

2004-2005 DCDM Plan



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Brantford Power 2004-2005 Conservation and Demand Management Plan



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This document was prepared for Brantford Power by IndEco Strategic Consulting Inc.

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1 Introduction

Brantford Power is the local distribution company serving the City of Brantford, Ontario. It replaced the former Brantford Hydro Electric Commission in 2000 under deregulation of the Ontario electricity industry.

Brantford Power is committed to customer service, and sees an important role that it can play helping its customers to use electricity wisely in order to minimize system costs, customer bills, and the environmental and health impacts associated with electricity use.

To this end, Brantford Power is proposing to introduce a number of programs that the OEB has referred to as Distributor Conservation and Demand Management (DCDM) programs.

1.1 Principles

The DCDM program Brantford Power is proposing is guided by several key principles:

- Avoid lost opportunities and keep options open
- The program should include a mix of conservation assets and programs
- The program should address all customer classes
- The program should build on existing programs and leverage other sources of funding, where possible
- The program should provide experience that will be helpful in the design and delivery of future DCDM programs.

Lost opportunities

The future of Demand Side Management (DSM) in Ontario is not fully determined. In the next 6 months, the Ontario Power Authority is expected to be established, with the Conservation Bureau to deliver provincial energy conservation initiatives. There are discussions underway at the Ontario Energy Board regarding how DCDM will be addressed in 2005 commodity rates, and in 2005 and 2006 distribution

rates. In the meantime, it is prudent to ensure that opportunities for long-term savings are not lost when immediate decisions have to be taken. At the same time, it is prudent to keep options open while the regulatory and business environment is being finalized.

A mix of conservation assets and customer programs

DCDM initiatives should ensure that electricity is used wisely by both the LDC, and its customers. Consequently, it is appropriate that both of these matters be addressed by the DCDM program. Further, the role of the LDC is to address barriers to customers' efforts to use energy more efficiently, whether these barriers are information barriers, economic barriers, or institutional barriers; it is not to take over their responsibilities for wise electricity use from them.

While the DCDM programs will address all customer classes to some extent, the majority of the expenditures will be targeted at conservation assets as these expenditures will benefit all of Brantford Power's customers, while enhancing Brantford Power's rate base.

All sectors

Where programs are targeted at customers, it will be desirable for all customers to have access to programs that give an opportunity to use electricity more efficiently. Consequently, at least initially, there should be individual component programs targeted at customers in large and small commercial and industrial companies, in the residential sector and in institutions. Within these sectors, there may be sub-sectors with special needs, such as low-income residential customers, and these will be targeted where appropriate and feasible.

Build on existing programs and leverage funding

Particularly during this transitional period while the regulatory and business framework for DCDM is being finalized, Brantford Power does not anticipate developing a significant internal DCDM unit, but instead wants to rely on partners offering existing programs. This both ensures rapid start-up and availability of programs to customers, and minimizes long-term obligations, while keeping the option of developing in-house offerings in the future.

While building on existing programs, Brantford Power also wants to take advantage of opportunities to leverage its funding, whether through

accessing other funding resources available, or by partnering with other groups in the community and thereby increasing its effectiveness. For example, the plan that follows will draw on foundations to assist in rolling out a low-income assistance program, and will draw on local partners such as the Brantford Chamber of Commerce, the Brantford Business Improvement Area, or the City of Brantford Economic Development Department to deliver business customers access to information about energy efficiency programs and opportunities.

Provide experience that is helpful in moving forward

Though Brantford Power does not want to spread its resources too thin, it is desirable to have a mix of different program types within the portfolio, possibly including:

- Customer energy efficiency programs
- Customer load management and demand response programs
- Distributed generation.

2 Components of the plan – core programs

Brantford Power has identified a number of programs that will make up the DCDM portfolio. The programs are divided into two groups: core programs which Brantford Power is prepared to commit to delivering, and other programs for which a final decision will be made subsequent to the submission of this plan. Brantford Power is seeking OEB approval of the entire menu of programs to enable it to select the appropriate mix based on further detailed planning and program design. Factors affecting whether these will be added to the program portfolio will include:

- whether suitable arrangements can be made with potential program delivery agents
- whether neighbouring LDCs will also participate in the program, and allow economies of scale to be realized
- the degree to which programs already committed to are subscribed to by customers, and the implications of this on resource availability.

Core programs address each of the key customer groups, including the distribution system, commercial and industrial customers, residential customers, and institutional customers.

2.1 *Distribution system improvements*

Brantford Power serves a number of older subdivisions, built in the 1960s, that operate at lower voltages (4.16 kV) than is current practice (27.6 kV), and which experience significant energy losses.

In particular, the Mayfair subdivision, in the north end of the city, is one of the oldest, and least electrically efficient. Further, this subdivision has been problematic and requires upgrading to improve the security of supply.

There is an opportunity to upgrade the voltage which requires replacing the transformers and the primary cable which would further enhance the security of supply, while improving the overall efficiency of the system. The estimated cost for these upgrades, if done concurrently, is estimated at 1.8 million dollars, and the annual energy savings are estimated at about 900,000 kWh; savings that will be realized over the life of the equipment of 30 to 40 years.

To fix the customer problem alone, Brantford Power could replace only the cable at a cost of 900 thousand dollars. Instituting the other proposed system changes at a later time would add considerable incremental cost, and defer the energy savings benefits, which accrue to all Brantford Power customers.

Only the cost directly attributable to the voltage conversion (\$900,000) is allocated to the DCDM budget, and it is expected that the work can be completed by December 2005.

The resource requirements are estimated. In the event that the tender bids come in significantly under the 1.8 million dollar estimate, it would be possible to undertake additional voltage conversion upgrades to other parts of the distribution system.

2.2 Smart meters for commercial/industrial customers

The Minister of Energy has announced his intention to replace all meters with 'smart meters' by 2007. Smart meters are meters that record electricity use at specific times of day, that are capable of being 'read' remotely (e.g. via a phone line), and that can provide customers with information on their real-time electricity use (e.g. over the web).

The provincial smart meter program is still under development, and its details are as yet unknown. Given this, it is not considered appropriate to initiate an aggressive meter replacement program at this time. However, there are a number of meters at commercial or industrial customer premises (>50 kW) that are coming up for their six year calibration in the next year, and it is prudent to take the opportunity to replace these with smart meters when they need to be pulled out for recalibration anyway. By replacing them at this time, only the capital cost is incurred, and the need to incur subsequent installation costs is avoided.

The number of meters coming up for recalibration in the next year is approximately 70, and the cost per meter is approximately \$700, for a total program cost over the next year of \$50,000.

2.3 Key accounts seminar series

Brantford Power will offer a quarterly breakfast seminar series to commercial and industrial customers, in collaboration with existing business associations, such as the Brantford Chamber of Commerce, the Brantford Business Improvement Area or the City of Brantford Economic Development Department. Possible themes for the series include:

- An introduction to the new electricity market and what it means to commercial and industrial electricity consumers, including for example, sources of information on wholesale prices, their electricity use, and what to look for in those data
- A presentation on the Energy Innovators program offered by Natural Resources Canada to assist companies in using energy more efficiently
- The role of energy service companies in helping industrial, commercial and institutional customers to reduce energy costs, and an introduction to energy service companies operating in the Brantford area
- Case studies from firms that have undertaken aggressive conservation or demand management programs
- Feedback from customers on difficulties or obstacles they have encountered in their efforts to use electricity more efficiently, and discussion of ways in which Brantford Power might assist them in addressing these.

Costs for delivering four quarterly seminars include the cost of renting a facility, catering, and publicizing the event, and are estimated at \$20,000.

2.4 Residential water heater load management

Prior to market opening, Brantford Power operated a load management system that could shed load from LDC-owned electric water heaters. The system has control over almost 3000 existing electric hot water heaters. Brantford Power's controllers are individually addressed and remotely controlled by radio. The system provides control of 9 MW of connected water heater load, or a demand load in the order of 5% of the Brantford peak. The effectiveness of the system is illustrated in Figure 1 which shows the Brantford Power demand during the days following the blackout of August 2003. The upward spikes just after 8:00 pm on August 18, 19 and 20 are over 5 MW of load being switched back on in Brantford. In addition, the control units have two relays, so it would be possible to control more than one appliance. For example, it would be possible to control air conditioners to temper summer peak loads.

Brantford Power Demand

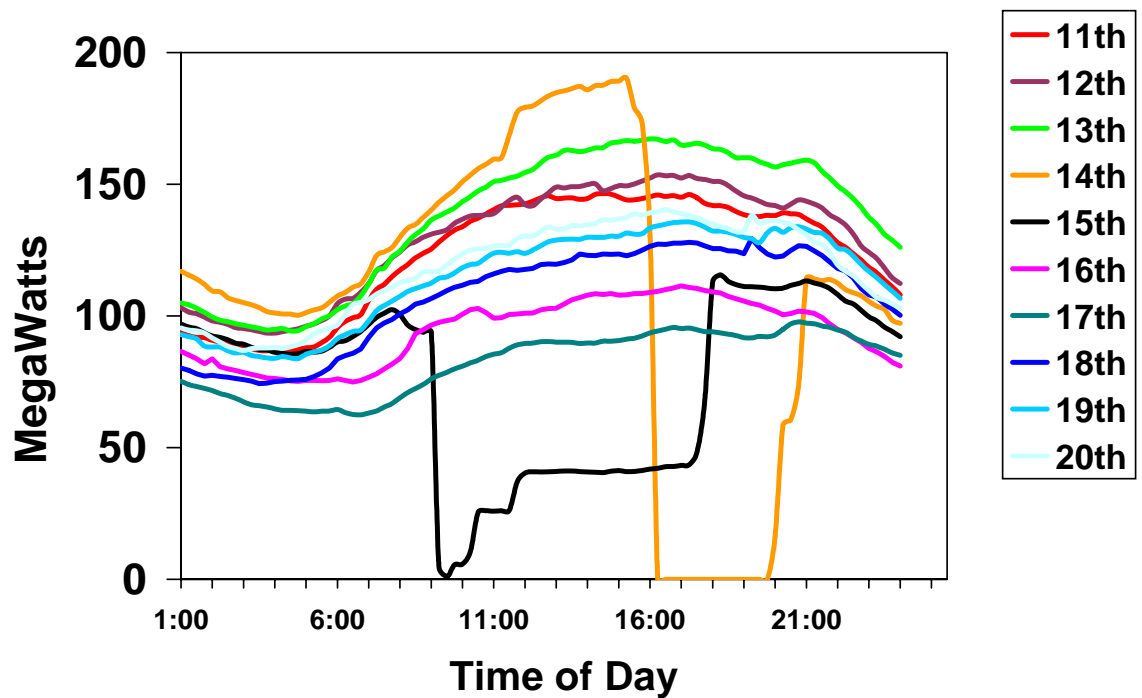


Figure 1 -- Brantford Power power demand in August 2003. The peaks just after 20:00 on the 18th, 19th and 20th are over 5 MW of controlled electric water heating load switching back on.

Prior to market opening, customers were paid an incentive of \$5.00 per month to participate in the program, but this was dropped to \$1.50 per month when the market opened, and the program was idled. This was seen as an opportunity cost by Brantford Power that kept open the option of restarting the program.

Brantford Power would now like to reactivate this program. Doing so will require staff training, since none of the current staff has experience with the program, system testing, and some hardware and software updates necessitated by upgrades made to the wholesale metering system.

It is proposed to continue paying the incentive at the rate of \$1.50 per month per participant. This level is seen as reasonable for maintaining existing participants, which is all that is being proposed at this time. However, should it be decided to solicit new participants, or to regulate another device (such as air conditioners, where the impacts of the program may be more noticeable to participants), a higher incentive may be required.

The cost of reactivating the system is estimated at \$35,000, and the cost of incentives at about \$55,000 per year.

2.5 *Low income consumer retrofit program*

Brantford Power has been working with *Share the Warmth* for a number of years to provide emergency energy assistance to low income households.

In collaboration with *Share the Warmth*, Brantford Power plans to develop and implement a comprehensive energy conservation program specifically targeted to low income households in Brantford. In particular, these low income households will include homeowners and tenants occupying premises where they directly pay their electricity bills (e.g. multi-residential complexes with individual meters).

Brantford Power has allocated \$100,000 for this program. Approximately, \$15,000 would be invested in developing a detailed program design and implementation strategy for the pilot. This may include, but is not limited to, developing an application process for the program, working out partnerships with other community groups and government organizations in Brantford, and identifying delivery agent partners for the energy efficiency measures (e.g. Green Communities Association group to deliver the audits and implementation of the retrofit measures in low income dwellings in Brantford).

The balance of the funds allocated would be for the delivery and implementation of the energy conservation measures (e.g. draftproofing and insulation, lighting retrofits, appliance upgrades etc.) to the low income participants and to conduct monitoring and evaluation of these measures.

Initial enquiries suggest that there may be foundations that would be willing to co-sponsor such a program. This might potentially mean there would be as much as twice the funds available to assist this group of customers in improving their energy efficiency.

2.6 *Customer outreach*

Brantford Power will assist all customers to use electricity more efficiently by assisting them to avail themselves of existing information sources and programs prepared by Natural Resources Canada, the Ontario Ministry of Energy, the Niagara-Erie Public Power Alliance (NEPPA), and others.

Further, it will assist consumers and stakeholders to understand what specific, unique programs are being developed and delivered by Brantford Power by producing an annual DCDM progress report that shows what initiatives were taken, their intended and their actual results.

The cost for these initiatives is estimated at \$15,000.

2.7 Technology and program research

In its Procedural Order of 5 October 2004 on *Applications by distributors under the Ontario Energy Board Act, 1998 for Approval of Conservation and Demand Management Plans*, the Ontario Energy Board recognized the value of development work on evaluating possible technologies or programs that may be suitable for use as part of future DCDM initiatives.

One such technology that is in need of additional research is technology for capturing landfill gas, and using this to generate electricity. Doing so brings numerous benefits, including safety and environmental benefits (landfill gas is primarily methane, and creates both explosion risks and methane is a much more significant greenhouse gas than is carbon dioxide), while capturing the energy contained in the gas, and thereby offsetting other generation.

A project in Brantford has encountered numerous barriers and has not moved forward. Brantford Power proposes to fund a feasibility assessment of proceeding with the project, allowing the City of Brantford to realize the benefits of landfill gas recovery, while reducing electricity bills and giving the LDC experience with embedded generation, interconnect issues, and 'net billing'.

The cost of the assessment is estimated at \$25,000.

2.8 Program administration and planning

A small allocation of resources is required for external assistance in developing the 2005 DCDM plan, input related to DCDM into the 2005 rates application, and design and implementation of monitoring and evaluation systems. The expenditures incurred to date related to the preparation of the DCDM plan and input related to DCDM into the 2005 rates application are tracked in the deferral account. Total resources required are estimated at \$20,000 for this work.

3 Components of the plan – supplemental programs

As outlined at the beginning of the previous chapter dealing with the core programs, some programs are not sufficiently advanced to be able to choose which is most appropriate for Brantford Power, and approval is sought for all these supplemental programs in order to allow Brantford Power to select from among them, once additional information is available. This additional information may include:

- additional detail on contractual agreements with program delivery agents
- whether or not co-operative arrangements can be struck with other LDCs to realize economies of scale.

Overall, these supplemental programs represent only about 10 percent of the DCDM investments to be made.

3.1 LED Christmas lighting

LED lights use considerably less energy per lumen of light than other types of lighting. One application for LEDs is in Christmas lights, which are often used during the times of the winter system peak (e.g. 5-7 pm in December and January). LEDs in this application have numerous other non-energy benefits, including less vulnerability to vandalism (when used outside), and less risk of fire (when used inside), and reduced maintenance costs, because the bulbs do not need to be replaced.

Further, there are reasons to suspect that demand for this application will increase as Brantford takes part in the *WinterLights* competition promoted by Canada Blooms that challenges municipalities to install impressive light displays.

Some of the key obstacles to the more widespread use of LEDs for Christmas lighting include a (false) perception that they cannot deliver the same quality of light as some other lighting types, they are less readily available, and customers are deterred by their somewhat higher initial cost.

Brantford Power is proposing to institute a program that would address some of these barriers to their more widespread adoption that includes:

- Working with the Brantford Business Improvement Area, or the City's Parks and Recreation Department to establish a highly visible demonstration program at which the light display in a prominent location (e.g. Victoria Park) would use exclusively LED lights
- A public information program to draw attention to this display, e.g. through on-site signage, and timely bill inserts to encourage customers to visit the demonstration site and purchase LEDs for their own use
- Consultation with local retailers to advise them of the program and to encourage them to stock LED strings.

The estimated cost of these program components is \$15,000.

3.2 LED Christmas light conversion incentive program

The Clean Air Foundation (CAF) has been working at developing a Christmas LED conversion incentive program, perhaps to be offered initially in the Greater Toronto Area, or the cities of Toronto and Mississauga. Brantford Power is exploring with the CAF whether this program might be brought to Brantford.

The LED replacement program is modelled after a successful program offered by BC Hydro. Program staff members are available in participating retail stores on specified days before the holiday season to advise customers of the benefits of LED Christmas lights, to show them the products available, and to offer discount coupons in exchange for trading in older, less efficient incandescent strings. Costs of the discount coupons would be shared by the manufacturer, the retailer and Brantford Power. Retailers and manufacturers would be encouraged to participate with Brantford Power and other LDCs in publicizing the event.

Costs for the CAF collaborative program are still under discussion, and will require cooperation with other distributors to ensure adequate economies of scale. The program would be delivered in the fall of 2005 for the 2005-2006 holiday season.

3.3 LED traffic light conversion

The City of Brantford has already initiated a program to replace some traffic lights with LED lamps. The advantages of LED signals are as follows:

- Each signal display uses approximately 10% of the energy required for an incandescent traffic signal display
- Less on-going maintenance and associated traffic disruptions since the LED components do not need to be changed for 5 to 7 years as opposed to the annual bulb changing required for incandescent signals
- Brighter displays which are more visible to the aging population of drivers.

By the end of 2004, there will be approximately thirty signalized intersections operating with LED components. Brantford Power proposes to accelerate the conversion to LEDs by supporting the conversion of the remaining seven traffic signals and two flashing beacons installations on Wayne Gretzky Parkway, one of the most important and visible routes into the centre of the City.

The costs of the LED traffic light conversion program are estimated to be \$49,000.

3.4 Room air conditioner (RAC) program

The Clean Air Foundation (CAF) offers the “Keep Cool” program to encourage customers to trade-in older, less efficient air conditioners for Energy Star® models. Customers are offered centralized drop-off locations where they can take their old RACs for free collection and recycling. At that point, coupons are distributed, offering instant rebates on various models of Energy Star® qualified RACs from participating retailers.

The program has been successfully offered in Montreal and Toronto since 2001, and CAF plans to work with various LDCs to realize a goal of collecting 10,000 units.

Brantford’s share of this program would be just over 400 units. Replacing these units will result in an estimated peak demand and electricity use reductions of 350 kW, and 1.35 million kWh, respectively. The preliminary estimate of the program cost is \$50,000 or \$140 per kW of peak reduction, and less than \$0.04 per kWh.

We are continuing to explore with CAF the feasibility of bringing this program to Brantford, possibly along with other utilities in the Niagara-Erie area.

3.5 Cool Shops Brantford

The *Cool Shops* program is partially funded by the federal government, and uniquely targets small commercial businesses. Certified Cool Shops Delivery Agents undertake energy audits of small commercial businesses to identify and implement in-store energy management measures that encourage the small commercial sector to reduce energy use, save on utility costs, and improve environmental health. Once recommendations have been adopted, the Clean Air Foundation will market and promote the business as energy efficient. Costs for the program have yet to be determined.

3.6 Accelerated smart meters for commercial/industrial customers

The core programs included a program to replace commercial/industrial meters coming up for recalibration with smart meters (see Section 2.2, p. 5). This program is an extension to that core program that would see early conversion of smart meters expected to come up for recalibration in 2006, in addition to those coming up in 2005.

The number of meters coming up for recalibration in 2006 is approximately 70, and the cost per meter is approximately \$700, for a total program cost over the next year of \$50,000.

3.7 Memberships and sponsorships

Membership in organizations specifically focused on energy efficiency, demand response and demand management is one means of ensuring that Brantford Power keeps current on opportunities for the organization and its customers. One such organization is the Canadian Energy Efficiency Alliance.

Similarly, there may be opportunities to co-sponsor events that may advance knowledge in these areas, both generally, and specifically within customers' organizations. For example, the McMaster Institute of Energy Studies is seeking sponsors for an upcoming event on demand response.

The maximum amount that would be allocated to memberships and sponsorships would be limited to \$10,000. The specific allocations would be determined in response to opportunities that arise.

4 Program summary and anticipated results

Table 1 summarizes the proposed core programs, their costs, and their anticipated results. These programs account for about 90% of Brantford Power's DCDM budget. Other programs accounting for the other 10% of the budget will be chosen from programs listed in Table 2. A final decision on which of the listed programs will be selected will be made subsequent to the submission of this plan. Factors affecting whether these will be added to the program portfolio will include:

- whether suitable arrangements can be made with potential program deliverers
- whether neighbouring LDCs will also participate in the program, and allow economies of scale to be realized
- the degree to which programs already committed to are subscribed to by customers, and the implications of this on resource feasibility.

It is anticipated that by the end of 2005, Brantford Power will have invested 1.34 million dollars in DCDM, this being the amount of money associated with its third tranche.

Table 1 – Core programs and anticipated costs, benefits and results

Program	Cost	Benefits/Anticipated results
Distribution system improvements	900,000	Annual energy savings of about 900 MWh over 30 years for an average cost of about 0.07 \$/kWh.
General services smart metering	50,000	70 additional meters installed.
Key accounts seminar series	20,000	Anticipate 20-50 customers informed of opportunities, and motivated to act on them, also provide input to future DCDM programs.
Residential water heating load management system	90,000	Ability to control approximately 3000 residential water heaters, representing about 5 MW of demand load, newly trained staff to operate program, upgraded software and hardware.
Low income retrofit program	100,000	Reduced vulnerability of low income customers to electricity costs.
Customer outreach	10,000	Increased access and awareness of customers to existing information tools that can assist them in reducing their electricity use and peak demand. Possible updating of information materials developed by LDCs who are members of NEPPA.
Technology and program research	25,000	Reduced barrier to landfill gas recovery program, increased understanding of implications of embedded/distributed generation for Brantford Power, 3-4 MW capacity.
Planning administration and monitoring	20,000	Coordinated plan for moving forward, and traceable results.
Total for core programs	1,215,000	

Table 2 – Supplemental programs and anticipated costs, benefits and results

Program	Cost	Benefits/Anticipated results
LED Christmas light demonstration program	15,000	Demonstration showcase, promotion of benefits to businesses and residences.
LED Christmas light incentive program	50,000	Incent the purchase of 6000 strings of LED lights representing savings of more than 400,000 kWh/a over 5 years, and peak reduction of about 400 kW at an average cost to Brantford Power of 0.03 \$/kWh.
Traffic light LED program	49,000	Upgrade 7 intersections and 2 flashing beacons on Wayne Gretzky Parkway for annual savings of 86,700 kWh over six years at a cost of 0.11 \$/kWh.
Room air conditioner program	50,000	Upgrade more than 400 RACs to EnergyStar® standards for savings of approximately 1,350,000 kWh over 15 years at an average cost of 0.04 \$/kWh, proper disposal of out-of-service units, reduction of summer peak by about 350 kW.
Cool Shops Brantford	30,000	Inexpensive efficiency upgrades for small stores, increased competitiveness of small stores, new marketing opportunity for participants.
Accelerated general service smart metering	50,000	An additional 70 smart meters installed.
Memberships and sponsorships	10,000	Brantford Power to maintain leading edge knowledge of DCDM opportunities, and encouragement of knowledge development or transfer to customers.
Total for programs that will be selected	125,000	



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