Peterborough Distribution Inc.

2008

Annual Conservation And Demand Management Report

Conservation and Demand Management Program

2008 Annual Report
CDM Third Tranche Funding,
Peterborough Distribution Inc.

ED-1999-0238
March 31, 2009

Introduction

We applied for and received $1,332,276 in funding through the OEB for our Conservation and Demand Management program initiatives. Our commitment has been fulfilled and programs completed as of September 30, 2007.

Additional funding in the amount of $180,000 was received and allocated for conservation initiative through the Green Municipal Fund providing further benefit to our Customers and Community.

The funding has been apportioned with the following results:

Installation of Thermal Storage Electric Heat – Total Budget $741,944

- Conversion of Electric Baseboard to Thermal Storage Heating in co-operation with the local social housing authority.
- Heaters in 124 Peterborough Housing units have been converted
- Savings of 4,123,863 kWh are expected during the life of the units
- Annual estimated electricity cost reduction for Peterborough Housing in the amount of $47,472
- This project has been completed

Radio Signal Control – Total Budget $165,698

- A radio signal system to control appliances and shift discretionary use of electricity to off peak, less costly, times.
- 362 appliances are being controlled benefiting 230 Customers
- Estimated Demand Savings on Peak of 281 kW
- We will continue to offer appliance control for existing participants

Lighting for Social Housing Item a) – Total Budget $150,000
Additional Lighting Programs through Utilization of Green Municipal Funding Items b) & c) - Total Budget - $180,000

- a) Replacement of incandescent light bulbs with compact fluorescent light bulbs in 1763 apartment units including 1688 Social Housing units
- b) In conjunction with the City of Peterborough, we provided funding for the replacement of Incandescent Traffic Signals with LEDs.

- c) We also provided funding to the Downtown Business Improvement Area (DBIA) to replace their Incandescent Christmas lights with LED bulbs.
- The estimated life cycle energy savings for all lighting initiatives is 21,466,047 kWh
- Life cycle cost savings for all lighting initiatives is estimated at $2,463,586

Energy Star Appliance Promotion – Total Budget $83,000

- A rebate incentive was provided to customers purchasing new 'Energy Star' rated appliances.
- Approximately 1753 Appliances have been replaced
- Savings of 1,521,645 kWh are expected during the life of the appliances
- This promotion was completed in 2007

Appliance Load Monitors – Total Budget $13,986

- Provided customers the loan of load monitors to measure energy use of various appliances and devices within their home or business
- This was intended as an educational tool
- As of the end of 2008, approximately 694 customers have benefited from this program
- Estimated energy conserved over lifecycle is 592,097 kWh
- The loan of these Monitors will continue

Public Education Programs – Total Budget $78,167

- Promoting electrical safety, conservation and demand management

Cool Shops (previously 'EnerGuide') – Total Budget $30,104

- Provided business owners in the small commercial sector with the assistance and encouragement to invest in energy conservation
- Approximately 169 customers have benefited from this program
- Estimated Energy Saved over lifecycle is 2,923,725 kWh
- This program was completed in 2005

Infra-Red Camera – Total Budget $82,385

- The original plan of performing heat loss audits for customers was not feasible. The camera will, however, be used to scan for and reduce line loss on our distribution lines.

Evaluation – Discussion - Lessons Learned - Conclusion

Installation of Thermal Storage Electric Heat

1) Description of Program

In co-operation with the local social housing authority, Peterborough Distribution Inc. provided financial, technical and administrative assistance to convert 124 electrically heated units from baseboard electric heating to electric thermal storage heating.

The non-ducted heaters are designed to heat the room or area into which they are placed. During off-peak hours, heaters convert electricity into heat and store that heat in specially designed high-density ceramic bricks capable of storing vast amounts of heat for extended periods of time. A fan inside the unit circulates this stored heat evenly and quietly as the room thermostat calls for heat.

2) Current Status

Total Approved Budget: $ 741,944

Expenditures to Date: $ 775,901

Percentage Completed: 100%

3) Challenges Faced

As Social Housing pays for heat in these units, there is a risk of tenants not giving adequate consideration to the savings benefit and opening a window instead of turning down the heat. Educating the tenants of the overall benefit mitigates this risk.

Peterborough Housing was cautious in allowing the implementation of this program. It was a challenge to convince them of the benefits of this initiative without upfront documentation and history to substantiate the benefits they could expect. Being new technology, this was unavailable and was a “learn as you go” experience for both of us.

An upgrade required to the heating service panel was not originally anticipated and cut into the budget.

After installation of heaters at the tops of stairs, we were notified that this did not comply with building code as they increased a potential hazard of young children climbing up and over the adjacent retaining wall and falling

into the stairs. This was rectified by building the unit up to the same height as the retaining wall.

4) Customer Reaction

The tenants were by and large indifferent, as they did not experience direct benefit.

There were some comments made about the increased size of the heaters taking up more space than the old baseboard heaters.

Peterborough Housing was very pleased with the results.

5) Benefits to Customers

The tenants benefited from an overall warmer and improved heating system. The difference was the fan within the unit circulating the heat.

Peterborough Housing benefited from an upgraded electrical panel and heating system.

This initiative has helped us educate customers and raise their awareness of the benefits of energy conservation.

6) Savings

With the availability of Smart Meters and Time of Use rates, the conversion will have a large impact on the reduction of Social Housing and/or the tenant's electrical bill.

The annual savings in electricity costs is approximately $383 per unit or $47,472 for 124 units converted. This was calculated by taking a case study of 20 units and comparing the direct cost difference between Time of Use and Price Protected rates as well as the overall shift of consumption to a reduced rate time period.

The residential load profile found that with baseboard heat, consumption was Off Peak for 34% of the total consumption. After the conversion to Thermal Storage Electric Heat, the Off Peak consumption increased to 88% with the majority of the remaining portion being for Hot Water Tanks. Based on the Ontario Energy Board calculation model, the Total Resource Cost Guide (TRC), we are anticipating energy savings of 4,123,863 kWh over the 18-year life cycle of these storage heaters.

Assuming that carbon fuel, coal, is burnt in peaking generating stations, there will also be a reduction in greenhouse gas production.

7) Conclusion

This initiative has allowed us to extend our past experience with shifting demand from on peak to off peak by using radio control signals through the SCADA program. We were pleasantly surprised at how much of the load was actually shifted to off peak by the implementation of this initiative.

We have been able to demonstrate the savings to the social housing authority because of the availability of Smart Metering and Time of Use rates.

This initiative was successful in shifting consumption from on peak to off peak in partnership with the local municipality however, in accordance with the requirements of the TRC, the benefits calculated reflect a savings of consumption but not of demand as this was not a summer peaking initiative.

This initiative has been completed.

Radio Signal Control

1) Description of Program

We have developed a radio signal system that may be used by customers to control appliances and shift discretionary use of electricity to off peak times. The signals are currently provided at no cost to the customer and will automatically disable appliances connected to the in-home controller and enable the appliance at an 'off peak' time. Appliances such as electric water heaters, dishwashers, pool pumps, clothes washers and electric dryers are being controlled. A manual override button permits the customer to use the appliance during a control period if necessary.

2) Current Status

Total Approved Budget: $ 165,698

Expenditures to Date: $ 137,274

Percentage Completed: 100%

3) Challenges Faced

We had a difficult time finding customers able or willing to participate. Older homes were not wired to Code and finished basements made it difficult to fit in the additional electric panel required. We also targeted our

test group to customers who had rental water heaters further limiting the available participants.

4) Customer Reaction

We have found that this initiative required more administration time than expected as customers had many questions and requests for information on how the program works and the potential benefits and savings.

Customers appreciate the educational aspect regardless of the savings potential of this program.

Most participants reported that although their appliances and water heating were shut off during certain times of the day, it did not cause any inconvenience.

5) Benefits to Customers

The benefit is the ability to shift consumption from ‘On Peak’ to ‘Off Peak’ times and therefore reduce costs. Total benefit is dependent on the individual consumption pattern of each customer. There is also a community and provincial benefit with overall shift of consumption to off peak.

The value of installed equipment per home is approximately $1,500.

We have currently installed in 230 locations including 98 to water heaters in Social Housing units. The number of appliances being controlled is 362.

6) Savings

Based on the TRC, we are currently controlling 281 kW of Demand.

Assuming that carbon fuel, ie coal, is burnt in peaking generating stations, there will be a reduction in greenhouse gas production as a result of this initiative.

This initiative has been successful because of the availability of Smart Meter technology and Time of Use rates.

Current charge for energy is 3 cents per Kilowatt-hour ‘Off Peak’, 8.7 cents per kilowatt-hour ‘On Peak’ and 7 cents per kilowatt-hour ‘Mid Peak’.

7) Conclusion

For the pilot, we initially targeted customers that are committed to conservation and demand management. In the general population, our success may be slightly less definite.

More public education would attract further participants.

Installing a smart meter at these residences and providing TOU rates readily demonstrated the financial savings to participants.

We had originally hoped that once Smart Metering had been fully deployed, this program would continue on a rental/lease basis for new customers' installations. Currently, we are unconvinced that customers will choose to pay for the ability of us controlling their appliances when they have the ability of controlling most appliance use on their own.

This initiative has been completed though we continue to control appliances for existing participants.

Lighting

1) Description of Programs

a) Replaced incandescent light bulbs in 1688 Social Housing units with approximately 22,269 compact fluorescent light bulbs (CFL).
b) In conjunction with the City of Peterborough, we provided funding for the replacement of Incandescent Traffic Signals with LEDs.
c) Provided funding to the Downtown Business Improvement Area (DBIA) to replace their Incandescent Christmas lights with LED bulbs.

2) Current Status

Total Approved Budget: $ 150,000.00 + $ 180,000.00 GMF

Expenditures to Date: $ 268,649

Percentage Completed: 100%

3) Challenges Faced

a) There is a risk of losing ground over time by tenants not giving consideration to the savings benefit of CFL bulbs and replacing burned out bulbs with cheaper Incandescent bulbs. This risk may be increased by the fact that many Social Housing tenants do not have to

pay for their own electricity and would not see direct benefit. Providing a supply of replacement CFL bulbs to Social Housing Caretakers as well as educating both Social Housing and their tenants of direct and indirect savings associated with this program has mitigated the risk.

4) Customer Reaction

a) Customers really appreciate the program and like the new lighting.

We are finding that most customers are anxious to do their part in conservation.

b) & c) The DBIA and City were both very excited about our participation in their initiatives.

5) Benefits to Customers

The lighting programs bring many benefits to the City of Peterborough, the tenants of Social Housing, and Peterborough Distribution Inc. These include energy reduction (kWh), environmental savings (GHG), cost savings for tenants, local employment, reduced bulb replacement (5 year life expectancy 8000 hours), and recycling of incandescent bulbs.

6) Savings

Combined Life Cycle Cost Saving $ 2,463,586

Combined Life Cycle Energy Saving 21,466,047 kWh

7) Conclusion

The Lighting Programs are uncomplicated yet very effective with a large cost to benefit ratio.

These initiatives have been completed

Energy Star Appliance Promotion

1) Description of Program

This program provided a rebate incentive to customers purchasing new 'Energy Star' rated appliances. It was a continuation of the original rebate program which we applied for, to assist customers forced to replace appliances after the July 2004 flood in Peterborough. The program involved the customer completing a form and bringing in their appliance

receipt. Customer Service activity involved confirming that the appliance qualified as an Energy Star appliance and applying the rebate to the customer's utility account.

Appliance retailers participated in the program by notifying customers that it was available and by providing forms.

2) Current Status

Total Approved Budget: $ 83,000

Expenditures to Date: $ 84,459

Percentage Completed: 100%

3) Challenges Faced

There was confusion initially since appliances were labeled Energy Star but did not qualify according to the catalogue or website. Coordination with appliance retailers was required so that they communicated to customers that models had to qualify officially for the Energy Star Rebate program.

It took longer than expected to do the research to make sure that the appliance that was purchased by the customer was in fact an energy star appliance and met with the requirements. We found that by using the website for the list of energy star appliances, it provided us with the most up to date list and was much more efficient than looking it up in the catalogue that became outdated quickly.

At first we rebated a straight $50 per appliance; however, some customers were requesting a $50 rebate on a $60 appliance. We changed our policy to pay 15% of the appliance cost with a maximum of $50.

4) Customer Reaction

The program participation rate has been favorable.

A large frustration for customers was the fact that some appliances were labeled as Energy Efficient but did not qualify for the Energy Star rebate. The reasons were numerous including 1) United States rating being different that Canada’s 2) Old stock bearing Energy Star label which no longer applies due to increased standards 3) Retailers giving misleading or inaccurate information.

5) Benefits to Customers

This program has been successful in generating interest in Energy Star appliances and encouraging customers who might have focused on other appliance features to consider energy efficiency as part of the purchase decision.

We have provided rebates on approximately 1753 appliances.

6) Savings

We are anticipating energy savings of 1,521,645 kWh over the 15-year life cycle of the average appliance.

7) Conclusion

A rebate program will become less effective as appliance retailers start carrying only Energy Star appliances.

We were easily able to disburse the number of appliance rebates for which we budgeted.

This initiative has been completed.

Appliance Load Monitors

1) Description of Program

Peterborough Distribution Inc. provides the loan of load monitors to customers who use them to measure how much energy is being used by various appliances and devices within their home or business. Customers are asked to complete a form providing information on which appliance(s) they monitored and what action they expect to take to reduce consumption or demand.

This is an educational tool intended to help customers be more prudent with their electrical consumption.

2) Current Status

Total Approved Budget: $13,986

Expenditures to Date: $11,972

Percentage Completed: 100%

3) Challenges Faced

We found that, although there is a fair amount of public interest, customers are busy and tend not to make a special trip to pick up a load monitor. By making the load monitors more accessible to the public for pick up and drop off, we would increase the participation rate, however, we would lose valuable information on customer results and their anticipated action plan.

We created an in-house reporting program that reduced the manual collection of data and produced more information to aid in the annual reporting.

4) Customer Reaction

Experience to-date is that customers who take advantage of the monitor are residential. Customers report that they will use the offending appliance more carefully by turning it off/down or that they intend to replace the appliance.

5) Benefits to Customers

Based on experience to-date, we assume participation will continue with reduced numbers as interested customers utilize the monitor. Currently, 694 customers have borrowed a load monitor.

This initiative is break-even in financial terms but provides the intangible benefits of educating customers in addition to giving them the means to make an individual direct contribution to energy conservation. It will provide an energy conservation benefit but the financial benefit to the consumer is offset by the incremental cost of the energy-efficient appliance.

We also use the load monitor for any high bill complaint locations to help resolve the complaint.

6) Savings

We anticipate energy savings of 592,097 kWh over the 15-year life cycle of the average appliance. Assumptions were made based on the customer's report, life expectancy of the technology, number of customers estimated over this period and when and/or how energy is used, saved or shifted.

7) Conclusion

Although the Program period is over, we intend to continue with this service for as long as customers are interested.

Public Education Programs

1) Description of Program

Our goal is to promote electrical safety, conservation and demand management through participation in trade shows, home shows and advertisement through various media.

Peterborough Distribution Inc. provides a safety program to all of the schools within its service territory. This program will be augmented to provide electricity conservation along with the safety messages.

2) Current Status

Total Approved Budget: $78,167

Expenditures to Date: $77,219

Percentage Completed: 100%

3) Challenges Faced

N/A

4) Customer Reaction

Customers are generally happy to do their part in conservation and feel good about contributing. They are open to knowledge and suggestions on how they can do their part.

5) Benefits to Customers

Benefits are recognized in the other initiatives within the CDM portfolio and their costs are related to marketing and advertising

6) Savings

Savings are as recognized in the other initiatives both within the CDM portfolio and outside of it.

7) Conclusion

Knowledge is always beneficial. Although the program period is over, we will continue to educate the public.

Cool Shops (previously 'EnerGuide for Small Business')

1) Description of Program

The original proposal was to develop an EnerGuide for Small Business; however, once the Cool Shops program became available, it was more efficient to join with other cities in this joint service offering. Cool Shops tried a different approach to engaging the small commercial sector in order to make it easier for businesses to participate and undergo energy efficient changes. Throughout program implementation in Peterborough, Street Teams visited all small commercial areas within the City as well as the outlying communities of Norwood and Lakefield. The Street Teams provided assistance to businesses that exchanged inefficient light fixtures or bulbs to energy efficient versions. This initiative is successful because it provides business owners with the assistance and encouragement to invest in energy conservation.

2) Current Status

Total Approved Budget: $30,104

Expenditures to Date: $30,104

Percentage Completed: 100%

3) Challenges Faced

Businesses need a significant financial incentive in order to consider and implement the replacement of current lighting to energy efficient lighting. In the eyes of a business owner, this is a huge capital investment that most businesses are not able to take part in.

A lot of businesses did not participate in the program due to landlords/owners not being present or available to speak to. In addition, some business owners did not have time to do an audit or were simply not interested in participating.

4) Customer Reaction

The program was extremely well received in Norwood and Lakefield due to the lack of programs and attention directed towards them in the past.

If given significant enough financial incentives, small business owners will purchase simple, turnkey, energy efficient products for their business.

5) Benefits to Customers

Approximately 169 Customers have benefited from this Program representing the number of store audits completed.

6) Savings

We anticipate energy savings of 2,923,725 kWh over the 2 or 5-year life cycle of the new bulbs.

The final Cool Shops Report indicated that Businesses saved a total of $3,600 per year as a result of the free CFL installation and the purchase of discounted energy efficient products.

7) Conclusion

There may be a greater opportunity to encourage the exchange to energy efficient lighting retrofits in participating cities if a number of local, qualified electrician contractors are recommended and promoted through the program.

For future program expansion, partnerships should be developed with local community groups to help increase credibility and awareness of the program.

Participation in the Cool Shops initiative was helpful for us because it was more efficient to join with other cities in this joint service offering. This initiative was successful because it provided business owners with the assistance and encouragement to invest in energy conservation.

This initiative has been completed.

Infra-Red Camera

1) Description of Program

Peterborough Distribution Inc. has purchased an infrared camera. In co-operation with Peterborough Green Up, building audits were to have been performed at the customer's request. Peterborough Green Up was to conduct its audit with the intent of reducing consumption of electricity and other environmental considerations. The building owner could then take remedial measures on the building. This service was to have been available to all electricity customers; however, Peterborough Green Up has indicated that the program requires more resources than originally anticipated. The camera will, however, be used by the Distribution Company to scan the electric distribution lines within the LDC to detect places where conductors and transformers are abnormally hot and thereby reduce losses in the electric distribution system.

2) Current Status

Total Approved Budget: $82,385

Expenditures to Date: $82,385

Percentage Completed: 100%

3) Challenges Faced

Our expectation of conducting building audits at the customer's request has not been realized. We expected that our partner, Peterborough Green-Up, would be able to perform home audits but we discovered that it takes much longer to do an audit than originally expected and the camera is more complicated to use than expected. Given this experience in actual application, we have determined that Peterborough Green-Up does not have the resources to perform this function.

4) Customer Reaction

Faulty Connections can cause damage to equipment and create poor system reliability. Customers react very negatively when power is off for repair of damaged equipment.

5) Benefits to Customers

Reduced emergency power outages and improved system reliability.

6) Savings

Although faults have been located and corrected, these faults have been found in the past by hiring a contractor to perform the annual Infrared inspections. No net new kWh or kW savings have been attributed to this initiative.

7) Conclusion

The original plan of performing heat loss audits for customers was not feasible. The camera will, however, be used to scan for faulty connections or hot spots, reduce line loss on our distribution lines and reduce emergency power outages.

This initiative has been discontinued.

Smart Meters and Time of Use Rates

Without the implementation of a test group for Smart Meters, we would not have the mechanism to track the energy savings or allow the Time of Use rates required to realize these savings for certain programs. Consumers in our test groups receive the advanced benefit of these technologies, savings, and information that will soon follow to the general public.

Conclusion

Our CDM plan has been a success. It enabled us to learn about our individual initiatives and, importantly, to learn about smart meters, its associated technologies and the billing of TOU rates.

We find that customers are interested in energy conservation but need encouragement to take action in achieving energy savings.

We underestimated how long it takes to implement initiatives in general and how onerous it is to report on the initiatives.

We found the TRC ratio for our initiatives was not always positive based on the requested year to date calculations. We feel that the benefit of these programs is more accurately reflected over their Life Cycle and will become more apparent as time passes. We are pleased with our Life Cycle results.

Appendix D - Total Life Evaluation of the CDM Plan

Table is to be completed manually by totalling the information from each year of activity

	[5] Cumulative Totals Life-to-date	Residential	[6] Low Income	Commercial	Institutional	Industrial	Agricultural	LDC System	[4] Smart Meters	Other #1	Other #2
Net TRC value ($):	($548,654)	**-$ 282,303.51**	**-$ 110,277.29**	**-$ 156,073.17**	**$**	**$**	**$**	**$**		**$**	**$**
Benefit to cost ratio:	*11.85*	0.89	7.88	3.08							
Number of participants or units delivered:	*102,089*	72,736	22,393	6,960							
Lifecycle (kWh) Savings:	*30,607,378*	2,113,742	14,604,371	13,889,265							
Total kWh saved (kWh): Life to Date	*10,001,523*	446,037	5,996,959	3,558,526							
Total peak demand saved (kW):	*3342*	3342									
Total kWh saved as a percentage of total kWh delivered (%):	*0.39%*	*0.02%*	*0.14%*	*0.24%*							
Peak kW saved as a percentage of LDC peak kW load (%):	*0.55%*	*0.55%*									
[1] *Gross C&DM expenditures ($):*	$ 1,718,325.94	$ 672,672.20	$ 577,666.00	$ 467,987.74	$	$	$	$	$	$	$
[2] *Expenditures per KWh saved ($/kWh):*	$ 0.17	$ 1.51	$ 0.10	$ 0.13	$	$	$	$		$	$
[3] *Expenditures per KW saved ($/kW):*	$ 514	$ 201	$ -	$ -	$	$	$	$		$	$

Utility discount rate (%):	7.48

[1] Expenditures are reported on cumulative basis.
[2] Expenditures include all utility program costs (direct and indirect) for all programs which primarily generate energy savings.
[3] Expenditures include all utility program costs (direct and indirect) for all programs which primarily generate capacity savings.
[4] Please report spending related to 3rd tranche of MARR funding only. TRC calculations are not required for Smart Meters. Actual expenditures for the total third tranche period need to be reported.
[5] Includes total for the reporting year, plus prior years, if any (for example, 2008 CDM Annual report for third tranche will include 2007, 2006, 2005 and 2004 numbers, if any).
[6] Includes totals from Low Income programs that fall under both commerical and residential.