



WHITBY HYDRO ELECTRIC CORPORATION

RP-2004-0203\EB-2004-0526



2008 ANNUAL REPORT

CONSERVATION AND DEMAND MANAGEMENT

THIRD TRANCHE FUNDING

INTRODUCTION

On February 17th, 2005, Whitby Hydro Electric Corporation (“Whitby Hydro”) received Board approval for its Conservation and Demand Management (“CDM”) Plan. The initial plan incorporated eleven different programs totaling \$1.3M. As a result of ongoing review and monitoring of programs by an internal CDM committee, a revised CDM plan was submitted to the OEB in January 2007, and on March 22nd, approvals were obtained which allowed for concentrated efforts on programs identified.

During 2007, the provincial Ontario Power Authority (OPA) programs were announced and LDCs were given an opportunity to participate by offering these programs to customers. In order to avoid any overlap between OPA provincial programs and OEB third tranche programs, the revised CDM plan allowed for budgetary funds earmarked for programs that were considered similar in nature to the OPA funded programs, to be redirected to other identified CDM programs at the discretion of Whitby Hydro. As the process unfolded and applications to the OPA were approved, both “flexible” third tranche programs (Refrigerator and Air-Conditioner Drop off and Recycling Keep Cool program and the Refrigerator Retirement program) that had been put on hold, were closed off and any remaining funds available were redirected to other programs within the revised approved plan.

Completion of all third tranche spending occurred by the end of December 2007 and the previously filed 2007 annual report to the OEB detailed the final program activity. Final spending has been summarized in the following schedule in comparison to approved budgets:

Whitby Hydro - CDM (Third Tranche Summary)

	Program To-Date Actuals	Revised Budget	Variance
<u>EXISTING PROGRAMS</u>			
Research	23,536	23,500	(36)
BiFuel Peak Shaving Pilot	59,934	61,500	1,566
BiFuel Peak Shaving (Town of Whitby)	117,446	110,000	(7,446)
BiFuel Incentive	108,570	112,000	3,430
Durham NP Housing Energy Efficiency	120,000	120,000	0
Power Medix Residential	75,777	69,000	(6,777)
Power Factor Correction	154,183	38,000	(116,183)
Sub-Metering	11,091	11,000	(91)
Education & Training (including CFL Bulb Promotion)	315,325	220,500	(94,825)
Load Balancing	2,552	34,000	31,448
Smart Meters	39,090	40,000	910
<i>Subtotal</i>	1,027,503	839,500	(188,003)
<u>NEW PROGRAMS</u>			
CDM Plan Admin/Reporting	51,563	25,000	(26,563)
Seasonal Light Program	30,280	28,000	(2,280)
Whitby Hydro Energy Audit	37,137	58,500	21,363
Seniors Care Package	46,495	58,000	11,505
Community Events	83,635	42,500	(41,135)
Website Development	10,918	6,000	(4,918)
<i>Subtotal</i>	260,028	218,000	(42,028)
<u>FLEXIBLE PROGRAMS*</u>			
RAC Drop Off & Recycling (Keep Cool)	4,071	79,000	74,929
Refrigerator Retirement	8,398	163,500	155,102
<i>Subtotal</i>	12,469	242,500	230,031
<i>Total Program Costs</i>	1,300,000	1,300,000	(0)

* Funding for Flexible Programs may be redirected between all of the above listed programs based on further review by Whitby Hydro. This review includes consideration of provincial CDM programs offered by the OPA.

Based on guidelines provided as well as discussions with OEB staff, the 2008 report will be comprised of a condensed report, given that no new activity occurred during the related calendar year. To minimize duplication of data already reported in previous annual reports, the 2008 annual report will contain only the following items:

- Introduction
- Lessons learned
- General conclusions
- Newly formatted version of Appendix D

Data contained in this report reflects information that was available at the time of completion of third tranche spending (December 2007). No attempt has been made to incorporate updated forecasts or guidelines/assumptions for the purpose of TRC calculations, savings etc. As noted in previous reports, Whitby Hydro utilized the expertise and model developed by EnerSpectrum Group in completing Total Resource Cost (TRC) calculations.

LESSONS LEARNED

A brief discussion of the third tranche programs as well as lessons learned, have been provided for third tranche CDM programs. For ease of reporting, some programs which naturally fit together due to their similar features and intent have been grouped together.

Research:

Total Spending \$ 23,536

Research focused on an induction lighting pilot, and emission testing for diesel and Bi-Fuel technology.

- **Induction Lighting**

During the research study, three different lighting applications were studied: parking lights, street lights, and warehouse lights. Measures and TRC reported for this program are based solely on the Induction Lighting pilot. Energy savings were found to be significant with the introduction of induction lighting however, TRC calculations are impacted by the size of the installation and the amount of retrofitting required.

- **Emission Testing**

In October 2004, Canadian ORTECH Environmental Inc (ORTECH) completed an emission testing program at the Whitby Hydro facility located in Whitby, Ontario. The objective of the testing program was to provide compliance quality data for an emergency power generator using two (2) different types of fuels – diesel and bi-fuel. Overall, the emission testing showed improved levels when using bi-fuel. This data was submitted to the Ministry of Energy as one of five test sites.

Peak Shaving

Whitby Hydro Bi-fuel Pilot	\$ 59,934
Town of Whitby Bi-fuel Pilot	\$ 117,446
Bi Fuel Incentive	<u>\$ 108,570</u>
	\$ 285,950

Peak shaving projects included Bi-Fuel pilots at both Whitby Hydro and the Town of Whitby. In addition, a Bi-Fuel incentive program was offered to customers.

Review of these projects and associated TRC analyses suggests positive results when generators are already required for emergency back-up purposes and where maximum usage can be obtained during peak hours. As a minimum, peak shaving generators should be equipped with closed transition transfer equipment to facilitate operation at all hours of the day without disrupting load customers.

Energy Efficiency – Durham Non-Profit Housing

Total Spending **\$ 120,000**

Durham Non Profit Housing (DNPH) owns and manages over 1,100 units in the Durham Region. DNPH implemented a plan targeted at reducing energy costs by 20% by taking a comprehensive approach to energy management. One of the critical elements of this plan was to replace inefficient lighting and refrigerators. This program provided incentives to help reduce the capital costs associated with replacing these building systems.

The replacement of lighting was found to be beneficial from a TRC perspective however, as the refrigerators were replaced (versus fully retired or removed from the system) the TRC benefits were not positive. Full removal of old underutilized refrigerators without replacement, would generate much more favorable results.

Power Factor Correction

Power Medix Residential \$ 75,776

Power Factor Correction \$ 154,183

\$ 229,959

Power factor correction has been a long proven way to improve efficiency in an electrical system. Whitby Hydro installed a series of power medix capacitors in a local subdivision after running a pilot project. Whitby Hydro also identified commercial locations within Whitby where power factor was an issue and educated the customers on the benefits of good power factor. A number of these customers took advantage of Whitby Hydro's incentive program.

By improving power factor, demand on the system is reduced and capacity is freed up, which means more services can be supplied by the existing infrastructure. Less loading on a system generally means less strain and less failure. It is however, difficult to quantify all savings into TRC calculations. Also, generators are sized to meet kVa requirements not kW. Therefore, by reducing the kVa, generation requirements are also reduced. Financially, you can also measure the reduction in power factor penalties (to the customer) to quantify the savings.

Significant improvements to power factor for customers with high consumption levels yield favorable TRC calculations. The results of the residential pilot project showed that the installation of capacitors at the residential level is a viable option in freeing up capacity within the province if deployed on mass. The savings can also be achieved without having the customer drastically change their lifestyle.

Sub-Metering

Total Spending \$ 11,091

This program offered financial incentives for multi-residential customers to install sub-meters for units within the complex.

While this program had lower participation rates than originally anticipated, sub-metering is still considered a proven method of generating conservation within multi-residential complexes. Lower than expected participation levels are partly due to the small volume of multi-residential units within Whitby, as well as the long sales cycle which did not match the timeline required for third tranche spending.

On average, when tenants are required to pay for their own electricity, consumption in a building reduces by between 15% - 25% (according to several Ontario sub-metering experts). However, participation in sub-metering is a voluntary process for tenants who currently rent their units. Therefore, the number of participants of a sub-metering program must be brought on over a period of time as a result of move in/out situations. Until all units of a building are on sub-metering, actual savings are not truly measurable.

Education & Training

Total Spending \$ 315,325

Whitby Hydro focused on a variety of educational and training initiatives which included:

- *Site visits to key commercial customers, as well as a one day training session held in conjunction with Natural Resources Canada and Enbridge on conservation improvements and programs available*
- *Television commercials (CHEX TV) focusing on residential conservation tips*
- *Generation Conservation – school program on energy and conservation*
- *Watts to Read – library program which made a watt reader available to the public*
- *Informational brochures on conservation and CFL giveaways*

Programs initiated were well received. TV commercials have had positive recognition throughout the Town and the library program has been very successful. The school program received provincial recognition among school boards. Whitby residents have come to appreciate the one-on-one relationship and the “face-to-face” communication that they can expect from Whitby Hydro. It is, however, difficult to measure the actual impact of general conservation programs.

Load Balancing

Total Spending \$ 2,552

Balancing improves voltage on a feeder by equalizing the voltage drops in each phase along the feeder. Released feeder capacity provides more reserve loading capacity for emergency loading conditions.

The initial analysis provided a good understanding of the current balancing requirements and allowed targeting of changes where the highest savings/benefits could be obtained. Coordinated planning between departments when new developments are added, will help ensure the benefits of balancing efforts are maintained.

Smart Meters

Total Spending \$ 39,090

A small pilot was conducted in 2004 to test the ability to implement interval meters at the residential level however, given the uncertainty with regards to various aspects of the Smart Meter initiative province-wide, a decision was made to defer any significant spending for additional pilot programs under third tranche CDM. Instead, focus shifted to involvement in groups investigating various technologies and monitoring the results from ongoing pilot projects started by other LDCs.

The initial pilot provided an opportunity to test and understand meter operation, data collection and communication methods. Information provided through OUSM and other LDCs who are targeting earlier pilots and implementations, has proven to be beneficial to Whitby Hydro's decisions and implementation strategies.

Seasonal Light Program

Total Spending \$30,280

This program focused on the 2006 Christmas season and included the following seasonal light exchange initiatives:

- Whitby Hydro *Employee Seasonal Light Exchange*
- Whitby Hydro *Building Seasonal Light Retrofit* (indoor & outdoor)
- *Lakeridge Health Seasonal Light Exchange*
- *Town of Whitby Seasonal Lights – Tree Lighting Event*

In each of these programs, the old incandescent lights were collected and replaced with new energy efficient lights (95% more energy efficient). The incandescent lights were recycled and disposed of in an environmentally friendly manner.

This has proven to be a very worthwhile conservation program as there appears to be a strong appreciation for the retrofit of community seasonal lights from the businesses and residents of Whitby. The program provided significant energy savings but also went a long way to raise awareness and helped promote culture conservation in our community.

Whitby Hydro Energy Audit

Total Spending \$ 37,137

The Whitby Hydro Building Energy Audit involved a detailed audit of the HVAC system, lighting systems, control systems, motors, building envelope and other mechanical and electrical systems within our building. The purpose of the audit was to help identify energy conservation and energy efficiency opportunities. Subsequent to the audit, Whitby Hydro successfully installed window reflective coatings (3M) at the office building.

The energy audit report is an important tool which allows Whitby Hydro to “lead by example” and show the community how to embrace the concept of conservation. We will share insights and personal experiences with others to help lend credibility and assist in the promotion of various conservation efforts.

Seniors Care Package

Total Spending \$ 46,495

This conservation program was specifically tailored to meet the special needs of the senior citizens within our community. The program involved a compact florescent light (CFL) giveaway and a Seasonal LED exchange component

Marketing to seniors is a very sensitive issue, as seniors can be an easy target for the unethical marketing behaviour of others. In this case, the local utility branding and employee identification were important, as staff provided information to put their minds at ease regarding the program objective. It was found that seniors may have difficulty redeeming EKC coupons and taking advantage of conservation events during the winter months and for this reason, Whitby Hydro decided to bring the program to their doorstep and make it convenient for them to participate (this was key to success). Seniors for the most part were anxious to participate in conservation initiatives (based on fixed income) and are very appreciative and grateful for the assistance from their local utility.

Community Events

Total Spending \$ 83,635

Whitby Hydro attended 32 community planned events in an effort to promote a culture of conservation including the Spring Home & Garden Show, Earth Day, Music in the Park, Safety Day, Town Carnival, Movie Nights, Harvest Festival, Heritage Day, World Planning Day etc. Whitby Hydro distributed compact fluorescent light (CFL) bulbs and brochures offering energy saving tips for consumers.

It is important for the local utility to be actively involved in promoting the culture of conservation in the community. Local residents are very appreciative of the opportunity to ask questions and receive answers from knowledgeable staff. Whitby residents expect the utility to be actively participating in local community events and actively promoting conservation programs. Also, marketing of the conservation message is always more effective when it is “layered” and the conservation message is repeated and reinforced through a variety of events and programs.

Flexible Programs

RAC Drop Off & Recycling (Keep Cool)	\$ 4,071
Refrigerator Retirement	<u>\$ 8,398</u>
	\$ 12,469

These two programs were targeted towards residential customers. Planning activities for this program were put on hold pending OEB approvals and announcements from the OPA regarding provincial programs. Once the announcements of the OPA Standard Conservation Programs for 2007 were made, these programs were cancelled and our efforts were redirected towards implementing the new OPA funded Standard Programs which included the Great Refrigerator Roundup program.

Website Development

Total Spending **\$ 10,918**

The Whitby Hydro website www.whitbyhydro.on.ca was updated with a new “Energy Conservation” section. The website is kept up to date with Energy Conservation Tips and initiatives.

Our conservation website has proven to be a strong communication tool which offers our customers easy access to conservation program details, worksheets, contact information, frequently asked questions and more. “Web traffic” can be tracked for effectiveness and it is also a cost-effective communication tool which helps us save on call centre and walk-in visitor costs.

CDM Plan Admin & Reporting

Total Spending **\$ 51,563**

Spending relates to costs associated with the planning, administration and reporting requirements associated with the third tranche CDM initiatives. These costs are general in nature and cannot be assigned to individual programs as they were incurred to support the entire CDM initiative.

CONCLUSION

Whitby Hydro began the third tranche CDM initiative with eleven programs as part of the overall CDM Plan. Throughout the past few years the number of programs expanded to include eight additional programs, many of which focused on the residential customer base to ensure that the benefits of this initiative were seen across a broad range of customers.

The annual reports filed demonstrate that the CDM programs selected by Whitby Hydro have proven to be beneficial both from a net TRC, and a kWh and demand savings perspective. Many of the programs served to educate customers on ways that they can help to conserve electricity and save money. The programs also ensured that Whitby Hydro embraced the “lead by example” mentality that is so important when a change in conservation behaviour and decision-making is required. This truly helped to demonstrate that Whitby Hydro was willing to lead by supporting a culture of conservation in the community.

In addition to the third tranche programs, Whitby Hydro also took an active role in 2007 and 2008 in select OPA provincial CDM programs and as a result made a conscious effort to invest in third tranche programs that did not overlap with the OPA but truly complimented them. Whitby Hydro did not overlook any opportunities to co-ordinate efforts and jointly promote both third tranche initiatives as well as OPA driven programs to optimize cost effectiveness.

The overall third tranche CDM programs (\$1.3M) were completed during the 2007 reporting year. This initiative allowed us to explore a range of different CDM programs and develop significant expertise, partnerships and proven programs that can be drawn upon in future years. It is clear that the benefits and learnings from this important initiative will continue on through the changes that have been made in consumer behaviour, as well as the ongoing savings that will carry on to future years.

Whitby Hydro looks forward to continuing to explore and participate in new CDM programs in the future. We continue to emphasize the importance of increasing information sharing amongst LDCs through various forums and reports in order to maximize the benefits from a variety of experiences which will serve to benefit the overall CDM initiative.

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	Mix of Customer Categories	Industrial & Commercial
<i>Net TRC value (\$):</i>	\$ 1,230,230.00	\$ 57,197.00	\$ 11,177.00	\$	\$	\$	\$	266.00	n/a	\$ 621,263.00	\$ 540,327.00
<i>Benefit to cost ratio:</i>	2.13	1.38	1.12					1.10	n/a	4.56	1.81
<i>Number of participants or units delivered:</i>	39,009	3,683	1,235					1	n/a	34,075	15
<i>Lifecycle (kWh) Savings:</i>	22,497,638	1,655,350	1,237,562					47,232	n/a	13,273,024	6,284,470
<i>Total kWh saved (kWh):</i>	9,061,028	678,768	693,876					35,424	n/a	7,121,798	531,162
<i>Total peak demand saved (kW):</i>	1,359	59	53					1	n/a	679	567
<i>Total kWh saved as a percentage of total kWh delivered (%):</i>	0.26%	0.02%	0.02%					0.00%	n/a	0.21%	0.02%
<i>Peak kW saved as a percentage of LDC peak kW load (%):</i>	0.82%	0.04%	0.03%					0.00%	n/a	0.41%	0.34%
¹ <i>Gross C&DM expenditures (\$):</i>	\$ 1,300,000.00	\$ 145,831.00	\$ 120,000.00	\$	\$	\$	\$	2,552.00	\$ 39,090.00	\$ 515,257.00	\$ 477,270.00
² <i>Expenditures per kWh saved (\$/kWh):</i>	\$ 0.06	\$ 0.09	\$ 0.10	\$	\$	\$	\$	0.05	n/a	\$ 0.04	\$ 0.08
³ <i>Expenditures per kW saved (\$/kW):</i>	\$ 956.59	\$ 2,471.71	\$ 2,264.15	\$	\$	\$	\$	2,552.00	n/a	\$ 758.85	\$ 841.75
<i>Utility discount rate (%):</i>	6.1857%										

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 commercial and residential.

SEE NOTES & ASSUMPTIONS FOR FURTHER CLARIFICATION OF DATA REPORTED

Appendix D: Notes and Assumptions:

- | | |
|--|---|
| 1) Net TRC value: | Reflects total life-to-date results which may include forecasts based on data available December 2007.
Reflects OEB guidelines/assumptions as of date of completion of program. |
| 2) Benefit to cost ratio: | See note 1) |
| 3) # of participants or units delivered | Data as of December 2007. |
| 4) Lifecycle (kWh) savings: | Reflects results which may include forecasts based on data available December 2007.
Reflects OEB guidelines/assumptions as of date of completion of program. |
| 5) Total kWh saved: | Reflects actual savings based on best information available for 2005 - 2008. For programs completed during the year, annual kWh savings are included (no proration applied). |
| 6) Total peak demand saved (kW) | Reflects annual savings (1 year) based on completed program results using data available as of December 2007.
This reflects total kW (does not differentiate between "peak" vs. off-peak). |
| 7) Total kWh saved as a % of total kWh delivered (%) | Utilizes data collected under note 4) divided by the LDC's total retail kWh sold for 2005 - 2008 |
| 8) Peak kW saved as a % of LDC peak kW load (%) | Utilizes data collected under note 6) divided by the LDC's 2008 peak. |
| 9) Gross CDM expenditures (\$) | Reflects LDC net CDM spending (matches 3rd tranche funds available). This does not reflect customer or other third party funded costs. |
| 10) Expenditures per kWh saved (\$/kWh) | Gross CDM expenditures (note 9) divided by Lifecycle kWh savings (note 4) for all third tranche programs |
| 11) Expenditures per kW saved (\$/kW) | Gross CDM expenditures (note 9) divided by Total demand saved kW (note 6) for all third tranche programs. |
| 12) Utility discount rate (%) | As of December 2007. |