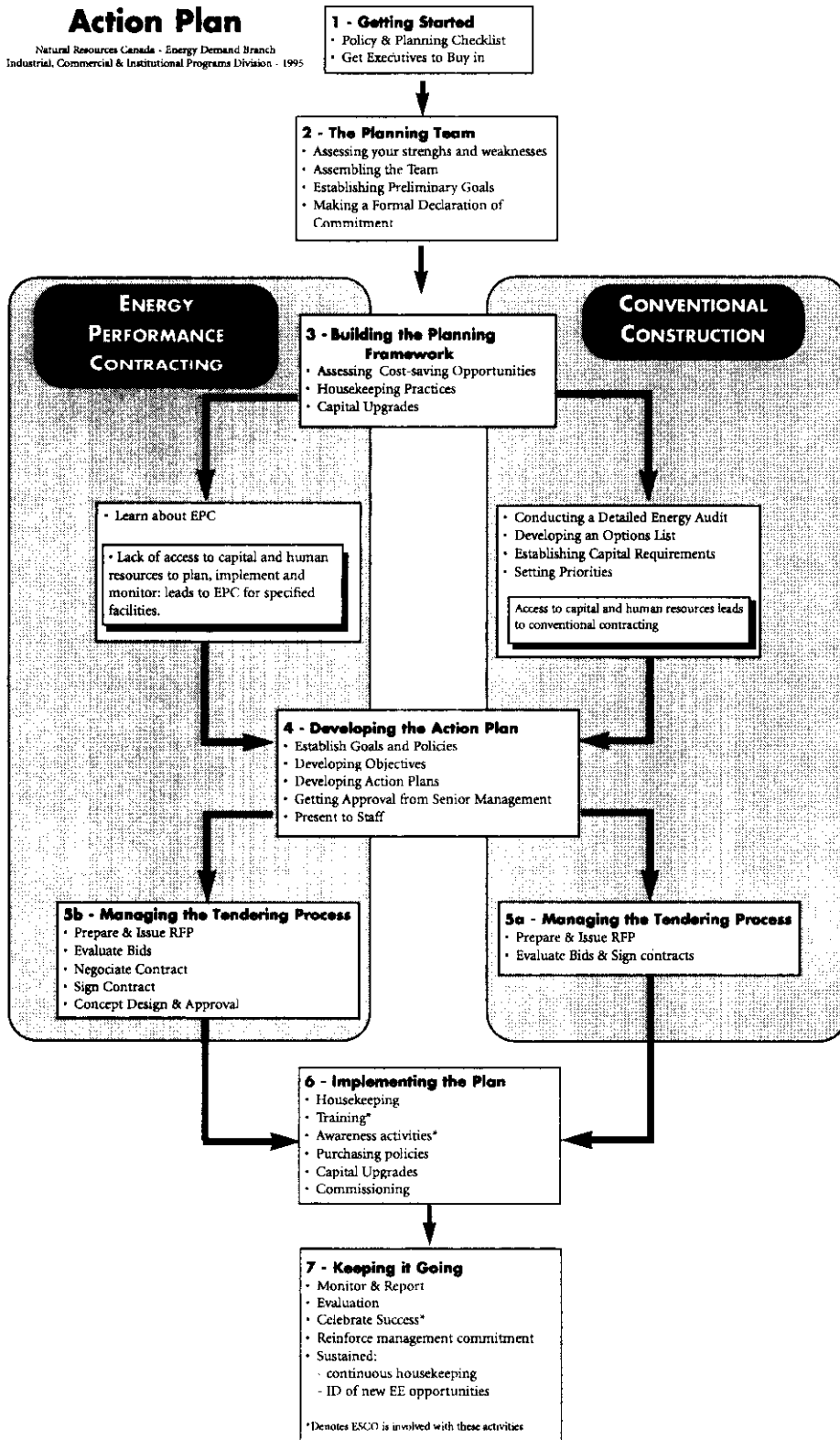
To get the best results from a program like FBI, you need to have a action plan. This document provides a framework to establish an energy management program in your organization. As depicted in the following flow chart, it addresses the following topics:

- the importance of gaining **executive-level support** for energy management and how to get it;
- **who should be involved** in planning for energy management ventures;
- how to set **goals and integrate energy management planning** within an organization's formal and informal management structures;

- how to determine what **contractual and financial arrangements** make the most sense for your organization;
- how to **market energy management planning** to all players to ensure participation and support;
- what **products and services** NRCan provides to assist an organization in implementing energy management programs (see Appendix A); and
- how to **sustain an organization's commitment** to energy management.

Energy Management Action Plan

Natural Resources Canada - Energy Demand Branch
Industrial, Commercial & Institutional Programs Division - 1995



1. Getting Started

The most successful approach to reaping energy efficiency savings calls for managing energy use just as other resources are managed. This approach involves developing and implementing an **energy management action plan** which is:

- fully integrated into the corporate planning framework. Everyone — from facility operating staff to the legal, finance and accounting departments and facility tenants — should understand their responsibilities for smart energy use;
- visibly supported by senior management. This ensures that all players fully participate in the effort and that the organization devotes adequate time and resources to the plan;
- led by an Energy Champion who is empowered by senior management to pull together a team to develop and implement the plan.

Asking the right questions — policy and planning checklist

Before developing an energy management action plan, you need to consider some key issues:

Benefits	What does your organization want from its energy management action plan? Identify those benefits that matter to your organization. These could be, for example, cost reduction, competitive advantage, environmental stewardship or local job creation.
Financing	Does your organization have access to capital for upgrade projects? Lack of access to capital need not be a barrier. Mechanisms such as energy performance contracting, in which your energy savings fund the investment, and strict adherence to low-cost or no-cost housekeeping strategies, may allow cash-poor organizations to mount aggressive energy efficiency plans.
Risk Management	Does your organization need guaranteed savings programs to get access to capital?
Procurement	Is your organization bound by legislation, or other restrictions on purchasing, on energy performance or other contracting?
Terms and conditions	Will your organization be allowed to keep energy savings? Within the departments that created them? Is there a minimum investment threshold?

- Organizational issues** Will the organization be able to get the staff required to plan and implement.
- Training** Has your organization considered its training requirement? Will your organization fund energy management training out of energy savings?
- Communications** Does the organization have ways to motivate employees, enlist the support of external stakeholders, and celebrate its successes?

Getting executives to buy in

The next step is to persuade senior management of the need to mount an action plan. Your strategy should be to:

- sell the benefits early on. Use case studies of other organizations in your sector to illustrate how others are benefiting. Prepare preliminary estimates of the impact of saving 10%, 20% or 30% of costs;
- discuss the organization's circumstances and how it plans to deal with procurement, financing, human resources and other relevant issues;
- ask for commitment — to proceed with the plan, to get a formal energy management policy, to get the resources required to do it right, to appoint a Champion; and
- make a commitment — offer to come back to senior management with an Energy Management Action Plan for approval, and to report and celebrate progress regularly.

2. The Planning Team

Assessing your strengths and weaknesses

How important is energy efficiency in your organization? To get a better idea, use the Energy Efficiency Matrix in Appendix B. Your assessment will be a baseline to help you track progress and identify where improvements are needed. You will assess:

- how committed is your organization to energy management?
- where does accountability for energy management reside?
- does your organization plan for comprehensive energy management activity, including training?

- does your organization use full life cycle **cost analysis**?
- are adequate **communication and motivational plans** built into your energy management activities?

As you move from the bottom of the matrix to the top, methods of managing energy use become increasingly sophisticated and comprehensive. Can you improve the performance of your organization?

Assembling the team

The team should be led by the Energy Champion appointed by senior management.

All aspects of an organization's activities affect energy use and the action plan must reflect that. Thus the planning team should include representatives from the physical plant, finance, human resources engineering and legal sources — each energy-using department or section.

The planning team has overall responsibility for formulating, implementing and monitoring the energy management action plan. It reports directly to senior management.

You may need some outside help to develop the plan — so consider calling in consultants from an engineering firm or the federal government's On-Site program (see Appendix A).

Accountability for energy use should be spread throughout the organization with responsibilities clearly defined. The end user has primary responsibility for energy consumption and is accountable to the nearest budget holder. The budget holder is responsible to the financial manager for controlling energy costs.

Establishing preliminary goals

These goals could focus on:

- reducing energy costs or energy intensity (e.g., a 20% reduction overall or a 10% reduction in energy use per tonne of product);
- reducing the environmental impact (e.g., reducing the tonnes of CO₂ emissions);
- stimulating the local economy (e.g., creating a number of local jobs); or
- improving the technical competence of facility staff (e.g., ensuring they are fully familiar with current energy management technologies and practices).

Making a formal declaration of commitment

Launch the planning process with a formal declaration of commitment from senior management in the form of an energy efficiency policy statement. The policy can be communicated to all staff, as well as to external audiences, through industry newsletters and the like.

3. Building the Planning Framework

Assessing cost-saving opportunities

Review your energy bills and break down your consumption by fuel type, cost, location of use (office, plant, floor) and type of use (lighting, heating, cooling) as much as possible. This record should be updated regularly (see Appendix C).

Gather information about your facilities. The number of facilities, their locations, floor area (heated and unheated) and function are all variables that affect your energy use.

This energy use inventory will allow you to identify which areas have good potential for energy savings.

A preliminary walk-through audit, which you can do with auditing software or by following auditing workshops (see Appendix A), can also be useful. Engineering firms, energy service companies and some utilities can help you do a preliminary audit, or a more detailed one at a later stage.

There are two ways to reduce energy use: by modifying housekeeping practices and by undertaking capital upgrades. As much as possible, organizations should avoid adopting quick-fix low-cost/no cost measures before a comprehensive review of all energy savings opportunities. Skimming the quick payback measures “off the top” will adversely affect the economic attractiveness of a comprehensive retrofit that blends short and longer term payback items and generates more benefits to the organization and the community.

Housekeeping practices

The planning team should examine all practices that affect energy use and prepare recommendations on how to improve energy efficiency. These modifications can often be made in-house at little or no cost — and can lead to considerable savings over time. Some possibilities are:

- negotiating for optimal fuel rates;

- developing new purchasing policies to encourage the purchase of energy-efficient equipment;
- establishing preventive maintenance contracts;
- renovating or building new accommodation; and
- ensuring that all facility operators are trained in up-to-date energy management techniques. Well-trained facility staff can generate impressive and continuing savings (see Appendix A).

Capital upgrades

Investing in new equipment and processes is the most obvious way to save energy. High-efficiency lights and motors, variable air handling systems and computerized controls are just a few technologies that can significantly reduce energy use. Depending on circumstances, capital upgrades can be done through energy performance contracts or through conventional construction projects (or both).

If you plan to contract out energy performance services, you will not need to identify the specific options; energy service companies bidding on these projects usually design their own upgrade packages. If you have decided on conventional construction, you will need to take a closer look at potential energy-saving opportunities.

Energy performance contracting

If you do not have the financial and human resources to undertake energy-saving retrofits, you may want to consider energy performance contracting. (For advice on how to procure these services, see Appendix A).

Conventional construction

Conducting a detailed energy audit

These audits cover the whole building and include all energy-using systems, including electrical, operations, water, waste management and air quality. The planning team should probably hire outside expertise (consulting firms, energy service companies, utilities, etc.) to conduct the audit unless facility staff have enough time and knowledge.

The audit should generate a detailed record of energy use to add to the record already described, and a list of recommended energy-saving options. You can get more ideas by talking to your facility staff, exploring the relevant literature, and

observing what other organizations in your sector do. Utility companies may also be able to provide advice.

Developing an options list

Energy management projects will have to compete with other investments. To improve your access to capital, you should assess the various energy management options on your list using life cycle cost analysis or another method that fully accounts for all costs and savings.

Look at all the possibilities; some options that seem marginal now could be feasible in the future.

How much capital will you need?

To help you select which upgrades should go into the first year of the plan and to develop options for future years, first establish an estimated capital allowance. Here is an easy way to calculate this:

$$\text{Capital Required} = \frac{(\% \text{ desired reduction in energy costs} \times \text{total energy cost})}{\text{desired Return on Investment}}$$

Setting priorities

Once you have established your capital budget and the investment thresholds for your organization, the planning team should review the options list and select the upgrade opportunities that offer the highest potential return. Plan to implement those options in the first year.

4. Developing the Action Plan

The planning team must pull together all the information on energy management activities and put in plan form so that timing, budgets, priorities and responsibilities are all clear.

Establish goals and policies

At the top of the action plan will be the overall energy management goals. The preliminary goals and policy statement developed earlier may be revisited at this time in light of new information. The goals will include specific, realistic, quantitative targets. Such goals will compel those involved to agree on the kind of improvements they want and how progress will be measured.

Policies on energy-saving opportunities in housekeeping should be written to ensure that such practices become ingrained in the organization's operations.

Developing objectives

The planning team should also prepare a statement of objectives that define the basic functions (e.g., management, operational, human resources, engineering, financial) that must be carried out to achieve the stated goals.

Developing action plans

The action plans are the heart of the planning document. They include a detailed description of the key steps needed to meet each objective, who is accountable, start and completion dates, and budget. While the goals may be long term and the functional objectives timeless, the action plans should be developed only for each planning year. As suggested earlier, the action plans may be based on the use of either conventional construction or energy performance contracting (or both). They should also address the reporting and communications activities that may be necessary.

Getting approval from senior management

Once a complete draft energy management action plan is available, the planning team should present it to senior management. You will need to show management how you propose to achieve the benefits expected, and how the action plan contributes to organizational objectives. At this stage, you should press for the go-ahead to implement the plan.

Presenting the plan to staff

You will also need the support of your staff and other stakeholders. They need to know about the plan and its objectives. In fact, it is vital that key stakeholders be involved in developing the plan from the beginning.

Members of the team can make presentations on the plan to various groups in the organization. Show the groups how the action plan will help them, and how they can be part of the effort. Appendix A features an awareness guide designed to get everyone in the organization to participate in energy management.

5. Managing the Tendering Process

Tendering is the preparation required to implement the capital upgrades contained in your plan, whether you are using conventional construction or energy performance contracting.

For either method, Requests for Proposal must be drafted and issued. Bids must be evaluated and contracts signed. Most organizations have well-established tendering procedures.

For energy performance contracts, additional steps are required: the energy service company you choose must be invited to conduct a detailed energy audit and submit a feasibility and concept report that describes how the desired efficiency improvements will be achieved.

6. Implementing the Plan

Actions identified in the plan must be implemented by the scheduled dates. Facility staff must be trained, either as part of an energy performance contract, or to permit more efficient housekeeping, or both. At this stage, you should also be running an awareness program for all employees.

7. Keeping it Going

The implementation of an energy management action plan is never really finished. As capital upgrades are completed and facilities are commissioned, the energy efficiency gains must be monitored and fed back into the ongoing building and energy use inventory.

It is important to continually implement improvements in housekeeping practices and new energy use policies. Managers must continue to report on energy use, and staff at all levels must continue to identify new ways to reduce costs. These suggestions can be incorporated into a list of options for the next year's plan.

Results should be reported to senior management regularly to maintain their commitment and to enlist their help in obtaining needed resources. Communications activities, directed at employees and at external audiences, should regularly celebrate progress.

By continuing to emphasize the importance of improving energy efficiency, wise energy use will become an integral part of the organization's planning and operational framework.

Appendix A - ENERGY MANAGEMENT PRODUCTS AND SERVICES - NATURAL RESOURCES CANADA

The following is a short list of products and services designed to help you at the development and implementation stages of the energy management action plan. Items marked (*) are listed on the "Energy Efficiency Order Form" that can be found in your kit. If not, fax your request to: Industrial, Commercial and Institutional Programs Division at (613) 947-4121

1. Getting Started

Case Studies:

Federal Buildings Initiative*
Energy Innovators*
FBI Replication*
Training*

Energy Innovators *

Financing Options
Training
Case Studies

2. The Planning Team

On-Site

3. Building the Planning Framework

On-Site

FBI

Federal Buildings Initiative -
"How To" Guide*
Energy Management Training: A
Model for FBI

Financing

Financing Catalogue
Financing Options for Energy
Management Services*

Training

Energy Management Training -
The Key to Success

Audits

Electrical Energy Management
Opportunities Workshop
FBI Audit Standards Guidelines*

Energy Performance Contracting

Managing Energy Performance
Contracts in Federal Buildings*
The Energy Innovator's Energy
Performance Contracting Primer*
CAESCO - Energy Performance
Contracting

Technical Information

CADDET*
Opportunities Binder*
Technical Information Guide*

4. Developing the Action Plan

On-Site

5. Managing the Tendering Process

RFP Model Documents*

6. Implementing the Plan

Employee/tenant awareness

A Manager's Guide to Creating
Awareness on Energy Efficiency*

FBI

Federal Buildings Initiative "How
To" Guide*
Health and Safety Guidelines*
Energy Efficiency: Qualified
Bidders List*

THE ENERGY EFFICIENCY MATRIX

	ORGANIZATION COMMITMENT	MANAGEMENT STRUCTURE	TRAINING AND IMPLEMENTATION	INVESTMENT ANALYSIS	MARKETING AND MOTIVATION	MONITORING AND TARGETING
4 PLATINUM	Energy policy developed, action plans in place and reviewed regularly. Have the commitment of top management and energy efficiency goals and objectives are an integral part of the corporate strategy. +	Energy efficiency is fully integrated into the management structure. The planning committee has a clear delegation of authority and responsibility for reducing energy waste, and meets regularly. +	Energy efficiency projects are completed on a planned basis, staff is fully trained to operate facilities and equipment at peak efficiency, and a full staff development and organizational training programs are in place. +	Positive discrimination favouring investments to reduce energy waste, with a full investment and asset management analysis being conducted on all energy-consuming assets in new facilities and renovations. +	Formal and informal channels of communication are being regularly used, both inside (all employees) and outside (all suppliers) the organization, to reinforce the benefits of reducing energy waste. +	Appropriate and reliable systems are used to set targets, monitor consumption, identify faults, quantify savings, track budgets, manage projects, distribute reports, and keep up with new technologies. +
3 GOLD	Energy policy has been developed, some action plans are in place, but there is no serious commitment from top management. +	An Energy Manager has been appointed, and is accountable to a management committee chaired by one senior manager. This Committee meets on an irregular basis. +	Efficiency projects are being completed on a planned basis, staff is provided with equipment-specific training on an 'as required' basis. No ongoing training program is in place. +	Investments in energy efficiency are given consideration after all key capital investments have been made. +	The Energy Manager discusses energy efficiency with major energy end-users and some information brochures are available for interested staff. +	Monthly monitoring and targeting reports are produced on each premise based upon sub-metering. Savings reports are not shared with energy end-users, and new technology is not tracked. +
2 SILVER	An energy policy has been proposed but not adopted, and it has not attracted the serious attention of any senior management staff. +	Facilities Manager reports to an ad-hoc committee, but there is no senior management participation. +	Projects are undertaken only if an equipment supplier can sell a short-term payback package and agrees to provide the basic training required for staff directly involved in the new equipment. +	Investments in energy efficiency are only considered when the payback is quick and the supplier is willing to take payment out of actual energy savings, and the organization does not take any financial risks. +	Energy efficiency reviewed with middle management staff from time-to-time by the Facilities Manager to encourage some awareness. +	Quarterly monitoring and targeting reports are based upon an estimated division of the total utility costs. Facility Manager reviews costs with Committee on an irregular basis. +
1 BRONZE	The facilities staff follow an unwritten set of guidelines to do the best they can with little or no funding. +	Energy management is the part-time responsibility of someone with limited authority to achieve any meaningful results. +	Some no-cost and low-cost items are being done on an irregular basis. Training is left entirely up to individual staff members, provided it does not interfere with their work schedule. +	Only low-cost items are considered for funding, the budget is less than 5% of the annual energy costs, and other budgeted line items are not over budget. +	Informal contacts are made on an irregular basis to discuss areas of obvious energy waste. +	Annual utility costs are compared to prior years to identify significant changes. +
0 WHO CARES	No explicit policy or concern about energy waste. +	No active effort is being made to reduce energy waste. +	No projects are planned, even no-cost and low-cost items are being ignored, and staff are not encouraged to take any training on how to reduce energy waste. +	No consideration has been made for energy efficiency investments. +	Energy efficiency is not a subject of discussion or interest within the organization. +	Energy costs are not tracked, and are considered an unavoidable, unmanageable cost of doing business. +

Appendix B - THE ENERGY EFFICIENCY MATRIX

If you are going to help your organization reduce energy waste in the most cost-effective and sustainable fashion, you need a way to:

- identify the issues with the highest priority;
- review how well you are performing;
- assess the quality and level of support which you are being given; and
- focus your present situation and identify where you want to go next.

Establishing your profile with this matrix is a quick, easy, effective method for doing this. Each column of the matrix deals with an organizational issue. The ascending rows, from 0 to 4, represent increasingly sophisticated ways to handle these issues. Your aim is to move your organization up through these levels to the best practice column, and maintain a balance across the columns.

Appendix C - ENERGY EFFICIENCY: A MANAGEMENT PRIORITY

Understanding your Buildings

Checklist

(Ref: Appendix B of the Energy Management Service Contract document, Natural Resources Canada, July 1995)

This checklist was taken from chapter headings of the Federal Buildings Initiative's energy management contract documents. This is the type of information an organization would need to provide to a contractor or energy management firm at the proposal stage.

As an energy efficiency champion, this information is essential to better understanding your buildings and their sites and developing a information base for your initiatives.

1.0 Facility Information

- 1.1 Identification/Description of the facility(ies).
- 1.2 The age of the facility(ies).
- 1.3 The remaining useful life of the facility(ies).
- 1.4 The number of occupants in the facility(ies).
- 1.5 Future occupancy plans in the facility(ies).
- 1.6 A list of known deferred maintenance projects, or major renovation plans.
- 1.7 The normal business/working hours for each facility.
- 1.8 All energy bills (electricity, natural gas, oil) for the facility(ies) over the previous 24 months.
- 1.9 All water bills, not related to energy use, over the previous 24 months.
- 1.10 A listing of energy and water efficiency improvements undertaken in the facility(ies) over the past 24 months.
- 1.11 A summary of current maintenance practices.
- 1.12 An inventory (a list) of all major equipment in the facility(ies) including equipment size or capacities.
- 1.13 An assessment of the condition of energy consuming equipment and systems including lighting fixtures and ballasts that would be affected by the proposed work.

- 1.14 An assessment of the condition of water consuming and or using equipment and systems including cooling and heating systems and pumping and plumbing equipment that would be affected by the proposed work.
- 1.15 A list of contractors currently servicing the facility and its equipment including the type and duration of service contracts.
- 1.16 Facility(ies) systems and architectural drawings.
- 1.17 A list of areas with special occupant requirements different from normal facility(ies) standards.
- 1.18 A list of all known PCB, Asbestos and any other dangerous material by facility(ies).