Pembina

A Quick-Start Energy-Efficiency Strategy for Ontario

the PEMBINA institute
Sustainable Energy Solutions

Roger Peters, Stephen Hall and Mark Winfield

April 2006

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About the Pembina Institute

the PEMBINA institute

Sustainable Energy Solutions

The Pembina Institute is an independent, not-for-profit environmental policy research and education organization specializing in the fields of sustainable energy, community sustainability, climate change and corporate environmental management. Founded in 1985 in Drayton Valley, Alberta, the Institute now has offices in Calgary, Edmonton, Vancouver, Ottawa and Toronto.

For more information on the Institute's work, please visit our web site at www.pembina.org.

Summary of Ontario Quick-Start Energy-Efficiency Key Actions by Agency

Ontario Ministry of Finance

- Exempt from PST Energy Star appliances, HVAC systems and windows recommended through EGH audits.
- Provide a Green Buildings Tax Credit for new commercial buildings.

Ontario Ministry of Municipal Affairs and Housing

- Establish a permanent three-year cycle of reviews of the Ontario Building Code to upgrade the energy-efficiency and renewable-energy performance of Ontario's buildings.
- Adopt EGH-80 and solar readiness in the 2007 Building Code for new homes.
- Adopt ASHRAE 90.1 2004 or 25% better than the national model energy code in the 2007 building code for new commercial buildings.

Ontario Ministry of Energy

Energy Efficiency Act Standards

- Update The Energy Efficiency Act regulations to achieve current Energy-Star levels for appliances, HVAC systems, and windows by 2008, and to phase out the distribution and sale of T12 commercial lamps and magnetic ballasts by 2011. Establish a regular three-year review cycle of performance standards starting in 2008 (with the next in 2011).

Power Authority Direction

- Adopt resource goals of 4,500MW for energy-efficiency and CHP systems by 2012.

Institutional Arrangements

- Establish the Conservation Bureau as an independent body with access to the funding mechanisms available to the OPA.

Ontario Power Authority

- Implement Standard-Offer Contracts totaling 2,000MW of CHP systems by 2010.

Conservation Bureau of the OPA

- Establish and administer province-wide programs in the following market segments:
  - Small-business high-efficiency lighting;
  - Existing single-family residential rebate/retrofits;
  - Existing commercial rebate/retrofits;
  - Residential high-efficiency new homes; and
  - Commercial new green buildings.
- Pursue province-wide bulk procurement of Energy-Star HVAC systems working with manufacturers, distributors and retailers.
- Implement a province-wide Energy Star advertising campaign aimed at consumers — modeled after California's successful "Flex Your Power" campaign.
- Establish a CDM Support and Coordination Unit to provide program and technical support to LDCs to ensure CDM program design, implementation and delivery reflects Best Practice garnered from successful experience across North America.

Ontario Ministry of Universities and Colleges

- Implement a provide-wide training and certification program through community colleges for energy-efficiency and renewable-energy technicians capable of the following:
  - delivering EGH audits;
  - installing Solar-PV and SDHW systems;
  - providing energy-efficient home-renovation services; and
  - becoming commercial-building-retrofit managers and circuit riders.

Glossary

AFUE	Annual Fuel Utilization Factor
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
CDM	Conservation and Demand Management — also called Demand Side Management (DSM) — utility run programs to reduce or shift demand for electricity and natural gas.
CBIP	Commercial Building Incentive Program (administered by NRCan)
CHP	Combined Heat and Power — also known as cogeneration — on-site power systems in which the waste heat is used to meet local heating needs
CMHC	Canada Mortgage and Housing Corporation
CSA	Canadian Standards Association
DSM	Demand Side Management
EER	Energy Efficiency Ratio
EGH	EnerGuide for Houses
Energy Star®	a voluntary labeling program designed to identify and promote energy-efficient products such as major appliances, office equipment, lighting and home electronics
GW	GigaWatt: 1 billon (109) Watts or one million kilowatts
GWh	GigaWatt hour: one million kilowatt hours of electric power
HRV	Heat Recovery Ventilator
HSPF	Heat-season performance factor
HVAC	Heating, ventilation and air conditioning
IEEC	International Energy Efficiency Code
LDC	Local Distribution Companies — municipal and other power and gas retail utilities
LEED®	Leadership in Energy and Environmental Design — an initiative of the US Green Building Council, LEED® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings
MEF	Mechanical Electricity Factor (clothes washers)
MW	MegaWatt: one thousand kiloWatts (1,000 kW) or one million (1,000,000) Watts
NGO	Non-government organization
NMECB	National Model Energy Code for Buildings
NRCan	Natural Resources Canada
OEB	Ontario Energy Board — the regulator of Ontario energy utilities
OPA	Ontario Power Authority — a new Provincial agency with the mandate of managing Ontario's power system
PBC	Public Benefits Charge
R2000	Developed in partnership with Canada's residential construction industry, R-2000 is an initiative of NRCan's Office of Energy Efficiency to promote the use of cost-effective energy-efficient building practices and technologies.
SEER	Seasonal Energy-Efficiency Ratio
Smart Meter	An electricity meter that provides the user with an indication of the time of power use as well as quantity.
SOC	Standard Offer Contracts
The Province	For the purposes of this document is Ontario
WF	Water factor (clothes washers)

1. Introduction

This report outlines a Quick-Start energy-efficiency strategy that could be put in place over the next two years in Ontario. The Quick-Start strategy would lay the groundwork for the realization of major long-term reductions in electricity and natural-gas consumption in Ontario. In addition to improving the energy productivity of Ontario's economy, these measures would also allow time for more rigorous and open decision-making about the province's electricity and energy policies.

1.1 Background

A major public debate is currently taking place on the future direction of Ontario's electricity system. Despite public statements by the provincial government about creating a 'conservation culture' in Ontario, the government's overall approach so far has been overwhelmingly supply-oriented. An analysis of provincial initiatives up to December 2005 by The Pembina Institute concluded that the ratio of planned investment in supply resources to conservation and demand management (CDM) was 64:1 ($10.5 billion to $163 million) in favour of supply-side initiatives.[1] By March 2006 the estimated ratio had grown to 73:1 ($12 billion to $163 million). [2]

The Ontario Power Authority (OPA) tabled its electricity supply-mix advice to the province in December 2005. The OPA's approach was again strongly supply oriented, with an underlying implication that efficiency and conservation, while worthwhile, could not deliver dependable savings of any size. The OPA recommended that only 1,800MW of potential savings from energy efficiency improvements and demand response measures be considered in the province's electricity planning to 2025.[3] In contrast, the authority recommended an investment of between $30 and $40 billion to provide 9,400 to 12,400MW of new or refurbished nuclear-generating capacity. [4] This is despite a number of studies that have shown that Ontario lags behind the rest of North America in terms of its energy productivity,[5] that the cost of acquiring CDM is far less than the cost of new supply,[6] and that there is large untapped potential for higher efficiency in Ontario. [7]

In the last two years the Province has taken several steps to support CDM. The steps are as follows:

- the establishment of a Conservation Bureau within the OPA.
- the provision of incentives for local energy distribution companies (LDCs) to deliver CDM programs;
- the promise of "Smart Meters" to all households and small business consumers by 2010;
- the enactment of Bill 21, the Energy Conservation Responsibility Act, providing for the installation of Smart Meters, establishing requirements for energy efficiency planning but public sector agencies, and permitting the establishment of regulations permitting the use of energy efficient devices; and
- the announcement of several new programs, with a target of a reduction in peak demand of 1000MW by 2010 through a combination of demand response and efficiency measures.

This level of effort and committed resources, however, falls far short of the long-term comprehensive approach to energy efficiency and conservation taken by many US states. It also lacks a coordinated approach to CDM that will lead to permanent reductions in base load as well as peak power demand (see section 1.2 below)

In US jurisdictions, power planning is driven by the goal of providing energy services at the least total cost to society, with economic, environmental and social costs being internalized into electricity costs. Given that energy efficiency is the least expensive resource, many US states seek to purchase all cost-effective conservation as the first priority in the resource dispatch order. In California, for example, the goal is to buy 70% of what is considered most economically advantageous.[8]

US states such as New York[9], Vermont[10], Oregon[11], Wisconsin[12] and Texas[13] have also created dedicated institutions to deliver energy-efficiency programs and procure reductions, using permanent funding mechanisms to finance them. While consumers and businesses pay for these programs through a Public Benefits Charge (PBC), the cost is far lower than

what these customers would have paid for power had new energy sources been built. Energy efficiency and conservation are seen as the cornerstone of many states' energy and power policy.

Without concrete action on energy efficiency like that taken in the US, Ontario consumers could find themselves faced with energy bills that are far higher than they need to be. In effect, Ontario consumers will be faced with a double hit: higher energy prices due to the need to pay for expensive new supply that could have been avoided had effective efficiency programs been put in place, and larger bills due to the failure to help consumers reduce their energy needs.

At the same time, major potential to improve the energy efficiency and productivity of Ontario's economy has been identified. A recent study prepared for OPA by ICF Consulting estimated that 35,000 GWh/yr of savings against OPA forecasts (equivalent to 7000MW) is economic relative to the current OPA avoided cost of supply.[14] Using energy-efficiency programs that provide significant financial incentives, coupled with higher energy efficiency standards, many of the changes needed to acquire this potential could be made in the near term (by 2015), keeping demand at or below current levels.[15]

The study uses "expectations" from several US jurisdictions to support these estimates. The States of California and New York, for example, expect to maintain electricity demand at current or lower levels in the period to 2015 through the continued aggressive acquisition of efficiency resources.[16] The average cost of acquiring efficiency resources in the US since 1998 is just over US 2¢/kWh[17] — well below the avoided cost of new supply in Ontario.

Previous studies by The Pembina Institute[18] and Torrie Smith Associates[19] show that the savings potential is much higher if enabling policies and measures are also put in place both to maximize cogeneration in both the commercial and industrial sectors and to maximize the conversion of electricity water heating to other sources. For example, the Pembina study estimated that, by using incentive programs that allow electricity users and cogenerators to spread the cost of economic efficiency measures over a longer period, more than 70,000 GWh/yr of savings could be achieved by 2020 — equivalent to 12,000MW in generating capacity. The Torrie Smith study reached similar conclusions.

An assessment of the best energy-efficiency policy practices in the US and other countries currently being conducted by The Pembina Institute shows that there are a number of common elements in jurisdictions that have achieved on-going success in acquiring significant efficiency resources. Common elements are as follows:

- a long-term commitment to energy efficiency that includes making acquisition of efficiency the cornerstone of power planning, with dedicated legislation and resource allocations to bring this about;
- a permanent long-term funding mechanism to transform markets, acquire efficiency resources and deliver efficiency services;
- a dedicated independent agency responsible for the coordination of efficiency programs and the delivery of energy services;
- a comprehensive set of efficiency programs designed to transform efficiency markets rapidly;
- the proactive marketing and delivery of programs in which solutions are taken directly to residential, commercial, industrial and institutional customers rather than waiting for their response;
- the use of financial incentives to spur incentives in high-efficiency products and accelerate the turnover of existing inefficient stock;
- the pursuit of aggressive building-code and standards review cycles to consolidate gains made through incentives programs and complete market transformations; and
- the integration of electricity and natural gas energy efficiency programs and measures wherever possible.

These approaches can more than double the savings that can be achieved with less aggressive programming.[20]

1.2 Current Programming

The Province has set a target of 1,000 MW of electricity savings by 2010 through efficiency and demand response initiatives led by the Conservation Bureau. These initiatives include directives to the OPA to establish the following programs:

- A 300MW City of Toronto conservation program
- A 250MW Demand Response procurement program
- A 250MW CDM procurement program
- A 100MW low-income housing program
- A 100MW appliance-change-out and efficient-lighting program

In addition, the following initiatives have been announced:

- a 1,000MW Industrial/Commercial CHP procurement directive to the OPA;

- the establishment of incentives for LDC CDM programs including:
  - a one-time decision by the Ontario Energy Board (OEB) to allow LDCs to use $163 million of "historical" profits towards approved CDM programs.
  - an ongoing OEB CDM incentive mechanism in which the utility gets a conservation profit bonus equal to 5% of the bill savings it creates for its customers by increasing their energy efficiency.
- a commitment to provide all households and small businesses with Smart Meters by 2010;
- the enactment of Bill 21 in March 2006. The legislation includes provisions for the smart-meter initiative, for energy-efficiency planning by public-sector agencies, and for removing barriers to the use of energy efficient devices;
- The initiation of consultations on options to upgrade the energy-efficiency requirements in Ontario Building Code

Compared to energy-efficiency efforts in US states, however, these initiatives are under-resourced and lack a coordinated approach to conservation and efficiency. They will not lead to the major market transformation and base-load reductions that have been achieved in the US. The particular weaknesses in the province's initiatives are as follows:

- The Conservation Bureau's resources and mandate are not sufficient to undertake or manage the types of programming common in US States.
- While Ontario LDCs plan to spend $163 million over the next three years on CDM programs a review of the programs approved so far indicates that most are quite modest and address only demand response. The program designs reflect out-of-date approaches, such as information-only initiatives, and rely on voluntary action. There is also a wide variation among LDC CDM plans, meaning that many Ontario customers will not have access to the savings opportunities that would occur with comprehensive CDM programming. Many LDCs do not include detailed program plans or specific reduction targets and cost analyses.
- While the OEB CDM shared-savings-rate incentive mechanism is quite generous, it has not led to proposals from LDCs in their 2005/6 annual rate reviews. This is due in part to considerations of the OEB's rate cycle, although a lack of CDM program experience — especially among smaller LDCs may also be a factor.
- Smart Meters on their own will not lead to major reductions in energy consumption, and no comprehensive strategies have yet been proposed to install the meters or coordinate their use with other programs. There are two additional dangers if Smart Meters are not linked to programs: 1) customers may associate reducing energy use with sacrifice, and 2) without programs there is a real possibility of "snapback" — customers returning in the long-term to their original energy consumption levels after having implemented energy-efficiency measures. The smart-meter initiative is also primarily focused on residential customers. Most studies show that there is higher savings potential the commercial and industrial sectors.
- The three, new, recently announced Conservation Bureau programs (low-income, appliance-change-out, and lighting) also focus mostly on residential customers, and few details have yet been provided on how these programs would be financed or implemented. No targets for base-load electricity savings have been yet set for the new programs.
- The proposed energy-efficiency revisions to the Building Code are very modest, and no regular cycle for review updating has yet been set.

In summary, the Province's current programming is unlikely to provide lasting reductions in base-load power demand as it is poorly coordinated, offering customers no common opportunities to save energy, and under-resourced, with no ongoing funding being provided.

1.3 A More Comprehensive and Aggressive Approach Is Needed

A new comprehensive approach to energy efficiency is required in Ontario, emphasizing strong financial incentives and regulations that achieve permanent demand reductions. Conservation and efficiency are not sacrifices, but mechanisms that will lead to improved productivity, lower energy bills and reduced environmental impact from the energy sector. Major progress on efficiency and productivity is possible through building a conservation culture in Ontario and delivering major dependable reductions in demand for electricity and natural gas.

The initial work done by the OEB and the OPA Conservation Bureau to establish interest in energy efficiency and conservation and to provide incentives and programs is to be commended. However, given the large economic potential demonstrated by the studies cited above, a significantly higher investment

in efficiency and conservation, reflecting the lower cost of these resources, is needed.

A Quick-Start energy-efficiency strategy for Ontario would begin this process. The strategy comprises a series of flagship programs focusing on all sectors, programs that could be implemented within a year using the wealth of experience that exists in Ontario, the rest of Canada, the EU, and the US. The strategy also identifies the provincial management, financing, and capacity-building framework that would be needed to support these programs and lay the groundwork for a long-term efficiency strategy. The strategy builds on current initiatives by the Conservation Bureau and OEB.

The proposed programs address core barriers to energy efficiency — high first cost, lack of technical resources, and inefficient embedded practices. While energy prices that reflect the full costs of generation are an important signal for conservation efforts, experience in the US has shown that policy intervention to remove market, attitude and institutional barriers are critical to delivering high levels of efficiency on a permanent basis. The US Environmental Protection Agency's (EPA), recent assessment of state energy efficiency initiatives, highlights this point, identifying 16 policy options for achieving significant energy efficiency gains.[21]US experience indicates the following pattern for successful efficiency programming:

- the use of financial capital-cost incentives in cases where the incremental cost of the efficiency measure is relatively small;
- the use of innovative ways of spreading the initial cost over a longer period when the incremental cost is higher; and
- the use of an aggressive standards- and code-upgrade cycle to consolidate gains made through programs and to accelerate market transformation.

These approaches are reflected in the Quick-Start programs proposed below.

Taking the Quick-Start approach means Ontario can significantly improve its energy efficiency and productivity without introducing crippling increases in electricity price. In fact, consumers win twice: energy prices are held in check while energy-bill amounts are reduced through improved efficiency.

2. Objectives and Features of the Quick Start Strategy

2.1 Objectives

The objectives of the Quick-Start Strategy are as follows:

1. To begin to deliver base-load energy savings relatively quickly.
2. To demonstrate the potential to achieve real and dependable reductions in demand.
3. To allow time for more open and rigorous decision-making on overall electricity and energy policy.
4. To lay the groundwork for a longer-term efficiency strategy.
5. To bring Ontario's energy productivity in all sectors above that of its neighbours in the US and Canada.
6. To put in place manufacturing, training, servicing, and distribution infrastructure and to enable policies that would completely transform energy-use markets to become high efficiency over a 15-year period
7. To enact financing plans, procurements and supporting policies and programs that would meet new demand for energy services in Ontario from gains in efficiency over the next 5 years and pave the way for deeper efficiency gains.

2.2 Goals

The goals of the Quick-Start Strategy are to lay the groundwork for a "conservation power" plant in Ontario by 2012, one that would save 23,000 GWh/yr of base-load electricity. Approximately 30% of these savings would be achieved through 2,000MW of combined heat and power (CHP) facilities, the remainder — equivalent to 2,500MW of capacity — through electricity efficiency and fuel switching.

2.3 Key Features of the Quick Start Strategy

Key features of the Quick Start Strategy are as follows:

- A five-year plan to build energy-efficiency markets and industry in Ontario.
- A focus on a comprehensive portfolio of key end-use measures saving both electricity and natural gas, including fuel switching from electric heat to solar and high-efficiency gas.
- A portfolio of programs that:
  - combine strategies, such as resource acquisition, market transformation and infrastructure development (training/internships, education, manufacturing/distribution support, innovative financing, tax measures, and ongoing upgrading of standards and codes);
  - are based on programs and approaches that have been successfully and cost effectively pursued in the US and in other provinces;
  - are built on current CDM initiatives by the Conservation Bureau, the OEB and the Building Code Review;
  - minimize lost opportunities, particularly in new buildings;
  - engage all sectors in implementation and delivery (sectors include non-profits, private-sector firms, municipalities, universities and colleges); and
  - establish a well-trained and capable energy-efficiency service industry.
- The establishment of a regular review cycle for building codes and equipment standards.
- The coordination of programs/standards for immediate and maximum impact.
- The provision of a stable and long-term funding source for efficiency programs.
- The province's participation in national initiatives on energy efficiency coordinated by the Council of Energy Ministers and the Office of Energy Efficiency.
- A prompt start: up by summer 2006.

3. Quick Start Energy Efficiency Program Portfolio

3.1 Overview and Introduction

Quick Start consists of nine programs, and three cross-cutting enabling initiatives needed to support these programs: management and coordination, financing, and infrastructure. Each program is described in a template (attached in appendix 1), including program design and components, objectives and targets, the barriers addressed, proposed delivery agents and evaluation criteria, and similar programs undertaken in other jurisdictions. The programs are also summarized below.

The programs outlined in the Quick-Start Strategy represent the first tranche of programming in a long-term energy-efficiency strategy. Other programs could be added as savings potential is identified. For example, if a national lighting-efficiency initiative[23] were created by federal or provincial agencies, a focus on lighting could be added to the Quick-Start programs or a dedicated new program developed.

3.2 Program Initiatives

3.2.1 New Construction Programs

This suite of three programs addresses the need to increase the efficiency of new building construction in Ontario on a predictable and regular basis — programs designed to greatly increase the number of new high-efficiency homes and buildings, backed up by a building-code review cycle that increases the minimum efficiency of homes and buildings in a regular and predictable fashion towards a series of consensus targets. The objectives are to increase energy-efficiency code requirements every three years and to provide incentives to cover the incremental cost of meeting the code before it is upgraded.

Program 1: New Housing Energy Efficiency

The goal of this program is to greatly increase the number, types and profiles of high-efficiency Energy-Star and other homes being built in Ontario — adding significantly to the small number of projects currently under way in Mississauga, Ottawa and other cities. The objective is to achieve 65% market share for homes with an EnerGuide for Houses (EGH) rating of greater than 80 by the end of 2009 — of which 25% would have solar water heaters and 5% would be net-zero-energy homes.

The program would have several elements, including the maintenance of a province-wide directory of certified Energy-Star home builders, an Energy-Star home-buyers' kit, annual awards and a conference for Energy-Star building achievements, certification of homes with an Energy Star/EGH 80 rating, and a series of financial incentives for both the builder and the home buyer.

The Home-Buyers' Kit would include information on the benefits of Energy-Star homes, standard specifications for Energy-Star features, the importance of having an HRV and solar-readiness package, the requirements that must be met by the builder, options for adding a solar water heater and other components for a net-zero-energy home.

Financial incentives for the builder would consist of a sliding scale of rebates based on the EGH rating for the new house, starting at $2,000 for EGH 80 up to $5,000 for a net-zero-energy home. Rebates would be provided only for homes that receive EGH 80+ certification, that use only natural gas or solar water heating, and that meet other green building-requirements such as solar readiness (attic to basement wiring and plumbing channels, and on-site power interconnections) and the installation of a heat recovery ventilator (HRV).

Financial incentives for home buyers would include a reduction in CMHC mortgage insurance and sales tax rebates for Energy-Star appliances purchased for the home.

Program 2: New Commercial/Institutional Green Buildings

The objective of this program is to encourage high levels of energy efficiency and other green building characteristics in new construction of non-single-

family- home buildings in all parts of Ontario. The goal is that more than 50% of new buildings would have energy consumption equal to or better than 30% of the NMECB by 2009. The 30% requirement would become the minimum requirement for the Ontario Building Code in 2010 (see Program 3: Ontario Building-Code Energy-Efficiency-Requirements Upgrade Cycle).

The Province would institute a Green Buildings Tax Credit similar to the tax credit program successfully used in New York State for a number of years. Owners of completed "green" buildings would be issued certificates that could be set against taxes for a specified number of tax years. The credit would be a certain percentage of the additional cost of building green — up to a stated maximum.

A new Green Building Services Team coordinated by the Conservation Bureau would be established to assist building owners and design teams with energy-efficient facility design through analysis and resources such as those listed below:

- provision of technical assistance and computer modeling to help evaluate energy-efficiency measures, for guidance in integrated design and the incorporation of new and emerging energy-efficient technologies, for life cycle costing analysis, and for recommendations on green materials;
- organization of design charrettes;
- assistance in obtaining LEED® certification, the Ontario Green Buildings Tax Credit, and federal CBIP grants (owner incentives of up to $60,000[24]);
- assistance for commissioning services, advanced solar, day lighting, and other new green building opportunities; and
- **provision of design-team incentives** of up to $50,000 per project to reward designers who meet ambitious energy-efficiency goals.

Program 3: Ontario Building-Code Energy-Efficiency-Requirements Upgrade Cycle

The Province would use the current 2006 review of the Ontario Building Code to introduce increased minimum energy efficiency and green-building-technology barrier-removal regulations into the Ontario Building Code — effective in 2007.

The new 2007 efficiency levels for new housing should refer to EGH 80 or the International Energy Efficiency Code (IEEC) 2003, while those for all other buildings should be required to meet CBIP standards[25] or refer to ASHRAE 90-1 2004. The 2007 code should also include requirements for solar readiness and other measures to eliminate barriers to green building technologies. These proposed code requirements are significantly better than the proposed "aggressive" prescriptive enhancements in the current review.[26]

A three-year review cycle for energy efficiency requirements in the Building Code would be established. Targets should be set for 2010 based on an EGH rating of more than 80 (for residential housing) and 30% better than the updated NMECB (for all other buildings).

Discussions on the 2010 revisions should begin in 2007. At the same time, under the auspices of the Council of Energy Ministers DSM Working Group, the NMECB would be updated in cooperation with the federal government and other provinces, and agreement would be sought among provinces to use a common EGH rating for efficiency levels in housing. Where possible, harmonization with US states would also be sought.

3.2.2 Building Retrofit Programs

The suite of three retrofit programs is aimed at high levels of participation in retrofits of existing residential homes, small business establishments, and larger commercial/institutional buildings.

Program 4: Ontario Existing Single-Family-Residential Retrofit

The Ontario Existing Single-Family-Residential Retrofit Program provides prescriptive rebates directly to consumers for the purchase and installation of energy-efficient equipment recommended by the federal EGH audit program and appliances with the Energy-Star labels. The objective is to encourage more homeowners to implement the recommendations of the audit report and purchase Energy-Star products. Consumers are provided with additional assistance through the certification of renovators and bulk purchasing of equipment.

The goal of the program is to achieve a permanent minimum of 10% electricity and gas savings in 25% of existing single-family housing stock over five years. The program could include appliance change-out and a lighting programs under development by the OPA Conservation Bureau.

Program 5: Ontario Small-Business High-Efficiency Lighting

The goal of this small-business program is to deliver 10,000 high-efficiency lighting retrofits over a five-

year period. The program will be structured with comprehensive management and coordination services to assist small retail outlets, small offices, and small food-and-beverage companies from beginning to end of the installation process. The set of services envisioned comprises education, outreach and marketing; an on-site lighting survey; arrangement of pre-certified contractors; specification of lighting products; financial incentives; quality control/quality assurance; and independent evaluation, measurement and verification.

Another goal of this comprehensive turnkey service is to make participation easy: the small-business owner signs on the bottom line; the program takes care of the rest. "Direct install" means that the program covers 100% of material and labour costs.

Program 6: Ontario Existing Commercial Buildings Retrofit

The primary objective of this program is to assist private small- and medium-commercial customers achieve long-term energy savings and peak-demand reductions through energy-efficiency retrofits. Rebates offered through the program will help offset the cost of upgrading to high-efficiency equipment. Retrofit contractors will be certified to provide energy-efficiency services to commercial building owners and managers, and the Province will provide a team of "circuit riders" to help building owners and managers through the retrofit process (based on a successful California model).

The target technologies for this program are commercial lighting replacement, HVAC equipment turnover and motor turnover. The program is limited to small and medium customers, who are defined as having a monthly electrical demand range between 30kW and 500kW. A separate public/institutional program would be established for universities and colleges, municipalities, hospitals, and K–12 schools.

The goal of the program is to reduce electricity use at every site by at least 20% — inspired by California's Green Building Action Plan through which that state has made a commitment to reducing electricity use by 20% across the commercial sector by 2015.

The program would also address the commercial sector's large amount of energy waste through poor air-conditioning practices.

3.2.3 Industrial/Commercial Programs

Program 7: Ontario Combined Heat/Power (CHP) Standard Offer Contracts Pilot Program

A Standard Offer Contract (SOC) permits the interconnection of CHP resources to the electric-utility grid and specifies how much the CHP generator is to be paid for electricity. The SOC approach creates strong financial incentives and a stable market environment that can "unleash the power" of the private sector.

The Pembina Institute recommends that the initial phase of the SOC be run as a large pilot program with a target of acquiring at least 2,000MW by 2010 from both industrial buildings and larger commercial/institutional buildings such as hospitals, schools, hotels, retail complexes and food processing plants. The OPA would ensure that the CHP portfolio reflects a diverse range of sectors, industries and regions across the province.

3.2.4 Appliances and Equipment

Program 8: Ontario Energy Efficiency Act Standards-Upgrade Cycle

Ontario, like California, should establish a regular schedule of upgrades to minimum efficiency standards under the Ontario Energy Efficiency Act. As the programs increase the market share of high-efficiency products, the standards would be upgraded to reflect the change. Although the minimum performance standards in Ontario have been improving, substantial energy-efficiency gains remain to be seen. Some of the technologies for which minimum performance standards should be upgraded immediately are as follows:

Residential Sector

- Energy-Star refrigerators — to 15% better than the 2001 US federal standard by 2008
- Energy-Star clothes washers — to MEF 1.42, WF 7.5 by 2008
- Energy-Star furnaces — to AFUE 90% by 2008
- Energy-Star windows — to R3.2 by 2008
- Energy-Star central air conditioners — to SEER 14 by 2011
- Split Systems — to SEER 14, EER 11.5, HSPF 8.2
- Single Package Systems — to SEER 14, EER 11.0, HSPF 8.0[27]

Commercial Sector

While some commercial-sector technologies are not yet labeled and rated as are residential Energy-Star products, many technologies do have performance standards that could be upgraded given that high-efficiency products are already widely available. Technologies that should be the focus of new regulations include the following:

- Clothes washers — to MEF 1.26, WF 9.5 (harmonized with California, Maryland, and Connecticut) by 2008
- Gas water heaters — to Thermal Efficiency 90% by 2008
- Gas boilers — to Thermal Efficiency 90% by 2008

3.2.5 Utility CDM Programs

Program 9: CDM Coordination and Support Unit

A CDM Coordination and Support Unit will be established in the Conservation Bureau, offering CDM program design, management, and verification services to Ontario LDCs. This will allow smaller LDCs to take advantage of the OEB CDM incentive mechanism, enable customers across Ontario to benefit from the same efficiency improvements wherever they live or run businesses and ensure that all CDM programming meets provincial objectives.

The Coordination and Support Unit would provide services free of charge but would also offer to find delivery agents for the CDM programs it has helped to design. The LDCs would pay for the delivery of these programs at-cost on a contract basis.

To ensure that LDC CDM programs leverage the acquisition of efficiency resources at less than avoided-cost, only CDM programs that produce verifiable market transformation or permanent reductions in power consumption though efficiency or fuel switching would be eligible for assistance from the CDM Coordination and Support Unit. Such programs would include those funded under the $163 million currently allocated to approved CDM programs, and those approved under the new CDM shared-savings incentive mechanism.

The goal of this program is to help LDCs deliver permanent energy savings from the already-approved $163 million of CDM programming at an average of 2.5¢/kWh providing 2,000 GWh/yr of savings. A further goal is to encourage LDCs to take advantage of the OEB CDM shared-savings incentives mechanism, saving a further 2,000 GWh/yr by 2010.

3.3 Cross-Cutting Initiatives

US experience suggests that in order to achieve sustained gains in energy efficiency, core-management, infrastructure and funding mechanisms need to be in place. To implement the Quick-Start programs described above, Pembina recommends the following three cross-cutting enabling measures:

1. Provincial coordination/management
2. A secure funding base
3. Training and infrastructure

Initiative 1: Provincial Coordination/ Management

Make the OPA Conservation Bureau an independent agency reporting to the Ministry of Energy, and increase its staff and resources so that it can manage and coordinate the delivery of existing and Quick-Start programs, and influence and coordinate CDM programs delivered by LDCs.

Initiative 2: A Secure Funding Base

This will involve three distinct streams:

a. The use of the rate-based mechanisms established by Bill 100[28] to finance the OPA to finance energy efficiency and conservation programs.
b. The allocation of sufficient resources within the budgets of the ministries of Energy and of Municipal Affairs and Housing to manage regular three-year cycles of building-code energy-efficiency improvements and equipment minimum efficiency standards upgrades under the Energy Efficiency Act.
c. The continued provision of a shared-savings CDM incentive mechanism to LDCs.

Funds and technical support offered by the federal government through national energy-efficiency initiatives and climate-change mitigation agreements should be actively pursued.

Initiative 3: Training and Infrastructure

Establish training, apprenticeship and certification programs in all community colleges to provide retrofit and new building contractors, CDM program managers, suppliers and "circuit riders" who have all been well trained in energy-efficiency techniques and are knowledgeable about energy-efficient products. Offer internships and business-development loans to allow energy users to make use of the newly trained expertise and to encourage the development of turn-key energy-efficiency service companies.

The rationale for each of these recommendations is provided below.

3.3.1 Initiative 1: Provincial Coordination/Management

The current institutional arrangements for the management of efficiency programs in Ontario are lim-

ited to the Conservation Bureau in the OPA, and a small Codes and Standards Office in the Ministry of Energy.

A review of how US states manage energy efficiency programming shows that a dedicated independent agency with its own stable funding is needed if the objective is to deliver comprehensive conservation and demand-management (CDM) programs to all consumers and sectors, and to transform markets or acquire significant efficiency resources. Several different models are used where the designated agency works with a variety of private-sector companies, professionals, distributors and NGOs to deliver programs. Examples of US states with successful management of energy-efficiency programming include New York[29], Vermont[30], Oregon[31], Wisconsin[32] and Texas.[33]

It is recommended that the Conservation Bureau be removed from the OPA and established as an independent agency modeled on Efficiency Vermont. An independent Bureau's core funding would be provided through the mechanisms provided for the OPA through Bill 100.[34] The Bureau's funding could also be supplemented by contracted services provided to smaller LDCs that choose not to operate their own CDM programs (see the CDM Coordination and Support Unit Program).

Making the Bureau independent of the OPA would allow it to undertake efficiency programming with its own budget. The OPA should, however, be required to include Conservation Bureau programming in its resource acquisition and integrated power-system planning processes. The Bureau could also manage Ontario components of any new national energy-efficiency programs.

The Bureau should participate in OEB rate hearings to assist in evaluating CDM programming submitted for approval by LDCs under the 5% shared-savings incentive mechanism. By participating in the OEB process and providing selective technical support through its LDC CDM Support Unit, the Bureau would be able to ensure that a) LDC CDM programming meets the Provinces supply-mix needs, b) this programming is available to all regions and sectors of the Province, and c) the latest and most effective programs are delivered.

3.3.2 Initiative 2: A Secure Funding Base

US experience shows that a jurisdiction cannot hope to produce long-term sustained energy-efficiency improvements and market transformation without a permanent source of financing that is independent of annual budget decisions by government. Typically a combination of the following measures has been used:

- The establishment of legislated, regular (usually three- or four-year) cycles for revisions to energy-efficiency requirements in the building code and minimum standards for equipment, requiring a permanent government budget allocation for this process. Forty (40) US states have set up such processes.[35]
- The establishment through legislation of a small, permanent, rate-based funding mechanism that is paid by every electricity or gas user on the utility bill. The proceeds from this mechanism are used to finance energy-conservation and efficiency programs. Eighteen (18) US states that have deregulated their utilities have re-regulated a "Public Benefits Charge" (PBC) to provide customers with efficiency programs.[36] The OPA, for its part, is allowed to establish fees and charges for anything it is required or permitted to do under The Electricity Act (including the delivery of conservation programming), subject to approval by the Minister of Energy and the OEB.[37]
- The establishment of a legal requirement for power utilities to purchase the lowest cost resources or set a minimum fraction of efficiency resources (efficiency portfolio standard). Utilities then acquire efficiency resources themselves, or from third-party CDM program delivery agents. A market for energy-efficiency certificates can also be established that allows those with energy-efficiency commitments to purchase reductions from others.
- The provision of CDM incentive mechanisms that allow utilities to share savings from CDM programs by linking rate increases to program performance (verified net benefits).

These approaches equitably share the cost of acquiring efficiency resources and market transformation among energy users, taxpayers, and utilities in the following ways.

- All energy users pay small rate increases but benefit from avoidance of long-term, large rate increases needed to pay for expensive new supply facilities.
- Taxpayers finance new regulations for buildings and equipment but would benefit from lower energy bills.
- Participants in programs purchase more-efficient equipment but would benefit from lower bills and the program incentives.
- Utilities share in both the cost and the benefits of DSM programs.

The cost is more than recovered through lower rates (because of deferred supply resources), and lower energy consumption. California, for its part, invests approximately $1 million per MW of permanent savings achieved.[38]

The Ontario Quick-Start strategy would be financed using the following three funding mechanisms:

- Budget Allocations for a Regular Cycle of Code and Standard Reviews through the Ministries of Energy and of Municipal Affairs;
- Bill 100 Funding Mechanisms for Energy-Efficiency and Conservation Programming; and
- LDC CDM Incentives

3.3.2.1 Budget Allocations for a Regular Cycle of Code and Standard Reviews through the Ministries of Energy and of Municipal Affairs

Adequate resources must be made available to the responsible ministries for the administration of the building-code review cycle and regular improvements to equipment standards under the Energy Efficiency Act carried out under the Quick-Start Initiative. These cycles are described in more detail in section 3.2 and in Appendix 1.

3.3.2.2 The Use of Bill 100 Funding Mechanisms for Energy-Efficiency and Conservation Programming

The OPA should employ the financing mechanisms provided to it under Bill 100[39], to fund conservation programs, with the proceeds being managed by the Conservation Bureau to fund both existing programs and the new Quick-Start programs to be delivered by the Bureau.[40] The Bureau may choose to deliver some programs itself; to deliver programs in partnership with the private sector, professional groups, or NGOs; or to contract delivery of programs to these same groups or to gas or electric LDCs.

In the longer term, Ontario should consider a legislated energy-efficiency portfolio standard for LDCs with an energy-efficiency-certificate program that would allow LDCs to purchase reductions from other LDCs or energy users. This would be especially worthwhile should a regional US/Canada market develop for these certificates.

3.3.2.3 Utility CDM Incentives

Since 2005, electricity and gas distributors (LDCs) in Ontario have been allowed to recover the cost of investment in conservation and demand management (CDM) initiatives from ratepayers in the rates approved by the OEB. The LDCs may also share in the benefits their customers receive from the CDM programs by recovering 5% of the net benefits from the program in the form of increased rates. To be eligible for this incentive, the CDM programs must be approved by the OEB. A similar incentive has existed for gas distributors for several years.

As few LDCs in Ontario have CDM program experience (it has been more than 10 years since these types of programs were widely offered), only larger LDCs will be able to take full advantage of the incentive and, therefore, great opportunity to obtain permanent reductions in consumption and demand will be lost. In addition, due to differences in the scope and number of programs, many customers will not have full access to important opportunities.[41]

In the future, the OEB incentive should support only the CDM programs that meet specified targets and deliver verifiable permanent reductions in consumption and demand, or verified transformation of the market for energy-efficient equipment. Program approval would be contingent on demonstrating that these objectives can be met at less than the avoided cost.

To help LDCs with CDM plans approved under the OEB incentive process (and those already approved under the one-time $163 million grant), the Conservation Bureau and experienced LDCs should set up a CDM Coordination and Support Unit (see Program 9: CDM Coordination and Support Unit). The objective would be to acquire permanent savings at between 2 and 3¢/kWh, a level that has been shown to be possible in the US.[42] The Unit would also coordinate CDM programming across Ontario so that all customers would be able to benefit equally from common programs.

3.3.3 Initiative 3: Training and Infrastructure

Ten years without government support for energy efficiency and conservation has left Ontario without a well developed, energy-efficiency manufacturing and service industry. Many parts of the Province also do not possess the professionals and technicians needed to deliver energy-efficiency products and services. Finally, many LDCs also do not have the capacity or experience to deliver DSM programs. There is a need to quickly establish energy-efficiency training and certification programs at all community colleges and other training institutions in Ontario.

Another barrier to the rapid deployment of energy-efficiency measures is the fact that energy users themselves do not have the knowledge, staff

resources, or time to review an energy audit, analyze options, decide on the appropriate retrofit plan and manage its implementation — even if the products and services were available. Energy users need technical and project-management "hand-holding" during the whole retrofit process. Mechanisms, such as the provision of "circuit riders" to help energy users manage retrofit projects, internships, and embedded project managers should be used proactively to help individual building owners and operators with retrofit projects. These would also encourage the establishment of new, turnkey, energy-efficiency, service-delivery companies like Home Works.

Ontario needs to support a training, certification and oversight initiative through a partnership among the Conservation Bureau, community colleges and contractor organizations across the Province. The network of Community colleges would train and certify the following energy-efficiency professionals and trades:

- Residential energy-efficiency retrofit contractors and renovators;
- CDM program managers; and
- Interns and circuit riders for commercial and institutional retrofit projects.

Contractors such as home renovators should be encouraged to set up dedicated associations of certified members. Association members would appear on a central list of certified contractors maintained by the Conservation Bureau. Participants in CDM programs offered by the Bureau would be required to use certified contractors. Programs that offer interns and circuit riders should take advantage of employment-creation programs such as On-Site.

The concept of certifying contractors that provide retrofit services has been well tested in New York State, where Home Performance Contractors certified by the Building Performance Institute provide home audits (like the Canadian EGH) and carry out retrofit work.[43]

The Conservation Bureau would be responsible for overseeing a complete delivery infrastructure for energy efficiency across Ontario, ensuring that trained, knowledgeable and qualified contractors, suppliers, professional support, and CDM programs are available to all Ontarians and their businesses.

4. The Quick-Start Strategy Energy Savings

It is not possible in this report to provide detailed estimates of the savings and peak-demand reductions that each Quick-Start program would generate due to limitations in the available data on current electricity-consumption patterns. The programs should be seen as the first tranche of efficiency programming in the long-term development of a conservation culture in Ontario.

Some observations can be made about the potential reductions that could be obtained using the Quick Start approach over the next five years. The Pembina Institute's "Power for the Future" study showed that, with the appropriate combination of codes, standards, incentives and other programs, 7,500 GWh/yr could be produced through cogeneration and a 16% savings achieved through fuel switching and efficiency in the residential and commercial sectors by 2010. This level of savings is similar to the 20% targets that exist in several US states.

The targets for Ontario's Quick-Start programming implied by this finding would be as follows:

	GWh/yr	MW Equivalent
Cogeneration	7,500	2,000
CDM, Efficiency and Fuel Switch	15,500	2,500
Total	**23,000**	**4,500**

While the increases in cogeneration and fuel switching will increase the demand for natural gas, this will be partially offset by the savings in natural gas from heating and water-heating efficiency produced by the Quick-Start programs.

The building code and Energy Efficiency Act standards updating programs are designed to consolidate the gains of new-building and retrofit programs respectively. Gains made by the new-building and retrofit programs may be assumed to be permanent. The ongoing cycles of code and standards changes will leverage additional savings beyond the scope of the programs.

It is assumed that the CDM programs delivered by LDCs under the one-time $163 million OEB grant over three years ($54 million per year) and the additional programs offered under the ongoing OEB shared-savings incentive initiative would create savings in addition to those created from the above Quick Start programs. The objective of the CDM Coordination and Support Unit is to help LDCs produce savings from the $163 million at 2.5¢/KWh, and to produce a similar level of savings from the shared-savings incentives — $54 million per year at 2.5¢/kWh would produce 2,000 KWh/yr savings. The CDM Coordination and Support Unit program would, therefore, yield 4,000 kWh/yr savings or 800MW.

Quick-Start program goals are summarized in Table 1 on the following page.

Table 1: Summary of Quick Start Programs Goals and Objectives

Program name	Goals
1. New Housing Energy-Efficiency Program	65% market share of solar-ready, EGH 80 homes by 2010; 25% with SWH and 5% with net zero energy.
2. New Commercial/Institutional Green Buildings Program	50% of new buildings with energy consumption better than 25% of the NMECB by 2009. High incorporation of green building features.
3. Ontario Building-Code Energy-Efficiency-Requirements Upgrade Cycle	Introduce a 3 year review cycle. Harmonize with US, embed green readiness features, EGH 80 and 25% better than model energy code in 2007. EGH 80 and 30% better-than-model energy code by 2010.
4. Ontario Existing Single-Family-Residential Retrofit Program	10% savings in electricity and gas in 25% of homes over five years.
5. Ontario Small-Business High-Efficiency-Lighting Program	20% savings at 10,000 sites.
6. Ontario Existing Commercial Buildings Retrofit Program	20% savings in energy in target floor space over five years.
7. Ontario Combined Heat/Power (CHP) Standard Offer Contracts Pilot Program	2,000MW from a broad range of sectors.
8. Ontario Energy Efficiency Act Standards-Upgrade Cycle	Harmonize with leading US states — at least 15% improvement in most standards for energy-using equipment.
9. Conservation and Demand Management (CDM) Coordination and Support Program	Acquire LDC CDM savings at an average of 2.5¢/kWh.

5. Conclusions

The large potential for technologically feasible and economically rational improvements in the energy efficiency and productivity of the Ontario economy is well established. Unfortunately the current programming being offered by the Government of Ontario is inadequate to realize this potential on a major scale.

Successful large-scale, integrated energy-efficiency strategies have emerged as cornerstones of energy policy in a significant number of US states. California, New York and Vermont are frequently cited as the leading jurisdictions in this regard. Strategies implemented by these states have delivered substantial reductions in electricity consumption.

The successful US strategies have been built around a common set of key themes, which include:

- a long-term commitment to energy efficiency that includes making acquisition of efficiency the cornerstone of power planning, with dedicated legislation and resource allocations to bring this about;
- a permanent long-term funding mechanism to transform markets, acquire efficiency resources and deliver efficiency services;
- a dedicated independent agency responsible for the coordination of efficiency programs and the delivery of energy services;
- a comprehensive set of efficiency programs designed to transform efficiency markets rapidly;
- the proactive marketing and delivery of programs in which solutions are taken directly to residential, commercial, industrial and institutional customers rather than waiting for their response;
- the use of financial incentives to spur incentives in high-efficiency products and accelerate the turnover of existing inefficient stock;
- the pursuit of aggressive building-code and standards review cycles to consolidate gains made through incentives programs and complete market transformations; and
- the integration of electricity and natural gas energy efficiency programs and measures wherever possible.

A Quick-Start Energy-Efficiency Strategy for Ontario drawing on these experiences and themes would include three cross-cutting enabling measures, and nine specific program initiatives that target major sectors and end-use technologies.

The cross-cutting initiatives would include the following:

- improved provincial coordination and management, including the establishment of the Conservation Bureau as an independent agency with its own funding mechanism;
- the establishment of a secure funding base for energy-efficiency programs through the base budgets of key provincial ministries, the use of the Bill 100 funding mechanisms for conservation purposes, and rate-based incentives to LDCs; and
- training and infrastructure building, in particular, energy-efficiency training and certification of retrofit and new-building contractors, CDM program managers, and outreach "circuit riders".

Programs (outlined in detail in Appendix 1) would include the following:

- A residential high-efficiency new-homes program
- A commercial new green buildings program
- An aggressive cycle of regular reviews and upgrades of the energy-efficiency provisions of the Ontario Building Code.
- An existing-housing audit, retrofit and rebate program.
- A small-business high-efficiency lighting program.
- A larger-business lighting, HVAC and shell retrofit program.
- A CHP standing offer program.
- An aggressive cycle of regular reviews and upgrades of equipment standards under the Ontario Energy Efficiency Act.
- An LDC CDM support and coordination program within the Conservation Bureau.

The programs outlined in the Quick-Start Strategy represent the first tranche of programming in a long-term energy-efficiency strategy. When imple-

mented, the programs would provide a major step towards the Quick Start target of savings of in grid electricity consumption of 23,000 GWh/yr, with an implied reduction in required generating capacity of 4500MW, by 2012, through cost-effective reductions in electricity consumption and increased cogeneration. These savings would be over and above those achieved by existing provincial initiatives.

Endnotes

1 M. Winfield, Towards a Sustainable Electricity System for Ontario: A Provincial Progress Report. (Toronto: Pembina Institute, 2005), Figure 3.

2 Ontario Clean Air Alliance, http://www.cleanair.web.ca/resource/fs18.pdf

3 Ontario Power Authority, Supply Mix Advice Report. (Toronto: OPA, December 2005), p. 61.

4 Ontario Power Authority, Supply Mix Advice Report. (Toronto: OPA, December 2005) p. 63.

5 See, for example, J. Gibbons, A New Electricity Strategy for Ontario (Toronto: Ontario Clean Air Alliance, 2005)

6 See, for example, M. Winfield et.al., Power for the Future: Towards a Sustainable Electricity System for Ontario. (Ottawa: Pembina Institute, 2004); ICF Consulting, Report on CDM Potential in Ontario (Toronto: Ontario Power Authority, December 2005).

7 See, for example, Winfield et.al., Power for the Future; ICF Consulting, Report on CDM Potential.

8 Interim Opinion: Energy Efficiency Portfolio Plans and Program Funding Levels for 2006-2008 — Phase 1 Issues. (California Public Utilities Commission, Decision 05-09-043, September 22, 2005) p. 10

9 http://www.nyserda.org/default.asp

10 http://www.efficiencyvermont.com/

11 http://www.energytrust.org/productionefficiency/index.html

12 http://www.focusonenergy.com/index.jsp

13 http://www.seco.cpa.state.tx.us/

14 ICF Consulting. Report on CDM Potential. p. 47

15 ICF Consulting. Report on CDM Potential. p. 35

16 ICF Consulting. Report on CDM Potential. p. 22

17 ICF Consulting. Report on CDM Potential. p. 24

18 Winfield et.al., Power for the Future.

19 Torrie, Ralph and Richard Pratt. Phasing Out Nuclear Power in Canada — Towards Sustainable Electricity Futures. (Ottawa: Campaign for Nuclear Phase-Out, July 2003).

20 Western Governors Association. Clean and Diversified Energy Initiative — Energy Efficiency Task Force Report, 2005

21 US Environmental Protection Agency, Clean Energy-Environment Guide to Action. 2005 www.epa.gav/cleanenergy/stateandloacl/activities.htm

22 ICF Consulting. Report on CDM Potential. p. 23

23 The Council of Energy Ministers Energy Efficiency Working Group and the Canadian Electrical Association are discussing a national initiative focusing on residential, commercial and outdoor lighting efficiency.

24 The NRCan Commercial Building Incentive Program (CBIP) Performance Path. The CBIP pays an incentive to the building owner equal to twice the annual energy cost-saving of the proposed building design compared to a Reference building design approximately based on the Model National Energy Code for Buildings (MNECB). The minimum threshold for incentive eligibility is 25% energy consumption reduction compared to the Reference, and the maximum available amount is $60,000 per building. Compliance must be demonstrated using software provided or sanctioned by the program.

25 25% better than the NMECB.

26 Ministry of Municipal Affairs and Housing. Proposed Changes to Ontario's Building Code to Increase Energy Efficiency of Buildings — Technical Requirements, Consultation Document. (Toronto: 2006).

27 MEF = Modified Energy Factor (Higher is better.)
WF = Water Factor (Lower is better.)
AFUE = Annual Fuel Utilization Efficiency (Higher is better.)
R = Resistance to Heat Loss (Higher is better.)
SEER = Seasonal Energy Efficiency Ratio (Higher is better.)
EER = Energy Efficiency Ratio (Higher is better.)
HSPF = Heating Season Performance Factor (Higher is better.)

28 See The Electricity Act, 1988 as amended, ss.25.20-25.21.

29 http://www.nyserda.org/default.asp

30 http://www.efficiencyvermont.com/

31 http://www.energytrust.org/productionefficiency/index.html

32 http://www.focusonenergy.com/index.jsp

33 http://www.seco.cpa.state.tx.us/

34 The Electricity Act, 1988, ss.25.20-25.21.

35 US Environmental Protection Agency. Clean Energy-Environment Guide to Action. 2005 www.epa.gav/cleanenergy/stateandloacl/activities.htm

36 US Environmental Protection Agency. Clean Energy-Environment Guide to Action. 2005 www.epa.gav/cleanenergy/stateandloacl/activities.htm

37 The Electricity Act 1988, as amended, ss.25.20 and 25.21.

38 Interim Opinion: Energy Efficiency Portfolio Plans and Program Funding Levels for 2006-2008 - Phase 1 Issues, California Public Utilities Commission, Decision 05-09-043, September 22, 2005

39 As authorized under s.25.20 Fees of The Electricity Act.

40 In the short term, the Bureau might operate under contract to the OPA. In the longer term, The Electricity Act should be amended to establish the Conservation Bureau as a separate agency with access to funding mechanisms similar to those provided to the OPA.

41 In 2005, the OEB also approved CDM program plans

from electricity distributors to spend $163 million over three years. This expenditure was approved under a one-time ruling that past LDC profits could be used for approved CDM programs. The CDM programs approved by the OEB cover a broad spectrum of measures, from smart meters to financial incentives but focus mainly on demand-response measures. Some LDCs offer a comprehensive set of programs while others very few. No LDC CDM plans have set targets. for the savings to be achieved from each program, or have estimated the cost per kWh delivered. The OEB also did not set targets for approved CDM plans — just the rules for claiming the incentive if achieved.

42 $163 million over three years at an average of 2.5¢/kWh would provide a savings of 2,000 GWh/yr by 2008.

43 http://www.getenergysmart.org/WhereYouLive/HomePerformance/overview.asp

Appendix 1: Energy-Efficiency Program Templates

Program One: New Housing Energy-Efficiency Program

Sector: Single Family, Duplex, and Row Housing
Customer Eligibility: All prospective new home-builders and buyers. All new homes exceeding Energy Star, EGH 80 or equivalent standards with optional solar water heating and net-zero-energy home (NZEH) enhancements.
Measures: Whole house measures + SWH heating and NZEH enhancements
Goal: 65% market share for homes with an -EGH rating greater than 80 by 2010 — 25% of which would have solar water heaters and 5% would be net-zero-energy homes.
Program Components and Financial Incentives: Ontario-wide directory of Energy-Star Home Builders, Home-Buyers' kit, annual awards, certified-builder incentives based on EFH rating and inclusion of solar readiness, CMHC mortgage insurance concessions, sales tax rebate on Energy-Star appliances, free interconnection and feed-in tariff for solar PV.
Delivery Agent: Partnership of Conservation Bureau or other Provincial agency, Energy Star home builders, CMHC, and EnerGuide for Houses (EGH) Auditors

Program Description

The goal of this program is to greatly increase the number, types and profiles of high-efficiency Energy-Star and other homes being built in Ontario over the next four years — adding significantly to the small number of projects currently under way in Mississauga, Ottawa and other cities. The objective is to achieve 65% market share for homes with an EGH rating of greater than 80 by the end of 2009 — of which 25% would have solar water heaters and 5% would be net-zero-energy homes.

The program would have several elements, including the maintenance of a province-wide directory of certified Energy-Star home builders, an Energy-Star home-buyers' kit, annual awards and a conference for Energy-Star building achievements, certification of Energy Star/EGH 80 rating, and a series of financial incentives for both the builder and the home buyer.

The Home-Buyers' Kit would include information on the benefits of Energy-Star homes, standard specifications for Energy-Star features, the importance of having an HRV and solar-readiness package, the requirements that must be met by the builder, options for adding a solar water heater and other components for a net-zero-energy home.

Financial incentives for the builder would consist of a sliding scale of rebates based on the EGH rating for the new house, starting at $2,000 for EGH 80 up to $5,000 for a net-zero-energy home. Rebates would be provided only for homes that receive EGH 80+ certification, that use only natural gas or solar water heating, and that meet other green building-requirements such as solar readiness (attic to basement wiring and plumbing channels, and on-site power interconnections) and the installation of a heat recovery ventilator (HRV).

Financial incentives for homebuyers would include a reduction in CMHC mortgage insurance, sales tax rebates for Energy-Star appliances purchased for the home, tax credits on solar water heaters.

Barriers/Program Theory

Several Energy Star subdivisions are being built in Ontario, some with solar water heaters and net-zero-energy features. CMHC provides reductions in mortgage insurance for these homes. The homes have received very positive support from builders, owners and municipalities. Successful Energy Star building support programs in the US are being implemented in the states of Wisconsin, Vermont, Massachusetts and others. Such programs involve state-wide promotion of Energy-Star homes backed up by incentives for builders (MA), certification and mortgage concessions (VT), and builder certification (all). This combination of financial and industry-development

measures has overcome the barriers of higher initial cost and lack of builder experience that inhibit the building of more efficient housing.

Ontario, therefore, has a great opportunity to raise the bar of home building efficiency in Ontario, using an Energy-Star promotion and incentive program combined with a new Building Code Revision cycle. The goal would be to make Energy-Star homes common in all parts of the Province within four years and to familiarize all home builders and owners with their features and benefits. The objective would be to make Energy-Star homes standard practice by 2010. There is also an opportunity to "piggyback" support initiatives for solar water heaters and net-zero-energy homes onto the Energy-Star program.

Experience in the US shows that a combination of financial incentives for both builders and prospective home buyers is needed in addition to information and promotion. The rating and certification of homes and builders is also important if energy efficient homes are to be publicly supported with confidence.

Marketing and Outreach

Information about the program, including directories, financial incentive applications, home-buyer kits, etc., would be distributed at home shows, through municipalities and LDCs, and on the internet. An annual conference and awards ceremony would increase awareness and participation among builders.

Delivery and Staffing

Program would be coordinated by the Conservation Bureau in cooperation with a new Association of Energy-Star Home Builders, which would also provide self-certification and a directory. Arrangements would be made with CMHC to provide mortgage incentives, and with Energy Guide for Houses Auditors to provide verification/certification of qualified new homes. Financial incentives for builders would be coordinated by the Province through the Conservation Bureau.

Evaluation, Measuring and Verification

The program would track the number of Energy-Star, R2000 and other greater-than-EGH-80 homes being built and qualify for incentives through the EGH rating estimated by the EHG auditors.

List of Programs from Other Jurisdictions

Wisconsin Focus on Energy Energy Star Homes Program http://www.focusonenergy.com/page.jsp?pageId=26

Efficiency Vermont Energy Star Homes Program http://www.efficiencyvermont.com/index.cfm?L1=85&sub=res

Northwest Energy Star Homes Program http://www.northwestenergystar.com/index.php?cID=296

Massachusetts and Rhode Island Energy Star Homes Program http://www.energystarhomes.com/ESHController.aspx?home

Program Two: New Commercial/Institutional Green Buildings Program

Sector: New Commercial and Institutional Buildings
Customer Eligibility: All new buildings except single family/row
Measures: Whole building efficiency and green building technologies
Goal: 50% of new buildings would have energy consumption of at least 30% of the National Model Energy Code for Buildings (NMECB) by 2009. Significant numbers of these buildings would obtain Green-Building certification.
Program Components and Financial Incentives: Green Buildings Services (technical assistance during design, construction and commissioning), Green Building Tax Credit, Designer Grants to complement federal CBIP Owner Incentives.
Delivery Agents: Major gas and power utilities with the new Provincial Green Building Services Team

Program Description

The objective of this program is to encourage high levels of energy efficiency and other green building characteristics in new construction of non-single-family- home buildings in all parts of Ontario. The goal is that more than 50% of new buildings would have energy consumption equal to or better than 30% of the NMECB by 2009. The 30% requirement would become the minimum requirement for the Ontario Building Code in 2010 (see Program 3: Ontario Building-Code Energy-Efficiency-Requirements Upgrade Cycle).

The Province would institute a Green Buildings Tax Credit similar to New York State's successful Green Building tax credit. Owners of completed "green" buildings would be issued certificates that could be set against taxes for a specified number of tax years. The credit would be a certain percentage of the additional cost of energy efficiency and green building features — up to a stated maximum.

A new Green Building Services Team coordinated by the Conservation Bureau would be established to assist building owners and design teams with energy-efficient facility design through analysis and resources including:

- provision of technical assistance and computer modeling to help evaluate energy-efficiency measures, for guidance in integrated design and the incorporation of new and emerging energy-efficient technologies, for life cycle costing analysis, and for recommendations on green materials;
- organization of design charrettes;
- assistance in obtaining LEED® certification, the Ontario Green Buildings Tax Credit, and federal CBIP grants (owner incentives of up to $60,000[1]);
- assistance for commissioning services, advanced solar, day lighting, and other new green building opportunities; and
- provision of design-team incentives of up to $50,000 per project to reward designers who meet ambitious energy-efficiency goals.

LDCs and gas utilities, municipalities and organizations such as the Better Buildings Partnership in cooperation with the Green Buildings Services Team would deliver these services in larger centres. For institutional buildings such as hospitals and schools, the Services Team would work with appropriate Ministries and Boards.

1. The NRCan Commercial Building Incentive Program (CBIP) Performance Path. The CBIP pays an incentive to the building owner equal to twice the annual energy cost-saving of the proposed building design compared to a Reference building design approximately based on the Model National Energy Code for Buildings (MNECB). The minimum threshold for incentive eligibility is 25% energy consumption reduction compared to the Reference, and the maximum available amount is $60,000 per building. Compliance must be demonstrated using software provided or sanctioned by the program.

Barriers/Program Theory

Current new building practice has not changed for many years. Architectural design, envelope specification and equipment specification are carried out sequentially, often following old rules of thumb, and on a lowest first-cost basis. The proposed program would attempt to make integrated-green-building design the norm in Ontario by 2009 so that the Ontario Building Code can be updated to much higher standards in 2010.

Green Buildings programs in New York and California have shown that a combination of technical assistance with financial tax and grant incentives is necessary in order to make any major changes in the number of buildings built to green standards. The proposed program would attempt to maximize the value to Ontario of CBIP and other federal programs that provide assistance for new buildings.

The proposed program would draw on the growing green building professional and technical expertise and skills in Ontario — using and expanding the demand for these skills.

Marketing and Outreach

The program would be promoted through utilities and through organizations that represent owners of new buildings, including developers, financial institutions, school and hospital boards, etc. To reach builders of smaller facilities, local municipalities would be used to promote the program with interested owners being referred to the Green Building Services Team. Brochures and other information on the program would be prepared for use by delivery agents.

Delivery and Staffing

The Green Building Services Team would be a Provincial entity led and coordinated by the Conservation Bureau that would bring together private- and public-sector skills in integrated and green building design. The Team would work very closely with the Canada Green Building Council, the Ontario Building Envelope Council and other professionals in this field. One option would be to have one or more of these organizations manage the program.

Evaluation, Measuring and Verification

Certification and verification of energy performance and green building design would be an essential component of the program. The program would work with delivery agents and the professional organizations in the program to keep track of the performance and number of buildings supported — and the annual savings achieved.

List of Programs from Other Jurisdictions

California Savings By Design

http://www.pge.com/biz/rebates/new_construction/

This program provides incentives for efficiency during the design process for non-residential buildings, creating an incentive for designers to become engaged in energy efficiency. The California Public Utilities Commission sets out general requirements, and approves or amends plans and budgets submitted by individual utilities. CPUC has directed that at least 50% of funds be used for "whole-building" oriented projects. Building architects, design teams, building owners and developers receive incentives based on the percentage by which the work exceeds the "Title 24 standards" (California's building energy standard). Building owners or designers receive an incentive if work is more than 10% above the standard, while if the work exceeds standards by 15%, the architects and design team also receive an incentive.

The total budget for the program is $23.3 million per year, of which $22.5 million is for programs and the remainder is for monitoring and administration. The program-savings goals approved by CPUC for 2002 were 87.6 GWh/year of electricity and 14 GWh of thermal energy along with an electrical demand reduction of 29MW[2].

New York State New Construction Program

http://www.nyserda.org/programs/New_Construction/default.asp

This program aims to save energy in buildings by providing technical and financial incentives to applicants to specify and install selected energy-efficient equipment or to erect buildings that exceed the energy efficiency of standard design practice as determined

2. CPUC (2002).

by NYSERDA and the minimum requirements of the New York State Energy Conservation Construction Code. It can also be used for substantial renovations of buildings.

Applicants may choose among incentives for pre-qualified equipment, custom measures or whole-building capital costs. The program provides technical assistance incentives to applicants to assist in the evaluation of energy-saving options for each qualified project, and capital-cost incentives to defray a portion of the incremental capital cost to purchase and install more energy-efficient or advanced equipment. The program may cover up to 80% of the incremental costs of qualified energy-efficiency measures. All energy-efficiency measures must meet cost-effectiveness and benefit/cost criteria set by NYSERDA. The cumulative budget of US$64 million to date will deliver an expected savings of 238 GWh and a demand-reduction of 38MW.

The process starts with an application to NYSERDA, which has retained several Outreach Project Consultants (OPCs) to assist applicants. These OPCs work directly with program applicants to determine eligibility, explore participation options, identify technical assistance needs, and assist in completing program applications. NYSERDA provides written pre-approval of all qualified applications for incentives under this program. This pre-approval authorizes the applicant to proceed with the purchase and installation of the specific equipment and building features outlined in the approved application. Upon completion of the approved installation, the applicant is asked to provide written certification that the equipment and building features have been installed. NYSERDA may elect to inspect any or all projects prior to final approval. All building projects with approved incentive offers of more than $50,000 are inspected prior to payment[3].

3. See http://www.nyserda.org/593pon.html and http://www.nyserda.org/sbcsept2002.pdf .Questions can be directed to Cullen O'Brien at (518) 862-1090, ext. 3414 or cmo@nyserda.org.

Program Three: Ontario Building-Code Energy-Efficiency-Requirements Upgrade Cycle

Sector: Residential and Commercial Buildings
Customer Eligibility: All new buildings and houses
Measures: Building and housing envelope and heating/cooling systems + green building technology readiness features + lighting for non-residential buildings
Goal: From 2007, all new homes built to EnerGuide for Houses (EGH) rating of 80, and all new buildings built 25% better than the current National Model Energy Code for Buildings (NMECB), with higher levels mandated in 2010.
Program Components and Financial Incentives: Establishment of a three-year code-review cycle that harmonizes building code requirements with those of leading US states, requires green-technology readiness and revised ventilation requirements, and sets 2007 code requirements at EGH 80 for houses and 25% better than the current National Model Energy Code for Buildings (NMECB) — with higher requirements to be set in 2010.
The 2007 code would also include requirements for solar readiness and other measures to eliminate barriers to green building technologies.
Delivery Agent: Ontario ministries of Energy and of Municipal Affairs and Housing

Program Description

The Province should use the current 2006 review of the Ontario Building Code to introduce a three-year cycle of increased minimum energy efficiency and green-building-technology barrier-removal regulations into the Ontario Building Code — effective in 2007.

The new 2007 efficiency levels for new housing should refer to EGH 80 or the International Energy Efficiency Code (IEEC) 2003, while those for all other buildings should be required to meet CBIP standards[1] or refer to ASHRAE 90-1 2004. The 2007 code should also include requirements for solar readiness and other measures to eliminate barriers to green building technologies. These proposed code requirements are significantly better than the proposed "aggressive" prescriptive enhancements in the current review.[2]

Targets should be set for 2010 based on an EGH rating of more than 80 (for residential housing) and 30% better than the updated NMECB (for all other buildings).

Discussions on the 2010 revisions should begin in 2007. At the same time, under the auspices of the Council of Energy Ministers DSM Working Group, the NMECB would be updated in cooperation with the federal government and other provinces, and agreement would be sought among provinces to use a common EGH rating for efficiency levels in housing. Where possible, harmonization with US states would also be sought.

Barriers/Program Theory

The Government of Ontario is already undertaking a consultation process to update the energy-efficiency requirements in the Ontario Building Code. The current code provides prescriptive requirements for housing and references ASHRAE 90.1 1989 and the National Model Energy Code for Buildings (NMECB) for other buildings. The changes being proposed, even those that are termed "aggressive", still fall below many of the code requirements in US states and would bring levels only up to those that were proposed in Ontario in the mid-1990s.

1. I.e.25% better than the NMECB.

2. Ministry of Municipal Affairs and Housing. *Proposed Changes to Ontario's Building Code to Increase Energy Efficiency of Buildings — Technical Requirements, Consultation Document.* (Toronto: 2006.)

The Government of Ontario has the opportunity to put in place a Building Code that reflects best building practice across Canada and the US, and to institute a regular code review cycle. Under this review-cycle approach, which is used in California and several other US states, efficiency requirements under the code would be increased on a regular basis towards future targets. A three-year cycle is proposed in order to provide sufficient time to obtain Provincial consensus and to coincide with national targets for 2010 set by the federal government and other provinces and states[3].

The objective is to engage the building industry in the setting of province-wide targets for building efficiency so that the building code includes stepwise improvements to the minimum efficiency requirements that are predictable and within the capacity of all builders. Other programs designed to increase the percentage of high-efficiency homes built, promote the benefits of improved efficiency, will prepare purchasers of the these efficient buildings for the a small increase in first cost that will apply when the new code level is introduced – a cost that is easily recovered through lower operating costs. (See Programs 1 and 2 for New Housing and Commercial Green Buildings respectively)

The 2007 Code revision would base requirements on the EGH rating system and the current NMECB or international standards[4]. The 2010 code revision would reference a new version of NMECB that will be produced by the Council of Energy Ministers DSM Working Group.

2007 code revisions would also include specific requirements that would remove barriers to green-building technologies. These would include mandatory "solar readiness" requirements such as roof-to-basement wiring and plumbing channels, and two-way meters and connections that would allow easy and low-cost future installation of solar and other green technologies. They would also include revised mandatory ventilation requirements to make heat recovery ventilation mandatory in order to ensure that high-efficiency buildings provide good air quality while minimizing heat loss.

The City of Toronto has already requested many of the proposed program features, and it is expected that most municipalities, builders and developers, and new building owners will welcome the predictable and progressive environment that the program would offer. As noted above, California and several other states have initiated regular building-code review cycles and have much higher efficiency requirements than Ontario's. California has also set long-range targets for code efficiency (see the List of Programs from Other Jurisdictions below).

Marketing and Outreach

The three-year cycle would include regular consultations on targets and efficiency with the building industry, developers, municipalities, building owners and community/consumer groups. Familiarization of the building industry with the changes proposed to ensure compliance would be carried out through partnerships with major stakeholders. Details of other programs designed to encourage building beyond the current code would be provided to all builders and prospective building owners (see other program profiles).

Delivery and Staffing

The code review and upgrade cycle, and compliance would be managed by the Ontario Ministry of Municipal Affairs and Housing in cooperation with the Ministry of Energy. Many aspects of the process could be contracted out, and there would be major roles for stakeholders such as the building industry, municipalities and community groups.

Evaluation, Measure and Verification

The compliance function of the program would verify that all buildings meet the requirements of the code. Savings verification would be based on standard reporting of numbers of new homes built and floor areas of new buildings multiplied by the agreed unit savings versus conventional (2005) construction based on EGH ratings and NMECB performance.

3. Federal Kyoto Plan 2002 and BC Building EE Strategy.

4. The International Energy Efficiency Code for houses (IEEC 2003) is used by many US states. ASHRAE 90.1 2004 is used by several states for buildings.

List of Programs from Other Jurisdictions

Current Status of Code Adoption in US States

Residential Energy-Code Adoption:

Version or Equivalent State Code	States Adopted
2003 IECC	19 states: AR, CA, CT, ID, KS, MD, ME[b], MT, NE, NM, NV, OH, OR, PA, RI, SC, UT, VA, WA
2001 IECC	2 states: NY, TX
2000 IECC	12 states: AL[b], AZ[b], DC, DE, FL, GA, KY, LA[a], NC, NH, VT, WV
1998 IECC	1 state: OK[b]
95 MEC	6 states: AK[bc], HI[b], MA, MN, NJ, WI
93 MEC	2 states: CO[b], ND[b]
92 MEC	4 states: IA, IN, MI, TN[b]
prior to 92 MEC	1 state: WY[b]
None	4 states: IL, MO, MS[b], SD[b]

a. Code adopted but not yet effective. Click on the state for more information.

b. Code implementation depends upon voluntary adoption by local jurisdictions.

c. Mandatory for state-owned/funded residential buildings.

Commercial Energy-Code Adoption:

ASHRAE/IESNA Standard or Equivalent State Code	States Adopted
ASHRAE 04	2 states: OH, WA
2003 IECC	16 states: AR, CT, ID, KS, KY, MD, MT, NC[a], NE, NM, NV, PA, RI, SC, UT, VA
2001 IECC	2 states: NY, TX
ASHRAE 01	7 states: AL[c], CA, CO[b], FL, GA, LA, ME
2000 IECC	6 states: DC, IL, NH, VT[b], WI, WV
ASHRAE 99	6 states: AZ[bc], DE, MA, MI, NJ, OR
ASHRAE 89	7 states: HI[b], IA, IN, MN, MO[c], ND[b], OK[b]
90A90B	1 state: TN[b]
prior to 90A90B	1 state: WY[b]
None	3 states: AK, MS[c], SD[b]

a. Code adopted but not yet effective. Click on the state for more information.

b. Code implementation depends upon voluntary adoption by local jurisdictions.

c. Mandatory for state owned/funded commercial buildings.

Examples of States with Code Review Cycles

California

Residential Code: State-developed code, *Title 24*, *Part 6*, exceeds 2003 IECC, and is mandatory state-wide.

Commercial Code: State-developed code, *Title 24*, *Part 6*, meets or exceeds ASHRAE/IESNA 90.1-2001 and is mandatory state-wide.

Code Change Cycle: Three-year code change cycle. The 2005 California Energy Efficiency Standards became effective on October 1, 2005. The Commission has begun work on the 2008 Standards.

Code Change Process: The California Building Standards Commission (BSC) is responsible for administering California's building standards adoption and publication, and the implementation processes of the California Code of Regulations, Title 24. Since 1989, the BSC has published an edition of Title 24 in its entirety every three years. Detailed information on code promulgation and amendment procedures may be found under supporting documents.

State Code History: The first state-wide energy requirements were established in 1975 by the Department of Housing and Community Development for all low-rise residential buildings. In 1974, the California legislature passed the Warren-Alquist Act establishing the California Energy Commission and authorizing the Commission to establish energy requirements for both residential and commercial buildings.

Governor Schwarzenegger issued Executive Order S-20-04 on December 14, 2004, known as the Green Building Initiative. It laid out a comprehensive set of actions for California to take in order to improve energy efficiency in non-residential buildings. The California Energy Commission was directed to undertake all actions within its authority to increase the efficiency requirements in the California Building Energy Efficiency Standards for non-residential buildings by 20% by 2015.

Pennsylvania

Residential Code: 2003 IECC, mandatory state-wide; can use REScheck to show compliance.

Commercial Code: 2003 IECC, mandatory state-wide; can use COMcheck to show compliance.

Code Change Cycle: Generally reviewed at least every three years with the publication of the new editions of the model codes. The most recent code update was effective April 9, 2004.

Connecticut

Residential Code: 2003 IECC, mandatory state-wide; can use REScheck to show compliance.

Commercial Code: 2003 IECC, mandatory state-wide; can use COMcheck-EZ to show compliance.

Code Change Cycle: Not more than every four years. Most recent update was effective July 1, 2004.

Washington

Residential Code: State-developed and implemented code. The most recent update was effective July 1, 2005. Exceeds 2003 IECC standards for most homes. Mandatory state-wide.

Commercial Code: State-developed code that meets or exceeds ASHRAE/IESNA 90.1-2004. The most recent update was effective July 1, 2005.

Code Change Cycle: Three-year code review/change cycle. The most recent update was effective July 1, 2005.

Program Four: Ontario Existing Single-Family-Residential Retrofit Program

Sector: Existing Residential
Customer Eligibility: All residential single family electricity and gas customers
Goals: 10% natural gas reduction, 10% electricity reduction in 5% of the housing stock per year for five years (in 25% of stock by 2012).
Measures: Energy-Star appliances, HVAC systems, windows, attic and wall insulation
Program Components and Financial Incentives: Trained and Certified Contractors, EnerGuide for Houses Audits, Graduated Rebates, PST exemption, Bulk Procurement
Administrator: Conservation Bureau
Delivery Agents: Community-Based Organizations, LDCs, Trade Allies, Ontario Ministry of Finance

Program Description

The Ontario Existing Single-Family-Residential Retrofit Program provides prescriptive rebates directly to consumers for the purchase and installation of energy-efficient equipment recommended by the federal EGH audit program, appliances with the Energy-Star label, and CSA-certified solar water heaters. The objective is to encourage more homeowners to implement the recommendations of the audit report and purchase Energy-Star products. Consumers are provided with additional assistance through the certification of renovators and bulk purchasing of equipment.

This program is based on successful, existing US residential programs in California and New England. Customer rebates will be available for both electric and gas measures including:

- Energy-Star-qualified refrigerators
- Energy-Star-qualified clothes washers
- Energy-Star-qualified furnaces
- Energy-Star-qualified central air conditioners
- Energy-Star-qualified windows
- Attic and wall insulation
- CSA-certified solar water heaters

The Ontario Ministry of Finance could provide an additional financial incentive by removing the PST for Energy-Star-qualified products and solar water heaters. It is recommended where applicable that the program offer graduated incentives — higher efficiency levels to receive higher rebate amounts — that act as a market driver, moving the technology towards higher minimum-performance standards.

It is recommended that the Province offer an appliance early-retirement/turn-in program for refrigerators and freezers as a companion program to that offering rebates on new Energy-Star refrigerators. This program ensures that used refrigerators are taken out of the active stock and recycled (not reused) in an environmentally sound manner.

In addition, the Province could work with manufacturers, distributors and retailers to ensure increasing quantities of Energy Star products are shipped to and promoted in Ontario. This could be coordinated by a province-wide advertising campaign to promote energy-efficiency investments through the purchase of Energy-Star-qualified products. This activity would be similar to the California promotional campaign known as "Flex Your Power", which began in 2001. It is a state-wide advertising campaign encouraging Californians to "flex their power" by investing in Energy-Star products. A web site designed with the consumer in mind, describes the wide range of financial incentives available to promote energy efficiency and renewable energies.

Finally, as Energy Star products capture increasing portions of market share, the standards under the Energy Efficiency Act can be changed to reflect these levels. Rebate programs should be in place long-term in order to accelerate turnover of the stock.

To ensure that homeowners have access to reliable, factual, and experienced retrofit services, the program also includes a renovator energy-efficiency certification program run as a joint venture between

the Province, community colleges, and home builder/renovator associations.

Barriers/Program Theory

Homeowners do not have the time to become energy-efficiency experts; therefore, there is a role for a public program to increase public awareness of how to identify an energy-efficient product, to make sure that sound and experienced contractors are available, and to provide financial incentives to reduce first cost and induce customers to invest.

The Barriers are addressed by the program are as follows:

- Lack of consumer information is addressed through the EnerGuide for Houses report and Energy Star promotions by the Program
- The issue of higher first cost versus lower operating costs is addressed through rebates and sales tax measures
- The split incentive whereby current home owners pay for improvements but future owners reap many of the benefits is also addressed through the financial incentives
- Lack of availability of equipment and good contracting services is addressed through bulk purchases and renovator certification.

Marketing and Outreach

It is suggested that, where applicable, the Conservation Bureau work with community-based organizations (CBOs) who will provide continuity through the retrofit process. CBOs would carry out several program activities, including: 1) arranging for Energuide for Housing audits, 2) coordinating bids and installations from pre-certified contractors 3) assisting with rebate promotion and application 4) identifying energy-savings opportunities not currently covered by the Energuide audit, including those from appliances, super efficient plumbing fixtures and lighting.

The program should set up a toll-free provincial hotline through which homeowners can reserve rebate funds, receive support for filling out rebate applications, identify pre-certified contractors, and receive independent technical advice in the absence of local support. LDCs can be enlisted to promote the program through bill inserts and identification of eligible customers.

Delivery and Staffing

The Conservation Bureau would be the overall province-wide administrator for this program. The Conservation Bureau work would with Ontario's community colleges to set up training and certification programs for energy-efficiency/renewable energy contractors. Local delivery is best implemented by community-based organizations, but for parts of the province in which this option is not available, LDCs may play a role.

Customer service/marketing firms will likely staff the hotline, implement application and rebate processing and provide retailer training.

Evaluation, Measurement and Verification

The program energy savings will be verified through deemed-savings assumptions. These evaluation activities will also include on-site verifications of measure installations, audits and engineering modeling. All relevant parameters, including "free ridership", effective useful life and per-unit energy savings for all measures in the program will be documented in the impact-evaluation study. These assumptions will be used to determine the level of energy savings and demand reduction based on the number of verified installations in the program year.

Experience in Other Jurisdictions

Since 1998, numerous US utilities have offered successful, ongoing, residential rebate programs to customers. Some of the most notable are as follows:

National Grid – Home Energy Services
http://www.nationalgridus.com/masselectric/home/energyeff/4_energy_svcs.asp

PG&E – Rebates and Energy Efficiency in Your Home
http://www.pge.com/res/rebates/

NYSERDA Energy Smart – Residential Contractors Program
http://www.getenergysmart.org/ContractorsPartners/ResidentialContractors/overview.asp

California's Flex Your Power
http://www.fypower.org/

Program Five: Ontario Small-Business High-Efficiency-Lighting Program

Sector: Small and very small business
Customer Eligibility: Independent small business with average monthly demand under 30kW
Goal: 10,000 installations – 20% electricity reduction per site
Measures: Super T8 lamps with electronic ballasts, compact fluorescent lamps (CFLs), delamping
Financial Incentives: Direct install
Administrator: Conservation Bureau
Delivery Agents: Community-based organizations in partnership with various large municipalities

Program Description

The goal of this small-business program is to deliver 10,000 high-efficiency lighting retrofits over a five-year period. The program will be structured with comprehensive management and coordination services to assist small retail outlets, small offices, and small food-and-beverage companies from beginning to end of the installation process. The set of services envisioned comprises education, outreach and marketing; an on-site lighting survey; arrangement of pre-certified contractors; specification of lighting products; financial incentives; quality control/quality assurance; and independent evaluation, measurement and verification.

Another goal of this comprehensive turnkey service is to make participation easy: the small-business owner signs on the bottom line; the program takes care of the rest. "Direct install" means that the program covers 100% of material and labour costs. For larger small-business customers, some programs have split the cost: 80% program, 20% customer. This program is sometimes viewed as expensive in relation to other programs. However, the program should be viewed as a long-term investment that will transform local lighting-efficiency markets and act as a foundation for achieving higher lighting-performance standards in the future. Thus, the higher cost achieves large long-term energy-savings benefits.

Barriers/Program Theory

The small-business sector is historically one of the most difficult sectors in which to advance energy efficiency due to a long list of complicated market barriers. Below is just a sample of the market barriers experienced in this sector:

1) Higher first-cost versus lower operating costs
2) Lack of information on the profitability of energy-efficient technologies
3) Split incentive
4) Transactional costs
5) Lack of time
6) Business uncertainty
7) Perceived lack of control

Energy end-use studies across North America indicate that this sector contains enormous technical and economic potential for energy savings. Encouraging energy efficiency in the small-business sector has typically taken two approaches in the past: 1) Information-only 2) utility rebates

Both approaches have achieved very little if any success because they have failed to take into account the barriers mentioned above. It is for these reasons combined with success demonstrated in California that we recommend a comprehensive turnkey service and direct install delivery.

Marketing and Outreach

The major challenge of this program is reaching small businesspeople and increasing their interest in energy efficiency investments. The experience of California programs indicates that the "Fuller Brush Man model" works the best — that is, going door-to-door to establish a face-to-face relationship with people in small businesses. It is suggested that the program begin with a large pilot in Toronto. Toronto's famous, distinct neighbourhoods lend

themselves to this model — the Beaches, the Annex, the Danforth, Queen West — and could act as focal points for community-based delivery. Toronto's Business Improvement associations could act as valuable partners for neighbourhood outreach and marketing. The City of Toronto's Energy Efficiency Office — with its experience — might be able to help provide technical support.

Once the pilot program in Toronto demonstrates some success, the program can be expanded to Ottawa, Hamilton and London.

Delivery and Staffing

Community-based organizations, with their knowledge of local relationships and local networks combined with skills in public education, are ideally suited to deliver this type of program. Their independence is an added bonus when contacting local small businesses. The basic staff configuration required is a Project Manager and three Lighting Survey Specialists, who will act as project managers for individual jobs. Given the multi-cultural nature of many of Ontario's cities the staff should be proficient in several languages, such as Greek, Mandarin, Cantonese, Italian, etc.

Evaluation, Measurement and Verification

Two EM&V approaches are suggested for the program

1) The lighting survey specialist will conduct an on-site inspection after installation to ensure there is congruence between the original site survey, the work order and the actual installation. The lighting contractor will not receive payment until the lighting survey specialist and the small business owner approve the installation.
2) An independent third-party contractor is hired to inspect the work of the lighting survey specialist and to conduct spot checks of various installations. It is recommended that the contractor be engaged at the beginning to provide ongoing EM&V services.

Experience from Other Jurisdictions

In 1997 California established a Public Benefits Charge (PGC) fund, which creates a $300 million annually for energy-efficiency programs. Every year California sets aside 20% of this fund for Third-Party, Local Programs. Program ideas are solicited through an RFP process that conforms to the state's energy-efficiency policy objectives. It is through this process that community-based organizations are able to access public funds. Some of the better community-based organizations delivering small-business, high-efficiency lighting programs are listed below:

Valley Energy Efficiency Corporation, Davis, California — LightsLite
http://www.ci.davis.ca.us/yeep/commercial.cfm

Ecology Action of Santa Cruz, California — RightLights
http://www.rightlights.org

Community Energy Services Corporation, Berkeley, California — SmartLights
http://www.ebenergy.org/cescsmartlights/

Program Six: Ontario Existing Commercial Buildings Retrofit Program

Sector: Existing Commercial Building Sector
Customer Eligibility: Commercial customers with an average monthly demand from 30kW to 500kW
Goal: 20% electricity reduction in 5% of the market on an annual basis (25% over five years)
Measures: Super T8 Lighting, HVAC Systems, Motors, Refrigeration, Variable Frequency Drives (VFDs)
Program Components and Financial Incentives: Prescriptive Rebates, "Circuit Riders", Pre-Certified Contractors
Administrator: Conservation Bureau
Delivery Agents: Conservation Bureau/LDCs/Third Party Vendors

Program Description

The primary objective of this program is to assist private small- and medium-commercial customers achieve long-term energy savings and peak-demand reductions through energy-efficiency retrofits. Rebates offered through the program will help offset the cost of upgrading to high-efficiency equipment. Retrofit contractors will be certified to provide energy-efficiency services to commercial building owners and managers, and the Province will provide a team of "circuit riders" to help building owners and managers through the retrofit process (based on a successful California model).

The target technologies for this program are commercial lighting replacement, HVAC equipment turnover and motor turnover. The program is limited to small and medium customers, who are defined as having a monthly electrical demand range between 30kW and 500kW. Pembina suggests a separate public/institutional program be established for universities and colleges, municipalities, hospitals, and K–12 schools.

The program would deploy "circuit riders" for each market segment for each region of the province. A circuit rider may best be described as a project-management specialist who guides the business owner/landlord through the retrofit process, conducting site surveys, arranging pre-certified contractor bids, arranging rebate application and processing, and implementing installation-verification procedures. The circuit rider becomes the key to achieving energy savings because each market segment is highly specialized in terms of energy end uses, market issues and trade ally relations. Each circuit rider would serve a number of projects in a particular sector and region each year.

Lighting and HVAC contractors would be trained and certified in retrofit measures as well as familiarized with the available rebates and organizational aspects of the program. The program would also address the commercial sector's large amount of energy waste through poor air-conditioning practices. Finally the program would be coordinated with the federal Energy Innovators audit and grant program.

The goal of the program is to reduce electricity use at every site by at least 20% — inspired by California's Green Building Action Plan through which that state has made a commitment to reducing electricity use by 20% across the commercial sector by 2015.

Barriers/Program Theory

The program is designed to help small and medium commercial customers overcome the many obstacles that prevent program participation and, ultimately, business investments in energy efficiency. Key barriers and measures taken to address them in the program are as follows:

- Higher first cost versus lower operating costs — addressed through the rebate system.
- Lack of credible information and time — addressed by providing certified HVAC and lighting contractors and "circuit riders" to guide building owners and managers through the

retrofit process.
- The split-incentive problem between owners/property managers and tenants — addressed by providing a financial incentive and clear targeted guidance through the circuit riders.
- Circuit riders would be able to provide service to those whose primary spoken language is not English.

Marketing and Outreach

This program will strive to increase the adoption of high-efficiency equipment by small and medium customers by leveraging the networks of business improvement associations, local chambers of commerce, ethnic business organizations and trade organizations. The Conservation Bureau should work closely with these organizations on program marketing. Program literature would highlight the profitability of various technologies. Marketing efforts could include the implementation of the following:

- Direct mail to business improvement associations and their members
- Customer testimonials highlighting the benefits of energy efficiency submitted to chambers of commerce and trade newsletters, and local newspapers
- Bill inserts delivered by LDCs

The program should divide up its marketing and outreach along the lines of market segments. For example,

- Hospitality (hotels, motels, food service)
- Agricultural and Food Processing (food processing, greenhouses, wineries, dairies and refrigerated warehouses)
- Retail (retailers and department stores)
- Office (offices)

The program would deploy the circuit riders with appropriate experience to market the program to each sector for each region of the province.

Delivery and Staffing

The Conservation Bureau should become the province-wide administrator of this program, which will require extensive coordination and management of a variety of partners. A toll-free hotline needs to be established to provide services to those parts of the Province not served by the circuit riders. Hotline staff would reserve rebate funds, support the application process and rebate processing and provide independent technical support. Lighting and HVAC contractors will require training and certification concerning the measures, available rebates and organization of the program. Local utilities could distribute bill inserts and identify potential customer opportunities through analysis of the billing system.

Evaluation, Measurement and Verification

The primary measurement of program success will be the tabulation of deemed energy savings and demand reduction for measures installed through the program versus baseline data. On-site verification of a selected sample of installations across the province and across market segments will ensure rebated equipment is installed correctly.

Experience in Other Jurisdictions

Many utilities across the United States have for years offered business-specific energy-efficiency incentive programs funded by a state public benefits charge (also known as a systems benefits charge or a public goods charge). Some of the programs notable for their success are as follows:

San Diego Gas and Electric's Express Efficiency Program
http://www.sdge.com/business/bus_expressefficiency.shtml

Efficiency Vermont's Business Program
http://www.efficiencyvermont.com/index.cfm?L1=159&sub=bus

Sacramento Municipal Utility District (SMUD) Commercial Services
http://www.smud.org/commercial/saving/incentives.html

California Governor's Green Building Action Plan
http://www.fypower.org/pdf/green_bldg_action_plan.pdf

Program Seven: Ontario Combined Heat/Power (CHP) Standard Offer Contracts Pilot Program 2007–2012

Sector: Commercial and Industrial Customers
Goal: 2,000MW secured by 2010
Measures: Biomass- and Natural-Gas-Fired CHP systems
Program Components and Financial Incentives: Standard Offer Contracts
Delivery Agent: Ontario Power Authority

Program Description

The Province is currently implementing a 1,000MW RFP process for CHP systems. However, a study for the Ontario government published in 2000 estimated the technical potential of CHP to be more than 16,500 MW by 2020.[1] It was estimated that 3,800MW would be economic at electricity prices that are substantially lower than current prices.[2] The Pembina Institute's Power for the Future study estimated a potential for 6,700MW of cogeneration as being technologically feasible and economically rational by 2020.

Clearly, there is a large gap between the potential CHP resource and the amount targeted in its initial promotional efforts. Several US states are proactively pursuing the CHP resource through ongoing programs. For example, there are more than 770 cogenerators in California producing 9,000MW, or 17% of that state's electrical power.[3] New York State has already installed 5,000MW, with 8,500 MW of technical potential of new CHP identified for the next decade.

Experience suggests that a competitive tendering process such as an RFP may not be the best approach to capturing a major portion of the opportunities that exist for the CHP resource. Instead, many trade associations and public interest groups have suggested the implementation of Standard Offer Contracts for CHP systems.

A Standard Offer Contract (SOC) permits the interconnection of CHP resources to the electric-utility grid and specifies how much the CHP generator is to be paid for electricity. The SOC approach creates strong financial incentives and a stable market environment that can "unleash the power" of the private sector. In this case, the Institute envisions engineering firms proactively seeking to develop CHP projects in hospitals, schools, hotels and food processing plants. The Pembina Institute recommends that the initial phase of the SOC be run as a large pilot program with a target of acquiring at least 2,000MW by 2012. It is likely the OPA will receive many more project proposals than the initial target. One role the OPA can play is to ensure that the CHP portfolio reflects a diverse range of sectors, industries and regions across the province.

Barriers/Program Theory

There are many market barriers inhibiting the full realization of the Province's CHP potential, including the following:

- Uncertainty for Investors — The current condition favours large industries that can develop large projects because they have both the capital and the in-house expertise. A few large projects will be developed, many will not be. Project developers will be unwilling to commit significant time and resources if there is no clear

1. Hagler Bailly. *Potential for Cogeneration – Final Report.* (prepared for the Ministry of Energy, Science and Technology, August 2000.)
2. "Potential for Cogeneration – Final Report", Hagler Bailly, prepared for the Ministry of Energy, Science and Technology, August 2000
3. CogenWorks. Press Release, January 1, 2006.

long-term framework creating a stable market.

- "Lowest-Price" Criteria — A competitive tendering/RFP process primarily driven by price discriminates against small and medium projects that have relatively higher costs, but they are worth more because they bring system benefits such as avoided transmission and distribution upgrades, reduced line losses and greater system flexibility, reliability and resilience.
- Investment Requirements (High First Capital Cost) — CHP projects demand large amounts of up-front capital for feasibility studies, project planning and approvals. These costs represent high risk for small investors in the market.

Marketing and Outreach

Sponsoring targeted seminars for plant managers and building-facilities managers, and linking them with engineering firms would be one way to stimulate this market. Perhaps the OPA would consider offering grants for feasibility studies of small projects modeled on the NYSERDA program.

Delivery and Staffing

A core group of staff will be required to implement all aspects of the SOC.

Evaluation, Measurement and Verification

CHP project developers can refer to the *International Performance Measurement Verification Protocol — Concepts and Options for Determining Energy and Water Savings, Volume 1, Revised March 2002* for guidance on how to establish verification protocols.

Experiences from Other Jurisdictions

New York State Energy Research and Development Authority (NYSERDA) — Distributed Generation and Combined Heat and Power Program
http://www.nyserda.org/programs/dgchp.asp

New Jersey — Combined Heat and Power 2006 Program
http://www.njcleanenergy.com/html/Combined/combined.html

Program Eight: Ontario Energy Efficiency Act Standards-Upgrade Cycle

Sector: All sectors
Goal: Establish regular schedule of minimum performance standards upgrades
Measures: Energy Star appliances, HVAC systems, windows
Commercial HVAC systems – water heaters, boilers, air conditioners
Phasing out of T12 lamps/magnetic ballasts
Delivery Agent: Ontario Ministry of Energy

Program Description

It is widely acknowledged after more than 30 years of experience that the promulgation of building energy codes and minimum performance standards for appliances and HVAC systems is a very potent tool for locking energy savings permanently and cost-effectively into the economy. Many US states and regions such as California and New England are continuously proactive in establishing new codes and standards. The Government of Ontario has a policy tool — the Energy Efficiency Act — that can be used to produce immediate large system changes to address the province's energy challenges. The current policy of the Ontario Ministry of Energy is to harmonize with US federal and California standards activities.

The Pembina Institute suggests that Ontario, like California, establish a regular schedule of standards upgrades linked to an increasing market share of high-efficiency products through programs. As the programs increase the market share of high-efficiency products, the standards would be upgraded to reflect the change. Even though minimum performance standards in Ontario have been improving, substantial energy-efficiency gains remain to be seen. Some of the technologies for which minimum performance standards should be upgraded immediately are as follows:

Residential Sector

- Energy-Star refrigerators — to 15% better than the 2001 US federal standard by 2008
- Energy-Star clothes washers — to MEF 1.42, WF 7.5 by 2008
- Energy-Star furnaces — to AFUE 90% by 2008
- Energy-Star windows — to R3.2 by 2008
- Energy-Star central air conditioners — (to ?) by 2011
- Split Systems — to SEER 14, EER 11.5, HSPF 8.2
- Single Package Systems — to SEER 14, EER 11.0, HSPF 8.0[1]

Commercial Sector

While some commercial-sector technologies are not yet labeled and rated as are residential Energy-Star products, many technologies do have performance standards that could be upgraded given that high-efficiency products are already widely available. Technologies that should be the focus of new regulations include the following:

- Clothes washers — to MEF 1.26, WF 9.5 (harmonized with California, Maryland, and Connecticut) by 2008
- Gas water heaters — to Thermal Efficiency 90% by 2008
- Gas boilers — to Thermal Efficiency 90% by 2008

This is only a partial list: many more upgrade opportunities are readily available. This document focuses on the some of the energy end uses that can create an immediate, large impact on energy efficiency and conservation.

The increasing use of T8 lighting in the commercial-buildings sector over the last several years offers the Province an immediate opportunity to phase

1. MEF = Modified Energy Factor (Higher is better.)
WF = Water Factor (Lower is better.)
AFUE = Annual Fuel Utilization Efficiency (Higher is better.)
R = Resistance to Heat Loss (Higher is better.)
SEER = Seasonal Energy Efficiency Ratio (Higher is better.)

out T12 and magnetic ballasts, and reap large peak-demand reductions cost-effectively over the next five years.

Barriers/Program Theory

Increasing the minimum performance standards of appliances and HVAC systems is a particularly good remedy for lost opportunities, which occur when a customer does not install an energy-efficiency measure at a key point in time but whose installation is unlikely to be cost-effective or as cost-effective later. A good example is equipment failure. Suppose you're a home water heater fails suddenly: the purchase of a new water heater in such a case occurs in a stressful environment where there is an immediate need to rush out and buy the most readily available unit, probably the cheapest, without considering the energy-efficiency implications of the purchase decision. Raising minimum-performance standards would ensure that energy efficiency savings are built into new, replacement equipment.

One of the central lessons from California's success in acquiring large energy-efficiency savings has been the need for conscious effort to coordinate the development and upgrading of codes and standards with program activities. In the typical California case, the program offers a rebate incentive for a technology performing above the current standard. The offer of a rebate increases the market share of the higher-efficiency product encouraging the next round of standards development to set the higher efficiency technology as the new minimum and to set a new goal for the rebate program.

Marketing and Outreach

It is suggested that the Ontario Ministry of Energy (the Ministry) raise the visibility of codes and standards development by publishing a newsletter that would be available to the public and the building industry. The California Energy Commission publishes a monthly newsletter called "Blueprint" (http://www.energy.ca.gov/efficiency/blueprint/index.html) which keeps all interested parties up-to-date about codes and standards under development and highlights advances in energy efficient buildings.

Delivery and Staffing

The Ministry should set up a project team to consult with manufacturers and public interest groups, conduct economic analysis, harmonize with other jurisdictions, and implement enforcement activities. In addition, the project needs a budget allocation so that research can be undertaken to assess the efficiency levels of the energy end-use stock through studies of market saturation and potential.

Evaluation, Measurement and Verification

One of the keys to successful codes and standards development is enforcement. Trained team members need to be deployed to ensure that retailers and builders are adhering to the upgraded standards.

Experience in Other Jurisdictions

California

California upgrades its building energy code, Title 24, and its performance standards for appliances, Title 20, every three years. The 2006 round for Title 20 is nearing completion, and the 2008 round for Title 24 is already under way. Codes and standards activities are constant. As soon as adoption takes place, the next round starts. For example, the Title 24 schedule is 2002, 2005, 2008 and 2011, while the Title 20 schedule is 2003, 2006, and 2009.
http://www.energy.ca.gov/title24

Consortium on Energy Efficiency (CEE)

CEE is a Boston-based non-profit organization that works with manufacturers to transform energy-efficiency markets through the development of standards and labelling.
http://www.cee1.org

Appliance Standards Awareness Project (ASAP)

ASAP is a consortium of public-interest groups in the US that advocates for higher standards at the federal-government level.
http://www.standardsasap.org

EER = Energy Efficiency Ratio (Higher is better.)

HSPF = Heating Season Performance Factor (Higher is better.)

Program Nine: Conservation and Demand Management (CDM) Coordination and Support Program

Sector: All
Customer Eligibility: All gas and electric local distribution companies (LDCs)
Measures: Conservation and Demand Management (CDM) programs that achieve market transformation and permanent improvements to energy demand and efficiency in all sectors and end uses.
Goal: To acquire permanent reductions of 4,000 GWh/yr and leverage market transformation through LDC CDM programming at an average program cost of 2.5¢/kWh.
Program Components and Financial Incentives: CDM Coordination and Support Unit provides free and contract services to LDCs for CDM programs that are financed as follows: i) under the OEB $163 million one-time CDM support initiative and ii) under the OEB CDM shared-savings incentive mechanism. Support provided to CDM programs is designed to acquire efficiency resources or transform markets. Services include program design, contracted delivery, and verification services.
Delivery Agents: The CDM Coordination and Support Unit will be a joint venture between the Conservation Bureau and major LDCs with CDM experience. The joint venture supports LDCs by using experienced private-sector, professional organizations and NGOs to deliver services to LDCs.

Program Description

A CDM Coordination and Support Unit will be established in the Conservation Bureau, offering CDM program design, management, and verification services to Ontario LDCs. This will allow smaller LDCs to take advantage of the OEB CDM incentive mechanism; allow customers across Ontario to benefit from the same efficiency improvements wherever they live or run businesses; and ensure that all CDM programming meets provincial objectives.

The Coordination and Support Unit would provide services free of charge but would also offer to find delivery agents for the CDM programs it has helped to design. The LDCs would pay for delivery of these programs at-cost on a contract basis. The Unit would also arrange for program delivery using either experienced LDC staff or commissioned private-sector or NGO delivery agents. On-the-job training would be part of the service provided to the LDC.

To ensure that LDC CDM programs leverage the acquisition of efficiency resources at less than avoided-cost, only CDM programs that produce verifiable market transformation or permanent reductions in power consumption though efficiency or fuel switching would be eligible for assistance from the CDM Coordination and Support Unit. Such programs would include those funded under the $163 million currently allocated to CDM programs by the Ontario Energy Board (OEB), and those approved under the new CDM shared-savings incentive mechanisms.

The goal of this program is to help LDCs deliver permanent energy savings from the already-approved $163 million of CDM programming at an average of 2.5¢/kWh providing 2,000 GWh/yr of savings. A further goal is to encourage LDCs to take advantage of the OEB CDM shared-savings incentives mechanism, saving a further 2,000 GWh/yr by 2010.

The services provided by the Unit would include advice on CDM program design; evaluation, monitoring and verification; and innovative approaches such as the use of innovative financing[1] and contracted delivery by community, municipal, NGO and private-sector agencies[2]. Since many of Ontario's LDCs are owned by municipalities, full advantage

1. Examples of innovative financing include the use of local improvement charges to finance long-payback efficiency measures, in-bill loan repayment, and leasing.

2. Fortis BC, a small British Columbia LDC, has run several very successful CDM programs on a contract basis since 1989.

would be made of the information, financing and program delivery tools available to municipal governments.

The Unit would also develop a series of generic province-wide CDM programs that LDCs could access to ensure that all Ontario residents and businesses have the same opportunities to reduce energy costs.

Barriers/Program Theory

Since 2005, electricity and gas distributors (LDCs) in Ontario have been allowed to recover the cost of investment in conservation and demand management (CDM) initiatives from ratepayers in the rates approved by the OEB. The LDCs may now also share in the benefits their customers receive from CDM programs by recovering 5% of the net benefits from the program in the form of increased rates. To be eligible for this incentive, the CDM programs must be approved by the OEB. A similar incentive has existed for gas distributors for several years.

As few LDCs in Ontario have CDM program experience (it has been more than 10 years since these types of programs were widely offered), only larger LDCs will be able to take full advantage of the incentive. A great opportunity to obtain permanent reductions in consumption and demand will therefore be lost. Also, because of the differences in scope and number of programs, many customers will not have full access to important programs.

In 2005, the OEB also approved CDM program plans from electricity distributors to spend $163 million over three years. This expenditure was approved under a one-time ruling that past LDC profits could be used for approved CDM programs. The CDM programs approved by the OEB cover a broad spectrum of measures, from smart meters to financial incentives but focus mainly on demand-response measures. Some LDCs offer a comprehensive set of programs while others very few. No LDC CDM plans have set targets. for the savings to be achieved from each program, or have estimated the cost per kWh delivered. The OEB also did not set targets for approved CDM plans — just the rules for claiming the incentive if achieved.

The proposed CDM Coordination and Support Unit would be help LDCs with CDM plans approved under the OEB incentive process (and those already approved under the one time $163 million grant). The objective is to acquire permanent savings of between 2 and 3¢/kWh, a level that has been shown to be possible in the US[3]. The Unit would also coordinate CDM programming across Ontario so that all customers would be able to benefit equally from common programs.

The focus would be on CDM programs that deliver verifiable permanent reductions in consumption and demand, or verified transformation of the market for energy-efficient equipment. Receipt of CDM services would be contingent on demonstrating that these objectives can be met at less than avoided cost.

Marketing and Outreach

Outreach would be through associations representing LDCs and municipalities that own and/or regulate LDCs.

Delivery and Staffing

A CDM Coordination and Support Unit would be established within the Conservation Bureau, providing program design, management, and verification services to the LDCs. Core staff would work with experienced CDM staff from larger LDCs to provide these services. The Unit would also arrange for CDM programs to be delivered in local service areas by LDC staff or by commissioned private-sector or NGO delivery agents. LDCs would contract for the delivery of these programs at cost.

Evaluation, Measuring and Verification

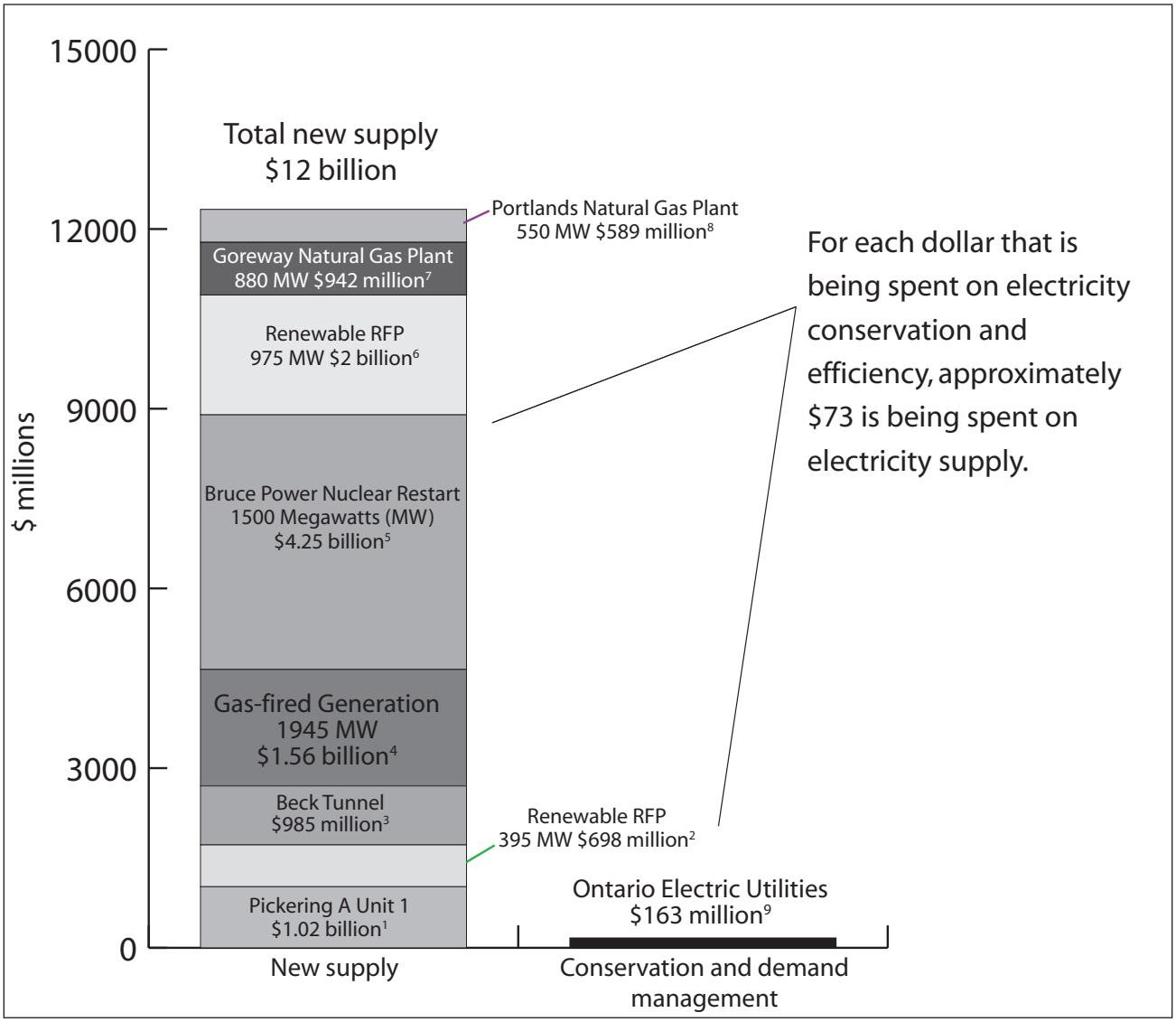
Evaluation and verification of savings would be coordinated with the OEB regulatory process under which LDCs must report the results of their CDM programs at annual rate hearings. The CDM Coordination and Support Unit would provide assistance to LDCs to verify and report program results. To be eligible for Unit assistance, CDM programs would be required to demonstrate that Total Resource Cost is less than avoided cost, and that verifiable market transformation or permanent savings (resource acquisition) will be achieved.

List of Programs from Other Jurisdictions

While not exactly like the program proposed for Ontario, major California power utilities have established partnerships with a variety of LDCs to offer CDM programs so that the experience of larger utilities is shared and a consistent set of programs is offered across the state.

3. $163 million over three years at an average of 2.5¢/kWh would provide a savings of 2,000 GWh/yr by 2008.

Appendix 2: Supply vs. Conservation Spending in Ontario



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Source: Ontario Clean Air Alliance

www.pembina.org