Thunder Bay Hydro

Thunder Bay Hydro
34 N. Cumberland Street
Thunder Bay, ON P7A 4L4

Tim Wilson
Customer Service Mgr.
Phone (807) 343-1030

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Proposed 3 Year Distributor Conservation Demand Management Plan for Ontario's Energy Culture of Conservation

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Introduction

The Ontario government is committed to getting Ontarians to conserve electricity by a total of 5% by the end of 2007. The government believes that local distribution utilities need to play a leading role in this 3-year initiative, which begins May 1st, 2005. As such, the Ministry of Energy through the Ontario Energy Board has strongly encouraged utility involvement and has outlined six areas that utilities need to consider when evaluating conservation and demand management projects. The areas are as follows:

- Energy efficiency
- Utility operational changes
- Load management measures to both shift and interrupt load
- Measures to encourage fuel switching
- Programs targeted to low income and hard to reach customers
- And, distributed energy options behind a customer's meter

To this end, Thunder Bay Hydro Electricity Distribution Inc. has developed its own plan for encouraging customers to conserve electricity. It is our desire to be a conservation leader in our community through partnering with our own local conservation agencies to help this government and the province achieve the targeted 5% reduction. Our plan is intended to cover all areas of conservation and demand management while allowing full participation from all of our customer classes.

Our Unique Circumstance

Since the introduction of Market Based Rate of Return to Ontario distribution utilities, Thunder Bay Hydro has been operating under a 'Rate Minimization' model. The model was mandated by the utility's shareholder, the City of Thunder Bay. The essence of this model is that the City of Thunder Bay has decided that it will forego any financial return from its ownership of Thunder Bay Hydro. The shareholder made this decision in anticipation that avoiding the distribution rate increases associated with a financial return to the City would serve as an economic stimulant in a weak local economy.

In accordance with the 'Rate Minimization' model, Thunder Bay Hydro did not previously apply for the distribution rate increases required to fund a financial rate of return. The utility is essentially operating under a breakeven scenario, where the small return earned is used to fund the capital expenditure program. At this time, the City of Thunder Bay is not considering abandoning the 'Rate Minimization' model. As such, Thunder Bay Hydro has no plans to apply for a third tranche distribution rate increase.

Nonetheless, Thunder Bay Hydro is eager to participate in delivering Conservation and Demand Management programs to its customers. The utility is currently involved in a dialogue with the Ministry of Energy aimed at determining a mechanism for funding these programs at an appropriate level. It is anticipated that Ministry approval of a funding mechanism will be received in the near future. Thunder Bay Hydro's application for final approval of its Conservation and Demand Management programs will reflect the projected resources available under the approved funding mechanism.

Thunder Bay Hydro

About Us: Our Customer Data

Class	# of customers
Residential	44,110
General Service	5,105
General >1MW	20
General >5MW	3
Total Customers	**49,238**

Class	Total kWh consumption
Residential	362,446,555
Streetlight	10,585,102
General Service	450,267,385
General > 1MW	167,354,400
General > 5MW	60,967,082
Total kWh	**1,051,685,176**

Thunder Bay Hydro's DCDM Programs

Summary of Programs

	Total Cost	Total Savings
Energy Efficiency Programs	$575,165	5,828,160kWh
Distribution System Efficiency Programs	$549,000	493,848kWh / 61kW
Fuel Switching Programs	$61,000	634,458kWh / 50,000kWh shift
Low Income & Supplemental Programs	$101,500	1,543,275kWh
Distributed Generation	$20,000	
Administrative Support	$300,000	
TOTALS	**$1,606,665**	**8,499,741kWh / 61kW system peak reduction/ 34,000kWh peak shift**

For a detailed breakdown of the above, please see Appendix I.

Energy Efficiency Programs

	Total Cost	Total Savings
Commercial Lighting Retrofits	$33,500	349,809kWh
Key Account Seminars	$3,500	
City Lighting Program	$483,165	3,315,000kWh
Community Outreach Campaigns	$31,000	867,000kWh
Media, Advertising & Public Outreach	$17,000	1,234,620kWh
Load Control Programs	$7,000	61,731kWh
TOTALS	**$575,165**	**5,828,160kWh**

Descriptions

Commercial Lighting Retrofits

This Program will be available to all general service classes and will include incentives or rebates to have businesses upgrade to more efficient lighting systems. Businesses will be required to apply to the program and applications will include projected energy savings, total costs for upgrade, etc. Program development is scheduled to occur in 2005, with implementation from 2006 through 2007. Long term energy savings are expected to last 10 to 15 years.

Key Account Seminars

Seminars, to educate customers on the Minister's goal of a 5% reduction in electricity consumption will be held in 2005. The seminars will introduce customers to programs, agencies and companies that can assist them in being part of the 5% target. As a follow up, we will elicit feedback from customers on what they need from us in helping them achieve the 5%.

Energy Efficiency Programs

Descriptions

City Lighting Program

In partnership with the City we have two plans. Part A, the Traffic light LED's, begins in 2005 and completes at the end of 2007 and will benefit all tax paying rate classes. The plan includes traffic head and pedestrian signals conversion to LED. Thunder Bay Hydro is to reduce contributions in years 2 and 3 and the City is to use the energy operating savings to continue with the capital program. It is estimated that an 80% reduction in kWh will be achieved. Once the program begins, long-term energy savings are expected in perpetuity.

Part B, the Streetlight Roadway Illumination Design Standard Reduction program, begins in 2005 and completes at end of 2007. Again, this program benefits all tax paying rate classes. The program goal is to reduce residential streetlights from 100W to 70W while maintaining overall standard lumin output. Some ballast changes will be required. The estimated kWh reduction is 25%. As long as in the future, lights are not upgraded from 70W to 100W the long term energy savings are expected in perpetuity.

Community Outreach Campaigns

This program will include a Compact Fluorescent Lighting promotion consisting of giveaways of 3,000 bulbs at local trade shows and community presentations. The program benefits customers in the residential rate class. The derived wattage benefit is calculated based on a 17W bulb replacing a 60W bulb. Although we can't be certain that individuals will continue using CFLs, we are confident that this program combined with our education efforts will instill a conservation culture shift.

A second program, the Refrigerator Buy Back program, is aimed at customers with a second fridge. Thunder Bay Hydro will pay for the pickup, disposal and recycle costs, with a target of one hundred refrigerators.

A third program, the Energy Star Appliance Rebate program, will target consumer purchases of 200 new appliances. Programs will run from 2005 through 2007.

Energy Efficiency Programs

Descriptions

Media, Advertising & Public Outreach in partnership with local agencies

This program is designed to raise awareness of the need to reduce electricity consumption and to provide customers with simple energy efficiency tips. It will also provide customers with access to Thunder Bay Hydro conservation programs. This program benefits all rate classes. The program will utilize EcoNews tabloid, television and print campaigns, school programs, community presentations, advisories and Public Service announcements as promotional opportunities. We will also utilize 2-minute news hour features, radio and website support local communications firms. Program components are more heavily weighted in 2005.

Load Control Programs

This program will be designed to promote the smart use of appliances during off-peak times. The program may include water heater, appliance and heating and cooling control systems. We believe the program could be of benefit to all rate classes. Incentives will be provided for purchase of devices that meet our criteria. This program begins in 2006 and continues to end of 2007.

Distribution System Efficiency Programs

	Total Cost	Total Savings
Voltage Conversions	$240,000	267,501kWh / 27kW
Urban 4kV Rebuild	$171,000	102,885kWh / 19kW
Transformer Upgrades	$138,000	123,462kWh / 15kW
TOTALS	**$549,000**	**493,848kWh / 61kW**

Descriptions

Voltage Conversions

It is our experience and that of the industry that area voltage conversions result in line loss savings that benefits all rate classes. Not only will our conversion program from 4kV to 25kV do this, it will also allow us to decommission an existing 4kV substation. In the process we will also be replacing distribution transformers. The result is that we will achieve distribution transformer, station transformer, and line loss reductions. Targeted completion for our conversion is 2005. The long-term energy savings will last for at least 25 years.

Urban 4kV Rebuild

The purpose of this program is to identify existing 4kV lines that are nearing the end of their useful life. Then, on a feeder-by-feeder basis we would perform voltage conversion. This program benefits all rate classes by incorporating transformer upgrades during line upgrades. In the end we achieve line, transformer and station loss reductions. The long-term energy savings will last for at least 25 years.

Transformer Upgrades

This program identifies high loss transformers that can be replaced. Replacing transformers on the distribution system to gain efficiencies will benefit all rate classes. The program begins in 2005 and continues over the three years. The long-term energy savings on the transformers last for 20 years.

Fuel Switching Programs

	Total Cost	Total Savings
Water Heater Electric Efficiency Programs *	$27,000	583,015kWh
Electric Thermal Storage Heating * * programs were very successful prior to market opening	$34,000	51,443kWh 34,000kWh peak shift
TOTALS	**$61,000**	**634,458kWh 34,000kWh peak shift**

Descriptions

Water Heater Electric Efficiency Programs

These programs are of benefit primarily to our residential customers. The first program deals with water heater tune-ups and the second deals with electric to gas conversions. We are targeting 200 water heater tune-ups and 60 tank conversions. Program costs will be spread over the three years, beginning in 2005. It is estimated the conversion program alone will produce 5kWh/person/day in savings. Based on the life of the tank, savings will last 7-12 years. The program will target non-electrically heated homes with electric water heaters and further target homes with the oldest tanks, as they would have the highest standby losses.

Electric Thermal Storage (ETS) Heating

Electric thermal storage (ETS) is a heating system that uses lower-cost, off-peak electricity to generate and store heat in ceramic bricks contained in an insulated cabinet. The units release their heat as needed for up to 12 hours, even when the electricity is turned off. Individual room units are available for space heating, along with units that can assist with heating your entire house.

This program targets homes with no access to Natural Gas and will benefit residential customers. The program begins in 2006 and runs for two years, with an estimated 50% savings in electrical heating load equating to approximately 35% savings in total electrical consumption. The program will require a Smart Metering component for providing evidence of load reduction and shifting. Long term savings are expected for 15-20 years.

Low Income & Supplemental Programs

	Total Cost	Total Savings
Homeowner Services	$5,500	308,655kWh
Distributed Generation research/study		
EII – Energy Innovators Initiative – Natural Resources Canada		
LIEN – Low Income Energy Network		
Thunder Bay Social Housing		
LED Christmas lights		
Room Air Conditioner program		
DSSAB – District Social Services Advisory Board		
Share the Warmth		
Thunder Bay Hydro HELP program		
ZWAT – Zero Waste Action Team		
TOTALS	**$101,500**	**1,543,275kWh**

Low Income & Supplemental Programs

Descriptions

Homeowner Services partnerships - Power Reduction & Low Income

Part A of this program consists of electrical consumption add-on development to be used in conjunction with EnerGuide home visits. Part B is the development of a similar type of program geared toward low-income customers. The final results of both programs will be returned to Thunder Bay Hydro for calculated load reduction. These programs are to run in 2005 with an estimated 1,000kWh reduction/home in a targeted is 150 homes.

General Programs

The remaining $96,000 will be used to investigate partnering with the remaining agencies in the list in order to assist low-income customers. One idea is to develop easy to use instructions and tips on energy conservation. Ideas may include tips on insulating, smart appliance use, low-flow showerheads etc. The other thrust is to provide these customers with direct access to our other programs within the DCDM plan. The ultimate intent is to give these customers the tools required to reduce their electrical bills.

Distributed Generation Programs

	Total Cost	Total Savings
Technology and Program Research	$20,000	To be determined
TOTALS	$20,000	

Description

Technology and Program Research

This portion of the plan is intended to allow us to devote some funding toward studying future technologies and programs as it relates to behind the meter distributed generation. Projects considered in this program will include small-scale wind turbine and rooftop photo-voltaic. Program studies are scheduled to begin in 2005.

Administrative Support Programs

	Total Cost	Total Savings
Program Administration	$300,000	Ensures delivery and prudence of programs and signals magnitude of commitment to conservation
TOTALS	**$300,000**	

Description

Program Administration

It is our intention to hire an individual to further develop and administer our DCDM plan. Areas of responsibility will be to manage customer and partnership relationships and program delivery. Activities will include program research, initiative implementation, program monitoring and evaluating, and monthly reporting. Initial discussions with the utilities in our district have yielded an interest in working together on initiatives. As a result, we will look at the coordination of DCDM activities among the district utilities to realize efficiencies.

Thunder Bay Hydro's DCDM Programs

Appendix 1 - revised January 13, 2005

Summary of Programs

	Yr 1 Costs	Yr 1 kWh Savings	Yr 2 Costs	Yr 2 kWh Savings	Yr 3 Costs	Yr 3 kWh Savings	Total Costs	Total kWh Savings
Energy Efficiency	$281,165	1,070,347	$195,500	1,944,579	$98,500	2,813,234	$575,165	5,828,160
Distribution System Efficiency Programs	$346,000	126,892	$106,000	164,616	$97,000	202,341	$549,000	493,848
Fuel Switching/Load Management	$10,000	102,885	$27,000	222,918	$24,000	308,655	$61,000	634,458
Supplemental & Low Income	$39,500	308,655	$34,000	514,425	$28,000	720,195	$101,500	1,543,275
Distributed Generation	$20,000	0	$0	0	$0	0	$20,000	0
Administrative Support	$100,000	0	$100,000	0	$100,000	0	$300,000	0
TOTALS	$796,665	1,608,779	$462,500	2,846,538	$347,500	4,044,425	$1,606,665	8,499,741

- plan includes 61kW system peak reduction and 34,000kWh peak shift

Energy Efficiency Programs

Commercial Lighting	$3,500	20,577	$17,000	123,462	$13,000	205,770	$33,500	349,809
Key Account Seminars	$3,500	0	$0	0	$0	0	$3,500	0
City Lighting Program	$226,165	555,000	$175,000	1,100,000	$82,000	1,660,000	$483,165	3,315,000
Community Outreach	$31,000	289,000	$0	289,000	$0	289,000	$31,000	867,000
Media, Advertising & Public Outreach	$17,000	205,770	$0	411,540	$0	617,310	$17,000	1,234,620
Load Control Program	$0	0	$3,500	20,577	$3,500	41,154	$7,000	61,731
TOTAL	$281,165	1,070,347	$195,500	1,944,579	$98,500	2,813,234	$575,165	5,828,160

Distribution System Efficiency Programs

Voltage Conversions	$240,000	89,167	$0	89,167	$0	89,167	$240,000	267,501
Urban 4kV Rebuild	$58,000	17,148	$58,000	34,295	$55,000	51,443	$171,000	102,885
Transformer Upgrades	$48,000	20,577	$48,000	41,154	$42,000	61,731	$138,000	123,462
TOTAL	$346,000	126,892	$106,000	164,616	$97,000	202,341	$549,000	493,848

Fuel Switching Programs

Water Heater Electric to Gas	$10,000	102,885	$10,000	205,770	$7,000	274,360	$27,000	583,015
Electric Thermal Storage Heating	$0	0	$17,000	17,148	$17,000	34,295	$34,000	51,443
TOTAL	$10,000	102,885	$27,000	222,918	$24,000	308,655	$61,000	634,458

Supplemental & Low Income Programs

Homeowner Services	$5,500	102,885	$0	102,885	$0	102,885	$5,500	308,655
Low Income Programs	$34,000	205,770	$34,000	411,540	$28,000	617,310	$96,000	1,234,620
TOTAL	$39,500	308,655	$34,000	514,425	$28,000	720,195	$101,500	1,543,275

Distributed Generation Programs

Technology & Program Research	$20,000	0	$0	0	$0	0	$20,000	0
TOTAL	$20,000	0	$0	0	$0	0	$20,000	0

Administrative Support

Program Administration	$100,000	0	$100,000	0	$100,000	0	$300,000	0
TOTAL	$100,000	0	$100,000	0	$100,000	0	$300,000	$0