

**2007 OEB Annual
Conservation and Demand Management Report**
CDM Third Tranche Funding

Submitted By:
Welland Hydro-Electric System Corp.
RP- 2004-0203/EB- 2004-0523



**Welland Hydro-Electric System Corp.
2007 Conservation and Demand Management Annual Report**

March 31, 2008
Board Secretary at Ontario Energy Board
P.O. Box 2319
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**2007 Annual Conservation and Demand Management Report
RP-2004-0203 / EB 2004-0523**

A milestone was reached by Welland Hydro-Electric System Corp. in 2007 as we completed our Third Tranche Conservation and Demand Management expenditures.

Since Third Tranche programming commenced in 2005, Welland Hydro-Electric System Corp. has brought CDM initiatives to all sectors and stakeholders, including residential users, commercial, and industrial customers, as well as the students who are our future electricity customers. Welland Hydro-Electric System Corp. also invested in a more energy efficient distribution system, with positive results.

Of note in 2007 was our very successful LED traffic and streetlight program, which demonstrated a robust technology that will not only save energy and energy costs in the years ahead, but also represents lower maintenance cost over the long term.

With our Niagara Erie Power Alliance (NEPA) partners, Welland Hydro-Electric System Corp. took the the Conserver Joe family into our schools once again, engaging Grade 5 students in auditing electricity use at home. It helped imprint the importance of considering household energy consumption continually, a message that was also taken home, with effect, to parents.

The details of these, and other 2007 CDM programs are set out in the accompanying 2007 Conservation and Demand Management Annual Report that Welland Hydro-Electric System Corp. is pleased to submit.

It has been a worthwhile journey to help customers embrace the benefits of CDM over these past three years, and it has helped bring CDM to the core of Welland Hydro-Electric System Corp.'s business. As we now move forward with the Ontario Power Authority programs, and CDM in general, we take with us the knowledge and confidence that our Third Tranche CDM experience has provided.



**Welland Hydro-Electric System Corp.
2007 Conservation and Demand Management Annual Report**

Regards,

NEPA Member
Perry Orosz
Director of Customer Service
Welland Hydro-Electric System Corp.



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1.0 Introduction

Welland Hydro-Electric System Corp. concluded its Third Tranche Conservation and Demand Management (CDM) Plan in 2007, fittingly, with activities to benefit consumers, business, and infrastructure in Welland, helping all electricity users, and the distribution system itself, better embrace the benefits of CDM in the years ahead.

Serving more than 22,000 electricity customers in the City of Welland, Welland Hydro-Electric System Corp. has planned and directed its CDM activities toward its residential, General Service, and Large Use customers, promoting a sustainable conservation culture and introducing new technologies and methods that save energy and reduce loads at critical times.

Once again, Welland Hydro-Electric System Corp. joined with its Niagara Erie Power Alliance (NEPA) in developing and implementing CDM programming, and in sharing vital ideas to our collective benefit. Collaboration is a hallmark of Third Tranche CDM that has strengthened both its message and reach. Successful programs from the previous year continued in 2007, and innovative new initiatives came on stream.

2.0 Evaluation of the CDM Plan

The year 2007 saw Welland Hydro-Electric System Corp. build on its most successful initiatives from 2006, to optimize its CDM

expenditures. Notably, Welland Hydro-Electric System Corp. expanded its LED traffic light program by increasing its contribution to the conversion cost from 25% in 2006 to 60% in 2007, due to the early success of the program. Welland Hydro-Electric System Corp. also contributed to LED street lighting in 2007, which relamped some 40 units, dropping from 190 watt lamps to 90 watt lamps, while maintaining light levels.

The successful Conserver Joe franchise which has proven popular within schools, again scored a win with the distribution of an energy audit kit to all Grade 5 students. The kit, pictured in this report, provided four compact fluorescent bulbs and a note pad for the students to audit, an energy conservation booklet, an online energy conservation quiz and report on the replacement of four incandescent bulbs at home via the Conserver Joe website. Programs such as this not only make tomorrow's electricity consumers conscious of energy consumption, but it also helps change parents' energy behaviours at home.

In 2007, Welland Hydro-Electric System Corp. completed its expenditures for voltage conversion to 27.7 kV along Niagara Street, in the fastest growing economic area of the city. This conversion enabled system energy savings of more than 156,000 kWh and a peak load reduction of 29 kW.



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Program	Target Customers	Shared Initiative	Total kWh/ kW peak Savings	Actual Expenditure to Dec 31, 2007
Mass Market: Conserver Joe Website	Residential	NEPA	--	\$ 900.00
Mass Market: Home Audit Kits	Residential	NEPA	244,296 kWh	\$ 15,795.00
Refrigerator Bounty	Residential	NEPA	271,440 kWh	\$ 1,230.00
Breakfast Seminars	>50kW Interval metered	--		\$ 5,574.98
LED Traffic Lights	All	City of Welland	212,623 kWh 24 kW	\$ 11,416.23
LED Street Lighting	All	City of Welland	23,666 kWh 5kW	\$ 23,386.00
Voltage Conversion	All	--	156,151 kWh 29 kW	\$345,420.49



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3.0 Discussion of the Programs

Consaver Joe Website. In 2007, Welland Hydro-Electric System Corp. again provided support to the mass market Consaver Joe Website which invites students and consumers in general to visit and learn about home energy conservation.

Energy Audit Kits. As part of its core strategy to reach and help shape the next generation of energy consumers, Welland Hydro-Electric System Corp. expanded the successful online Consaver Joe franchise by bringing energy audit kits to each grade 5 student in Welland. The program distributed some 650 kits, which included four 14-watt CFL bulbs intended to replace four 60-watt incandescent bulbs. An instruction booklet and note pad accompanied the CFL bulbs in the kit (pictured). Students were encouraged to complete an online questionnaire about energy usage, for a chance to win an Ipod.



System savings from the kits exceeded 270,000 kWh.

Refrigerator Bounty. Welland Hydro-Electric System Corp. completed its payment in 2007 for the successful refrigerator retirement program of 2006 conducted by Energy Shop on behalf of six NEPA partners. Participating customers received coupons as an incentive to contribute a working refrigerator or freezer that was at least 10 years old. Appliances were picked up, decommissioned and recycled. Now an OPA program, the refrigerator retirement program is an effective load and energy saver that can be re-introduced as needed.

Breakfast Seminars. In 2007, Welland Hydro-Electric System Corp. played host to its NEPA partners for regular CDM meetings to discuss ongoing progress with CDM programs and new opportunities. The LDC also hosted interval metered customers in sessions with Utilismart Cost Prediction Services to help customers better understand electricity price fluctuations and the time sensitivity for electricity use.

LED Traffic Lights. A major success for Welland Hydro-Electric System Corp. CDM program in 2007 was its leadership in LED traffic and pedestrian lights. Building on the 2006 partnership with the City of Welland, Welland Hydro-Electric System Corp. increased its initial share of 25% of the costs to 60% of the cost, investing more than \$34,000 to complete the replacement of incandescent traffic and pedestrian lights with LED lighting in the City. During 2007, eight intersections were



Welland Hydro-Electric System Corp. 2007 Conservation and Demand Management Annual Report

converted to LED traffic and pedestrian lights in Welland.

The results have been outstanding, with close to 212,623 kWh in annual energy savings from the LED traffic and pedestrian lights at four major intersections with annual cost savings of approximately \$69,563. Moreover, the LED lights last up to five times longer than their incandescent ancestors, implying significant lifetime savings.

LED Street Lights. Welland Hydro-Electric System Corp. was instrumental in helping Welland to become a leader in relamping an entire street (Fitch Street) completely with LED overhead street lighting. The initiative has earned the City of Welland accolades from Peter Love, Ontario's Chief Energy Conservation Officer in the regional media. "It is the first in Canada of a whole street that has been lit by LED lights, and could possibly be the first in the world."



The relamping of almost 50 high pressure sodium street lights with LED lights has resulting in 5255 watts of power savings and cost savings of more than \$150 monthly. A more aggressive relamping program will only increase the power and cost savings over time, again with lighting units that have substantially longer lives than conventional high pressure sodium lamps.

Niagara Street Voltage Conversion. A significant improvement to distribution system losses was realized in 2007 with the completion of a voltage conversion from 4kV to 27.7 kV on Niagara Street, investing some \$345,000 to complete the work. This work was the second voltage conversion project, following an earlier voltage conversion project at the same voltages.

4.0 Lessons Learned

The successful LED traffic light conversion program with the City of Welland was a valuable experience, but not only in demonstrating that LED lights were safe, effective, and a significant energy conservation contributor. The success of the program reinforced the importance of purchasing large quantities of LED technology, thus providing an even larger economic impetus to making the infrastructure conversions. This could have been accomplished by partnering with other LDCs and municipalities in acquiring sizeable volumes of LED technology.

Although advertising and promotion can help shape behaviour with regard to energy use among adults, it is children who can have the greatest impact on adult energy use. The energy audit kits distributed to Welland Grade 5 students, helped inform and motivate young consumers who brought the lesson home with them, creating opportunity for discussion of home energy practices, and a shift in behaviour by each family member.



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Collaboration is a key element in successful CDM. As a partner with NEPA utilities, Welland Hydro-Electric System Corp was able to access and share valuable learning, and obtain external services more efficiently. It has also been helpful to turn to third party expertise in marketing CDM, and in its objective measurement.

With the Third Tranche CDM expenditures and programming coming to a conclusion, it is possible to look back at both the learning and the confidence that the initiative engendered. It has helped Welland Hydro-Electric System Corp. to bring CDM much more into the core of its business, and motivated the LDC to enrol in CDM programming now provided and supported by the OPA.

5.0 Conclusions

Welland Hydro-Electric System Corp. contributed 58 kW of peak demand reduction and 663,860 kWh in energy savings in 2007.

Building on proven programs of previous years, Welland Hydro-Electric System

Corp.'s most successful initiatives in 2007 were:

- Energy Audit Kits to 650 Grade 5 students helped bring energy awareness and action into the residential sector
- LED Technology Program demonstrated exceptional savings in both energy and longer term capital expenditures and earned Welland praise from the OPA for its efforts.
- Voltage Conversion on Niagara street, with a growing commercial sector, helped reduce system losses significantly.

Overall, the Third Tranche CDM programming has helped Welland Hydro-Electric System Corp. and its customers save more than 217 kW and 2,750,956 kWh of demand and energy, while moving CDM to the core of the Welland Hydro-Electric System Corp.'s business. It is a solid foundation to move forward confidently with Conservation and Demand Management in the years ahead.

Appendix A - Evaluation of the CDM Plan

Highlighted boxes are to be completed manually, white boxes are linked to Appendix C and will be brought forward automatically.

	5 Cumulative Totals Life-to-date	Total for 2007	Residential	Commercial	Niagara St. Voltage	LED Traffic Light	LED Street Lights
<i>Net TRC value (\$):</i>	\$ 451,836.61	\$ (37,739.20)	\$ 51,744	\$ -	\$ (142,859)	\$ 69,563	\$ (8,187)
<i>Benefit to cost ratio:</i>	2.02	0.91	4.70	0.00	0.61	7.09	0.65
<i>Number of participants or units delivered:</i>	59,515	2,655	2,600	0	0	8	47
<i>Lifecycle (kWh) Savings:</i>	25,829,767	10,414,244	1,085,760	0	7,650,419	1,275,736	402,328
<i>Report Year Total kWh saved (kWh):</i>	2,856,861	663,860	271,440	0	156,131	212,623	23,666
<i>Total peak demand saved (kW):</i>	232	58	0	0	29	24	5
<i>Total kWh saved as a percentage of total kWh delivered (%):</i>	5.50%	2.22%	0.23%	0.00%	1.63%	0.27%	0.09%
<i>Peak kW saved as a percentage of LDC peak kW load (%):</i>	0.06%	0.06%	0.00%	0.00%	0.03%	0.02%	0.00%
¹ <i>Report Year Gross C&DM expenditures (\$):</i>	\$ 641,865	\$ 412,279	\$ 17,025	\$ 5,575	\$ 363,502	\$ 11,416	\$ 23,386
² <i>Expenditures per kWh saved (\$/kWh):</i>	0.02	\$ 0.04	\$ 0.02	\$ -	\$ 0.05	\$ 0.01	\$ 0.06
³ <i>Expenditures per kW saved (\$/kW):</i>	\$ 2,765.38	\$ 7,130.15	\$ -	\$ -	\$ 12,534.56	\$ 470.35	\$ 5,139.78

2007

<i>Utility discount rate (%):</i>	7.63	Total kWh delivered:	469,602,528
		Peak kW load:	97,858

¹ Expenditures are reported on accrual 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. Only actual expenditures for the year need to be reported.

⁵ Includes total for the reporting year, plus prior year, if any (for example, 2007 CDM Annual report for third tranche will include 2006, 2005 and 2004 numbers, if any).

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** Co-Branded Mass Markets (Energy Audit Kids & Energy Media Kits [Conserver Joe])

Description of the program (including intent, design, delivery, partnerships and evaluation):

The Conserver Joe Energy Conservation kits complimented the Grade 5 Energy Conservation Curriculum. Every Grade 5 student in stu

Measure(s):

	Energy Audit Kits		
Base case technology:	60W Incandescent		
Efficient technology:	CFL Screw-In 15W		
Number of participants or units delivered for reporting year:	2600		
Measure life (years):	4		
Number of Participants or units delivered life to date	2600		

B. TRC Results:	Reporting Year	Life-to-date TRC Results:
¹ TRC Benefits (\$):	\$ 65,719	\$ 597,318
² TRC Costs (\$):		
Utility program cost (excluding incentives):	-\$ 9,295	-\$ 20,991
Incremental Measure Costs (Equipment Costs)	-\$ 4,680	-\$ 58,488
Total TRC costs:	-\$ 13,975	-\$ 79,479
Net TRC (in year CDN \$):	\$ 51,744.46	\$ 517,839.35
Benefit to Cost Ratio (TRC Benefits/TRC Costs):	4.70	7.52

C. Results: (one or more category may apply)	Cumulative Results:			
Conservation Programs:				
Demand savings (kW):	Summer	0	14	
	Winter	59	450	
			Cumulative Lifecycle	Cumulative Annual Savings
Energy saved (kWh):	lifecycle	in year	11,645,988	1,969,571
Other resources saved :				
Natural Gas (m3):				
Other (specify):				
Demand Management Programs:				
Controlled load (kW)				
Energy shifted On-peak to Mid-peak (kWh):				
Energy shifted On-peak to Off-peak (kWh):				
Energy shifted Mid-peak to Off-peak (kWh):				
Demand Response Programs:				
Dispatchable load (kW):				
Peak hours dispatched in year (hours):				
Power Factor Correction Programs:				
Amount of KVar installed (KVar):				
Distribution system power factor at beginning of year (%):				
Distribution system power factor at end of year (%):				
Line Loss Reduction Programs:				
Peak load savings (kW):				
	lifecycle	in year		
Energy savings (kWh):				
Distributed Generation and Load Displacement Programs:				
Amount of DG installed (kW):				
Energy generated (kWh):				
Peak energy generated (kWh):				
Fuel type:				
Other Programs (specify):				
Metric (specify):				

D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>	\$ 9,295	\$ 20,991
	<i>Incentive:</i>	\$ 6,500	\$ 13,381
	<i>Total:</i>	\$ 15,795	\$ 34,372
<i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>		\$ 2,124
	<i>Total:</i>		\$ 2,124

E. Assumptions & Comments:

- The students, teachers and school boards have used Conserver Joe as the theme for their Grade 5 unit on Energy Conservation.
- The number of Energy Audit Kits provided by Welland Hydro-Electric System Corp.

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** Fridge Bounty

Description of the program (including intent, design, delivery, partnerships and evaluation):

This Program was a pilot program based on the OPA Great Refrigerator Round up.

Measure(s):

<i>Base case technology:</i>			
<i>Efficient technology:</i>			
<i>Number of participants or units delivered for reporting year:</i>			
<i>Measure life (years):</i>			
 <i>Number of Participants or units delivered life to date</i>			

B. TRC Results:	Reporting Year	Life-to-date TRC Results:
¹ TRC Benefits (\$):		\$ 91,157
² TRC Costs (\$):		
<i>Utility program cost (excluding incentives):</i>	-\$	4,150
<i>Incremental Measure Costs (Equipment Costs)</i>	-\$	15,356
<i>Total TRC costs:</i>	-\$	19,506
<i>Net TRC (in year CDN \$):</i>	\$	71,651.27
<i>Benefit to Cost Ratio (TRC Benefits/TRC Costs):</i>		

C. **Results:** (one or more category may apply) **Cumulative Results:**

Conservation Programs:

<i>Demand savings (kW):</i>			
	<i>Summer</i>		
	<i>Winter</i>		

	<i>lifecycle</i>	<i>in year</i>	<i>Cumulative Lifecycle</i>	<i>Cumulative Annual Savings</i>
<i>Energy saved (kWh):</i>				
<i>Other resources saved :</i>				
<i>Natural Gas (m3):</i>				
<i>Other (specify):</i>				

Demand Management Programs:

<i>Controlled load (kW)</i>			
<i>Energy shifted On-peak to Mid-peak (kWh):</i>			
<i>Energy shifted On-peak to Off-peak (kWh):</i>			
<i>Energy shifted Mid-peak to Off-peak (kWh):</i>			

Demand Response Programs:

<i>Dispatchable load (kW):</i>			
<i>Peak hours dispatched in year (hours):</i>			

Power Factor Correction Programs:

<i>Amount of KVar installed (KVar):</i>			
<i>Distribution system power factor at beginning of year (%):</i>			
<i>Distribution system power factor at end of year (%):</i>			

Line Loss Reduction Programs:

<i>Peak load savings (kW):</i>			
	<i>lifecycle</i>	<i>in year</i>	
<i>Energy savings (kWh):</i>			

Distributed Generation and Load Displacement Programs:

<i>Amount of DG installed (kW):</i>			
<i>Energy generated (kWh):</i>			
<i>Peak energy generated (kWh):</i>			
<i>Fuel type:</i>			

Other Programs (specify):

<i>Metric (specify):</i>			

D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>	\$ -	\$ -
	<i>Incremental O&M:</i>	\$ 1,230	\$ 5,380
	<i>Incentive:</i>		\$ 21,410
	<i>Total:</i>	\$ 1,230	\$ 26,790
<i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>		
	<i>Total:</i>		

E. Assumptions & Comments:

- This program provided the knowledge and expertise for the successful OPA GRR Program

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** LED Traffic Lights

Description of the program (including intent, design, delivery, partnerships and evaluation):

During 2006, Welland Hydro-Electric System Corp. relamped incandescent traffic and pedestrian lights at four Welland intersections with LED equivalents. In 2007 Welland Hydro re-lamped incandescent traffic and pedestrian lights at 8 intersections in Welland with LED equivalents.

Measure(s):

	LED Traffic Lights		
Base case technology:	Original Stock		
Efficient technology:	LED Traffic Lights		
Number of participants or units delivered for reporting year:	8		
Measure life (years):	6		
Number of Participants or units delivered life to date	12		

B. TRC Results:	Reporting Year	Life-to-date TRC Results:
¹ TRC Benefits (\$):	\$ 80,979	\$ 119,799
² TRC Costs (\$):		
Utility program cost (excluding incentives):	\$ -	\$ -
Incremental Measure Costs (Equipment Costs)	-\$ 11,416	-\$ 32,207
Total TRC costs:	-\$ 11,416	-\$ 32,207
Net TRC (in year CDN \$):	\$ 69,563	\$ 87,592
Benefit to Cost Ratio (TRC Benefits/TRC Costs):	7.09	3.72

C. **Results:** (one or more category may apply) **Cumulative Results:**

Conservation Programs:

Demand savings (kW):	Summer	Winter		
	24	24	36	36

	lifecycle	in year	Cumulative Lifecycle	Cumulative Annual Savings
Energy saved (kWh):	1,275,736	212,623	1,913,604	318,934
Other resources saved:				
Natural Gas (m3):				
Other (specify):				

Demand Management Programs:

Controlled load (kW)		
Energy shifted On-peak to Mid-peak (kWh):		
Energy shifted On-peak to Off-peak (kWh):		
Energy shifted Mid-peak to Off-peak (kWh):		

Demand Response Programs:

Dispatchable load (kW):		
Peak hours dispatched in year (hours):		

Power Factor Correction Programs:

Amount of KVar installed (KVar):		
Distribution system power factor at beginning of year (%):		
Distribution system power factor at end of year (%):		

Line Loss Reduction Programs:

Peak load savings (kW):		
Energy savings (kWh):	lifecycle	in year

Distributed Generation and Load Displacement Programs:

Amount of DG installed (kW):		
Energy generated (kWh):		
Peak energy generated (kWh):		
Fuel type:		

Other Programs (specify):

Metric (specify):		
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D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>	\$ 11,416	\$ 16,614
	<i>Incentive:</i>		\$ -
	<i>Total:</i>	\$ 11,416	\$ 16,614
 <i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>		
	<i>Total:</i>		

E. Assumptions & Comments:

- 3.034 kW were assumed, operating 7X24 for TRC results.
- The number of Traffic Lights Replaced were provided by Welland Hydro-Electric System Corp. Staff

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** LED Street Lights

Description of the program (including intent, design, delivery, partnerships and evaluation):

This program used the LED Technology of the Traffic light Program for streetlights. This is the first street in Ontario with LED Streetlights

Measure(s):

	LED Street Lights	LED Street Lights	
Base case technology:	190 W	190 W	
Efficient technology:	90 W LED	120 W LED	
Number of participants or units delivered for reporting year:	42	5	
Measure life (years):	17	17	
Number of Participants or units delivered life to date	42	5	

B. TRC Results:	Reporting Year	Life-to-date TRC Results:
¹ TRC Benefits (\$):	\$ 15,199	\$ 15,199
² TRC Costs (\$):		
Utility program cost (excluding incentives):	-\$ 23,386	-\$ 23,386
Incremental Measure Costs (Equipment Costs)	\$ -	\$ -
Total TRC costs:	-\$ 23,386	-\$ 23,386
Net TRC (in year CDN \$):	-\$ 8,187	-\$ 8,187
Benefit to Cost Ratio (TRC Benefits/TRC Costs):	0.65	0.65

C. **Results:** (one or more category may apply) **Cumulative Results:**

Conservation Programs:

Demand savings (kW):	Summer	4.55	4.55
	Winter	5	5

	lifecycle	in year	Cumulative Lifecycle	Cumulative Annual Savings
Energy saved (kWh):	402,328	23,666	402,328	23,666
Other resources saved:				
Natural Gas (m3):				
Other (specify):				

Demand Management Programs:

Controlled load (kW)		
Energy shifted On-peak to Mid-peak (kWh):		
Energy shifted On-peak to Off-peak (kWh):		
Energy shifted Mid-peak to Off-peak (kWh):		

Demand Response Programs:

Dispatchable load (kW):		
Peak hours dispatched in year (hours):		

Power Factor Correction Programs:

Amount of KVar installed (KVar):		
Distribution system power factor at beginning of year (%):		
Distribution system power factor at end of year (%):		

Line Loss Reduction Programs:

Peak load savings (kW):	lifecycle	in year
Energy savings (kWh):		

Distributed Generation and Load Displacement Programs:

Amount of DG installed (kW):		
Energy generated (kWh):		
Peak energy generated (kWh):		
Fuel type:		

Other Programs (specify):

Metric (specify):		
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D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>	\$ 23,386	\$ 23,386
	<i>Incentive:</i>		
	<i>Total:</i>	\$ 23,386	\$ 23,386
 <i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>		
	<i>Total:</i>		

E. Assumptions & Comments:

- This pilot provided the information for the City of Welland to proceed with future LED streetlights with a larger bulk purchase and lower installation costs
- The number of Street Lights Installed provided by Welland Hydro-Electric System Corp
- The number of Street Lights Installed provided by Welland Hydro-Electric System Corp.

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** Niagara St. Voltage

Description of the program (including intent, design, delivery, partnerships and evaluation):

The voltage conversion project was completed to meet the demands of the commercial customers on Niagara Street in Welland

Measure(s):

	Niagara St. Voltage			
Base case technology:	4 kV			
Efficient technology:	27.7 kV			
Number of participants or units delivered for reporting year:				
Measure life (years):	25			
Number of Participants or units delivered life to date				

	Reporting Year		Life-to-date TRC Results:
¹ TRC Benefits (\$):	\$ 220,643		\$ 220,643
² TRC Costs (\$):			
Utility program cost (excluding incentives):	-\$ 363,502		-\$ 363,502
Incremental Measure Costs (Equipment Costs)	\$ -		\$ -
Total TRC costs:	-\$ 363,502		-\$ 363,502
Net TRC (in year CDN \$):	-\$ 142,859		-\$ 142,859
Benefit to Cost Ratio (TRC Benefits/TRC Costs):	0.61		0.61

C. **Results:** (one or more category may apply) Cumulative Results:

Conservation Programs:

Demand savings (kW):		Summer	29		29
		Winter	23		23

	lifecycle	in year	Cumulative Lifecycle	Cumulative Annual Savings
Energy saved (kWh):	7,650,419	156,131	7,650,419	156,131
Other resources saved:				

Natural Gas (m3):				
Other (specify):				

Demand Management Programs:

Controlled load (kW)				
Energy shifted On-peak to Mid-peak (kWh):				
Energy shifted On-peak to Off-peak (kWh):				
Energy shifted Mid-peak to Off-peak (kWh):				

Demand Response Programs:

Dispatchable load (kW):				
Peak hours dispatched in year (hours):				

Power Factor Correction Programs:

Amount of KVar installed (KVar):				
Distribution system power factor at beginning of year (%):				
Distribution system power factor at end of year (%):				

Line Loss Reduction Programs:

Peak load savings (kW):				
	lifecycle	in year		
Energy savings (kWh):				

Distributed Generation and Load Displacement Programs:

Amount of DG installed (kW):				
Energy generated (kWh):				
Peak energy generated (kWh):				
Fuel type:				

Other Programs (specify):

Metric (specify):				
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D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>	\$ 363,502	\$ 363,502
	<i>Incentive:</i>		
	<i>Total:</i>	\$ 363,502	\$ 363,502
 <i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>		
	<i>Incremental O&M:</i>		
	<i>Total:</i>		

E. Assumptions & Comments:

- The TRC Benefit would be greater if the life was calculated over 50 years, which is the actual historical life of Welland Hydro overhead electrical plant.
- Project life extended to 50 to comply with Welland Hydro-Electric System Corp. staff's assumptions

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix B - Discussion of the Program

(complete this Appendix for each program)

A. **Name of the Program:** Breakfast Meetings

Description of the program (including intent, design, delivery, partnerships and evaluation):

Conservation meetings were held for large use customers and the NEPA to provide education on electrical pricing and to determine cost efficient methods to proceed with CDM programs.

Measure(s):

<i>Base case technology:</i>			
<i>Efficient technology:</i>	Breakfast Seminar		
<i>Number of participants or units delivered for reporting year:</i>			
<i>Measure life (years):</i>			
 <i>Number of Participants or units delivered life to date</i>			

B. TRC Results:	Reporting Year	Life-to-date TRC Results:
¹ TRC Benefits (\$):		
² TRC Costs (\$):		
<i>Utility program cost (excluding incentives):</i>		
<i>Incremental Measure Costs (Equipment Costs)</i>		
<i>Total TRC costs:</i>		
<hr/>		
<i>Net TRC (in year CDN \$):</i>		
<hr/>		
<i>Benefit to Cost Ratio (TRC Benefits/TRC Costs):</i>		

C. **Results:** (one or more category may apply) **Cumulative Results:**

Conservation Programs:

<i>Demand savings (kW):</i>		<i>Summer</i>		
		<i>Winter</i>		

	<i>lifecycle</i>	<i>in year</i>	<i>Cumulative Lifecycle</i>	<i>Cumulative Annual Savings</i>
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<i>Energy saved (kWh):</i>				
<i>Other resources saved :</i>				
<i>Natural Gas (m3):</i>				
<i>Other (specify):</i>				

Demand Management Programs:

<i>Controlled load (kW)</i>				
<i>Energy shifted On-peak to Mid-peak (kWh):</i>				
<i>Energy shifted On-peak to Off-peak (kWh):</i>				
<i>Energy shifted Mid-peak to Off-peak (kWh):</i>				

Demand Response Programs:

<i>Dispatchable load (kW):</i>				
<i>Peak hours dispatched in year (hours):</i>				

Power Factor Correction Programs:

<i>Amount of KVar installed (KVar):</i>				
<i>Distribution system power factor at beginning of year (%):</i>				
<i>Distribution system power factor at end of year (%):</i>				

Line Loss Reduction Programs:

<i>Peak load savings (kW):</i>				
	<i>lifecycle</i>	<i>in year</i>		
<i>Energy savings (kWh):</i>				

Distributed Generation and Load Displacement Programs:

<i>Amount of DG installed (kW):</i>				
<i>Energy generated (kWh):</i>				
<i>Peak energy generated (kWh):</i>				
<i>Fuel type:</i>				

Other Programs (specify):

<i>Metric (specify):</i>				
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D. Actual Program Costs:		Reporting Year	Cumulative Life to Date
<i>Utility direct costs (\$):</i>	<i>Incremental capital:</i>	\$ -	\$ -
	<i>Incremental O&M:</i>	\$ 5,575	\$ 11,704
	<i>Incentive:</i>	\$ -	\$ -
	<i>Total:</i>	\$ 5,575	\$ 11,704
<i>Utility indirect costs (\$):</i>	<i>Incremental capital:</i>	\$ -	\$ -
	<i>Incremental O&M:</i>	\$ -	\$ 4,522
	<i>Total:</i>	\$ -	\$ 4,522

E. Assumptions & Comments:

- Customers advised the meetings were educational and helpful in understanding their opportunities in the electricity market

¹ Benefits should be estimated if costs have been incurred and the technology has been deployed. Benefits reflect the present value of the measure for the number of units deployed in the year, i.e. the number of units times the net present value per unit benefit specified in the TRC Guide.

² For technologies which have not been deployed but for which the LDC has incurred costs, report only the TRC costs on a present value basis. Incentives (e.g. rebates) from the LDC to a customer are not a component of the TRC costs. However, payments made to a third party service provider to run an incentives program are program costs, and are to be included as TRC costs under the "Utility Program Costs" line.

Appendix C - Program and Portfolio Totals

Report Year: 2007

1. Residential Programs

List each Appendix B in the cells below; Insert additional rows as required.

Note: To ensure the integrity of the formulas, please insert the additional rows in the middle of the list below.

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
Co-Branded Mass Market Refrigerator Retirement Program	\$ 65,719	\$ 13,975	\$ 51,744	4.70	271,440	1,085,760	0	\$ 15,795
	\$ -	\$ -	\$ -	0.00	0	0	0	\$ 1,230
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
*Totals App. B - Residential	\$ 65,719	\$ 13,975	\$ 51,744	4.70	271,440	1,085,760	0	\$ 17,025
Residential Indirect Costs not attributable to any specific program	→							
Total Residential TRC Costs		\$ 13,975						
**Totals TRC - Residential	\$ 65,719	\$ 13,975	\$ 51,744	4.70				

2. Commercial Programs

List each Appendix B in the cells below; Insert additional rows as required.

Note: To ensure the integrity of the formulas, please insert the additional rows in the middle of the list below.

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
Breakfast / Audit Program	\$ -	\$ -	\$ -	0.00	0	0	0	\$ 5,575
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
*Totals App. B - Commercial	\$ -	\$ -	\$ -	0.00	0	0	0	\$ 5,575
Commercial Indirect Costs not attributable to any specific program	→							
Total TRC Costs		\$ -						
**Totals TRC - Commercial	\$ -	\$ -	\$ -	0.00				



3. Niagara St. Voltage Programs

List each Appendix B in the cells below; Insert additional rows as required.

Note: To ensure the integrity of the formulas, please insert the additional rows in the middle of the list below.

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
Niagara Street Voltage	\$ 220,643	\$ 363,502	-\$ 142,859	0.61	156,131	7,650,419	29	\$ 363,502
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
*Totals App. B - Niagara St. Voltage	\$ 220,643	\$ 363,502	-\$ 142,859	0.61	156,131	7,650,419	29	\$ 363,502
<i>Niagara St. Voltage Indirect Costs not attributable to any specific program</i>								
Total TRC Costs		\$ 363,502						
**Totals TRC - Niagara St. Voltage	\$ 220,643	\$ 363,502	-\$ 142,859	0.61				



4. LED Traffic Light Programs

List each Appendix B in the cells below; Insert additional rows as required.

Note: To ensure the integrity of the formulas, please insert the additional rows in the middle of the list below.

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
LED Traffic Lights	\$ 80,979	\$ 11,416	\$ 69,563	7.09	212,623	1,275,736	24	\$ 11,416
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
*Totals App. B - LED Traffic Light	\$ 80,979	\$ 11,416	\$ 69,563	7.09	212,623	1,275,736	24	\$ 11,416
<i>LED Traffic Light Indirect Costs not attributable to any specific program</i>								
Total TRC Costs		\$ 11,416						
**Totals TRC - LED Traffic Light	\$ 80,979	\$ 11,416	\$ 69,563	7.09				

5. LED Street Lights Programs

List each Appendix B in the cells below; Insert additional rows as required.

Note: To ensure the integrity of the formulas, please insert the additional rows in the middle of the list below.

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
LED Street Lights	\$ 15,199	\$ 23,386	-\$ 8,187	0.65	23,666	402,328	5	\$ 23,386
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
			\$ -	0.00				
*Totals App. B - LED Street Lights	\$ 15,199	\$ 23,386	-\$ 8,187	0.65	23,666	402,328	5	\$ 23,386
LED Street Lights Indirect Costs not attributable to any specific program								
Total TRC Costs		\$ 23,386						
**Totals TRC - LED Street Lights	\$ 15,199	\$ 23,386	-\$ 8,187	0.65				

LDC's CDM PORTFOLIO TOTALS

	TRC Benefits (PV)	TRC Costs (PV)	\$ Net TRC Benefits	Benefit/Cost Ratio	Report Year Total kWh Saved	Lifecycle (kWh) Savings	Total Peak Demand (kW) Saved	Report Year Gross C&DM Expenditures (\$)
*TOTALS FOR ALL APPENDIX B	\$ 382,540	\$ 412,279	-\$ 29,739	0.93	\$ 663,860	\$ 10,414,244	\$ 58	\$ 428,904
Any <u>other</u> Indirect Costs not attributable to any specific program		\$ 8,000						
TOTAL ALL LDC COSTS		\$ 420,279						
**LDC' PORTFOLIO TRC	\$ 382,540	\$ 420,279	-\$ 37,739	0.91				

* The savings and spending information from this row is to be carried forward to Appendix A.

** The TRC information from this row is to be carried forward to Appendix A.