
Toronto Hydro-Electric System Ltd.

Conservation and Demand Management Plan

Ontario Energy Board File No. RP-2004-0203

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Introduction

Ontario's Minister of Energy has authorized electricity distributors to apply to the Ontario Energy Board (Board) for 2005 rate implementation of their third installment of market adjusted revenue requirement (MARR), on the condition that an equivalent amount of incremental revenue be invested by those distributors in conservation and demand management activities. In a letter dated May 31, 2004 to electricity distributors, the Minister identified some of the activities that might be included in a distributor's Conservation and Demand Management Plan, including:

- Energy efficiency;
- Behavioral and operational changes, including the application of benchmarking or "SMART" control systems;
- Load management measures which facilitate interruptible and dispatchable loads, dual fuel applications, thermal storage, and demand response;
- Measures to encourage fuel switching which reduces the total system energy for a given end-use;
- Programs and initiatives targeted to low income and other hard to reach consumers; and
- Distributed energy options behind a customer's meter such as tri-generation, co-generation, ground source heat pumps, solar, wind, and biomass systems.

On October 5, 2004 the Board issued a procedural order (RP-2004-0203) setting out the process for how distributors may apply for approval of a Conservation and Demand Management Plan. It also set out the filing requirements for a distributor's plan. Distributors were given the option of applying for interim or final approval of their plan.

Toronto Hydro-Electric System Ltd.'s (THESL's) Conservation and Demand Management (CDM) Plan has been developed within the context of the Minister of Energy's May 31, 2004 letter and the procedural order issued by the Board.

THESL hereby requests the Board's approval and final order authorizing its CDM plan as being appropriate and effective in discharging its CDM investment obligation, subject to issuance in due course of an order for distribution rates including the final tranche of the market adjusted revenue requirement (MARR).

Plan Budget and Assumptions

THESL's third MARR installment is approximately \$39.8 million, exclusive of any payments in lieu of taxes.

Through a letter accompanying its Preliminary Guidelines for Electricity Distributor Conservation and Demand Management Activities, the Board has authorized that distributor conservation and demand management spending may occur until September 30, 2007.

THESL's Conservation and Demand Management Plan is therefore based on investing approximately \$39.8 million in a combination of capital and operating expenses during the period from January 1, 2004 to September 30, 2007.

The implementation of this plan will require re-deployment of some existing personnel. Costs associated with the use of existing resources to implement this plan have been allocated to the individual programs and are provided for in the annual budget figures.

While the current plan is well balanced, it is recognized that the industry and regulatory framework is dynamic. THESL will continue to assess and update its plan as new opportunities are presented. If necessary, THESL will re-allocate funds between programs to respond to customer demand levels. However, THESL will make best efforts to achieve the target levels of capital and operating expenditures by year.

Objectives

The Province of Ontario is facing serious challenges in meeting its future electricity needs. Energy conservation and demand management has been identified as one of the most viable and cost-effective means of meeting the province's energy needs in the short term.

The Minister of Energy has called for the creation of a 'Conservation Culture' in the province, and has established two important objectives for the electricity sector and electricity consumers. First, he has targeted a reduction in Ontario's demand for electricity by 5% by 2007. Second, he has committed to the installation of 800,000 SMART electricity meters by 2007, and the full deployment of SMART meters for all electricity consumers by 2010.

The objective of this plan is to contribute to the emergence of a conservation culture in Ontario and, more specifically, to support the Minister's commitments to peak demand reduction and SMART meter installations.

Strategy

In developing this plan, the following criteria were used to guide the selection of component programs:

- i. Allocation of Benefits – The overall plan should distribute benefits broadly to THESL's customers.
- ii. Certainty of Achieving Targeted Benefits – Preference was given to investments that offer more predictable results.
- iii. Leveraging Partnerships – Partnerships will be sought to deliver 'behind the meter' programs that will benefit from greater scale for cost-effective implementation.

Programs

Conservation and Demand Management (CDM)

Residential and Small Commercial (< 50 KW)

Co-branded Mass Market Program

Description

This flagship co-branded mass-market program (e.g. *powerWISE™*) is a multifaceted approach to fostering the conservation culture in Ontario. Through development of a significant cooperative effort amongst six of the largest municipal LDC's, this program will become synonymous with specific initiatives such as Compact Fluorescent Lighting (CFL) change out programs, LED Christmas Lights, Energy Star, Multi-Choice, energy audits, water heater blanket wraps, school based education and a host of other programs aimed at providing customers with the tools and education needed to reduce their energy usage. Access to online services such as energy consumption calculators, an energy expert, and personalized energy audit services are contemplated as components of this program.

Target users

Mass-market including residential and small commercial

Benefits

Increased awareness, improved product supply, culture shift, and significant demand and energy reductions.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$900	\$900	\$900	\$2,700
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$900	\$900	\$900	\$2,700

SMART Meter Pilot

Description

A pilot program for residential SMART meters will be deployed to enable the assessment of metering, communications, settlement, load control and other technologies that may be used to accommodate the universal application of SMART meters in the future. Further, sub-metering opportunities for the purposes of customer information in a bulk-metered situation (i.e. condominiums) may be considered.

This initiative will commence upon the release of a formal definition of a SMART meter by the Board.

Target users

Residential and small commercial customers

Benefits

This program supports the Minister of Energy's commitment to the installation of 800,000 SMART meters across Ontario by 2007. It will provide THESL with the experience and knowledge needed to efficiently expand the use of SMART meters over the next several years.

In conjunction with appropriate rate structures, the program will also provide customers participating in the pilot programs with an incentive to conserve or shift energy use.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$300	\$300	\$300	\$900
Capital Expenditures	\$100	\$1,500	\$1,500	\$3,100
Totals	\$400	\$1,800	\$1,800	\$4,000

Design Advisory Program

Description

This initiative helps to create an integrated approach to the design process for new buildings, and involves architects, engineers, building owners and THESL design advisors.

Target users

Residential and small commercial customers

Benefits

This program results in cost effective improvements to the energy efficiency of a building without adversely affecting other performance requirements stipulated by the owner. More specifically, the Advisor can develop an energy performance model to demonstrate achievable energy savings and provide a breakdown of energy end uses. Through the installation of energy efficient equipment during construction, the customer benefits by avoiding stranded costs incurred with equipment upgrades.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$150	\$150	\$150	\$450
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$150	\$150	\$150	\$450

Residential Load Control Program

Description

Load control uses a real time communications link to enable or disable customer loads at the discretion of the utility. These controls are usually engaged during system peak periods or when required to relieve pressure on the system grid and may include such "dispatchable" loads as electric hot water tanks, pool pumps, lighting, air conditioners, etc.

Target users

Direct load control applies to all market segments. Though the control systems and technologies may vary by market segment, the methodology remains the same.

Benefits

Load control allows customers to respond quickly to external price signals. This also provides a mechanism for utilities to relieve pressure on constrained areas within the distribution grid and also reduces the need to bring on large peaking generators.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$200	\$200	\$200	\$600
Capital Expenditures	\$270	\$6,200	\$6,200	\$12,670
Totals	\$470	\$6,400	\$6,400	\$13,270

TAPS Program

Description

This initiative would enhance the existing Enbridge program by adding electricity measures such as compact florescent (CFL) light bulbs to replace existing incandescent bulbs.

Target users

Residential and small commercial customers

Benefits

This program is simple in concept and highly effective, since CFL's use 75% less energy than incandescent bulbs and fit into standard sockets. Although a single change-out makes a very small difference, wide-scale use of CFL's could have a significant impact.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$437	\$437	\$437	\$1,311
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$437	\$437	\$437	\$1,311

Refrigerator Buy-Back Program

Description

A program to facilitate the return of old inefficient refrigerators will be evaluated. So called "beer fridges" in the basement of many homes use significant amounts of electricity.

Target users

Residential customers

Benefits

A reduction in both demand and consumption due to the removal of inefficient appliances.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$250	\$850	\$0	\$1,100
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$250	\$850	\$0	\$1,100

Social Housing Program

Description

A province wide centralized energy management service for the social housing sector may be developed in collaboration with the Provincial Government, utilities (e.g. Enbridge, Union Gas) and others.

A pilot program will be conducted to determine feasibility with an expectation that a full-scale provincial program would follow.

Target users

Local social housing corporations, non-profit homes and co-op housing

Benefits

Synergies may be created though the combined initiatives of the various agencies.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$405	\$405	\$405	\$1,215
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$405	\$405	\$405	\$1,215

Commercial, Industrial and Institutional (> 50 kW)

SMART Meter Program

Description

THESL will make an investment to further the use of SMART meters by commercial industrial and institutional customers.

This program will commence upon the release of a formal definition of a SMART meter by the Board.

Target users

Larger Commercial, Industrial and Institutional customers

Benefits

This program supports the Minister of Energy's commitment to the installation of 800,000 SMART meters across Ontario by 2007. These meters are seen as an important means of establishing a 'conservation culture' in Ontario. In conjunction with appropriate rate structures, they will encourage customers to conserve or shift energy use.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$0	\$0	\$0	\$0
Capital Expenditures	\$800	\$0	\$0	\$800
Totals	\$800	\$0	\$0	\$800

LED Retrofits for Traffic Lights

Description

This initiative involves replacing traffic signals at intersections to light-emitting diode (LED) technology, which is now fairly common in many U.S. municipalities.

Target users

Municipalities

Benefits

This program results in significant energy savings since the LED technology uses approximately 80% less electricity. Other benefits include reduced maintenance (LED's last longer) and improved visibility.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$150	\$150	\$150	\$450
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$150	\$150	\$150	\$450

Leveraging Energy Conservation and/or Load Management Programs

Description

Existing energy conservation and/or load management programs such as NRCan's Energy Innovators initiative, Enbridge initiatives etc. will be promoted and incentives may be provided to advance market uptake of these programs and implementation of the recommendations. The LDC's are well positioned to introduce such programs to their customer base. Work will be conducted with the existing program providers to maximize leverage opportunities. Promotion will potentially include face-to-face meetings, conferences and seminars.

Target users

Large consumers over 50 kW including schools, large commercial facilities, institutional facilities, industrial, and municipal facilities

Benefits

Customer awareness and additional incentives will help advance market uptake of audit services, feasibility studies and retrofit opportunities already established within the government program framework.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$330	\$330	\$330	\$990
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$330	\$330	\$330	\$990

Commercial Industrial & Institutional (CI&I) Load Control Program

Description

Load control uses a real time communications link to enable or disable customer loads at the discretion of the utility. These controls are usually engaged during system peak periods or when required to relieve pressure on the system grid.

Target Users

Larger commercial, industrial and institutional customers

Benefit

Demand control provides lower costs and increased stability for customers and utilities.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$0	\$0	\$0	\$0
Capital Expenditures	\$0	\$130	\$0	\$130
Totals	\$0	\$130	\$0	\$130

Energy Audits and Feasibility Studies

Description

A standard energy audit will be developed to assist in completion of audits. As well, a training program tailored to this specific sector will allow companies with a certified employee or outside consultants to perform the audit. Any cross-linkages with the residential audit project will be accessed where feasible. Strategic partnerships will be analyzed for incentives or other synergies. The audit model will be developed, tested and refined in co-operation with partners that will be involved with training, certification, and management of the process. This standard checklist or procedure will be duplicated where possible.

Target users

Larger consumers over 50 kW including schools, large commercial facilities, institutional facilities, industrial, and municipal facilities like recreation centres, arenas, and libraries.

Benefits

Include increased awareness, skills development, benchmarking energy data, establishing best practices, fostering the conservation culture within this sector and significant reductions in demand and energy consumption.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$90	\$90	\$90	\$270
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$90	\$90	\$90	\$270

Design Advisory Program

Description

This initiative helps to create an integrated approach to the design process for new buildings, and involves architects, engineers, building owners and LDC THESL advisors.

Target users

Commercial, Industrial and Institutional customers

Benefits

This program results in cost effective improvements to the energy efficiency of a building without adversely affecting other performance requirements stipulated by the owner. An energy performance model can be created to demonstrate achievable energy savings and can provide a breakdown of energy use. Through the installation of energy efficient equipment during construction, the customer benefits by avoiding the stranded costs incurred with equipment upgrades after the fact.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$437	\$437	\$437	\$1,311
Capital Expenditures	\$0	\$0	\$0	\$0
Totals	\$437	\$437	\$437	\$1,311

Distribution Loss Reduction

Distribution Loss Reduction Program

Description

The Distribution Loss Reduction Program is a broad network based initiative to drive greater efficiencies within the distribution grid. This program will identify opportunities for system enhancements. Next steps will be to complete the engineering analysis and feasibility studies. Projects will be prioritized, selected and implemented based on the most attractive investment to results ratio. Items to be addressed may include, but are not limited to:

Power Factor Correction - Under the Power Factor Correction initiative, a power factor assessment will be completed which will identify locations for the installation of power factor correction capacitor banks. The results and available funding will determine which projects proceed.

Voltage Conversion - Voltage upgrades can save up to 90% of the losses associated with a feeder as higher voltages and lower current results in lower losses. This study will ascertain the locations and value of voltage conversions. This program could also involve changing out all the meters on a particular feeder to SMART Meters so that the exact losses can be determined.

Power System Load Balancing - This program is designed to ascertain where load shifting can occur within the grid to improve system efficiency including the location of optimized "open points". It is estimated that approximately 5% - 10% of system losses could be saved.

Voltage Profile Management - Changing voltage profiles at the distribution station level can result in a peak reduction at the controllable distribution stations. This is in addition to the IMO's voltage reduction program and will not interfere with the effectiveness of that program.

Line Loss Reductions - Replacement of conductors such as #6 AWG copper with #2 AWG aluminum can reduce line losses. An evaluation of where such opportunities exist may be undertaken. The results and available funding will determine which projects proceed.

Transformer and Other Losses - Using infrared scans of transformers this program will help to identify additional electricity losses including overloaded equipment. "Hot" transformers will be investigated further to determine operational improvement opportunities.

Target users

All of THESL's customers

Benefits

Reduced electricity distribution system delivery losses will reduce system demand, relieve network capacity to accommodate growth, and reduce the requirement for new generating capacity in the Province. Costs associated with distribution system delivery losses are recovered through electricity distribution charges. Reductions in these costs will therefore benefit all customers.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$320	\$320	\$320	\$960
Capital Expenditures	\$103	\$103	\$103	\$309
Totals	\$423	\$423	\$423	\$1,269

Distributed Energy

Load Displacement Program

Description

Distributed generation behind the customer's meter provides an excellent opportunity to displace load from the local distribution system's grid in a very effective manner. Load displacement technology, such as combined heat and power systems, provides increased efficiency of power and thermal systems. Combined with an existing or new district heating distribution system this technology contributes to the development of sustainable energy networks within Ontario's communities.

Other technologies such as micro-turbines, wind, biomass fuels and solar provide additional options to meet the customer's needs. This initiative will facilitate the development and implementation of these opportunities. Financial incentives will be considered based on the project's viability.

Development of educational and technology programs in conjunction with local colleges and universities may be considered. Small pilots or demonstration projects to promote alternative and renewable energy sources may also be considered.

Target users

Commercial, industrial, and residential, schools, colleges and universities

Benefits

Benefits include additional capacity within the grid. Cleaner technologies result in reductions in green house gas (GHG) emissions. Other benefits include improved system reliability, reduced harmonics, backup power possibilities, education and skills development.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$320	\$330	\$310	\$960
Capital Expenditures	\$1,000	\$800	\$600	\$2,400
Totals	\$1,320	\$1,130	\$910	\$3,360

Stand-by Generators Program

Description

This program may provide for the use of customers' existing stand-by generators when required and/or economical. Environmentally friendly generators will be the primary focus of this initiative however all generators may be considered if needed during an emergency.

Target Users

Commercial and industrial customers with sufficiently sized stand-by generators

Benefits

Reduction of customer and system peak demand and energy costs

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$510	\$520	\$510	\$1,540
Capital Expenditures	\$1,800	\$1,800	\$1,500	\$5,100
Totals	\$2,310	\$2,320	\$2,010	\$6,640

Overall Program Support

Description

Several functions supporting initiatives may be considered such as; an annual Key Account Conference, Home Show participation, an energy conservation website, customer newsletters, staff training and media support activities etc. may be considered.

Outreach support to smaller utilities is an additional area that may be explored.

Target Users

All customer classes

Benefits

Supports existing programs and drives energy conservation awareness that will facilitate the culture change in Ontario.

Budget

<u>\$k</u>	<u>2004/05</u>	<u>2006</u>	<u>2007</u>	<u>Totals</u>
Operating Expense	\$96	\$96	\$96	\$288
Capital Expenditures	\$200	\$0	\$0	\$200
Totals	\$296	\$96	\$96	\$488

Conclusion

THESL believes that the plan set out in this document is a prudent and effective approach in helping to achieve the Province's energy conservation and demand management goals. This plan addresses many of the potential initiatives outlined in the Minister's letter and represents a responsible first step in THESL's implementation of CDM programs.

THESL looks forward to the Board's approval of this plan and the implementation of these initiatives. THESL requests that in the Board's Decision granting approval of THESL's CDM Plan, the Board confirm that the approved plan will discharge THESL's obligation to invest an amount equivalent to its third tranche MARR, subject to *ex post* review by the Board only with respect to planned versus actual CDM spending.

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Program Budget and Timeline Summary

Summary Information				
	Budget (x 1,000)			
	2004-05	2006	2007	Cost
Conservation and Demand Management	4,819	12,079	11,099	27,997
Distribution Loss Reduction	423	423	423	1,269
Distributed Energy	3,630	3,450	2,920	10,000
Regulatory Reporting	296	96	96	488
Totals	9,168	16,048	14,538	39,754

Conservation & Demand Management				
Residential & Small Commercial Market (< 50kW)	Budget (x 1,000)			Total Cost
	2004-05	2006	2007	
Co-branded Mass Market Program	900	900	900	2,700
Residential & Small Commercial Smart Meter Program	400	1,800	1,800	4,000
Design Advisory Program	150	150	150	450
Residential Load Control Program	470	6,400	6,400	13,270
TAPS Program	437	437	437	1,311
Old Refrigerator/Freezer Return	250	850	0	1,100
Social Housing Program	405	405	405	1,215
Sub-Total Program	3,012	10,942	10,092	24,046

Commercial, Industrial & Institutional Market (> 50 kW)	Budget (x 1,000)			Total Cost
	2004-05	2006	2007	
Smart Meters	800	0	0	800
LED Retrofits for Traffic Lights	150	150	150	450
Leveraging Existing Energy Conservation Programs	330	330	330	990
CI & I Load Control Program	0	130	0	130
Energy Audits and Feasibility Studies	90	90	90	270
Design Advisory Program	437	437	437	1,311
Sub-Total Program	1,807	1,137	1,007	3,951
CDM Total	4,819	12,079	11,099	27,997

Distribution Loss Reduction				
	Budget (x k)			Total Cost
	2004-05	2006	2007	
Distribution Loss Reduction Programs	423	423	423	1,269
Distribution Loss Reduction Programs – Subtotal	423	423	423	1,269

Distributed Energy				
	Budget (x k)			Total Cost
	2004-05	2006	2007	
Load Displacement	1,320	1,130	910	3,360
Stand-by Generators	2,310	2,320	2,010	6,640
Distributed Energy - Subtotal	3,630	3,450	2,920	10,000

Overall CDM Support				
	Budget (x k)			Total Cost
	2004-05	2006	2007	
Regulatory Reporting	296	96	96	488
Regulatory Reporting - Subtotal	296	96	96	488