Aurora Hydro Connections Limited

2005 Conservation and Demand Management Plan

Responsive and responsible conservation and demand management for Aurora's homes, businesses and infrastructure

EnerSpectrum Group

Aurora Hydro

AURORA HYDRO CONNECTIONS LIMITED

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Introduction

Part of Ontario's and Canada's fastest growing region, Aurora's population is now more than 44,000, doubling since 1986 and projected to rise to 63,700 by 2021. Residential, commercial and industrial development has grown rapidly since 2000, with building permit activity growing from more than $40 million to approximately $100 million annually for all sectors.

As this future unfolds, the Town of Aurora will increasingly depend on its local distribution company, Aurora Hydro Connections Limited (Aurora Hydro), to meet growing demand for electricity with reliable, cost-effective service to homes, businesses and the public infrastructure that all will depend on.

Aurora Hydro serves more than 15,700 electricity customers, delivering almost 330,000 kWh of energy with a load more than 72,000 kW in 2003. This load is projected to increase to more than 104,000 kW by 2013.

This growing electricity load is indeed a sign of economic development, requiring investment in distribution assets and infrastructure. But it also presents an opportunity to apply conservation and demand management principles and programming. This will help Aurora Hydro better manage its load growth, improve the energy efficiency of the distribution system, and derive the fullest possible value for customers, while reducing electricity generation below the level otherwise required.

The Conservation and Demand Management Plan embodies the rationale and programming to invest some $820,000 in reducing load growth, embedding more efficiency in the distribution system, and helping promote greater energy efficiency across all electricity customer segments.

Strategic Framework

Aurora Hydro has structured a balanced conservation and demand management plan for 2005 and beyond that aligns with the electricity delivery challenges outlined above. The purpose of the plan is to address the reality that each sector of Aurora Hydro's diverse customer base engages in conservation and demand management at different levels and at different starting points. This plan's objective, therefore, is to move forward on a number of fronts to diversify efforts and secure the best opportunity for creating a conservation culture. Plan elements focus on five key fronts:

- **Conservation and Demand Management Promotion and Education** intended to improve overall conservation and demand management awareness levels among all customers. Individual program scope, design and implementation are developed to address sector and customer requirements.

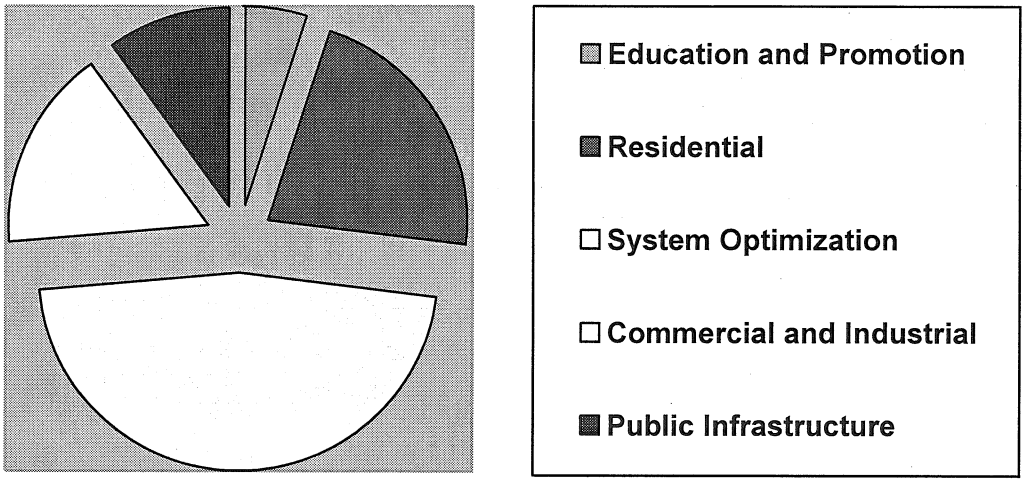
- **Residential Programming Pilots** to establish the basis for influencing both interest and action in energy efficiency initiatives. Key to the plan is enhancing customer ability to recognize cause and affect relationship between household energy appliances and energy use, potential for energy savings, and impacts on energy bills.

- **System Optimization Study and Pilot** upstream of the customer meter to identify loss mitigation potential through strategic system investments. Programming in this area also looks at assessing the significance of targeted customer load reductions on system losses.

- **Commercial and Industrial Pilots** targeted over a number of fronts to establish the economic triggers that motivate customers to take action on conservation and demand management initiatives. Programming in this area is also pilot oriented to identify the relationships between suitable technologies and customers' propensity to take action.

- **Public Infrastructure Pilot** improvements to demonstrate political leadership. Programming designs showcase state of the art energy efficiency technologies and their impacts at Town of Aurora facilities.

Conservation and Demand Management Funding Allocation



Aurora Hydro's Conservation and Demand Management Plan takes a prudent approach to funding energy efficiency across all segments of customers and the distribution system itself to deliver:

1. Overall heightened public awareness of conservation and demand management.
2. Analyses of the system, to identify opportunities to achieve energy and demand reductions.
3. Pilot testing to prove the level of results that can be achieved and the effectiveness of incentives so that major funding is focused where it can return the greatest value to customers and the distribution system.

2005 Conservation and Demand Management Programs

Using prudence for conservation and demand management spending, Aurora Hydro has designed its 2005 Programs to test, learn and monitor across virtually all customer segments. The information gained in 2005 will then provide the basis for the expansion of some programs, the addition of others, and the termination of those programs that fail to demonstrate potential. This will provide the basis to allocate spending more effectively on programming to achieve lasting energy and demand results in 2006 and 2007. Moreover, Aurora Hydro will take advantage of opportunities that emerge to partner its programs with other LDCs or organizations for greater impact.

The following programs set out the estimated funding, target segment and key measures. A summary of expenditures and benefits is appended to this document, with the estimated spending envelope for 2006/2007.

1.0 Conservation Education and Promotion

The platform for successful and enduring conservation and demand management is informed and committed electricity customers, and consumers of all ages. To build this platform, Aurora Hydro proposes to invest in communication and education programs that take conservation messages and valuable information to all customer segments, thereby raising awareness and motivating change.

For greater message impact and efficiency, some of the communication and programming will leverage existing programs in the market place, while others will be specific to Aurora Hydro customers.

1.1 Key account seminars

Direct interaction with major commercial and industrial customers is the most effective medium for transferring conservation and demand management information and receiving valuable feedback. In addition to the ongoing contact with key accounts by Aurora Hydro representatives, a series of seminars is proposed to provide useful

information about available programs and technologies that helps customers benefit from improved energy efficiency. Envisioned as breakfast meetings that do not inconvenience business schedules, the forums will allow the exchange of information and ideas, as well as a feedback point for programming.

Estimated funding allocation: $20,000
Target: 72 accounts with load greater than 50 kW
Key measures: Attendance and interest level

1.2 Cold water washing pilot

Aligned with an ongoing program of the Energy Efficiency Alliance, Aurora Hydro will promote the use of cold water clothes washing in the residential sector. With an estimated consumption of some 200 kWh of energy for washing clothes with electrically heated water each month in a typical family home, there is ample opportunity to reduce both energy and load – some coincident with peak demand.

The campaign will make use of information and advertising currently available from the Energy Efficiency Alliance, for insertion in customer billing envelopes, and on the Aurora Hydro website.

Estimated funding allocation $1,500
Target: Residential customers
Key measures: Insertion of flyer to one residential billing cycle

1.3 School speaker program

Students are a vitally important audience for shifting consumer behaviour over the long term. Curricula in most schools currently provide environmental studies, even in junior grades. As such, it is possible to extend this environmental content with additional messages and information about electricity conservation, and how it helps so many stakeholders in society.

Aurora Hydro proposes to fund the acquisition of content and suitable speakers to visit schools and participate in environmental studies by instructing students on the basics of how the electricity system works, and how the choices they make have significant impact on it. Content and materials would be made available to the Board of Education to integrate into existing environmental curricula, and to distribute materials for students to retain. Years two and three may include contests for energy efficiency ideas from students.

Estimated funding allocation: $10,000
Target: 20 schools
Key measures: Attendance at speaker event

1.4 Facilitate conservation and demand management program access

One of the systemic barriers to practical conservation and demand management in all sectors is a lack of knowledge or understanding of the various energy efficiency incentives available federally, provincially or regionally. Aurora Hydro proposes to help facilitate the reach of programs and program incentives to various customer segments through the use of its website, and key account contacts.

Estimated funding allocation $5,000
Target: Residential, commercial, industrial customers
Key measures: Web page hits

2.0 Residential Programming

Conservation and demand management programming for residential customers will be targeted at different economic segments so that the benefits are shared.

2.1 Low-income conservation and demand management pilot

Aurora currently has some **266** units of low-income housing, including both house and apartment units. Utility costs can be particularly difficult for lower income families because rent and food expenditures

often consume most of a household budget. By helping fund the improvement of energy efficiency in lower income housing, it is possible to provide families with more control over their electricity bills.

Aurora Hydro proposes that it provide funding or grants to existing social service programs such as "Share the Warmth" to help families upgrade the energy efficiency of their homes. This funding would provide materials and services such as insulation, weather stripping, window replacements and other measures that help improve the energy envelope of a dwelling.

Estimated funding allocation: $40,000
Target: Low income housing units
Key measure: program uptake

2.2 Residential air conditioner upgrade pilot

The sale of window air conditioner units has burgeoned in recent years, as have central air conditioning installations. However, window air conditioning units can remain in service for more than a decade, and frequently longer than 20 years, implying that there are a large number of lower efficiency units still functioning. Aurora Hydro believes that by supporting the purchase of upgraded window air conditioners, and the safe recycling of retired units, both peak load and environmental impacts can be reduced. This support will be in the form of cash-off coupons for the purchase of Energy Star and other highly-rated air conditioning units through major retailers. Aurora Hydro will also provide support to the recycling chain that currently handles Aurora's disposal of old appliances.

Estimated funding allocation: $7500
Target: Residential units without central a/c
Key measure: Program uptake

2.3 Smart meter pilot

The success of 'smart' meter technology in Ontario depends not only on installations, but on a behavioural shift in how residential customers respond to price signals and are motivated to conserve energy. A smart meter pilot program will enable Aurora Hydro to test the effectiveness of price signals and gain experience in helping residential customers leverage lasting value from smart meter technology. It will also provide a valuable observation point for Aurora Hydro to learn how best to address customer interests and concerns in implementing smart meter technology.

Envisioned is a pilot program of 330 smart meter installations and monitoring by utility staff or a third party service. It will help determine the most effective communication and web link technology needed to bring about effective customer involvement. The results of information and orientation to customers with these meters can later be compared to a similar neighbourhood without smart meters to determine the potential gains in energy and load reduction.

Estimated funding allocation: $115,500
Target: 330 smart meter installations
Key measure: Technology effectiveness

3.0 System Optimization

The energy efficiency of Aurora Hydro electricity distribution system is a vital dimension of conservation and demand management. A system that has low losses requires less power to deliver energy to customers, in turn lowering costs and reducing the need for generation in the first place.

Aurora Hydro proposes to analyze selected feeders with larger industrial and/or commercial loading patterns to identify the opportunities to reduce losses at key points in the system, and install upgrades such that loss reductions are sustained far into the future. This analysis will form the basis for a pilot study to mitigate these losses.

3.1 Loss mitigation study

The first step in lowering system losses is to analyze the distribution system to quantify losses and the potential for mitigation. Such a study would model the Aurora Hydro distribution system in areas of higher load for system configuration, loading patterns and customer factors to quantify losses and identify opportunities to mitigate those losses. The findings, if appropriate, would form the basis for a loss mitigation pilot as described in 3.2.

Estimated funding allocation: $100,000
Target: Sub transmission and selected distribution feeders
Key measure: Quantify loss mitigation opportunities

3.2 Loss mitigation pilot

Concurrent with the quantification of system losses and the prioritization of loss mitigation opportunities in 3.1, it will be possible to pilot test the loss reductions from a transformer upgrade, and from other interventions such as the installation of capacitor banks, reconductoring, and other improvements. The measured results of this pilot can then be the basis for a decision to undertake further retrofits for additional loss reduction.

Estimated funding allocation: $250,000
Target: High potential loss mitigation opportunities
Key measure: Effectiveness of loss mitigation interventions

4.0 Commercial and Industrial Programs

Currently, of Aurora Hydro serves some 1400 commercial and industrial accounts that consume more than 200 million kWh. Accordingly, five program areas have been identified to address conservation and demand management across this diversified and important sector.

4.2 Big box retailer retrofit pilot

The fastest growing segment of the retail commercial sector is the 'Big Box' store, where retailers construct large floor areas to sustain large volume sales. However, such structures are typically constructed with a focus on building construction cost efficiency, rather than energy efficiency. As a consequence, retailers are not deriving the full operating efficiency that they otherwise might attain through more energy efficient technologies and practices.

Aurora Hydro proposes that an audit program be piloted to provide big box retailers with detailed information on how they can upgrade the energy efficiency of their operations with investments that deliver a payback period of 3 years or less from energy savings. Such a pilot program would provide an energy audit and report by an accredited firm to participating retailers approved for audit by Aurora Hydro. Then can monitor implementation with monitoring and reporting.

Estimated funding allocation: $50,000
Target: 1 big box retail outlet for retrofit
Key measure: Energy savings opportunities and results achieved

4.3 By design initiative

The building design phase is a significantly more cost-effective time to introduce energy efficiency than through retrofits. Moreover, the savings from energy efficiency by design commence from the opening of a new structure, eclipsing the life cycle cost savings that accrue to a retrofitted building.

To promote more energy efficient design in commercial and industrial buildings, Aurora Hydro, will provide professionals to review the designs of pending construction in Aurora to offer design improvement suggestions that will enhance energy efficiency. This service, and the findings will be promoted through municipal level planning linkages and other forums.

2005 Estimated funding allocation: $10,000
Target: New construction in zoning approval stage
Key measure: Program uptake

4.4 Air conditioner upgrade pilot

Similar to the residential sector, there is a growing body of older less-efficient window and wall air conditioners used in the commercial sector. A pilot program will help encourage businesses to trade in their older units in exchange for credits or coupons for the purchase of more efficient units. Traded models will then be properly recycled.

Estimated funding allocation: $1000
Target: 50 commercial businesses
Key measure: Program uptake

4.5 Manufacturing energy upgrade pilot

There is a growing base of large manufacturing customers in Aurora, representing demand levels that exceed of 300 kW. Aurora Hydro proposes the issuance of grants on a pilot basis to help fund the replacement of energy intensive technologies in manufacturing facilities with more efficient alternatives, and measure the demand and energy impacts. Such grants would help pay for the cost of new motors, lighting and HVAC.

Estimated funding allocation: $45,000
Target: 15 industrial production facilities
Key measure: Impacts of upgrades

4.6 Customer power factor corrections

Low power factors for major industrial or commercial customers can have adverse impacts on distribution system losses. With some 67 customers with power factors less than 90%, Aurora Hydro believes an opportunity is at hand to quantify the impacts of poor power factors and identify lasting solutions that contribute to loss reductions and a more efficient distribution system overall. This will provide a plan

for future implementation of power factor corrections in conjunction with customers.

Estimated funding allocation: $15,000
Target: Customers with the largest loads and lowest power factors
Key measure: Program uptake

5.0 Public Infrastructure Programs

5.1 Town of Aurora demonstration program

Aurora's municipal structures currently number 33 office, works, recreation and pumping facilities, 20 schools and 18 sets of traffic lights. Aurora Hydro proposes arranging energy audits for these facilities, and recommending energy efficiency improvements that the Town can select to showcase. These might include insulation upgrades, lighting and HVAC improvements; and the introduction of solar technologies that can help defray energy load and costs. Aurora Hydro would arrange to meter consumption patterns for these improvements to provide demonstration data for interested businesses and municipalities.

Estimated funding allocation: $60,000
Target: 10 municipal facilities
Key measure: Visibility of efficient technologies and practices

5.2 Festive lights pilot

Seasonal lighting represents a load that is largely borne during peak evening hours. A pilot program is proposed to promote the purchase and use of low-energy LED lights by residential and business customers. As part of this pilot, all Town seasonal lighting will be changed to LED lighting for demonstration purposes. Additionally, Aurora Hydro will co-sponsor local retail promotions of LED lighting

through funding and distribution of discount coupons for lighting during the billing cycle, and through multi-municipal or provincial programs to trade in older festive lighting for high efficiency LED lighting. Funding will also be provided to the Town of Aurora's annual festive lighting contest, to reward the best energy-efficient display.

Estimated funding allocation: $15,000
Target: Fund LED municipal lighting; sponsor retailers
Key measure: Program uptake

6.0 Plan Development and Administration

6.1 Plan development

Funding has been allocated to contract specialized expertise for the research, and development of demand management programs.

Estimated funding allocation: $25,000
Target: Support resources for programming research and design
Key measure: plan viability

6.2 Plan monitoring and administration

Monitoring and administering the various conservation and demand management programs from 2005 to 2007 will require ongoing expenditures for external services.

Estimated funding allocation: $50,000
Target: Support services program administration
Key measure: programs delivered as targeted

Conservation and Demand Management Plan Summary Table

Plan Element	Funding Allocation 2005	Funding Allocation 2006/07*	Percentage
Key account seminars	$ 10,000	$10,000	
Cold water washing pilot	$ 1,500	$0	
School speaker program	$ 7,500	$2,500	
Facilitate DSM program access	$ 5,000	$0	
Sub-total Conservation Education and Promotion	**$ 24,000**	**$ 12,500**	**4.5%**
Low-Income DSM pilot	$ 10,000	$ 30,000	
Residential Air Conditioning Upgrade Pilot	$ 7,500	$0	
Smart Meter Pilot	$115,000	$0	
Sub-total Residential Programming	**$132,500**	**$ 30,000**	**19.9%**
Loss mitigation study	$ 10,000	$ 90,000	
Loss mitigation pilot	$250,000	$0	
Sub-total System Optimization	**$260,000**	**$ 90,000**	**42.7%**
Big Box Retailer Retrofits	$ 25,000	$ 25,000	
By Design Program	$ 3,333	$ 6,667	
Commercial Air Conditioning Upgrade Pilot	$ 1,000	$0	
Customer Power Factor Corrections	$ 5,000	$ 10,000	
Manufacturing Energy Upgrades	$ 15,000	$ 30,000	
Sub-total Commercial and Industrial Programming	**$ 43,383**	**$ 71,667**	**14.8%**
Town of Aurora Program	$ 20,000	$ 40,000	
Festive Lights Program	$ 5,000	$ 10,000	
Sub-total Public Infrastructure Programming	**$ 25,000**	**$ 50,000**	9.1%
DSM Program	$ 25,000	$0	
Plan monitoring and administration	$ 18,000	$ 32,000	
Sub-total Program Administration	**$ 43,000**	**$ 32,000**	**9.1%**
Program Totals	**$533,833**	**$286,167**	**$820,000**

*Funding may be relocated based on Pilot results and customer needs

This conservation and demand management plan was prepared for Aurora Hydro Inc. by EnerSpectrum Group.

EnerSpectrum Group provides a full spectrum of services to Local Distribution Companies for conservation and demand management programming, asset and operations management, strategic growth and due diligence, system troubleshooting, customer programs, and workforce planning.

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