

# POWER WITH PURPOSE

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## 2016 SUSTAINABILITY REPORT



**ONTARIOPOWER**  
GENERATION





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Front Cover | Construction of the Peter Sutherland Sr. Generating Station.





# OVERVIEW

## OUR BUSINESS

Ontario Power Generation (OPG) is an electricity generation company whose principal business is the generation and sale of electricity in Ontario. OPG was established under the *Business Corporations Act* (Ontario) and is wholly owned by the Province of Ontario. OPG was formed in April 1999 through the restructuring of Ontario Hydro's integrated electricity business.

As at Dec. 31, 2016, OPG's electricity generation portfolio had an in-service capacity of 16,177 megawatts (MW). Total electricity generation in 2016 was 78.2 terawatt hours (TWh).



1

OPG owns and operates two nuclear generating stations, 65 hydroelectric generating stations, three thermal generating stations, and one wind power turbine. OPG's in-service capacity excludes 878 MW from the Darlington Nuclear Generating Station (GS) on account of Unit 2 having been taken offline in 2016 for refurbishment. In 2016, one new hydroelectric station was under construction.

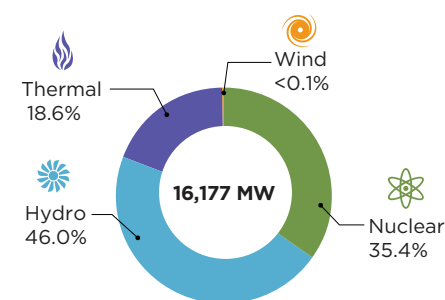
OPG and TransCanada Energy Ltd. co-own the 550 MW Portlands Energy Centre gas-fired combined cycle GS. OPG and ATCO Power Canada Ltd. co-own the 560 MW Brighton Beach gas-fired combined cycle GS. OPG's 50 per cent share of the in-service capacity and generation volume of these co-owned facilities is included in the generation portfolio statistics set out in this report. OPG does not operate the co-owned stations.

OPG also owns two other nuclear generating stations, Bruce A GS and Bruce B GS, which are leased on a long-term basis to Bruce Power Limited Partnership to operate. The leased stations are not included in the generation portfolio statistics set out in this report.

All of OPG's owned and co-owned generating facilities are located in Ontario, Canada. OPG's registered head office is located at 700 University Avenue, Toronto, Ontario, M5G 1X6.

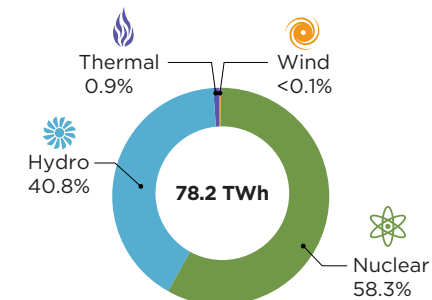
### IN-SERVICE CAPACITY

Dec. 31, 2016



### ELECTRICITY PRODUCTION

2016



1 | DeCew Falls GS.



# OPG OPERATIONS



## OPG GENERATION FACILITIES AT DEC. 31, 2016



1

### OPG's Role in the Electricity Industry

The electricity industry is principally comprised of four components: generation, transmission, distribution, and marketing of energy and other services in wholesale and retail markets.

Generation is the production of electricity. Transmission is the transfer of electricity across high-voltage power lines from generating facilities to local areas. Distribution is the delivery of electricity within local areas to homes and businesses using relatively low-voltage power lines. Energy marketing relates to the purchase of large amounts of electricity or equivalent financial products, and the subsequent re-selling in smaller quantities to third parties in either the wholesale or retail markets.

As a power producer, OPG offers its generation into the real-time energy market, or spot market, to be dispatched by the Independent Electricity System Operator (IESO). OPG operates under an electricity generation licence issued by the Ontario Energy Board (OEB).

Some generators are needed to produce a constant supply of energy to meet basic energy needs (baseload generation), while others are needed to adjust energy output to match changes in demand (peaking and intermediate generation). OPG's nuclear generating stations operate as baseload facilities, whereas the hydroelectric stations operate as baseload, intermediate or peaking stations, depending on their physical characteristics and hydrological conditions. OPG's thermal stations operate as peaking facilities.

### LEARN MORE

#### Ontario Electricity System

Information about Ontario's electricity system is available on the Ontario Ministry of Energy's website at [www.energy.gov.on.ca](http://www.energy.gov.on.ca) and the IESO website at [www.ieso.ca](http://www.ieso.ca)

1 | Sir Adam Beck II GS.



## MESSAGE FROM THE PRESIDENT AND CEO AND THE VICE PRESIDENT OF ENVIRONMENT



**JEFF LYASH**  
President and CEO



**HEATHER FERGUSON**  
Vice President, Environment

**“The work we do has purpose that goes beyond the power we generate. Reliable, clean power is essential to a healthy future and a strong economy. OPG produces more clean energy – at a lower cost – than any other generator in Ontario. At OPG, we’re not just generating power, we’re generating a better Ontario.”**

**JEFF LYASH**  
President and CEO

Ontario Power Generation produces more clean energy, at a lower cost, than any generator in Ontario. We believe reliable, clean power is fundamental to a healthy environment and a strong, low-carbon economy.

In this era of technological, environmental and economic change, staying focused on our company’s mission to generate safe, clean, reliable and low-cost power is particularly important. Whether it’s promoting innovation and creating jobs through nuclear station upgrades, renewing and expanding our hydroelectric fleet, taking a leadership role in the electrification of Ontario’s transportation sector, or building lasting, clean-power partnerships with Indigenous communities, OPG is committed to sustainable operations and improving the well-being of Ontario’s communities.

1 | Darlington Nuclear GS Unit 2 refurbishment work.



### Clean Power Transition

Ontario’s electricity supply mix has transformed dramatically to reduce greenhouse gas emissions. The most significant contributor was OPG’s successful shutdown of its coal-fired generation. We also converted two of our former coal stations to burn cleaner, renewable biomass. OPG’s power is now 99 per cent free of smog and greenhouse gas emissions. Ontario is viewed as a North American leader in decarbonizing its electricity system.

To sustain this commitment to clean power, OPG has undertaken a \$12.8 billion project to refurbish Darlington Nuclear GS. This is Canada’s largest clean energy project and it’s off to a strong start. A significant milestone was reached in October 2016 when OPG began the refurbishment of the first unit. A refurbished Darlington will deliver 30 more years of clean power, create thousands of jobs, and provide significant economic benefits across the province. We are also preparing to extend the operation of Pickering Nuclear GS to 2024.

We believe that investing in nuclear power is central to meeting provincial and national targets to reduce greenhouse gas emissions. It will also enable greater electrification, and decarbonization, of Ontario’s economy.

### Building on our Legacy

For more than a century, our hydroelectric generating stations have contributed to Ontario’s prosperity by delivering clean, reliable, cost-effective and renewable energy. OPG continues to expand and invest in these valuable assets to provide electricity for generations to come.

In 2016, work advanced on the construction of the Peter Sutherland Sr. GS on the Abitibi River in northeastern Ontario. This partnership project with Taykwa Tagamou Nation (TTN) was completed in early 2017 ahead of schedule and on budget. We also refurbished our 750-acre reservoir at the Sir Adam Beck Pump GS in Niagara to extend its operating life by 50 years. This facility can pump and store the equivalent of 8,000 Olympic-sized swimming pools of water in the reservoir during periods of low energy demand and then release the water to produce electricity during periods of high demand. This project too was completed ahead of schedule and under budget.

### Indigenous Partnerships

Renewable energy partnerships with Ontario’s Indigenous communities have emerged as a mutually beneficial approach with lasting economic benefits.

These relationships contribute to Indigenous community development through employment and training opportunities, and they provide a long-term revenue stream. In addition to the project with TTN, we have hydroelectric power partnerships with Lac Seul First Nation and Moose Cree First Nation, and have plans to develop a solar facility with Six Nations of the Grand River. We’re also exploring microgrid development partnerships with Indigenous communities.

### Driving Results for the Future

While our recent accomplishments are encouraging, we remain focused on meeting our business objectives and targets to continue to deliver value to the people of Ontario. This means operating our plants safely and reliably, delivering all projects on time and on budget, keeping our rates low while achieving strong financial performance, and maintaining our social licence to operate. It also requires forward-looking innovation and growth strategies to support the development of clean technologies and electrification of the economy. Regardless of the challenges, our purpose will not change and our efforts will continue to yield value for Ontario’s economy and environment.

Thank you for your interest in OPG and we welcome your feedback.

**JEFF LYASH**  
President and CEO

**HEATHER FERGUSON**  
Vice President, Environment





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## ABOUT THIS REPORT

### Purpose

This report is OPG’s platform for communicating the value OPG places on sustainability, the company’s approach to managing its impacts, and recent performance results and trends. This report is organized by the three sustainability pillars: Environment, Social and Economic.

The reporting period is from Jan. 1 to Dec. 31, 2016. This report presents information about sites operated by OPG unless otherwise noted. This is OPG’s 18<sup>th</sup> annual sustainability report. Detailed generation and performance data from the past five years is provided in Appendix A and B.

In conjunction with this report, OPG provides information about its sustainability programs and performance in annual reports,

management’s discussion and analysis, consolidated financial statements, news articles, and station performance reports, all available on [www.opg.com](http://www.opg.com).

### Reporting What is Most Relevant

This report covers the topics that are considered to be the company’s most important environmental, social and economic impacts, and reflects the interests and expectations of OPG’s stakeholders and partners. OPG’s stakeholders and partners include: local communities, Indigenous communities and partners, employees, suppliers and contractors, industry groups, government and agencies at federal, provincial and municipal levels, non-government organizations, media, electricity customers and the general public.

OPG’s priority sustainability topics were formally identified through an assessment that reviewed and ranked the environmental, social and economic aspects of OPG’s activities based on the views of internal and external stakeholders. Internal stakeholder input was obtained through interviews with senior OPG leaders. The views of external stakeholders were assessed by reviewing survey and research results, topics discussed at public hearings and meetings, and requests for information submitted to OPG.

The assessment identified a total of 22 priority sustainability topics. The following table provides a summary of these topics, why they are a priority, and where impacts occur across OPG’s supply/value chain.





1 | Biomass silos at Atikokan GS.

## PRIORITY SUSTAINABILITY TOPICS AND PROCESS MAP

Key: ● Direct impacts ● Indirect or localized impacts

TOPICS	Resource Extraction	Suppliers	OPG	Electricity Customers
<b>HIGHEST PRIORITY</b>				
<b>Cost of electricity:</b> The cost of generating electricity is a portion of customers’ bills. OPG’s power is priced lower than other generators.			●	●
<b>Nuclear emissions:</b> Very low levels of radioactivity are released to the environment as a result of nuclear generation.			●	●
<b>Public health and safety, emergency preparedness:</b> Includes nuclear emergency management and water safety around dams and hydroelectric stations.			●	●
<b>Radioactive waste:</b> Nuclear generation produces a small amount of radioactive waste as a by-product that requires long-term management in a willing and informed host community.			●	●
<b>HIGHER PRIORITY</b>				
<b>Development of new generating assets:</b> Critical to the company’s long-term financial success and job creation.	●	●	●	●
<b>Employee engagement:</b> An engaged workforce drives performance and a culture to succeed.			●	
<b>Environmental compliance and spills:</b> Strong environmental management practices protect the environment and build customer trust.			●	●
<b>Indigenous relations:</b> OPG is committed to building and growing mutually beneficial working relationships with Indigenous communities.	●	●	●	●
<b>Long-term financial strength:</b> OPG has a duty to deliver an appropriate level of return on equity to its shareholder and to meet its financial obligations.		●	●	●
<b>Modernization and renewal of generating assets and sites:</b> Tied to financial strength and positive local economic impacts. Positions the company for growth.		●	●	●
<b>Protection of species of concern (i.e. fish):</b> Electricity generating facilities located on waterways can impact fish.			●	●



TOPICS	 Resource Extraction	 Suppliers	 OPG	 Electricity Customers
<b>PRIORITY</b>				
<b>Biodiversity, habitat stewardship:</b> Electricity generating stations can impact biodiversity through habitat loss and emissions to the environment.			●	●
<b>Corporate citizenship, community development:</b> Strengthens the well-being of host communities and the company's social licence to operate.			●	●
<b>Electricity market, long-term energy plan:</b> As Ontario's largest clean power generator, OPG is a major contributor to the energy supply.			●	●
<b>Employee health and safety:</b> A strong safety culture is a legal obligation; it makes good business sense and is the right thing to do.			●	
<b>Generation of renewable energy:</b> Important to company growth and is a stakeholder expectation.	●	●	●	●
<b>Greenhouse gas emissions and climate change:</b> Important societal issue and a business opportunity for the electricity generation sector.	●	●	●	●
<b>Local economic impact:</b> Covers employment opportunities, spending on goods and services, and payments to the shareholder.		●	●	●
<b>Reliability and efficiency of generating assets:</b> Impacts the financial sustainability of the company and enables customers to function and prosper.		●	●	●
<b>Security, terrorism, cyber security:</b> Component of maintaining nuclear safety and public safety.			●	●
<b>Transparency, access to information, trust:</b> As a government-owned company, OPG holds itself accountable to the public.		●	●	●
<b>Water management and flows:</b> Critical to maximizing hydroelectric power production. Related to managing water levels and watershed protection.			●	●



### Data Assurance and Quality

The following reviews are conducted to ensure OPG's sustainability reporting is accurate and credible.

- 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.
- An audit of OPG's 2016 consolidated financial statements by independent external auditors concluded the statements fairly present the financial position of OPG.
- OPG's sustainability data and practices are verified by an independent auditor every four years as part of the Canadian Electricity Association's Sustainable Electricity Program. The strategic pillars of this program are: low-carbon future, infrastructure, building relationships, risk management systems, and business innovation.
- The Global Reporting Initiative (GRI) Sustainability Reporting Standards were used as guidance to define report content and quality. Refer to Appendix C for a table mapping GRI criteria to this report's content.
- OPG's 2015 Sustainability Report was evaluated by an external sustainability consultant against criteria for best practices in sustainability reporting. OPG's report was scored as having above average achievement. Recommendations from the evaluation were taken into account for this 2016 report.
- OPG participates in an energy sector sustainability study every two years to benchmark its sustainability performance and practices against other energy

utilities and oil and gas companies, and to identify energy sector sustainability trends. In 2016, OPG was in the second quartile of the overall performance rankings for its sustainability management and disclosure practices. Areas for improvement identified by the study were considered for this report.

Comments and suggestions about this report are encouraged and may be provided to:

Vice President, Environment  
Telephone: 416-592-8195  
Email: [webmaster@opg.com](mailto:webmaster@opg.com)

1 | Darlington Nuclear GS control room.





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## OUR APPROACH TO SUSTAINABILITY

### Business Drivers

OPG believes that operating in a sustainable manner is directly connected to business success. Sustainability is a prerequisite for maintaining a social licence to operate, advancing positive stakeholder and community engagement, and understanding the company's long-term risks and opportunities. Concern for the needs of future generations also drives efficiencies and innovation to ensure the best possible use of resources.

For these reasons, OPG's sustainability requirements are integrated into the company's business model, policy requirements, performance targets, and long-term strategic goals and initiatives. OPG is committed to ensuring its progress toward meeting these requirements is disclosed to its stakeholders and partners.

### Sustainability Strategy

OPG's sustainability strategy is guided by its business model which describes how OPG operates its business. The business model includes the company's mission

statement, values, and expected behaviours — the elements that are central to OPG's culture. The business model also outlines how OPG plans its business and sets targets, and identifies the controls that are in place to address the key risks faced by the company. The following diagram shows how the business model creates value for OPG, the environment and society.

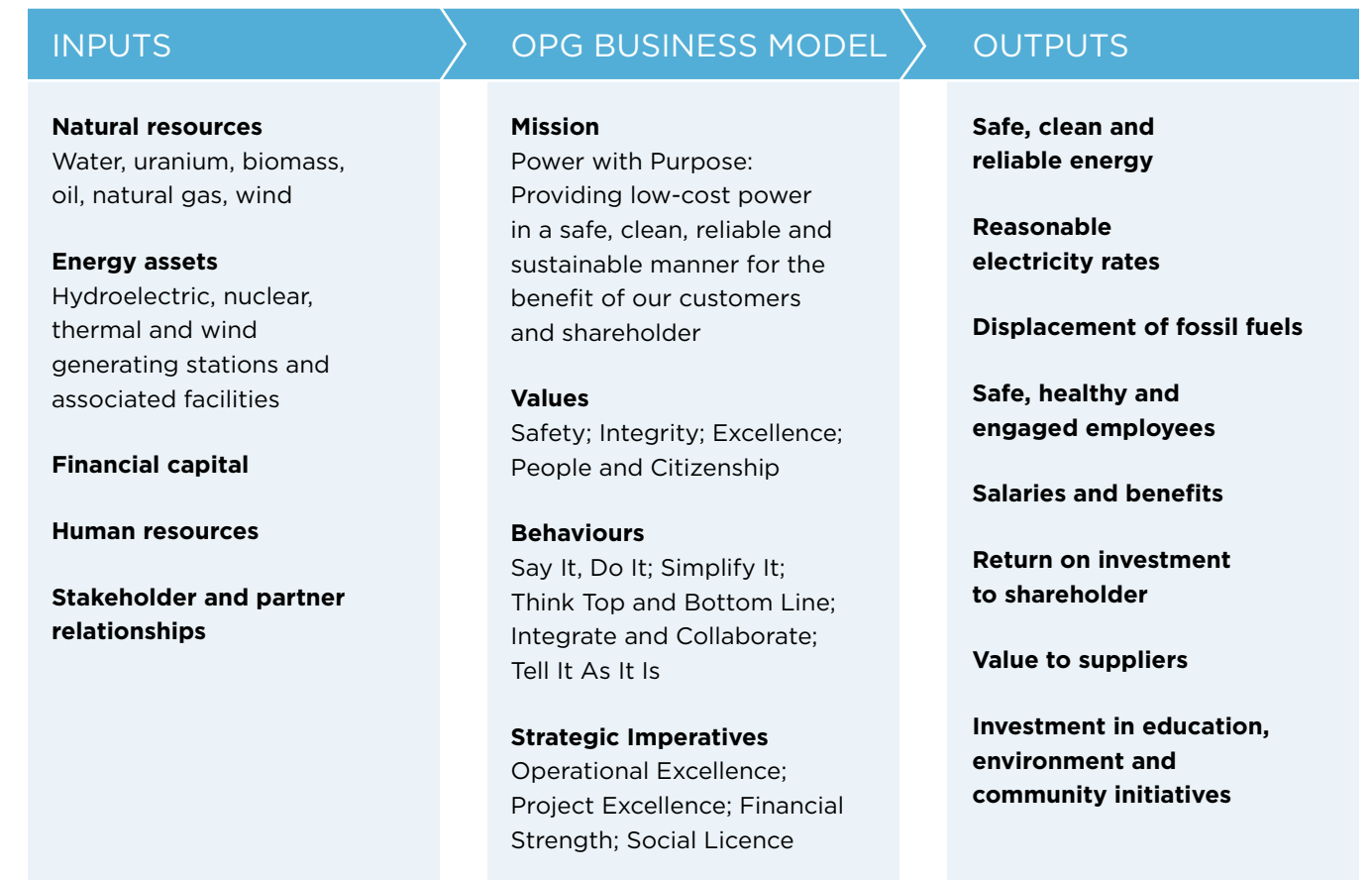
1 | Pickering wind turbine.

2 | OPG uses the power of water to create electricity.



2

## HOW OPG CREATES VALUE



OPG's policy statements establish the parameters for the management of the company. These policies are driven by legal and regulatory requirements, and the company's objectives, culture, and approach to risk management. OPG has policy statements pertaining to the environment, nuclear safety, safe

operations, employee health and safety, Indigenous relations, code of business conduct, risk management, cyber security, and disclosure. OPG's operating units and functions are accountable for establishing and maintaining implementation of the policies specific to their areas of responsibility.

### LEARN MORE

#### OPG Policy Statements

Copies of OPG policy statements are available at [www.opg.com/about](http://www.opg.com/about)



OPG plans its business through annual strategic and business planning processes. These processes are used to set short-term and long-term business objectives, priorities, and targets in the areas of environmental performance, health and safety, financial performance, operations, and project execution.

Annual priorities and targets are included in a corporate scorecard which is used to assess the company's overall performance. Individual operating units and functions are required to establish annual performance objectives and to report monthly on key performance results. Performance targets are reinforced with management employees through an annual incentive plan that links compensation to performance.

OPG's long-term goals, to be met by 2021, are to:

- Increase net income and return on equity
- Maintain OPG's generation price advantage for the benefit of customers
- Establish growth platforms that put OPG on track to replace retiring generation
- Build a diverse, healthy, engaged workforce, and the culture to succeed in a challenging future

In keeping with the business model, OPG has the following four strategic imperatives to ensure it is focused on the right work and programs to meet its long-term goals.

 <p><b>OPERATIONAL EXCELLENCE</b></p>	<p>Operational excellence at OPG is accomplished by the safe and environmentally responsible generation of reliable and cost-effective electricity from the company's generating assets through a highly trained and engaged workforce.</p>
 <p><b>PROJECT EXCELLENCE</b></p>	<p>OPG's vision for project excellence is to be an industry leader in project management capability and performance. As part of the commitment to project excellence, OPG continues to enhance and streamline its approach to project planning and execution, with the goal of delivering all projects safely, on time, on budget, and with high quality.</p>
 <p><b>FINANCIAL STRENGTH</b></p>	<p>As a commercial enterprise, OPG's financial priority is to achieve a consistent level of strong financial performance that delivers an appropriate level of return on the shareholder's investment and positions the company for future growth.</p>
 <p><b>SOCIAL LICENCE</b></p>	<p>OPG holds itself accountable to the public and its employees, and continues to focus on maintaining public trust. OPG is committed to maintaining high standards of public safety and corporate citizenship, including environmental stewardship, transparency, community engagement, and Indigenous relations.</p>

The following table provides a summary of OPG's key sustainability-related policy requirements, associated risks, and opportunities.

**SUSTAINABILITY STRATEGY: REQUIREMENTS, RISKS AND OPPORTUNITIES**

Focus Area	Policy Requirements	Risks	Opportunities
<p><b>ENVIRONMENT</b></p>	<ul style="list-style-type: none"> <li>• Meet environmental compliance obligations with the objective of exceeding these obligations where it makes business sense</li> <li>• Maintain and continually improve an environmental management system</li> </ul>	<ul style="list-style-type: none"> <li>• OPG may be subject to orders or charges if it is not in compliance with applicable environmental laws</li> <li>• Changes in environmental requirements can result in existing operations being non-compliant and a potential inability to comply</li> </ul>	<ul style="list-style-type: none"> <li>• Advance biodiversity and habitat stewardship</li> <li>• Manage greenhouse gas emissions through OPG's clean generation portfolio and by facilitating transportation electrification</li> </ul>
<p><b>SOCIAL</b></p>	<ul style="list-style-type: none"> <li>• Ensure public communications are informative, timely and accurate</li> <li>• Work with Indigenous communities to foster positive and mutually beneficial relationships</li> <li>• Prevent workplace injuries and ill health, and continuously improve employee health and safety performance</li> <li>• Operate facilities in a safe, secure and reliable manner that minimizes risks to the public, employees, contractors, and assets</li> </ul>	<ul style="list-style-type: none"> <li>• OPG is exposed to risks associated with its social licence and public profile due to changes in the opinions of various stakeholders and partners</li> <li>• OPG's operations involve inherent occupational safety risks and hazards</li> <li>• Natural, technological, or human-caused hazards may impact OPG's business continuity</li> <li>• OPG's ability to operate effectively is, in part, dependent on minimizing cyber risks</li> <li>• Operations could be affected if human resources are not aligned with talent requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and execute stakeholder engagement and brand management strategies</li> <li>• Increase access to procurement opportunities for Indigenous businesses</li> <li>• Achieve goal of zero injuries</li> <li>• Execute program to shift the company's culture to enable overall business strategy</li> <li>• Promote diversity and equity within OPG and in the community</li> </ul>



Focus Area	Policy Requirements	Risks	Opportunities
<b>ECONOMIC</b>	<ul style="list-style-type: none"> <li>Achieve a consistent level of financial performance that will ensure long-term financial sustainability and maintain the value of assets</li> <li>Operate and maintain nuclear facilities to optimize equipment, performance, availability, and electricity generation</li> <li>Evaluate and implement plans to increase capacity, maintain performance, and extend the operating life of hydroelectric generating assets</li> </ul>	<ul style="list-style-type: none"> <li>Ontario electricity market conditions could impact revenue and operations</li> <li>Uncertainties remain regarding the outcome of proceedings for OPG's rate regulated operations</li> <li>Risks related to long-term obligations could impact financial performance</li> <li>Variable output from generating stations could adversely impact financial performance</li> <li>Risks associated with major development projects could adversely impact financial performance</li> <li>Suppliers could adversely impact performance, financial results, and reputation</li> </ul>	<ul style="list-style-type: none"> <li>Improve return on equity</li> <li>Support successful outcomes for OPG's rate regulated operations</li> <li>Establish project management centres of excellence</li> <li>Deliver best in class performance over the life of Darlington Nuclear</li> <li>Plan and execute a strategic investment plan</li> </ul>

**Accountabilities**

**BOARD OF DIRECTORS**

The OPG Board of Directors explicitly assumes responsibility for the stewardship of OPG and its business. The Board is made up of individuals with expertise in managing large businesses, managing and operating nuclear stations, managing capital intensive companies, and overseeing regulatory, government and public relations.

The Board oversees OPG's approach of identifying, reporting and mitigating the risks that could significantly impact the company's capacity to achieve its long-term strategic objectives, as well as specific business plan objectives. The following committees of the Board focus on areas critical to the company:

- Audit and Risk Committee
- Compensation, Leadership and Governance Committee
- Darlington Refurbishment Committee
- Generation Oversight Committee

**PRESIDENT AND CEO**

The Chief Executive Officer (CEO) position is accountable to the Board for ensuring a culture of integrity and ethical conduct; increasing shareholder value; defining and executing a corporate strategy, including a sustainable business model that will service the long-term power generation needs of the province; and providing a standard of leadership that will achieve operational excellence with respect to matters of safety, stakeholder relationships, financial performance, asset reliability, and health, environmental and regulatory compliance.

In addition, the Board delineates the President and CEO role and responsibilities through by-laws, the Board Charter, Board policies, and the corporate and CEO annual goals and objectives. The Board sets and monitors performance against annual corporate and CEO targets and objectives.

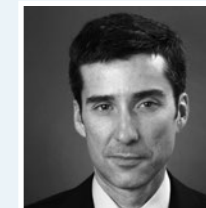
**LEARN MORE**

**OPG Governance**

Additional information about OPG's Board of Directors, Charter of the Board, and Board Committees is available at [www.opg.com/about](http://www.opg.com/about)

**EXECUTIVE TEAM**

Sustainability performance is a shared responsibility at OPG. The following members of OPG's leadership team have responsibilities for setting standards, and key performance indicators where appropriate, related to the environment, health and safety, stakeholder and partner engagement, and financial stewardship.



**Carlo Crozzoli**  
Senior Vice President, Corporate Business Development and Strategy  
**Responsibilities include:** Corporate business development and strategy



**Chris Ginther**  
Chief Administrative Officer  
**Responsibilities include:** Environment, legal services, supply chain, real estate and services, Ontario regulatory affairs



**Ken Hartwick**  
Chief Financial Officer and Senior Vice President, Finance  
**Responsibilities include:** Finance, treasury, risk management, cyber security



**Glenn Jager**  
Nuclear President and Chief Nuclear Officer  
**Responsibilities include:** Nuclear operations, nuclear waste management, security and emergency services, nuclear regulatory affairs, nuclear decommissioning



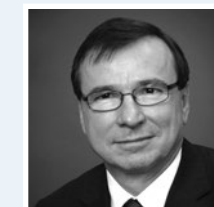
**Barb Keenan**  
Senior Vice President, People and Culture  
**Responsibilities include:** Health and safety, labour relations, human resources, learning and development, ethics



**Catriona King**  
Vice President, Corporate Secretary  
**Responsibilities include:** Board support



**Mike Martelli**  
President, Renewable Generation and Power Marketing  
**Responsibilities include:** Hydro and thermal operations, dam safety and water resources, Indigenous relations, commercial contracts and power marketing



**Dietmar Reiner**  
Senior Vice President, Nuclear Projects  
**Responsibilities include:** Refurbishment of the Darlington Nuclear GS



**Jennifer Rowe**  
Senior Vice President, Corporate Affairs  
**Responsibilities include:** Corporate relations and communications, government relations



## KEY ACHIEVEMENTS IN 2016

### Performance Results

The information presented here is an overview of OPG's goals, targets and performance results for the company's priority sustainability topics. More information about each topic can be found in the relevant sections of this report.

A number of OPG's environmental targets were adjusted upward for 2017 to account for work activities associated with the Darlington Nuclear GS refurbishment project. OPG's targets for financial and operating performance are not

provided due to confidentiality constraints as per the company's disclosure policy.

**Key**

- Fully fulfilled
- ◐ Partially fulfilled
- Not fulfilled

TOPICS	GOALS AND TARGETS	2016 RESULTS
<b>ENVIRONMENT</b>		
<b>Environmental compliance and spills</b>	Meet compliance obligations. 2016 Targets: 30 infractions; 17 spills 2017 Targets: 29 infractions; 20 spills	Achieved excellent performance against targets for infractions and spills: 6 infractions; 10 spills. Zero significant environmental events. ●
<b>Protection of species of concern (i.e. fish)</b>	Meet compliance obligations. Work to prevent or mitigate adverse effects on fish and fish habitat.	Continued to implement measures to facilitate fish migration and to mitigate fish impingement and entrainment. ●
<b>Biodiversity, habitat stewardship</b>	Meet compliance obligations. Manage sites in a manner that strives to maintain significant natural areas. Support regional ecosystems and biodiversity.	Continued to advance biodiversity conservation through various programs, partnerships and third-party certification. OPG, through its many conservation partners, has planted more than 6.5 million native trees and shrubs since 2000. ●
<b>Greenhouse gas emissions and climate change</b>	Support Ontario's Climate Change Action Plan to fight climate change, reduce greenhouse gas pollution and transition to a low-carbon economy. Continue to invest in nuclear capabilities and enhance the role of renewables.	Began the execution phase of the Darlington Nuclear GS refurbishment project. Proceeded with the construction of Peter Sutherland Sr. GS, refurbishment of the Sir Adam Beck Pump GS reservoir, and plans to develop Nanticoke Solar. Launched a transportation electrification strategy. ●
	Define and understand climate change adaptation requirements.	Developed and issued a climate change adaptation plan as part of OPG's risk management process. ●

TOPICS	GOALS AND TARGETS	2016 RESULTS
<b>ENVIRONMENT</b>		
<b>Generation of renewable energy</b>	Continue to invest in and expand the renewable generation portfolio.	Proceeded with the construction of Peter Sutherland Sr. GS, refurbishment of the Sir Adam Beck Pump GS, and plans to develop Nanticoke Solar. ●
<b>Nuclear emissions</b>	Ensure nuclear operations have no adverse impacts on human health or the environment.	Conducted environmental monitoring in the vicinity of nuclear stations. Annual public radiation doses resulting from the operation of each of OPG's nuclear stations were less than 0.2 per cent of the annual legal limit. Environmental monitoring program results are available on opg.com. ●
	Keep nuclear emissions as low as reasonably achievable. 2016 Targets: 18,500 curies tritium to air; 13,500 curies tritium to water; 120 curies carbon-14 to air 2017 Targets: 23,920 curies tritium to air; 20,025 curies tritium to water; 120 curies carbon-14 to air	Targets for tritium emissions to air and water were not achieved: 23,357 curies tritium to air; 17,730 curies tritium to water. Emissions remained less than one per cent of the legal limit. Carbon-14 emissions to air were better than target: 106 curies to air. ◐
<b>Radioactive waste</b>	Reduce the effect of low and intermediate level radioactive waste (LILRW) on the environment. 2016 Target: 2,879 cubic metres LILRW produced 2017 Target: 5,468 cubic metres LILRW produced	Target for volume of LILRW produced was not achieved: 3,433 cubic metres. Progress continued toward a decision regarding OPG's proposed deep geologic repository for LILRW. ◐
<b>Water management and flows</b>	Meet compliance obligations.	Balanced energy production requirements with environmental, commercial and recreational needs within watersheds. ●



TOPICS	GOALS AND TARGETS	2016 RESULTS
<b>SOCIAL</b>		
<b>Transparency, access to information, trust</b>	Ensure public communications are informative, timely, and accurate and disclosed in accordance with compliance obligations.	Maintained the company's reputation through frequent communications with stakeholders, partners and the public. ●
<b>Indigenous relations</b>	Work with Indigenous communities, proximate to present and future operations, to foster positive and mutually beneficial relationships.	Continued to support procurement, employment and educational opportunities with Indigenous community partners. Proceeded with the construction of Peter Sutherland Sr. GS with Taykwa Tagamou Nation and plans to develop Nanticoke Solar with Six Nations of the Grand River. Continued to engage proactively with Indigenous communities regarding OPG's operations. ●
<b>Employee engagement</b>	Build an engaged workforce and the culture to succeed.	Offered programs and activities to recognize employee achievements and increase involvement. Kicked off a program to create a culture that aligns all employees and allows the company to achieve its business strategy. ●
<b>Employee health and safety</b>	Ultimate goal of zero injuries. 2016 Target: All Injury Rate of 0.38 (injuries per 200,000 hours worked) 2017 Target: All Injury Rate of 0.37	Target for workplace safety was not achieved: All Injury Rate of 0.56. OPG's workplace safety performance was among the best of comparator Canadian electrical utilities. ○
<b>Public health and safety, emergency preparedness</b>	Meet compliance obligations. Ensure that safe operation is the overriding priority in all activities performed.	Promoted public water safety around dams and hydroelectric stations. The Canadian Nuclear Safety Commission gave Pickering Nuclear GS and Darlington Nuclear GS the highest possible safety rating. ●
<b>Security, terrorism, cyber security</b>	Meet compliance obligations. Operate facilities in a safe and secure manner.	Increased employee cyber security awareness through training and company-wide communications on relevant cyber security topics. ●
<b>Corporate citizenship, community development</b>	Contribute to host community well-being.	Community investment support was provided to over 850 initiatives in the program focus areas of education, environment and community. ●

TOPICS	GOALS AND TARGETS	2016 RESULTS
<b>ECONOMIC</b>		
<b>Electricity market, long-term energy plan</b>	Support Ontario's Long-Term Energy Plan to create a system that is clean, reliable, modern, and cost-effective.	Provided perspective and ideas on how OPG can lead Ontario's clean power future through the 2017 Long-Term Energy Plan review process. ●
<b>Long-term financial strength</b>	Achieve a consistent level of strong financial performance that delivers an appropriate level of return and positions the company for future growth.	Net income attributable to the Shareholder was \$436 million. Income before interest and income taxes was \$741 million. ●
<b>Cost of electricity</b>	Continue serving as Ontario's low-cost energy producer to moderate overall electricity prices.	OPG produced power at a price which was approximately 40 per cent lower than other generators in Ontario. ●
<b>Reliability and efficiency of generating assets</b>	Implement key strategic initiatives in support of operational excellence.	Total electricity generation was 78.2 TWh. Continued to evaluate and implement plans to improve reliability and efficiency, increase capacity, and extend the operating life of generating assets. ●
<b>Development of new generating assets</b>	Invest in the development of new generating stations to ensure long-term financial strength.	Proceeded with the construction of Peter Sutherland Sr. GS and plans to develop Nanticoke Solar. ●
<b>Modernization and renewal of generating assets and sites</b>	Invest in existing generating assets to ensure long-term financial strength.	Began the execution phase of the Darlington refurbishment project. Executed projects to overhaul and rehabilitate hydroelectric facilities. ●
<b>Local economic impact</b>	Support Ontario's economic development objectives where feasible.	Employed approximately 9,270 regular employees. Eighty-nine per cent of spending on goods and services was to suppliers in Ontario. ●





1

### Awards and Recognition

OPG is proud to have received the following awards, certifications, and recognition in 2016. These awards are a tribute to the hard work and dedication of OPG's employees.

1. OPG was named – for the fourth year in a row – as one of the **Best 50 Corporate Citizens in Canada** by Corporate Knights. This distinction reflects OPG's commitment to resource, employee and financial management.
2. OPG maintained the **ISO 14001 certification** of its environmental management system. OPG's major production facilities have had formal environmental management systems in place since 1999.
3. Smoky Falls GS earned **Leadership in Energy and Environmental Design® (LEED) Gold Certification** from the Canada Green Building Council. Smoky Falls GS is OPG's third gold certified facility, joining the St. Lawrence Power Development Visitor Centre and the Darlington Energy Complex.
4. The Canadian Electricity Association (CEA) presented OPG with its **President's Gold Award of Excellence for Employee Safety** in recognition of ranking in the top quartile of

CEA member organizations for all injury and accident severity rates for three consecutive years (2013–2015).

5. OPG was selected as the winner of the CEA's 2016 Sustainable Electricity Program award for **Leadership in External Collaboration and Partnerships**. The award was given in recognition of OPG's partnerships with Indigenous groups to produce electricity while providing education, training, jobs and contract opportunities.



2

6. OPG received a **Community Commitment Award** for its 17-year commitment to the Firehouse Youth Centre, a non-profit charity located in Bowmanville.
7. OPG was recognized by Community Care Durham with the **Corporate Community Leadership Award**. The award was for the support OPG provides to Community Care through OPG's Corporate Citizenship Program.
8. The Canadian Nuclear Safety Commission gave the Pickering and Darlington nuclear stations its **highest possible safety performance rating** for 2015. Pickering Nuclear GS received its best ever rating of "Fully Satisfactory" and Darlington Nuclear GS achieved the rating of "Fully Satisfactory" for the seventh year in a row.

9. An international industry assessment recognised Darlington Nuclear GS as one of the **safest and best performing nuclear stations in the world** for the third time in a row. It is the first time a plant outside the United States has received the recognition three times.
10. OPG was the runner-up winner of the Shared Services Outsourcing Network's **Excellence in Process Improvement** award for implementing industry best practices and process improvement initiatives to optimize accounts payable processes. These improvements were made as part of a company-wide initiative to improve efficiency and reduce costs.

11. Two OPG employees were recognized by the Electric Power Research Institute (EPRI) with a **Technology Transfer Award** for their innovative work in expanding the use of a nuclear accident analysis program. The Technology Transfer Awards spotlight electricity sector leaders and innovators that apply EPRI research and technology to help make electricity more reliable, efficient, affordable, safe, and environmentally responsible.

1 | Jeff Lyash, OPG President and CEO (middle) accepts the Leadership in External Collaboration and Partnerships Award from the Honourable Sergio Marchi, CEA President and CEO (left) and Scott Thon, CEA Chair.

2 | Smoky Falls GS is LEED Gold Certified.



# ENVIRONMENT



1

OPG has an ISO 14001-certified **Environmental Management System** (EMS) to manage its environmental responsibilities. The EMS provides OPG with a framework to meet its compliance obligations, set environmental targets, and maintain planning, operational control and monitoring programs to manage the significant environmental aspects of its operations.

OPG's environmental priorities include spills, emissions to air and water, fish, biodiversity and wildlife habitat, radioactive waste, and waterway flows and levels.

1 | One of the goals of OPG's biodiversity program is to maintain or enhance natural areas at or adjacent to its operations.

2 | Releasing Atlantic salmon fry into Duffins Creek as part of the Bring Back the Salmon program.

## In this section:

- Environmental compliance and spill management
- Protection of fish
- Biodiversity and habitat stewardship
- Low-carbon future and climate change
- Nuclear emissions and radiation dose to the public
- Waste management
- Water management and energy efficiency



2

## ENVIRONMENTAL COMPLIANCE

### Regulatory Infractions

OPG must comply with a large number of environmental requirements contained in statutes, regulations, bylaws, licences, permits and approvals. OPG considers regulatory compliance to be a minimum, non-negotiable standard, and strives to exceed legal requirements and improve performance year over year where it makes business sense.

OPG classifies its non-compliances with environmental regulatory requirements based on the potential for regulatory action (i.e. charges, orders, and penalties), and the level of impact to the environment or human health.

Non-compliances that have a high potential for regulatory action or cause severe environmental or

health impacts, or are determined to be significant by the President and CEO, are recorded as a significant event in OPG's annual corporate scorecard. OPG met its target of zero significant environmental events in 2016.

Non-compliances that have a moderate potential for regulatory action or impact are recorded against an environmental infractions performance measure. OPG identified six environmental infractions in 2016, which was much better than the annual target. The majority of these infractions were non-compliances with effluent monitoring requirements administered by the Ontario Ministry of the Environment and Climate Change (MOECC). All infractions were reported by OPG to the appropriate federal, provincial

and/or municipal authorities as required, and actions were taken to prevent recurrence. OPG did not receive any environmental non-compliance penalties from a regulatory authority in 2016.

OPG continues to remediate historical land contamination at its properties. This remediation work is the continuation of a program initially established by Ontario Hydro in 1997 in response to a Director's Order from the Ontario MOECC. As of the end of 2016, remediation at 48 sites was complete and remediation was ongoing at three sites. Completion of the program is targeted for the end of 2020.



### Spill Management

OPG has extensive spill management programs to prevent spills to the environment and minimize their potential consequences. Spills are prevented through careful material handling and management practices, use of less hazardous materials where possible, and evaluations of past spill events for trends. Engineered controls such as spill containment structures are used to catch and contain leaks. When a spill does occur, emergency response processes minimize any adverse impacts on the environment and reporting procedures ensure regulatory authorities are notified as required.

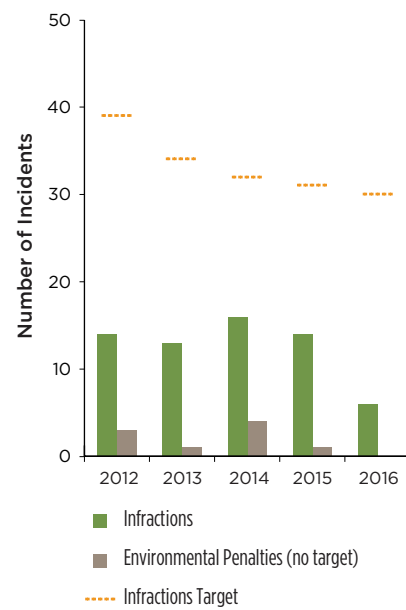


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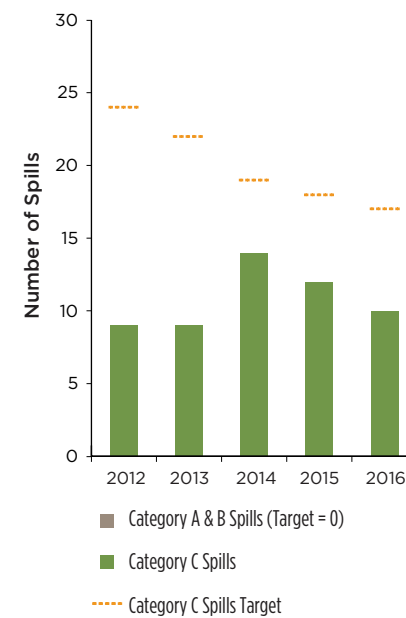
OPG classifies its spills that are reportable to a regulatory authority as Category A, B or C spills, based on the actual or potential impacts. Category A spills are considered very serious due to the scale of injury or damage, health effects, or safety impairment. Category B spills are considered serious 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 MOECC regulatory requirements for the classification of contraventions.

OPG had no Category A or B spills in 2016 and the associated annual targets remain at zero. Category C spill performance was better than target, with oil leaks from equipment as the most frequent type of spill. Corrective actions were taken to increase the maintenance and surveillance of equipment, and to replace and upgrade equipment.

#### REGULATORY INFRACTIONS



#### SPILLS TO THE ENVIRONMENT



1 and 2 | The R.H. Saunders GS eel ladder allows juvenile eels to head upriver across the station.



2

### PROTECTION OF FISH

Electricity generating facilities located on waterways can impact fish in a number of ways. At nuclear and thermal stations, the intake of water for cooling purposes can result in fish being impinged on equipment as the water is filtered coming into the station, and fish larvae and eggs can be entrained in the water as it passes through the station. Warmer water returned to the water body from a nuclear or thermal station has the potential to impact aquatic organisms and habitat near the station. At hydroelectric stations, the flow of water through the station turbines can result in fish entrainment and mortality. Physical barriers such as dams can prevent the upstream migration of fish.

OPG utilizes measures such as trap and transport programs, a fish ladder, stocking programs, barriers and deterring structures, water flow alterations, habitat protection and creation, and station effluent temperature limits to manage and mitigate impacts to fish. OPG also works cooperatively with its regulators, the scientific community, and partner utilities regarding impacts to fish and fish habitat.

Some examples of the programs and project work completed in 2016 to eliminate, mitigate and offset impacts to fish are provided below.

- OPG continued the implementation of 11 mitigation plans for lake sturgeon and

American eel for hydroelectric stations where these species may be impacted. OPG used enhanced flow mitigation and began an evaluation of alternative mitigation processes at hydroelectric stations in northwestern and eastern Ontario.

- OPG participated in an Electric Power Research Institute (EPRI) project to investigate technologies for the safe downstream passage of eels at hydroelectric stations. This included behavioural guidance field trials to guide and concentrate migrating eels. This work formed part of the five-year action plan (2013-2017) for offsetting turbine mortality of American eels at R.H. Saunders GS.





1

- As part of the Sir Adam Beck Pump GS reservoir refurbishment project, the reservoir was dewatered and the fish were relocated to the Niagara River. A total of 2,394 fish representing 15 native species were captured and released.
- Several measures were taken to protect fish and aquatic habitat during the Shebandowan dam replacement project: a temporary channel was created around the old dam to allow for normal river flow during construction; the project schedule ensured there was no in-water work during the spring spawning period; fish were captured and released from construction areas drained of water; the shoreline around the site was protected during construction to prevent potentially harmful sediment releases to the river; and the area where the old dam was removed was rehabilitated into new spawning habitat.
- To support the Peter Sutherland Sr. hydroelectric GS, over 5,000 cubic metres of fish habitat was built in the Abitibi River, minimum flows on New

- Post Creek were established to protect spring spawning fish, and minimum headpond elevation and maximum intake velocities were set to protect fish and aquatic habitat upstream of the station.
- Post-construction monitoring for the Lower Mattagami River hydroelectric project began. Surveys were undertaken in the spring for lake sturgeon and walleye spawning, and in the fall for fisheries and benthic invertebrates. Monitoring of the newly constructed spawning shoals downstream of Smoky Falls GS was also conducted. The spawning shoals are habitat offsetting measures for disturbances incurred as part of the project.
- Two followup monitoring programs were completed at the Big Island, Bay of Quinte wetland which was restored by OPG to offset operational impacts. The monitoring results found that a range of fish species are using the newly created habitat, and aquatic vegetation that provides habitat for fish and wildlife is beginning to grow.



**LEARN MORE**

**Protecting the Catch of the Century**

OPG is dedicated to protecting Ontario's lake sturgeon on rivers where it operates and working with partners to track and monitor populations.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160715\\_SturgeonSurgeon.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160715_SturgeonSurgeon.pdf)

- The fish barrier net installed at Pickering Nuclear GS's water intake continues to be an effective fish diversion system, and has significantly reduced fish impingement. The net performed very well in 2016 and contributed to the lowest impingement rate observed at the station since monitoring began in 2004.



2

**BIODIVERSITY AND HABITAT STEWARDSHIP**

**Biodiversity Strategy**

OPG has a multi-faceted biodiversity program founded on the "4 Rs" of biodiversity: **retain** what is ecologically significant, **restore** habitats that have been degraded, **replace** habitats that have been lost, and **recover** species that are at risk.

OPG manages 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 also works with its community partners to support regional ecosystems and biodiversity through science-based habitat stewardship.

OPG endorses Ontario's Biodiversity Strategy and is a standing member of the Ontario Biodiversity Council.

1 | Lake sturgeon in the Ottawa River are implanted with a radio transmitter to track their movements.

2 | Volunteers from OPG assisted with the identification of plant species at Oshawa's Second Marsh.





1



2



3

## Site Biodiversity Management

OPG has developed biodiversity management plans that describe priority natural areas, conservation goals, threats, and proposed actions to sustain biodiversity. Where disruption to the environment is unavoidable, OPG plans and conducts work carefully to maximize benefits and responsibly manage or offset residual impacts. Here are just a few examples of how OPG managed biodiversity at its sites in 2016.

- **Biodiversity Monitoring:** Darlington Nuclear GS continued to conduct long-term biodiversity monitoring of breeding birds, amphibians, bats, vegetation communities

and species at risk. OPG, in collaboration with the Ganaraska Region Conservation Authority, monitored fish species, and improved stream habitat and access at the Wesleyville site.

- **Naturalization:** Pickering Nuclear GS completed the final year of a 15-year reforestation effort, culminating in more than 15,000 trees and shrubs being planted in Alex Robertson Park, the Brock Woodlot and adjacent habitats in the Frenchman's Bay watershed. At OPG's Niagara Operations, native trees and shrubs were planted at Niagara Glen in collaboration with the Niagara Parks Commission. And a site naturalization plan was prepared for Lambton GS, a former coal generation site.

- **Habitat Creation:** Several OPG sites have constructed barn swallow structures, snake hibernacula, turtle nesting and basking sites, bird nest boxes, and pollinator gardens.
- **Control of Invasive Species:** Niagara Operations continued to control invasive plants and trees. Ragged Rapids GS conducted an inventory of invasive species along Ragged Rapids Road.
- **Wetland Studies:** Chats Falls GS, with input from Ducks Unlimited Canada, identified wetland water level targets to promote biodiversity. Marsh monitoring continued at the Grassy Bay wetland on Calabogie Lake.

- **Third-Party Certification:** OPG has certifications from the Wildlife Habitat Council (WHC) for several of its site biodiversity programs. WHC is an international non-profit, non-lobby group that promotes and independently certifies habitat conservation and management on corporate lands. During 2016, OPG held 12 "Wildlife at Work" certifications and seven "Corporate Lands for Learning" certifications. In January 2017, OPG received WHC's new "Conservation Certification" for the biodiversity programs at its Darlington and Pickering nuclear stations.

1 | Painted turtle at Lennox GS.

2 | Wetland at the Nanticoke site.

3 | Tree swallows near Pickering Nuclear GS.



## LEARN MORE

### Record Year for Peregrine Falcons

Four peregrine falcon chicks hatched at Pickering Nuclear GS in 2016, the largest brood yet to hatch at the station.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160615\\_PickeringPeregrines.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160615_PickeringPeregrines.pdf)





1

**Regional Biodiversity Program**

OPG's regional biodiversity program strategically funds and promotes efforts to protect and restore biodiversity in areas of Ontario

where genetic, species or ecosystem diversity have been most impacted, and substantive threats remain. Work contracts are awarded by OPG to selected vendors through a competitive process. Recent highlights from OPG's regional biodiversity program are as follows.

1 | Biodiversity banner and display at the Reveler Conservation Area Grassland Restoration project. Photo courtesy of Karen Paquette.

2 | Kettle Creek Conservation Authority wetland restoration work.

3 | Tree planting by Long Point Region Conservation Authority.



2



3

**REGIONAL PROGRAM PROJECT PROFILES**

**Eastern Ontario**

South Nation Conservation increased forest habitat by planting trees. Landowner consultations were offered through an expanded woodlot advisory service to help protect woodland species at risk. Grassland restoration programs increased habitat for birds, enhanced pollinator habitat and addressed environmental stressors. To improve wetlands, wild rice was sown to increase habitat and wildlife food sources, wood duck boxes were installed, and a significant turtle nesting site was enhanced.

**Southwestern Ontario**

Catfish Creek Conservation Authority and its partners restored wetland sites to improve wildlife habitat, and the regulation and retention of runoff. Upland nesting was improved by planting a tallgrass

prairie; native wildflowers, trees and shrubs were planted to benefit pollinators and other organisms. Students from East Elgin Secondary School played an important role in the restoration efforts.

Essex Region Conservation Authority and its partners planted tree and shrub seedlings in Essex County, the Municipality of Chatham-Kent and Lambton County. Low productivity farmland was converted to future rural forests, and native tree and shrub seeds were collected for propagation. New grassland was created in the Essex Region and Lower Thames Region Conservation Authority jurisdictions.

Kettle Creek Conservation Authority and its partners created and restored wetlands and wetland habitat in the Kettle Creek and Upper Thames River watersheds, and trees were planted adjacent to the wetland sites. OPG's funding

contribution was combined with that of the Elgin Clean Water Program, the Elgin Stewardship Council and Ducks Unlimited Canada.

Long Point Region Conservation Authority completed integrated woodland, wetland and grassland initiatives on public and private lands having connectivity to larger, more diverse core areas. New wetlands were constructed in low productivity farmland, old field habitat, former reservoirs, along floodplain fringes and in historic river oxbows. A mix of species and trees were planted.





1



2

**Central Ontario**

The Minesing Wetlands, situated west of Barrie, is frequently referred to as the “Everglades of the North” because of its biodiversity, including several rare species and species at risk. In collaboration with partners like the Nottawasaga Valley Conservation Authority and numerous volunteers, the Nature Conservancy of Canada created

large river meanders in Willow Creek, improved stream banks along the Mad River, completed invasive species control, and conducted rare species monitoring.

**Tree Planting**

OPG’s tree and shrub planting efforts promote diverse, healthy and resilient forests which help to mitigate the effects of climate change. In 2016, OPG’s regional

biodiversity program partners planted more than 250,000 native trees and shrubs on existing or newly created forest or wetland habitats. Since 2000, OPG and its partners have planted more than 6.5 million native trees and shrubs.

It is estimated that these plantings could offset over three million tonnes of carbon dioxide over their lifetime.

1 | Data obtained by volunteers is used to help track species diversity at Minesing Wetlands.

2 | Dragonfly at Minesing Wetlands.

3 | OPG has been a proud sponsor of Rouge Park since 2010, funding education and outreach initiatives, trail rehabilitation and the construction of the Vista Trail viewing platform.

**CUMULATIVE TREE PLANTING**



3

**Biodiversity Partnerships**

OPG supports initiatives that contribute to biodiversity education, awareness, scientific knowledge and ecological stewardship. OPG partners with Bruce Trail Conservancy, Earth Rangers, LEAF (Local

Enhancement and Appreciation of Forests), Ontario Nature, Rouge Park, Toronto Wildlife Centre, and the Let it Bee campaign through Friends of the Earth Canada.

In 2016, OPG renewed its commitment as the lead sponsor for the Lake Ontario Atlantic Salmon Restoration Program. Also

known as Bring Back the Salmon, the program works to help restore a self-sustaining Atlantic salmon population to Lake Ontario and its streams. The main components of the program include: fish production and stocking, water quality and habitat enhancement, outreach and education, and research and monitoring.



**LEARN MORE**

**OPG Helps Bring Back the Salmon at Duffins Creek**

More than six million fish have been stocked through the Lake Ontario Atlantic Salmon Restoration Program.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160601\\_CorporateSalmon.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160601_CorporateSalmon.pdf)





**LEARN MORE**

**Low-Carbon Impact of Nuclear Power**

Continued operation of Darlington Nuclear GS will take the equivalent of two million fossil-fuelled cars a year off Ontario's roads by avoiding significant emissions of greenhouse gases.

Read more at [www.opg.com/news-and-media/news-releases/Documents/20161005\\_IntrinsicReport.pdf](http://www.opg.com/news-and-media/news-releases/Documents/20161005_IntrinsicReport.pdf)

## LOW-CARBON FUTURE

### Climate Change Mitigation

Efforts are underway around the world to mitigate the rate and scale of climate change by reducing greenhouse gas emissions to the atmosphere. Here in Ontario, OPG is proud of its transition to a low-carbon electricity generation portfolio, and its role in helping to meet federal and provincial greenhouse gas reduction targets.

OPG is Ontario's largest clean energy provider, producing and selling electricity that is 99 per cent free of greenhouse gas emissions. The elimination of coal-fired electricity production resulted in coal being reduced from one-quarter of Ontario's energy supply mix in 2003 to zero in 2014.

To ensure a supply of clean power for generations to come, OPG's operational and growth strategies are focused on innovation, and energy and storage development. This includes preserving the nuclear portion of OPG's generation portfolio, participating in the development of new nuclear technologies, evaluating and implementing plans to increase hydroelectric generation, and investing in other low-carbon technologies.

OPG supports climate change policy and regulations that promote further reductions in greenhouse gas emissions. In 2016, OPG established the necessary processes to comply with Ontario's cap and trade program requirements which came into effect in January 2017.

OPG is a member of the Carbon Pricing Leadership Coalition, which brings together government, the private sector and civil society to share experience working with carbon pricing and to advance carbon pricing.

1 | Darlington Nuclear GS.

## OPG'S LOW-CARBON FOOTPRINT

### 2016 carbon dioxide (CO<sub>2</sub>) equivalent emissions (tonnes)

#### THERMAL

598,586



CO<sub>2</sub> emissions are from power generation (i.e. combustion of natural gas, oil and biomass) and non-generation sources (i.e. auxiliary boilers). Includes OPG's share of emissions from co-owned facilities.

In comparison, OPG's CO<sub>2</sub> emissions peaked at 39 million tonnes before the phase-out of coal.

#### NUCLEAR

13,080



Nuclear power plants do not emit CO<sub>2</sub> as part of the power generation process. However, OPG's nuclear sites have standby generators to provide backup electrical power to the stations if required. These generators are routinely tested to ensure their availability.

#### HYDRO

0



Hydroelectric stations do not emit CO<sub>2</sub> as part of the power generation process.

#### WIND

0



Wind power turbines do not emit CO<sub>2</sub> as part of the power generation process.





1



3

## TRANSPORTATION ELECTRIFICATION STRATEGY

In 2016, the Province of Ontario released its five-year Climate Change Action Plan to reduce greenhouse gas pollution and transition to a low-carbon economy. Creating a cleaner transportation system is one of the key actions identified in the plan. As Ontario's largest clean power generator, OPG is well-positioned to provide the province with the clean, safe, reliable and cost-effective electricity it needs to support electrification plans.

OPG is a founder and lead sponsor of Plug'n Drive, a non-profit organization committed to accelerating the adoption of electric vehicles. Electric vehicles help reduce greenhouse gas emissions by displacing gasoline and diesel

vehicles. Plug'n Drive focuses on education and outreach, electric vehicle charging infrastructure, electric vehicle research, and the implementation of policies and programs that make switching to an electric vehicle easier.

OPG also has its own transportation electrification strategy to stimulate electric vehicle growth and innovation. This strategy is focused on increasing OPG's use of electric vehicles (i.e. cars, boats, trucks) where possible, expanding its workplace charging infrastructure, and initiatives aimed at capitalizing on potential future commercial growth opportunities and new lines of business.



2

1 and 2 | OPG is transitioning its gas-powered vehicle fleet to electric vehicles, where feasible.

## Climate Change Adaptation

OPG has identified climate change adaptation and extreme weather as strategic risks for the company. Longer term changes in precipitation patterns and amounts, water temperatures, and ambient air temperatures can impact the availability and quality of water resources. These changes could potentially affect power production at hydroelectric stations, and cooling water efficiency at nuclear and thermal stations. Unusual or unpredictable weather also has the potential to damage electricity generation and transmission infrastructure.

To date, OPG has not experienced significant impacts attributable to climate change or extreme weather, but it is recognized that efforts are required to assess the short and long-term risks, better

define adaptation requirements, and monitor developments in climate science, adaptation activities, and potential changes to policy and regulatory requirements.

In 2016, OPG prepared a climate change adaptation plan which will be used to assess the resilience of systems and processes against projected climate change effects, and identify areas where system and process hardening activities may be required.

OPG continues to participate in climate change adaptation initiatives with municipal and regional governments, the Ontario Ministry of the Environment and Climate Change, the Ontario Ministry of Energy, and Natural Resources Canada. OPG is also a member of the Canadian Electricity Association (CEA) Adaptation Working Group, the Durham Region Roundtable on

Climate Change, and the Ontario Climate Advisory Committee.

OPG is an affiliate member of the Ouranos consortium on climate change which allows OPG to participate in climate change science research and access expertise related to watersheds. A key project Ouranos has undertaken for OPG is the development of an Ontario hydro-climatic atlas. This atlas will show projected temperature and precipitation signals for the rivers where OPG has hydroelectric operations.

Inflow forecasting models being developed for hydroelectric operations will also support OPG in assessing the impacts of changing weather and climate on production and operational efficiency, and will inform decisions regarding adaptation measures.

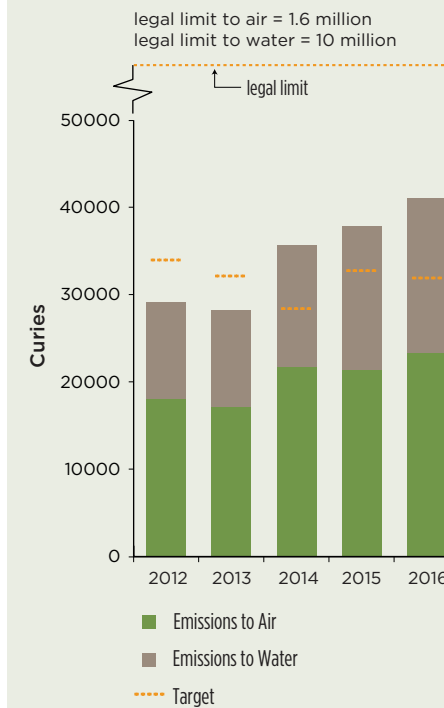
3 | Climate change could potentially impact hydroelectric operations.



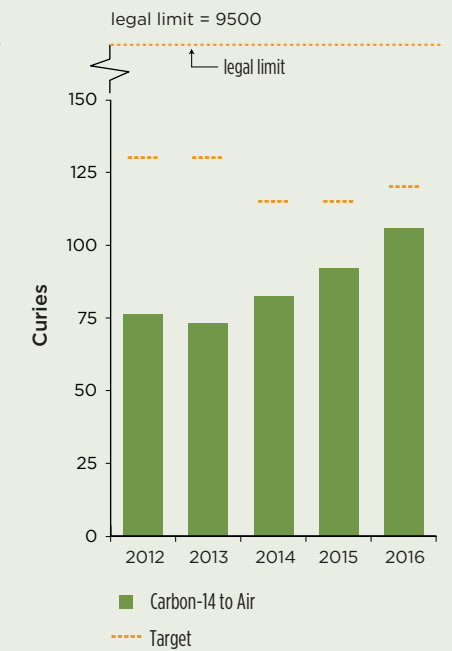


1

TRITIUM EMISSIONS



CARBON-14 EMISSIONS



NUCLEAR EMISSIONS

Radiation Protection

Very low levels of radioactivity are released to air and water as a result of operating OPG’s nuclear generating stations. These releases are all derived from the fissioning of uranium in the reactor core. OPG has a radiation protection program to keep emissions and radiological doses to the public and the environment as low as reasonably achievable, taking social and economic factors into account.

Multiple systems are in place to minimize and control radioactive emissions, including dryers to remove tritiated water vapour, ion exchange resins to remove

carbon-14, and air filters to remove particulate radioactive material and radioiodine. Additionally, releases are monitored and controlled through station maintenance and operating procedures.

Stringent internal station targets for tritium and carbon-14 emissions are set based on past performance and external benchmarking to promote continual improvement. In 2016, the annual targets for tritium emissions to air and water were not achieved due to equipment performance issues and because the operation of OPG’s tritium removal facility was reduced by an extended maintenance outage. Despite these challenges, emissions

remained less than one per cent of station legal regulatory operating limits. Performance for carbon-14 emissions was better than target in 2016.

To ensure OPG’s nuclear operations have no adverse impacts on human health and the environment, Darlington Nuclear GS and Pickering Nuclear GS have well-established environmental monitoring programs (EMPs) in the vicinity of the stations. These programs are designed to assess impacts, demonstrate compliance with regulatory limits, validate the effectiveness of containment and effluent controls, and verify predictions made by environmental risk assessments.

In 2016, the results of the EMPs confirmed that both airborne and waterborne radioactive releases were small fractions for the regulatory release limits. Furthermore, annual average tritium concentrations in drinking water at nearby water supply plants were well below the level committed to by OPG. In conclusion, the results of the EMPs continue to demonstrate that the impact of operations on the local population and environment is extremely low.

Independent Environmental Monitoring

The Canadian Nuclear Safety Commission (CNSC) - the federal

government agency that regulates the use of nuclear energy and materials in Canada - maintains an independent environmental monitoring program to verify that the public and environment around CNSC-regulated nuclear facilities are not adversely affected by releases to the environment. Under the monitoring program, samples are taken from public areas around nuclear facilities and analyzed at the CNSC’s laboratory. Data and conclusions are then published on the CNSC website.

In 2016, the CNSC released sampling results from its independent environmental monitoring program which confirmed that the public

and the environment around OPG’s nuclear generating stations continued to be safe.

LEARN MORE

Nuclear Power and Radiation

Publications, educational resources, and scientific and technical information about nuclear power plants and radiation are available on the CNSC website at [www.nuclearsafety.gc.ca](http://www.nuclearsafety.gc.ca)

1 | Radiological emissions from the Darlington and Pickering nuclear sites remain a small fraction of the allowable release limits.



### Radiation Dose to the Public

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

In 2016, the public doses calculated for Darlington Nuclear GS and Pickering Nuclear GS were 0.6 and 1.5  $\mu\text{Sv}$  respectively. These doses are less than 0.2 per cent of the legal limit of 1,000  $\mu\text{Sv}$  per year, and approximately 0.1 per cent of the estimated average background radiation dose around Darlington Nuclear GS and Pickering Nuclear GS of 1,400  $\mu\text{Sv}$  per year.

#### LEARN MORE

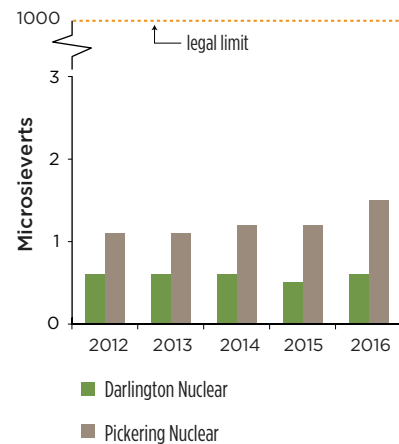
##### OPG Emissions Data

OPG's radiological emissions data is accessible online. Detailed environmental monitoring program results and environmental emissions data reports are available at [www.opg.com/news-and-media](http://www.opg.com/news-and-media)

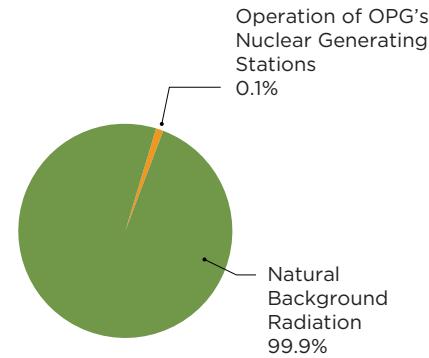


1

#### PUBLIC DOSE



#### DOSE SOURCE COMPARISON



1 | Environmental monitoring station.

2 | Used nuclear fuel storage containers.



2

## 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 materials such as protective clothing, floor sweepings, mops and rags. Intermediate level waste includes materials such as resins, filters and used reactor components. LILRW from OPG-owned nuclear stations is safely stored at OPG's waste management facility located at the Bruce nuclear site in the Municipality of Kincardine.

Minimizing the generation of waste not only reduces OPG's environmental footprint, it is also an effective means of lowering costs associated with the in-station processing, transportation, storage, and long-term management of waste. Key strategies to reduce the generation of low level waste include segregation of radioactive and non-radioactive waste, decontaminating and/or reusing items, and only taking what is

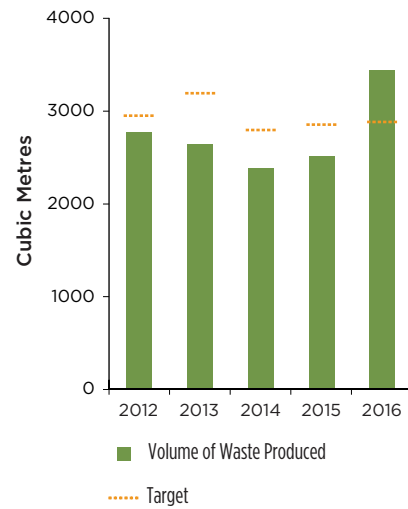
necessary into radioactive work areas to prevent contamination. As a means to further reduce waste storage requirements, low level waste is incinerated or compacted where possible to reduce the volume of waste. In 2016, OPG did not meet its internal target for the production of LILRW, mainly due to the volume of waste generated from work activities to prepare for the Darlington Nuclear GS refurbishment project.

**"Given the ongoing importance of nuclear power to our provincial and national well-being, OPG is committed to the safe, responsible management of nuclear waste. We have an obligation to future generations to dispose of nuclear-related waste safely and responsibly — where it cannot pose a threat to the public or the environment."**

**JEFF LYASH**  
OPG President and CEO



## LOW AND INTERMEDIATE LEVEL RADIOACTIVE WASTE



OPG is working to develop a permanent solution to safely store its LILRW. OPG has proposed to build and operate a deep geologic repository (DGR) which would safely isolate about 200,000 cubic metres of LILRW at a depth of 680 metres at the secure Bruce nuclear site. High level used nuclear fuel will not be stored or managed in the DGR.

The Joint Review Panel (JRP) for the DGR project held public hearings in 2013 and 2014 to give participants the opportunity to hear about the project and its potential environmental effects. In 2015, the JRP issued a report to present their conclusions and recommendations regarding the project. The Panel concluded that the project is not likely to cause significant adverse environmental effects, taking into account the implementation of mitigation measures.

In 2016, OPG completed three further technical, environmental and economic studies into the proposed DGR at the request of the federal Minister of Environment and Climate Change. These studies show that OPG could build the DGR elsewhere in Ontario, but with additional delays, risks and environmental effects, largely due to transporting the existing waste to a new site. OPG's preferred location remains at the Bruce nuclear site. In 2017, the federal Minister of Environment and Climate Change requested that OPG update its analysis of the potential cumulative effects of the DGR project on physical and cultural heritage, through its ongoing process with Saugeen Ojibway Nation.

## High Level Radioactive Waste

High level radioactive waste is used nuclear fuel that no longer contains enough fissionable uranium to heat water efficiently. Once a used fuel bundle is replaced by a new bundle, the used bundle is removed from the reactor and placed in water-filled pools, known as fuel bays, at the nuclear generating station. Fuel bays are built of reinforced concrete, lined to prevent leaks, and designed to withstand earthquakes. The used fuel bundles are stored underwater for at least ten years while their heat and radioactivity decline. Afterwards, the fuel bundles are transferred to dry above-ground storage containers at the site. Currently, used nuclear fuel is in storage at the Pickering, Darlington and Bruce nuclear generating station sites.

The Nuclear Waste Management Organization (NWMO) was established in 2002 by Canada's nuclear electricity producers, including OPG, to design and implement Canada's plan for the safe, long-term management of used nuclear fuel. The plan, known as Adaptive Phased Management, requires used fuel to be contained and isolated in a deep geological repository. It also calls for a comprehensive process to select an informed and willing host for the project. The site selection process began in 2010 and will take many years to complete. This will be followed by an estimated 10-year period to construct the facility. In the interim, OPG will continue to store its used fuel at its nuclear generating station sites.



## RESOURCE USE

### Water Management

#### WATER LEVELS AND FLOWS

In 2016, OPG operated 65 hydroelectric plants and 240 dams on 24 river systems. Many of these structures are used to control or adjust water levels and flows in accordance with requirements that range from voluntary watershed management commitments to international treaties.

Regulating water levels and flows helps maintain water levels for recreational, commercial or other water-based activities; prevents shoreline erosion and damage to infrastructure; reduces impacts to fish; and prevents damage to

aquatic and terrestrial habitats. It can also play a significant role in flood mitigation and prevention in many watersheds. OPG uses hydrological and meteorological data to manage water levels, flows, and water storage. OPG strives to schedule water use for optimum utilization.

OPG works with municipalities and organizations, including the Ontario Ministry of Natural Resources and Forestry, the Ottawa River Regulation Planning Board, and the International Lake Ontario-St. Lawrence Board of the International Joint Commission, on water management provisions for water levels and water flows across the province.

### LEARN MORE

#### Predicting the Power of Water

OPG is participating in the NSERC Canadian FloodNet project, a multidisciplinary research network led by the Natural Sciences and Research Council of Canada.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160805\\_Floodnet.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160805_Floodnet.pdf)

1 | Stewartville GS.



## WATER USE AND CONSERVATION

To ensure water 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.

Almost all of the water used by nuclear and thermal stations is used for cooling purposes. It passes through the station only once and is returned to its source.



1

### Energy Efficiency

OPG (and previously Ontario Hydro) has pursued an energy efficiency improvement program for more than 20 years to conserve energy and increase generation capacity. The cumulative energy improvement since 1994 has been 2,557

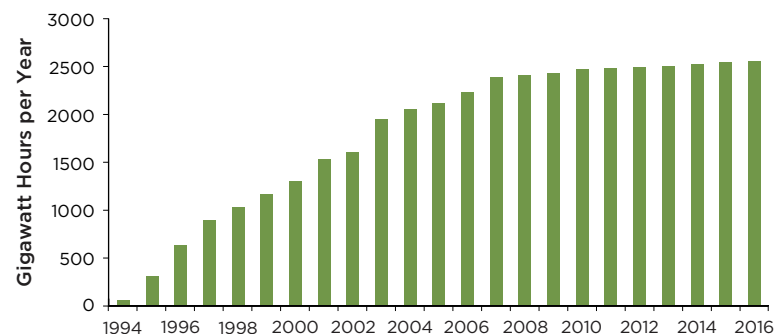
gigawatt hours per year, and is the result of various initiatives to reduce electricity consumption and increase energy output through station upgrades.

In 2016, OPG achieved new internal energy efficiency savings of 15.6 gigawatt hours per year primarily due to the shutdown of

Nanticoke GS and Lambton GS. In addition to this program, OPG also considers energy efficiency and sustainability when renovating and constructing buildings. Improvements were recently completed at OPG's Wesleyville site to reduce the amount of energy required for building cooling and lighting.

1 | OPG provides river water level and flow data at [www.opg.com/generating-power/hydro/Pages/River-System-Data.aspx](http://www.opg.com/generating-power/hydro/Pages/River-System-Data.aspx).

## CUMULATIVE ENERGY EFFICIENCY IMPROVEMENTS



### LEARN MORE

#### Energy Conservation

To learn more about the value of energy conservation and ways to save electricity, refer to the Green Ontario Fund website at [www.GreenOn.ca](http://www.GreenOn.ca)



## SOCIAL

OPG holds itself accountable to its core values of **Safety, Integrity, Excellence, and People and Citizenship** as outlined in its Code of Business Conduct. OPG is committed to maintaining high standards for stakeholder and community engagement, health and safety, emergency preparedness, and community investment because it is an essential part of being a good corporate citizen and neighbour.

1 | Employees and pensioners contribute to charities of their choice through payroll deductions and special events.




### In this section:

- Stakeholder and community engagement
- Indigenous engagement
- Employee health and safety
- Public health and safety
- Emergency preparedness and security
- Employee engagement, development and diversity
- Corporate citizenship program





## STAKEHOLDER AND PARTNER ENGAGEMENT

Group	Methods of Engagement and Feedback Systems	Engagement Examples 2016
<b>Indigenous partners and communities</b> 	Community relations and outreach, capacity-building support including employment and business opportunities, Corporate Citizenship Program	<ul style="list-style-type: none"> <li>In partnership with Taykwa Tagamou Nation, construction of the new Peter Sutherland Sr. GS progressed on schedule and on budget</li> <li>Ongoing engagement with the Saugeen Ojibway Nation regarding the proposed Deep Geologic Repository (DGR) within their traditional territory in Bruce County</li> <li>Provided community investment support to 87 Indigenous initiatives near OPG operations</li> </ul>
<b>Local communities</b> 	Website, social media, visitor centres, community advisory councils, open houses, facility tours, direct mail, TV (select communities), print, radio and online advertising, hearings, consultations, participation in community events, Corporate Citizenship Program, community research	<ul style="list-style-type: none"> <li>Continued the distribution of potassium iodide (KI) pills to new residents and residents near the Darlington and Pickering nuclear stations</li> <li>Hosted Darlington Energy Complex two-day open house and Pickering Nuclear GS extended operation open houses</li> <li>Hosted community open houses on select river systems to inform residents of safety and water management</li> <li>Held a "Virtual Town Hall" telephone discussion about OPG operations in Northeast Ontario</li> <li>Use of Twitter to highlight community news and events</li> <li>Regular update meetings with Darlington and Pickering community advisory councils</li> <li>Nuclear facility performance reports published quarterly on opg.com</li> <li>Provided community investment support (charitable, non-profit, in-kind support) in host communities</li> <li>Conducted community research in Durham Region, Northeast, Northwest and Central Ontario</li> </ul>
<b>Employees</b> 	Intranet, newsletters, regular face-to-face meetings, email, videos, posters, ad hoc surveys, information sessions	<ul style="list-style-type: none"> <li>PowerNet intranet site</li> <li>PowerNews company newsletter</li> <li>Senior manager emails, blogs and video messages</li> <li>Regular safety and department meetings</li> </ul>

## STAKEHOLDER AND COMMUNITY ENGAGEMENT

### Building Trust and Relationships

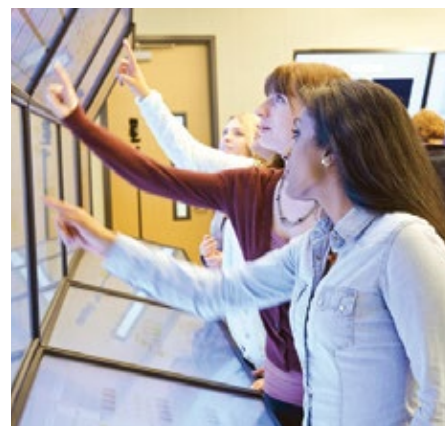
OPG's licence to operate depends on meeting the environmental, social and economic expectations of stakeholders and local Indigenous communities. Accordingly, OPG has an engagement framework

for openly sharing information about the company's activities and operations, and for receiving and considering feedback. This framework allows OPG to build trust, adapt to evolving stakeholder expectations and regulatory requirements, and make better business decisions.

### Engagement Processes

The following table summarizes OPG's processes for stakeholder engagement, as well as key engagement activities in 2016.

1 | Visitors at a Pickering Nuclear GS community information session.




### LEARN MORE




#### Collaboration with Educational Partners

OPG has a partnership with Durham College and the University of Ontario Institute of Technology (UOIT) to produce career-ready graduates for the energy industry.

Read more at [www.opg.com/news-and-media/news-releases/Documents/20160510\\_DC-UOIT\\_Partnership.pdf](http://www.opg.com/news-and-media/news-releases/Documents/20160510_DC-UOIT_Partnership.pdf)



Group	Methods of Engagement and Feedback Systems	Engagement Examples 2016
<b>Suppliers and contractors</b> 	Internet webpage on opg.com, supplier pre-qualification process, labour requirements, face-to-face meetings	<ul style="list-style-type: none"> <li>All suppliers who have transactions with OPG are required to comply with OPG's Supplier Code of Conduct and register with the Ariba Network</li> <li>On-site service providers are also required to register with ISNetworld</li> <li>Interface to promote continuous improvement in supplier performance and quality of parts and services delivered to OPG</li> </ul>
<b>Industry groups</b> 	Working groups, organizations, meetings, conferences	<ul style="list-style-type: none"> <li>Sponsorships of and memberships in a variety of organizations such as the Canadian Nuclear Association, CANDU Owners Group, Canadian Electricity Association, Ontario Waterpower Association, Ontario Biodiversity Council, Canadian Council of Aboriginal Business, Chambers of Commerce and Boards of Trade, and Canadian Manufacturers and Exporters</li> </ul>
<b>Government and government agencies</b> 	Meetings, hearings, consultations, correspondence	<ul style="list-style-type: none"> <li>Presented to several federal parliamentary committees on OPG's nuclear operations</li> <li>Ongoing engagement with local federal and provincial Members of Parliament, host community mayors and councillors, as well as groups like the Mayor's Nuclear Technology Caucus and the Great Lakes Caucus</li> <li>Participation in consultations and preparation of a formal submission to Ontario's Long-Term Energy Plan</li> <li>Presentation and submissions to support the federal review of environmental and regulatory processes</li> <li>Work plan and meetings under a memorandum of understanding to protect fish</li> <li>Facilitated tours and briefings on OPG's operations across the province with politicians from all parties</li> <li>Meetings with officers of the government such as the Environmental Commissioner of Ontario</li> <li>Engagement with the City of Toronto to build awareness around the importance of Pickering Nuclear GS operations to the city</li> </ul>

Group	Methods of Engagement and Feedback Systems	Engagement Examples 2016
<b>Non-government organizations</b> 	Meetings, hearings, consultations, open houses	<ul style="list-style-type: none"> <li>Member or supporter of organizations such as Ontario Community Newspaper Association, Lake Ontario Waterkeepers</li> <li>Partnerships to support biodiversity initiatives</li> <li>Sponsorship of various environmental groups such as Ontario Nature, Friends of the Earth, Toronto Wildlife Centre, LEAF, Bruce Trail, Rouge Park and Earth Rangers</li> <li>Increased engagement and information sharing with clean air advocacy groups such as Pembina Institute, Pollution Probe and Toronto Atmospheric Fund</li> </ul>
<b>Media</b> 	News releases, Twitter, 24/7 media desk coverage, media tours of stations, outreach to media stakeholders	<ul style="list-style-type: none"> <li>Issued 47 news releases in 2016, regarding water safety, plant operations, financial results, etc.</li> <li>Hosted more than 20 media tours of facilities</li> </ul>
<b>Electricity ratepayers, general public</b> 	Public hearings, earned and paid media including TV water safety public service announcements, extensive digital and social media presence, open houses, visitor centres, print publications	<ul style="list-style-type: none"> <li>Regular updates on opg.com</li> <li>Relaunched <i>Powering the Future</i> advertising campaign</li> <li>Relaunched <i>The Power of Water</i> public safety campaign in winter and summer</li> <li>Fall social media campaign to support economic and environmental impact studies on Darlington refurbishment</li> <li>Advertised in major and community newspapers and industry magazines</li> <li>Distributed 100 education kits to Ontario schools</li> <li>Daily tweets and retweets on Twitter; @opg had more than 7,000 followers at the end of 2016</li> <li>Launched Instagram and LinkedIn social media platforms</li> <li>Various publications available to the public, including sustainability report, financial reports, PowerNews and performance reports</li> </ul>





## INDIGENOUS ENGAGEMENT

### Indigenous Relations

OPG is committed to building and growing mutually beneficial working relationships with Indigenous communities near its current and future operations. These relationships are built on a foundation of respect for the culture, customs and rights of Indigenous peoples.

OPG's Indigenous Relations Policy guides the company in its engagement and relationships with Indigenous communities in five key areas:

- Community relations and outreach
- Capacity building

- Employment and training opportunities
- Business and procurement opportunities
- Staff Indigenous relations training

OPG understands that some Indigenous communities have been impacted by the development of hydroelectric facilities in the past. Because of the groundwork laid through OPG's past grievance process, the company has been able to successfully build lasting relationships with Indigenous communities. Beginning in 1992, the grievance process addressed flood damage caused to First Nations reserve lands by the

operations of OPG's predecessor companies. A total of 23 past grievance settlements with 21 First Nations have been resolved. This was an integral step in reconciling the relationship between OPG and the affected communities.

In November 2016, OPG and Animbiigoo Zaagi'igan Anishinaabek (AZA), also known as Lake Nipigon Ojibway, renewed a long-standing relationship with a formal apology from OPG at the community's annual gathering. The apology addressed past grievances related to dams and diversion constructed on the Lake Nipigon and Ogoki River between 1918 and 1950.

1 | The project to remediate Long Lake 58 First Nation's shoreline is complete.

OPG meets regularly with Indigenous community representatives and members to share information, discuss development initiatives and review planned project activities. In 2016, outreach activities included:

- Proactive engagement with Indigenous communities on environmental assessments regarding the Calabogie, Ranney, and Coniston hydroelectric station upgrades.
- Celebration of the completion of two shoreline restoration projects. Whitesand First Nation worked closely with OPG to restore their shoreline and employed community members on the project. Long Lake 58 First Nation undertook the management of their three-year shoreline project and finished under budget and a year ahead of schedule.
- Information sharing sessions with Indigenous communities about nuclear operations and projects with a focus on the relicensing of the Western Waste Management Facility (WWMF) at the Bruce nuclear site and the Pickering Waste Management Facility (PWMF) at Pickering Nuclear GS.
- Ongoing discussions with Saugeen Ojibway Nation (SON), the Métis Nation of Ontario (MNO) and the Historic Saugeen Métis (HSM) on waste operations and the proposed Deep Geologic Repository (DGR) for low and intermediate level radioactive waste at the Bruce nuclear site.
- Seven tours with 29 SON members were conducted at the WWMF and the proposed DGR site, with more community tours planned in 2017. Environmental monitoring field trips are also being planned with representatives of the MNO and HSM to build their capacities.
- Regular meetings with the Williams Treaties First Nations (Mississaugas of: Alderville, Curve Lake, Hiawatha and Scugog Island; Chippewas of: Beausoleil, Georgina Island and Rama) to share information about nuclear generation and updates on the Darlington Nuclear GS refurbishment project and the PWMF relicensing process.
- OPG participated in the second annual Aboriginal Apprenticeship Board of Ontario "Day in the Trades" event hosted by LiUNA Local 183 at their facility in Cobourg. Representatives from various building trades, suppliers, and contractors interacted with

Indigenous high school students from the communities as diverse as the Mohawks of the Bay of Quinte, Curve Lake First Nation, Pikwakanagan First Nation, and Durham Region Métis.

- OPG welcomed the Native North American Travelling College display to the St. Lawrence Power Development Visitor Centre. The Centre also commissioned a work by renowned Akwesasne artist John B. Thomas to paint a 21-foot-long mural over three canvases to depict a typical day in the lives of the Mohawk people who lived on the river before the construction of canals began in the late 1700s.
- OPG supports local education programs like the electricity science camps operated by Elephant Thoughts Educational Outreach for students in Mattagami and Gull Bay First Nations. In addition, OPG continued its support of The Lieutenant Governor's Indigenous Youth Summer Reading Camps operated by Frontier College in 26 First Nations in northern Ontario. In total, OPG's Corporate Citizenship Program provided support to 87 Indigenous initiatives.



### LEARN MORE

#### Mohawk History Comes to Life

Renowned Akwesasne artist John B. Thomas painted a mural at the St. Lawrence Power Development Visitor Centre in Cornwall.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20161114\\_Mural.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20161114_Mural.pdf)



**Growing Economic Partnerships**

Through partnerships with Indigenous communities and companies, OPG has successfully developed a number of projects to produce clean, renewable electricity while providing education, training, employment and contract opportunities to surrounding Indigenous communities. OPG is committed to exploring business partnerships that maximize employment while developing a qualified workforce.

Partnerships have included the Obishikokaang Waasiganikewigamig / Lac Seul, Lower Mattagami, and Peter Sutherland Sr. hydroelectric projects with the Lac Seul First Nation, Moose Cree First Nation and Taykwa Tagamou Nation, respectively. Combined, these projects added 478 MW of generation capacity. The most recent project - Peter Sutherland Sr. GS - employed 109 Indigenous people in craft and non-craft positions and \$52.4 million in contracts out of \$63 million available were awarded to Indigenous businesses. OPG has also entered into a partnership



with Six Nations Development Corporation to build a 44 MW solar power facility at its Nanticoke site.

OPG continues to enhance its business relationship with Indigenous communities through its commitment to the Canadian Council for Aboriginal Business's Progressive Aboriginal Relations (PAR) program. In 2015, after its initial assessment, OPG was awarded

a Silver level certification. OPG will continue to improve its PAR results to achieve a Gold level certification in the next review period.

Two key improvements will be a renewed, proactive business engagement strategy to identify supplier and partnership opportunities for Indigenous businesses, and the development of outreach and recruitment strategies

targeted to Indigenous communities and students to promote OPG as an employer of choice.

Investing in relationships with Indigenous communities also means investing in its young people. OPG is pleased to give the John Wesley Beaver Memorial Award to a female and male Indigenous post-secondary student each year to support their studies. The award is named after John Wesley Beaver, an engineer who had a long career with Ontario Hydro. Mr. Beaver was from the Alderville First Nation and was a veteran of World War II. He also served as the Chief of his community.

The John Wesley Beaver Awards are organized by OPG's Native Circle - an internal network for Indigenous employees of OPG. The Native Circle also organizes OPG's annual National Aboriginal Day celebrations to support



cultural awareness for employees and provides overall advice and guidance on policies and initiatives that shape OPG's relationships with Indigenous communities.

OPG was recognized in 2016 by the Canadian Electricity Association (CEA) for its approach to Indigenous relations with the Leadership in External Collaboration and Partnerships award. The award is presented to companies with a strong commitment to external collaboration and partnerships with Indigenous peoples, local communities, and other stakeholders. The selected company is chosen based on a demonstration of how collaborative efforts have led to better sustainability outcomes for the communities, the company, and the electricity sector.

**LEARN MORE**

**Celebrating Tomorrow's Indigenous Leaders**

OPG congratulates Stephanie Seymour and Shadrak Gobert, the 2016 recipients of the John Wesley Beaver Memorial Student Awards.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160818\\_JohnWesleyBeaver.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160818_JohnWesleyBeaver.pdf)

1 | National Aboriginal Day celebrations at OPG's Kipling site.

2 | OPG's Barb Keenan and Jeff Lyash with John Wesley Beaver Award winners Stephanie Seymour and Shadrak Gobert.



**LEARN MORE**

**Employment and Training Opportunities**

Individual training plans were completed for Taykwa Tagamou Nation members on the Peter Sutherland Sr. hydro project.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160406\\_TTNPartnership.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160406_TTNPartnership.pdf)





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2

## HEALTH AND SAFETY

### Employee Safety

At OPG, the overarching objective is to ensure that every employee and contractor goes home safely at the end of each day. OPG's goal of zero injuries is attainable, and OPG believes it is on the path to making it a reality. OPG's commitment to safety excellence extends beyond a conventional framework of standards and procedures to include transformational cultural initiatives, mechanisms for continual improvement, and a team-orientated approach.

OPG remains at the top of its class when measured against other Canadian electrical utilities of similar size. In 2016, the company

was awarded the President's Gold Award for Excellence in Employee Safety from the CEA in recognition for maintaining All Injury and Accident Severity Rates in the top quartile for the preceding three consecutive years (2013-2015).

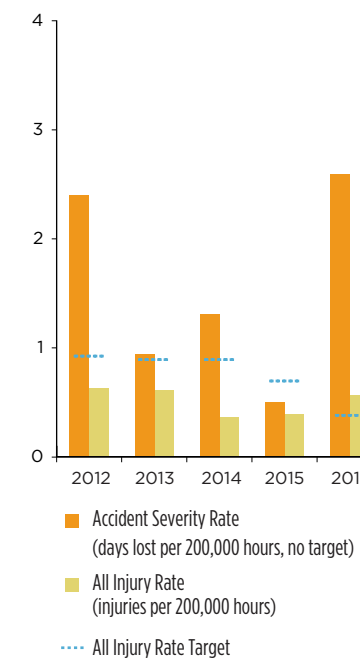
All Injury Rate (AIR) measures the number of injuries involving employees that result in lost time or that require medical treatment. OPG's 2016 AIR was 0.56 injuries per 200,000 hours worked, which was worse than target. Accident Severity Rate (ASR) measures the number of days lost due to injuries. The ASR for the year was 2.59. In 2016, OPG saw a slight increase in leading safety indicator events such as slips and trips, insect bites, sharp objects,

musculoskeletal disorders, and caught by / pinned incidents. OPG will incorporate these results into an injury reduction plan by determining causal factors and focusing on improvement mechanisms for 2017.

1 | Jeff Lyash, OPG President and CEO (right) accepts the CEA's President's Gold Award of Excellence for Employee Safety from the Honourable Sergio Marchi, CEA President and CEO.

2 | Employees are provided with the training and tools required to do their jobs safely.

### OCCUPATIONAL INJURY RATES



OPG also monitors High Maximum Reasonable Potential for Harm (MRPH) events. MRPH is a rating system used to classify incidents, and to determine the potential severity of safety incidents. These are incidents with potential for injury to personnel; however, no actual injury may have occurred. High MRPH incident investigations offer learning opportunities for continued improvement in safety performance. OPG and its contractors experienced 29 High MRPH incidents in 2016. Of these incidents, 15 were related to OPG employees and 14 were related to contractors. Collectively, OPG and its contractors will be focusing on continued improvement in the reduction of incidents involving motor vehicles, falling objects, and potential falls from heights.

In mid 2016, OPG identified that its year-to-date safety performance was not meeting expectations. To refocus the organization on safety, all employees and contractors participated in a mandatory company-wide safety stand down to discuss why OPG values safety and how to improve performance. This type of stand down was a first in the history of OPG. It was also used to launch a new "Care Enough to Act" initiative to encourage employees to practice positive safety behaviours to protect themselves and their co-workers. OPG is committed to working to reach the next level of safety culture – one where everyone is motivated because they care, not only because of a rule or procedure.





1

### Employee Health

OPG's greatest asset is its people. To protect its workers, OPG has a Total Health strategy to embed a health culture that supports employees and families in their efforts to achieve an optimal level of health and functioning. OPG feels that "Total Health" builds a more resilient and engaged workforce, reduces the costs associated with ill-health, and makes OPG a more attractive place to work.

A Total Health team works to ensure the needs of employees are heard and addressed, and the right programs and services are available. OPG also continues

to educate employees on the benefits available through the Employee and Family Assistance Program. There has been a notable increase in the use of services that pertain to proactive health initiatives such as nutrition and weight management.

In 2016, OPG partnered with Ontario Shores, one of four Ontario Psychiatric Hospitals, to deliver mental health training that is accredited by the Mental Health Commission of Canada. The goal is to educate participants and help them identify signs of mental health problems in co-workers, friends, family, and even themselves. This training also gives participants the tools to support

an individual and direct them to appropriate help and treatment. OPG launched the training in May 2016 and has a commitment to train 2,000 employees by the end of 2018. The response has been very positive with over 94 per cent of the participants stating the training is beneficial to their role within OPG.

1 | Contractors are required to maintain a level of safety equivalent to that of OPG employees while at OPG workplaces.

2 | Always Stay Clear, Stay Safe.



2

### Public Water Safety

OPG staff work closely with partners in site communities to help ensure public safety around OPG's dams and hydroelectric stations. OPG properties and facilities are clearly marked with warning signs, and barriers such as fences and booms are in place to prevent access. As an extra safety

measure, OPG has a water safety outreach program to inform the public about the potential for rapid and dangerous changes in water levels and flows. OPG's message remains "Stay Clear, Stay Safe."

Safety messages are broadly communicated to the public on television, radio, online, through social media and in newspaper

and magazine advertisements, as well as through brochures and regular news releases prior to holiday weekends. "The Power of Water" public service television announcement illustrates how OPG uses the powerful flow of water to produce clean, renewable electricity, and it reminds viewers to stay clear of stations and dams.



### LEARN MORE

#### Mental Health Awareness

OPG employee Tony Hall knows the lasting impact mental illness can have on a family. A heartfelt video about his family's story and the need to talk about mental health can be viewed at [www.youtube.com/watch?v=0wA6ASCQNPU](http://www.youtube.com/watch?v=0wA6ASCQNPU)



### LEARN MORE

#### Water Safety in Niagara

OPG's team at the Niagara River Control Centre organizes water rescue training with the area's first responders.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160722\\_DaringRescues.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160722_DaringRescues.pdf)





1



2



**LEARN MORE**

**Tali Serota**  
Associate Coordinator of Dam and Public Safety

Tali spearheads the creation of simulated emergencies at OPG's hydroelectric facilities.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160923\\_TaliSerota.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160923_TaliSerota.pdf)

## EMERGENCY PREPAREDNESS AND SECURITY

### Emergency Preparedness

OPG's emergency management program is designed to ensure the company can manage an emergency in a timely and effective manner. To support this program, OPG has comprehensive emergency preparedness plans in place to protect employees and the public, the environment, property and assets, and operational continuity. In 2016:

- OPG's Security and Emergency Services staff continued to provide 24/7 emergency response coverage at the

Darlington and Pickering nuclear stations. OPG also has standing bilateral agreements with the Municipality of Clarington and the City of Pickering to provide support and specialized resources and equipment in emergency situations.

- OPG participated in the testing and implementation of the Wireless Public Alerting System (WPAS) pilot project in Durham Region. The WPAS project was developed to assess the technical function and user response to emergency alerts using mobile devices.

- An international team of experts visited Pickering Nuclear GS for an in-depth review of the station's operational performance and adherence to safety standards. The team confirmed that Pickering demonstrates a strong commitment to safety.

- Pickering Nuclear GS updated its public evacuation time estimate using the latest census data available from 2011.
- OPG and the Canadian Nuclear Safety Commission hosted a series of community information sessions about operations at Pickering Nuclear GS.

Representatives from the Office of the Fire Marshal and Emergency Management, Toronto Office of Emergency Management, and Durham Emergency Management participated in the sessions and provided support to answer questions.

- OPG's Northwest Operations held a major dam safety exercise with Thunder Bay serving as the emergency operations centre. The exercise simulated the failure of an earth dam at Caribou Falls GS. The Ontario Provincial Police, Ontario Ministry of Transportation, Hydro One and Wabaseemoong

Independent Nation were just a few of the many groups involved, putting their own response plans into action during the exercise.

### Cyber Security

Cyber security incidents have been on the rise for the past several years. This trend is expected to intensify as organizations' reliance on technology continues to increase. OPG has strategies in place to prepare for, respond to, and recover from cyber security incidents. In particular, OPG's cyber security program focuses on compliance with

regulatory requirements and applicable laws, improving cyber security protection and detection capabilities, improving incident response and recovery capability, and increasing the cyber security awareness and training level of employees.

1 | OPG's Wesleyville Fire and Training Academy provides highly specialized training to prepare for potential emergencies.

2 | Control room at R.H. Saunders GS.



## PEOPLE AND CULTURE

### Employee Engagement

OPG aspires to be a company where people work together with a greater sense of ownership and involvement; where employees at all levels have opportunities to expand their skills and understanding, in an environment where information flows freely.

OPG has employee programs, events and activities to create a sense of pride in being an OPG employee, and to foster collaboration and team-building across the organization. Programs include: Power of You employee awards, which recognize the tremendous efforts of employees, a charity campaign, employee service recognition, Take Our Kids to Work Day, and various events that celebrate OPG's diversity and promote an inclusive workplace.

OPG also has an active and robust talent and succession planning process. In support of building leadership talent, OPG offers an "Accelerate" development program which provides high-potential employees with the

opportunity to learn, grow and build their career. More than 180 employees at various levels and functions across the organization have participated in the program. To reinforce the focus on staff development, all OPG people leader performance plans are required to include objectives regarding leadership and development. Succession planning is key to the company's success, particularly in recognition that a significant portion of OPG's employees are eligible to retire over the next five years.

Employees are kept current on business and operational activities by leveraging several communication tools such as the company's intranet site, newsletters, face-to-face rollouts, and emails from executives to provide employees with ongoing performance updates and to highlight accomplishments by teams and individuals.

In 2016, OPG kicked off a culture transformation journey. By engaging all employees through a survey, OPG gained important



1

insight into the current culture, as well as the culture needed to achieve the company's business strategy. Beginning in 2017, OPG will execute a multi-faceted program to shift the company's culture and to continue to attract and retain the best candidates to deliver on OPG's goals and strategic priorities.



2

### Diversity and Equity

A diverse and inclusive organization generates innovative ideas, has broader perspectives, and has better ways to problem-solve, all of which lead to better decision-making and improved results. In 2016, OPG promoted diversity and equity within its own workforce and in the community through the following initiatives.

#### OPG INITIATIVES

- OPG is a signatory of the Catalyst Accord, and has set a target for "diverse" representation on the Board of 50 per cent, including 40 per cent women by 2019 and adopted a target of 25 per cent women on the Board by 2017. OPG defines diversity to include: women, Indigenous peoples,

people with disabilities, and visible minorities. The Board's policy on diversity is to interview a diverse candidate for every vacancy on the Board. As of the end of 2016, 36 per cent of the Board met the diversity definition (five members), and representation of women on the Board was 21 per cent (three members).

- OPG's senior leadership team and diversity committees participated in unconscious bias training to encourage and support an inclusive work environment. A new training program was also developed and delivered to highlight fair and equitable recruitment and selection practices.
- Several events took place in recognition of Diwali, Eid al-Fitr, Black History Month and International Women's Day. The Christian Society hosted an event where Kim Phuc, who

is best known as the girl in the famous photo of a napalm attack during the Vietnam War, spoke about overcoming adversity.

- OPG continued to use a variety of methods to advertise job postings, including local media outlets, social media sites, its career website, and direct contact with Band offices and Indigenous communities. OPG also augmented its traditional recruitment strategy through a partnership with Career Edge, a not-for-profit career organization that offers paid internship programs for new graduates, candidates with disabilities, and internationally qualified professionals.

1 and 2 | One of OPG's long-term goals is to build a diverse, healthy, engaged workforce and the culture to succeed.

### EMPLOYMENT NUMBERS 2016

- Approximately 9,270 regular employees
- Approximately 5,070 OPG employees were represented by the Power Workers' Union
- Approximately 3,140 OPG employees were represented by the Society of Energy Professionals
- Approximately 6 per cent annual staff turnover due to attrition (5 per cent due to retirement)
- Over 700 external hires
- 20 per cent of employees are eligible to retire in the next 5 years
- 30 per cent of employees are eligible to retire in the next 10 years



REPRESENTATION OF DESIGNATED GROUPS BY EMPLOYMENT EQUITY OCCUPATIONAL GROUP

Employment Equity Occupational Group	Designated Groups	Representation as of Dec. 31, 2015		Representation as of Dec. 31, 2016	
		Number	Per Cent	Number	Per Cent
<b>Senior Managers</b> e.g. Board Chair, President and CEO, Presidents, Senior Vice Presidents	Women	2	14.3	1	7
	Visible Minorities	0	0	0	0
	Indigenous Peoples	0	0	0	0
	Persons with Disabilities	0	0	0	0
<b>Middle and Other Managers</b> e.g. Vice Presidents, Directors, Senior Managers, Managers, Section Managers, Project Leaders, etc.	Women	241	23.2	273	25
	Visible Minorities	200	19.3	206	19
	Indigenous Peoples	6	0.6	7	0.6
	Persons with Disabilities	10	1.0	10	0.9

COMMUNITY SUPPORT

- OPG, through its Corporate Citizenship Program, provided support to organizations that assist people with disabilities. Organizations included: Abilities Centre, Canadian Mental Health Association, Canadian National Institute for the Blind, Community Living, DeafBlind Ontario Services, Diversity Thunder Bay, Easter Seals Ontario, Learning Disabilities Association, Niagara Children's Centre, ParaSport Ontario, Pathways Health Centre, Special Olympics Ontario, Willow Springs Creative Centre, and WindReach Farm.
- OPG mentors from the National Society of Black Engineers (NSBE) continued to support the students at Saint Mother Teresa Catholic Academy. Students competed in a mathematics proficiency "Try-Math-A-Lon" competition in Boston and the First Robotics Canada competition at the University of Ontario Institute of Technology (UOIT).
- OPG continued its partnership with Toronto Region Immigrant Employment Council (TRIEC) to deliver The Mentoring Partnership program to bring together skilled immigrants and established professionals in occupation-specific mentoring relationships.
- OPG continues to support Women in Nuclear which is a worldwide association of women working professionally in various fields of nuclear energy and radiation applications. One key objective is to promote career interest in nuclear engineering, science, trades and other nuclear related professions especially among women and young people.

CORPORATE CITIZENSHIP

OPG has generating stations in communities across Ontario from Kenora to Cornwall. As a publicly owned generator with a history of service that goes back for more than 100 years, OPG strives to be an engaged and productive community member, helping to contribute to host community well-being.

The Corporate Citizenship Program (CCP) is one way OPG demonstrates its commitment to corporate social responsibility by providing community investment support (charitable, non-profit, and in-kind support) to grassroots initiatives in the communities in which OPG operates. OPG believes this is essential to being a good corporate citizen and neighbour.

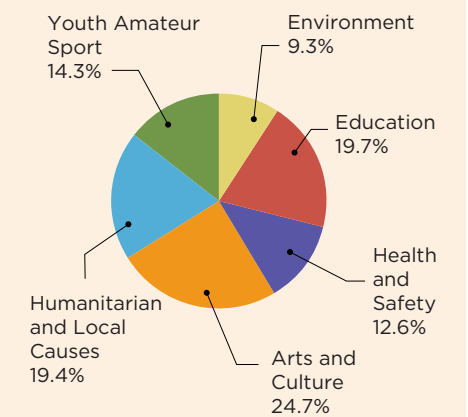
In 2016, through the CCP, OPG provided Community Investment

(CI) support to over 850 grassroots host community initiatives in the program focus areas of: education (including 250 student awards); environment; and community (youth amateur sport, arts and culture, health and safety, humanitarian and local causes) including support of Indigenous initiatives. With average annual program CI totalling \$2.4 million, and 80 per cent of OPG's annual contributions between \$100 and \$2,500, OPG ensures its support benefits a broad spectrum of community needs and leverages good value.

Featured here and in the following pages are examples of the beneficial work done in 2016 by OPG's community partners. It is their hard work and passion that is contributing to community well-being and sustainability.

2016 CORPORATE CITIZENSHIP PROGRAM

Community Investment by Focus Area



Corporate Citizenship Partnership Profiles

COMMUNITY

Special Olympics Ontario Provincial School Championships

"Ladies and gentlemen, the torch is here!" The responding cheers may well have blown the roof off. Hundreds of athletes, parents and spectators gathered at Durham College on June 1 eager to watch the Opening Ceremonies for the 2016 Special Olympics Ontario (SOO) Provincial School Championships. The two-day event provided sports competition for more than 600

student athletes, ages 12 to 21, with an intellectual disability. Each athlete has a story to tell, and a challenge they have to overcome. School teams competed in one of 52 regional qualifiers held in 2016. The qualifiers had over 5,000 athletes attend and making it to the provincial championships is an accomplishment.

Scott Burns, OPG's Vice President, Security and Emergency Preparedness, introduced the Law Enforcement Torch Run and arrival of the torch in the building and wished the athletes luck in their upcoming events. The athletes would compete in bocce,

basketball, soccer, track and field, and floor hockey. In addition to their family and fans, they were accompanied by 200 coaches and supported by community partners including the City of Oshawa, the Durham Regional Police Service, Durham College, OPG and others. "We are fortunate here in Durham," noted Burns. "We possess a rich heritage, a caring spirit, and a strong dedication to community service." More than 300 volunteers - the majority from Durham - came together to help ensure the Championships were memorable and enjoyable for the athletes, and everyone involved.





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Since 2008, OPG has proudly supported SOO. During this time, countless OPG employees have volunteered their time in support of these inspiring athletes. For over 40 years, SOO has been providing opportunities for individuals with intellectual disabilities. It maintains programs in 140 active communities across Ontario, reaching 21,000 participants annually. Participation in the program helps athletes acquire skills and self-confidence that influence their ability to succeed in school, obtain employment, and achieve personal goals.

For more information, visit [www1.specialolympicsontario.com](http://www1.specialolympicsontario.com)

## ENVIRONMENT

### Children's Groundwater Festivals

Every spring and fall, yellow school buses roll across the landscape in Ontario bringing thousands of elementary school children to local conservation areas, outdoor education centres, streams and wetlands to learn about one of our most valuable natural resources, water. Education specialists from the Children's Water Education Council (CWEC), local teachers, volunteers, post-secondary students, conservation groups, industry and government partners join together to provide students with this unique outdoor environmental learning opportunity.

At the festivals, children take part in a variety of activity stations where they learn the importance water plays in our daily lives, and about water conservation and water

safety. Educating communities and particularly children about the importance of healthy water and water systems helps to lay the foundation for good water stewardship. The festivals complement classroom lessons and the Ontario School Curriculum, and they also excite and motivate students to share their knowledge that we are all responsible for maintaining healthy water systems for future generations.

The CWEC, a charitable organization, has been promoting and facilitating water-based education programs for children since 2001. Currently the CWEC supports 25 Children's Water Festivals (CWF) across Ontario. OPG provides direct support to and participates in a number of these festivals in Eastern Ontario, Durham, Haldimand, Haliburton-Muskoka-Kawartha, Grey-Bruce,



2

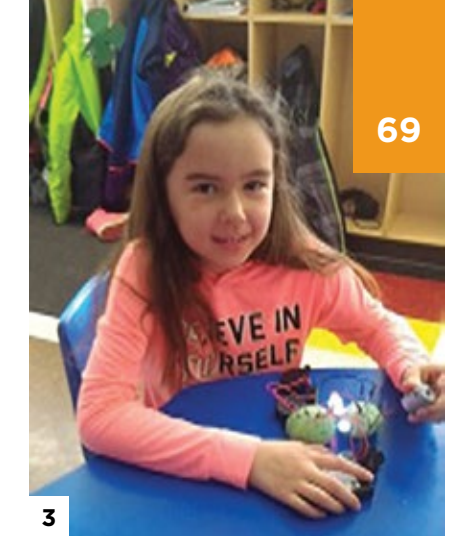
Niagara, Quinte (Tri-County), and Sudbury. OPG staff engage students in hydroelectric (water power) generation and water safety learning activities. They remind everyone to Stay Clear, Stay Safe around dams, hydroelectric stations and fast-flowing rivers.

For more information visit [www.cwec.ca/Festivals](http://www.cwec.ca/Festivals)

## INDIGENOUS COMMUNITIES

OPG is committed to building mutually beneficial working relationships with Indigenous communities near its operations. OPG's relationship with Ontario's Indigenous communities is founded on respect for their languages, customs and cultural institutions.

In 2016, OPG supported 87 Indigenous initiatives in the areas of education, environment, and community. Partner organizations included: First Nations, Métis Nation of Ontario, Elephant Thoughts Educational Outreach, Frontier College, Indspire, the Little Native Hockey League, the Nishnawbe Aski Development Fund and The Anishinabek Nation 7th Generation Charity.



3



## EDUCATION

### Elephant Thoughts Educational Outreach

Elephant Thoughts Educational Outreach is a registered charity and leader in Indigenous education programs. Their programs celebrate distinct Native culture and identity, while at the same time teaching and integrating both traditional and contemporary knowledge. The organization focuses on getting students excited about learning, connecting the community to the education system, and teaching programs that are pertinent to the audience, all with the aim to increase graduation rates. They bring high quality science camp programming to remote First Nations with the goals of: empowering Indigenous youth to believe in themselves as students, relating First Nations culture and values to science, cultivating environmental stewardship, and giving campers a fun week of learning that they will remember. In 2016, with OPG Northwest and Northeast Operations' support, Elephant Thoughts provided one-week "electricity" science camps for students in Kindergarten

to Grade 8 in the communities of Mattagami First Nation and Gull Bay First Nation. Camp objectives included building literacy among campers in STEM (Science, Technology, Engineering and Math) using fun, hands-on activities to provide campers with a basic understanding of what electricity is, the role electric power plays in our lives, energy conservation and electrical safety. Learning modules included: Laws of Energy, Bicycle Generators, Water Wheel Generator, Squishy Circuits, Van der Graff Generator, Eco Stories and more.

For more information visit [www.elephantthoughts.com](http://www.elephantthoughts.com)

1 | Mayor John Henry (Oshawa), Police Chief Paul Martin (Durham Region), Scott Burns VP (OPG Security), Glenn MacDonell CEO (Special Olympics Ontario (SOO)) and athletes, celebrate the 2016 SOO Provincial School Championships.

2 | Bretton Christensen, OPG, demonstrates how hydroelectric power is produced and the importance of water safety to students attending the 2016 Quinte (Tri-County) Children's Water Festival.

3 | Camper at Elephant Thoughts OPG Electricity Camp, Mattagami First Nation, uses conducting and insulating play dough to learn about electric circuits.





1

## ARTS AND CULTURE

### Landscape of Nations: The Six Nations and Native Allies Commemorative Memorial

In 2009, a Legacy Working Group of the Niagara-on-the-Lake War of 1812 Bicentennial Committee was created to recognize the important role Native peoples played in the defence of Upper Canada. Landscape architect Tom Ridout of Fleisher Ridout Partnership and Raymond Skye, a renowned Six Nations artist, were chosen to collaborate on the memorial. On Oct. 2, 2016, Landscape of Nations: The Six Nations and Native Allies Commemorative Memorial

was unveiled and opened to the public at Queenston Heights Park. It serves as a living memorial to the contributions and sacrifices made by First Nations and Métis forces on Queenston Heights and throughout the War of 1812. It inspires citizens to learn and acknowledge the critical role that Native peoples played in the defence of this land and the ability of Canada to remain free. The memorial inspires remembrance, reinforces the need to renew historic bonds between Native peoples and Canadians, and enhances awareness of the War of 1812 and its role in shaping the future of the country.

Visitors to the memorial will view magnificent bronze figures of Major John Norton (see photo 1) and John Brant (see photo 3), the two primary Native leaders who led Six Nations and Native Ally forces at the Battle of Queenston Heights and in other engagements. Visitors proceed along a walkway representing the Two Row Wampum Belt, through a metal frame structure symbolizing a longhouse, toward the Memory Circle (see photo 2). The circle consists of eight Queenston limestone walls, which emanate like a sunburst. At this gathering place, visitors are asked to remember

the contributions of Six Nations and Native Allies in the War of 1812. They are also asked to recognize the historic Council of Peace and Reconciliation held at Niagara on Aug. 31 - Sept. 1, 1815, that restored peace among the Native nations who fought on opposing sides at the time of the war. The memorial features indigenous plants and grasses that would have been found in the region during this period. An eastern white pine tree stands as a symbol of the Haudenosaunee constitution known as the Great Law of Peace.

The memorial was made possible by the generosity of citizens, the Legacy Working Group, Town of Niagara-on-the-Lake, Niagara Parks Commission, Six Nations Legacy Consortium, commissioned artists Tom Ridout of Fleisher Ridout Partnership and Raymond Skye, and the support of signature donors. Signature donors included Government of Canada (Founding Donor), Anonymous (Title Donor), Ontario Trillium Foundation, Walker Industries, Casino Niagara, TD Bank, OPG, The Niagara Foundation and other businesses, families and individuals. OPG's Niagara Operations is a proud supporter

of this important and long overdue memorial.

To learn more or plan a visit, go to [www.landscapeofnations.com](http://www.landscapeofnations.com)

1, 2 and 3 | Landscape of Nations, Queenston Heights Park. Photos courtesy of © Alex Heidbuechel / Flashbox Photography.



2



3



# ECONOMIC



OPG focuses on providing maximum value to the people of Ontario by generating reliable electricity at a price that moderates overall rates for Ontario electricity customers. OPG also provides economic value to Ontarians through employment, the purchase of goods and services, and contributions to government revenues.

## In this section:

- Financial performance
- Cost of electricity
- Dedicated nuclear funds
- Electricity generation and reliability
- Investments in infrastructure and new generation capacity
- Economic impact
- Supply chain

1 | Pickering Nuclear GS.

2 | Darlington Energy Complex training facility.



# FINANCIAL STRENGTH

As a commercial enterprise, OPG's financial priority is to achieve a consistent level of strong financial performance that delivers an appropriate level of return on the Shareholder's investment and positions the company for future growth. Inherent in this priority are three objectives:

- Increase revenue, reduce costs and achieve appropriate return
- Ensure availability of cost-effective funding for operational needs, generation development projects and long-term obligations
- Pursue opportunities to expand the existing core business and capitalize on new growth paths

## Financial Performance

OPG's net income attributable to the Shareholder was \$436 million for 2016, compared to \$402 million in 2015. The increase was the result of higher generation from the nuclear fleet, higher earnings on the Nuclear Segregated Funds,

lower operations, maintenance and administration expenses, and higher revenues for stations in the contracted generation portfolio segment, namely Lennox GS and Atikokan GS.

OPG manages an array of risks to mitigate potentially unfavourable impact on the company's financial performance. This includes risks related to rate regulation, financial markets and long-term obligations. OPG is also exposed to risks such as weak electricity demand, displacement of generation by competitors, and financial risk associated with energy trading. Detailed information about the company's financial risks is available in OPG's **2016 Annual Report**.

## Ontario's Low-Cost Generator

OPG provides about half the power used in Ontario and represents about 20 per cent of a customer's bill. OPG currently generates electricity that is about 40 per cent less expensive than the average

of all other generators. This lower cost helps moderate the price customers pay.

The Ontario Energy Board (OEB) sets the prices for electricity generated from OPG's regulated nuclear and hydroelectric facilities. The average sales price for the regulated nuclear generation segment during 2016 was 6.9 cents per kilowatt hour (¢/kWh), compared to 6.5 ¢/kWh during 2015. The average sales price in 2016 for the regulated hydroelectric segment was 4.4 ¢/kWh, compared to 4.7 ¢/kWh during 2015. Approximately 90 per cent of OPG's revenue comes via regulated rates. Electricity generated from most of OPG's unregulated assets is subject to Energy Supply Agreements (ESAs) with the Independent Electricity System Operator (IESO). Regulated rates and ESAs provide stable and predictable revenue streams, compared to potential fluctuations in revenue caused by increases or decreases in energy market prices.





1

In May 2016, OPG filed a five-year application with the OEB for new base regulated prices for production from its regulated nuclear and hydroelectric facilities, with a proposed effective date of Jan. 1, 2017. The application seeks to ensure that prices allow for sufficient cash flow to meet the company's liquidity needs, support cost-effective funding for the Darlington Refurbishment project and other expenditures, and maintain the company's investment grade credit rating, while also taking into account the impact on customers. In addition, the application will further challenge and incentivize OPG to find additional cost reductions and efficiencies within its operations.

### Dedicated Nuclear Funds

OPG is responsible for the long-term management of used nuclear fuel bundles and low and intermediate level radioactive waste, and the eventual decommissioning of its nuclear generating stations and nuclear waste facilities, including the stations leased to Bruce Power.

Pursuant to the Ontario Nuclear Funds Agreement (ONFA) between OPG and the Province of Ontario, OPG established a Used Fuel Segregated Fund and a Decommissioning Segregated Fund to fund future costs. OPG maintains these funds in third-party custodial and trust accounts that are segregated from the rest of OPG's assets. OPG's required contributions to the Nuclear Segregated Funds are determined

based on periodically updated reference plans approved by the Province under the ONFA, at least once every five years. In the fourth quarter of 2016, OPG completed a comprehensive update of the estimate for its obligations for nuclear waste management and nuclear facilities decommissioning.

### LEARN MORE

#### Ontario Energy Board

Additional information about the Ontario Energy Board (OEB) and OPG's submissions to the OEB can be found at [www.oeb.ca](http://www.oeb.ca)

1 | Sir Adam Beck I GS.

2 | Turbine inspection at R.H. Saunders GS.



2

## GENERATION AND RELIABILITY

### Electricity Generation

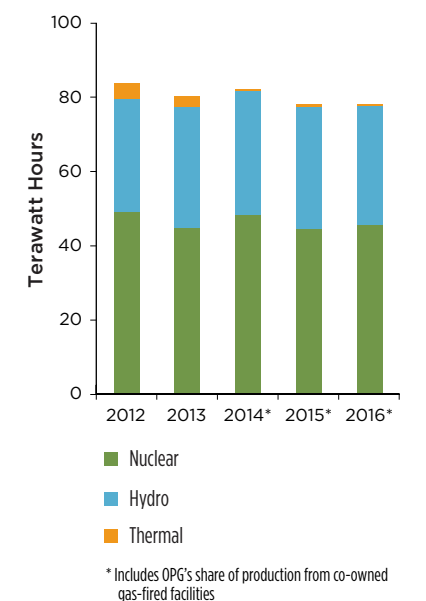
Total electricity generated increased in 2016 to 78.2 terawatt hours (TWh) from 78.0 TWh in 2015. Higher nuclear generation, primarily due to a lower number of non-refurbishment planned outage days at Darlington Nuclear GS during 2016, was partially offset by lower regulated hydroelectric generation due to higher volume of water spilled at OPG's hydroelectric stations in 2016 as a result of more prevalent surplus baseload generation conditions. OPG's generation for 2016 was also affected by the Unit 2 refurbishment outage at Darlington Nuclear GS, which commenced in October 2016.

### Ensuring Reliability

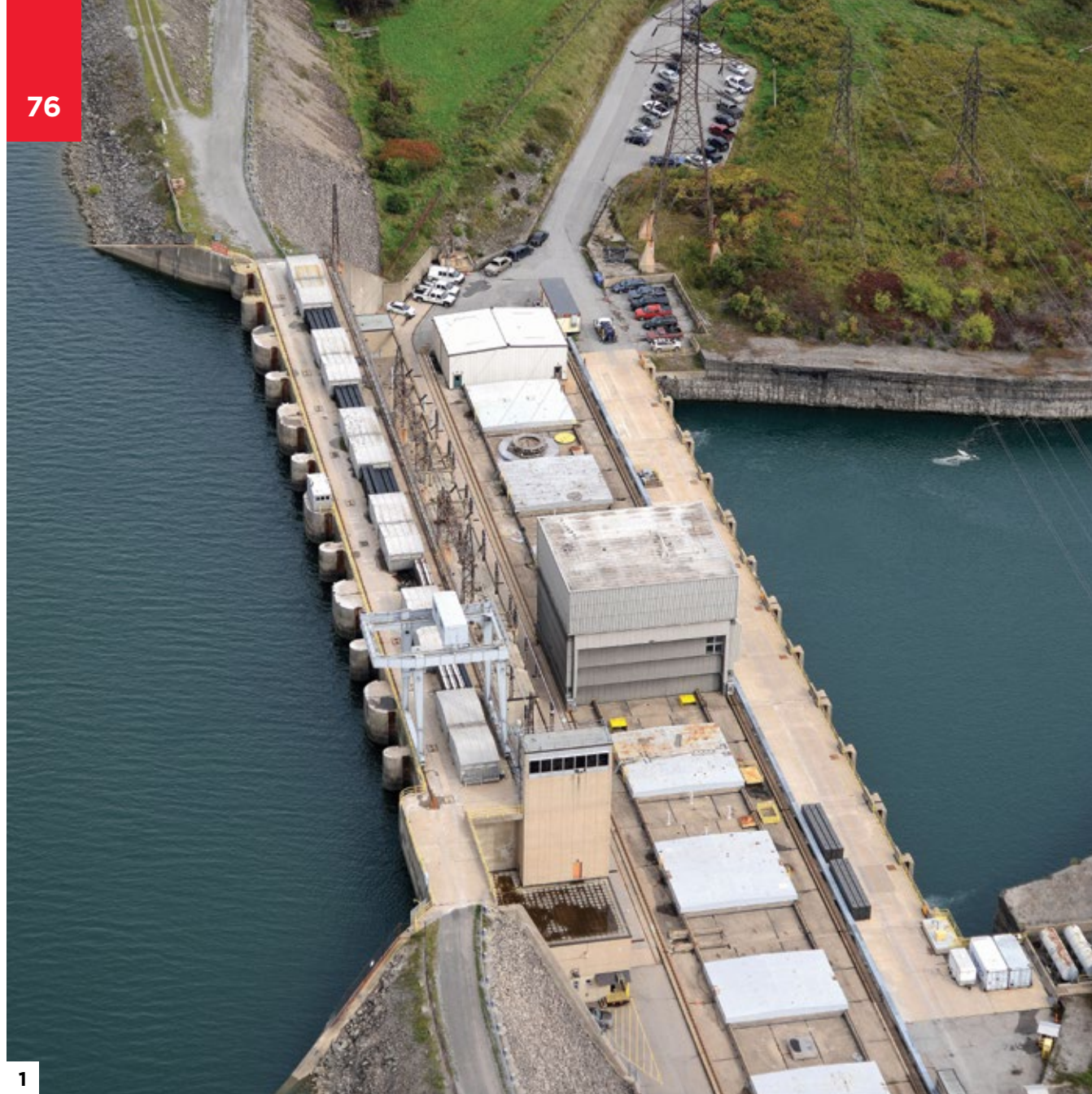
OPG strives to operate and maintain its facilities to optimize the reliability of its generating assets. OPG manages reliability risks through equipment maintenance, inspection and testing programs, and by conducting engineering reviews and station condition assessments to identify and prioritize short-term and long-term requirements to sustain or improve performance.

OPG reports Nuclear Unit Capability Factor (UCF) as the reliability measure for its nuclear stations and Hydroelectric Availability for the reliability of its hydroelectric generating units. Effective in 2014, Thermal Equivalent Forced

### ELECTRICITY PRODUCTION







1

Outage Rate (EFOR) is the key reliability measure for thermal station performance.

The UCF at Darlington Nuclear GS increased in 2016 compared to 2015, primarily due to fewer planned and unplanned outage days at the station during 2016. The UCF excludes Unit 2 while it is undergoing refurbishment. At Pickering Nuclear GS, the UCF decreased in 2016 compared to 2015, primarily due to a higher

number of unplanned outage days at the station in 2016 as a result of emergent discovery work during planned outages.

The availability of OPG's hydroelectric generating stations decreased during 2016 compared to 2015. The decrease was primarily due to the planned reservoir refurbishment project at Sir Adam Beck Pump GS and other planned outage days.

The lower Thermal EFOR in 2016, compared to 2015, was primarily due to an outage in 2015 to perform repair work at Lennox GS.

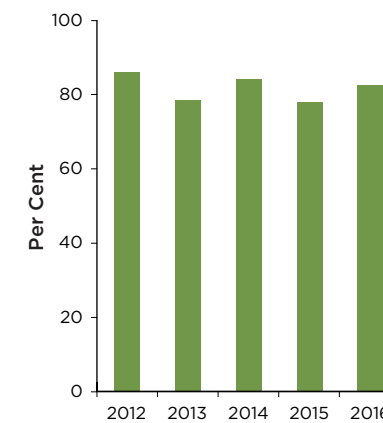
1 | Sir Adam Beck Pump GS.

2 | Turbine work to support the Darlington Nuclear GS refurbishment.



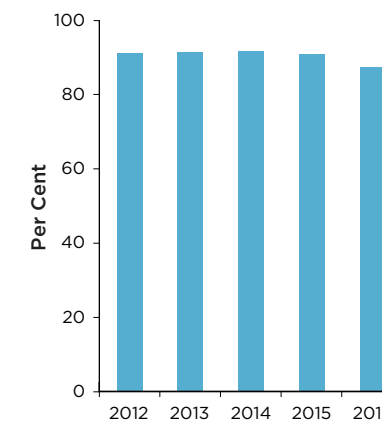
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### NUCLEAR UNIT CAPABILITY FACTOR



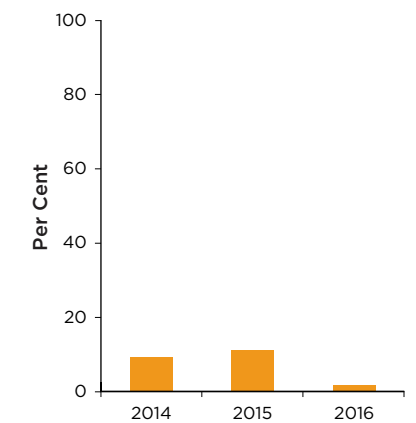
**Unit Capability Factor** represents energy generated, adjusted for external constraints such as transmission or demand limitations, as a percentage of potential maximum generation over a specified period. (Good = ↑)

### HYDROELECTRIC AVAILABILITY



**Availability** represents the amount of time generating units are capable of providing service as a percentage of the total time for a respective period. (Good = ↑)

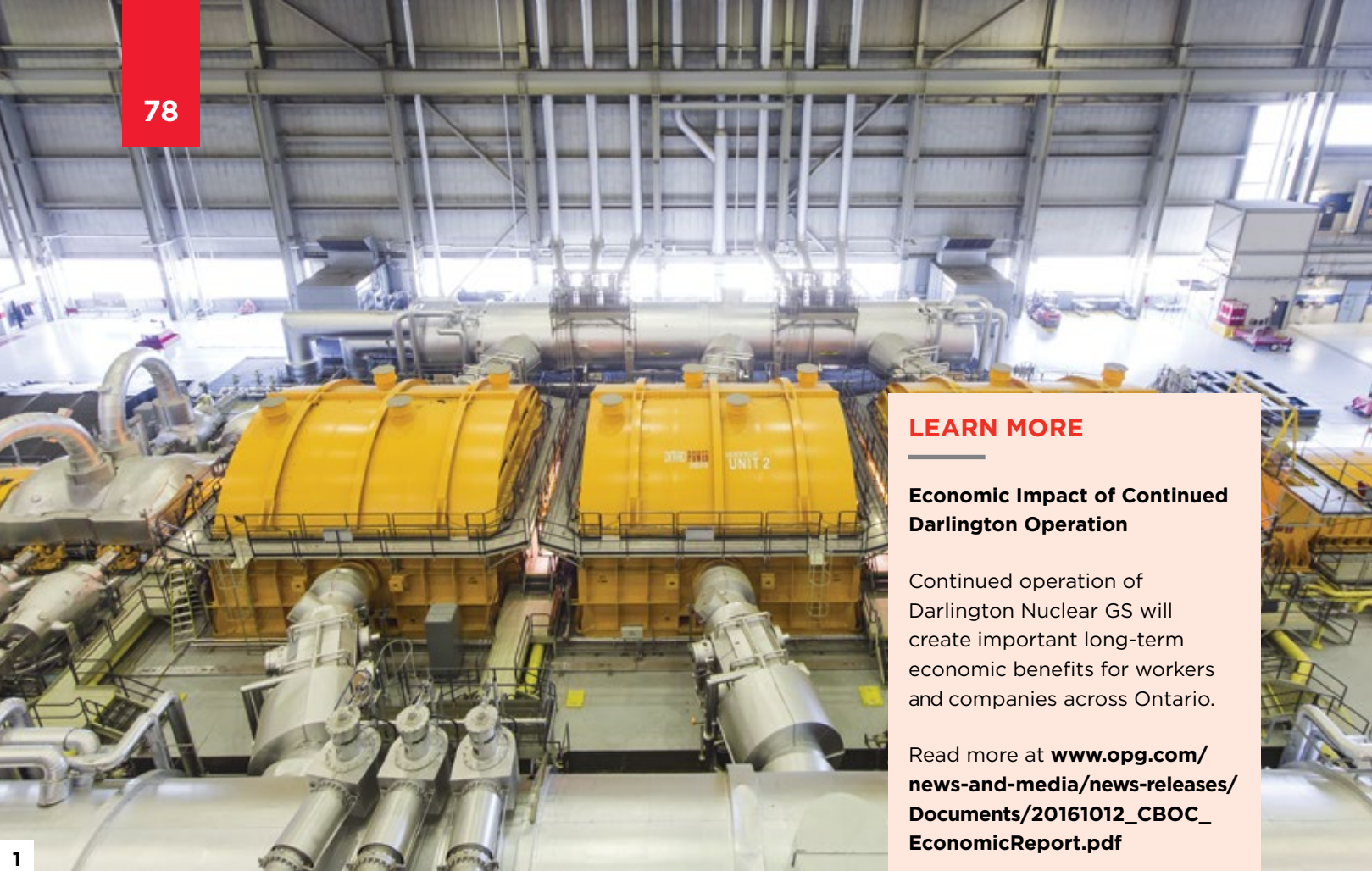
### THERMAL EQUIVALENT FORCED OUTAGE RATE\*



**Equivalent Forced Outage Rate** represents the amount of time that generating units are forced out of service as a percentage of the amount of time available to operate. (Good = ↓)

\* Key indicator as of 2014.





### LEARN MORE

#### Economic Impact of Continued Darlington Operation

Continued operation of Darlington Nuclear GS will create important long-term economic benefits for workers and companies across Ontario.

Read more at [www.opg.com/news-and-media/news-releases/Documents/20161012\\_CBOC\\_EconomicReport.pdf](http://www.opg.com/news-and-media/news-releases/Documents/20161012_CBOC_EconomicReport.pdf)

## INFRASTRUCTURE INVESTMENTS

OPG produces electricity from a diversified portfolio of generating assets. In 2016, OPG continued to invest in infrastructure renewal and modernization and to pursue projects to increase generation capacity.

### Nuclear

#### Darlington Refurbishment Project

Darlington Nuclear GS, rated as one of the top performing nuclear stations in the world, has been one of Ontario's most important assets since the early 1990s. A mid-life refurbishment of the station will ensure the continuation of the station's role as a key supplier of clean, safe and affordable power for another

30 years. The scope of the project, which is the largest clean energy project in Canada, includes infrastructure upgrades at the Darlington site and the replacement, repair and maintenance of station components. The refurbishment of Darlington is a multi-phase project that was initiated in 2007, and is scheduled to be completed by 2026. The total project budget is \$12.8 billion, including capitalized interest and escalation.

OPG is well-positioned to deliver the Darlington Refurbishment project on time and on budget. OPG has built a strong foundation for success based on years of detailed planning, extensive inspections, and

industry benchmarking. The project also has an experienced management team and a robust risk management strategy. A key preparation strategy was the construction of a training centre with a state-of-the-art full-size reactor mock-up to test specialized tools and train workers.

In 2016, the Darlington Refurbishment project transitioned from the planning phase to the execution phase. The first unit to be refurbished, Unit 2, was taken safely offline as planned in mid October. Defuelling of the reactor, the first critical refurbishment activity undertaken once the unit was removed from service, was safely completed in January 2017 ahead of schedule. Islanding of



Unit 2, the physical separation of the unit under refurbishment from the three operating units, was completed in April 2017, signifying the completion of the first major segment of the project. The project is tracking on schedule and budget.

#### Pickering Nuclear Continued Operations

Pickering Nuclear GS has been safely producing electricity for more than 40 years. In January 2016, OPG and the Province announced plans to pursue continued operation of the Pickering station to 2024. OPG's objective is to maximize the safe and reliable operating life of the Pickering units. Under OPG's plan, all six operating units at the station would operate to 2022, at which point two units would be shut down and the remaining four units would continue to operate to 2024.

OPG has conducted assessments to demonstrate that extending operations at Pickering Nuclear GS is safe, technically feasible and has economic benefits for Ontario. Having Pickering available will provide Ontario with a source of baseload electricity during nuclear unit refurbishments at the Darlington Nuclear GS and the Bruce Power GS, reducing the need for gas-fired capacity and energy imports. Extending operations will also provide continued employment for approximately 3,000 regular employees at OPG, and will reduce carbon dioxide emissions by approximately 17 million tonnes over the 2021 to 2024 period. For electricity customers, the primary benefit is to moderate electricity rate impacts.

Extending Pickering's operating life will require approval from the Canadian Nuclear Safety Commission (CNSC). OPG filed the Pickering licence renewal application in August 2017 for the CNSC's approval in 2018. The requested licence renewal will span the planned extended operations period, through to the end of the planned period to defuel, dewater, and place the station in a safe state condition after shutdown. OPG will work closely with its community partners to ensure the station is operated reliably, and to the highest standards of safety, security and environmental stewardship.

**"We have a leadership team relentlessly focused on delivering results, a workforce committed to excellence in project execution and homegrown suppliers and partners who understand the importance of this effort. We all understand refurbishing Darlington is about the future of Ontario."**

**JEFF LYASH**  
OPG President and CEO

1 | Darlington Nuclear GS Unit 2 turbine hall.

2 | Nuclear is Ontario's best option for cost-effective, greenhouse gas emissions-free, reliable baseload generation.

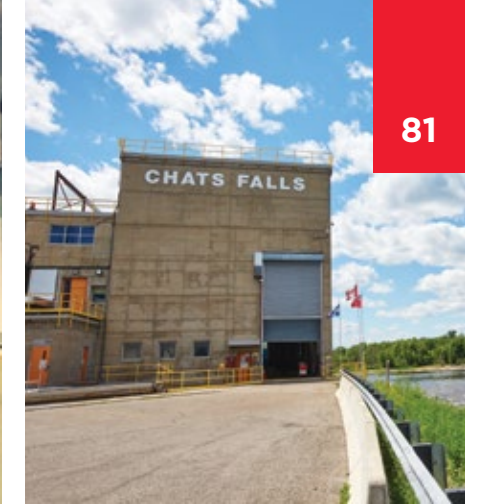




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**LEARN MORE**

**Hydro Upgrades Add More Years of Clean Power**

Refurbishment of Chats Falls GS will ensure another 40 years of safety and performance.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160928\\_ChatsFalls.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160928_ChatsFalls.pdf)

**Hydroelectric**

**Peter Sutherland Sr. GS**

In 2016, OPG and its partner Coral Rapids Power, a wholly-owned company of the Taykwa Tagamou First Nation, continued construction on the new Peter Sutherland Sr. GS north of Timmins. The station was placed in-service at the end of the first quarter of 2017, ahead of the originally planned schedule. The 28 MW station provides clean, renewable and reliable hydroelectric power for up to 25,000 homes. The project is expected to close below the approved budget of \$300 million following the completion of site remediation, camp dismantling, demobilization and other project close-out activities.

This project is one in a series of successful development partnerships with Ontario's Indigenous communities. The partnership between OPG and Coral Rapids Power was founded on respect and trust, and resulted in local employment, skills development and a long-term revenue stream for the local community and OPG. Coral Rapids Power has a 33 per cent interest in Peter Sutherland Sr. GS.

OPG and Coral Rapids Power worked collaboratively with numerous stakeholders including provincial government ministries, federal government departments, and consultants to ensure the project was completed safely and with environmental integrity.

1 and 2 | The new Peter Sutherland Sr. GS will provide lasting economic opportunities for the people of Taykwa Tagamou Nation.

**“Ontario’s newest waterpower generating station further demonstrates our government’s commitment to building a clean and reliable electricity system. Not only will it help to support a healthier environment and cleaner air for today and future generations, this project highlights a partnership between Taykwa Tagamou Nation and OPG that delivered meaningful economic benefits to the local First Nation community.”**

**GLENN THIBEAULT**  
Ontario Energy Minister

**Sir Adam Beck Pump GS Reservoir Refurbishment**

The Sir Adam Beck Pump GS 750-acre reservoir refurbishment project, which began in April 2016, was completed and returned to service in February 2017. This project included the installation of a partial new liner and construction of a grout curtain in the bedrock foundation of the reservoir dyke. The refurbishment is expected to add another 50 years of life to the reservoir.

The Sir Adam Beck Pump GS facility is integral to OPG's hydroelectric fleet as it allows water to be diverted from the Sir Adam Beck complex during periods of low electricity demand and stored in the reservoir, to be used to generate up to 600 MW of electricity during subsequent periods of high demand. The

project was completed ahead of the originally planned in-service date and below the approved budget of \$58 million.

**Overhauls and Improvements**

OPG's hydroelectric stations are the oldest and most established components of OPG's energy portfolio and have formed the basis of Ontario's power supply for more than a century. As part of its commitment to operational excellence, OPG continues to make investments in its existing hydroelectric generating fleet. During 2016, OPG continued to execute a number of projects, including:

- Completion of major equipment overhauls and rehabilitation work on Unit 5 of Sir Adam Beck Pump GS and Unit 2 of Whitedog Falls GS

- Completion of a runner upgrade, headgate replacement and rehabilitation of Unit 2 of Harmon GS
- Completion of headgate replacement at Units 1 and 2 of Kipling GS
- Completion of concrete rehabilitation of the main dam at Chats Falls GS
- Continued work on the rehabilitation of Unit 10 of Sir Adam Beck 1 GS, Unit 5 of DeCew Falls 1 GS, Unit 1 of Harmon GS, and the replacement of the Shebandowan Lake Control Dam at Kakabeka Falls GS



## Growth Opportunities

OPG seeks to continue to expand beyond its core generation business through investments in innovation and emergent low-carbon technologies, including selective solar generation, energy storage, micro-grid, electrification of transportation and other development. OPG is also considering longer-term growth paths that include broader electricity sector opportunities, within and outside Ontario. Growth opportunities may be pursued in partnership with other commercial entities where appropriate synergies exist and are aligned with OPG's business objectives.

In March 2016, Nanticoke Solar LP was selected, through the Independent Electricity System Operator's (IESO) Large Renewable Procurement program, to develop a 44 MW solar facility at OPG's Nanticoke GS site and adjacent lands. The project is planned to commence in the first half of 2018 and it is expected to be completed in the first quarter of 2019.

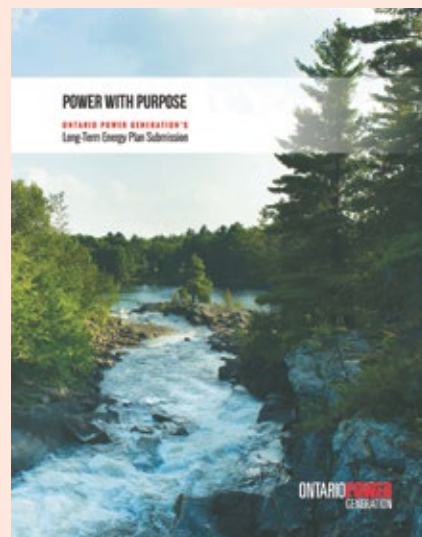
Between October and December 2016, the Government of Ontario conducted a consultation process to update its Long-Term Energy Plan (LTEP). OPG made a formal submission as part of the consultation as it relates to OPG's core generation business and growth opportunities. The

Ontario Ministry of Energy has indicated that the development of the updated LTEP, scheduled to be published in the later part of 2017, will balance the principles of affordability, reliability, clean energy, community and Indigenous engagement, as well as conservation and demand management. OPG's business growth opportunities may be affected by the results of the 2017 LTEP.

1 | OPG employs a highly skilled workforce across Ontario.



## OPG'S ROLE IN ONTARIO'S LONG-TERM ENERGY PLAN



OPG is well-positioned to provide Ontario with the electricity it needs today, and to support its future electrification plans.

OPG supports Ontario's energy plan in the following ways:

- OPG's low-cost power helps consumers
- Nuclear assets provide economic benefits and reduce greenhouse gas emissions
- Hydroelectric investments will build on a legacy of renewable, low-cost power

- Partnerships with Ontario's Indigenous communities yield renewable power and lasting economic benefits
- OPG is driving innovation through clean technologies

Additional information about OPG's perspective on Ontario's Long-Term Energy Plan is available at [www.opg.com/news-and-media/Reports/OPG\\_2017\\_LTEP\\_Submission.pdf](http://www.opg.com/news-and-media/Reports/OPG_2017_LTEP_Submission.pdf)

## PROCUREMENT AND PAYMENTS

### Economic Impact

Electricity generation is a capital-intensive business. It requires continued investment in plants and technologies to maintain and improve operating performance, to increase generation capacity of existing stations, and to invest in the development of new generating stations, emerging technologies and other business growth opportunities. When making these investments, OPG provides support to the economy through the purchase of goods and services. During 2016, OPG purchased \$2.6 billion in goods and services.

In 2016, compensation to employees totalled approximately

\$1.4 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 its shareholder, the Province, also benefit the economy and the people of Ontario. Payments to the Province include payments in lieu of taxes, gross revenue charges, and current income tax payments. These payments totalled \$527 million in 2016.

### Supply Chain

OPG's supply chain organization supports the company through the cost-effective acquisition and timely availability of materials

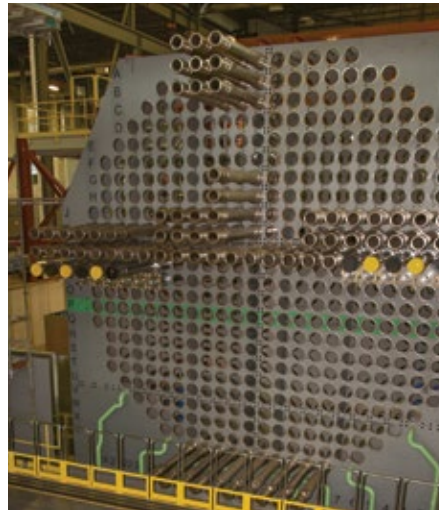
and services. OPG's supply chain processes are consistent with approved financial management and control standards, and all applicable legal requirements.

OPG requires suppliers and contractors who wish to do business with OPG 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 procurement activity procedures. OPG's suppliers are expected to ensure full compliance to OPG's Supplier Code of Conduct and Code of Business Conduct in their business



dealings with OPG. Certain suppliers may also be subject to OPG audits or assessments, which are commensurate with their approved scope of work and specified quality requirements. OPG has approximately 2,000 active suppliers.

OPG is also proud to be a strong supporter of local businesses. Recent assessments found that 92 per cent of OPG's spending was executed through suppliers within Canada with 89 per cent of them within Ontario. OPG also has strong working relationships with its Indigenous suppliers, providing jobs and training to the local communities.



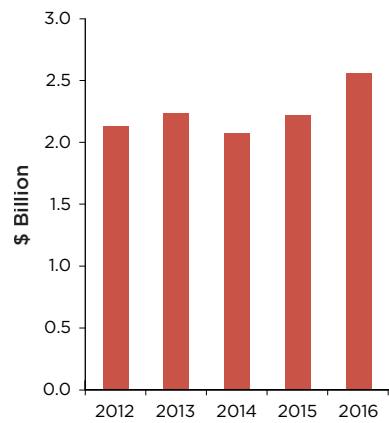
**LEARN MORE**

**Investing in Ontario**

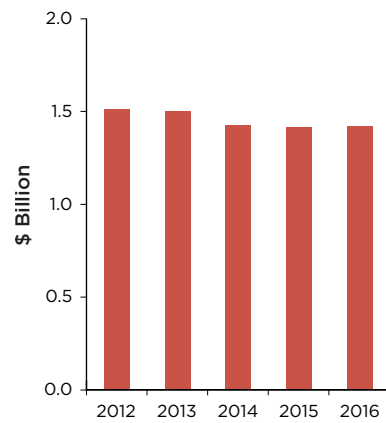
The Darlington Refurbishment project involves more than 60 major companies and contractors supplying components.

Read more at [www.opg.com/news-and-media/our-stories/Documents/20160614\\_RefurbNuTech.pdf](http://www.opg.com/news-and-media/our-stories/Documents/20160614_RefurbNuTech.pdf)

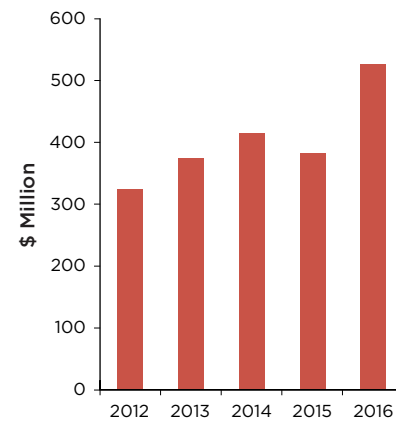
**SPENDING ON GOODS AND SERVICES**



**EMPLOYEE COMPENSATION**



**PAYMENTS TO THE PROVINCE OF ONTARIO**



APPENDICES





## APPENDIX A GENERATION CAPACITY AND PRODUCTION

HYDROELECTRIC	Net Generation Capacity (MW)	Net Generation (GWh)				
		2016	2015	2014	2013	2012
<b>Central Operations</b> Includes 26 stations, headquarters in North Bay	124	<b>493</b>	564	692	645	519
<b>Eastern Operations</b> Includes 10 stations, headquarters in Renfrew	2,571	<b>12,535</b>	12,241	13,281	12,774	11,632
<b>Niagara Operations</b> Includes 5 stations, headquarters in Niagara area	2,272	<b>12,015</b>	12,547	12,267	12,372	11,953
<b>Northeast Operations</b> Includes 13 stations, headquarters in Timmins	1,781	<b>3,779</b>	4,057	3,802	3,359	2,982
<b>Northwest Operations</b> Includes 11 stations, headquarters in Thunder Bay	687	<b>3,089</b>	3,497	3,448	3,583	3,528
NUCLEAR	Net Generation Capacity (MW)	Net Generation (GWh)				
		2016	2015	2014	2013	2012
<b>Darlington Nuclear</b> Located on Lake Ontario in the Municipality of Clarington. The station has four units. One unit was taken offline in October 2016 for refurbishment.	2,634	<b>25,619</b>	23,293	27,960	25,051	28,308
<b>Pickering Nuclear</b> Located on Lake Ontario in Pickering. The station has six operating units and two units in a safe shutdown state.	3,094	<b>19,958</b>	21,231	20,045	19,642	20,735
THERMAL	Net Generation Capacity (MW)	Net Generation (GWh) <sup>(1)</sup>				
		2016	2015	2014	2013	2012
<b>Atikokan Generating Station</b> Located near the town of Atikokan in northwestern Ontario. The station has one biomass unit. The station stopped using coal in 2012.	205	<b>149</b>	109	10	-18	13
<b>Brighton Beach</b> <sup>(2)</sup> Located in Windsor. The station is a combined cycle generating station fuelled by natural gas.	280	<b>113</b>	115	100	Not reported	Not reported
<b>Lambton Generating Station</b> Located on the St. Clair River south of Sarnia. The station was retired from service in 2013.	0	<b>-23</b>	-26	-42	1,552	2,218
<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	<b>27</b>	-38	73	-29	104
<b>Nanticoke Generating Station</b> Located on Lake Erie in Haldimand County. The station was retired from service in 2013.	0	<b>-24</b>	-36	-55	1,361	1,731
<b>Portlands Energy Centre</b> <sup>(2)</sup> Located in Toronto. The station is a combined cycle generating station fuelled by natural gas.	275	<b>509</b>	513	500	Not reported	Not reported
<b>Thunder Bay Generating Station</b> Located in Thunder Bay. The station has one advanced biomass unit. The station stopped using coal in 2014.	153	<b>-16</b>	-34	43	-16	16
WIND	Net Generation Capacity (MW)	Net Generation (GWh)				
		2016	2015	2014	2013	2012
Includes one turbine located in Pickering.	1.8	<b>2.5</b>	3.0	3.4	3.5	3.7

(1) Negative net generation indicates the station consumed more electricity from the grid than it produced.  
(2) Represents OPG's 50 per cent share of capacity and generation. Reported by OPG as of 2014.

## APPENDIX B SUSTAINABILITY PERFORMANCE

INDICATOR	2016	2015	2014	2013	2012
<b>Regulatory compliance</b>					
Significant Environmental Events	<b>0</b>	0	0	0	0
Environmental Infractions	<b>6</b>	14	16	13	14
Environmental Penalties	<b>0</b>	1	4	1	3
<b>Reportable spills to the environment</b>					
Category A Spills - Very Serious	<b>0</b>	0	0	0	0
Category B Spills - Serious	<b>0</b>	0	0	0	0
Category C Spills - Less Serious	<b>10</b>	12	14	9	9
<b>Atmospheric emissions</b> Changes as of 2014: Added OPG's 50 per cent share of emissions from co-owned facilities; added emissions from thermal non-generation sources (i.e. auxiliary boilers); began reporting carbon dioxide equivalent (CO <sub>2</sub> eq) emissions in place of carbon dioxide emissions.					
<b>Atmospheric emissions - OPG</b>					
Carbon Dioxide (tonnes, CO <sub>2</sub> eq as of 2014)	<b>611,666</b>	537,737	561,656	3,195,649	4,528,023
Sulphur Dioxide (tonnes)	<b>274</b>	109	552	9,812	9,705
Nitrogen Oxides (tonnes, as NO <sub>2</sub> )	<b>582</b>	476	703	5,018	6,556
<b>Atmospheric emissions - Thermal</b>					
Carbon Dioxide (tonnes, CO <sub>2</sub> eq as of 2014)	<b>598,586</b>	520,130	552,499	3,190,396	4,517,690
Atikokan Generating Station	<b>204,176</b>	194,298	41,757	0	44,830
Brighton Beach	<b>46,326</b>	47,359	48,542	Not reported	Not reported
Lambton Generating Station	<b>1,171</b>	3,253	7,845	1,592,290	2,237,250
Lennox Generating Station	<b>118,372</b>	55,661	161,062	33,386	155,550
Nanticoke Generating Station	<b>0</b>	5,817	13,968	1,528,800	2,008,720
Portlands Energy Centre	<b>205,291</b>	207,101	185,685	Not reported	Not reported
Thunder Bay Generating Station	<b>23,251</b>	6,641	93,640	35,920	71,340
Sulphur Dioxide (tonnes)	<b>270</b>	104	550	9,812	9,705
Atikokan Generating Station	<b>0</b>	0	0	0	207
Brighton Beach	<b>0</b>	0	0	Not reported	Not reported
Lambton Generating Station	<b>0</b>	0	0	1,288	2,474
Lennox Generating Station	<b>270</b>	104	327	35	39
Nanticoke Generating Station	<b>0</b>	0	0	8,409	6,843
Portlands Energy Centre	<b>0</b>	0	0	Not reported	Not reported
Thunder Bay Generating Station	<b>0</b>	0.15	223	80	142
Nitrogen Oxides (tonnes, as NO <sub>2</sub> )	<b>505</b>	383	654	4,989	6,515
Atikokan Generating Station	<b>167</b>	152	43	0	100
Brighton Beach	<b>22</b>	22	25	Not reported	Not reported
Lambton Generating Station	<b>2</b>	3	6	2,118	3,019
Lennox Generating Station	<b>164</b>	64	219	35	144



INDICATOR	2016	2015	2014	2013	2012
Nanticoke Generating Station	0	5	11	2,761	3,021
Portlands Energy Centre	131	132	138	Not reported	Not reported
Thunder Bay Generating Station	20	5	212	75	232
Mercury (kilograms)	0	0	2.3	28	25
<b>Atmospheric emissions - Nuclear</b>					
Carbon Dioxide (tonnes, CO <sub>2</sub> eq as of 2014)	13,080	17,607	9,157	5,253	10,333
Sulphur Dioxide (tonnes)	3.8	4.4	2.3	0	0.1
Nitrogen Oxides (tonnes, as NO <sub>2</sub> )	77	93	48	29	40
Waste Incinerator Dioxins and Furans Toxicity Equivalent Emissions Test Result (pg TEQ/Rm <sup>3</sup> )	3.15	4.82	Exempt from testing	<1.80	<3.03
<b>Atmospheric emission rates</b>					
<b>Atmospheric emission rates - OPG</b>					
Changes as of 2014: Added OPG's 50 per cent share of emissions from co-owned facilities; added emissions from thermal non-generation sources (i.e. auxiliary boilers); began reporting carbon dioxide equivalent (CO <sub>2</sub> eq) emissions in place of carbon dioxide emissions.					
Carbon Dioxide (tonnes/GWh-net, CO <sub>2</sub> eq as of 2014)	7.8	6.9	6.8	40	54
Sulphur Dioxide (tonnes/GWh-net)	0.004	0.001	0.01	0.12	0.12
Nitrogen Oxides (tonnes/GWh-net, as NO <sub>2</sub> )	0.01	0.006	0.01	0.06	0.08
<b>Atmospheric emission rates - Thermal</b>					
Thermal generation sources only. Changes as of 2014: Added OPG's 50 per cent share of emissions from co-owned facilities; began reporting carbon dioxide equivalent (CO <sub>2</sub> eq) emissions in place of carbon dioxide emissions.					
Carbon Dioxide (tonnes/GWh-net, CO <sub>2</sub> eq as of 2014)	731	727	694	1,119	1,107
Sulphur Dioxide (tonnes/GWh-net)	0.35	0.16	0.76	3.44	2.38
Nitrogen Oxides (tonnes/GWh-net, as NO <sub>2</sub> )	0.60	0.52	0.84	1.75	1.60
<b>Radioactive emissions</b>					
Tritium to Air (curies)	23,357	21,321	23,280	17,072	17,976
Tritium to Water (curies)	17,730	16,566	14,007	11,164	11,211
Carbon-14 to Air (curies)	106	92	84	73	76
<b>Public radiation dose</b>					
Pickering Nuclear Critical Group Dose (microsieverts)	1.5	1.2	1.2	1.1	1.1
Darlington Nuclear Critical Group Dose (microsieverts)	0.6	0.5	0.6	0.6	0.6
<b>Radioactive waste management</b>					
Annual Production of Used Fuel (tonnes of uranium) (includes waste produced by Bruce Power)	1,526	1,525	1,561	1,392	1,439
Used Fuel in Storage (tonnes of uranium) (includes waste produced by Bruce Power)	46,878	45,243	43,714	42,152	40,647
Used Fuel Bundles in Storage at Pickering Nuclear	727,749	710,877	693,049	676,059	662,437

INDICATOR	2016	2015	2014	2013	2012
Used Fuel Bundles in Storage at Darlington Nuclear	524,828	497,491	478,026	455,301	435,266
Low and Intermediate Radioactive Waste Produced (m <sup>3</sup> )	3,433	2,510	2,384	2,616	2,762
Low and Intermediate Radioactive Waste Stored (m <sup>3</sup> ) (includes waste produced by Bruce Power)	1,479	3,247	2,515	2,455	2,639
<b>PCB management</b>					
High Level PCB Material in Storage at Year-End <sup>(1)</sup> (tonnes)	0.1	0.2	0	0.4	0.1
High Level PCB Material Sent for Destruction <sup>(1)</sup> (tonnes)	1.6	3.9	9.7	27.6	60.9
Low Level PCB Material in Storage at Year-End <sup>(2)</sup> (tonnes)	0.7	0.4	1.7	0.8	0.4
Low Level PCB Material Sent for Destruction <sup>(2)</sup> (tonnes)	6.0	23.5	2.4	6.1	184.5
Estimated Inventory of Low Level PCB Material in Service <sup>(2)</sup> (tonnes)	0.3	0.3	9.4	14.0	63
(1) High level: ≥ 500 mg/kg PCB (2) Low level: ≥ 50 to < 500 mg/kg PCB					
<b>Hazardous waste generation</b>					
Solids (tonnes)	389	181*	1,283	113	1,125
Liquids (kilolitres)	1,312	2,125*	3,544	1,175	1,615
<b>Water use</b>					
Hydroelectric Turbine Flows (million m <sup>3</sup> )	426,845	443,100	463,110	443,998	404,229
Nuclear and Thermal Non-Consumptive Cooling and Service Water Use (million m <sup>3</sup> )	8,667	8,850	8,677	9,785	10,722
<b>Internal energy efficiency</b>					
Internal Energy Saving - Cumulative since 1994 (GWh/year)	2,557	2,542	2,525	2,507	2,493
Annual Incremental Energy Saving (GWh/year)	15.6	17.0	17.9	13.9	12.3
<b>Occupational safety</b>					
Accident Severity Rate (days lost per 200,000 hours)	2.59	0.50	1.31	0.94	2.4
All Injury Rate (injuries per 200,000 hours)	0.56	0.39	0.36	0.61	0.63
Fatalities	0	0	0	0	0
<b>Gross energy generation</b>					
Includes OPG's 50 per cent share of generation from co-owned facilities as of 2014. Excludes power purchases.					
Total Energy Generated (GWh)	81,678	81,561	85,814	84,136	87,925
Thermal (GWh)	902	823	851	3,354	4,737
Hydroelectric (GWh)	32,146	33,313	33,793	33,068	31,015
Nuclear (GWh)	48,628	47,422	51,166	47,711	52,169
Wind (GWh)	2.5	3.0	3.4	3.5	3.7

\* Value restated from the 2015 Sustainability Report.



INDICATOR	2016	2015	2014	2013	2012
<b>Net energy generation</b>					
Includes OPG's 50 per cent share of generation from co-owned facilities as of 2014. Excludes power purchases.					
Total Energy Output (GWh)	<b>78,225</b>	78,037	82,127*	80,280	83,745
Thermal (GWh) (net of consumption at retired stations)	<b>735</b>	605	629	2,851	4,082
Hydroelectric (GWh)	<b>31,910</b>	32,905	33,489	32,733	30,616
Nuclear (GWh)	<b>45,577</b>	44,524	48,005*	44,693	49,043
Wind (GWh)	<b>2.5</b>	3.0	3.4	3.5	3.7
Generation Energy Efficiency (per cent)	<b>95.77</b>	95.68	95.70	95.42	95.25
<b>EcoLogo<sup>SM</sup>-certified green power</b>					
Net Energy Generation (GWh) (26 small hydroelectric stations and 1 wind turbine)	<b>487</b>	558	674	625	507
<b>Generation performance</b>					
Nuclear Unit Capability Factor (per cent)	<b>82.7</b>	78.0	84.3	78.6	86.1
Hydroelectric Availability (per cent)	<b>87.5</b>	90.9	91.7	91.5	91.2
Thermal Equivalent Forced Outage Rate (per cent)	<b>1.6</b>	11.2	9.2	Not reported	Not reported
<b>Economic contributions</b>					
Spending on Goods and Services (billions of dollars)	<b>2.6</b>	2.2	2.1	2.2	2.1
Employee Compensation (billions of dollars)	<b>1.42</b>	1.41	1.43	1.50	1.51
Payments to the Province of Ontario (millions of dollars)	<b>527</b>	383	415	375	324

\* Value restated from the 2015 Sustainability Report.

Data Reported to Environment and Climate Change Canada's National Pollutant Release Inventory (NPRI)	2015	2014	2013	2012	2011
<b>Total releases to air, water and land</b>					
Aluminum (tonnes)	<b>Not reported</b>	0.509	35.6	40.5	68.1
Ammonia (tonnes)	<b>Not reported</b>	Not reported	22.60*	33.48	35.12*
Arsenic (kilograms)	<b>Not reported</b>	Not reported	233	302*	279*
Cadmium (kilograms)	<b>0.32</b>	Not reported	5.1	5.8*	6.7*
Carbon Monoxide (tonnes)	<b>51.8</b>	69	846	1,345	955
Chromium (tonnes)	<b>Not reported</b>	Not reported	Not reported	0.168*	0.228*
Copper (tonnes)	<b>Not reported</b>	Not reported*	0.042	0.042	1.742*
Dioxins and Furans (grams Toxic Equivalent)	<b>0.0107</b>	0.043	0.087	0.107	0.075*
Hexachlorobenzene (grams)	<b>0.0259</b>	0.0259*	0.017	0.029*	0.044*
Hydrazine (kilograms)	<b>1,011</b>	504	311*	330*	310
Hydrochloric Acid (tonnes)	<b>Not reported</b>	Not reported	185	194	307*
Hydrogen Fluoride (tonnes)	<b>Not reported</b>	Not reported	31	34	50
Lead (kilograms)	<b>Not reported</b>	0.039*	70.3*	83.8*	132.9*
Manganese (tonnes)	<b>Not reported</b>	Not reported	0.096	0.137*	5.48
Mercury (kilograms)	<b>Not reported</b>	0.017*	29.13	22.96*	35.14*
Nitrogen Oxides expressed as NO <sub>2</sub> (tonnes) (includes small generation sources)	<b>289</b>	524	5,037	6,572	5,855
Phosphorus (tonnes)	<b>Not reported</b>	Not reported	4.13*	4.773*	7.384*
PM - Total Particulate Matter (tonnes)	<b>Not reported</b>	Not reported*	416	385	468
PM10 - Particulate Matter ≤10 microns (tonnes)	<b>Not reported</b>	5.69*	253	273	324
PM2.5 - Particulate Matter ≤ 2.5 microns (tonnes)	<b>0.77</b>	4.15*	143	180	169
Selenium (kilograms)	<b>Not reported</b>	Not reported	857	996*	1,359*
Sulphur Dioxide (tonnes)	<b>104</b>	550	9,752	9,706	11,264
Sulphuric Acid (tonnes)	<b>0.015</b>	0.048	214.005	294.006	188.006
Vanadium (tonnes)	<b>Not reported</b>	Not reported	0.374	0.405*	0.619*
Volatile Organic Compounds (tonnes)	<b>Not reported</b>	Not reported	21.3	27	24
Zinc (tonnes)	<b>Not reported</b>	Not reported	0.102*	1.52*	1.4*

For detailed information about OPG's releases to air, water and land, please visit the NPRI website at [www.ec.gc.ca/inrp-npri](http://www.ec.gc.ca/inrp-npri). NPRI data for 2016 was not available at the time of publishing.

\*Value restated from the 2015 Sustainability Report.



## APPENDIX C GRI CONTENT INDEX

This report references selected disclosures from the Global Reporting Initiative (GRI) Sustainability Reporting Standards and Electric Utilities Sector Disclosures.

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