# Chief Energy Conservation Officer

## 2005 Annual Report

# Our Conservation Challenge

2007 Targets:

- 5% reduction in peak electricity demand
- 10% reduction in electricity consumption

Long-Term Target:

- Create a conservation culture

Ontario Power Authority

"Ontario needs to create a conservation culture that delivers cumulative and sustainable improvements in energy use and demand response. Ontario's long-term plan for electricity should include a comprehensive conservation strategy, with clear targets, reflecting a full analysis of the costs and benefits of conservation."

– Electricity Conservation and Supply Task Force in its Final Report to the Minister, *"Tough Choices: Addressing Ontario's Power Needs", January 2004*

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November 1, 2005

The Honourable Donna Cansfield
Minister of Energy
900 Bay Street, 4th Floor
Toronto, ON M7A 2E1

Peter L. Jones
Chairman
Board of Directors
Ontario Power Authority
120 Adelaide Street West, Ste. 1600
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Dear Minister and Board:

In accordance with the requirements under *The Electricity Restructuring Act, 2004*, which amended *The Electricity Act, 1998*, I am pleased to present the 2005 annual report of the Chief Energy Conservation Officer.

As required under the Act, this report includes:

- details about the Conservation Bureau's activities during 2005 (chapter 3 of this report);
- information on the Conservation Bureau's proposals to promote electricity conservation and demand management, procure reductions in electricity demand, and facilitate the provision of services relating to energy conservation and demand management in 2006 (chapter 5);
- a review of the Ontario Government's progress in meeting its conservation and demand management goals (chapter 6);
- and information on government policies or legislation that result in barriers to the implementation of electricity conservation measures (chapter 7).

In addition, the annual report presents background on the creation of the Conservation Bureau, reviews Ontario's electricity consumption and demand trends and discusses the potential impact of conservation on electricity consumption.

Yours truly,

Peter Love
Chief Energy Conservation Officer

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# A Message From The Chief Energy Conservation Officer

I have the privilege of serving as Ontario's first Chief Energy Conservation Officer, and presenting this first annual report to the Minister of Energy, the Board of the Ontario Power Authority and the people of Ontario. The theme of the report, *Our Conservation Challenge*, is my challenge to all Ontarians to make more informed decisions about electricity use regularly at home, at school and at work. To meet this challenge, Ontarians must learn to value electricity and make a commitment to use electricity more wisely.

*Our Conservation Challenge* also reflects the important goal of building and supporting a conservation culture in all sectors of Ontario's economy as a cornerstone of Ontario's long-term electricity future.

It recognizes that no one sector or group can do this alone – that there is a vital and essential role that all Ontarians must play in achieving our electricity conservation goals. And it represents our starting point in meeting the province-wide targets that are presented on the cover of this annual report: a 5% reduction in peak electricity demand and a 10% reduction in electricity consumption by 2007. The 10% target was set by the government for its own buildings across the province. I challenge all Ontarians to adopt the 10% target.

We have much work ahead of us.

As the economy continues to grow, it is estimated that by 2020 Ontario will need to refurbish, rebuild, replace or conserve 25,000 megawatts (MW) worth of generating capacity – more than 80 per cent of Ontario's current electricity generating capacity – at an estimated cost of $25 to $40 billion. Clearly, producing more electricity is only part of the answer.

There are tremendous opportunities to reduce the supply-demand gap through conservation and demand management. That's why Ontario has set a target to reduce peak electricity demand by 5% by 2007. Conservation will play an important role in a coordinated, province-wide approach to addressing the growing gap between electricity supply and demand.

Conservation will keep our economy healthy and competitive, help the bottom line of every business – both short-term and long-term – and help keep money in the hands of Ontario consumers.

Conservation will stabilize electricity bills for residential and small business consumers and provide flexibility to large volume consumers so they can organize themselves to be as competitive as possible.

It will also foster local and regional employment. Energy conservation is typically labour intensive – conservation products and services are designed, manufactured, installed, and serviced by Ontario companies and their employees.

And, of course, electricity conservation helps reduce the environmental impacts from both domestic and imported coal-fired electricity generation.

If we are to achieve our long-term target of building a true conservation culture, the participation of all Ontarians is essential. We all need to make meaningful changes in the way we use electricity in our homes, schools, institutions and businesses.

Taken together, these individual changes will bring big savings.

Experience proves that this is possible. People have demonstrated their willingness to get involved on an individual level in the past; one example is through their actions in making Ontario's Blue Box one of the most effective curbside recycling programs in the world. That same commitment to action – to reduce electricity use – will be crucial to building a culture of conservation.

**To effectively move to a conservation culture, all sectors of the economy must participate and all sectors must be given the means to measure the effect of their efforts.**

My role as Chief Energy Conservation Officer is to ensure conservation and energy efficiency play a vital role in Ontario's ongoing energy strategy. My mandate flows from the recognition that if Ontario's electricity system is going to continue to serve us and to power our economy, conservation must play an increasing role in meeting our electricity needs.

I was appointed to this new position in April, 2005 and started on May 16, 2005. During the initial months of the Conservation Bureau's existence, I focused on developing an appropriate organizational structure, hiring key personnel and setting budgets and plans for 2005 and 2006. I also began the vital work of speaking to the many organizations interested in this new office. In addition, I addressed some urgent electricity supply issues by raising the public understanding of the critical role conservation must play in addressing Ontario's electricity needs.

The summer of 2005 was one of the hottest on record in Ontario, so it became a priority to encourage all electricity consumers to reduce consumption. Accordingly, we began a public awareness initiative that included extensive media interviews, public speeches and appearances in communities and schools and at industry conferences, and the launch of the *Electricity Conservation Challenge*.

To ensure our efforts were coordinated with those of other government organizations, the Bureau held regular meetings with the Independent Electricity System Operator, the Ontario Energy Board, local distribution companies, the Ministry of Energy and the Chair of the Conservation Action Team.

The power advisories and warnings issued this past summer and the emphasis placed on the importance of conserving electricity have resulted in a number of fundamental advances towards a culture of conservation. Already, we are seeing a substantial change in consumer attitudes towards energy consumption. More people have accepted that conservation should be an everyday part of life, and they are looking for concrete steps that they can take. Many have already taken action and are reaping the benefits, as illustrated in the success stories that appear throughout this report.

The government is also actively engaged. In addition to its own 2007 target to reduce the electricity consumption of government operations by 10%, it is leveraging the relationships local distribution companies have with their customers by allowing them to invest more than $160 million in local conservation programs. It is moving to a sophisticated system of smart meters where electricity consumers can monitor their consumption and shift some of their electricity use to off-peak hours when electricity will cost less than it does at peak hours. In addition, the Province has raised the standards for minimum energy efficiency of many household and commercial appliances.

These steps demonstrate that Ontario is serious about conservation. They indicate we have made a very solid start, but much more remains to be done by my office, the government, local distribution companies and, most importantly, by all electricity consumers.

To effectively move to a conservation culture, all sectors of the economy must participate and all sectors must be given the means to measure the effect of their contribution. We will encourage and support their efforts.

In the residential sector, the Conservation Bureau will collaborate with local distribution companies in the delivery of their conservation programs, ensuring they have access to long-term funding and complementing their initiatives with province-wide programs. One of the key pieces of intelligence from the Blue Box program was that buy-in from municipalities and local community groups is critical to ensuring success.

In the commercial and institutional sectors, we will support an expanding role for energy management firms that can help public and private companies identify, implement and, if appropriate, finance cost-effective energy efficiency upgrades and reinvestments. The Conservation Bureau will issue a number of Requests for Proposals designed to provide funding to organizations that wish to reduce their electricity demand and/or consumption.

In the industrial sector, we will encourage large companies to make cost-effective investments in energy-saving equipment and participate in the Requests for Proposals for conservation, demand management and combined heat and power installations. An important part of this will be fostering successful employee engagement programs to identify no-cost or low-cost savings opportunities. For small to medium enterprises, we will work with existing electrical, mechanical and industrial contractors and consultants to promote investments in energy conservation.

The programs the Conservation Bureau is implementing will be cost effective. They will reduce Ontario's electricity consumption, create more involved and competitive businesses and allow consumers to save money. Our programs will help address current supply constraints, protect and improve the environment, and help customers manage their utility bills.

Building a culture of conservation is essential. And I strongly believe that it is achievable. But not without the support and active participation of all Ontarians. And that is why I am issuing a challenge – Our Conservation Challenge – to individuals in all sectors of the province.

Together, we can lay the groundwork for a stronger economy and build a conservation culture.

Peter Love
Chief Energy Conservation Officer

CHAPTER

# 1 A Brief History

The establishment of the Conservation Bureau grew out of the realization that conservation would have to play an increasingly important role in assuring an adequate supply of electricity for the Ontario public, businesses and institutions.

## Electricity Conservation and Supply Task Force

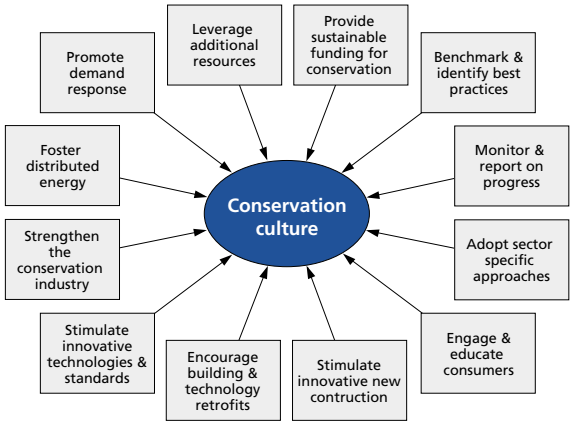
In June 2003, the Minister of Energy appointed the Electricity Conservation and Supply Task Force (Task Force) to review Ontario's current and future electricity supply and demand situation and recommend changes to ensure the continued adequacy of electricity supply. The Task Force was made up of 19 leaders from all parts of the electricity industry, including representatives of consumer, labour and environmental groups. The Task Force's objective was to recommend how to address the issues of attracting new generation, promoting conservation and enhancing the reliability of the transmission grid for the Province of Ontario.

On January 14, 2004, the Task Force released its recommendations on the reforms required to provide a solid foundation to Ontario's electricity sector [1]. Included in its many recommendations was a call for the creation of a conservation culture as a cornerstone of Ontario's long-term energy future. This recommendation is quoted on the inside front cover of this report.

## Electricity Restructuring Act, 2004

The introduction of the *Electricity Restructuring Act, 2004* (The Act), which was passed in November 2004, legally implemented several of the recommendations of the Task Force. The Act created the Ontario Power Authority and mandated the Ontario Power Authority's Board to establish the Conservation Bureau.

Figure 1:
**Conservation Culture Framework**




Source: Conservation Action Team Report: *Building a Conservation Culture in Ontario*[2]

On April 20, 2005, the Minister of Energy appointed Peter Love as Chief Energy Conservation Officer (CECO). Under Peter Love's leadership, the mandate of the Conservation Bureau, as defined in the Act, is "to provide leadership in planning and co-ordination of measures for electricity conservation and load management in Ontario and to engage in such activities as may be prescribed in the regulations."

## Conservation Action Team

One month later, the Conservation Action Team (CAT) ) – a group of 12 Parliamentary Assistants formed in January, 2004 – released its benchmark report: *Building a Conservation Culture in Ontario*, after months of consultations and study. The CAT

report[2], issued in May 2005, established a framework for creating a conservation culture and set the context for the Bureau's initiatives to foster a conservation culture. This framework is depicted in Figure 1, adapted from the report.

The recommended scope of the Bureau's conservation and demand management (CDM) programs was defined in the CAT Report as:

- Energy efficiency
- Behavioural/operational changes (including benchmarking or "smart" control systems)
- Load management measures (including demand response)
- Fuel switching
- Distributed generation options behind the customer's meter (such as tri-generation, co-generation, back-up power generators, ground-source heat pumps, solar, wind, and biomass systems).

## Definition of Conservation and Demand Management (CDM)

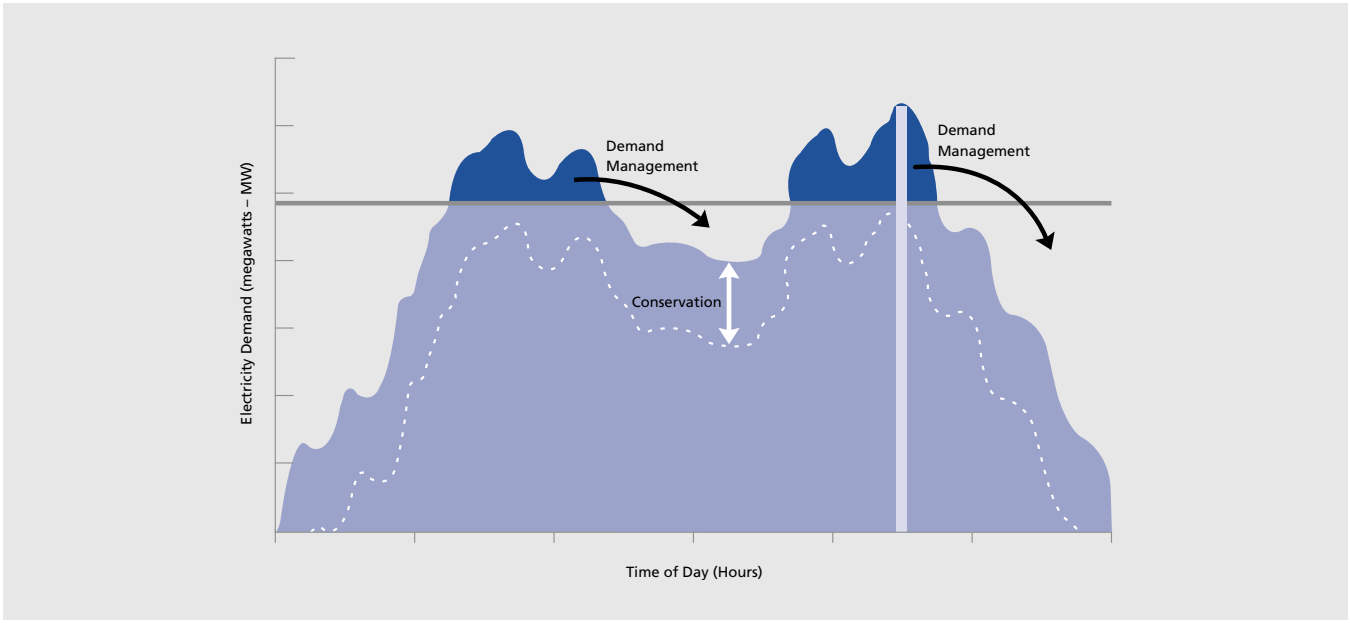
The Bureau's programs fall under Conservation – reducing the amount of energy used – and Demand Management – impacting both the amount and timing of electricity demand. The effect on electricity conservation and demand of the two components of CDM are illustrated in Figure 2. The Bureau's Conservation and Demand Management (CDM) mandate does not, however, include setting or influencing electricity prices.

## Ministerial Directives

The *Act* also stipulates that the Minister of Energy may issue directives that set out specific goals to be achieved during the period prior to the approval of an integrated power system plan, (which will be submitted to the Ontario Energy Board in the summer of 2006 for review and approval in 2007), including goals relating to the development and implementation of conservation measures, programs and targets. The costs of payments made under the procurement contracts associated with directives will be recovered from consumers as charges.

By the end of October 2005, the Minister had

Figure 2
**Components of Conservation and Demand Management**




Source: Conservation Bureau, 2005[3]

issued three directives pertaining to CDM initiatives:

- June 15, 2005: procurement of 250 MW or more of demand-side management and/or demand response initiatives and up to 1,000 MW of high efficiency combined heat and power (CHP) supply projects across the province.
- October 6, 2005: conservation and demand management initiatives for residents of low-income and social housing to reduce overall electricity energy consumption and demand by up to 100 MW.
- October 20, 2005: conservation and demand management initiatives directed at appliance change-out and efficient lighting to reduce overall electricity consumption and demand by residential, commercial, and industrial customers by up to 100 MW.

### Conservation Bureau's Strategic Objective

To achieve its mandate, the Conservation Bureau's strategic objective is to :

**develop, coordinate and stimulate electricity conservation and demand management**.

The Bureau plans to achieve this objective by:

- Planning, designing and implementing comprehensive conservation programs that deliver conservation and demand management, as directed by the Minister of Energy.
- Fostering the development of a culture of conservation across all sectors of the Ontario economy through a three-part conservation culture initiative consisting of Conservation Awareness, a Conservation Fund and Research and Tracking.
- Coordinating and supporting other organizations such as local distribution companies (LDCs) and retailers in the identification, design and delivery of conservation and demand management (CDM) programs and high-efficiency combined heat and power (CHP) projects.
- Gathering valuable information and experience from other programs and tracking public opinion on conservation in various markets and publics to monitor the impact of conservation efforts.
- Creating a public profile for the Chief Energy Conservation Officer so that his comments and suggestions on conservation are seen in the public arena as authoritative and important.
- Producing an Annual Report.

CHAPTER

# 2 Ontario's Electricity Consumption and Demand Trends

As we set out to meet our conservation challenge, it is important to have a clear understanding of the present and the past. An understanding of electricity consumption and demand and its relationship to economic growth will assist in projecting future demand and the development of appropriate conservation initiatives for Ontario.

In its first few months, the Bureau began to review and assess Ontario's electricity conservation and demand trends and their relationship to economic productivity.

To assist in this early assessment, the Conservation Bureau commissioned a study, which was received in September, 2005. The full study, entitled "Factor Analysis of Ontario Electricity Use – 1990 to 2003"[3], is posted on the Conservation Bureau's section of the OPA website at www.powerauthority.on.ca.

This chapter provides a summary of the information highlighted in the study.

## Long-Term Consumption – 1958-2003

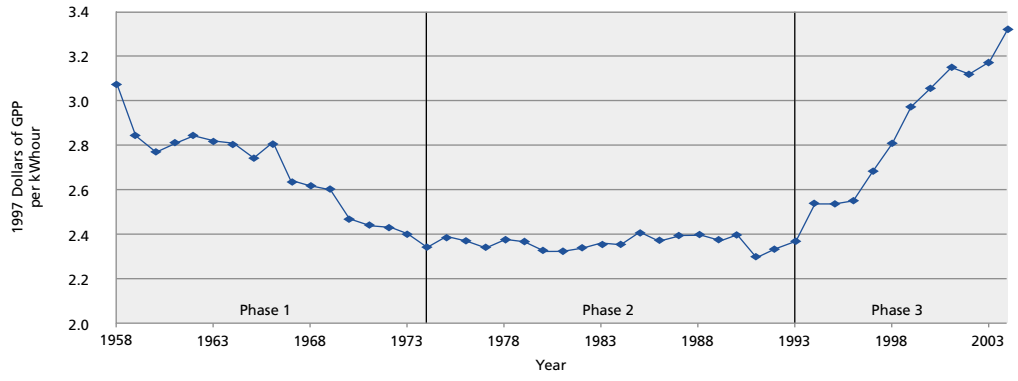
In the 45 years from 1958 to 2003, Ontario has gone through three distinct phases of electricity consumption. In the 1958-1974 phase, consumption grew faster than the economy. In the 1974-1993 second phase, consumption grew at the same rate as the economy. And finally, in Phase 3 from 1994-2003, consumption grew significantly slower than the economy.

These phases, as measured by electricity productivity – the Gross Provincial Product (GPP) per kWh of electricity consumed – are presented in Figure 3 and discussed below:

**Phase 1:** ***1958-1974 – Consumption Grows faster than the Economy*** In Phase 1, consumption increased by 6.8% annually, the economy by 5% annually and the population by 2.2% annually. Electricity costs remained very low, the use of

Figure 3

**Electricity Productivity in Ontario, 1958-2004**




Source: ICF Consulting Inc.: "Factor Analysis of Ontario Electricity Use – 1990 to 2003"[4]

electricity for space and water heating grew and virtually no thought was given to conservation.

**Phase 2:** ***1974-1993 – Consumption Grows at the Same Rate as the Economy.*** In Phase 2, both consumption and the economy grew at about 2.4% annually; while the population grew at 1.4% annually.

**Phase 3:** ***1993-2003 – Consumption Grows at a Much Slower Rate than the Economy.*** In Phase 3, productivity increased significantly as the economy grew at 4.1% annually, while electricity consumption increased at only 1.0% annually and the population increased by 1.4% annually. The productivity improvement signalled a very important development with implications for future demand projections.

## The Impacts of Electricity Productivity Improvements

The increase in electricity productivity resulted in relatively little growth in consumption since 1988. Figure 4 charts the impact on consumption if electricity productivity had not improved in Phase 3 from 1993-2003. It shows, for example, that had the ratio of GPP to consumption remained at the 1994 level throughout the period, the electricity demand in 2003 would have exceeded 200,000 GWh – 50,000 GWh higher than the actual demand.

While most customers experienced very little change in electricity prices during Phase 3, there was substantial uncertainty from 2000-2003 in both future electricity supply and pricing. These, combined with considerable price volatility in the commodity portion of the consumer's bill for a few months in the late summer of 2002 and the subsequent 'refunding' of some of these costs also may have had an impact leading to reduced consumption.

## Electricity Usage by Sector

**Residential Sector – 1990-2003**

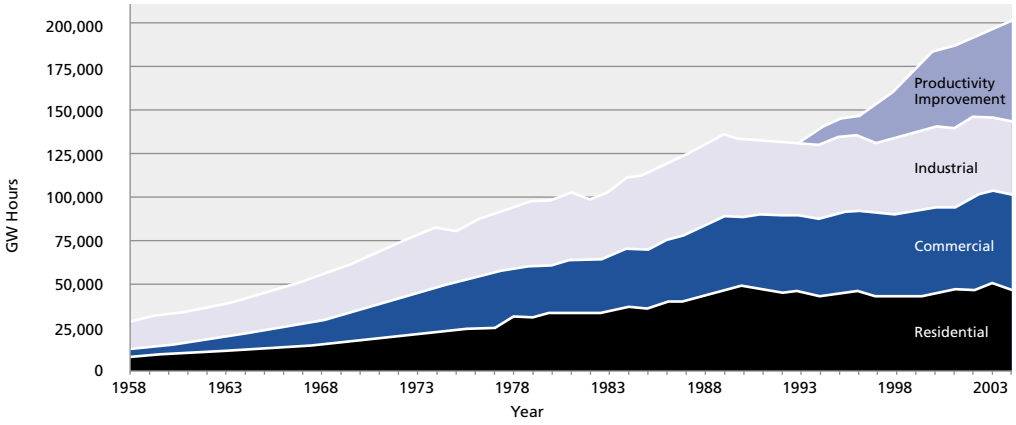
Over this 13-year period, residences in Ontario used 33% of the total electricity consumption in 2003, down marginally from 34% in 1990. During this period:

- Electricity intensity (amount of electricity used relative to activity levels) per household decreased by 16%
- Consumption increased by 5%
- Population grew by 19%
- The number of households increased by 26%

Space heating represents the largest share at 23% of

Figure 4

**Electricity Consumption by Sector in Ontario With Impact of Productivity Improvement**




Source: ICF Consulting Inc.: "Factor Analysis of Ontario Electricity Use – 1990 to 2003"[4].

total consumption. Electricity use for space heating has grown by 5% since 1990 even as the market share for electric heat has declined from 13% to 11%. In the same period, the number of homes using electric heat, including heat pumps and dual-fuel systems, increased by 13%. Significantly, an estimated 666,000 Ontario homes are now heated with baseboard heaters.

The market share for electric water heating decreased from 33% to 22%. A total of 1.9 million homes used electric water heaters in 1990. In 1991, that figure had dropped to 1.5 million, only to bounce back to 1.6 million by 2003.

Residential cooling energy use showed the greatest increase (more than 100%) in the period 1990-2003 as more homes installed central air conditioning. Electricity use by central air conditioning systems increased by 121% and electricity use by room air conditioners was up by less than 20% in the period.

Part of this increase is attributable to warmer weather. Cooling degree-days were approximately 20% higher in 2003 than in 1990. If the summer of 2003 had been comparable to 1990, the increase in air conditioning electricity use would have been closer to 70%.

Although air conditioning is responsible for only 7.6% of annual residential electricity use, it has a disproportionate impact on demand. In the past 13 years, the amount of electricity used for space cooling has increased rapidly in both the residential and commercial/institutional sectors. On an annual basis, air conditioning has a low load factor, but it drives extremely high loads in hot summer months. As a result, peak demand for electricity – which used to occur in the winter in Ontario – now occurs in the summer.

New major appliances have become substantially more efficient. As the stock of inefficient appliances was replaced with high-efficiency models, electricity use declined. For example, while there was essentially no change in the average number of refrigerators or freezers per household over the period, electricity use by these appliances dropped an average of 16.4%.

Electricity use by other appliances – such as home electronics – increased 57% from 1990-2003.

Lighting use increased by almost 20%. Limited information on appliances is available in the *Other Appliance* category of the Office of Energy Efficiency (OEE) database[5]. Further investigation of these appliances, their loads, their efficiency and their saturation would appear warranted.

**Commercial/Institutional Sector – 1990-2003**

The Commercial and Institutional sector consumed 37% of Ontario's electricity in 2003, an increase in consumption share from 1990, when it represented 30% of the total.

The Commercial and Institutional sector had the highest growth rate of the three major sectors. From 1990 to 2003, electricity use increased by 30% or slightly more than 2% per year. Total floor area for the sector grew 25% reflecting a modest increase in electricity intensity from 250 to 260 kWh/m$^2$ over the period.

The distribution of electricity use by sub-sector for 2003 breaks down as follows:

- Offices accounted for 54% of the electricity used by the sector;
- Accommodation and Food, which represents less than 5% of total floor area in this sector, accounted for 16% due to its higher energy intensity;
- Retail accounted for 11%.

The breakdown by end-use within this sector is as follows:

- More than 37% of the electricity consumed is used for lighting – the largest single end use. Lighting energy use increased by 33% from 1990-2003, while the total floor area for the sector increased by 24.9%. Lighting intensities (measured in kWh/m$^2$) increased in all of the sub-sectors, in spite of improved efficiency in lighting systems.
- Auxiliary motors account for 24%; auxiliary

equipment 21% of all the electricity consumed.

- Cooling accounts for 14% of all the electricity consumed. Electricity use for air conditioning increased by 52% during the period, signalling a major increase in its share of total electricity use, as in the residential sector. During this period, natural gas began to capture an increased share of the cooling market. In 1990, electricity supplied more than 96% of cooling (natural gas 4%) for the commercial/institutional sector. By 2003, electricity supplied 80% of cooling.
- Electric space heating, which represented just 2.3% of electricity use in the sector in 1990, grew by 185% over the period, more than doubling its share of total electricity use to 4.9%.
- Electricity use for water heating fell by 80% during the period.

**Industrial Sector – 1990-2003**

The industrial sector accounted for 29% of all electricity used in the province in 2003. Industrial electricity use actually declined by 9% between 1990 and 2003. Agricultural electrical use, which accounted for 2% of total electricity consumption, grew by 12% over the period, while transportation use (0.3% of total consumption) declined by 2%.

It is a measure of this sector's efficiency that while electricity consumption declined, sector economic output grew by 42%. From 1990 to 2003, average industrial electricity intensity fell 36%, from 559 MWh for each 1997 dollar of Gross Domestic Product produced to 357 MWh for each 1997 dollar of Gross Domestic Product produced.

Electricity use by the petroleum refining, chemical, mining and other manufacturing industries declined over the period as did GDP in several sectors. The iron and steel industry increased its electricity consumption. The pulp and paper and smelting and refining industries also increased their consumption despite a decline in GDP. In contrast, electricity use in Other Manufacturing declined while output increased.

### Electricity Demand in Ontario

Most electricity customers understand electricity consumption – the amount of electricity they use in a particular period, typically per month. For households, this is typically measured in kWh (kilowatt

ENERGY CONSERVATION SUCCESS STORIES

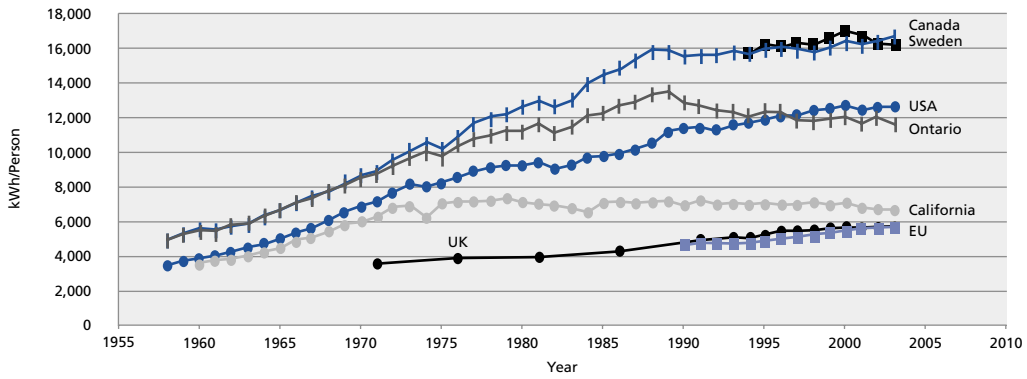
## Reduce the Juice


University students Sarah Tratt and Sarah Fairlie enjoyed working on the project.

Shelburne parents who ask their kids what they learned in Centre Dufferin District High School might get a response something like this … they learned about alternative energy from a combination solar photovoltaic/windmill installation at their school, called the Green Power Project. This project was championed by teacher Jeff Wellman, assistant head of the Science Department, and initiated by a donation of equipment from a community group called Power Up Renewable Energy Co-operative (PURE).

After they learned about energy conservation strategies in class, some of the students participated in another community program organized by PURE called "Reduce the Juice" and went door to door around town teaching homeowners about energy conservation opportunities. Thanks to the efforts of the hard-working students, the "Reduce the Juice" program helped residents lower electricity use in Shelburne by 5%.

Figure 5
**Electricity Consumption Per Capita**




Source: Conservation Bureau [3].

hours), which is the amount of electricity used by a 60 watt bulb that is on for 17 hours. It is also the amount of electricity used when a 15 watt energy efficient compact florescent light (CFL) is on for 67 hours. By switching to CFLs, consumers get the same amount of light but consume 75% less electricity.

Electricity demand is a very important concept that is not as well understood by most electricity consumers. It is the maximum amount of electricity required by an individual consumer or the entire province at a particular time. Using the example above, the 60 watts and the 15 watts are the demands for the two types of lights. For the province, the total peak demand record was set this summer at 26,160 MW.

The year 1998 was a watershed for Ontario electricity consumption. Prior to that time, Ontario's electricity demand traditionally had peaked in the winter when heating demand rose in the coldest month. All that changed in 1998. For the first time, electricity demand peaked during the summer. That has been the case every year since, with the exception of 2000 and 2004.

## Electricity Consumption Per Capita

Comparing Ontario's electricity consumption with that of other jurisdictions must take into account the important differences in the Province's economic structure, industrial mix, climate, personal habits, and so on. The most useful indicator of relative success in promoting conservation across different jurisdictions is a comparison of the relative trends in consumption per capita.

Figure 5 compares Ontario's electricity consumption per capita since 1960 with that of the rest of Canada, the U.S., California, the European Union, the U.K. and Sweden. It is very notable that Ontario's per capita consumption peaked in 1990 and has been trending lower every year since then. This is in contrast to the other jurisdictions shown in this figure where per capita consumption has either continued to grow or has stabilized.

## Conclusion

The information presented in this chapter represents the progress we have made at this early stage in learning about Ontario's electricity demand and consumption trends. It is a start, but clearly much more needs to be done. The Bureau is still compiling and analyzing the very complex information on this issue. To achieve greater understanding of the trends, more research and analysis is required and will be undertaken in the months ahead. The Bureau will continue to share its findings in this area as an important step in meeting our conservation challenge.

CHAPTER

# 3 Progress to Date

Our conservation challenge starts with the Conservation Bureau. Its mandate is to provide leadership in the planning and coordination of measures for electricity conservation and demand management (CDM) in Ontario.

In the months since the CECO's appointment in May, the Bureau has made solid progress in its leadership role. It has also made significant strides in creating the organization, identifying priorities and launching programs.

As a new organization, the Bureau's key priorities in 2005 included building the organization, stakeholder communications and consultation, producing the 2005 annual report and laying the groundwork for its activities in the following three areas:

- Promoting electricity CDM
- Facilitating services for CDM
- Procuring reductions in electricity demand

## Building the Organization

The Bureau undertook two major initiatives in developing the organization. The first was to create an organizational structure divided along sectoral lines and the second was to develop a business model.

### Organizational Structure

The Bureau reviewed an extensive array of organizational structures before deciding to adopt the sectoral approach to the market. As a result, the Bureau has grouped program activities that promote CDM into three sectoral areas:

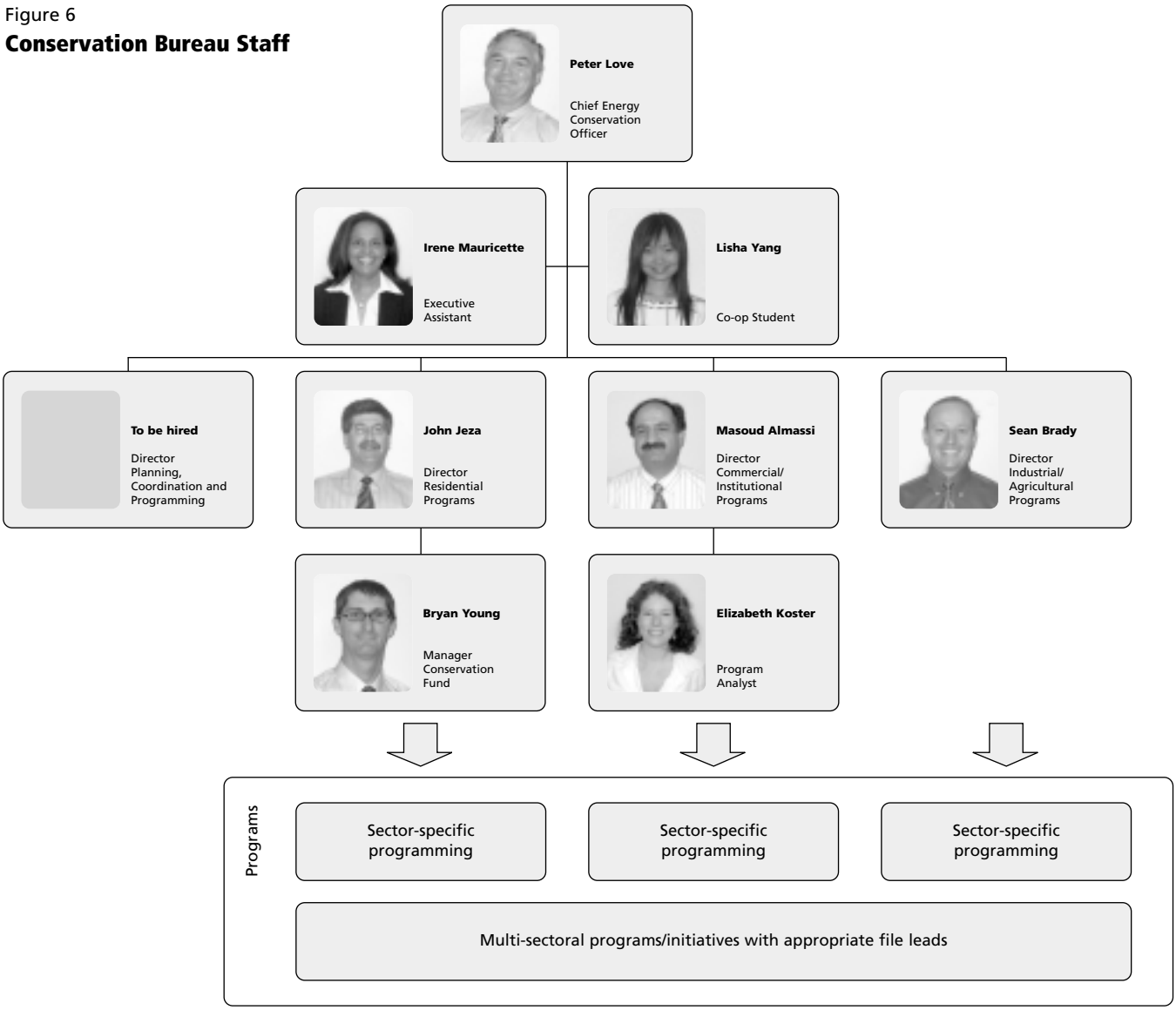
- Residential
- Commercial/Institutional
- Industrial/Agricultural

***Residential –*** This program area will focus on facilitating coordination among LDCs and retailers on residential CDM programs. It will also involve developing province-wide programs in which LDCs may participate. The Conservation Bureau also will work with other delivery agents, such as retailers, that have a broad reach across the province for the development and delivery of conservation programs. LDCs and retailers offer a direct and respected channel to consumers. They are recognized by their customers as trusted sources of energy information, have a history of community involvement, and have established strong linkages within their communities to help build a conservation culture. The Director, Residential Programs, was hired in September 2005 to work with LDCs and other stakeholders.

> *"In order to ensure that the benefits associated with increased levels of energy efficiency are realized, the Alliance recommends that a system benefits fund be created ... and that the funded projects be delivered through the existing local infrastructure, where possible."*
>
> – Submission to The Advisory Committee on Competition in Ontario's Electricity System by the Canadian Energy Efficiency Alliance, January 26, 1996.

***Commercial/Institutional –*** This program area will focus on facilitating coordination of commercial and institutional CDM and CHP programs across Ontario. It will also involve developing province-wide programs

Figure 6
**Conservation Bureau Staff**




for commercial and institutional sectors in which LDCs may participate. The Director, Commercial/ Institutional Programs, was hired in August, 2005.

***Industrial/Agricultural –*** This program area will focus on facilitating coordination of industrial and agricultural CDM and CHP programs across Ontario. It will also involve developing province-wide programs for the sector in which LDCs may participate. The program area will focus on developing strong relations with the 100 largest industrial electricity consumers as well as representatives from industry associations. The Director, Industrial/Agricultural Programs joined the Conservation Bureau in mid-September 2005.

In addition, there is a fourth area – Planning, Coordination and Reporting – that is responsible for the business planning of the Conservation Bureau, facilitation of the activities of the Bureau that require coordination among sector staff, and preparation of the annual report. At the time of writing, the Conservation Bureau had not hired staff in this area.

Multi-sectoral programs/initiatives will be assigned to program areas. A Director will take the

lead for the program/initiative and coordinate input from across the Bureau.

In the first few months, staff grew from one to seven full-time employees. The proposed total staffing complement of the Conservation Bureau is 16. The Bureau plans to contract the services of consultants and support staff with specific skill sets as required to help achieve the goals of the Conservation Bureau.

In 2005 consultants were retained to:

- Assist in investigating the potential for various province-wide programs
- Assist with research on electricity consumption trends and conservation opportunities
- Advise on the development of Requests for Proposals (RFPs) for CDM Programs and cogeneration
- Advise and assist with the Annual Report and Conservation Bureau component of the OPA Fee Submission
- Promote the Conservation Challenge to the private sector
- Calculate the total resource cost test for selected CDM programs

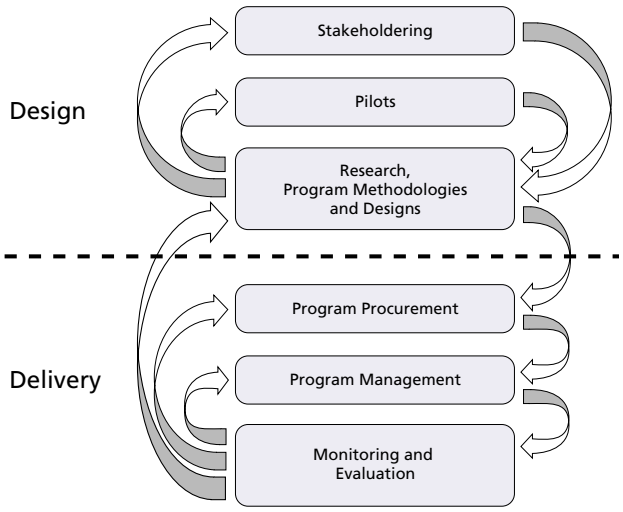
**Developing a Business Model**

The Conservation Bureau also developed a business model for its operations. In general terms, the Conservation Bureau's business model involves the design and delivery of its programs in a structured and consistent way. The model contains two distinct sets of activity designed to ensure that programs to promote CDM will be effective and responsive.

The first set of activities comprises an ongoing process of stakeholder discussions followed by outside research, program design and the development of metrics. These program concepts are fed back to relevant stakeholders for comment and fine-tuning.

The second set of activities involves a program of periodic procurement and ongoing program delivery.

Figure 7
**Business Model**




Upon completion of the required research, certain strategic programs will be deemed ready for implementation. These individual programs will proceed through a process of refinement to program management and delivery. Tracking and monitoring will take place for both reporting requirements and for feedback into each of the previous steps to improve all Bureau processes.

## Communication and Consultation with Stakeholders

Participation and buy-in from stakeholders from across the province will be critical to the Conservation Bureau's success in exercising its mandate. During fiscal 2005, the Bureau held meetings with market participants and stakeholders.

The Conservation Bureau also worked closely with industry organizations such as the Independent Electricity System Operator (IESO). The Bureau and the IESO coordinated their respective public messages related to the recent hot summer.

In addition, the Conservation Bureau met with market participants. For example, the Bureau is committed to ensuring that local distributors have the opportunity to develop and manage CDM programs and have access to long-term funding for their CDM

programs. As part of this commitment, the Conservation Bureau participated in a dialogue with Ministry of Energy, IESO and Ontario Energy Board officials to discuss long-term funding, evaluation and coordination of CDM activities undertaken by local distributors.

The Conservation Bureau also convened a meeting with energy management firms in Ontario. As part of the Bureau's commitment to supporting the growth and development of energy management firms in Ontario, the Chief Energy Conservation Officer invited the most active of these companies to meet with the Bureau to present and discuss CDM opportunities.

The Bureau supports the creation of aggregators, a new type of organization that aggregates CDM opportunities from individual customers and bids them into the electricity market. As part of the commitment to creating these organizations, the Chief Energy Conservation Officer held meetings with two leading U.S. aggregators to better understand what will be required to encourage such companies to become active in Ontario and work with Ontario companies.

## Conservation and Demand Management Activities in 2005

The Conservation Bureau promotes electricity CDM in response to directives from the Minister of Energy on specific programs to be implemented and through its own initiatives based on the research, program piloting and stakeholder consultation that it undertakes on an ongoing basis.

### Government Directives

In June, 2005, the Minister of Energy issued a directive to procure 250 MW or more of demand management (DM) and/or demand response (DR) initiatives and up to 1,000 MW of CHP across the province, with particular focus in the cities of Toronto, Mississauga, Brampton and Oakville. The combined heat and power directive includes industrial cogeneration and district energy projects. The focus of the Conservation Bureau's work in 2005 on procurement was on working with the Generation Development group within the OPA to create procurement processes to implement the Minister's directives. Two separate RFPs will be developed for the DM/DR procurement – one for DR and one for DM – to effectively address the differences in DM and DR and in response to information from the stakeholder consultation process. These RFP's will include sector specific bidding components. The process for the CHP procurement is under way. Stakeholders have been consulted and have provided valuable input. The level of interest in this opportunity is very high, with over 100 proposed projects identified by potential proponents. The development of the draft RFP is underway and it is expected that the final RFP will be issued by the end of 2005.

On October 6, the Minister of Energy issued a directive to establish a conservation program to reduce the overall electricity consumption of residents in low-income and social housing by up to 100 MW. The program is expected to result in longer-term reductions in electricity peak demand, particularly, by increasing building efficiency and reducing the use of inefficient appliances. The program is also expected to include a comprehensive package of energy efficiency measures that are designed to address these goals.

On October 20, the Minister of Energy issued a directive to establish a lighting efficiency and an appliance change-out program that together will reduce overall electrical energy consumption and demand by residential, commercial and industrial customers by up to 100 MW. The program will encourage residential and commercial electricity consumers to take energy-inefficient appliances out of service and encourage the adoption of efficient lighting technologies and efficient lighting design, primarily in the residential and commercial sectors. The program is expected to include a comprehensive

outreach and education component that will be designed to help promote a conservation culture among all electricity users.

In addition, procurement processes for CDM to improve reliability in York Region will be launched, subject to OEB approval. Shortly after the OPA was created, the OEB requested that that OPA investigate alternatives to the construction of a new 230 kV transmission line from Parkway Transformer Station in Markham to Armitage Transformer Station in Newmarket and make recommendations. The final recommendation included an objective of procuring 20 MW of DR by 2011 in the Newmarket area and aggressive conservation, with as much as possible procured by the summer of 2006. These 20 MW represent 15% of the 130 MW shortfall in the area.

**Sectoral Initiatives**

The Bureau also made progress in its own sectoral initiatives, particularly in the areas of research, program design and ongoing consultation in 2005.

In the residential sector, the Bureau initiated extensive contact with LDCs, including:

- Regional groups:
  Coalition of Large Distributors (Enersource, PowerStream Inc., Toronto Hydro, Horizon Utilities Corporation, Ottawa Hydro, and Veridian Corporation), Niagara Erie Public Power Alliance (11 Niagara area LDCs), and Cornerstone Hydro Electric Concepts (an association of 18 LDCs modeled after a cooperative);
- Independent LDCs throughout the province:
  Bluewater Power, Greater Sudbury Utilities, London Hydro, Newmarket Hydro, North Bay Hydro, Thunder Bay Hydro, Woodstock Hydro
- The Electricity Distributors Association;
- Hydro One.

In the commercial/institutional sector, the Bureau initiated a number of sectoral studies to assess the potential for energy efficiency in hospitals, universities and colleges, offices, retail, and retail chain stores. It also had ongoing discussions with key stakeholders in this market. In addition, support was provided for a joint demand response study with

ENERGY CONSERVATION SUCCESS STORIES

## "Doors Closed Ontario!": Opens a Window on Energy Savings


During one of the hottest summers on record, with several IESO power warnings and voltage reductions, the Conservation Council of Ontario was shocked to see so many small "main street" businesses blasting cold air onto hot city streets. Welcome to *Doors Closed Ontario!*, a program to encourage stores and restaurants to keeps their doors and windows closed when operating their air conditioning. The Council provided participating businesses with signs saying "Our doors are closed but we are open" to ensure customers were aware of the program. Over 5,000 posters were distributed by 24 organizations in 15 communities. Five municipalities signed up, as did two chambers of commerce. The poster was translated into French, Mandarin, Cantonese and Portuguese. Preliminary results show that 64% of the stores approached closed their doors, leading to cool 5 – 7 MW savings in demand! The Campaign also demonstrated the potential of a united conservation movement, with groups, businesses and municipalities working together to achieve conservation goals.

Natural Resources Canada to identify the best practices around the world and a detailed assessment of California's 20/20 Program and its applicability to Ontario markets.

In the industrial/agricultural sectors, the Bureau began initiatives to build stakeholder relations with industry groups and associations representing the largest industry segments, including the Association of Major Power Consumers of Ontario, the Ontario Federation of Agriculture and the Canadian Manufacturers and Exporters. Contact was also made with many individual companies within this sector. These meetings have begun a dialogue which will ultimately help shape any programs the Bureau delivers to industry. In addition, work has begun on developing a strategy to help foster electricity CDM within the industrial sector. Significant emphasis will be placed on ensuring the Conservation Bureau's efforts are effective and serve the needs of the various industry groups.

**Planning, Coordinating and Reporting**

The Conservation Bureau contributed to the development of the OPA's 2005 Business Plan and prepared the Bureau's part of the OPA 2006 Fee Submission to the Ontario Energy Board.

In addition, the Bureau prepared and submitted this 2005 annual report to the Minister of Energy and the OPA Board of Directors on November 1, 2005.

## Activities to Promote a Conservation Culture

The Conservation Bureau also began the drive to create a conservation culture through:

- Conservation Awareness
- Pilot Projects

**Conservation Awareness Initiatives**

During 2005, the Conservation Bureau actively pursued its mandate to raise conservation awareness across the province through a number of initiatives. These initiatives include:

- raising the Chief Energy Conservation Officer's profile in the media (over 190 media citations have been recorded to date);
- creation of a Certificate of Recognition for leadership in electricity conservation which has been presented by the Chief Energy Conservation Officer to over 80 organizations;
- an Electricity Conservation Challenge issued by the Chief Energy Conservation Officer. (A copy of the challenge is provided on page 23.) About 1,000 e-mails were sent to public sector CEOs and over 100 responded. In addition, over 160 private sector companies agreed to participate;
- Support of non-government organizations' programs such as Pollution Probe's *After Coal*, Canadian Energy Efficiency Alliance's *Switch to Cold* Campaign and the launch of the Conservation Council's *We Conserve* and *Doors Closed* campaigns;
- The Chief Energy Conservation Officer and his staff made keynote presentations to organizations across Ontario, including events in Ottawa, Thunder Bay, Sudbury, Sarnia, Port Dover, North Bay, Hamilton, Niagara Falls, Kitchener, Shelburne, Orangeville, Newmarket, Milton, Ottawa, St. Catharines, Mississauga, Markham, Vaughan, Sault Ste. Marie, Barrie, and Woodstock;
- Coordination with the industry and stakeholders on conservation messages.

Increasing the CECO's public activities was geared towards raising the profile of CDM issues with the public and demonstrating support at events where CDM was being promoted. The campaign was highly successful, with the CECO at over 43 events in the first five months, delivering keynote speeches, leading public openings and press conferences, and issuing numerous news releases on the pressing need for electricity conservation. Keynote speeches and openings were delivered across the province to community leaders and industry associations such as the

Ontario Energy Association and the Electricity Distributors' Association. Importantly, there was a strong, positive response to the CECO's messaging about the vital need for CDM among those in the general public, business and industry across the province.

In addition to these activities, the Bureau also launched its site on the OPA website. The website is designed to inform and educate Ontarians about the Conservation Bureau, its mandate, its programs and the issues surrounding electricity supply in Ontario and the critical need for conservation.

**Pilot Projects**

To continue with the intent of the Ministry of Energy's Conservation Partnership Program which was terminated in early 2005, the Conservation Bureau funded a number of sector-specific conservation pilots which show promise for wider replication. These initiatives included:

- *Project Porchlight* – a neighbourhood-based campaign which saw the distribution of electricity-saving compact fluorescent bulbs to Ottawa residents;
- *On-Farm Energy Audit Pilot Program* – once developed could save farmers valuable energy dollars by targeting operational changes and capital retrofits;
- *'Chill Out' Appliance Bounty Program* – to be launched by London Hydro for single-family and multi-unit residential on a pilot basis;
- *Green Learning.ca* – an educational program that provides teachers and students with web-based, curriculum-linked materials on energy and the environment;
- *Reduce the Juice* – a grassroots energy conservation awareness program based in Shelburne which delivered a summertime 5% reduction in demand; and
- *Doors Closed!* – a public awareness campaign which urged shopkeepers to keep their doors closed on hot days to reduce air conditioning waste.

Full details on these programs are at: www.powerauthority.on.ca.

ENERGY CONSERVATION SUCCESS STORIES

## Giving Canadians EnergySmarts

ENERGYSMARTS

For two weeks each September, electrical and gas utilities, manufacturers, the Government of Canada through the One Tonne Challenge, and Home Depot do their utmost to teach consumers how to be smarter users of energy. The EnergySmarts program, launched by the Clean Air Foundation, is the largest national retail-based energy efficiency campaign in the country. The EnergySmarts event provides customers with rebates, discounts, promotions and information on energy efficient products and services, ENERGY STAR and related clean air products that make a demonstrable improvement in the environment and reduce energy bills. Now that's smart!

# Electricity Conservation Challenge

(referenced on page 21, Conservation Awareness Initiatives)

**August 4, 2005**

**Electricity Conservation Challenge**

**Background**
All Ontario residents need to play a part in ensuring that our province's electricity supply is managed effectively and that we manage the development of new power sources to meet demand. As recent heat waves have shown, there is an urgent and ongoing need to conserve electricity because the demand is increasing faster than the supply.

**What Is It?**
The Electricity Conservation Challenge is designed to encourage public-minded organizations and their employees to use simple, no-cost measures (such as reducing lighting, operating buildings at higher temperatures in summer and cooler temperatures in winter) as well as cost effective investments in energy efficiency upgrades.

**How Does It Work?**
On a periodic basis, an e-mail will be sent to the person you choose to be the Energy Efficiency Champion in your organization with information on energy reduction measures which can have benefit over both the short and long term. You can also learn more about energy Conservation and Demand Management (CDM) programs available in your area by contacting your local electricity distribution company. The "Energy Efficiency Champion" will be asked to communicate this message to other employees. Energy Efficiency Champions will also receive information on how they can retrofit your facility to make it more energy efficient.

**How Can You Get Involved?**
To launch the Electricity Conservation Challenge, we need your help to:
- Identify the "Energy Efficiency Champion" in your organization;
- Identify other organizations and champions that we should be contacting across the province; and
- Report your conservation activity and success to us.

**Why Participate?**
The Conservation Bureau at the Ontario Power Authority will reward your organization's conservation efforts by:
- Giving your organization a "Certificate of Recognition." (Milton Hydro was the first recipient of this award for their innovative Energy Drill Program.™) Please find information on this program as well as our media release at http://www.powerauthority.on.ca/index.taf?pid=4&sp=2&pr=1&ss=1 and,
- Publishing the name of your organization on the Ontario Power Authority website.

**We want to hear from you! Please respond to this email by Friday, August 26, 2005 and:**
- Recommend an Energy Efficiency Champion. Provide the name, title and contact information; and,
- Update us on what actions your organization has taken so far. Perhaps you have retrofitted your facility to use less energy or you have invested in additional energy efficient technologies – let us know about it!

Thank you for supporting the electricity conservation challenge!

Sincerely,

Peter Love
Chief Energy Conservation Officer

CHAPTER

# 4 Looking Forward: The Potential Impact of Conservation on Energy Consumption

Ontarians have already demonstrated their willingness and ability to meet the challenge of incorporating electrical energy efficiency into their lifestyles and how they do business. This is evidenced in the IESO's current annual growth forecast of 0.9% against a historical norm of 2.5 – 3.5% annual growth.

It is on this foundation that a true culture of conservation can now be built and electricity conservation can become a sustainable resource to meet Ontario's growing energy needs. However, it is becoming apparent that there is no single answer or consensus regarding the future impact or potential of conservation. In order for conservation to become a reliable, predictable source of supply in the coming years, we need to develop a consensus position on the role of conservation as supply. Our focus remains, however, on maximizing the role of conservation.

One of the Bureau's 2006 activities will be to analyse the potential effect of conservation on Ontario's electricity demand. To carry out this analysis, a high level of detailed modelling is required to accurately represent the impact of conservation programs and efficiency standards on demand. The necessary details include sectoral end-use information, vintages and efficiencies of appliances, equipment and buildings that make up current and future stock. Assumptions regarding the growth of the economy, by sector and sub-sector, are required. In particular, future structural changes in the industrial and commercial sectors of the Ontario economy can have major impacts on demand. Price expectations have impacts, both in terms of the competitiveness of alternative fuel use and in terms of the attractiveness and affordability of investing in more efficient stock.

At the present time, neither the Bureau nor the OPA has such data, nor forecasting and analysis capability. Both the Bureau and the OPA will, in the near future, begin to develop or gain access to that capability. This will enable the Bureau to track the results of various conservation initiatives, refine the market sector data on electrical energy consumption, and continually assess the potential for electricity conservation. The results of the various programs will be a key aspect in the Bureau's ongoing efforts to assess the further potential for electricity conservation in Ontario.

To gain an appreciation for the potential for electricity conservation, the Bureau reviewed several scenarios. The scenarios cover a broad range of possibilities based upon a number of differing assumptions. As noted earlier, as the Bureau obtains the results from programs initiated by various parties, and their own programs, it will be possible to better identify the ongoing potential for conservation and aid in the identification of both opportunities and barriers to achieving cost-effective conservation.

The Bureau is confident that major efficiency improvements can occur in lighting, air conditioning, heating and industrial processes. Technologies, standards and codes will continue to improve energy efficiency. Policies, incentives and changes in energy use practices can further increase efficiency.

A recent study commissioned by the Pembina Institute[6] attempted to predict power consumption

consistent with specific postulated scenarios. Scenarios were developed in which electricity savings are expected to result from three types of technological and behavioural changes:

- The adoption of the most energy-efficient technologies instead of conventional products in all sectors. Energy-efficient technologies are generally expected to have a higher initial cost than conventional ones.
- The expansion of cogeneration in the industrial and commercial/institutional sectors as consumers take advantage of the efficiencies of combined heat and power, and generating power through cogeneration and micro-turbines rather than buying from the grid.
- A shift from electricity to natural gas for space and water heating in the residential and commercial/institutional sectors.

Using these scenarios, unconstrained co-generation leads to a 6-7% drop in electricity consumption, the majority of it coming from increased micro-turbine use in commercial/institutional buildings. Energy efficiency and near complete fuel switching to gas for all space and water heating as well as some process industries lead to a further 35% savings. In addition, the study included the assumption that 10% of Ontario's peak demand could be shifted through implementation of demand response measures. Finally, the study also postulated the implementation of a rooftop solar photovoltaic program whereby 750 MW could be saved through the implementation of rooftop units on 200,000 homes.

The study estimates that capital investments of $18.2 billion over the period 2005-2020 would be required to achieve these savings. Administrative costs associated with program development and implementation were not considered.

The OPA has recently commissioned specific studies to estimate the achievable potential for conservation. Preliminary findings indicate that results will likely be lower than those in the Pembina study. Final results are expected in November 2005.

In addition to the studies already reviewed, the OPA will be interested in the results of a study currently underway , "Demand Side Management Potential in Canada: Energy Efficiency Study". Representatives from the federal government (Natural Resources Canada), provincial governments and industry have come together to collaborate on

ENERGY CONSERVATION SUCCESS STORIES

## Loblaws Rings Up Energy Savings


Loblaws recently audited its seasonal energy use, and began a 10 MW Demand Response Retrofit Project to reduce electricity consumption when Ontario's electricity demand is high. Ten MW represents 5% of Loblaws' total 200 MW demand in Ontario. The strategy includes dimming store lights, reducing ambient and task lighting, setting back air conditioning, and reducing parking lot lighting. After lighting was reduced in only 20 stores, Loblaws rang up a 2 MW savings in energy use and plans to retrofit 100 stores. Loblaws, incidentally, was the only successful bidder for the province's first Clean Energy Supply/CDM RFP.

advancing the role of energy efficiency in Canada. As a result of this collaboration, a national study has been undertaken to look at conservation potential across Canada. The analysis is to be of sufficient depth and scope so as to provide credible data on which to base policy decisions. The national study will use the CIMS modelling framework that was used in the Pembina study. Results will be available before the end of 2005.

### Observing the California Experience with Conservation Measures

The Bureau is planning to monitor other studies and will commission its own additional studies to better estimate the impact of its programs on electricity demand. The experience of other jurisdictions shows savings of 10 -15% can be achieved after 20 years of consistent aggressive conservation policy. The State of California has one of the longest and most accomplished energy efficiency track records on the continent, spending annually from $100 million to over $300 million on energy efficiency initiatives. Since 1976, total electricity sales have been reduced by 15%, relative to what they would otherwise have been. Approximately half the energy savings realized were due to the implementation of utility programs. The balance of the savings was due to the implementation of appliance and equipment standards as well as changes made to the building codes. California energy codes are recognized as being some of the most energy efficient in the U.S.

Between the year 2000 – 2004, California utilities spent a total of $1.4 billion on conservation activities. Specifically in 2004, it is estimated that the three main California utilities spent $317 million on conservation for a first year savings of 1,843 GWh or 1% of major investor owned utility generation (0.7% of state wide demand).

In September of 2005, the California Public Utilities Commission launched the most ambitious energy efficiency and conservation campaign to date, authorizing $2 billion in funding for 2006-2008.

The Bureau will be monitoring relevant developments in California to see what can be learned, and determine what might be applied in Ontario to promote a conservation culture. While it is informative to look to the experience of other jurisdictions, it is necessary to view such experience in the proper context. Local industry structure, age of building stock, climate, economic strength and energy prices all have significant impacts on conservation potential.

CHAPTER

# 5 2006 Plan: Building a Culture of Conservation

In 2006, the Conservation Bureau will build on the foundation of its activities in 2005 to make greater strides across Ontario towards creating a culture of conservation.

## Organizational Development

In order to support the Bureau's 2006 initiatives, the Conservation Bureau will require operational support from internal staff as well as from external professional and consulting fees.

The Bureau proposes to hire another 9 people in order to reach its proposed full complement of 10 professional and 6 support staff. External resources may be required for:

- Services such as impartial measurement and reporting of the Conservation Fund's success over time
- Development of a consultation plan for 2006, that will include program design, implementation, and tracking/measurement of results
- Development of a best practices program
- Transfer programs developed by LDCs to ones that can be implemented province-wide
- Support in preparation of the 2006 Annual Report including technical expertise related to identifying barriers and opportunities and progress towards targets.

## Conservation and Demand Management Activities in 2006

Specific conservation and demand management proposals for 2006 focus on the following:

**Promoting Electricity Conservation and Demand Management:** The Bureau's programs fall under CDM – impacting both the amount and timing of electricity demand. In 2006, the Bureau will lever the gains made in awareness and understanding through its 2005 public profiling initiatives to significantly increase general public awareness of CDM issues and opportunities through an expanded media profiling campaign, and coordinated communications with the industry and stakeholders on conservation messages.

**Facilitating Services for Conservation and Demand Management:** In 2005, the Bureau was successful in gaining the support and buy-in from stakeholders in all sectors. In 2006, the Bureau will continue these efforts through ongoing specific sector meetings, through the development and implementation of stakeholder-led pilot projects across the province, and through the Conservation Fund.

**Procuring Reductions in Electricity Demand:** To realize its objectives, the Bureau undertakes the delivery of programs to reduce demand in response to directives from the Minister of Energy on specific programs to be implemented and as a result of its own research, program piloting and stakeholder consultation. Program procurement includes such things as RFPs, the tendering process, bilateral contracting, sole sourcing, program management and the tracking and monitoring of programs.

### Government Directives

In 2006, the Bureau will work with the Generation Development group within the OPA on the development and implementation of contracts for procurement for the directives issued in 2005 and any new

contracts that result from government directives issued in late 2005 and in 2006.

In 2006, the Conservation Bureau will support the implementation of these directives by providing market information and, when appropriate, by initiating pilot projects to ensure successful procurement of the results. The Conservation Bureau will also monitor, evaluate and report on progress toward achievement of the procurement targets for CDM and CHP.

**Sectoral Initiatives**

At the time this report was prepared, the Bureau was conducting sector-specific research and in some areas had started to work on program design. It is premature to present a list of planned programs for 2006, but the following provides some information on potential initiatives:

- Residential – For this sector, the Bureau will focus on the development of programs to retire energy inefficient appliances, to encourage the adoption of energy efficient lighting and lighting designs and to educate residential customers on energy efficient lighting. The Bureau is committed to fostering a community focus for residential conservation programs. Working with LDCs and retailers in all program efforts and activities will be integral to the success of the residential programs.
- Commercial/Institutional – The focus in this sector will be on the development of programs, primarily for small commercial, to retire energy inefficient appliances, encourage the adoption of energy efficient lighting and lighting design, and to educate commercial and institutional customers on energy efficient lighting. The Director, Commercial/Institutional, will take the lead on the design of programs for low-income and social housing. An additional initiative will be to provide support for energy management firms, aggregators and other suppliers of products and services of DSM/CHP in an effort to strengthen Ontario's conservation industry.
- Industrial/Agricultural – In the Industrial/Agricultural sectors, the Bureau will focus on the development of programs to retire energy inefficient appliances, encourage the adoption of energy efficient lighting and lighting design, and educate industrial and agricultural customers on energy efficient lighting. It will develop and implement employee engagement initiatives for the industrial and agricultural sectors to build more capacity for energy management activities. The program area will also focus on developing strong relations with the 100 largest industrial electricity consumers as well as representatives from industry associations, such as the Canadian Manufacturers and Exporters, the Association of Major Power Consumers of Ontario and the Ontario Federation of Agriculture.

**Planning, Coordination and Reporting**

The planning, coordination and reporting area will focus on the business planning of the Conservation Bureau, coordinating multi-sectoral activities of the Bureau, and fulfilling the Bureau's reporting requirements. Business planning will include the coordination of the development of the Conservation Bureau's proposals for 2007, the development of its strategic objectives and how they will be achieved as part of the OPA's 2007-2009 business plan, and input to the OPA's integrated power system plan.

The Bureau's input to the OPA's Integrated Power System Plan (IPSP) will include recommendations on the role of LDCs in delivering conservation and demand management.

Coordinating multi-sectoral activities will include:

- Gather and report on information and experience from other programs, including best practices;
- Prepare guidance to the OPA Corporate Affairs group on surveys needed for tracking public opinion and the impact of particular conservation activities.

Reporting requirements will include:

## Milton Buildings Get an "A" in Electricity Reduction


Back row, l-r: Gloria Ramsay, Peter Love, Jake Peetoom, Darby Wood, Paul Graham, Lynda Lloyd, Sharon Barkley. Front row: Meggan Sleep, Tanner Briggs.

Milton Hydro, with the Town of Milton, Halton District School Board and Indeco, is piloting the Energy Drill Program, an innovative demand response initiative, in three buildings. The Energy Drill Program provides a rapid response to short-term supply constraints by taking immediate actions to reduce electricity use at the Robert Baldwin Public School, the Milton Leisure Centre and the Milton Hydro building.

When electricity prices exceed a certain pre-determined price, "energy marshals" at each building initiate their Energy Drill Action Plan – turning off lights and other electrical equipment, deferring work that can be done later, and raising the temperature in the summer. A test run at the Robert Baldwin Public School resulted in a 40% reduction of electricity use – a very good report card! Even better – if the drill had been conducted on a hotter day, the savings could have reached as much as 70%! After a six-month pilot, the Energy Drill pilot may be extended to other Milton buildings.

- Prepare the Conservation Bureau's part of the OPA fee submission to the OEB;
- Prepare the Conservation Bureau's annual report to the Minister of Energy and the OPA Board.

### Activities to Promote a Conservation Culture

The Culture Transformation Program is the major vehicle that the Conservation Bureau will employ in 2006 in its drive to shift towards a conservation culture. This program builds on the foundation of elements established in 2005.

The Culture Transformation Program consists of:

- Conservation Challenge Initiatives,
- Conservation Fund,
- Conservation Awareness,
- Research and Tracking.

**Conservation Challenge Initiatives**

Awareness, understanding and commitment are the keys to making a successful transformation to a conservation culture. In 2006, the general public awareness programs established in 2005 will continue. The Conservation Bureau will endeavour to develop a conservation culture, focused on harnessing leadership within groups, organizations and corporations and individuals. The Conservation Bureau will challenge individuals, organizations, and corporations to match the provincial government's internal 10% conservation goal by 2007.

The Conservation Challenge initiatives will include:

- Certificates of Recognition – continuation of the initiative to acknowledge those that are taking action to conserve energy in Ontario;
- Electricity Conservation Challenge – continuation of the initiative to stimulate and recognize electricity conservation in the institutional sector across Ontario;
- Support for non-governmental organizations – continuation of the initiative to support CDM and CHP activities by attending key events and making speeches including those at launches of new initiatives, to community leaders, and associations;
- Inform and educate the various publics and target markets on the benefits of conservation to both individuals and society as a whole;
- Coordinate conservation messages with the IESO –

continuation of the initiative to coordinate conservation messages;
- Community awareness – continuation of the operation of the Conservation Bureau site on the OPA website to inform and educate Ontarians about the Conservation Bureau and its programs and key issues.

**Conservation Fund**

The Bureau's Conservation Fund is an outgrowth of the pilot projects conducted by the Conservation Bureau in 2005. The Conservation Fund will support sector-specific conservation education and electricity reduction pilots. The goal of the program will be to mobilize as many sectors of the Ontario economy as possible to embrace a culture of conservation. The program will identify and fund sector-specific pilot projects with a strong potential for replication across a given sector and which hold promise for delivering real reductions in electricity use. If a pilot proves successful, the initiative will be considered for broader implementation, or for development as an 'in the box' program that can be replicated by LDCs.

To implement the Conservation Fund in 2006, the Bureau will:

- Develop program guidelines, an application guide and selection criteria that are easily accessible to the public
- Develop a more formal approvals process for fund applications
- Identify sectors and sector needs that may be appropriate for funding
- Coordinate with relevant stakeholders to develop initiatives for application to the Fund that will address these needs
- Coordinate the applications approval process
- Develop a project tracking and evaluation system for approved projects
- Ensure that the Fund complements, coordinates with, and leverages similar programs undertaken by others.

The Fund will be implemented in a manner to ensure that it complements similar programming undertaken by other third party programs. The Fund will also leverage and complement the work being done by the LDCs and Natural Resources Canada, and play a coordinating role with other funding entities when it comes to conservation grant-making.

**Conservation Awareness**

The purpose of the Conservation Awareness initiative is to help to create a public profile for the Chief Energy Conservation Officer as an authoritative and important resource in the public arena. The program will be comprised of multi-media campaigns across the province using local, regional and provincial media, leveraged initiatives with local distribution companies, and targeted special events.

**Research and Tracking**

The Conservation Bureau will track and disseminate information on developments and best practices in conservation programs, specifically in Ontario, and in other jurisdictions, In addition, through surveys, a baseline will be developed for various markets and then used to track the impact of various conservation activities.

## Conclusion

Our 2006 Plan as presented in this report will continue to evolve with research, internal review and input from stakeholders as we go forward with our activities next year towards meeting our conservation challenge.

CHAPTER

# 6 Measuring Progress Against Energy Conservation Targets

An important step in meeting our conservation challenge is working towards the provincial targets of a 5% reduction in peak electricity demand and a 10% reduction of electricity consumption by provincial operations by 2007.

The Conservation Action Team report[2] cites the 5% target to be equal to 1,350 MW and the 10 % target to be equal to 62 million kilowatt-hours.

The Conservation Bureau's activities and programs will contribute towards achieving these targets. As well, the Bureau is working together with electricity consumers across all sectors, interest groups, and other stakeholders to ensure that we all contribute to creating a culture of conservation.

As part of its mandate, the Conservation Bureau is required to provide a detailed review of the Government's progress in meeting the provincial targets.

The government has clearly stated its goal of creating a conservation culture in Ontario and has taken many steps to bring that about. One step has been the creation of a supporting institutional framework.

## Creation of the Institutional Framework

**The Conservation Bureau**

The Chief Energy Conservation Officer heads the Conservation Bureau, which is part of the OPA. The role and mandate of the Conservation Bureau are noted in chapter one of this report.

The OPA is a non-profit statutory corporation with an independent board of directors that reports to the Legislature of Ontario through the Minister of Energy. The corporation is licensed and regulated by the Ontario Energy Board. Its mandate covers four critical areas:

1. Power System Planning – developing and maintaining a long-term plan for coordinating the supply and transmission of electricity in Ontario.
2. Generation Development – contracting for investment in new generation projects and demand management initiatives to reduce the demand-supply gap for electricity.
3. Retail Services – assuring smooth prices to residential and other designated customers, while recovering the full cost of electricity.
4. Conservation Bureau (as described earlier)

**The Ontario Energy Board (OEB)**

The OEB approves distribution rates and currently approves CDM plans for local distribution companies, the transmission rates for Hydro One, as well as the fees of the Independent Electricity System Operator and OPA. The OEB uses the Total Resource Cost test to assess the benefits of the programs to both the local distribution companies and customers. This test does not include the benefits derived from reducing environmental externalities. The OEB also sets the price of electricity paid by residential and small commercial customers that do not have contracts with retailers and has developed recommendations on smart meters and time of use rates policies.

**The Independent Electricity System Operator (IESO)**

The IESO manages Ontario's bulk electricity system and operates the wholesale electricity market. Its focus

is on optimizing the existing electricity infrastructure for reliability. The IESO promotes CDM aimed at small businesses and the institutional sector. It has operated a 100 MW Transitional Demand Response Program designed to reduce electricity consumption at peak times in the wholesale electricity market. This two-year pilot permits all but the largest electricity consumers to voluntarily reduce their demand and be paid a predetermined fee for this reduction.

**In April of 2004, the Minister of Energy directed the OEB to develop a plan to install a smart electricity meter in 800,000 Ontario homes by 2007 and in every home by 2010.**

**Electricity Retailers**

Private electricity retailers can offer their customers electricity pricing plans and services which are related to energy efficiency – such as installation, maintenance, service, repair and retrofits of HVAC equipment, building automation and energy management software, and the financing of capital projects. Some retailers also wish to provide energy conservation aggregation services to enable small/medium-sized organizations to participate in the demand response aspects of the electricity market.

### Other Ontario Government Initiatives

In addition to establishing an institutional framework for the restructured electricity market, the government has set goals for:

- The acquisition of renewable energy. Targets have been set for 2007 and 2010;
- The reduction of peak electricity demand by 5% and electricity consumption in provincial operations by 10% by 2007;
- Phasing out the last coal-fired electricity generating plants by 2009;
- The installation of smart meters throughout Ontario. A total of 800,000 smart meters will be installed by 2007. The entire province will have smart meters by 2010.

The Ontario Government and the Minister of Energy have also undertaken initiatives to meet the current CDM goals;

- The government issued Requests for Proposals (RFPs) for renewable energy and CDM resources. In January, 2004, the Ontario government announced that it was seeking proposals for 2,500 MW of new electricity capacity through either generation or CDM initiatives. The administration and implementation of these RFPs is in the process of being transferred to the OPA.
- The Minister issued directives to the OPA/Conservation Bureau to procure 250 MW of DSM/DR initiatives, 1,000 MW of Combined Heat and Power projects, 100 MW of savings from reductions in overall electricity consumption and demand by residents of low income and social housing through implementation of a low income program, and 100 MW in the residential/industrial/commercial sectors by taking energy inefficient appliances out of service and installing efficient lighting. The planning and implementation of these directives is currently being done and will continue into 2006.
- The Ministry of Energy requested that the OPA and OEB work together to develop the terms and conditions for a standard offer program for small generators that use renewable or clean resources. Work on this initiative is underway.
- Prior to the existence of the Conservation Bureau, the Ministry established the "Conservation Partnerships Programs" to fund replicable, sector-specific pilot conservation projects. The Program was intended as

an interim measure, pending the formation of the Conservation Bureau and the development of its own programming. During its one year of operation, fiscal year 2004-2005, the Ministry of Energy funded 25 projects through the program in a variety of sectors including low income, agriculture, small commercial and hospitals. Some of the projects were awareness-raising initiatives, such as the funding provided to Kingston's St. Lawrence College for its new renewable energy and conservation training facility, called "Energy House". Funding also supported the development of prototype energy efficiency programs such as the ON-farm Energy audit, which held significant promise as a larger province-wide program that could help Ontario farmers save energy.

- The government removed the 4.3 cent per kwh cap on electricity commodity prices, established interim pricing for electricity and introduced the Regulated Price Plan (RPP).The RPP was developed by the Ontario Energy Board (OEB), and designed to better reflect the price paid to generators, while recognizing the need to control price volatility. The two-tiered plan will be based on the OEB price forecast over the next 12 months.
- The government provided financial incentives to support CDM programs delivered by the LDCs. For the 2005 rate year, the LDCs implemented CDM programs, and in return the government allowed them to retain the third tranche of their allowable market based rate of return. These programs are estimated to be worth $160 million to LDCs and will be spent over three years. As a result of these incentives, LDCs have taken further actions, for example the branding of their programs such as "powerWise" (Coalition of Large Distributors) and programs for low income families and the agricultural sector (Hydro One).
- In April of 2004, the Minister of Energy directed the OEB to develop a plan to install a smart electricity meter in 800,000 Ontario homes by 2007 and in every home by 2010. The OEB issued its recommendation in January, 2005. The government has also undertaken extensive consultations and is expected to announce a strategy shortly. Numerous LDCs have initiated smart metering pilots and are developing data standards.
- The government also announced a plan to expand and encourage the practice of net metering to allow home owners and businesses generating renewable electricity to sell excess power back to the grid. The government has issued a net metering regulation applying to generators up to 500 kW.
- The Minister asked the OPA to recommend conservation targets for 2015, 2020 and 2025, taking into account targets already set by the government.
- In 2004 and 2005, the Ministry of Energy introduced new regulations under the Energy Efficiency Act which added new products and changes to efficiency levels and CSA reference standards.
- The Minister created two new positions in the Ministry of Energy – the Assistant Deputy Minister of Conservation and Strategic Policy, and the Manager of Conservation – to signal the importance of energy conservation.

Conservation is also expanding into broader government-wide initiatives, including;

- The release of new revised science and technologies curricula (grades 1-12) is scheduled for spring 2007 and 2008.
- The Ministry of Economic Development and Trade is supporting conservation measures through the Ontario Fuel Cell Innovation Program, Ontario Automotive Investment Strategy and Energy Conservation seminars for Small and Medium Enterprises.
- The Ministry of Agriculture, Food and Rural Affairs is working with industry participants on energy audits and information sessions, and contributing to design and development of energy efficiency

programs and renewable energy projects.
- The Ministry of Public Infrastructure and Renewal released a draft growth plan which encourages municipalities to develop energy conservation strategies, renewable energy sites and procurement and public education programs.

In January of 2004, the government established The Conservation Action Team ("CAT"). It was a team of parliamentary assistants that was asked to identify barriers to conservation. The CAT report[2] made 30 conservation recommendations, including:
- Identifying the future role of the team and the newly created Conservation Bureau in building a conservation culture
- Actions required for the government to put its own house in order
- Ways to lever conservation into provincially-funded infrastructure projects and capitalize on policy activity across ministries
- Reforming codes and standards under the control and authority of the government
- Suggesting specific efforts to reach financially vulnerable target groups

The government has implemented several of these recommendations, particularly those around government operations, and is expected to be introducing further legislation this fall.

The government has made significant progress in bringing about the desired "Conservation Culture". Several initiatives are well underway and others are in the planning stage. The next chapter on Removing Barriers to Progress: *Finding Opportunities To Build Conservation*, will recommend further actions.

**Quantitative Measurement**

Measuring the government's quantitative progress towards meeting the 5% reduction in peak electricity demand and the 10% reduction of electricity consumption by provincial operations by 2007 presents some challenges. Among them:
- Clearly defining the base level – against which progress will be measured in subsequent years
- Determining whether the base level and subsequent year estimates should be measured on an actual consumption basis or on a weather normalized consumption basis, which would take into account unusual or extreme weather
- Determining whether these targets should include or exclude increased consumption due to growth
- Determining the ability to effectively and accurately audit consumption to give reported levels credibility

### 5% Reduction in Peak Electricity Demand by 2007

The government-assigned figure of 1,350 megawatts to a 5% reduction assumes a base level in peak electricity demand of 27,000 megawatts in 2007. This target was announced in December of 2003. This amount is in the range of a May 2003 Independent Electricity Market Operator's 10-year forecast of peak demand[7], which estimated a normal summer peak demand of 26,922 megawatts and an extreme weather summer peak demand of 27,756 megawatts for 2007. The IESO report forecast the annual average growth from the 2002 actual summer peak level to the 2013 estimated level was 1.1% for normal summer weather and 1.7% for extreme summer weather.

The IESO has updated its forecast for demand a number of times since its May 2003 forecast, with the most recent being the August 2005 10-year forecast[8] and the 18-month forecast[9] issued in September, 2005. The 10-year outlook forecasts a 2007 summer peak demand of 24, 301 MW for normal weather and 27,075 MW for extreme weather. The 18-month forecast estimates a winter peak of 24,526 MW for normal weather, and 26,069 MW for extreme weather in 2007 (summer 2007 was not in the forecast period.)

To better understand the importance of weather

impacts, it should be noted that during the summer of 2004, which was relatively cool, the peak demand was only 23,976 MW, or 23,372 MW when adjusted for the summer weather. Ontario set a new record of 26,160 MW on July 13, 2005. However, the weather adjusted peak demand was 24,609 MW.

The IESO notes in its 18-month forecast that while extreme weather conditions have a lower probability of occurring, history shows that even seasonally average weather will include periods of more extreme conditions comparable to those experienced over long periods in the summer of 2005. It also noted that it does not take the effect of CDM into account as the impact of these initiatives is difficult to forecast. Nevertheless, these initiatives could have a significant impact.

**Conclusion**

Based on its review of the government's announced targets, including when they were set and excluding the positive or negative impact of extreme weather conditions, the Conservation Bureau concludes that the appropriate target should be interpreted as 5% reduction in weather adjusted peak demand from 27,000 MW to 25,650 in 2007, a reduction of 1,350 MW. This ensures that achieving this target will not be helped or hindered by the extreme weather conditions in 2007.

The Conservation Bureau also believes that it is important to identify and measure structural changes to the market such as the effects of plant openings or population increases on energy consumption over the time period. If this amount is known, then it can be backed out of the total consumption amounts.

CDM initiatives should be monitored at an appropriately disaggregated level to be an additional check on what level of reduced energy use is attributable to the effects of energy efficiency. The Conservation Bureau will work on developing such a methodology.

### 10% Reduction of Electricity Consumption By Provincial Operations By 2007

The government's goal of reducing electricity consumption in provincially-owned facilities by 10% by 2007 is based on consumption in fiscal 2002-2003 (April 1, 2002 – March 31, 2003) of an estimated 620 million kilowatt hours (kWhs) of electricity.

**The IESO notes in their current 18-month forecast that while extreme weather conditions have a lower probability of occurring, history shows that even seasonally average weather will include periods of more extreme conditions comparable to those experienced over long periods in the summer of 2005.**

The 620 million kWh figure is based on consumption in buildings owned by the province and operated by the Ontario Realty Corporation (ORC) and estimates for non-ORC managed buildings (buildings owned by the province and managed/operated by individual ministries). Only the reduction in electricity consumption in Government-owned facilities (2/3 of buildings housing government operations) will be counted towards the 10% reduction goal.

On this basis, the 10% conservation target requires the government to reduce its annual consumption by 62 million kWhs. The government announced a four-point plan to meet this target in April, 2004[10]. It includes:

- Employee awareness programs
- Engaging the public

- Facility upgrades
- Working with private sector landlords to cut back on energy use in leased space.

The Ministry of Government Services is responsible for the employee awareness programs and engaging the public. The Ministry of Public Infrastructure is responsible for facility upgrades and working with landlords.

Under this plan, Ontario's 62,000 Ontario Public Service employees will be involved in government-wide conservation efforts to raise internal awareness, while the public will be challenged to help the government to reach its energy savings goals. This may be done by actions such as reporting of electricity consumption after the designated "lights out policy of 8 p.m." Members of the public have been invited to submit suggestions about how the government can improve energy conservation. Leasing schedules also have been enhanced to reflect conservation priorities and efforts will be made to encourage private sector landlords to reduce electricity use in leased space.

The report by the Ministry of Public Infrastructure and Renewal has identified building upgrades and retrofit projects as the greatest contributors to reaching the 10% energy reduction goal. These upgrades and retrofits include such initiatives as chiller replacements; lighting upgrades; heating, ventilation and air conditioning (HVAC) improvements; building controls; and the Deep Lake Water Cooling project in Toronto. The Deep Lake Water Cooling project will air condition the legislative buildings and other provincial government buildings. It is estimated that the government will save $4.5 million over the next 30 years from this project. A total of 278 projects costing $55.35 million are underway. Estimated savings from these projects are 42.75 kWh.

In addition to funding energy management activities, the Ontario Realty Corporation has responded proactively to the IESO Conservation Appeals or Power Warnings. If a smog advisory is announced or outside temperatures rise above 26 degrees, all facility managers in government-owned buildings immediately take 25% of elevators out of service, turn off all non essential lighting, pumps and fans and increase building temperature to 26 degrees.

Ongoing energy audits are conducted at government owned facilities to identify energy savings projects with high payback. Other capital projects, special initiatives and changes in facility operations also are being examined to help meet the target. In addition, the government is planning to track the effects of the weather, sales, and the acquisition of government buildings on the savings target. A consultant has been retained to determine the actual consumption numbers from the base year 2002/2003

ENERGY CONSERVATION SUCCESS STORIES

## Honeywell Gives School Board an Energy Education

Honeywell Energy Solutions has partnered with the Thunder Bay Catholic District School Board to upgrade Board schools to reduce energy costs and provide a high-quality learning and working environment for students and staff. The Board will invest $2.8 million in capital improvements, conversions and upgrades, resulting in a guaranteed $239,448 in annual utility and electricity savings of almost 2 million kW hours per year.

The Energy Savings Retrofit also encourages individual participation in energy savings at school, work and home by providing energy conservation awareness education for students and staff … learning today for savings tomorrow.

until the present, since a portion of these numbers did not measure actual consumption, but were based on estimates.

The government has also put in place a monitoring system that tracks high profile energy projects and their status on a monthly basis. Electricity consumption across the government will be tracked quarterly and reported in July of each year. Since consumption needs change according to season, it is assumed that it is only useful to compare consumption data annually. The 2004/2005 actual consumption numbers for the period April 1, 2004 – March 31st, 2005, were to have been reported in July, 2005, but have not yet been issued pending verification from the government.

**Conclusion**

The Conservation Bureau believes that it is both reasonable and practical that the province's target of reducing consumption by 62 million kWh should be assessed by adding up specific savings of individual initiatives. The Conservation Bureau, would, however further recommend that in addition to verifying the savings of its various conservation initiatives, the provincial government measure and report actual electricity consumption in all its buildings in a timely manner.

The Bureau also recommends that conservation plans be developed and posted by government ministries, agencies and municipalities, universities and hospitals. This would help to foster an ongoing commitment to conservation. Such plans should be based on defensible estimates of savings plus verifiable results reporting. The government should consider this recommendation and how it can be implemented in those ministries that do not manage their own facilities.

CHAPTER

# 7 Removing Barriers to Progress: Opportunities to Build Conservation

The process of building a conservation culture in Ontario will be more successful once the barriers impeding significant advances in energy efficiency are identified and addressed. The Bureau's mandate includes reporting on any government policy or legislation that acts as a barrier to the development and implementation of electricity conservation measures.

Once removed, these barriers unlock opportunities to build and support conservation measures. In this chapter, the Bureau identifies five important opportunities and makes recommendations for further studies or action. Many of these opportunities can lead to substantial reductions in electricity use. For example, Figure 8 demonstrates the positive impact of changes to the building code and appliance standards in California.

## The Opportunities Ahead

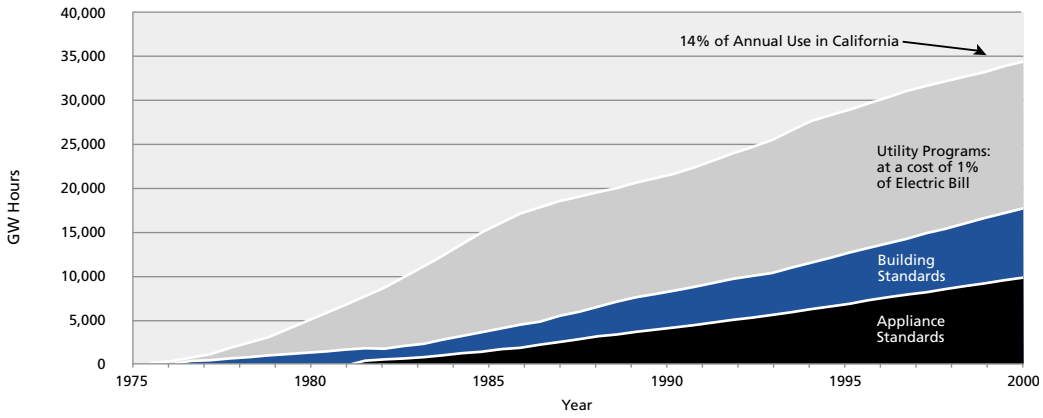
### Provincial Energy Policy and Conservation

Although the government already has taken many steps to create a conservation culture in Ontario, as described in chapter 6, there are additional opportunities to build an efficient and cost-effective framework for CDM programs.

### Setting Strategy and Targets

The government should continue to set conservation strategy and targets through a process that includes public consultation. In his 2004 report, the Environmental Commissioner noted that the government did not use the Environmental Registry process in setting its conservation strategy and targets and therefore failed in its obligations. In response, the government has asked the OPA to solicit input from the public and recommend targets for 2010, 2015 and 2025.

Figure 8
**GWh Impacts from Programs Begun Prior to 2001**




Source: California Energy Commission[11]

**Soliciting OPA Advice on Estimates**

The Integrated Power System Plan (IPSP) provides an ongoing mechanism to develop estimates for generation and CDM opportunities. The government may issue directives on these opportunities and have them incorporated in the IPSP process. If the government continues to solicit advice from the OPA based on public input, it can ensure that broad and representative views on the subject will be considered. The IPSP, through its own process – or based on government directive – will then define the amount of CDM to be used in Ontario's electricity supply mix.

**Consolidating Documents**

The government may wish to consolidate its CDM policy statement, strategy, tactics and its plan for ongoing success measurement into one document once certain outstanding issues – such as the implementation plan for smart meters – are resolved. Clear communication of the comprehensive policy, strategy, tactics and measurement of its successes is essential to promoting a culture of conservation. The Framework for Ontario's Conservation Culture, (Appendix D, in the Conservation Action Team Report) could be a good starting place for the envisioned consolidated document. The Conservation Bureau would like the opportunity to assist in the development of the strategies and tactics.

**Clarifying Stakeholder Roles**

The government also has an opportunity to clarify the roles of the various stakeholders—the Ministry, the Conservation Bureau, the OEB, the IESO, LDCs and retailers—in CDM programs. Clearly, all parties would benefit from a standard policy that outlines how programs should be funded and which organizations should deliver which types of programs. A standard approach would:

- Eliminate duplication of efforts
- Enable Ontario to achieve more cost-effective energy-conservation programs
- Enable broader marketplace penetration of these programs.

**Determining Funding**

LDCs currently provide CDM programs to the marketplace. If it were appropriate for the LDCs to expand their activities to include programs that lead to the creation of a conservation culture but cannot be funded through rates, these initiatives would need to be funded in another manner.

The Bureau plans to sponsor various types of projects, including pilot projects, consumer demonstration projects, market transformation projects, and consumer education projects. It may offer specific programs in certain sectors, or province-wide programs using established delivery channels such as the LDCs or other service providers. The Bureau has a standard procurement process, which defines the eligibility of bidders, and mandates the inclusion of a detailed cost breakdown in the responses to RFPs. In evaluating responses to RFPs, the Bureau may, for example, decide to offer supplemental funding to LDCs or other service providers for programs requiring funds beyond those that can be recovered in rates.

**Leveraging CAT Strengths**

The government has an opportunity to leverage the strengths of the Conservation Action Team (CAT). Since this group is comprised of representatives from a number of government ministries, it is ideally constituted to continue its coordination role, ensuring policy integration across the government, and assisting in the monitoring of the 10% reduction in energy use for government buildings by 2007.

**Summary of Recommendations Relating to Provincial Energy Policy and Conservation**

The Bureau recommends that:

- The government continue public consultation on

its conservation strategy and goals.

- The government complete the various elements of its strategy and publish the policy, strategy tactics and a plan for ongoing success measurement in one document.
- The government, the Bureau, the OEB and the IESO build on informal meetings currently being held to establish a formal working group to review the criteria for CDM program delivery and funding. The working group would recommend the appropriate criteria and tests, and determine whether regulation or legislative amendment is needed. Although each of these organizations may be mandated to act autonomously, a common understanding would help to advance the effective delivery of conservation programs.
- The Conservation Action Team play a policy integration and monitoring role within government.

## The Current Context for Energy Efficiency in Ontario

The *Ontario Energy Efficiency Act* – administered by the Ontario Ministry of Energy – sets energy efficiency standards for various products, such as appliances. Retailers may only sell or lease new products that meet these standards and carry an appropriate verification label. Ontario Energy Efficiency Standards can be used to effect provincial energy efficiency policies.

The Ontario standards often mirror the national standards established by the Canadian Standards Association (CSA) in the areas of energy efficiency and renewable energy sources such as solar power and wind power. The Ministry of Energy has used the consensus standards developed by the CSA as reference documents in Regulations under the *Ontario Energy Efficiency Act*.

### Opportunities to Change the Ontario Energy Efficiency Act

As well as participate in the CSA assessment process, the Ministry could develop its own independent assessments of the technical and economic feasibility for energy saving enhancements to household appliances and equipment. These independent assessments could then be fed into the CSA process or used to support changes the Ministry proposes to make to the *Ontario Energy Efficiency Act*.

The assessment-based approach may be particularly relevant in addressing circumstances particular to Ontario, such as geography, electricity price and load patterns. If there were an appropriate return on investment for Ontario, then it would be appropriate for the province to raise its product standards above national standards. The Bureau has identified possible revisions to two such existing energy efficiency standards:

**T-12 Lamps:** From March 1, 2006 onward, magnetic lamp ballasts that operate with T12 lamps will no longer be available. However, there will still be existing installed ballasts and therefore continued use of T12 lamps wherever they are available. There is no plan for discontinuing the T12 lamps, but they are energy inefficient and should be discouraged in favour of more efficient options.

High efficiency T8 and T5 fluorescent tubes last longer than standard T12 lamps, maintain light quality, require less maintenance and use more efficient electronic ballasts. On a relative light output per fixture comparison, an electronic ballast with a T8 fixture, 32/38 watt lamp, will use 30 to 40% less energy compared to a standard ballast with two T12, 40/34 watt lamps. Moving to T8 s and T5s will also result in less heat gain in the building and thus lower cooling load and create less demand for air conditioning during peak demand in the summer.

Commercial and institutional lighting requirements can add to peak electricity requirements. More than 50% of fluorescent lamp market sales are T12 lamps. The government should assess why T12s are still being sold, determine how best to eliminate

T12 lamps from the market in view of the planned obsolescence of certain T12 ballasts and how to best increase market penetration of T5 and T8 fluorescent tubes. As part of this assessment, the government should also consider a timetable for the removal of all T12 lamps and non electronic ballasts from the marketplace.

**Windows:** Significant energy savings would result if all new and replacement windows installed in new houses as well as apartments and commercial buildings were required to have a low emissivity coating on the glass. Further energy savings would be achieved by adding features such as warm-edge spacers and inert argon gas to window construction.

The government should quantify the costs and benefits of such windows and determine whether changes to the *Ontario Energy Efficiency Act* should be made to mandate these features. Should the government decide on this course of action, it is possible that the proposed requirement could also be referenced under the Ontario Building Code.

**Summary of Recommendations Regarding the *Ontario Energy Efficiency Act***

The Bureau recommends that:

- The Ministry of Energy dedicate staff and resources for further study of appropriate energy efficiency standards through either the CSA process or the government's own assessment.
- Further analysis be done on ways to phase out the installation of T12 fluorescent lamps and to promote the use of T8 or T5 lamps.
- CSA window performance standard A440.2-04 be reviewed and consideration be given to incorporating these changes into the *Ontario Energy Efficiency Act.*

## Examining the Role of the *Ontario Building Code* in Conservation

The *Ontario Building Code* sets uniform building standards – minimum provisions for the safety of new buildings and building that are being renovated or changing their use in terms of public health, fire protection and structural sufficiency. Parts of the

ENERGY CONSERVATION SUCCESS STORIES

# Cool Savings for Toronto Hydro


Toronto Hydro-Electric System Ltd. announced this spring that it committed to reducing peak energy consumption in Toronto by 250 MW or 5%, matching the Ontario government's 5% target. The company dedicated almost $40 million to CDM programs through 2007. Throughout 2005, several initiatives were launched:

A partnership with *Home Depot* for 3 years and $5.4 million to provide electricity users in Toronto valuable incentives to lower their energy consumption; a three-year, $1.6 million investment with *Enwave Energy Corporation* to replace existing air conditioning equipment with Deep Lake Water Cooling technology at Queen's Park and five other downtown buildings – this initiative will reduce the buildings' air conditioning by 90 per cent; *PeakSAVER*, in partnership with Cannon Technologies and Good Cents is a voluntary program for residential and small business customers that attaches wireless technology to air conditioning units, allowing the utility to temporarily reduce cooling loads during peak consumption periods. Several other partnerships and initiatives were also launched.

In a speech at the Net Zero Energy Home workshop on January 19, 2005, Brad Duguid, Parliamentary Assistant to the Ontario Minister of Housing, said: "*Current provincial codes and standards* are outdated *and should* mandate *stricter energy efficiency and conservation. This is a* real priority."

Building Code also are designed to promote energy conservation and environmental integrity. The Ministry of Municipal Affairs and Housing works with municipal and building sectors and consumer groups to improve the technical requirements of the Building Code with respect to advances in the industry and to promote government policy.

There have been no substantial improvements in energy efficiency requirements in the *Ontario Building Code* since 1993. In 1997, a requirement was introduced for larger buildings to meet the minimum level of energy efficiency by recognizing the new Model National Energy Code for Buildings as an alternative to ASHRAE 90.1 (for all buildings except part 9 buildings – those that are 3 stories or less). However, also in 1997, some of the improvements in energy efficiency requirements that were introduced in 1993 were reversed: the most significant change being the removal of the requirement for full-height insulation in basements.

The CAT has identified a need to raise the energy efficiency standards in the *Ontario Building Code*, and so has the Ministry of Municipal Affairs and Housing.

The Ministry subsequently issued an RFP for consulting services to develop and evaluate potential energy efficiency measures for buildings, through proposed amendments to the *Ontario Building Code*. An agreement with a supplier is expected shortly and following the consultant's work, the Ministry is expected to develop a proposal for changes to the Building Code.

The Ontario Cabinet must then give approval for public consultation on proposed changes. Once this is completed, the Ministry will propose language changes to the Building Code. Due to the length of time required for consultation, Building Code changes are usually implemented on a five-year cycle. Currently, there are other proposed changes to the Building Code that likely will take effect in 2006. The government has made mid-cycle changes in the past and should do so in this instance since energy conservation is an urgent issue that requires immediate action.

ENERGY CONSERVATION SUCCESS STORIES


## Power Play Scores!

When Inco launched its *PowerPlay; Take Charge of Energy* grassroots energy conservation program at its Sudbury operations, few had any idea just how big it would become. *PowerPlay* involved all levels of staff, from the shop floor to the top floor, changed employees' attitudes about energy, and built energy management into the way business is done every day at Inco. When Inco ran the pilot program, 500 employees suggested 650 energy-saving ideas, identifying $9.7 million in savings – more than three times the smelter's original target of $2.7 million. The ideas generated by *PowerPlay* are becoming an energy-management philosophy, and the pilot has extended to other Inco facilities.

The RFP for proposed changes to the Building Code directs respondents to:

- Examine and analyze areas to improve the energy efficiency of residential buildings governed by Part 9 of the Act, giving particular attention to detached, semi-detached, duplex and row houses.
- Propose potential amendments to the Building Code. Consideration may be given to measures relating to building envelope, lighting and HVAC systems.
- Examine and analyze areas to improve the energy efficiency of small and large buildings. Respondents should compare the updated ASHRAE 90.1-2004 with current requirements, and present a detailed comparison of the 2004 ASHRAE standard and the 1997 MNECB. The equipment efficiencies given in ASHRAE 90.1 2004 will be compared with those currently required by the Ontario Energy Efficiency Act. RSO 1990, Chapter E.17 as amended.
- Examine the energy efficiency of small buildings addressed in Part 9 of the Building Code, and propose potential prescriptive requirements for Part 9 non-residential buildings. The purpose of these alternate requirements is to meet the needs of small buildings without the detailed analysis required by the ASHRAE standard.
- Describe how it would conduct an environmental scan of current and established energy efficiency certification or labelling programs for all houses. Following this review, the respondent must develop a proposed labelling program for houses that would be best suited to the particular climate, conditions, construction practices and regulations in Ontario, based on identified best practices and standards.
- Identify potential barriers to energy efficiency within the existing Building Code for adoption of emerging "green technologies," and recommend potential remedies.

**The Ministry has identified many important issues that could be addressed in the Building Code to increase energy efficiency. All proposed changes should first be subject to the appropriate cost/benefit analyses to determine feasibility.**

**Opportunities to Change the Building Code to Support Energy Efficiency**

The Ministry has identified many important issues that could be addressed in the Building Code to increase energy efficiency. All proposed changes should first be subject to the appropriate cost/benefit analyses to determine feasibility.

The Ministry should consider the building standards in the Commercial Building Incentive Program (CBIP) offered by Natural Resources Canada. This program is designed to increase energy efficiency in new commercial, institutional and multi-unit residential buildings. Generally, there are higher upfront capital costs for construction, but ongoing operational savings. The CBIP helps offset the extra cost of designing energy efficient buildings. To qualify for an incentive, a building must be at least 25% more energy efficient than if it were constructed to meet the requirements of the Model National Energy Code for Buildings (MNECB). The elements that were considered include energy-efficient mechanical, electrical and lighting systems. The government should consider the criteria supporting the MNECB standard minus 25% in making amendments to the Ontario Building Code.

The EnerGuide for Houses (EGH) rating is a standard measure of a home's energy performance developed and managed by Natural Resources Canada. The standard compares a house with a reference house of similar size in a similar climatic region. The rating is done on a scale of 1-100. A stan-

dard EGH 80 and the supporting criteria may be appropriate for assessment.

Based on the results of the RFP to amend the *Ontario Building Code*, and the timeline for the project, the Ministry will decide whether to put out a proposal for public consultation. The importance and urgency of this work cannot be underestimated. The Bureau strongly urges the Ministry of Municipal Affairs and Housing, and the Ministry of Energy to expedite this process.

**Summary of Recommendations to Change the Ontario Building Code**

The Bureau recommends that the government:

- Consider incorporating higher minimum energy efficiency standards into the Ontario Building Code such as those presented in the CBIP (MNCEB-25%) for Part 2 buildings, reinstating the pre-1997 minimum energy efficiency requirements, increasing the minimum energy efficiency standards for electrically heated houses, and requiring renovations to meet the same minimum energy efficiency requirements as new buildings.
- Expedite the public consultation and approvals process to make changes to the Building Code in recognition of the urgent need to address energy conservation issues.

### The Wasted Opportunity of Underused On-Site, Standby Generators

A significant number of large commercial, industrial and multi-family buildings have standby generators – on the customer side of the meter – to supply electricity to an emergency distribution system for the operation of the facilities' elevators, fire-suppression systems, lighting and other services, as required by the Ontario Building Code and Fire Codes. A significant opportunity exists to better utilize these standby generators. In aggregate, they represent significant capacity and could be used as distributed generation to shave demand in peak periods. Distributed generation is located near to load, and thereby reduces distribution and transmission constraints.

One of the main challenges for the electricity grid to access this pool of emergency generators is that both the Ontario Fire and Building Codes require that a minimum quantity of fuel is stored on site to power the generator. Due to the low cost of diesel generators, and the relatively simple storage requirements, No. 2 diesel fuel has been the fuel of choice. The *Ontario Fire and Building Codes* use many of the design and operational standards from the CSA 282 Standard. Until recently, this standard required onsite fuel storage. However, a new standard will be released this fall which will allow build-

ENERGY CONSERVATION SUCCESS STORIES

## NAIMA Posts Comforting Savings

NAIMA Canada, the trade association for manufacturers of fibre glass, rock wool and slag wool insulation, applauds its members' commitment to reduce electrical consumption in their Ontario plants by 10% per unit of production. NAIMA is the first industry association to adopt the 10% target in reduced electricity demand, matching the province's own target. NAIMA's Ontario members, Owens Corning Canada and Roxul Inc., continue to innovate and initiate environmentally sound processes that will ensure they meet the 10% target. In the first year alone, each pound of fibre glass and rock and slag wool insulation saved more than 12 times the amount of energy used to produce it, and continues to save that much for the life of the building in which it was installed. Makes you feel warm all over, doesn't it?

ing designers/owners the option of installing a utility gas-line to feed their emergency generators in lieu of on-site diesel storage.

The use of 100% natural gas-fired generators would represent a more environmentally benign fuel source than 100% diesel-fired generators, as well as one that has the benefits of continuous supply, above and beyond that afforded by limited diesel storage capacity.

Despite the benefits of this option, there are several issues that must be addressed to encourage the installation of natural gas-fired standby generators, including the higher upfront cost of natural gas generators, the need to consider better noise control if units are to be used more often and the need to increase the comfort level of installers who are currently more familiar with diesel systems.

The *Ontario Building Code and Fire Code* must be amended to reference the latest edition of the CSA standard C282 ("Emergency Electricity Power Supply in Buildings") to permit the option of installing a gas line directly from the utility. The two provincial ministries, each responsible for one of these codes, are expected to begin their review of the new CSA Standard by year end to determine how to incorporate any new changes.

**Summary of Recommendation for Action on Natural Gas Back-Up Generators**

The Bureau recommends that the government expedite the review and public process necessary for the adoption of CSA C282 in both the Ontario Building Code and Fire Code.

### Opportunities to Support Energy Efficient Investment Through Financial Incentives

This past summer the Chief Energy Conservation Officer held consultations with energy management firms and others on the barriers to conservation in the municipalities, universities, colleges, schools and hospitals (MUSH) sector and other sectors. The following financial barriers in the MUSH sector were identified:

- In consolidating accounts, some accounting practices call for operating expenses (savings) to be reported in one set of accounts and capital expenditures in another. This is a disincentive for energy efficiency investment since those who make the capital investment do not record the benefit of future savings.
- There is a need for recognition of the "payback horizon" for DSM initiatives. It is difficult for institutions to justify capital investments when the payback through the reduction in operating costs does not occur in the current fiscal period.
- Often there is limited capital available for energy efficiency investments, since those who decide on such expenditures are unfamiliar with the risks and benefits of these investments. In environments where infrastructure replenishment is necessary, it is important that these benefits be recognized.

**This past summer the Chief Energy Conservation Officer held consultations with energy management firms and others on the barriers to conservation in the municipalities, universities, schools and hospitals (MUSH) sector and other sectors.**

In the May, 2005 budget, the government recognized some of these challenges and provided for new, low-cost financing for municipalities, universities and government-owned buildings. The administration and criteria for such funding is currently under discussion. The government may wish to consider extending this financing to hospitals, colleges and schools.

**Summary of Recommendation Regarding Financial Incentives**

The Bureau recommends that the government broaden the group eligible for low-cost financing to include hospitals and schools.

**Capitalizing on Other Opportunities**

Many other opportunities exist to increase energy conservation and manage demand. In this chapter, the Bureau has selectively focused on various established information sources for the identification of opportunities, including the CAT report. Others were identified through industry discussions. In 2006, the Bureau will continue to study these options and several others, including ideas from stakeholders.

Others opportunities that warrant further examination include:

- Establishing minimum standards of energy efficiency for MUSH sector investment
- Offering PST rebates to encourage replacement of older technology with energy efficient alternatives
- Establishing water conservation standards
- Discontinuing the provision of flat-rate water heating by local distribution utilities
- Farm sales tax provisions for high efficiency equipment
- Furthering energy efficiency communications and education in schools and public forums

## Conclusion

This chapter has only touched the surface in terms of opportunities to promote conservation in Ontario. More work is needed, including consultations with stakeholders to identify the critical barriers they face and to work together to develop and implement solutions. To this end, the Bureau will be establishing formal consultation processes in the near future. We expect that the 2006 annual report will provide more ideas and more detail with regard to opportunities to meet our conservation challenge.

CHAPTER

# 8 Our Conservation Challenge – A Call to Action for Ontarians

And so our conservation challenge begins. We have a lot of challenges and opportunities ahead of us. In the first five months of the Conservation Bureau's existence, we have begun a journey to build a culture of conservation in Ontario and secure a sustainable electricity future.

But it is only a beginning. Ontario, which for most of its history has enjoyed an abundance of cheap, reliable electricity, can no longer take electricity for granted.

Today, the demand for electricity keeps rising as the population and the economy grow. Thousands of new homes are built every year, hundreds of new businesses and institutions open. And all of them require electricity.

At the same time, our ability to produce ever more electricity is being stretched. Already, the Independent Electricity System Operator has issued a number of Power Advisories and Warnings during periods of peak usage. Electricity bills have increased as Ontario has had to buy power from outside the province to meet demand.

As the economy continues to grow it is estimated that by 2020 Ontario will need to refurbish, rebuild, replace or conserve 25,000 megawatts worth of generating capacity – a number equivalent to more than 80 per cent of Ontario's current electricity generating capacity. The estimated cost is staggering: $25 to $40 billion. Clearly, producing more electricity is only part of the answer.

The other part – a vital part – is conservation, including energy efficiency and demand management. It is one of the single most important things we can do to manage our electricity supply challenges.

That's why the Government has created the Ontario Power Authority – and its Conservation Bureau – and set aggressive targets for reducing Ontario's peak electricity demand by 5% by 2007 and electricity consumption in government buildings by 10% by 2007. The Conservation Bureau is challenging every household, school and business to match this target of 10% by 2007. Achieving the target will require all Ontarians to make changes in how – and when – we use electricity in our homes, institutions and businesses.

The mandate of the Conservation Bureau is to help reach that target by mobilizing all Ontarians to make meaningful changes, to become a part of the energy solution, to use electricity wisely, and to embrace a conservation culture.

Given the tremendous challenges we face, we must act now. We all have a part to play in building a conservation culture.

As Chief Energy Conservation Officer, I challenge all Ontarians to review their consumption, whether at home, at school or at work, and determine what can be done to conserve electricity.

In the coming months and years we will help educate consumers and move them from a culture of waste to a culture of conservation.

We will give Ontarians the information and the tools they need to use less electricity and consume electricity more wisely.

We have begun the journey of conservation. Working together, we will make a real change in the way we use energy in Ontario. Working together, we can all make Ontario a leader in energy efficiency.

And working together we can meet our conservation challenge.

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## Acronyms

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|---|---|
| CAT: | Conservation Action Team |
| CDM: | Conservation and Demand Management |
| CECO: | Chief Energy Conservation Officer |
| CHP: | Combined Heat and Power |
| ECSTF: | Electricity Conservation and Supply Task Force |
| GWh: | Gigawatt hours (million watt hours) |
| IESO: | Independent Electricity System Operator |
| IPSP: | Integrated Power System Plan |
| kWh: | Kilowatt hour (thousand watt hours) |
| LDC: | Local Distribution Company |
| MW: | Megawatt (million watts) |
| OBC: | Ontario Building Code |
| OEB: | Ontario Energy Board |
| OPA: | Ontario Power Authority |

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