A Water Conservation Plan for Federal Government Facilities

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1. Introduction

1. The 1987 Federal Water Policy sets out a national strategy for managing Canada's natural resources. Its goals are to protect and enhance the quality of our water and to promote its wise and efficient use. The Green Plan, announced in December 1990, reaffirms the strategy and goals of the Federal Water Policy and sets out the Government contribution to further national cooperative efforts to protect and enhance Canada's water resources.
2. The Green Plan also recognizes the public expectation of the federal government to show leadership in environmental matters and commits the government to adopting a Code of Environmental Stewardship, a declaration that the federal government will incorporate environmental sensitivity into all aspects of its operations and practices. The Environmental Stewardship Initiative outlines a number of environmental opportunities and requires departments to develop environmental action plans. Departments are also required to report on progress in achieving their targets. Water conservation is a vital component of departmental action plans. Improving water use efficiency at federal facilities will not only reduce the amount of water used and related expenditures but will also contribute to improving the environment by reducing the amount of waste.
3. To assist departments in the formulation and implementation of the water conservation component of their action plans, the Interdepartmental Advisory Group on Water Conservation at Federal Facilities (WCFF), representing various federal departments and agencies, was formed in December 1990 to prepare a water conservation plan for the federal government that could be used by all its departments and agencies. Before formulating the plan, it was essential to
    - compile baseline data on water use and expenditure at federal facilities. Analysis of these data enabled estimates of water use and expenditure for federal facilities across the country.
    - conduct a series of pilot water audits covering a sample of typical government facilities. These audits, conducted at offices, laboratories, animal areas, schools, and border crossing stations, allowed the estimation of costs, benefits, and the associated payback periods of converting facilities to a water efficient status.

4. The introduction of the Water Conservation Plan coincides with a major energy conservation program at federal facilities carried out under the Federal Building

Initiative (FBI) of the Department of Energy, Mines and Resources (EMR). This is a comprehensive program that provides custodian departments with an opportunity to realize the benefits of improved energy efficiency. Many of the principles employed in this program are directly applicable to water conservation, including an innovative third-party financing mechanism that allows departments to implement energy conservation without adding any costs above their existing energy bills. Departments considering an upgrade in their facilities could simultaneously implement water and energy conservation measures under this approach.

5. Since the original introduction of this Plan in 1993, various initiatives have given added impetus to departmental efforts to use water efficiently.
    - In 1994, the Canadian Council of Ministers of the Environment (CCME) endorsed "A National Action Plan to Encourage Municipal Water Use Efficiency". Among other things, the Action Plan calls for governments to show leadership by reducing water use in their own facilities, as well as publicly funded facilities, and to adopt consistent policies, regulations and codes concerning water efficiency.
    - In 1995, all federal Ministers signed the "Guide to Green Government" committing their departments to "green" their operations, policies and programs and be prepared for the Commissioner of Environment and Sustainable Development to audit their performance. The Guide outlines recommended best practices for "greening" operations in priority areas, including water use, and promotes environmental management systems (EMS) as a method of ensuring that environmental objectives are properly considered and implemented.

This Water Conservation Plan for Federal Government Facilities is a tool that can be used to help meet requirements of both the above initiatives.

2. Purpose of the Water Conservation Plan

1. The primary purpose of the Water Conservation Plan is to provide federal departments with an understanding of the water conservation opportunity and to give them the information, tools, and support required to launch a successful water efficiency program for their facilities.

3. Water conservation makes economic sense

1. The federal government owns or leases over 50 000 facilities across the country with a combined floor area of over 22 million square metres. About 90% of these facilities are federally owned. In addition, there are over 5000 facilitiesthat are owned or leased by crown corporations. Federal facilities vary widely in size (from very small structures such as border crossing stations to large complexes such as military bases) and in function (office buildings, laboratories, warehouses, etc). Some of the facilities have no water services at all, while others are large water users. Some are metered and pay for water based on the volume they use, while others pay flat rates or are self-supplied.
2. The pilot water audits demonstrated a real potential for significant water conservation benefits. They showed clearly that, aside from benefits to the environment, major economic gains could be made with modest investment, short payback periods, and significant long-term dollar savings.
3. Current expenditures on water are substantial and are expected to increase as municipalities increase their water charges to cover the escalating costs of

supplying and disposing of water. The pilot database compiled in the framework of the Interdepartmental Advisory Group indicated that in the National Capital Region alone, expenditure on water amounted to over$12 million dollars in 1990. When extrapolated to the other facilities across the country, this figure would amount to close to $100 million annually.

4. The implementation of water conservation can cut the expenditures on water significantly. The pilot water audits showed that by concentrating only on improvements with a payback period of less than 2 years (actual range: 4 months to 2 years, with an average of 7.5 months), water use could be reduced by close to 50%, with economic returns of close to 150%. In the National Capital Region alone, this means annual savings of about $6 million ($45 million present value over a ten-year period, assuming a 5% rate of return) for a one-time investment of some $3.8 million. For all government facilities across the country, hundreds of millions of dollars could be saved in a relatively short time. Although these are rough estimates, the economic benefits of water conservation are clear.

4. Basics of the Water Conservation Plan

1. Most existing federal facilities were built at a time when water conservation was not a concern. The task of converting these facilities to a water-efficient status may seem overwhelming because of the sheer size of the government and the diversity of its operations, as well as the perceived cost of the conversion. However, water conservation should be viewed as an opportunity rather than a burden.
2. The Water Conservation Plan outlines a step-by-step process to help individual departments in the design and implementation of a successful water conservation program for federally owned facilities (see Section 4.4). It also presents the various options for financing the conversion to water efficient operation (see Section 5).

   The plan is accompanied by a detailed manual, which covers the technical aspects of water conservation.
3. Although federally owned facilities are the primary target of this first Water Conservation Plan, the federal water conservation effort would be incomplete without parallel action for leased facilities and new construction (see Section 6).
4. *Guidelines for the Development of Departmental Water Conservation Programs*
   Following are basic guidelines for implementing a water conservation program; departments will need to tailor these guidelines to suit their needs.
   1. Each department establishes a water conservation management team to oversee the development and implementation of a water conservation program for its facilities. The management team should include personnel from facility, contract, and financial management, as well as technical operations.
   2. It is not feasible, or even desirable, to attempt to make all facilities water-efficient at once. The first priority is to identify through a preliminary survey the facilities with the highest water use, the highest water and sewage costs, and the greatest incidence of repair and leakage problems. It is here that the greatest benefits of water conservation can be realized. To the extent that the survey covers the broadest possible range of facilities in the department, the resulting experience will be of the greatest benefit for all future action.
   3. To identify the facilities with the highest priority for detailed water audits and water conservation implementation:
      - make a quick survey of facilities, using the above criteria of water use, water and sewage costs, and technical problems. The water

conservation manual contains a ready-to-use form for this purpose.
    - analyze and assess the results of the survey to identify facilities with the highest priority for water auditing (the ones that are large water users or that will benefit most from water conservation)
    - undertake the water audits, following the procedures described in the manual
4. The water audits will provide
    - an inventory of water-using equipment and fixtures
    - a basic analysis of water consumption patterns
    - estimates of potential cost savings, the cost of implementation, and the payback period
    - the recommended measures to achieve these savings
5. This information will enable the management team to develop for the audited facilities a water conservation *Action Plan*, which can be a part of the department's overall environmental stewardship action plan. It would outline departmental targets for implementation of water conservation, including reduction targets, schedule, and financial requirements. Ideally, the first Action Plan should include some recommendations for subsequent phases of water auditing and implementation.
6. The next step is for the management team to seek senior management approval of this initial Action Plan for water conservation.

   Implementation of this Action Plan will complete the first phase of water conservation. However, at any time during this phase, water auditing and further implementation can be initiated for the next set of priority facilities. This will be governed by several factors, such as needs, new problems, and the experience gained.
7. Federal departments should consider the following issues when developing their water conservation programs:
    - Facilities that are shared among departments will require cost/benefit sharing agreements.
    - Training of facility operators and managers constitutes a vital component of the program. This is essential for both the short-term implementation of the improvements and the long-term maintenance of the realized savings.
    - It is important to keep the employees aware and well informed of the water conservation efforts. This will help to develop a common cause, to promote interest and involvement of the employees, and also to indicate the commitment of management to water conservation. The positive attitude developed will foster acceptance of changes and cooperation in conserving water.
    - Each department will need to keep statistics on water use and expenditures. This is necessary not only to enable assessment of the effectiveness of the program, but also to monitor the resulting savings and provide baseline data for environmental pledge monitoring.

5. Since the original introduction of this *Plan* in 1993, Public Works and Government Services Canada (PWGSC) has developed the *Water Management Protocol*. It is a "how to" guide that assists facility managers and their Environmental Coordinators to make federal facilities water efficient in the most cost effective manner. It complements the original *Manual* which accompanies this *Plan*.

Although the protocol was intended for PWGSC facilities, it can be used in other facilities since most of the water usage concerns are similar to those explored in the protocol.

The Water Management Protocol has five phases.

1. Phase 1. Preliminary Evaluation/Facility Screening, evaluates the facility to determine whether financial savings are obtainable and if a water audit is warranted.
2. Phase 2. Water Audit, identifies and evaluates each facet of the water distribution system.
3. Phase 3. Water Reduction Workplan, assesses the water audit results for potential water reductions, as well as, simple costs and benefits. Based on this assessment, a strategy is developed for implementation, training, and specific actions. Costs and resources required for the approved initiatives are evaluated and responsibilities are assigned.
4. Phase 4. Implementation of Workplan, describes a process, including a checklist and general advice, for implementing the water efficiency measures within a specific time frame.
5. Phase 5. Annual Follow-Up Report, evaluates the water efficiency workplan one year after its initial implementation to verify results of the previous audit and to update the workplan.

The protocol has spreadsheet software for doing the calculations and also provides information on how to budget and select consultants, as well as, where to look for further help.

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5. Financing options

1. Given the size of the federal government and the diversity of its operations, and in view of budgetary constraints, funding is a major consideration in the implementation of water conservation. There are five options available to the departments:
    - net voting
    - revolving funds
    - appropriations
    - Treasury Board submissions
    - private sector third-party funding
2. Net Voting
   Net voting is a means of funding selected program activities wherein Parliament authorizes a department to apply revenues towards costs incurred and votes the net financial requirements (estimated total expenditure minus estimated revenues).

   This option would apply principally to those crown facilities where Public Works Canada (PWC) is the custodian. The regular management services carried out on these facilities are funded by PWC through its net voting authority. Therefore, where water conservation upgrades clearly translate to operational cost savings to PWC, this option could represent an attractive opportunity for reducing operating expenditures. This option may also be applied to other custodial departments that have a similar net voting authority.

3. Revolving Funds
   Revolving funds are continuing or non-lapsing authorizations by Parliament to make payments from the Consolidated Revenue Fund for working capital, capital acquisitions, and temporary financing of accumulated operating deficits. A revolving fund is a means by which Parliament provides continuing authorization for an operation that is funded completely by users, or partly by users and partly by subsidization. The authorization conferred by Parliament continues from year to year until amended.

   PWC operates a revolving fund account to finance work that is done by them on behalf of other custodial departments. The authority for this account would appear to cover the type of work necessary for water conservation retrofits. Therefore, the opportunity could exist for these PWC client departments to use the same funding mechanism for financing the capital investment associated with water conservation projects. Also, similar revolving funds used by other custodial departments could be used to finance their own water conservation projects.
4. Appropriations
   Departments, based on their individual circumstances, could decide whether to finance projects through existing resource levels (e.g., by temporary deferral of other expenditures), or by making a request for additional funding (e.g., through the Supplementary Estimates or MYOP).
5. Treasury Board Submissions
   A further option for large projects would be to seek funding through a submission to the Treasury Board.
6. Private Sector Third-Party Funding
   A further option that may be appropriate for implementing water conservation is third-party funding. This approach, which would be similar to that used by the FBI, is currently being explored.

   Conceptually, the approach is straightforward:
   - Based on an audit, an agreement would be negotiated with a private sector company to finance and implement defined cost-saving measures in a facility or a group of facilities.
   - The company would be fully repaid out of the resulting savings, including a profit, over a specified period of time.
   - After the debt for services is fully repaid, the department involved would realize the savings resulting from reduced water consumption.

6. Other considerations

1. The Water Conservation Plan outlined above covers existing federally owned facilities. It does not include leased facilities and new construction. It applies to facilities that are metered and pay for water based on the volume used. The plan is not applicable to facilities that are subject to flat rate water charges, primarily since the resulting savings, which are the main mechanism for financing the program, will not be realized. The flat rate case would require other arrangements.
2. New Construction and Renovation
   The fundamental first step towards water conservation is to avoid the repetition of past wasteful practices. Water-conserving technologies have advanced considerably during the past few years and are gradually becoming economical, reliable, and socially acceptable. The National Master Specifications (NMS) for plumbing fixtures and the Ontario Plumbing Code have been amended to reflect water efficiency. Departments should make every effort to introduce fixtures and systems that use the best water conservation technologies possible when

constructing new facilities or undertaking major renovations, until appropriate amendments are made to all such instruments. The plumbing and building codes and the NMS also offer opportunities to influence both public and private sector activities.

3. Leased Facilities
   Although most of the federal facilities are federally owned, about 7% of the facilities, representing approximately 18% of the total floor area, are leased. These still constitute a significant proportion of the federal government's hidden expenditure on water, with the water cost embedded in the lease. Steps will need to be taken to make water efficiency a condition for leasing facilities for the federal government in the future. A transition period may be required to give the lessee enough time to adjust to the new requirements. A feasible solution, during this transitional period, would be to give the lessee a reasonable incentive for the conversion of the facility to water efficient status. Arrangements could be worked out to allow the lessee to recover the cost of conversion from the resulting savings, in addition to a reasonable return on the investment.
4. Facilities Paying Flat Rate
   Federal facilities that are subject to flat-rate water charges, irrespective of the volume of water they use or the amount of waste they discharge, will lack the incentive and, more important, the funding mechanism to finance the water efficiency conversion.Nevertheless, federal departments can still pursue the water conservation objectives by informing the authorities that incur the cost of supplying and disposing of the water (i.e., the municipality or PWC) of the excessive water use and having them implement water efficiency measures.

For further information please contact the Sustainable Water Management Division at Environment Canada: 819-953-1515