

2013

ONTARIO POWER GENERATION

SUSTAINABLE DEVELOPMENT  
REPORT



**ONTARIO POWER**  
GENERATION



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# COMPANY PROFILE

Ontario Power Generation (OPG) is Ontario’s clean energy generator. OPG’s focus is on the efficient generation and sale of electricity from its generating assets, while operating in a safe, open and environmentally-responsible manner. OPG was established under the *Business Corporations Act* (Ontario) and is wholly owned by the Province of Ontario. OPG generates more than 50 per cent of the power produced in Ontario.

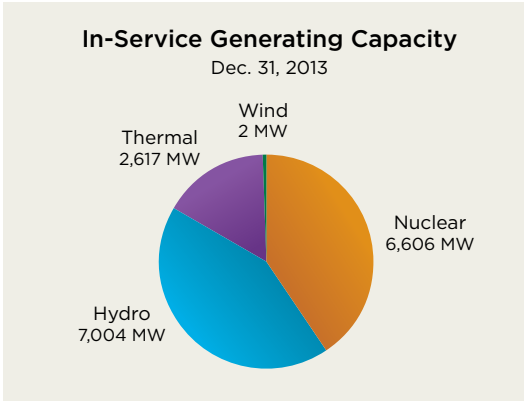
At December 31, 2013, OPG’s electricity generating portfolio had an in-service capacity of 16,229 megawatts (MW), which consisted of:



During 2013, OPG operated two additional thermal generating stations that used coal for the generation of electricity. These stations were removed from service in December 2013 as directed by the Province of Ontario.

OPG and TransCanada Energy Ltd. co-own the Portlands Energy Centre gas-fired combined cycle generating station. OPG and ATCO Power Canada Ltd. co-own the Brighton Beach gas-fired combined cycle generating station. OPG also owns two other nuclear generating stations, which are leased on a long-term basis to Bruce Power L.P. These co-owned and leased stations are incorporated into OPG’s financial results but are not included in the generation portfolio statistics set out in this report.

A map of OPG’s operations is available at [www.opg.com/generating-power](http://www.opg.com/generating-power).



# JOINT MESSAGE

FROM THE PRESIDENT AND CHIEF EXECUTIVE OFFICER AND THE VICE PRESIDENT OF ENVIRONMENT

“OPG is working hard to deliver clean, reliable, low-cost power to Ontario. This cannot be accomplished by any one group or individual. It is truly a collective effort, reflecting a company deeply and widely committed to environmental, social and community values.”

Tom Mitchell, President and CEO

Thank you for taking the time to read OPG's 2013 Sustainable Development Report. This report outlines our commitment to the environment and our communities. It also provides information on our safety and economic performance.

OPG operates across Ontario, on most of the Great Lakes and on many of Ontario's waterways and has done so for more than 100 years. This gives the company and our staff a unique sense of stewardship, which includes a strong commitment to the principles of sustainable development. We believe that by reflecting, respecting and responding to public expectations, we become a better company.

We met these expectations against a background of considerable change in 2013, including a smaller generating portfolio, lower revenues and increased competition. We responded by

transforming ourselves into a more flexible and efficient company while maintaining our commitment to sustainable development.

For 2013, our results show excellent environmental and safety performance. We are also proud of the partnerships we have in the communities in which we operate, including our mutually-beneficial working relationships with First Nations and Métis communities.

The closure of two of our coal plants in 2013 marks the start of a new era for OPG. We now have one of the cleanest generating portfolios in North America – a direct result of our successful and professional execution of the Ontario government's coal-closure policy. Close to 100 per cent of the electricity we produce now comes from our nuclear and hydroelectric facilities that are virtually free of climate change or smog causing emissions. In addition, OPG's Atikokan and Thunder Bay stations are being converted from burning coal to renewable biomass as a fuel source.

OPG creates value for Ontarians through our generation development projects. The completion of the Niagara Tunnel in 2013 was a major achievement, and it is now providing additional water to generate renewable electricity at the Sir Adam Beck generating complex. When fully completed in 2015, our Lower Mattagami project in northern Ontario will also provide a significant supply of additional hydropower for Ontarians.

In addition, OPG continued to generate electricity at a lower price than the average of all other generators. In 2013, improvements were made to better align our costs with revenues. Significant savings were achieved through OPG's ongoing business transformation project which has lowered salary costs and reduced overall headcount.

We are proud of our sustainable development commitment. The achievements described in this report reflect that commitment. We hope that you find this report informative. We welcome your feedback as we look for additional opportunities to make us even more environmentally responsible, safer, and financially strong.



*Mitchell*  
TOM MITCHELL  
President  
and CEO



*Reuber*  
BARBARA REUBER  
Vice President,  
Environment

# ABOUT THIS REPORT

## Purpose

This report outlines OPG's commitment to sustainable development and presents the company's environmental, social and economic performance related to all operations and sites for the period of 2013. This is the 15th annual Sustainable Development Report produced by OPG. Additional details regarding OPG's financial and operating results are provided in OPG's 2013 Annual Report available at [www.opg.com/news-and-media](http://www.opg.com/news-and-media).

## Audience

The audience for this report is the many stakeholders and partners who have an interest in OPG's operations

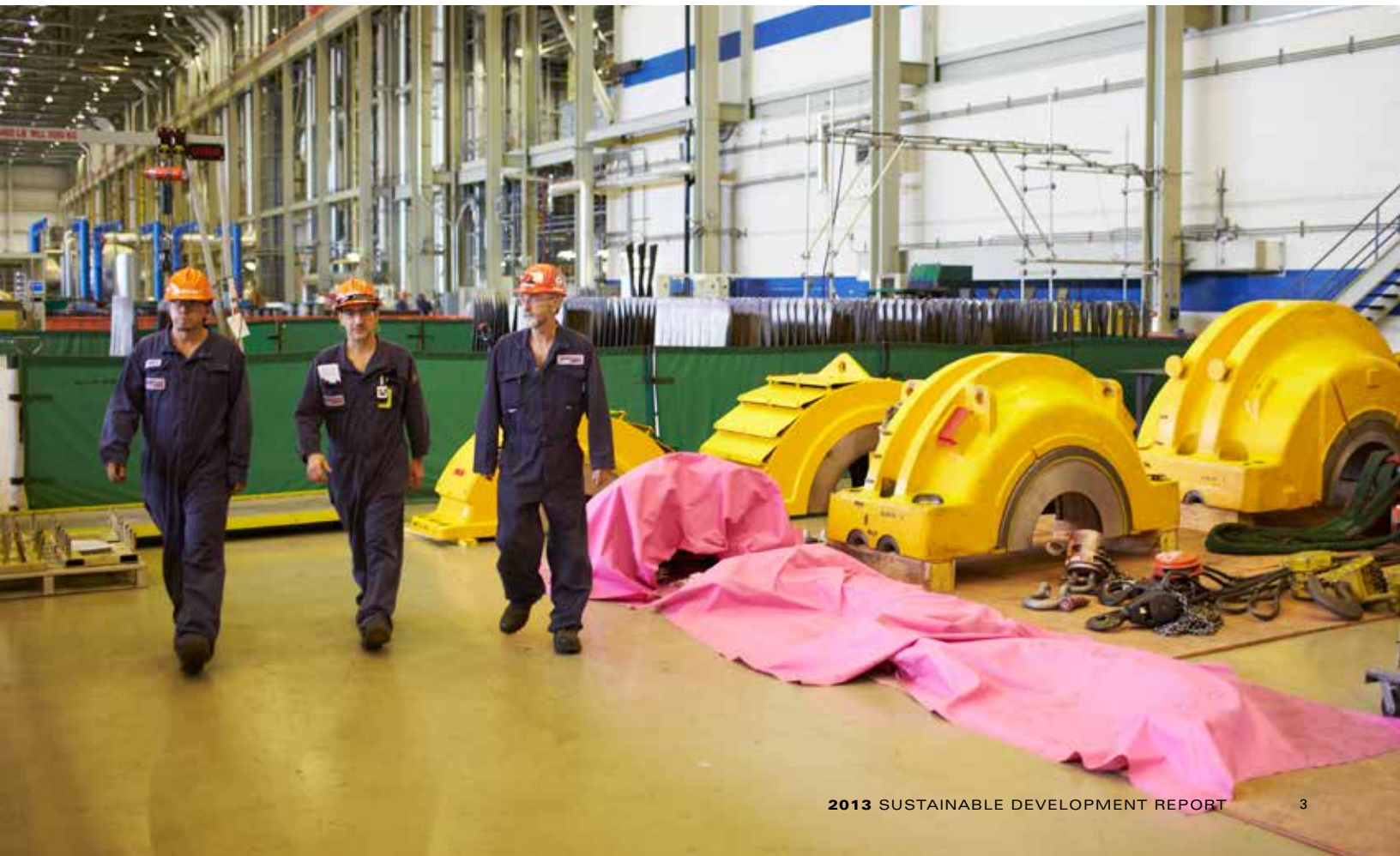
and activities. OPG's stakeholders and partners include: the communities in which we operate, First Nations and Métis communities, ratepayers, suppliers, employees, unions, industry groups, educational institutions, the media, government and agencies at federal, provincial and municipal levels, non-government organizations, and the general public.

## Stakeholder Engagement

The contents of the report are intended to meet the expectations and interests of OPG's stakeholders and partners. Industry materiality assessment results and OPG's external communications were consulted in the preparation of this report to identify material issues and key topics and concerns.

## Materiality Assessment

OPG is a member of the Canadian Electricity Association and actively participates on the board and in a number of committees and working groups. In 2013-2014, OPG participated in a Canadian Electricity Association materiality assessment project to identify and rank priority issues for Canadian utilities, power producers, transmission and distribution companies, and other related industry organizations. This assessment identified the following key sustainability issues based on business impact and degree of importance to stakeholders and partners.





Deep Geologic Repository public hearings - Fall 2013

- Aboriginal relations
- Air emissions
- Business model pressures
- Climate change adaptation
- Community development and investment
- Electricity demand
- Employee health and safety
- Employee relations and recruitment
- Governance
- Greenhouse gas emissions
- Infrastructure, renewal and grid modernization
- Land and biodiversity
- Public health and safety
- Stakeholder engagement and communication
- Waste
- Water availability
- Water quality

While the impact and importance of these issues can vary between Canadian Electricity Association members, the results of this materiality assessment provide a useful benchmark to OPG. This list of issues closely aligns with the significant aspects OPG has identified through its management system processes and with the topics presented in this report.

Additional details regarding the Canadian Electricity Association, including copies of the Canadian Electricity Association's annual Sustainable Electricity reports, are available at [www.electricity.ca](http://www.electricity.ca).

The Electric Power Research Institute's 2013 technical report *Material Sustainability Issues for the North American Electric Power Industry – Results of Research with Electric Power Companies and Stakeholders in the United States and Canada* was also used to prepare this report and identify issues material to the electricity sector, including OPG.

#### External Communications

OPG communicates with its external stakeholders and partners and solicits feedback to identify their key issues. Engagement takes place through channels such as:

- Licensing processes
- Environmental Assessments
- Publications (e.g. website, reports, newsletters, safety messages) that provide OPG's email, telephone and mailing address information
- Visitor information centres
- Community-based advisory councils and committees
- Meetings with regulators
- Social media (e.g. social networking, microblogging, video-sharing)
- Face to face meetings and open houses.

#### Continual Improvement

In 2013, OPG's 2012 Sustainable Development Report was evaluated by the EXCEL Partnership against criteria for best practices in sustainability reporting and was ranked as having better than average achievement. Recommendations from this evaluation were taken into account and this 2013 Sustainable Development Report includes increased emphasis on materiality, objectives and risks, specific governance accountabilities, and supply chain processes.

Additional information regarding the EXCEL Partnership is available at [www.excelpartnership.ca](http://www.excelpartnership.ca).

Comments and suggestions about this report are encouraged and may be provided via the contact information provided on the back cover of this report.

#### Data Integrity

Accuracy of the data provided in this report is assured through internal and third party reviews. Operational and performance data is validated by both line management and independent reviewers, and prescribed data is subject to assessments and audits as part of OPG's assurance program. OPG's sustainable development data and practices are periodically verified



Maintenance work at Darlington Nuclear








by an independent auditor as part of the Canadian Electricity Association's Sustainable Electricity Program to ensure information is accurate and credible.

An audit of OPG's consolidated financial statements by Ernst & Young LLP concluded the statements fairly present OPG's financial position. The consolidated financial statements and management discussion and analysis can be accessed at [www.opg.com](http://www.opg.com), on the Canadian Securities Administrators' website at [www.sedar.com](http://www.sedar.com), or can be requested from OPG.

### Performance Graphs and Targets

The graphs in this report are intended to provide a visual presentation of information and high-level conclusions related to performance. Where applicable, arrows are included alongside the graphs to summarize overall performance trends.

Consistent with industry norms, OPG has established targets for selected parameters to measure and monitor performance and drive continual improvement. Depending on the parameter, desired performance may be below or above target. For example, a lower than target number of spills would be considered good performance, while higher than target electricity production would also be considered good performance. Graphs

Performance Trend	Performance Rating
 Performance trend is improving	 Better than target by 5 per cent or more
 Performance trend neither improving nor declining	 Within 5 per cent of target
 Performance trend is declining	 Worse than target by more than 5 per cent but less than or equal to 10 per cent
	 Worse than target by more than 10 per cent

for parameters with targets have the target thresholds included in the graph and performance has been assigned a colour rating.

### Global Reporting Initiative

The Global Reporting Initiative's sustainability reporting guidelines were used as a reference in the preparation of this report. These guidelines provide a structure for sustainability reporting that makes reports comparable across companies. Refer to Appendix A for a table mapping Global Reporting Initiative criteria to this report's content.

Additional information regarding the Global Reporting Initiative is available at [www.globalreporting.org](http://www.globalreporting.org).

# SUSTAINABILITY STRATEGY

## Commitment

OPG's mission reflects the company's commitment to excellence in the areas of environmental, social and economic performance. OPG's ability to achieve sustainable business success relies on the assessment of key objectives and risks, and the integration of these issues into decision-making processes.

**MISSION:** To be Ontario's low-cost generator.

We will achieve our mission by reliably and cost-effectively producing electricity from our diversified generating assets, while operating in a safe, transparent and environmentally-responsible manner.

## KEY SUSTAINABLE DEVELOPMENT OBJECTIVES AND RISKS

	OBJECTIVES	RISKS
Environment	<ul style="list-style-type: none"> <li>▶ Meet all legal requirements and commitments with the objective of exceeding requirements where it makes business sense.</li> <li>▶ Maintain an environmental management system to the ISO 14001 standard.</li> <li>▶ Work to prevent or mitigate adverse effects with an objective of continual improvement.</li> <li>▶ Strive to maintain, or enhance where it makes business sense, significant natural areas and associated species of concern.</li> </ul>	<ul style="list-style-type: none"> <li>▶ OPG may be subject to fines, penalties, and claims if it is not in compliance with the applicable environmental laws.</li> <li>▶ Changes in environmental regulations can result in existing operations being non-compliant, a potential inability to comply, potential liabilities, and costs for OPG.</li> </ul>
Social	<ul style="list-style-type: none"> <li>▶ Prevent workplace injuries and ill health, and continually improve performance.</li> <li>▶ Operate facilities in a safe, secure and reliable manner that minimizes risks to equipment, to employees/contractors and to the public.</li> <li>▶ Build long-term, mutually beneficial working relationships with First Nations and Métis communities proximate to present and future operations.</li> <li>▶ Conduct relationships with stakeholders and partners in accordance with the principles of Safety, Integrity, Excellence, and People &amp; Citizenship.</li> </ul>	<ul style="list-style-type: none"> <li>▶ OPG's operations involve inherent occupational safety risks and hazards.</li> <li>▶ OPG is exposed to reputational risk associated with changes in public opinion.</li> <li>▶ The outcome of negotiations with the First Nations and Métis communities in Ontario depends on many factors such as legislation and precedents created by court rulings.</li> </ul>
Economic	<ul style="list-style-type: none"> <li>▶ Evaluate and implement plans to increase capacity, maintain performance, and extend the operating life of hydroelectric generating assets.</li> <li>▶ Improve the reliability and predictability of operating nuclear generating stations.</li> <li>▶ Pursue efficiency and productivity improvements while reducing costs.</li> <li>▶ Pursue and execute generation development opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>▶ OPG is exposed to variable output from its existing generating stations that could adversely impact its financial performance.</li> <li>▶ The risks associated with the cost, schedule, and technical aspects of major development projects could adversely impact OPG's financial performance and corporate reputation.</li> <li>▶ OPG is subject to extensive federal and provincial legislation and regulations that have an impact on its operations and financial position.</li> </ul>



## Governance and Accountability

OPG's approach to corporate governance is to continually improve the policies and procedures used to direct and manage the corporation, to enhance Shareholder value and to ensure its financial viability.

The OPG Board of Directors explicitly assumes responsibility for the stewardship of OPG and its business. OPG's Board retains all authorities related to corporate direction, strategy, organization structure, policy and planning not delegated to management. OPG's Board of Directors is made up of individuals with substantial expertise in managing and restructuring large businesses, managing and operating nuclear stations, managing capital intensive companies, and overseeing regulatory, government and public relations.

The Board has established the following five committees to focus on areas critical to OPG:

- Risk Oversight
- Compensation and Human Resources
- Audit and Finance
- Governance and Nominating
- Nuclear Oversight

Within these committees, responsibilities are established for decision-making on environmental, social and economic impacts. The Risk Oversight Committee is responsible for oversight of enterprise-wide risk and associated risk management activities, including oversight of OPG's Corporate Risk Management, Environment, First Nations and Métis Relations, and Safe Operations policies. The Compensation and Human Resources Committee provides oversight of OPG's human resources and compensation policies and practices, including oversight of

OPG's Health and Safety and Code of Business Conduct policies. The Audit and Finance Committee is responsible for the integrity, quality and transparency of OPG's financial information, the adequacy of the financial reporting process, and the systems of internal controls.

Accountabilities for senior executives and other employees are identified in Board policies. Executive responsibility for environmental, social and economic strategies and programs rests primarily with the following OPG Officers: Senior Vice President, Commercial Operations & Environment; Vice President, Corporate Relations & Communications; Senior Vice President, People & Culture; Senior Vice President, Corporate Business Development & Chief Risk Officer; and Senior Vice President, Chief Financial Officer.

The following information about OPG's Board of Directors and senior management is available at [www.opg.com/about](http://www.opg.com/about):

- Charters for the Board of Directors
- Charters for each Board committee
- Position description for the Chair of the Board
- Position descriptions for each Board Committee Chair
- Board Policy Statements
- Board Member and OPG Executive Team biographies
- List of OPG Officers

## Ethics and Integrity

OPG is committed to being an ethical and credible company in its relationships with employees, suppliers, and others with whom it does business. All business is to be conducted in accordance with the values of Safety, Integrity, Excellence, and People & Citizenship that are described in OPG's Code of Business Conduct. All OPG employees are expected to understand their obligations under the Code of Business Conduct.

OPG's Code of Business Conduct is available at [www.opg.com/about](http://www.opg.com/about).

## Managing Performance

OPG's Business Model defines the business controls, organization, programs, planning processes, and management system design principles used to operate OPG's business. This model provides assurance that OPG's commitments and obligations are resourced and managed.

Under OPG's Business Model, corporate targets from the OPG Business Plan are included in an annual Corporate Balanced Scorecard which is used to assess the company's overall performance. This scorecard includes indicators for safety, environment, reliability, financial performance, operating performance and project performance. Individual operating units and functions are also required to report their performance results each month. Performance targets are reinforced with management employees through an Annual Incentive Plan that links compensation to performance. In 2013, all key environmental and safety performance measures were at or better than target, but economic challenges were encountered from lower than planned production levels and net income.

Refer to Appendix B and Appendix C for detailed generation and sustainable development performance data.

## KEY SUSTAINABLE DEVELOPMENT PERFORMANCE MEASURES - 2013

Aspect	Performance Measure	Performance		Targets <sup>(1)</sup>	
		2012	2013	2013	2014
Environmental Compliance <sup>(2)</sup>	Significant Environmental Events	0	0	0	0
	Environmental Infractions	14	13	34	32
	Environmental Penalty Orders	3	1	N/A	N/A
	Category A Spills - Very Serious	0	0	0	0
	Category B Spills - Serious	0	0	0	0
	Category C Spills - Less Serious	9	9	22	19
Effluents - Thermal	Carbon Dioxide Emissions (gross teragrams)	4.5	3.2	11.5	N/A
	Acid Gas Emissions (total gross gigagrams)	16.2	14.8	236	N/A
Effluents - Nuclear	Tritium Emissions to Air (curies)	17,976	17,072	18,100	15,400
	Tritium Emissions to Water (curies)	11,211	11,164	14,000	13,050
	Carbon-14 Emissions to Air (curies)	76	73	130	115
Radiological Impact to Public	Dose to Public:				
	- Pickering Nuclear (microsieverts)	1.1	1.1	ALARA	ALARA
	- Darlington Nuclear (microsieverts)	0.6	0.6	ALARA	ALARA
Waste	Low and Intermediate Level Radioactive Waste Produced (cubic metres)	2,772	2,634	3,192	2,795
Occupational Safety	Accident Severity Rate (days lost per 200,000 hours)	2.40	0.94	N/A	N/A
	All Injury Rate (injuries per 200,000 hours)	0.63	0.61	0.89	0.89
Generation Performance	Electricity Production (terawatt-hours)	83.7 <sup>(3)</sup>	80.3	82.6	82.4
	Nuclear Unit Capability Factor (per cent)	86.1	78.6	84.3 <sup>(3)</sup>	86.4
	Hydroelectric Availability (per cent)	91.2	91.5	91.6	91.6
	Thermal Start Guarantee Rate (per cent)	97.5	98.0	94.0	N/A

(1) OPG sets annual targets to drive continual improvement. N/A = Not Applicable (no target). ALARA = As Low As Reasonably Achievable. Carbon Dioxide Emissions and Acid Gas Emissions will be removed as key performance measures in 2014 due to the end of coal-fired generation. Thermal Start Guarantee Rate will be replaced by Thermal Equivalent Forced Outage Rate in 2014.

(2) OPG self-determines and classifies its environmental events. Significant Environmental Events (e.g. significant regulatory non-compliances and spills) are determined by the President and CEO and may affect the corporate Annual Incentive Plan. Environmental Infractions are regulatory non-compliances that have moderate potential for regulatory action. Spills are categorized based on actual or potential impacts.

(3) Value restated from the 2012 Sustainable Development Report

# AWARDS AND RECOGNITION

OPG is proud to have received the following awards and recognition in 2013 for its environmental, social and economic programs.

1. OPG was named as one of the **Best 50 Corporate Citizens in Canada for 2013** by Corporate Knights. The ranking is based on performance indicators related to resource, employee and financial management. This distinction reflects OPG's commitment to environmental, social and community values.
2. OPG received the award for **Best Practices in Employer Support: Industry Category** from the Canadian Forces Liaison Council for employment support of Canadian Forces Primary Reservists. OPG received this award based on a nomination made by an OPG employee on behalf of the numerous soldiers working at OPG.
3. OPG was presented with the **Workplace Diversity Champion Award** and the **Emerging Leader Award** from Electricity Human Resources Canada. The Workplace Diversity Champion Award was presented to OPG for its overall diversity efforts. Brad Dennis from Pickering Nuclear received the Emerging Leader Award for his demonstration of leadership and performance.
4. OPG was presented with the Canadian Electricity Association's **Vice President's Award of Safety Excellence (Bronze)**. This award recognizes OPG's occupational health and safety achievement in the generation sector.
5. An employee from Pickering Nuclear and a group of employees from Otto Holden Generating Station were presented with Canadian Electricity Association **Lifesaving Awards** for events that occurred in 2012. Their swift actions helped to save the lives of fellow workers.
6. OPG's Fred Dermakar received the World Association of Nuclear Operators' **Nuclear Excellence Award**, which recognized his work in risk and safety management, both in the Canadian nuclear program and internationally through his work on the Fukushima project.



Senior Vice President People & Culture, Barb Keenan (second from left) accepted the Diversity Champion Award presented to OPG by Electricity Human Resources Canada.



Jeff Williamson from Pickering Nuclear (right) was presented with a Lifesaving Award for assisting a co-worker who had collapsed and stopped breathing. Photo courtesy of the Canadian Electricity Association.



Lifesaving Award winners from Otto Holden Generating Station were recognized for assisting an employee from another organization who suffered a serious electrical contact injury. Photo courtesy of the Canadian Electricity Association.



Jeff Hansen (centre) was very proud to receive a recognition award from the Simcoe and District Chamber of Commerce on behalf of OPG.



Mike Davidson (centre) received the 2013 Outstanding Implementer Award from the Construction Industry Institute.

*“Along with Hatch Mott MacDonald, STRABAG, Robbins, numerous subcontractors and hundreds of workers, OPG is honoured to receive the TAC award for our Niagara Tunnel Project. For the next one hundred years, the people of Ontario will benefit from the clean, renewable electricity generated by water the Niagara Tunnel delivers to our Sir Adam Beck hydro stations.”*

Rick Everdell, Niagara Tunnel Project Director

7. The Simcoe and District Chamber of Commerce presented Nanticoke Generating Station and its employees with a **Recognition Award** for service to the community, reliable electricity, outreach, environmental initiatives and safety over the last 40 years.

8. OPG received an Electric Power Research Institute **Environment Sector Technology Transfer Award** which recognized OPG’s role as part of an international team performing a test burn of wood pellets at a power plant in the United States. The project was part of OPG’s work to investigate the technical feasibility of using advanced biomass as an option to replace coal.

9. OPG’s Mike Davidson received the Construction Industry Institute’s 2013 **Outstanding Implementer Award** for adopting and implementing recognized construction industry best practices in more than 50 front-end project planning sessions within Hydro Thermal Operations and Nuclear Refurbishment.

10. OPG was honoured by the Tunnelling Association of Canada with their **Canadian Project of the Year Award** for the Niagara Tunnel project. The Niagara Tunnel construction was completed with a safety record twice as good as the industry average which was a remarkable achievement for a project of its complexity and size.



Rick Everdell (right) accepted the Tunnelling Association of Canada’s Canadian Project of the Year Award on behalf of OPG.

# ENVIRONMENT

## ENVIRONMENTAL MANAGEMENT SYSTEM

OPG has an environmental management system to ensure both negative and positive impacts on the environment are managed. This management system encompasses the processes OPG follows to meet its regulatory requirements and policy commitments. Structured environmental management systems have been in place at OPG's generating stations and waste management facilities for more than ten years.



Wetland at Lennox Generating Station

### Environmental Policy

OPG's commitment to the environment is described in its Environmental Policy. This policy commits OPG to meet all legal requirements and the environmental commitments that it makes, with the objective of exceeding legal requirements where it makes business sense. Through the policy, OPG also commits to:

- establish and maintain an environmental management system that conforms to the requirements of the International Organization for Standardization's ISO 14001 standard for environmental management systems;
- prevent or mitigate adverse effects on the environment with a long-term objective of continual improvement;
- support regional ecosystems and biodiversity;
- set environmental performance targets; and
- communicate environmental performance to stakeholders.

The success of OPG's environmental management system requires commitment from all levels and functions within the organization. The Environmental Policy establishes accountabilities for environmental management. OPG's senior leaders are accountable for the effective implementation of the environmental management system within their respective organizations. All employees are accountable for environmental performance and compliance within the scope of their accountabilities.

OPG's Environmental Policy is available at [www.opg.com/about](http://www.opg.com/about).

### Significant Environmental Aspects

OPG considers the following environmental aspects of its operations to be the most significant. These aspects are addressed as a priority by OPG's environmental management system.

- Carbon-14 emissions to air
- Chemical emissions to water
- Fish impingement and entrainment
- Electricity generation from low emission and renewable fuel sources

- Habitat alteration – loss and creation
- Low and intermediate level radioactive waste
- Spills
- Thermal emissions (waste heat) to water
- Tritium emissions to air, water and groundwater
- Water flow and level changes

### Environmental Performance

OPG achieved excellent environmental performance in 2013. There were no significant environmental events and performance was equal to or better than target for all key measures. Moreover, OPG's performance demonstrated improvement for the following indicators: Infractions, Tritium Emissions to Air, Carbon Dioxide Emissions, Acid Gas Emissions, and Low and Intermediate Level Radioactive Waste Produced.

All environmental performance targets for 2014 either remain unchanged from 2013 or have been revised where appropriate to promote improved performance.

## ENVIRONMENTAL COMPLIANCE

### Regulatory Infractions

OPG must comply with a large number of environmental requirements contained in statutes, regulations, bylaws, licenses, permits and approvals. OPG considers regulatory compliance to be a minimum, non-negotiable standard and strives to improve performance year over year.

OPG identified 13 environmental infractions in 2013, none of which had a significant impact on the environment or human health. All infractions were reported by OPG to the appropriate federal, provincial or municipal agencies as required. The majority of these infractions were related to water effluent monitoring program requirements. OPG reviews all infractions to learn from the events and takes corrective action to prevent recurrence. Trending and analysis of regulatory compliance is also conducted to identify opportunities for improvement.

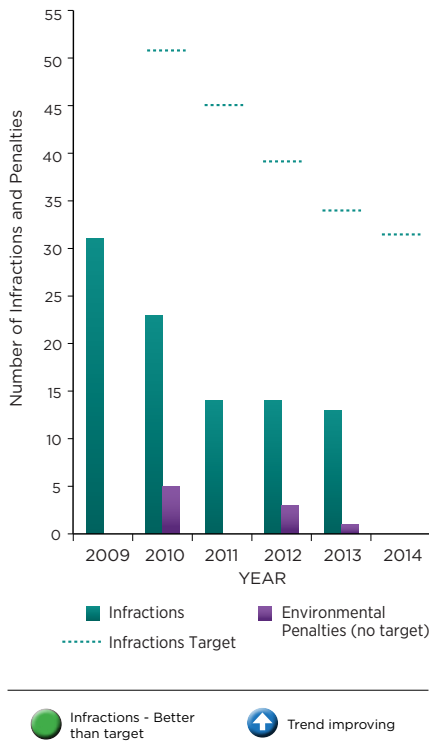
### ISO 14001 Registration

In 2013, OPG completed an initiative to consolidate its 15 environmental management systems into a single OPG-wide system under one ISO 14001 registration. This transition has improved alignment and consistency across the organization, streamlined the work required to maintain the environmental management system, and reduced costs.

OPG's Barbara Reuber (at left) and Tom Mitchell accept the certificate of registration for the OPG environmental management system from PricewaterhouseCoopers's Suzanne Onyschuk.



### Environmental Regulatory Infractions



Inspection of an oily water separator at Nanticoke Generating Station

In 2013, the Ontario Ministry of the Environment and Climate Change issued Darlington Nuclear an Environmental Penalty Order to pay \$1,625 for failing to meet a requirement of Ontario Regulation 215/95, *Effluent Monitoring and Effluent Limits - Electric Power Generation Sector*, in 2012. Consecutive weekly samples of the discharge from the station's radioactive liquid waste system were taken less than four days apart. Reductions in the penalty amount were granted because Darlington Nuclear has an environmental management system and corrective measures were promptly taken to revise sampling procedures. There was no adverse impact to the environment as a result of this contravention.

### Spills Management

OPG has extensive programs to ensure the risk of spills to the environment is effectively managed to acceptably low levels.

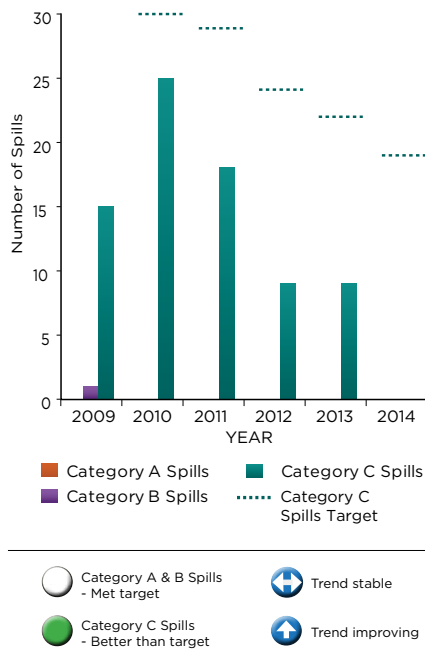
The focus of OPG's spill management program is prevention. Each site conducts assessments to evaluate the risk of spills and maintains processes for spill prevention. For example, past spill events are reviewed, releases are prevented through material management practices, and potential consequences from spills are minimized by selecting less hazardous materials where possible. Engineered and operational controls such as spill

containment structures, equipment and procedures are also used to reduce the likelihood of spills. When a spill does occur, emergency response processes are in place to minimize adverse impacts on the environment. OPG also has procedures to ensure its legal obligations to report spills to government agencies are met.

OPG classifies its spills that are reportable to a regulatory authority as Category A, B or C spills based on the actual or potential impacts. Category A spills are considered very serious due to the scale of injury or damage, health effects, or safety impairment. Category B spills are considered serious due to localized injury or impacts to property. Category C spills are all other reportable spills that are less serious than Category A and B spills. OPG's spill categories align with Ontario Ministry of the Environment and Climate Change regulatory requirements for the classification of contraventions.

OPG had no Category A or B spills in the past four years and the associated annual targets remain at zero. Overall, OPG's Category C spill performance has demonstrated continual improvement and performance has been better than target. In the past five years, the most frequent type of spill has been oil from equipment to water. OPG is preventing recurrence of these types of spills primarily by

### Spills to the Environment





Fish barrier net at Pickering Nuclear

increasing inspection or maintenance requirements. In 2013, increased focus was also placed on improving the reliability of water-oil heat exchangers at OPG's nuclear stations. Activities included the replacement of equipment and improvements to surveillance activities.

### Fish Protection

Electricity generating facilities can impact fish in a number of ways. The intake of water for cooling purposes at nuclear and thermal stations, and the flow of water through hydroelectric stations may result in fish impingement and entrainment. Physical barriers such as dams can also prevent the migration of fish.

OPG utilizes measures such as fish ladders, nets and deterring structures, stocking programs, trap and transport programs, water flow alterations, and habitat protection and creation to manage and mitigate these impacts. OPG also works cooperatively with its regulators, the scientific community, and partner utilities on matters related to fish and fish habitat.

In 2013:

- OPG continued to develop mitigation plans for lake sturgeon and American eel - two species identified under the provincial *Endangered Species Act* - for hydroelectric stations where these species may be impacted. A five-year action plan (2013-2017) for offsetting turbine mortality of

American eels at R.H. Saunders Generating Station was approved.

- OPG participated in an Electric Power Research Institute project that is investigating technologies for the safe downstream passage of eels at hydroelectric stations.
- A barrier net installed at Pickering Nuclear's water intake proved once again to be an effective fish diversion system. Monitoring results indicated that fish impingement was reduced by more than 90 per cent compared to impingement levels before the net was installed.
- OPG agreed to restore a section of a marsh to offset the impact of northern pike impingement at Pickering Nuclear.

### Land Assessment and Remediation

OPG has a program to assess and remediate historical contamination at its properties. This program is the voluntary continuation of a program that was initially established by Ontario Hydro in 1997 in response to a Director's Order from the Ontario Ministry of the Environment and Climate Change.

As of the end of 2013, remediation at 44 sites was complete and remediation was ongoing at seven sites. Remediation is planned for one additional site. Completion of the program is targeted for the end of 2017. The estimated present value of the assessment and remediation

plan is approximately \$9 million. This amount is fully reserved under OPG environmental and decommissioning provisions.

### Polychlorinated Biphenyls Management

Polychlorinated biphenyls, commonly known as PCBs, are synthetic compounds that were manufactured for use in industrial applications up to the late 1970s. Since then, actions have been taken to phase-out PCBs because of environmental and health concerns.

OPG eliminated its in-service high-level PCB equipment as required by federal legislation by the end of 2009. In 2013, OPG completed a multi-year project to remove several thousand out-of-service fluorescent light fixtures with PCB ballasts from Lambton Generating Station, Lennox Generating Station, Nanticoke Generating Station and Pickering Nuclear. These ballasts had been abandoned in place during lighting retrofits in the 1990s. As of the end of 2013, OPG had an estimated 14 tonnes of materials containing low-level concentrations of PCBs in service. These materials, along with remaining in-service PCB light ballasts, will be phased out by the end of 2025. Additional PCB materials may potentially be identified as equipment such as cables and bushings, whose PCB concentration cannot be determined without destructive testing, are removed from service.



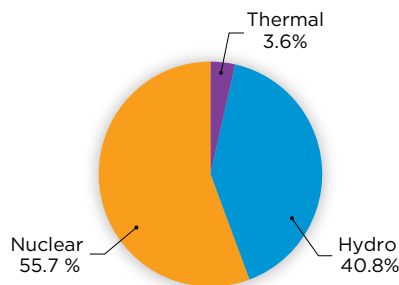
# ENVIRONMENTAL EMISSIONS

## End of Coal-fired Generation

In January 2013, the Ontario Ministry of Energy announced the shutdown of the remaining coal-fired units at the Lambton Generating Station and Nanticoke Generating Station by Dec. 31, 2013, in advance of the previous Dec. 31, 2014 deadline. The Lambton Generating Station stopped coal-fired electricity production in Sep. 2013. The Nanticoke Generating Station burned its last piece of coal on Dec. 31, 2013. The Lambton and Nanticoke generating units will be preserved so they can be converted to alternate fuels in the future, if required.

### OPG 2013 Generation Mix

Total Energy Generated = 80,290 GWh



By the end of 2013, nearly 100 per cent of the electricity produced by OPG came from nuclear and hydroelectric sources that are virtually free of climate change or smog causing emissions.

In 2013, air emissions of mercury, sulphur dioxide, nitrogen oxides and carbon dioxide from OPG's thermal

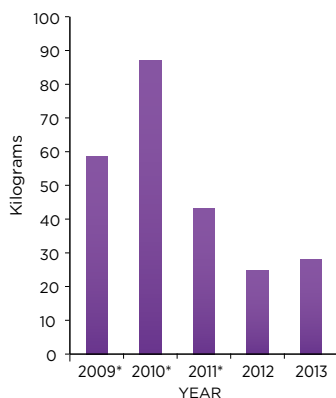
stations were lower than historical levels due to the low levels of required generation. The slight increases of mercury and sulphur dioxide emissions in 2013 over 2012 were due to higher amounts of mercury and sulphur in the coal burned.

## FAST FACTS

### Air Emissions

- ▶ OPG is Ontario's clean energy producer.
- ▶ Carbon dioxide emissions from fossil generation decreased to 3,190,396 tonnes in 2013 from 4,517,690 tonnes in 2012.
- ▶ Two companies will supply a total of 90,000 tonnes of biomass wood pellets per year to the Atikokan Generating Station.
- ▶ Electricity produced by burning biomass can reduce greenhouse gas emissions by 80 per cent, on average, compared to electricity produced by burning natural gas.

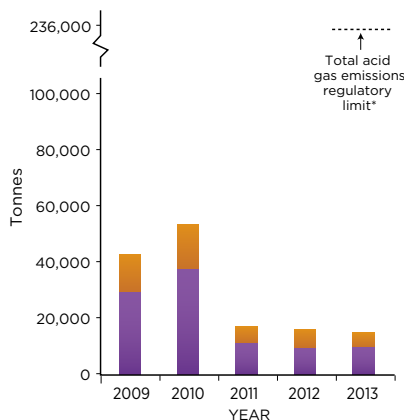
### Mercury Emissions



\* Value restated from the 2012 Sustainable Development Report

Trend variable

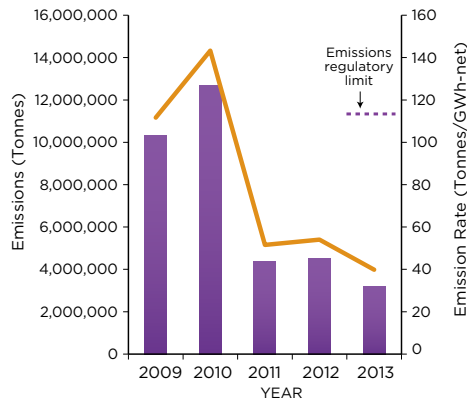
### Acid Gas Emissions



\* Value restated from the 2012 Sustainable Development Report

Better than target Trend improving

### Carbon Dioxide Emissions



\* Value restated from the 2012 Sustainable Development Report

Better than target Trend improving



Biomass storage silos at Atikokan Generating Station.

## Biomass - Conversion from Coal to Cleaner Fuel

### Atikokan Generating Station

Atikokan Generating Station's fuel source has been converted from coal to biomass in the form of wood pellets. OPG requires the wood-fibre to be sourced from sustainably managed forests. With over 200 megawatts of generating capacity, the plant is the largest 100 per cent biomass-fueled power plant in North America and generates renewable, dispatchable, peak capacity power. The project was completed in 2014.

More information about Atikokan Generating Station's biomass conversion project is available at [www.opg.com/generating-power](http://www.opg.com/generating-power).

### Thunder Bay Generating Station

In 2013, the Government of Ontario announced plans to convert Thunder Bay Generating Station from using coal as fuel to advanced biomass. Advanced biomass is a solid biomass fuel that has higher energy density and is hydrophobic (repels water), which allows it to be stored outside in a pile and withstand the elements. One unit at the station will be converted with an in-service capacity of 150 megawatts. Using advanced biomass to generate electricity is an exciting new area of development for the electricity industry and OPG is pleased to be at the forefront of this technology. The converted station is targeted to be operational in 2015.



Top: Testing for effects of outdoor storage on pellet quality. Bottom: OPG participated in a biomass test burn in the United States.

## Adapting to Climate Change

Historically the focus on climate change has been on mitigation. While still important, climate scientists have concluded the climate will change and weather extremes will occur as a result of natural and human activity and there is now an increased focus on adapting to the impacts.

During 2013, OPG continued its participation in climate change adaptation initiatives with municipal and regional governments, the Ministry of the Environment and Climate Change and the Ministry of Energy at the provincial level, and with Natural Resources Canada at the federal level. OPG is a member of both the greater-Toronto-based WeatherWise Partnership electrical sector core project team, and the Canadian Electricity Association Adaptation working group. In 2013, OPG recognized climate change adaptation as a strategic risk for the company.



Dust collectors at Atikokan Generating Station

OPG continues to work with Canadian Electricity Association member companies, non-government organizations, and government in a concerted effort to better define adaptation requirements through analysis and understanding of climate change impacts on watersheds and electricity supply and demand. Once these adaptation requirements are better known, a risk-based analysis will help OPG determine the extent of efforts it will undertake to reduce the impact of climate change on its operations.

### Radiation Monitoring

Very low levels of radioactivity are released to air and water as a result of operating OPG's nuclear reactors. Multiple systems are in place to minimize and control these releases, including dryers to remove tritium

vapour, ion exchange resins to remove Carbon-14, and air filters to remove particulate and radioiodine. In addition, emissions are minimized by careful plant operation, maintenance and routine emissions monitoring.

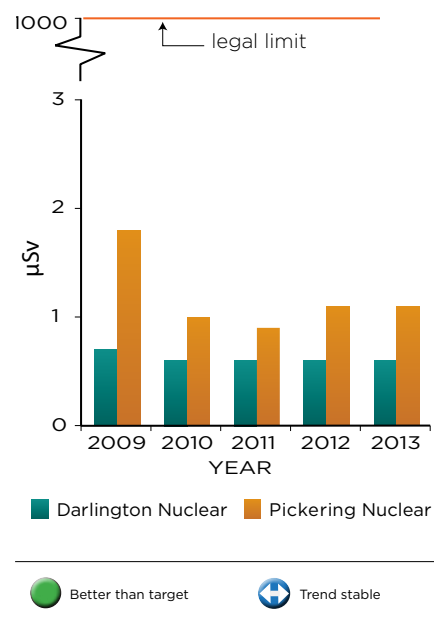
OPG maintains Environmental Monitoring Programs in the vicinity of Darlington Nuclear and Pickering Nuclear to assess the impacts resulting from operating these stations. For 2013, OPG expanded these programs to encompass protection of the public and the environment from hazardous substances and physical stressors, in addition to nuclear substances.

Radiation exposure to members of the public is estimated by assessing the impacts on "critical groups" of people who live near the nuclear generating stations. Dose calculations consider these groups' actual eating, drinking and living habits. This information is obtained through surveys and analysis of environmental samples taken from a variety of sources including air, lake water, fish, vegetables, milk, eggs and poultry. The group and age class with the highest dose is reported as the site public dose for the given year. Critical Group Dose is expressed in microsieverts ( $\mu\text{Sv}$ ) which is an international unit of radiation dose measurement.

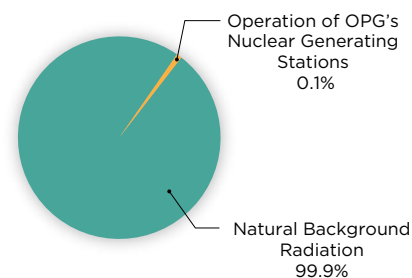
In 2013, the Critical Group Doses calculated for Darlington Nuclear and Pickering Nuclear were 0.6 and 1.1  $\mu\text{Sv}$  respectively. These doses continue to be a very small fraction of both the legal limit of 1,000  $\mu\text{Sv}$  per year and the estimated average background radiation dose around Darlington Nuclear and Pickering Nuclear of 1,400  $\mu\text{Sv}$  per year.

The complete 2013 Results of Environmental Monitoring Programs report is available at [www.opg.com/news-and-media](http://www.opg.com/news-and-media).

### Critical Group Dose



### Dose Source Comparison



## BIODIVERSITY AND HABITAT STEWARDSHIP

Every business and industry has effects on biodiversity either directly through habitat loss and fragmentation or indirectly through emissions to land, water and air.

OPG's biodiversity programs demonstrate that industry can and does have a role to play in conserving biodiversity. OPG considers habitat alteration to be a significant environmental aspect and recognizes its effects on nature do not stop at the boundaries of its sites, and nor do its efforts to protect and restore nature.

### Initiatives and Partnerships

OPG works with its community partners to support regional ecosystems and biodiversity through science-based habitat stewardship. Through these partnerships, OPG continues to demonstrate leadership and innovation in advancing biodiversity conservation in Ontario. OPG is also committed to managing its sites in a manner that strives to maintain, or enhance where it makes business sense, significant natural areas and associated species of concern.

OPG is the lead partner in the Lake Ontario Bring Back the Salmon program. This program is designed to help restore a self-sustaining Atlantic salmon population to Lake Ontario and its streams. The four components of the program include: fish production and stocking, water quality and habitat enhancement, outreach and education, and research and monitoring.

Through OPG's biodiversity program, woodland restoration projects are implemented in strategic locations across southern Ontario including the Carolinian forest, one of the most biologically imperiled regions in

## FAST FACTS

### Biodiversity Program

- ▶ Examples of OPG's biodiversity partners include: Bruce Trail Conservancy, Canadian Business and Biodiversity Council (CBBC), Earth Rangers, Local Enhancement and Appreciation of Forests (LEAF), Ontario Biodiversity Council, Ontario Nature, Rouge Park and Toronto Wildlife Centre.
- ▶ Supported by OPG, the Bring Back the Salmon program has stocked more than 61,000 one-year-old salmon between 2011-2013.
- ▶ In 2013, OPG celebrated planting the one-millionth tree with the Kettle Creek Conservation Authority.



Students release Atlantic salmon fry as part of the Bring Back the Salmon program

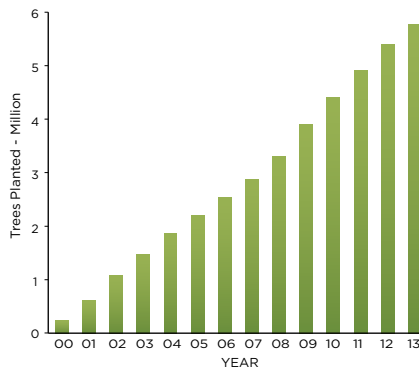
Canada. These plantings are targeted to expand key core forested areas and connect woodland patches to help promote the recovery of wildlife that are at risk in the heavily fragmented landscapes of southern Ontario. Sites are identified using regional scale natural heritage systems to achieve the greatest ecological and social value for the investment dollar.

In 2013, OPG through its conservation partners planted almost 400,000 native trees and shrubs, as well as approximately 1,135 kilograms of native seeds, on approximately 234 hectares of land. This brings the total plantings since 2000 to more than 5.7 million native trees and shrubs on over 2,700 hectares of land. This cumulative effort also addresses climate change adaptation and mitigation by enhancing the resiliency of woodland

ecosystems to withstand the effects of climate change while naturally sequestering carbon dioxide.

Additional information about OPG's biodiversity program is available at [www.opg.com/communities-and-partners](http://www.opg.com/communities-and-partners).

**OPG Cumulative Tree Planting**



Pride in Pickering event - making new homes for birds and toads



Wetland at Nanticoke Generating Station

### Ontario's Biodiversity Strategy

As a member of the Ontario Biodiversity Council, OPG supports *Ontario's Biodiversity Strategy, 2011* which highlights four strategic directions: engage people, improve knowledge, reduce threats and enhance resilience.

OPG is at the forefront in leading progress towards achieving *Ontario's Biodiversity Strategy*.

- OPG is a contributor to biodiversity education and awareness across Ontario through fostering various outreach programs, partnerships and contributing to scientific knowledge.
- OPG strives to minimize and mitigate adverse effects to biodiversity caused by operations.
- In addition to activities at its sites, OPG is a key contributor to habitat restoration and enhancing resilience of ecosystems across southern Ontario.

### Biodiversity Program Recognition

OPG continues to receive certification and recognition from the Wildlife Habitat Council for biodiversity programs at its sites. The Wildlife Habitat Council is a non-profit, non-lobbying group of corporations, conservation organizations and individuals dedicated to restoring and enhancing wildlife habitat. The Council's certification process helps ensure OPG's biodiversity programs remain dynamic and demonstrate continual improvement.

- OPG has 13 **Wildlife at Work** certifications. Wildlife at Work programs emphasize community involvement in projects that create, conserve and restore wildlife habitats on corporate lands.
- Six OPG sites are **Corporate Lands for Learning** certified for their educational and outreach programs.

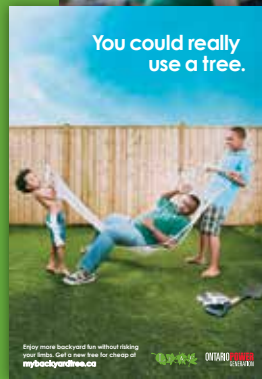
- In 2013, Nanticoke Generating Station was nominated for the prestigious Corporate Habitat of the Year award which recognizes outstanding environmental stewardship and voluntary employee efforts. Nanticoke was also a finalist in the Wings over Wetlands and the Prairies for Tomorrow award categories which recognize exceptional wetland stewardship and prairie restoration projects.

Additional information regarding the Wildlife Habitat Council is available at [www.wildlifehc.org](http://www.wildlifehc.org).

## BIODIVERSITY PARTNERSHIP PROFILES - 2013

### LEAF (Local Enhancement and Appreciation of Forests)

Did you know that healthy trees planted in urban environments provide numerous environmental, economic and social benefits to residents? For example, trees planted in urban areas can result in energy conservation savings for homeowners, provide habitat for biodiversity, improve air quality, and can help to mitigate climate change through carbon sequestration. LEAF is dedicated to the protection and improvement of the urban forest. OPG supports LEAF's Backyard Tree Planting Program as well as their educational programs including tree tours, public presentations and workshops.



**Urban Forest Demonstration Garden Event.**  
Photo courtesy of LEAF / Mike Barlas 2014



**Blanding's Turtle**

### EARTH RANGERS

OPG has been a proud sponsor of Earth Rangers since 2011. From supporting its signature school programs to protect the spotted turtle, the American badger and the Blanding's turtle, to sponsoring shows at Ontario Place and the Royal Ontario Museum (ROM), OPG and Earth Rangers share a common goal – to bring awareness of the importance of biodiversity. This message parallels OPG's commitment at all its site operations and Earth Rangers helps OPG carry that message to its young audience.



Photo courtesy of Essex Region Conservation Authority

### ESSEX CHATHAM-KENT NATURAL AREAS RESTORATION PROGRAM

Since 2009, OPG has supported the Essex Chatham-Kent Natural Areas Restoration Program's efforts to enhance landscape ecological function through woodland restoration. This restoration work is located within the Carolinian Life Zone of southwestern Ontario, a region of great species diversity yet it is also one of the most heavily developed and populated areas of Canada. In 2013, OPG supported planting 108,490 native trees and shrubs on 64.4 hectares. This work was completed by the Lower Thames Valley, St. Clair Region and Essex Region Conservation Authorities. Restoration sites were targeted because they enhance the existing natural heritage system by enlarging or linking existing features and corridors.

# WASTE MANAGEMENT

## Low and Intermediate Level Radioactive Waste

Low and intermediate level radioactive waste (LILRW) is produced during routine operations at nuclear facilities. LILRW includes products and components used in the reactor building that may have collected some radiation. Low level waste consists of minimally radioactive materials such as mop heads, rags, floor sweepings and protective clothing. Intermediate level waste consists mostly of resins, filters and used reactor components. OPG's LILRW is safely transported to and stored at its waste management facility located at the Bruce nuclear site in Kincardine, Ontario.

Key strategies for minimizing waste include segregating waste, decontaminating and/or re-using items, and minimizing what is taken into radioactive work areas. While OPG strives to minimize the production of waste and improve its performance, the number and scope of maintenance outages and projects can increase the amount of waste generated even when the work is carefully planned.

In 2013, the volume of LILRW produced was better than target and Pickering Nuclear achieved its best performance since 1983. A new performance measure was also introduced for 2014 to track the amount of LILRW being produced that cannot be incinerated or compacted to drive volume reductions.



Western Waste Management Facility

## FAST FACTS

### Waste

- ▶ OPG has safely transported, processed and stored its nuclear waste for more than 40 years.
- ▶ OPG's proposed deep geologic repository facility would manage about 200,000 cubic metres of low and intermediate level radioactive waste.
- ▶ 87 per cent (164,778 tonnes) of ash and gypsum from coal-fired stations was recycled in 2013.
- ▶ 329 tonnes of solid hazardous waste and 1,175 kilolitres of liquid hazardous waste were generated in 2013.

More information about nuclear waste management is available at [www.opg.com/generating-power](http://www.opg.com/generating-power).

### Deep Geologic Repository

OPG is working to make sure Ontario has a safe, permanent solution to manage nuclear waste. One aspect of this work has been developing a safe place to store LILRW. OPG has proposed to construct and operate a deep geologic repository (DGR) on its existing Bruce nuclear site that would safely isolate LILRW 680 metres below ground, in 450 million year-old, stable rock formations.

Only LILRW from OPG-owned or operated nuclear generating stations in Ontario will be accepted in the DGR. Much of the waste is already being stored at OPG's Western Waste Management Facility. Used nuclear fuel will not be stored or managed in the DGR.

In 2013, federal Joint Review Panel hearings for the DGR project were hosted in Kincardine and Saugeen Shores. The hearings provided opportunities for interested parties to participate in the review of the Environmental Impact Statement and licensing documentation for the project. Over the course of 25 days, the Joint Review Panel heard numerous presentations from OPG, the Canadian Nuclear Safety Commission, and

federal and provincial agencies on the safety and environmental protection case for the project. Over 200 presentations were made by members of the community and intervenors.

Additional public hearing days were held in 2014. This gave participants, OPG and the Canadian Nuclear Safety Commission the opportunity to provide their views in relation to the subjects of the information requests issued by the panel since November 2013.

More information about the DGR project is available at [opgdgr.com](http://opgdgr.com) and [www.opg.com/generating-power](http://www.opg.com/generating-power).

### Long-term Management of Nuclear Fuel

The Nuclear Waste Management Organization (NWMO) was established in 2002 by Canada's nuclear power plant owners, including OPG, to develop and implement a management approach for the long-term care of Canada's used nuclear fuel. In 2007, the NWMO began implementing Adaptive Phased Management which is the plan to contain and isolate used nuclear fuel in a deep repository constructed in a suitable rock formation in an informed and willing community. The plan will be implemented over many years through a process of phased and adaptive decision-making.



Details regarding the NWMO's strategic plan for implementing Adaptive Phased Management are available at [www.nwmo.ca](http://www.nwmo.ca).

### Hazardous Waste

OPG has programs in place to manage its hazardous waste in accordance with provincial and federal regulations. OPG's hazardous wastes include items such as oils and lubricants, solvents, batteries, paint and laboratory chemicals. To the extent practical, OPG attempts to minimize the amount of hazardous waste generated and employs reuse and recycling programs when the generation of waste cannot be avoided.

## RESOURCE USE

### Energy Efficiency

OPG has made steady progress in improving its internal energy efficiency since 1994. The annualized energy savings over this period have been 2,507 gigawatt-hours, saving both money and avoiding greenhouse gas emissions (2,805,179 tonnes of carbon dioxide). In 2013, ongoing equipment efficiency upgrades accounted for an incremental saving of 13.9 gigawatt-hours/year.

### Water Use and Conservation

OPG relies on the flow of waterways to generate clean renewable power at its hydroelectric stations. To ensure this valuable resource is used wisely, OPG undertakes regular assessments of its hydroelectric dams, powerhouses and associated facilities to detect and repair any water leaks and to identify opportunities to update equipment and fixtures to reduce water usage.

OPG incorporates natural vegetation at a number of sites to reduce the amount of watering required.

Tips and ideas on developing water conservation initiatives for communities, homes and businesses can be found at the following websites:

## FAST FACTS

### Resource Use

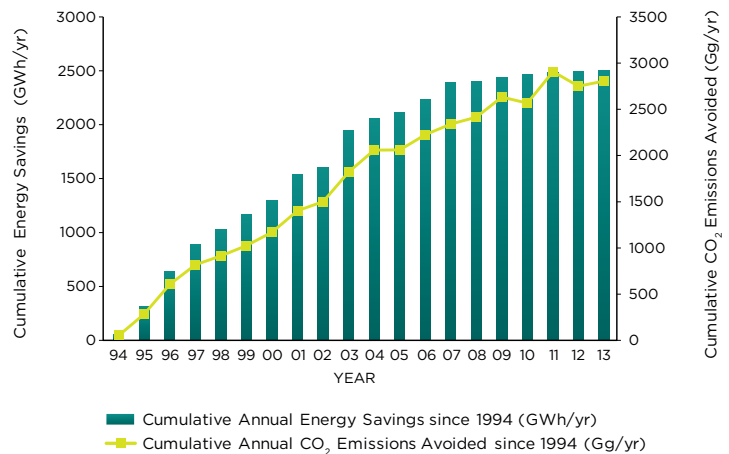
**Water Use** - Water is principally used by OPG in two ways:

- ▶ Flows through hydroelectric turbines: 443,998 million m<sup>3</sup> (2013)
- ▶ Flows through cooling and service water systems at nuclear and thermal stations: 9,785 million m<sup>3</sup> (2013)

**New Building Construction** - Darlington Energy Complex:

- ▶ Achieved LEED® Gold Certification.
- ▶ Used 36 per cent recycled materials.
- ▶ Used 88 per cent Forest Stewardship Council certified wood.
- ▶ Installed low-flow water fixtures that use 36 per cent less water than conventional fixtures.
- ▶ Installed an energy efficient R-35 roof which exceeds building code requirements.

**Cumulative Energy and Carbon Dioxide Emissions Savings**



**Cumulative Annual CO<sub>2</sub> Emissions Avoided** in a given year is the product of the cumulative energy savings and OPG's CO<sub>2</sub> emission rate for its Thermal operations that year. Annual emission rates fluctuate depending on plant capacity factor and efficiency.

- Environment Canada – Wise Water Use: [www.ec.gc.ca/eau-water](http://www.ec.gc.ca/eau-water)
- Ontario Ministry of the Environment and Climate Change – Great Lakes Strategy: [www.ontario.ca/ministry-environment](http://www.ontario.ca/ministry-environment)
- Ontario Ministry of Natural Resources and Forestry – Water: [www.ontario.ca/ministry-natural-resources-forestry](http://www.ontario.ca/ministry-natural-resources-forestry)

## Sustainable Building Construction

OPG is proud to have been awarded LEED® (Leadership in Energy and Environmental Design) Gold Certifications by the Canada Green Building Council in 2013 for two of its buildings. LEED® is a third-party certification program and an internationally accepted benchmark for the design, construction, and operation of high performance green buildings.

### St. Lawrence Power Development Visitor Centre

To achieve LEED® Gold for the St. Lawrence Power Development Visitor Centre, OPG ensured efficiency and environmental sustainability were incorporated into the facility's design and construction. Decisions included selecting a sustainable site, recycling construction material, and using ground source heat, which pumps heat to and from the ground. Additionally, the Visitor Centre is accessible by bike paths and equipped with bike racks and electric vehicle charging stations.

### Darlington Energy Complex

Construction of the Darlington Energy Complex was completed in 2013 and this 29,747 square-metre, multi-purpose facility includes a security processing centre, a public information centre, a warehouse, offices, and a training facility. The initial goal of the project was to attain LEED® Silver, but when the building was completed it achieved LEED® Gold. The following list includes just some of the measures that were incorporated into the project:

- High efficiency chillers and boilers
- Heat recovery on ventilation air
- Highly recycled and regional materials selection
- Low emitting construction products and office furniture
- Indoor air quality testing and enhanced air filtration



St. Lawrence Power Development Visitor Centre located in Cornwall, Ontario.



Darlington Energy Complex located in Courtice, Ontario.

- Green housekeeping plan
- Low flow plumbing fixtures
- Native, drought resistant landscaping that includes a butterfly garden
- Electric vehicle charging stations
- Stormwater management ponds that collect and treat rainwater while providing habitat

# SOCIAL

OPG's core values of Safety, Integrity, Excellence, and People & Citizenship guide OPG's commitments to safety and wellness, fostering positive relationships with stakeholders, giving back to the communities in which it operates, and fair labour practices.



Darlington Nuclear's Tuesdays on the Trail - Monarchs and Insects event

## HEALTH AND SAFETY

### Employee Safety

OPG's health and safety management system has been developed to ensure employees are protected from workplace hazards through the effective development and implementation of health and safety plans, procedures, monitoring processes and continuous improvement activities.

In 2013, OPG combined its existing local health and safety management systems into a single corporate system. In consolidating its health and safety governance, OPG drew on best practices within the company to establish consistently high standards for performance that will allow it to meet regulatory and corporate requirements effectively and efficiently.

OPG improved on its 2012 safety performance in 2013, achieving an All Injury Rate (AIR) of 0.61 and an Accident Severity Rate (ASR) of 0.94. AIR performance in 2013 was OPG's second best performance since the company's inception in 1999. ASR performance in 2013 was OPG's best ever.

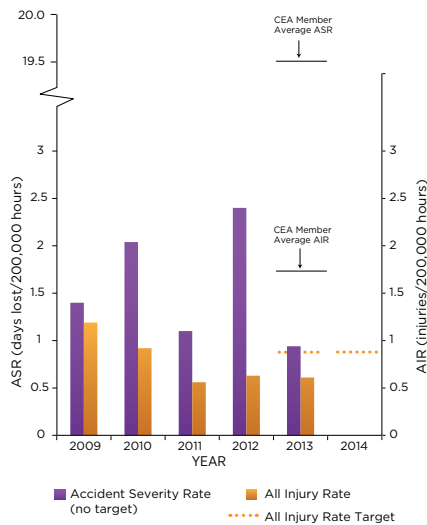
OPG benchmarks its safety performance against utilities across Canada through the Canadian Electricity Association. In 2013, OPG was awarded a Canadian Electricity Association Vice President's Award for achieving top quartile performance in both ASR and AIR among comparable Canadian electricity generators in 2012.

Of concern in 2013, was the number of near-miss incidents which increased over 2012. A corporate-wide program has been launched to improve safety by heightening situational awareness. Situational awareness means having an accurate understanding of conditions while working - it requires recognizing hazards, anticipating changes and taking action.



OPG representatives Mike Martelli, Greg Jackson and Wayne Robbins accepted an award for safety excellence from the Canadian Electricity Association on behalf of OPG. Photo courtesy of the Canadian Electricity Association.

### Occupational Safety



● All Injury Rate - Better than target
 ↑ Trend improving

### Employee Health

OPG's health promotion programs provide employees with education and resources that empower them to manage their overall health in order to be productive, engaged employees with fewer workplace accidents and absences.

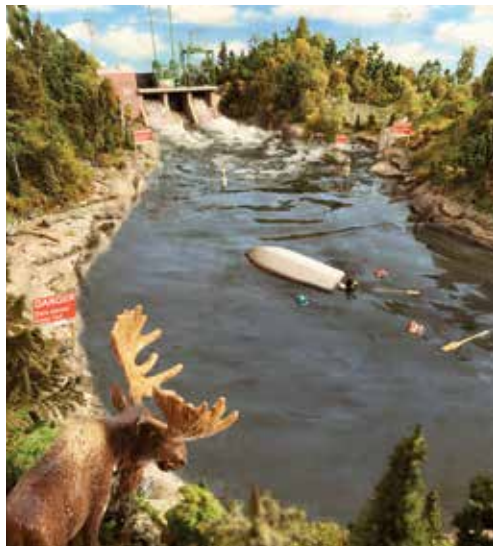
OPG has an integrated disability management process that offers a skilled and experienced network of health professionals and an infrastructure to provide objective and consistent case management services. This process supports employees' safe and timely return to work.

OPG's Employee and Family Assistance Program offers immediate confidential support to solve life problems and challenges. Employees and family members can receive support over the phone, in person, online or through a variety of issue-based health and wellness resources. A home mail-out package promoting Employee and Family Assistance Program services was sent to all employees in June 2013.

### Public Safety on Waterways

OPG staff work closely with partners in site communities to help ensure public safety around OPG's dams and hydroelectric stations. In partnership with the Ontario Provincial Police, OPG continues its water safety outreach program to inform the public about the potential for rapid and dangerous changes in water levels and flows. Fast moving water can create turbulence and strong undercurrents.

Safety messages are broadly communicated to the public on television and radio, online, and in newspaper and magazine advertisements, as well as through brochures and DVDs. OPG's message remains Stay Clear Stay Safe. To order a free copy of OPG's water safety DVD, e-mail your mailing address to [watersafety@opg.com](mailto:watersafety@opg.com).



## IGNORE THE WARNING SIGNS AND THIS COULD BE FOR REAL.

Watch for the warning signs and don't fish or swim near dams and hydroelectric stations. Water levels rise rapidly and currents can become deadly in seconds.

[stayclearstaysafe.ca](http://stayclearstaysafe.ca)



**ONTARIO POWER**  
GENERATION



IGNORE THE WARNING SIGNS AND THIS COULD BE FOR REAL.

Watch for the warning signs and don't swim, walk or cross country ski near dams and hydroelectric stations. The ice nearby can be thin and dangerous.

[stayclearstaysafe.ca](http://stayclearstaysafe.ca)



**ONTARIO POWER**  
GENERATION

OPG's water safety campaigns warn of dangers around hydroelectric sites

### Fukushima Response

In response to the events that occurred at the Fukushima Daiichi Nuclear Power Plant in 2011, OPG has implemented additional safety enhancements at its nuclear sites to ensure diverse and flexible response to highly unlikely events initiated by external hazards and severe accidents. For example:

- Flood barriers have been installed around essential systems.
- Portable emergency mitigation equipment was purchased to provide backup electrical power and cooling capability if an extreme event disables multiple power and cooling systems at each reactor.
- Severe accident guidance and procedures have been developed and upgraded.
- Emergency drills and exercises at Darlington Nuclear and Pickering Nuclear have been carried out to practice new procedures and the deployment of the emergency mitigation equipment.

OPG has been recognized as a leader in responding to the lessons learned from the Fukushima event. OPG's interactions with Canadian and American utilities continue to give a larger perspective and experience base.

In 2013, the following accomplishments were achieved:

- OPG completed a systematic review and verification of defences against external hazards and confirmed that its stations are safe and systems and procedures are in place to withstand significant emergencies.
- Along with two other Canadian nuclear utilities, OPG's Chief Nuclear Officer agreed to a new set of Principles for Beyond Design Basis Events. These principles provide guidance for utility decision-making to maintain consistency and to practically eliminate the potential for societal disruption due to a nuclear incident.
- OPG submitted action plans to the Canadian Nuclear Safety Commission and the World Association of Nuclear Operators to address actions items and recommendations from the Fukushima event that are applicable to OPG.

“ I realize that Fukushima is one of those watershed events that not only significantly changes the way our industry looks at nuclear safety. Equally important, it's also changing how the public looks at nuclear safety...

Which is why it is so important:

- to keep listening to our publics;
- to keep being aware of their concerns;
- to stay flexible and prepared;
- to be humble and continue to acknowledge our flaws.

And above all, to be ready to act, adapt and change. ”

Tom Mitchell, President and CEO

Additional information about OPG's response to Fukushima, nuclear safety and emergency preparedness is available at [www.opg.com/about](http://www.opg.com/about).

# TRAINING AND DEVELOPMENT

## Employee Training

OPG continues to focus on improving the capability of its workforce through its extensive internal training infrastructure, succession planning, leadership development, and knowledge retention programs. In addition, OPG relies on partnerships with government agencies, other electrical industry partners, and educational institutions for workers to meet the required level of qualification.

In 2013, OPG took an innovative approach to nuclear training to ensure certainty on the schedule and cost of the upcoming Darlington refurbishment by constructing a training centre and tool testing facility within the Darlington Energy Complex. This training center includes a full-scale, non-functioning mock-up reactor that accurately represents the size and space within the real reactor vaults. Workers will be trained and tested on the challenges, constraints and potential hazards they may face when executing work at the reactor face. Specialized tooling will also be tested and the work practised to determine the correct time and precise sequence needed for executing each refurbishment activity.

## Educational Outreach and Recruitment

Despite the decline in the number of full-time regular jobs filled in recent years, OPG continues to seek out opportunities to promote skilled trades and engineering in order to build the workforce of the future. Specifically, OPG engages in a number of initiatives to encourage youth to pursue studies in math and sciences which include:

- **Participating in events** to encourage youth to pursue skilled trades through hands-on demonstrations and by meeting OPG staff engaged in large construction projects.

## FAST FACTS

### Employment in 2013

- ▶ Approximately 10,270 full-time employees and 800 seasonal, casual construction, contract and non-regular staff.
- ▶ Approximately 6,000 OPG employees were represented by the Power Workers' Union.
- ▶ Approximately 3,200 OPG employees were represented by the Society of Energy Professionals.
- ▶ 4.8 per cent annual staff turnover due to retirement.
- ▶ 6.0 per cent annual staff turnover due to attrition.
- ▶ 68 external hires.
- ▶ 38 per cent employees eligible to retire in the next 5 years.
- ▶ 54 per cent employees eligible to retire in the next 10 years.



Reactor mock-up at the Darlington Energy Complex training facility



Strategies to transfer knowledge are critical to OPG's success

- **Offering awards and scholarships** at the post secondary and secondary levels.
- **Partnering with various colleges and universities** through participation in curriculum advisory committees.
- **Participating in various conferences, speakers' panels and networking events** targeted to promote learning about the electricity industry among both students and experienced professionals including members of employment equity designated groups.
- **Offering free resource kits** to Ontario teachers to help teach electrical energy and electricity generation to students in grades one, six and nine. Refer to [www.opg.com/communities-and-partners](http://www.opg.com/communities-and-partners) for more details.

OPG continues to partner with First Nations groups to foster potential employment and training opportunities on new projects with our construction partners. In addition, OPG seeks opportunities to provide internship and temporary placements to members of designated groups where possible.

For information about work opportunities at OPG refer to [www.mypowercareer.com](http://www.mypowercareer.com).

## DIVERSITY AND EQUITY

OPG's diversity program has evolved over the past number of years and OPG is proud of the following accomplishments in 2013:

- OPG was recognized with the Workplace Diversity Champion Award from Electricity Human Resources Canada.
- OPG's Senior Vice President, People & Culture was recognized as a Canadian Diversity Champion by the Women of Influence organization.
- OPG was recognized by the Toronto Region Immigrant Employment Council for demonstrating a strong commitment to reconnecting skilled immigrants to their career paths in Canada through mentorship.
- OPG provided mentorship and internship opportunities to students in the Licensing International Engineers into the Profession (LIEP)

program at the University of Toronto. This innovative program prepares new immigrants to obtain their P.Eng. designation while participating in hands-on engineering internships.

- OPG's Northwest Plant Group launched a mental health initiative designed to build an integrated, sustainable program to increase awareness and understanding of mental health issues and reduce the fear of discrimination associated with mental health.
- Through its Corporate Citizenship Program, OPG provided support to non-profit groups that assist people with disabilities. These include: Abilities Centre, WindReach Farms, Friends of the Disabled, George Jeffrey Children's Centre, Grandview Children's Centre, Special Olympics Ontario, Sports for the Disabled, and Pathways Health Centre.
- OPG participated in a groundbreaking study that focused on how to better encourage women to pursue skilled trades and engineering in the electricity sector.
- OPG continued to partner with local colleges to provide work placement opportunity for Métis, First Nation or Inuit students from the Technology Foundation Training Program in pursuit of a career in Ontario's energy sector.

### Representation of Designated Groups by Employment Equity Occupational Groups

Employment Equity Occupational Group	Designated Groups	Representation as of Dec. 31, 2012		Representation as of Dec. 31, 2013	
		Number	Per cent	Number	Per cent
<b>Senior Managers</b> e.g. Chairman, President and CEO, Executive Vice Presidents, and Senior Vice Presidents	Women	1	5.6	1	5.9
	Visible Minorities	1	5.6	0	0
	Aboriginal Peoples	0	0	0	0
	Persons with Disabilities	0	0	0	0
<b>Middle and Other Managers</b> e.g. Vice Presidents, Directors, Section/Project/Shift Managers, Managers, Project Leaders, etc.	Women	219	19.4	210	19.7
	Visible Minorities	200	17.7	188	17.7
	Aboriginal Peoples	8	0.7	9	0.8
	Persons with Disabilities	23	2.0	16	1.5

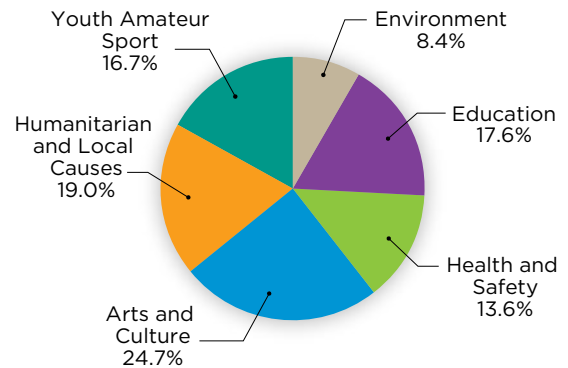
## CORPORATE CITIZENSHIP

OPG's Corporate Citizenship Program provides community investment support to the focus areas of environment, education and community, as well as First Nations and Métis initiatives.

In 2013, OPG supported more than 1,100 small grassroots charitable/not-for-profit initiatives, including about 250 student awards across OPG site communities. With average annual contributions totalling \$2.5 million, approximately 80 per cent of OPG's investments are between \$100 and \$2,500. While OPG believes community investment is essential to being a good corporate citizen, OPG is always mindful of the need to ensure each dollar invested leverages good value for the community.

Featured here is a sample of the valuable work carried out by OPG's many partners in 2013. It is the effort of these partners that helps make Ontario's communities stronger, healthier and more sustainable.

**2013 Corporate Citizenship Program  
Community Investment by Focus Area**



## CORPORATE CITIZENSHIP PARTNERSHIP PROFILES - 2013

### EDUCATION

OPG invests in the energy sector leaders of tomorrow by supporting educational programs and student awards that foster an interest in STEM (science, technology & trades, engineering and maths).

As a Founding Partner of FIRST Robotics Canada, OPG and its employees are proud to support and mentor school robotics teams in Ontario. Kaley Bibic from Kingston Ontario's W.A.F.F.L.E.S. robotics team (proudly supported by OPG's Lennox Generating Station) was one of only 10 students out of 10,000 at the 2013 FIRST world championship in St. Louis, Missouri to be named as a Dean's List winner for her outstanding accomplishments. Kaley was presented her award by entertainer and FIRST supporter, will.i.am. To learn more visit: [www.firstroboticscanada.org](http://www.firstroboticscanada.org) or [www.usfirst.org](http://www.usfirst.org)



Fostering Innovation in Youth

### ARTS AND CULTURE

The OPG Winter Festival of Lights in Niagara Falls is one of Niagara Region's premier events and is recognized as one of the Top 100 Events in North America. The festival, which runs from November to January each year, attracts over 1.5 million people and features more than 120 animated displays and millions of sparkling lights within the Niagara Parks Winter Wonderland and city tourist districts. Support of the festival is a natural fit for OPG given the company's historical ties to the City of Niagara Falls and to hydroelectric generation along the Niagara River. To learn more visit: [www.wfol.com](http://www.wfol.com)



OPG Powers the Winter Festival of Lights



## ENVIRONMENT

OPG invests in partnerships that help support healthier communities and a healthier environment through environmental education, wildlife and habitat restoration, biodiversity protection and recycling.

In 2013, OPG's Darlington and Pickering nuclear employees partnered with the Get to Know program, which encourages young people to connect with nature, celebrate their commitment to the environment and create art (the three Cs). The Durham program launch was held at Thicksen Woods in Whitby. Through this innovative program, young people learn about the importance of sustainability and biodiversity in their communities, and they are empowered through knowledge and creativity to become environmental guardians. To learn more visit: [www.get-to-know.org](http://www.get-to-know.org)



Getting to Know Nature

## HEALTH AND SAFETY

OPG invests in health and safety, arts and culture, humanitarian and local causes, and youth amateur sports initiatives to help enhance quality of life for our host community residents.

In 2013, OPG partnered with the Advanced Coronary Treatment (ACT) High School CPR and Defibrillator Training Program. The program's Durham launch (pictured here) drew representatives from ACT, OPG and other partner organizations – as well as students from the Donald A. Wilson Secondary School. Students were trained to recognize and respond to developing medical emergencies and how to use an automated external defibrillator (AED). To-date, 25 Durham high schools have implemented the program for a total of 7,000 students trained in CPR and defibrillator use. OPG has also partnered with ACT to help deliver the program in Atikokan, Kenora, Red Lake, Sarnia, and Wallaceburg. Schools receive mannequins and defibrillator training units and an AED. To learn more visit: [www.actfoundation.ca](http://www.actfoundation.ca)



Students Learn Lifesaving Skills



Little "NHL'ers" Celebrate 42 Years

## FIRST NATIONS AND MÉTIS COMMUNITIES

In 2013, OPG supported First Nations and Métis initiatives in the areas of education, environment and community. Partner organizations included: First Nations, Métis Nation of Ontario, Nishnawbe Aski Development Fund, the Anishinabek Nation 7th Generation Charity, Frontier College, Indspire, Native North American Travelling College, Friendship Centres, and the Little Native Hockey League.

In March 2013, more than 3,600 First Nation youth participated in the 42nd Annual Little Native Hockey League (Little NHL) Tournament in Mississauga hosted by the Six Nations Minor Hockey Association. Since 1971, the league has grown to 153 teams from 61 First Nation communities. OPG is proud to support the development of youth through sporting initiatives like the Little NHL.

OPG's Joe Heil, Director, First Nations & Métis Relations, dropped the ceremonial puck at the 2013 Little NHL Pee-Wee Division "A" Championship game between the Moose Factory Thunder Chiefs and the Curve Lake Screaming Eagles (pictured here). To learn more visit: [www.lnhl.ca](http://www.lnhl.ca)

## FIRST NATIONS AND MÉTIS RELATIONS

OPG is committed to building and growing mutually beneficial working relationships with First Nations and Métis communities near OPG's current and future operations. These relationships are established and maintained through ongoing dialogue aimed at preserving openness, transparency and trust. They are also developed on a foundation of respect for languages, customs, cultural institutions and rights.

In an effort to enhance its relationships with First Nations and Métis people in Ontario, OPG has adopted a formal framework to assess and resolve, where appropriate, historical past grievances that are proximate to OPG facilities with respect to past construction and operation. Since 1992, 20 past grievance settlements have been reached with First Nations communities.

### First Nations and Métis Relations Policy

OPG's First Nations and Métis Relations Policy describes the company's commitment to engage in community relations and outreach, and to provide capacity building support, including employment and business contracting opportunities.

The policy guides OPG's work with more than 50 First Nations and Métis communities on numerous projects and



OPG and its partner Coral Rapids Power are moving forward to construct a hydroelectric generating station on New Post Creek.



John Jonassen and Amanda Stanger were recipients of the 2013 John Wesley Beaver Memorial award for their outstanding community involvement and academic achievement.

partnerships. OPG holds information and update sessions annually in many Aboriginal communities providing an opportunity to share knowledge, discuss development initiatives and review planned project activities. In 2013, OPG continued to develop relationships with First Nations and Métis communities including:

- Continued discussions with Saugeen Ojibway Nation on the proposed deep geologic repository at the Bruce nuclear site.
- Information sharing sessions with the Williams Treaty First Nations on nuclear operations and Darlington refurbishment.

OPG's First Nations and Métis Relations Policy is available at [www.opg.com/about](http://www.opg.com/about).

### Growing Partnerships

OPG continues to pursue prospective economic partnerships with First Nations and Métis communities that will provide for long-term commercial arrangements and respect the evolving relationship between First Nations and Métis peoples and broader society. Underscoring this work is OPG's acknowledgement of the inherent Aboriginal and Treaty rights of First Nations and Métis communities. This

remains an important aspect of the company's generation development program.

OPG's partnership ventures are seen by many to be great examples of best practice. In 2013, work continued on OPG's existing ventures involving Lac Seul First Nation, Moose Cree First Nation, and Taykwa Tagamou Nation. In addition, discussions continued with a number of First Nation communities regarding potential development projects in the Lake Nipigon area and other parts of the North.

### Community Relations and Outreach

OPG's Corporate Citizenship Program supported 90 requests from First Nations and Métis communities across the province. Support was provided for a variety of cultural, educational, fundraising, and youth and sporting activities including:

- Canadian Aboriginal Festival
- Indspire Awards (formerly National Aboriginal Achievement Awards)
- John Wesley Beaver Educational Awards
- Lieutenant Governor's Aboriginal Youth Reading Camp Program

## Building Capacity

OPG's Lower Mattagami River project has created over 450 person years of construction employment for First Nations and Métis communities. This is more than double the initial target of 200 person years.

Development projects allow OPG to provide opportunities to support capacity building for Aboriginal people by helping identify and address barriers to employment and contracting. The Sibi training and employment initiative, now in its fourth year of operation, is a multi-million dollar joint undertaking involving OPG, Moose Cree, Kiewit Alarie Partnership (KAP), the federal government, unions and the Ontario Ministry of Training, Colleges and Universities. It was established as a direct result of OPG's Lower Mattagami River project. Training-to-employment services are provided to the members of Moose Cree, Taykwa Tagamou Nation, MoCreebec and Métis people of the Lower Moose River Basin. Sibi has become an industry model for large construction projects.

In 2013, OPG also continued its support of the Aboriginal Apprenticeship Board of Ontario (AABO). OPG's involvement with AABO further builds on OPG's Aboriginal employment and training program by helping to identify industry best practices and networking opportunities between Aboriginal partner communities and industry unions.



Top: OPG President & CEO, Tom Mitchell (left) and Ontario Minister of Energy Bob Chiarelli (right) visit the new Smoky Falls/Kâpâshkilehtek Generating Station construction site.

Bottom: Tom Mitchell and Chief Norm Hardisty, Moose Cree First Nation, with the Smoky Falls/Kâpâshkilehtek construction site in the background.

# ECONOMIC

## FINANCIAL SUSTAINABILITY

As a commercial enterprise, OPG's financial priority is to consistently achieve a level of financial performance that will ensure its long-term financial sustainability and maintain the value of its assets for its shareholder - the Province of Ontario. Inherent in this priority are three objectives:

- Enhance profitability by increasing revenue.
- Improve efficiency and reduce costs.
- Ensure a strong financial position that enhances OPG's ability to continue to finance its operations and generation development projects.



Runner for installation at the new Smoky Falls Generating Station

### Economic Performance

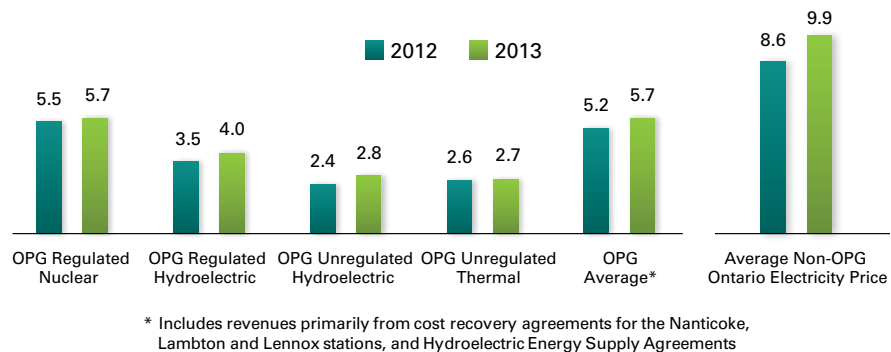
OPG's net income for 2013 was \$135 million, compared to \$367 million for 2012. The lower net income was primarily a result of lower nuclear production and higher expenses for operations, maintenance and administration. OPG's net income was also affected by restructuring costs related to the shutdown of the coal-fired units at the Lambton and Nanticoke generating stations. The decrease in income was partially offset by lower salary costs due to headcount reductions, higher energy supply contract revenues and higher unregulated hydroelectric revenues.

## Low-Cost Generator

In 2013, OPG continued to generate electricity at a lower price than the average of all other generators in Ontario. OPG's average sale price in 2013 was 5.7 cents per kilowatt-hour compared to 9.9 cents per kilowatt-hour for other electricity generators.

The prices for electricity generated from OPG's nuclear facilities and from most of its baseload hydroelectric facilities for 2013 were set by the Ontario Energy Board (OEB). Electricity generated from OPG's other generating assets received the Ontario electricity spot market price, except where a cost recovery agreement or energy supply agreement was in place. In September 2013, the Government of Ontario announced its intention to include all of OPG's previously unregulated and non-contracted hydroelectric generation facilities within the OEB's regulatory jurisdiction. OPG subsequently filed an application with the OEB for a rate increase. The amount OPG receives will be decided by the OEB after reviewing input from OPG and other stakeholders. If this application is approved in full, OPG's price would still be lower than the average price paid for all other electricity generators in Ontario. OPG has not had a base-rate increase since 2008.

## Average Ontario Electricity Prices (\$/kWh)



## Business Transformation

In 2011, OPG initiated a business transformation initiative to focus on cost reductions and improved efficiencies to better compete, grow and respond to changing market conditions.

Progress has been achieved through a restructuring of the company that has combined the hydroelectric and thermal operations, restructured commercial operations to take advantage of market opportunities, and implemented a scalable, centred service delivery model for business support functions. OPG has also simplified operational and project work processes to further streamline operations.

The company plans to save an estimated \$1 billion over six years (2011 - 2016) by reducing overall headcount from ongoing operations by 2,330 people. Since January 2011, OPG has achieved a headcount reduction of about 1,500. The estimated cost savings from this reduction is \$275 million as of the end of 2013.

In 2013, OPG continued to centralize its services and optimize business processes. Significant milestones were reached in the areas of health and safety management, environmental management, trending of corrective actions, records and document management, human resource management services and warehouse operations. OPG also continued to identify new opportunities to enhance revenue through ventures like Canadian Nuclear Partners. Canadian Nuclear Partners is a wholly-owned subsidiary of OPG which was established in 2012 to provide management, technical and service expertise to nuclear and power sector industries in Canada and around the world.

Looking ahead, OPG will determine which changes are driving results and which ones can be adjusted to make the company stronger and better at achieving its objectives. OPG will also increase its focus on engaging all employees to drive change and efficiency within their work groups.

“OPG is now operating in a new, more competitive business environment and with a smaller generation footprint. This demands we become increasingly more cost-efficient, accountable, financially strong and sustainable. The lower our costs and the more efficient our operations, the more we can moderate the prices people pay for electricity.”

Tom Mitchell, President and CEO

# GENERATION AND RELIABILITY

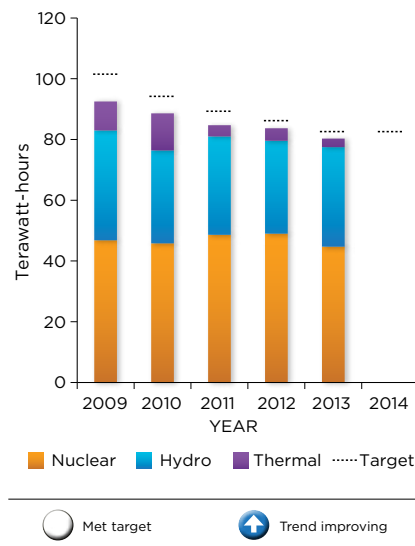
Total electricity generated in 2013 was 80.3 terawatt-hours which was slightly lower than the 83.7 terawatt-hours generated in 2012. The decrease was mainly due to lower nuclear generation and closure of coal-fired generating stations, but was partially offset by higher hydroelectric generation. Electricity generated by OPG is sold into Ontario's energy market administered by the Independent Electricity System Operator.

For OPG's hydroelectric and thermal generating stations, indicators to measure reliability showed improvement over 2012; however, nuclear generation capability

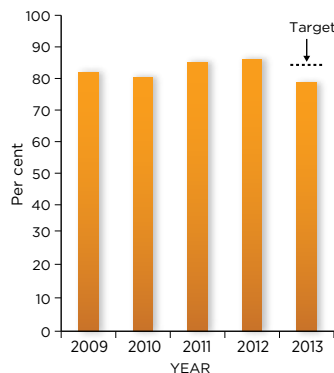
decreased compared to 2012 due to outage activity necessitated in part to support the planned refurbishment of Darlington Nuclear and to extend operations at Pickering Nuclear, as well as to address emergent repairs.

OPG continues to implement specific initiatives to improve reliability and increase productive capacity and efficiency of its generating assets. Initiatives include implementing technology advancements, enhancing maintenance practices, capital investment to replace aging equipment, life extension for existing stations, and the construction of new generating stations. The status of OPG's key capacity expansion and life extension projects are summarized in the following pages.

## Electricity Production



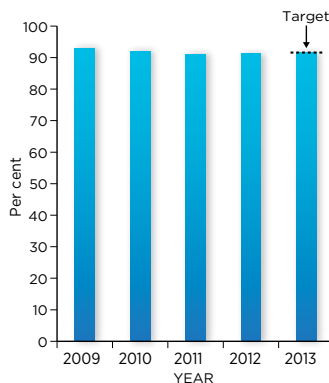
## Nuclear Unit Capability Factor



● Marginally worse than target    ↻ Trend stable

**Capability Factor** represents actual energy generated, adjusted for external constraints such as transmission or demand limitations, as a percentage of potential maximum generation over a specified period.

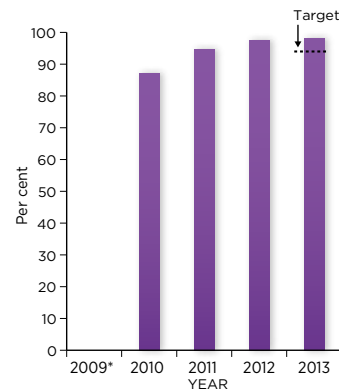
## Hydroelectric Availability



● Met target    ↻ Trend stable

**Availability** represents the amount of time that units are capable of producing electricity as a percentage of the total time for a respective period.

## Thermal Start Guarantee Rate



● Met target    ↻ Trend stable

**Start Guarantee** represents the ratio of successful thermal unit starts compared to starts requested by the Independent Electricity System Operator.

\*Data not available.

OPG's maintenance programs ensure the safe and reliable operation of plant equipment.



## Hydroelectric

### Niagara Tunnel in Service

In 2013, OPG's new Niagara Tunnel was declared in-service and is now producing additional clean, renewable electricity at the Sir Adam Beck generating complex. The tunnel can increase annual generation by an average of approximately 1.5 terawatt-hours, depending on water flow. The project was completed approximately nine months ahead of the approved project completion date and more than \$100 million lower than the approved budget. The capital project expenditures for 2013 were \$87 million and the life-to-date capital expenditures at Dec. 31, 2013 were \$1.46 billion.

### Lower Mattagami River Project

Construction activities on the Lower Mattagami River commenced in 2010 to add one additional generating unit at each of the existing Little Long, Harmon and Kipling generating stations, and replace the existing generating station at the Smoky Falls site with a new three-unit station.

The project will increase the generating capacity of the four stations on the Lower Mattagami River by 438 megawatts. Annual electricity generation is expected to increase by 0.9 terawatt-hours to 3.2 terawatt-hours. The project is expected to be completed on schedule by June 2015 and within the approved budget of \$2.6 billion. The capital project expenditures for 2013 were \$629 million and the life-to-date expenditures at Dec. 31, 2013 were \$1.98 billion.

OPG is expanding and refurbishing the hydroelectric stations on the Lower Mattagami River in partnership with the Moose Cree First Nation.

## FAST FACTS

### Hydroelectric

- ▶ OPG operates 65 hydroelectric stations and 240 dams on 24 river systems, including a green power portfolio of 29 small hydroelectric plants.
- ▶ OPG's hydroelectric stations range in age from less than one to over 115 years.
- ▶ The new Niagara Tunnel is 12.7 metres in diameter and 10.2 kilometres long. The tunnel provides an additional water diversion capacity of approximately 500 cubic metres per second.



New Niagara Tunnel outlet tunnel and gate





Construction at the Smoky Falls Generating Station

### Overhauls and Improvements

During 2013, OPG continued to execute a number of projects and completed major equipment overhauls and rehabilitation work at several stations to improve efficiency. These include:

- Completion of a refurbishment at Unit 3 of the Sir Adam Beck 1 Generating Station that increased the unit's capacity from 46 megawatts to 55 megawatts.
- Completion of a turbine runner upgrade and generator overhaul at Unit 1 of the Des Joachims Generating Station.
- Replacement of control and monitoring systems at 26 stations.
- Continued work on the rehabilitation of the concrete dam at Chats Falls Generating Station.

### New Post Creek Development

OPG and its partner Coral Rapids Power, a wholly-owned company of the Taykwa Tagamou Nation, are moving forward to develop approximately 25 megawatts of renewable hydroelectric power through the construction of a

generating station on New Post Creek, which is approximately 180 kilometres north of Timmins. Construction is targeted to begin in 2015 with an in-service date of 2017.



An OPG employee examines the concrete draft tubes of Smoky Falls Generating Station.

## Thermal

### Atikokan Conversion to Biomass

To support the conversion from coal to biomass fuel at Atikokan Generating Station, construction of two storage silos and the installation of redesigned burners were completed in 2013. The project was completed in 2014. The station has over 200 megawatts of generating capacity. The capital project expenditures for 2013 were \$85 million and the life-to-date expenditures at Dec. 31, 2013 were \$144 million.

### Thunder Bay Conversion to Advanced Biomass

In 2013, the Ontario Minister of Energy issued a directive to the Ontario Power Authority to negotiate and enter into a contract for electricity from Thunder Bay Generating Station using advanced biomass fuel. Thunder Bay Generating Station stopped burning coal in April 2014 and modifications required to convert the plant are underway. The plant is scheduled to begin using advanced biomass in 2015. The converted unit will have an in-service capacity of 150 megawatts.

Additional details regarding OPG's conversion from coal to biomass are available in the Environment section of this report.

“The scale and variety of our projects is amazing. And every one of them – every one – is going to bring major benefits to Ontario. That means:

- **economic benefits** for the communities where these projects are located
- **business and competitive benefits** for the many partners and contractors who work with us on these projects, and
- **environmental and cost benefits** – because these projects will all be producing safe, reliable, low-emission electricity.

These projects will also help modernize Ontario's electricity infrastructure – resulting in state-of-the-art facilities to ensure safe, reliable power for decades to come. ”

Mike Martelli, Senior Vice President, Hydro Thermal Operations

Aerial photo of Atikokan Generating Station



Biomass fuel pellet mills used to produce fuel for Atikokan Generating Station



Inside view of wood pellet silo at Atikokan Generating Station

## Nuclear

### Darlington Refurbishment

Darlington Nuclear is consistently among the best operating Canadian Deuterium Uranium (CANDU) plants in the world and provides about 18 per cent of Ontario's electricity. A mid-life refurbishment of Darlington Nuclear will allow the station to produce another 30 years of power. OPG is in the definition phase of the project and refurbishment is planned to begin in 2016.

Darlington refurbishment will be one of the largest capital infrastructure projects in Canada, creating significant benefits for 10 to 15 years including employment, business and supplier opportunities, and increased municipal revenue. Capital project expenditures for 2013 were \$431 million and the life-to-date capital expenditures at Dec. 31, 2013 were \$793 million.

### Pickering Continued Operations

At Pickering Nuclear, work continues on plant condition to prepare the station for continued operations. OPG is committed to ensuring the Pickering station, which is the longest-running nuclear plant in Ontario's fleet, generates safe and reliable electricity up to its last day of operations, expected to be in 2020.

OPG has made investments to improve the performance of Pickering Nuclear with a focus on implementing equipment modifications, fuel handling reliability improvements, and reducing degraded and broken equipment backlogs. The investments in Pickering Nuclear will help to provide a reliable electricity supply for Ontario while the Darlington reactors are being refurbished.



Top: Construction of the training facility at the Darlington Energy Complex.  
Centre: Turbine hall at Pickering Nuclear during a maintenance outage.  
Bottom left: Safety inspection. Bottom right: Control Room at Darlington Nuclear.

# PROCUREMENT AND PAYMENTS

## FAST FACTS

### Economic Value

Electricity generation is a capital-intensive business. It requires continued investment in plants and technologies to improve operating performance, increase generating capacity, and to maintain and improve safety and environmental performance. When making these investments, OPG provides support to the economy through the purchase of goods and services. During 2013, OPG purchased \$2.23 billion in goods and services.

In 2013, compensation to employees totalled approximately \$1.5 billion. The majority of employees live in Ontario and purchase their goods and services locally, thereby transferring wealth back into the economy.

Payments made by OPG to the Province of Ontario also benefit the economy. Payments to the Province include payments in lieu of taxes, gross revenue charges, interest on long-term debt, guarantee fee and Ontario Electricity Financial Corporation capital/income tax payments. These payments totalled \$556 million in 2013.

## Supply Chain

- ▶ 2,820 suppliers engaged by OPG.
- ▶ 94 per cent of spending on goods and services to Canadian suppliers.
- ▶ 89 per cent of spending on goods and services to suppliers in Ontario.
- ▶ Eight contracts were awarded in 2013 with First Nations and/or Métis suppliers.
- ▶ OPG's biomass (wood pellet) suppliers must have third-party chain of custody certification demonstrating that the wood is sourced from well managed forests.

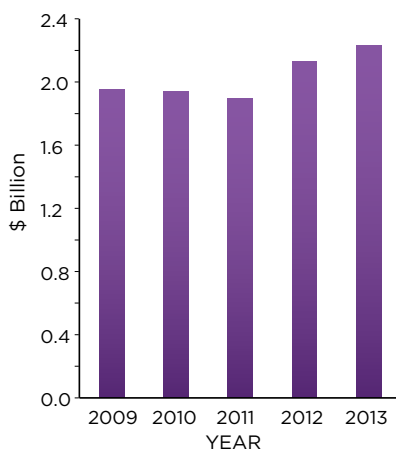
### Supply Chain

The objective of OPG's supply chain organization is to provide the material and services required by the business at the right time for the best value. OPG's supply chain processes are consistent with approved financial management and control standards, and all applicable legal requirements. OPG's supply chain begins with its suppliers and ends with OPG's consumption.

OPG requires all suppliers and contractors who wish to do business with OPG to be pre-qualified based on a demonstration of their ability to

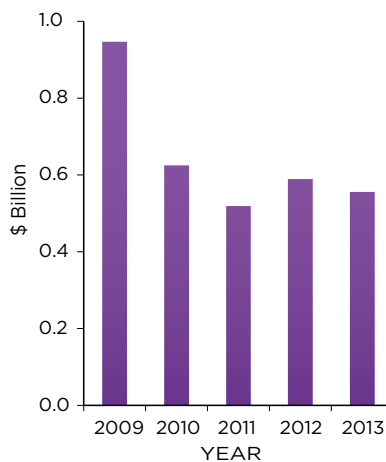
manage quality, health and safety, and environmental aspects, in addition to satisfying technical and commercial requirements. Contracts are awarded following OPG's established procedures for competitive bidding, evaluation and negotiation. OPG's suppliers are expected to ensure full compliance with OPG's Code of Business Conduct in their business dealings with OPG. A supplier's quality capability may also be subject to OPG audits or assessments, which are commensurate with the scope of work and specified quality requirements.

Spending on Goods and Services

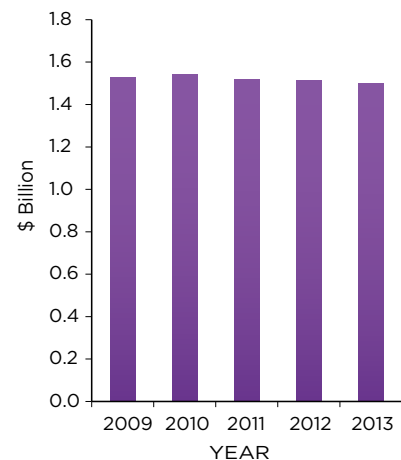


2009 - 2012 dollar values restated from the 2012 Sustainable Development Report.

Payments to the Province of Ontario



Employee Compensation



# Appendix A GLOBAL REPORTING INITIATIVE (GRI) INDICATOR ALIGNMENT

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# Appendix B

## GENERATION CAPACITY AND PRODUCTION

NUCLEAR	Net Generation Capacity (MW)	Net Generation (GWh)				
		2013	2012	2011	2010	2009
<b>Pickering Nuclear</b> Located on Lake Ontario in the city of Pickering. The station has six operating units and two units in a safe shutdown state. In 2013, OPG received an operating licence that combined the Pickering A and B station licences into a single licence.	3,094	19,642	20,735	19,675	19,236	20,761
<b>Darlington Nuclear</b> Located on Lake Ontario in the municipality of Clarington east of Toronto. The station has four units.	3,512	25,051	28,308	28,951	26,549	26,037

THERMAL	Net Generation Capacity (MW)	Net Generation (GWh)*				
		2013	2012	2011	2010	2009
<b>Atikokan Generating Station</b> Located near the town of Atikokan in northwestern Ontario. The station has one unit that stopped using coal as fuel in 2012. The station was converted to run on biomass in 2014.	211	-18*	13	39	417	133
<b>Lambton Generating Station</b> Located on the St. Clair River south of Sarnia. The station has four coal-fired units. Two units were retired from service in 2010 and the remaining two units were retired in 2013 as part of OPG's coal closure program.	950	1,552	2,218	1,129	3,317	3,596
<b>Lennox Generating Station</b> Located on Lake Ontario in the town of Greater Napanee. The station has four oil and/or natural gas-fired units.	2,100	-29*	104	9	60	122
<b>Nanticoke Generating Station</b> Located on Lake Erie in Haldimand County. The station has eight coal-fired units. Two units were retired from service in 2010, two at the end of 2011, and the remaining four units at the end of 2013 as part of OPG's coal closure program.	1,880	1,361	1,731	2,465	8,206	5,563
<b>Thunder Bay Generating Station</b> Located in Thunder Bay. The station has two units that stopped using coal as fuel in 2014. One of the units is being converted to run on advanced biomass starting in 2015.	306	-16*	16	74	191	123

\* Negative net generation indicates the station consumed more electricity from the grid than it produced.

HYDROELECTRIC	Net Generation Capacity (MW)	Net Generation (GWh)				
		2013	2012	2011	2010	2009
<b>Niagara Plant Group</b> Includes 5 stations, headquarters in Niagara area	2,267	12,372	11,953	12,614	12,415	12,291
<b>Ottawa St. Lawrence Plant Group</b> Includes 10 stations, headquarters in Renfrew	2,571	12,774	11,632	12,535	11,154	13,926
<b>Northeast Plant Group</b> Includes 13 stations, headquarters in Timmins	1,342	3,359	2,982	3,128	2,875	4,723
<b>Northwest Plant Group</b> Includes 11 stations, headquarters in Thunder Bay	687	3,583	3,528	3,442	3,558	4,630
<b>Central Hydro Plant Group</b> Headquarters in North Bay EcoLogo <sup>M</sup> -certified green power: Includes 28 stations (26 small hydroelectric stations including one station from the Northeast Plant Group, and two wind turbines)	125	625	507	592	563	579
Other capacity: Includes two stations (one hydroelectric station and power purchases from a New York wind farm)	13	44	36	44	39	45

# Appendix C

## SUSTAINABLE DEVELOPMENT PERFORMANCE

INDICATOR	2013	2012	2011	2010	2009
<b>REGULATORY COMPLIANCE</b>					
Significant Environmental Events	0	0	0	0	0
Environmental Infractions	13	14	14	23	31
Environmental Penalty Orders	1	3	0	5	0
<b>REPORTABLE SPILLS TO THE ENVIRONMENT</b>					
Category A Spills - Very Serious	0	0	0	0	0
Category B Spills - Serious	0	0	0	0	1
Category C Spills - Less Serious	9	9	18	25	15
<b>PCB MANAGEMENT</b>					
High-Level PCB material in storage at year-end <sup>(1)</sup> (tonnes)	0.4	0.1	7	1	2
High-Level PCB material sent for destruction <sup>(1)</sup> (tonnes)	27	61	21	215	72
Low-Level PCB material in storage at year-end <sup>(2)</sup> (tonnes)	0.8	0.4	0	1	2
Low-Level PCB material sent for destruction <sup>(2)</sup> (tonnes)	6	185	140	42	7
Estimated inventory of low-level PCB material in service <sup>(2)</sup> (tonnes)	14	63	18	23	15
(1) High-level PCB: ≥500 mg/kg PCB (2) Low-level PCB: ≥50 to <500 mg/kg PCB					
<b>ATMOSPHERIC EMISSIONS</b>					
<b>ATMOSPHERIC EMISSIONS - OPG</b>					
Carbon Dioxide (tonnes)	3,195,649	4,528,023	4,370,375*	12,688,028	10,329,107
Sulphur Dioxide (tonnes)	9,812	9,705	11,264*	37,661	29,500
Nitrogen Oxides (tonnes, as NO <sub>2</sub> ) (does not include small non-generation sources)	5,018	6,556*	5,835	15,996	13,382*
<b>ATMOSPHERIC EMISSIONS - THERMAL</b>					
Carbon Dioxide (tonnes)	3,190,396	4,517,690	4,361,150*	12,680,340	10,318,000*
Atikokan Generating Station	0	44,830	75,280	496,220	197,000
Lambton Generating Station	1,592,290	2,237,250	1,253,200*	3,286,360	3,729,000
Lennox Generating Station	33,386	155,550	77,200	95,000	194,000
Nanticoke Generating Station	1,528,800	2,008,720	2,816,530	8,538,000	6,010,000
Thunder Bay Generating Station	35,920	71,340	138,940	264,760	188,000
Sulphur Dioxide (tonnes)	9,812	9,705	11,264	37,661	29,500
Atikokan Generating Station	0	207	358	2,401	837
Lambton Generating Station	1,288	2,474	1,340	5,853	6,191
Lennox Generating Station	35	39	43	126	571
Nanticoke Generating Station	8,409	6,843	9,205	28,568	21,480
Thunder Bay Generating Station	80	142	317	713	421

\* Value restated from the 2012 Sustainable Development Report

INDICATOR	2013	2012	2011	2010	2009
Nitrogen Oxides (tonnes, as NO <sub>2</sub> )	4,989	6,515	5,794*	15,962	13,342*
Atikokan Generating Station	0	100	148	1,040	436
Lambton Generating Station	2,118	3,019	1,627	3,062	3,932
Lennox Generating Station	35	144	89	91	213
Nanticoke Generating Station	2,761	3,021	3,544	11,161	8,314
Thunder Bay Generating Station	75	232	386	608	447
Mercury (kilograms)	28	25	43	87	59
<b>ATMOSPHERIC EMISSIONS - NUCLEAR</b>					
Carbon Dioxide (tonnes)	5,253	10,333	9,225	7,688	9,107
Sulphur Dioxide (tonnes)	0	0.1	0.1	1	0.2
Nitrogen Oxides (tonnes, as NO <sub>2</sub> )	29	40	41	33	40
Waste Incinerator Dioxins and Furans Toxicity Equivalent Emissions Test Result (pg TEQ/Rm <sup>3</sup> )	<1.80	<3.03	1.79	2.97*	4.73*
<b>ATMOSPHERIC EMISSION RATES</b>					
<b>ATMOSPHERIC EMISSION RATES - OPG</b>					
Carbon Dioxide (tonnes/GWh-net)	40	54	52	143	112
Sulphur Dioxide (tonnes/GWh-net)	0.12	0.12	0.13	0.43	0.32
Nitrogen Oxides (tonnes/GWh-net, as NO <sub>2</sub> )	0.06	0.08	0.07	0.18	0.14
<b>ATMOSPHERIC EMISSION RATES - THERMAL</b>					
Carbon Dioxide (tonnes/GWh-net)	1,119	1,107	1,172	1,040	1,082
Sulphur Dioxide (tonnes/GWh-net)	3.44	2.38	3.03	3.09	3.09
Nitrogen Oxides (tonnes/GWh-net, as NO <sub>2</sub> )	1.75	1.60	1.56	1.31	1.40
<b>RADIOACTIVE EMISSIONS</b>					
Tritium to Air (curies)	17,072	17,976	18,837	19,266	23,501
Tritium to Water (curies)	11,164	11,211	11,479	10,588	Not Available
Carbon-14 to Air (curies)	73	76	76	118	113
<b>PUBLIC RADIATION DOSE</b>					
Pickering Nuclear Critical Group Dose (microsieverts)	1.1	1.1	0.9	1.0	1.8
Darlington Nuclear Critical Group Dose (microsieverts)	0.6	0.6	0.6	0.6	0.7
<b>RADIOACTIVE WASTE MANAGEMENT</b>					
Annual Production of Used Fuel (tonnes of uranium)	1,392	1,439	1,610	1,357	1,345
Used Fuel in Storage (tonnes of uranium)	42,152	40,647	39,319	37,910	36,521
Used Fuel Bundles in Storage at Pickering Nuclear	676,059	662,437	642,089	625,357	609,086
Used Fuel Bundles in Storage at Darlington Nuclear	455,301	435,266	411,747	388,503	366,863
Low and Intermediate Radioactive Waste Produced (m <sup>3</sup> )	2,616	2,762*	2,924	2,921*	3,078
Low and Intermediate Radioactive Waste Stored (m <sup>3</sup> ) (includes waste stored by OPG on behalf of Bruce Power)	2,455	2,639	3,913	2,615	3,300
<b>UTILIZATION OF SOLID COMBUSTION BY-PRODUCTS</b>					
Ash and Gypsum Produced (tonnes)	189,125	283,366	241,207*	575,140	517,371
Ash and Gypsum Recycled (tonnes)	164,778	296,208	209,744	388,885	381,205
Diversion Rate (per cent)	87	105	87	68	74

\* Value restated from the 2012 Sustainable Development Report



INDICATOR	2013	2012	2011	2010	2009
<b>HAZARDOUS WASTE GENERATION</b>					
Solids (tonnes)	329	1,125	339	690	465*
Liquids (kilolitres)	1,175	1,615	1,458	1,943	1,922*
<b>WATER USE</b>					
Hydroelectric Turbine Flows (million m <sup>3</sup> )	443,998	404,229	483,200	400,397	505,967
Nuclear and Thermal Non-consumptive Cooling and Service Water Use (million m <sup>3</sup> )	9,785	10,722	10,829	12,221	12,372
<b>ENERGY CONVERSION EFFICIENCY - THERMAL</b>					
Energy Input (GWh equivalent)	10,400	14,345	13,490	39,497	31,616
Net Energy Output (GWh)	2,998	4,082	3,678	12,192	9,538
Fuel Conversion Efficiency (per cent)	28.8	28.5	27.3	30.9	30.2
<b>INTERNAL ENERGY EFFICIENCY</b>					
Generation Energy Efficiency (per cent)	95.42	95.25	95.46	95.24	95.24
Internal Energy Saving - Cumulative since 1994 (GWh/yr)	2,507	2,493	2,481	2,469	2,434
Avoided Carbon Dioxide, Nitrogen Oxides (as NO <sub>2</sub> ) and Sulphur Dioxide from Energy Efficiency Improvements (tonnes)	2,818,125	2,768,829	2,919,829	2,578,454	2,644,565
Cumulative Value of Energy Savings at Market Clearing Rate (millions of dollars) (2013 = 5.7 ¢/kwh; 2012 = 5.1¢/kwh; 2011 = 5.3¢/kwh; 2010 = 4.7¢/kwh; 2009 = 4.5¢/kwh)	142.9	127.1*	131.5	116.0*	109.5
Annual Incremental Energy Saving (per cent of internal energy use)	0.4	0.3	0.3	0.8	0.6
Annual Incremental Energy Saving (GWh/year)	13.9	12.3	12.1	34.5	29.6
<b>OCCUPATIONAL SAFETY</b>					
Accident Severity Rate (days lost per 200,000 hours)	0.94	2.4	1.10	2.04	1.4
All Injury Rate (injuries per 200,000 hours)	0.61	0.63	0.56	0.92	1.19
<b>GROSS ENERGY GENERATION</b>					
Total Energy Generated (GWh)	84,146	87,937	88,716	92,997	97,118
Thermal (GWh)	3,354	4,737	4,381	13,300	10,570
Hydroelectric (GWh) (renewable excluding Central Hydro Plant Group)	32,411	30,487	32,055	30,376	36,178
Central Hydro Plant Group (GWh) (includes one station from the Northeast Plant Group)	670	544	636	603	626
Nuclear (GWh)	47,711	52,169	51,644	48,718	49,744
<b>NET ENERGY GENERATION</b>					
Total Energy Output (GWh) (includes power purchases)	80,290	83,757	84,687	88,570	92,497
Thermal (GWh)	2,851	4,082	3,717	12,192	9,538
Hydroelectric (GWh) (renewable excluding Central Hydro Plant Group)	32,077	30,088	31,709	29,991	35,536
Central Hydro Plant Group (GWh) (includes one Northeast Plant Group station, wind, power purchases)	670	544	636	602	624
Nuclear (GWh)	44,693	49,043	48,626	45,785	46,799
<b>GENERATION PERFORMANCE</b>					
Nuclear Unit Capability Factor (per cent)	78.6	86.1	85.1	80.2	81.96
Hydroelectric Availability (per cent)	91.5	91.2	90.9	91.9	92.8
Thermal Start Guarantee (per cent)	98.0	97.5	94.7	87	Not Available

\* Value restated from the 2012 Sustainable Development Report

<b>Data Reported to Environment Canada's National Pollutant Release Inventory (NPRI) <sup>(1)</sup></b>	<b>2012 <sup>(2)</sup></b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>
<b>Emissions to air, water and land (tonnes unless otherwise specified)</b>					
Aluminum	40.5	68.1	218.6	250.060	466.854
Ammonia	33.48	35.62	43.42	30.8	40.3
Arsenic	1.128	0.873	3.314	6.284	15.255
Cadmium (kilograms)	21.8	37	215	126	342
Chromium	3.198	2.928	21.418	18.852	47.553
Cobalt	Not Reported	Not Reported	5.886	Not Reported	17.065
Copper	0.042	6.042	25.342	25.442	68.72
Dioxins and Furans (grams Toxic Equivalent)	0.107	0.495	0.661	0.995	0.798
Hexachlorobenzene (grams)	0.404	1.026	5.662	4.929	3.612
Hydrazine	0.525	0.31	0.82	0.746	0.684
Hydrochloric Acid	194	Not Reported	1,112	1,577	2,720
Hydrogen Fluoride	34	50	133.0	126.0	270.0
Lead	0.884	1.64	10.24	7.79	20.70
Manganese	4.237	5.48	33.34	27.08	63.05
Mercury (kilograms)	30.36	63	186	155	419
Nickel	Not Reported	Not Reported	19,547	16.56	39.091
Phosphorus	26.773	99	489	297*	822
Selenium	1.079	2	Not Reported	Not Reported	Not Reported
Sulphuric Acid	294.006	188.006	452.319	522.983	575.006
Vanadium	4.105	5.9	38.7	30.5	81.0
Zinc	3.320	4.4	27.3	20.7	54.5
<b>Criteria Air Contaminants (tonnes)</b>					
Carbon Monoxide	1,345	955	5,693	1,813	6,012
Nitrogen Oxides (as NO <sub>2</sub> ) (includes small generation sources)	6,572	5,855	16,016	13,457	29,532
PM - Total Particulate Matter	385	468	1,432	2,105	4,097
PM10 - Particulate Matter ≤ 10 microns	273	324	1,555	1,425	2,679
PM2.5 - Particulate Matter ≤ 2.5 microns	180	169	531	700	1,059
Sulphur Dioxide	9,706	11,264	37,662	29,500	75,380
Volatile Organic Compounds	27	24	38	48	74

(1) For detailed information about OPG's emissions to air, water and land, please visit the NPRI web site at: [www.ec.gc.ca/pdb/npri/npri\\_home\\_e.cfm](http://www.ec.gc.ca/pdb/npri/npri_home_e.cfm)

(2) Data for 2013 was not available at the time of publishing.

\* Value restated from the 2012 Sustainable Development Report



# 2013 ONTARIO POWER GENERATION SUSTAINABLE DEVELOPMENT REPORT



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**For more information contact:**

Vice President, Environment  
1-877-592-5419, 416-592-5419  
email: [webmaster@opg.com](mailto:webmaster@opg.com)

**Our mailing address is:**

Ontario Power Generation  
700 University Avenue  
Toronto, Ontario, M5G 1X6

Visit our website at:  
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