



ONTARIO POWER AUTHORITY

## 2008 Final Conservation Results

January 2010

## ***About the Ontario Power Authority***

The Ontario Power Authority (OPA) is responsible for ensuring a reliable, sustainable supply of electricity for Ontario. Its key areas of focus are leading and coordinating conservation efforts across the province, planning the power system for the long term and ensuring development of needed generation resources.

The OPA was established by the *Electricity Restructuring Act, 2004* (amending the *Electricity Act, 1998*) and began operations in January 2005. A not-for-profit corporation without share capital, the OPA is governed by an independent Board of Directors, and programs are directed by a Chief Executive Officer. It reports to the Ontario Legislative Assembly through the Minister of Energy and Infrastructure. The OPA is licensed and regulated by the Ontario Energy Board.

## ***About this Report***

This report highlights the significant progress towards Ontario's conservation goals that was made through OPA-funded conservation initiatives implemented in 2008. It does not include savings from non-OPA-funded conservation activities, such as codes and standards and provincial and federal government programs funded through taxpayers, which also contribute toward Ontario's conservation goals.

## ***2008 Highlights***

2008 was an exciting year for the OPA, and there were many important changes, including the appointment of a new Minister of Energy and Infrastructure, the Honourable George Smitherman, in June 2008 and the appointment of a new Chief Executive Officer, Colin Andersen, in September.

It was also a year of significant activity and progress for the OPA's conservation portfolio. Conservation highlights for 2008 included:

- 1) **confirming that Ontario's first conservation target was met.** In June 2008, the OPA reported that Ontario had met its interim target of 1,350 megawatts (MW) of peak-demand reduction by the end of 2007, the first milestone in the province's long-term target of 6,300 MW of peak-demand reduction by the end of 2025.
- 2) **making strides towards Ontario's 2010 target.** The OPA's conservation portfolio achieved 387 MW of peak-demand reduction and 386 gigawatt-hours (GWh) of annual energy savings as a result of 2008 conservation activities, indicating progress toward the next interim target of an additional 1,350 MW of peak-demand reduction by 2010.
- 3) **expanding conservation offerings across all sectors.** In 2008, the OPA launched five new initiatives, broadening its reach within all market sectors through its consumer (residential), business (commercial and institutional) and industrial programs.
- 4) **enhancing successful partnerships with local distribution companies.** The OPA partnered with more than 70 local distribution companies (LDCs) in the delivery of conservation programs, reaching 99 percent of Ontario's electricity customers.
- 5) **launching Ontario's first Energy Conservation Week.** Designed to engage as many Ontarians as possible in advance of the summer peak demand, the grassroots campaign led to more than 74 percent awareness and 50 percent participation across the province.

## Introduction

Ontario has a long-term conservation target to achieve at least 6,300 megawatts (MW) of peak electricity demand reduction by 2025.<sup>1</sup> Aggressive interim targets included a 1,350 MW peak-demand reduction by 2007, which has been achieved, and an additional 1,350 MW reduction by the end of 2010.

The OPA has a leadership role in coordinating the province's electricity conservation efforts and working in partnership with local distribution companies (LDCs) and others to ensure Ontario's conservation targets are met.

The OPA is focused on long-term planning and adopting a market-transformation approach to ensure that conservation is sustainable, reliable and cost-effective. In parallel with this long-term planning, the OPA develops and manages conservation programs to encourage immediate conservation actions by consumers and businesses to help meet the near-term provincial targets. Programs span all customer segments – consumer (residential customers, including low-income), business (commercial and institutional customers) and industrial. These programs use tools as diverse as product rebates, building retrofits and direct installation services to encourage participants to undertake conservation actions.

## *Evaluation, Measurement and Verification*

The OPA is committed to transparency in reporting on the progress and results of its programs. As outlined in its evaluation, measurement and verification (EM&V) framework,<sup>2</sup> the OPA is also committed to undertaking rigorous independent evaluations of the programs it funds in accordance with internationally credible standards.

The primary purpose of evaluating programs is to verify and ensure the reliability of demand reductions and energy savings achieved. This is important because it helps determine the amount of generation that must be built to meet provincial energy needs. Evaluations are also used to assess program design performance, to provide information for continuous management improvement and to validate input assumptions made for specific end-use measures. All OPA-funded programs will undergo an EM&V process at least once between 2008 and 2010. Program evaluations will range from internal process and/or impact evaluations to full, independent third-party evaluations complete with measure reviews, participant surveys and project measurement and verification.

The OPA evaluated 14 of the initiatives that were delivered in 2008 (please see Appendix A for detailed list). In all cases, the 2008 results presented in this report are considered final.

---

<sup>1</sup> On September 17, 2008, the Minister of Energy and Infrastructure issued a directive asking the OPA to review the viability of accelerating the achievement of stated conservation targets.

<sup>2</sup> The OPA EM&V framework can be found at <http://www.powerauthority.on.ca/Page.asp?PageID=1224&SiteNodeID=404>.

## Portfolio Results

In 2008, the OPA began to consolidate its conservation initiatives into four programs, each aligned with the distinct sector it serves. Recognizing that having a large number of discrete conservation initiatives in the Ontario marketplace can be confusing, the OPA is moving to a comprehensive, integrated and customer-centric approach that will better serve program participants and help achieve greater conservation results.

Table 1 provides an overview of the target market for each program and the initiatives that were offered by the OPA in 2008 as part of each program. The OPA will continue to expand the offerings and reach of these programs to cover additional conservation opportunities.

**Table 1: OPA 2008 Conservation Portfolio**

Program	Target Market	2008 Conservation Initiatives
Consumer	Residential households	<ul style="list-style-type: none"> <li>▪ Free pickup of old, working, inefficient appliances</li> <li>▪ Rebates on high-efficiency, replacement cooling and heating systems</li> <li>▪ In-store coupons on energy-efficient products</li> <li>▪ Direct load-control devices for air conditioning and electric water heaters</li> <li>▪ Contest to encourage summer electricity conservation</li> <li>▪ Aboriginal retrofit pilot (five communities)</li> <li>▪ Clothesline giveaways, holiday light exchanges (Toronto only)</li> <li>▪ Incentives for retrofit (lighting, motors and HVAC) of multi-family buildings</li> <li>▪ Renewable Energy Standard Offer Program (RESOP)</li> </ul>
Low-Income Consumer	Low-income residential households	<ul style="list-style-type: none"> <li>▪ Free compact fluorescent light bulbs (Toronto only)</li> </ul>
Business	Commercial/ institutional facilities	<ul style="list-style-type: none"> <li>▪ Incentives for retrofit (lighting, motors and HVAC) of existing buildings</li> <li>▪ Incentives for energy-efficient new construction</li> <li>▪ Direct load-control devices for air conditioning and electric water heaters for small commercial businesses</li> <li>▪ Voluntary load shedding (DR1)</li> <li>▪ Contractual load shedding (DR3)</li> <li>▪ Incentives for peak shedding (Hydro One only)</li> <li>▪ Customer-based generation (RESOP, and combined heat and power)</li> </ul>
Industrial	Industrial facilities	<ul style="list-style-type: none"> <li>▪ Voluntary load shedding (DR1)</li> <li>▪ Contractual load shedding (DR3)</li> <li>▪ Incentives for peak shedding (Hydro One only)</li> <li>▪ Customer-based generation (RESOP, and combined heat and power)</li> </ul>

## Resource Savings<sup>3</sup>

The OPA's 2008 conservation programs achieved a net<sup>4</sup> savings of more than 387 MW of summer peak-demand reduction and more than 386 GWh of energy savings, exceeding the portfolio-level forecasted savings by more than 30 percent.

<sup>3</sup> All savings shown in this report are expressed at the generator level, meaning that they include both the savings at the end-user (customer) level where the conservation measure is installed as well as avoided transmission and distribution losses associated with those savings.

<sup>4</sup> Gross savings represent all savings associated with program activities. Net savings are the portion of gross savings that are *directly* attributable to the program. All savings shown in this report are net savings. The primary adjustment factor between gross and net savings is free ridership. Free ridership occurs when customers take advantage of rebates or cost savings available through conservation programs even though they would have installed the energy-efficient equipment on their own. Such customers are commonly referred to as "free riders." These customers may already be motivated to purchase energy-efficient equipment even without utility-sponsored incentives.

**Table 2: 2008 OPA Conservation Portfolio Results – Forecasts vs. Actuals**

Metric	Forecast	Final Results
2008 peak-demand savings (MW)	312	387
2008 energy savings (GWh)	181	386
Lifetime energy savings (GWh)	1,197	4,621

The 2008 conservation portfolio was balanced, with programs working together to achieve overall conservation goals, as seen in Figure 1. The industrial program, comprised primarily of demand response initiatives, focused on procuring peak-demand resources, while the consumer and business programs drove long-lasting energy savings through energy-efficiency initiatives. Additionally, lower-than-forecasted savings in the business program were offset by higher-than-forecasted savings in the consumer and industrial programs. Details on the specific initiatives within each of these programs and their relative contributions to the program results are provided in subsequent sections.

**Figure 1: Breakdown of 2008 OPA Portfolio Savings by Program**

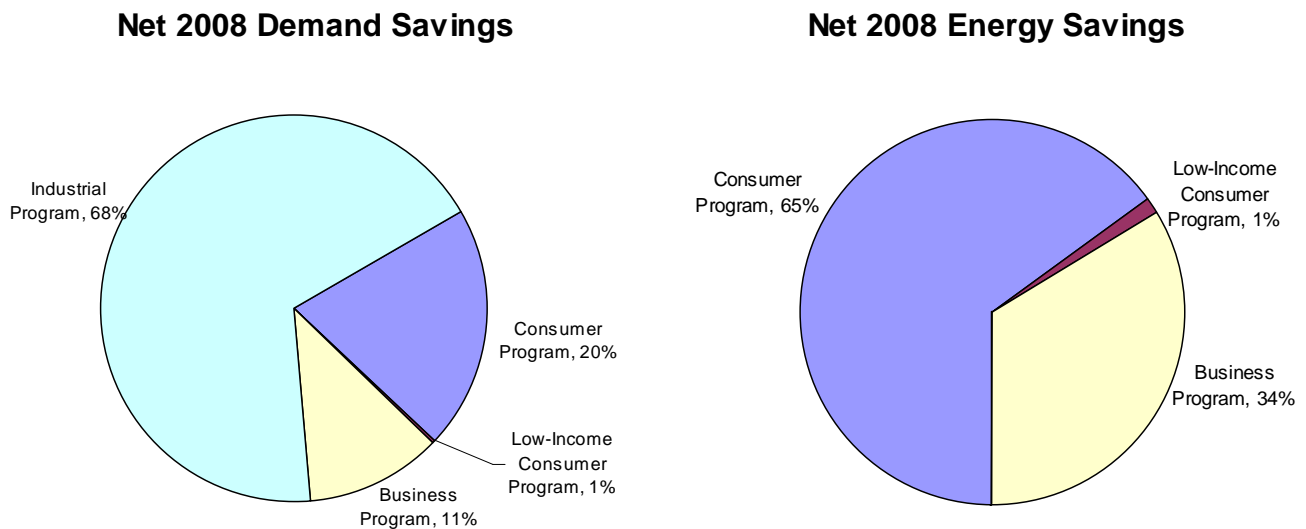
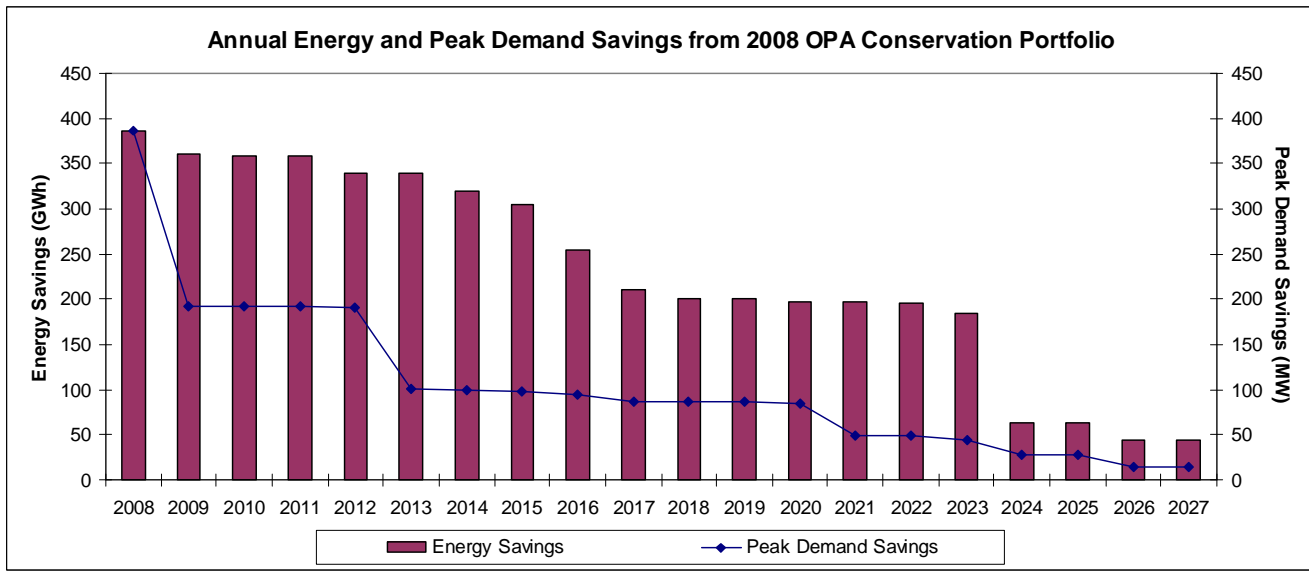


Figure 2 below illustrates an important and powerful characteristic of conservation – that savings typically last beyond the investment period. In other words, conservation program costs are all paid “up front” when the measure is installed; however, the benefits continue for many years. The expected duration or “persistence” of conservation is estimated based on the specific conservation measures that are installed and how long those measures are estimated to last. For example, a new energy-efficient furnace may last 18 years while behavioural actions might last only one year. As seen in this graph, the majority of energy savings from OPA’s 2008 conservation activities are expected to persist for at least 15 years.

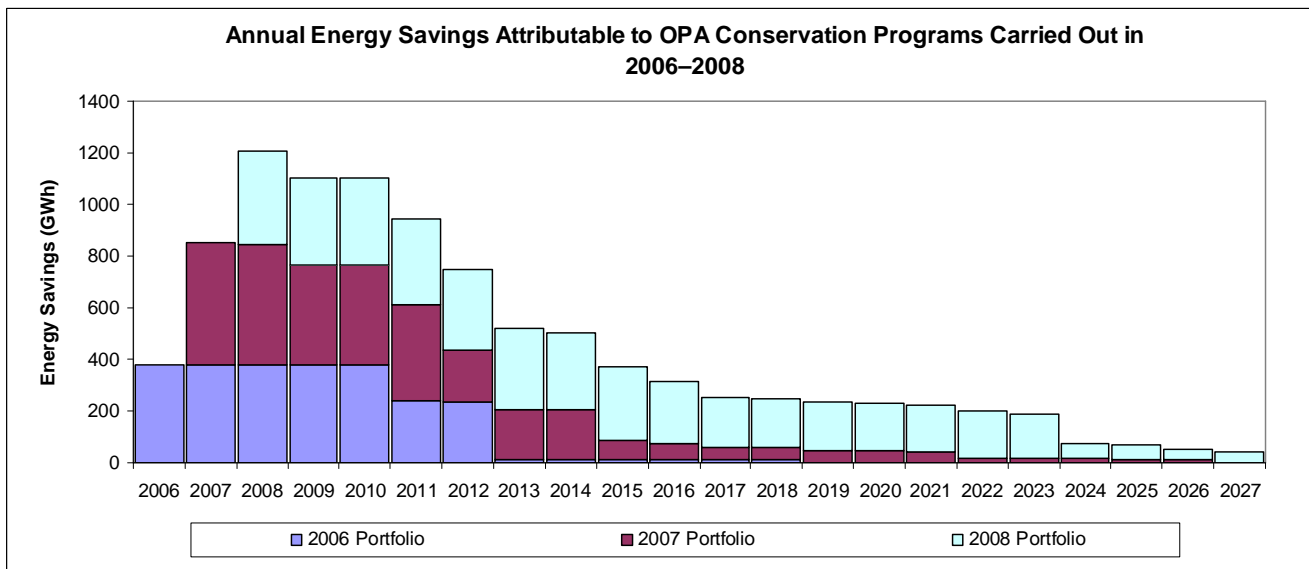
**Figure 2: Expected Duration of Savings from 2008 OPA Conservation Portfolio**



### OPA-funded Conservation Results to Date

The OPA began implementing conservation programs in 2006. The total annual energy savings that have occurred to date, as well as those that are expected to continue in the future as a result of OPA-funded conservation programs in 2006, 2007 and 2008, are shown in the figure below.

**Figure 3: Energy Savings from 2006-2008 OPA Programs**



## Cost-Effectiveness

The OPA assesses the cost-effectiveness of its conservation programs using a suite of standard industry benefit-cost analyses and metrics – the total resource cost (TRC) test, the program administrator cost (PAC) test and the levelized cost of conservation delivery.

The TRC test looks at cost-effectiveness from the perspective of society as a whole, taking into account all benefits and all costs, while the PAC test (also referred to as the utility cost test) considers cost-effectiveness from the perspective of the utility or program administration agency. Levelized conservation delivery costs reflect the total cost incurred by the OPA in procuring conservation resources and provide a basis for comparing the cost of conservation resources with the cost of electricity supply resources. Additional detail on these metrics is provided in Appendix B.

Table 3 summarizes portfolio cost-effectiveness results both for actual conservation resources implemented in 2008<sup>5</sup> and for those conservation resources implemented in 2008 combined with conservation resources projected for implementation in 2009 and 2010. The OPA conservation portfolio passes both cost-effectiveness tests (i.e., a positive net benefit) for both the 2008 program year alone as well as for the three-year portfolio period, providing assurance that the OPA is successfully procuring cost-effective conservation.

**Table 3: Assessment of OPA Conservation Portfolio Cost-Effectiveness**

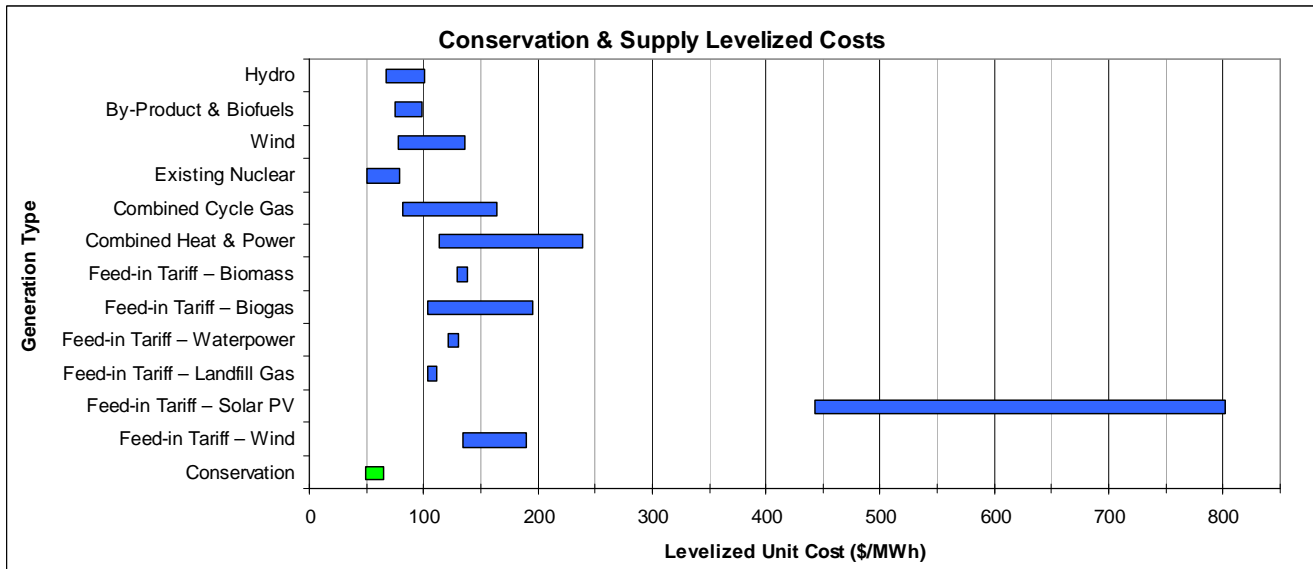
Costs expressed in present value 2008\$		2008 Program Year (Final Results)	2008 - 2010 Portfolio (Projection)
Program Administrator Cost Test	Benefit (millions)	\$293	\$1,051
	Cost (millions)	\$143	\$ 611
	Net Benefit (millions)	\$150	\$ 440
	Net Benefit Ratio	2.0	1.7
Total Resource Cost Test	Benefit (millions)	\$293	\$1,051
	Cost (millions)	\$187	\$756
	Net Benefit (millions)	\$106	\$295
	Net Benefit Ratio	1.6	1.4
Levelized Delivery Cost	\$/MWh	\$49	\$65
	\$/MW-yr	\$95,864	\$134,703

As seen in Figure 4, the cost of conservation is significantly lower than the cost of most types of electricity supply, when compared on a levelized basis.<sup>6</sup>

<sup>5</sup> This cost-effectiveness analysis includes only conservation initiatives administered by the OPA's conservation division. It does not include customer-based generation or contracted demand response initiatives that are administered by the OPA's electricity resources division.

<sup>6</sup> Source of non-Feed-in Tariff supply costs: OPA Generation Procurement Cost Disclosures [http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=6670&SiteNodeID=454&BL\\_ExpandID=](http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=6670&SiteNodeID=454&BL_ExpandID=)  
Source of Feed-in Tariff costs: [http://fit.powerauthority.on.ca/Storage/99/10863\\_FIT\\_Pricing\\_Schedule\\_for\\_website.pdf](http://fit.powerauthority.on.ca/Storage/99/10863_FIT_Pricing_Schedule_for_website.pdf)

Figure 4: Comparison of Levelized Costs of Conservation and Supply



## Program Results

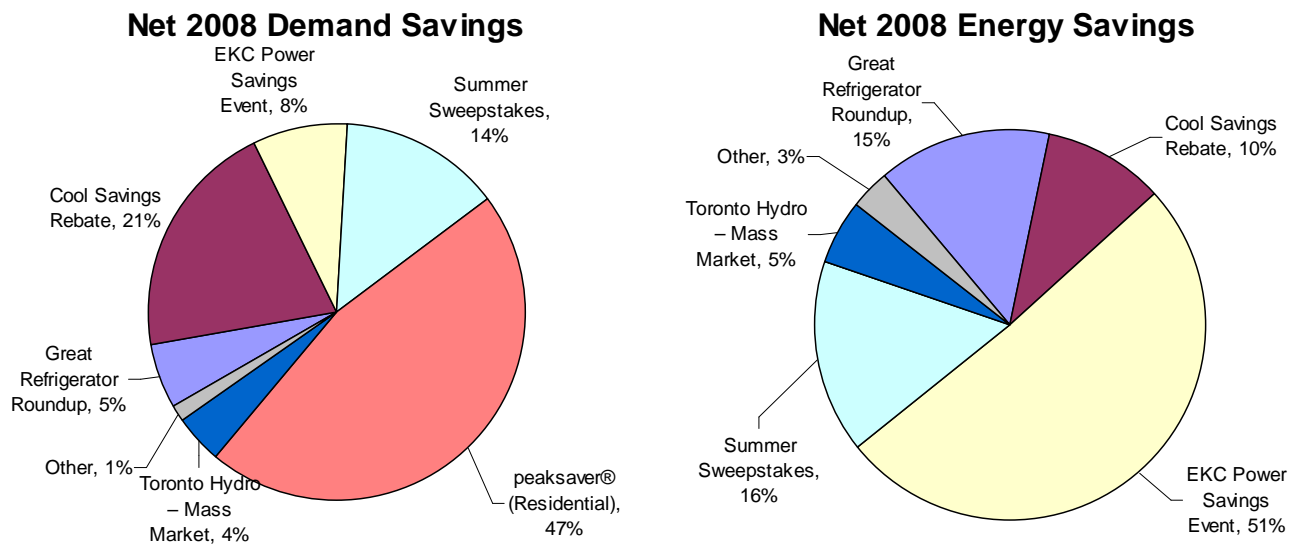
### Consumer Program

The consumer program performed very well in 2008, achieving 120 percent of forecasted net demand savings. Figure 5 shows the breakdown of 2008 consumer program savings by major initiative. As was seen with the portfolio as a whole, there is a balance of initiatives within the consumer program. The majority of demand savings are stemming from the **peaksaver®** initiative, while the Every Kilowatt Counts (EKC) Power Savings Event is contributing the majority of energy savings in the consumer program.

**Table 4: 2008 Consumer Program Final Results: Forecast vs. Actual**

Metric	Forecast	Actual
2008 peak-demand savings (MW)	61	73
2008 energy savings (GWh)	91	234
Lifetime energy savings (GWh)	888	2,235

**Figure 5: Breakdown of 2008 Consumer Program Savings by Initiative**



The maturity of the consumer program (many initiatives have been in market since 2006) has enabled the OPA to refine and improve program forecasting and management over time. Additionally, the comprehensive EM&V process that was undertaken on four consumer initiatives in 2007 significantly contributed to the refinement and improvement of the consumer program as a whole in 2008.

### Low-Income Consumer Program

Low-income consumers across Ontario were eligible to participate in all OPA consumer program initiatives in 2008; however, there was not a stand-alone, province-wide program geared specifically to low-income households.

In 2008, Toronto Hydro, as part of its portfolio of initiatives funded through the OPA, delivered an initiative that provided free compact fluorescent light bulbs (CFLs) to low-income customers in Toronto. The Toronto Hydro CFL initiative for low-income households achieved a net savings of 1.9 MW and 4.5 GWh in 2008 and an expected lifetime savings of 36 GWh.

The Ministry of Energy and Infrastructure is working to develop a comprehensive, province-wide, low-income residential initiative policy and direction for the delivery of conservation to this sector.

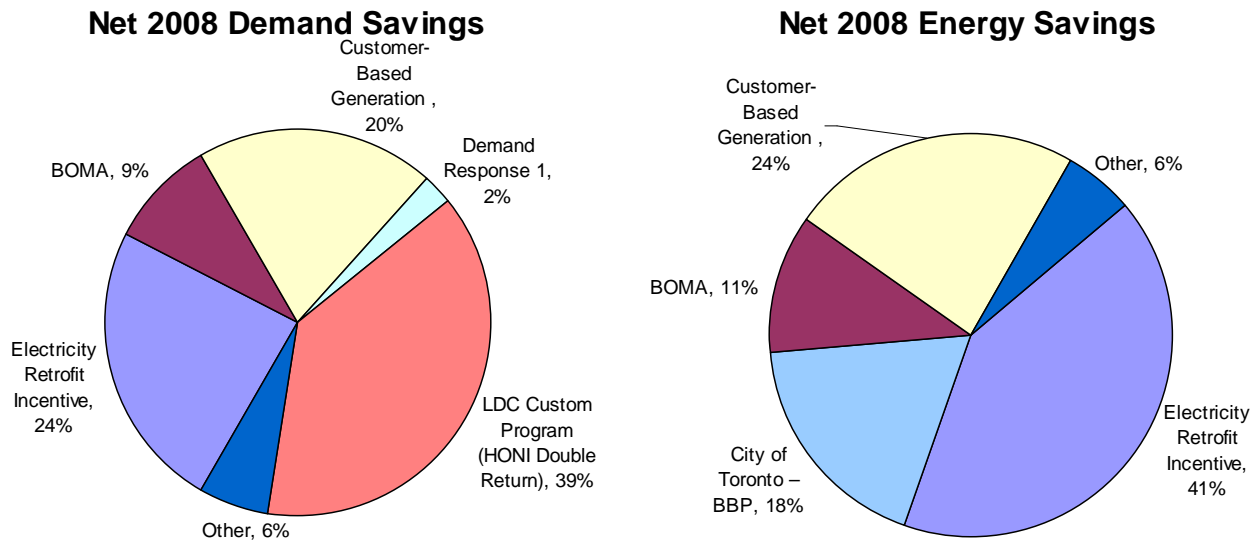
### Business Program

The business program achieved approximately 35 percent of forecasted net demand savings despite facing a number of significant challenges (described below). Figure 6 shows the breakdown of 2008 business program savings by major initiative.

**Table 5: 2008 Business Program Final Results: Forecast vs. Actual**

Metric	Forecast	Actual
Net peak-demand reduction (MW)	119	41
Net 2008 energy savings (GWh)	78	121
Net lifetime energy savings (GWh)	229	2,040

**Figure 6: Breakdown of 2008 Business Program Savings by Major Initiative**



A number of factors contributed to the lower-than-anticipated savings in the business program in 2008, including delays in the launch of some initiatives, program delivery challenges and the start of the economic downturn in mid-2008. Additionally, there were lower-than-expected savings per project for many initiatives, due to a preponderance of lighting measures versus other measures that offer substantial peak-demand savings and lifetime energy savings, such as motors and HVAC systems. Allowing for these factors, the program has had good initial success and is well-positioned to deliver substantial demand and energy savings over the next few years. A comprehensive evaluation was undertaken on the business program’s major retrofit initiatives in 2008. As was done with the consumer program initiatives after their initial evaluations in 2007, the OPA is currently assessing how

to adjust the design and delivery of these initiatives to improve and accelerate the performance of the business program.

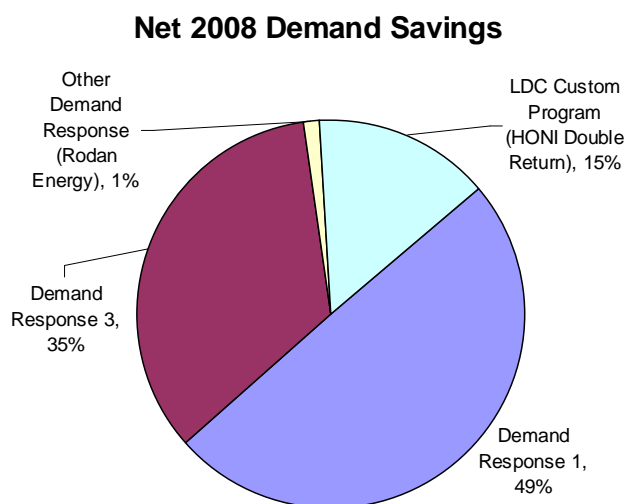
### **Industrial Program**

The industrial program performed very well in 2008, achieving more than 200 percent of forecasted demand savings. The 2008 industrial program was comprised solely of demand response and generation initiatives, whose primary focus was in reduced electricity demand rather than energy savings through conservation. As such, energy savings were not forecasted or evaluated for demand response initiatives. There is significant potential, however, for energy savings in the industrial sector through process improvements such as productivity and product quality, and through equipment improvements such as rightsizing equipment, replacing inefficient equipment and operating equipment more effectively. The OPA is actively working with industry partners, LDCs and the government on a strategy and initiatives to harness this conservation potential.

**Table 6: 2008 Industrial Program Final Results: Forecast vs. Actual**

<b>Metric</b>	<b>Forecast</b>	<b>Actual</b>
Net peak-demand reduction (MW)	109	245

**Figure 7: Breakdown of 2008 Industrial Program Savings by Major Initiative**



Going forward, Demand Response 1 (DR1) will be structured as a stepping stone to other, firmly contracted, demand response initiatives and will be positioned as a way for prospective companies to experiment with the concept of demand response. It is proposed that rules will be implemented in DR1 to limit the period of enrollment available and perhaps require a minimum number of activations as an encouragement to experiment and prepare for other demand response programs.

As for Demand Response 3 (DR3), the OPA will undertake a review of its program structure in 2010 to facilitate a higher level of participation and ensure the program aligns with the future needs of the electricity system.

## Supporting Initiatives

The OPA undertakes a number of initiatives to support the effectiveness of its consumer, business and industrial conservation programs and to help move Ontario towards a culture of conservation. Key supporting initiatives include:

- **conservation awareness activities** to help raise Ontarians' understanding of the need and ways to conserve energy
- **market research** to help the OPA to better target, deliver and track the impacts of its conservation programs
- **education and training activities** to help build the capability of Ontario's workforce to design and deliver conservation programs
- the **Conservation Fund and Technology Development Fund** to support new and innovative conservation programs and technologies.

### *Conservation Awareness*

The OPA uses consistent messaging and branding to support all conservation programs as well as the development of a conservation culture throughout Ontario. In 2008, the OPA re-launched its Every Kilowatt Counts website, [www.everykilowattcounts.ca](http://www.everykilowattcounts.ca), to provide broader and more in-depth conservation information for Ontarians. The site includes a special interactive, educational section for children called Kids' Corner, which also has resources that educators can download to supplement their energy conservation curricula. The website offers comprehensive information and case studies for all business sectors, including commercial, institutional, industrial and agricultural.

#### **First annual Energy Conservation Week**

The OPA promoted Ontario's first annual Energy Conservation Week, May 25 to May 31, 2008. Using a grassroots approach, the campaign encouraged wise electricity use by all Ontarians and was supported by the OPA website: [www.energyconservationweek.ca](http://www.energyconservationweek.ca). Individuals and organizations were encouraged to contribute to the site with their own Energy Conservation Week activities and testimonials.

A June 2008 Ipsos Reid poll indicated that 73 percent of Ontarians were aware of Energy Conservation Week. Fifty percent participated by engaging in an energy conservation activity during the week, with 74 percent of those participating at home, seven percent participating at work and 19 percent participating at both home and at work.

#### **Second annual Conservation Awareness Day at Rogers Centre**

The OPA hosted Conservation Awareness Day at the Toronto Blue Jays game on Sunday, May 25, 2008. The game was attended by more than 29,000 spectators and featured an on-field Certificate of Recognition presentation to Toronto Blue Jays president and CEO Paul Godfrey for energy conservation measures installed at Rogers Centre. The first 10,000 fans who entered the stadium received environmentally friendly Every Kilowatt Counts tote bags, and the first 15,000 fans who left the stadium received "Use Electricity Wisely" wheels.

#### **The Great Refrigerator Roundup 100,000<sup>th</sup> fridge pickup media event**

On November 13, 2008, the Great Refrigerator Roundup marked the decommissioning of the 100,000<sup>th</sup> refrigerator. This milestone event was celebrated at the ARCA decommissioning facility in Oakville

with the Honourable George Smitherman, Deputy Premier and Minister of Energy and Infrastructure, members of the media, representatives from ARCA Inc, LDCs and the OPA, officials and the customer who owned the 100,000<sup>th</sup> fridge.

“This is a great example of how conservation adds up for Ontarians,” said Minister Smitherman in the media release issued for this event. “With the removal of these fridges, enough energy has been saved to power about 3,000 homes, nearly 100 new green-collar jobs have been created and consumers collectively have saved about \$3.5 million in energy costs in just one year.”

### **OPA province-wide seasonal greeting card contest**

In September 2008, the OPA, with assistance from Paton Publishing, Canada’s largest youth magazine publisher, reached out to over 7,000 Ontario teachers and their students in grades four to six. Students were invited to submit an original coloured drawing with a seasonal theme that reflects either electricity efficiency or generation. More than 1,100 submissions from 74 schools across Ontario were received for the contest, illustrating awareness of the wise use of electricity. The winner, a student from St. Teresa of Avila Catholic School in Mississauga, received a commemorative trophy, a \$200 honorarium and had her design used for the OPA’s 2008 seasonal greeting card. The school was awarded a commemorative trophy and the grand prize of a 64” SMART interactive white board for use in the classroom. The top 14 creative submissions were displayed at The Children’s Museum in Kitchener, Ontario.

### ***Market Research***

The OPA’s market research initiative in 2008 had three main purposes: to inform its strategy to design and deliver the consumer and business programs, to monitor feedback on its residential initiatives and to inform the development of Every Kilowatt Counts as the umbrella brand for its conservation programs.

Market research results from 2008 indicate that Ontarians feel increasingly empowered about conserving electricity. Individuals are learning more about what they can do to use electricity more efficiently, and most of those surveyed report having taken some action to conserve electricity in the home.

Roughly two-thirds of survey participants, slightly more than 2007, believe they can definitely make a contribution to reducing total electricity use in the province. An overwhelming 85 percent reported that using electricity wisely in the home has become more of a personal priority than it was in 2007. Since 2007, progressively more Ontarians cite cost savings and reducing environmental impacts as the main drivers for their electricity conservation behaviours.

### ***Conservation Fund***

The Conservation Fund provides support for new and innovative electricity conservation initiatives that build the ability of Ontario’s residents, businesses and institutions to reduce their demand for electricity. These initiatives help lay the groundwork for the success of future conservation efforts by testing new program approaches and investing in market and labour force development that supports conservation action over the longer term.

The Conservation Fund supports projects developed by entities such as industry associations, public sector organizations, non-profit organizations and consulting companies serving the commercial, institutional, residential or industrial sectors.

**Table 7: 2008 Conservation Fund – Project Funding**

<b>Project Sector</b>	<b># of Projects</b>	<b>OPA Funding (\$)</b>	<b>Total Project Cost (\$)</b>
Residential	5	972,800	2,406,731
Commercial	4	727,700	1,456,600
Institutional	3	615,500	1,358,000
Industrial	3	684,000	1,572,000
<b>Total</b>	<b>15</b>	<b>3,000,000</b>	<b>6,793,331</b>

In 2008, the Conservation Fund invested \$3 million in 15 initiatives, such as:

- centralized incentive program application and administration in the education sector
- upstream program model development for ENERGY STAR<sup>®</sup> qualified television set-top boxes
- conservation education as a measurable resource in social housing
- energy management in industrial food and beverage operations
- residential shade-tree program delivery model development
- post-secondary training and education in conservation-related fields
- secondary school co-operative education in conservation-related fields.

Several projects were completed in 2008. Results of note include:

- the deployment of an energy conservation secretariat to assist Ontario's 24 publicly funded colleges in managing energy demand and planning for energy-efficiency retrofits
- the incubation of a direct install program that led to the development of the OPA's Power Savings Blitz initiative
- the development of a training program and web-based resources for contractors to drive client demand for energy-efficient building retrofits.

In all three cases, Conservation Fund investments have led to ongoing initiatives that continue to directly or indirectly obtain conservation savings in Ontario. These projects serve as a model to other interested parties and provide a base on which to build.

More information is available on the Conservation Fund website, [www.powerauthority.on.ca/cfund](http://www.powerauthority.on.ca/cfund).

### ***Technology Development Fund***

The Technology Development Fund promotes the development and commercialization of technologies or applications that have potential to improve electricity supply, conservation or demand management. Technology development is an essential part of market transformation because it accelerates the diffusion of new, more efficient technologies into the economy, thereby helping homes and businesses do more with less.

The Technology Development Fund has sharpened its focus on three priority end-uses:

- high-efficiency lighting
- advanced and integrated controls
- advanced cooling and refrigeration.

Focusing in these areas will help to accelerate the achievement of Ontario’s conservation targets because they deal with end-uses such as cooling and lighting, which contribute most significantly to high demand.

The OPA collaborates with the Ontario Centres of Excellence – Centre for Energy, and the Centre for Energy Advancement through Technological Innovation, organizations with significant electricity sector and technology expertise. These centres help to share the risk inherent in the development of emerging technologies. Together with its internally managed projects, the Technology Development Fund’s contributions have leveraged over \$36 million in external contributions – a ratio of more than 11 to one.

**Table 8: 2008 Technology Development Fund – Project Funding**

<b>Project Type</b>	<b># of Projects</b>	<b>OPA Funding (\$)</b>	<b>Total Project Cost (\$)</b>
Conservation	7	1,064,000	11,504,542
Other	4	865,000	13,155,444
<b>Total</b>	<b>11</b>	<b>1,929,000</b>	<b>24,659,986</b>

In 2008, the Technology Development Fund invested just over \$1.9 million in 11 projects involving the following innovative technologies and approaches:

- effective exterior solar shadings for residential windows
- energy hub management system for controlling energy use and generation in buildings and communities
- self-managing peak-demand management and response technology demonstration
- performance testing of high energy-efficiency ratio (EER) air conditioning units against the current technology (SEER)
- low-cost, high-performance thin-film photovoltaic solar cells

More information is available at the Technology Development Fund website, [www.powerauthority.on.ca/tdfund](http://www.powerauthority.on.ca/tdfund).

## Appendix A – 2008 evaluation summary

Table 9: 2008 OPA Conservation Portfolio Evaluations Summary

Initiatives	Consumer Program	Low-Income Consumer Program	Business Program	Industrial Program	New in 2008	2008 Activities Evaluated
Great Refrigerator Roundup	✓					✓
Cool Savings Rebate	✓					✓
Every Kilowatt Counts Power Savings Event	✓					✓
Summer Sweepstakes	✓				✓	✓
Aboriginal Retrofit Pilot <sup>7</sup>	✓					
Toronto Hydro – Mass-Market Initiatives	✓					
Toronto Hydro – Low-Income Initiatives		✓				
<i>peaksaver</i> <sup>®</sup>	✓		✓			✓
Electricity Retrofit Incentive	✓		✓			✓
City of Toronto – Better Buildings Partnership	✓		✓			✓
City of Toronto – New Construction			✓			
Toronto Hydro Business Incentive Program			✓			✓
BOMA Toronto			✓			✓
High Performance New Construction			✓		✓	
Power Savings Blitz			✓		✓	✓
LDC Custom Initiatives (Hydro One Double Return)			✓	✓	✓	✓
Demand Response 1 (DR1)			✓	✓		✓
Demand Response 3 (DR3)			✓	✓	✓	✓
Other Demand Response			✓	✓		✓
Customer-Based Generation	✓		✓	✓		

<sup>7</sup> Preliminary results for the 2008 Aboriginal Retrofit Pilot were not available as of publication date and will be reported in the OPA's 2009 Final Conservation Results report.

## Appendix B – Cost-Effectiveness Metrics

This appendix describes the metrics used to assess the cost-effectiveness of conservation resources. Two cost-effectiveness tests – the total resource cost (TRC) test and the program administrator cost (PAC) test – along with levelized delivery cost metrics, have been used to assess the portfolio's conservation resources.

A cost-effectiveness test is a benefit-cost analysis designed to evaluate benefits and costs of conservation efforts from a particular perspective (i.e., each cost-effectiveness test uses a unique combination of benefit and cost components to determine an overall net benefit).

The net benefit of each test may be expressed either in absolute terms, whereby the net benefit is the difference between the present value (PV) of both the benefits and the costs, or as a ratio, whereby the net benefit is determined by dividing the present value of the benefits by the costs.<sup>8</sup> A positive net benefit in absolute terms or a net benefit ratio greater than 1.0 indicates that benefits exceed costs from the perspective of each particular cost-effectiveness test.

### ***Total Resource Cost (TRC) Test***

The TRC test measures the benefits and costs of conservation efforts from a societal perspective. This test is described by the following equation:

$$\text{TRC Test Net Benefit (\$)} = \text{PV Avoided Supply Cost} - (\text{PV Incremental Equipment Cost} + \text{PV Program Cost})$$

or (to determine net benefit as a ratio):

$$\text{TRC Test (Ratio)} = \text{PV Avoided Supply Cost} / (\text{PV Incremental Equipment Cost} + \text{PV Program Cost})$$

Incentive costs are not included in the determination of the TRC net benefit because incentives are a transfer of funds from the program-sponsoring organization to participating customers and, consequently, do not directly enhance the aggregate net benefit from a societal perspective.

### ***Program Administrator Cost (PAC) Test<sup>9</sup>***

The PAC test measures the benefits and costs of conservation efforts from the perspective of the program administrator or utility. This test is described by the following equation:

$$\text{PAC Test Net Benefit (\$)} = \text{PV Avoided Supply Cost} - (\text{PV Incentive Cost} + \text{PV Program Cost})$$

or (to determine net benefit as a ratio):

$$\text{PAC Test (Ratio)} = \text{PV Avoided Supply Cost} / (\text{PV Incentive Cost} + \text{PV Program Cost})$$

<sup>8</sup> Present value is determined by discounting future benefits and costs over a 20-year period that begins in 2008. A real discount rate of four percent is used to perform this analysis.

<sup>9</sup> Also known as the utility cost test

### ***Levelized Conservation Delivery Cost***

Levelized delivery costs reflect the combined program administration and incentive costs required to procure conservation resources, expressed on a levelized basis by spreading these costs either over lifetime energy savings (in this case expressed as \$/MWh) or over lifetime peak-demand savings (in this case expressed as \$/MW-yr).

Levelized delivery cost expressed in terms of \$/MWh is described by the following equation:

$$\text{Levelized delivery cost (\$/MWh)} = \text{PV (Incentive Cost + Program Cost)} / \text{PV Lifetime MWh Savings}$$

Levelized delivery cost expressed in terms of \$/MW-yr is described by the following equation:

$$\text{Levelized delivery cost (\$/MW-yr)} = \text{PV (Incentive Cost + Program Cost)} / \text{PV Lifetime MW Savings}$$

Levelized delivery cost provides a basis for comparing conservation resources with different cost and resource savings characteristics, and with supply options with different cost and energy output capabilities.

For additional information on cost-effectiveness tests and levelized delivery costs, please refer to the OPA's EM&V Cost-Effectiveness Test Guide.<sup>10</sup>

<sup>10</sup> The OPA EM&V Cost-Effectiveness Test Guide can be found at:  
<http://www.powerauthority.on.ca/Page.asp?PageID=1224&SiteNodeID=404>.

Ontario Power Authority  
120 Adelaide Street West  
Suite 1600  
Toronto Ontario M5H 1T1  
416-967-7474  
416-967-1947  
[www.powerauthority.on.ca](http://www.powerauthority.on.ca)  
[info@powerauthority.on.ca](mailto:info@powerauthority.on.ca)



<sup>OM</sup> OPA and Ontario Power Authority are each official marks of the Ontario Power Authority.