

**ONTARIO POWER GENERATION INC.**  
**ANNUAL INFORMATION FORM**  
**FOR THE YEAR ENDED DECEMBER 31, 2017**

March 9, 2018



**ANNUAL INFORMATION FORM  
FOR THE YEAR ENDED DECEMBER 31, 2017**

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## PRESENTATION OF INFORMATION

References in this Annual Information Form (AIF) to the “Company”, the “Corporation” or “OPG” are made to Ontario Power Generation Inc. Unless otherwise noted, the information contained in this AIF is as at or for the year ended December 31, 2017. Amounts are expressed in Canadian dollars unless otherwise indicated. Financial information is presented in accordance with United States generally accepted accounting principles (US GAAP). This AIF is dated March 9, 2018.

## ADDITIONAL INFORMATION

Additional information relating to the Company may be found on SEDAR at [www.sedar.com](http://www.sedar.com). Additional financial information relating to the Company is provided in the Company’s annual Management’s Discussion and Analysis (MD&A) and audited consolidated financial statements as at and for the year ended December 31, 2017, which is available on SEDAR at [www.sedar.com](http://www.sedar.com) or on the Company’s website at [www.opg.com](http://www.opg.com). ***The above information is made available in accordance with legal requirements of an AIF and is not, unless otherwise specifically stated, incorporated by reference into this AIF.***

Details regarding compensation paid to directors and executive officers of the Company during the financial year ended December 31, 2017 is included in OPG’s Statement of Executive Compensation, which is attached to this AIF as Appendix B.

## FORWARD-LOOKING INFORMATION

This AIF contains forward-looking statements that reflect OPG’s current views regarding certain future events and circumstances. Any statement contained in this document that is not current or historical is a forward-looking statement. OPG generally uses words such as “anticipate”, “believe”, “foresee”, “forecast”, “estimate”, “expect”, “schedule”, “intend”, “plan”, “project”, “seek”, “target”, “goal”, “strategy”, “may”, “will”, “should”, “could”, and other similar words and expressions to indicate forward-looking statements. The absence of any such word or expression does not indicate that a statement is not forward-looking.

All forward-looking statements involve inherent assumptions, risks, and uncertainties. All forward-looking statements could be inaccurate to a material degree. In particular, forward-looking statements may contain assumptions such as those relating to OPG’s generating station performance and availability, fuel costs, surplus baseload generation (SBG), cost of fixed asset removal and nuclear waste management, performance and earnings of investment funds, refurbishment of existing facilities, development and construction of new facilities, pension and other post-employment benefit (OPEB) obligations and funds, income taxes, proposed new legislation, the ongoing evolution of Ontario’s electricity industry, environmental and other regulatory requirements, operating licence applications to the Canadian Nuclear Safety Commission (CNSC), health, safety and environmental developments, business continuity events, the weather, financing and liquidity, applications to the Ontario Energy Board (OEB) for regulatory prices, the impact of regulatory decisions by the OEB, Ontario’s Fair Hydro Plan (Fair Hydro Plan or the Plan), OM&A expenditures, retention of critical talent, supplier and third party performance, and project expenditures. Accordingly, undue reliance should not be placed on any forward-looking statement. The forward-looking statements included in this AIF are made only as of the date of this AIF. Except as required by applicable securities laws, OPG does not undertake to publicly update these forward-looking statements to reflect new information, future events, or otherwise.

OPG faces various risks that could have a material adverse effect on its business, strategy, generating stations, reputation, financial condition, operating results, generation development and other projects. There may be further risks and uncertainties that are not presently known, or that are not currently believed to be material, that may in the future adversely affect the Company’s performance or financial condition. OPG may be exposed to a significant event that it is not fully insured or indemnified against. For details on risks faced by OPG, refer to the section, *Risk Management*, in the Company’s 2017 year-end MD&A.

## CORPORATE STRUCTURE

OPG is an Ontario-based electricity generation company whose principal business is the generation and sale of electricity in Ontario. OPG was formed in April 1999 through the restructuring of Ontario Hydro's integrated electricity business. OPG was established under the *Business Corporations Act* (Ontario) (OBCA) and is wholly owned by the Province of Ontario (Province or Shareholder). OPG and the Province are parties to a Memorandum of Agreement (MOA) that sets out OPG's role and responsibilities. The current MOA was executed in July 2015 and reaffirmed for continuance by both the Ontario Minister of Energy and the OPG Board of Directors' Chair in the fourth quarter of 2016, as required by the MOA following a change in the Minister of Energy. Further details on the MOA are discussed in the section, *Interest of Management and Others in Material Transactions* under the heading, *Relationship with the Province and the OEFC*.

OPG's registered head office is located at 700 University Avenue, Toronto, Ontario, M5G 1X6, Canada.

## OVERVIEW OF OPG

OPG is Ontario's largest clean energy generator. As at December 31, 2017, OPG operated two nuclear generating stations, three thermal generating stations, 66 hydroelectric generating stations, and one wind power turbine. The majority of OPG's generation is from its rate-regulated nuclear and rate-regulated hydroelectric stations. In addition, OPG and TransCanada Energy Ltd. co-own the 550 megawatt (MW) Portlands Energy Centre (PEC) gas-fired combined cycle generating station (GS). OPG and ATCO Power Canada Ltd. co-own the 560 MW Brighton Beach gas-fired combined cycle GS (Brighton Beach). Including its share of the co-owned facilities, OPG's total in-service generating capacity was 16,210 MW as at December 31, 2017, which represented approximately 45 percent of installed generation capacity in Ontario's electricity grid as reported by the Independent Electricity System Operator (IESO). OPG's in-service generating capacity as of December 31, 2017 excludes Unit 2 of the Darlington Nuclear GS. The unit, which has a generating capacity of 878 MW, was taken offline in mid-October 2016 and is currently undergoing refurbishment. OPG operates under an electricity generation licence issued by the OEB, which is valid until October 30, 2023. OPG expects the licence to be renewed in the future.

OPG also owns two other nuclear generating stations, the Bruce A GS and the Bruce B GS, which are leased on a long-term basis to Bruce Power L.P. (Bruce Power) and are not included in the generation and other operating statistics set out in this AIF.

All of OPG's owned and co-owned generating facilities are located in Ontario.

OPG's business operations effective in the fourth quarter of 2017 are divided into six business segments that are discussed under the heading, *Description of the Business* in their respective sections. The six business segments are as follows:

- Regulated – Nuclear Generation
- Regulated – Nuclear Waste Management
- Regulated – Hydroelectric
- Contracted Generation Portfolio
- Services, Trading, and Other Non-Generation
- Fair Hydro Trust

In the fourth quarter of 2017, OPG modified its reportable business segments to include the Fair Hydro Trust segment, following the establishment of the Fair Hydro Trust (the Trust) in December 2017 as the financing entity to implement the Fair Hydro Plan under the *Ontario Fair Hydro Plan Act, 2017* (the Fair Hydro Act or the Act). Through its control over the key activities of the Trust and its obligation to absorb losses through ownership of the Trust's subordinated debt, the Company consolidates the financial results of the Trust in accordance with US GAAP. The Fair Hydro Trust segment reports the income related to OPG's role as the Financial Services Manager under the Act and holder of the Trust's subordinated debt, and includes the financial results of the Trust. The Fair Hydro Plan and the Fair Hydro

Trust are discussed in the section, *General Development of the Business* under the heading, *General Development* and in the section, *Description of the Business* under the heading, *Fair Hydro Trust Segment*.

Pursuant to the *Ontario Energy Board Act, 1998* and *Ontario Regulation 53/05*, OPG receives OEB-authorized regulated prices for electricity generated from the Pickering and Darlington nuclear generating stations and the 54 hydroelectric facilities prescribed for rate regulation (collectively, prescribed facilities or regulated facilities). The results of these stations are reported under the Regulated – Nuclear Generation, Regulated – Nuclear Waste Management and Regulated – Hydroelectric segments. The OEB is an independent, quasi-judicial tribunal that regulates market participants in Ontario's natural gas and electricity industries, and reports to the Legislature of the Province through the Ontario Ministry of Energy. OPG is Ontario's only electricity generator subject to rate regulation by the OEB.

Of OPG's 54 regulated hydroelectric facilities, 48 facilities were prescribed for rate regulation effective July 1, 2014 pursuant to a November 2013 amendment to *Ontario Regulation 53/05*. The remaining six regulated hydroelectric facilities and the Pickering and Darlington nuclear generating stations have been subject to rate regulation by the OEB since 2008.

Electricity generated from most of OPG's non-regulated assets is subject to Energy Supply Agreements (ESAs) with the IESO. The IESO is a non-profit corporate entity governed by an independent Board of Directors appointed by the Province and is responsible for operating the electricity market and directing the operation of the bulk electrical system in Ontario.

ESAs are in effect for the capacity and production from OPG's three operating thermal generating stations – the oil/gas dual-fuelled Lennox GS, the biomass powered Atikokan GS and the advanced biomass fuelled unit at the Thunder Bay GS. The results of these stations are reported under the Contracted Generation Portfolio segment. The expiry dates of these ESAs range from January 2020 to July 2024. In addition, 50-year ESAs are in place for the hydroelectric facilities reported under the Contracted Generation Portfolio segment. The hydroelectric ESAs have expiry dates ranging from February 2059 to March 2067. The ESAs for the contracted generating stations result in a relatively stable stream of revenues from the Contracted Generation Segment.

OPG's revenue and electricity generation by business segment for the years ended December 31, 2017, 2016 and 2015 and OPG's in-service generating capacity as at December 31, 2017, 2016 and 2015 are summarized in the table below.

		Regulated – Nuclear Generation	Regulated – Nuclear Waste Management	Regulated – Hydroelectric	Contracted Generation Portfolio <sup>1</sup>	Services, Trading, and Other Non- Generation	Fair Hydro Trust
2017	Revenue ( <i>millions of dollars</i> ) <sup>2</sup>	3,095	121	1,436	579	43	1 <sup>4</sup>
	Electricity Generation ( <i>terawatt hours</i> )	40.7	N/A	30.7	2.7	N/A	N/A
	In-service Generating Capacity ( <i>MW</i> ) <sup>3</sup>	5,728	N/A	6,426	4,056	N/A	N/A
2016	Revenue ( <i>millions of dollars</i> ) <sup>2</sup>	3,481	138	1,527	573	68	N/A
	Electricity Generation ( <i>terawatt hours</i> )	45.6	N/A	29.5	3.1	N/A	N/A
	In-service Generating Capacity ( <i>MW</i> ) <sup>3</sup>	5,728	N/A	6,421	4,028	N/A	N/A
2015	Revenue ( <i>millions of dollars</i> ) <sup>2</sup>	3,245	122	1,619	535	73	N/A
	Electricity Generation ( <i>terawatt hours</i> )	44.5	N/A	30.4	3.1	N/A	N/A
	In-service Generating Capacity ( <i>MW</i> )	6,606	N/A	6,428	4,021	N/A	N/A

<sup>1</sup> The in-service generating capacity includes OPG's share of 275 MW for PEC and 280 MW for Brighton Beach, and the electricity generation includes OPG's share of its 50 percent ownership in these stations.

<sup>2</sup> Revenue for each segment is shown before inter-segment elimination.

<sup>3</sup> Regulated – Nuclear Generation segment excludes the generating capacity of 878 MW from Unit 2 of the Darlington GS, which has been undergoing refurbishment since mid-October 2016.

<sup>4</sup> This represents OPG's earnings from the Fair Hydro Trust, which consist of income related to OPG's role as the Financial Services Manager under the Act and holder of the Trust's subordinated debt and includes the financial results of the Trust.

For the year ended December 31, 2017, OPG's electricity generation accounted for over 50 percent of the total energy generated on Ontario's electricity grid, as reported by the IESO.

OPG is subject to a number of provincial and federal legislation and regulations, including the decisions of administrative tribunals or other regulatory bodies, and to Canada's international obligations under certain international treaties. Collectively, these sources dictate many of the constraints within which OPG is permitted to operate its facilities and manage its business.

### Strategic Imperatives

OPG's mission is to provide low cost power in a safe, clean, reliable and sustainable manner for the benefit of its customers and its Shareholder. OPG also seeks to pursue, on a commercial basis, generation development projects and other business growth opportunities to the benefit of the Shareholder. The four strategic imperatives of OPG are briefly described below.

### *Operational Excellence*

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. Workplace safety and public safety are overriding priorities in all activities performed at OPG.

### *Project Excellence*

OPG is pursuing a number of generation development and other projects in support of Ontario's electricity planning initiatives. OPG's major generation development projects currently include the refurbishment of the Darlington GS, the redevelopment of the Ranney Falls hydroelectric GS, and the construction of a solar facility at the Nanticoke GS site. OPG aims to be an industry leader in project management capability and performance.

### *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 the following objectives:

- Increasing revenue, reducing costs and achieving appropriate return;
- Ensuring availability of cost effective funding for operational needs, generation development projects and other business opportunities, and long-term obligations;
- Pursuing opportunities to expand the existing core business and capitalize on new growth paths including emerging renewable energy opportunities; and
- Managing risks. Refer to the section, *Risk Management*, in the Company's 2017 year-end MD&A for further details.

### *Social Licence*

As the largest, publicly-owned electricity generator in Ontario with geographically diverse operations across the province, 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.

OPG has in place a Code of Business Conduct that establishes the standards, expectations, and accountabilities for ethical behaviour. All employees and all parties with whom the Company does business are expected to abide by OPG's Code of Business Conduct. A copy of the Code of Business Conduct can be found on SEDAR at [www.sedar.com](http://www.sedar.com) and also is available on the Company's website at [www.opg.com](http://www.opg.com).

Further details on OPG's strategic imperatives can be found in the corresponding sections of the Company's 2017 year-end MD&A in the section, *Core Business, Strategy, and Outlook*.

## **GENERAL DEVELOPMENT OF THE BUSINESS**

The following is a summary of key developments in OPG's business since January 2015.

### **General Development**

#### OPG's Regulated Prices and Other OEB-Related Developments

Energy revenue generated from the Company's regulated nuclear and regulated hydroelectric facilities is based on regulated prices determined by the OEB through public proceedings. To date, the regulated

prices have included a volumetric base regulated price, and volumetric rate riders for the recovery or repayment of approved balances in variance and deferral accounts (regulatory accounts). As the regulated operations account for the majority of the Company's electricity generation, the outcomes of OPG's applications for regulated prices to the OEB determine a large portion of the Company's revenues and can have a significant impact on the Company's financial performance. *Ontario Regulation 53/05* under the *Ontario Energy Board Act, 1998* sets out certain requirements the OEB must follow in setting regulated prices for OPG's prescribed facilities.

The following are the OEB-authorized regulated prices for electricity generated from the Company's regulated facilities in effect during the periods from January 1, 2015 to May 31, 2017, as well as new regulated prices retrospectively effective June 1, 2017 that OPG has calculated and submitted to the OEB, based on the OEB's decision on OPG's 2017-2021 application for new regulated prices issued on December 28, 2017:

	2017		2016	2015	
(\$/megawatt hour)	January 1 to May 31	June 1 to December 31 <sup>1</sup>	January 1 to December 31	January 1 to June 30	July 1 to December 31
<b>Regulated – Nuclear Generation</b>					
Base regulated price	59.29	80.65	59.29	59.29	59.29
Variance and deferral account rate riders	-	-	10.84 <sup>2</sup>	1.33	12.17 <sup>2</sup>
	59.29	80.65	70.13	60.62	71.46
<b>Regulated – Hydroelectric</b>					
<i>Hydroelectric generating stations prescribed for rate regulation prior to 2014</i>					
Base regulated price	40.20	41.67	40.20	40.20	40.20
Variance and deferral account rate riders	-	-	3.19 <sup>2</sup>	6.04	9.23 <sup>2</sup>
	40.20	41.67	43.39	46.24	49.43
<i>Hydroelectric generating stations prescribed for rate regulation effective in 2014</i>					
Base regulated price	41.93	41.67	41.93	41.93	41.93
Variance and deferral account rate riders	-	-	3.19 <sup>2</sup>	-	3.19 <sup>2</sup>
	41.93	41.67	45.12	41.93	45.12

<sup>1</sup> Regulated prices for the June 1, 2017 to December 31, 2017 period were calculated and submitted to the OEB by OPG in January 2018 based on the OEB's December 28, 2017 decision on OPG's 2017-2021 application for new regulated prices. The final regulated prices will be determined by the OEB as part of the payment amounts order process, which is expected to be completed in the first half of 2018. As part of the process, the OEB is expected to authorize separate rate riders to allow for the recovery of the shortfall between the new regulated prices and the previously approved regulated prices that OPG continues to receive during the interim period between June 1, 2017 and the implementation date of the new regulated prices. The revenue for the period between June 1, 2017 and December 31, 2017 arising from this retrospective application of the new regulated prices submitted by OPG in January 2018 was accrued in 2017.

<sup>2</sup> The OEB authorized interim period rate riders for the period from October 1, 2015 to December 31, 2016 to allow for the recovery of the variance and deferral account riders effective July 1, 2015 for the period from July 1, 2015 to September 30, 2015. The nuclear interim period rate rider was \$2.17 per megawatt hour (MWh) and the regulated hydroelectric interim period rate rider was \$0.64/MWh. These interim period rate riders have not been included in the above table. All rate riders in effect during 2016 expired on December 31, 2016.

### *Base Regulated Prices Effective June 1, 2017*

The OEB's decision on OPG's May 2016 five-year application for new regulated prices for nuclear and regulated hydroelectric generation was issued on December 28, 2017, following a public hearing process. The OEB set an effective date for the new regulated prices of June 1, 2017. OPG had requested an effective date of January 1, 2017. The decision reflected the terms of an OEB-approved partial settlement agreement reached by OPG and intervenors on a limited set of issues in the first quarter of 2017 (Settlement Agreement). The decision included the OEB's findings with respect to ratemaking methodologies for the prescribed facilities, the basis for inputs into the hydroelectric incentive ratemaking formula, and the elements of the nuclear revenue requirement. Pursuant to the decision, for the first time since OPG's prescribed facilities became subject to rate regulation, the new prices will be determined using an incentive ratemaking methodology for the hydroelectric facilities and a custom incentive regulation framework for the nuclear facilities.

New regulated prices for the hydroelectric facilities for each of the years 2017 to 2021 will be determined by annually escalating the base regulated prices in effect prior to June 1, 2017, with some adjustments, using a formula equal to an industry-specific weighted inflation factor based on indices published annually by the OEB for use in incentive regulation formulas, less a stretch factor adjustment. The OEB accepted OPG's proposal to set the annual stretch factor adjustment at 0.3 percent. Based on the approved formula, the 2017 increase in the base regulated price for the regulated hydroelectric facilities is 1.4 percent as of June 1, 2017 and the 2018 increase is 0.9 percent as of January 1, 2018. For the 2019-2021 period, the base regulated price for the regulated hydroelectric facilities will be determined annually before the beginning of each year using the approved formula and inflation indices published by the OEB.

For the nuclear operations, a revenue requirement is determined for each of the years 2017 to 2021 based on the OEB-allowed level of OPG's forecast operating costs as reduced by a stretch factor amount, and a return on rate base determined using the OEB's generic prescribed return on equity rate and an OPG-specific deemed capital structure approved by the OEB. Rate base for OPG represents the average net level of investment in regulated fixed and intangible assets in service and an allowance for working capital. OPG has calculated that the findings of the OEB's December 2017 decision with respect to the forecast operating costs, rate base and deemed capital structure for the nuclear generating facilities will result in nuclear revenue requirements totalling approximately \$15.9 billion over the full five years.

The OEB's findings with respect to the nuclear revenue requirement include approval for inclusion in rate base of in-service capital amounts related to the Darlington Refurbishment project of \$5.5 billion by 2021, which comprises \$4.8 billion forecast in the first quarter of 2020 upon return to service of Unit 2, \$0.4 billion forecast for pre-requisite projects excluding the construction of the Heavy Water Storage and Drum Handling Facility (HWSF) and over the 2016-2021 period and \$0.3 billion for pre-requisite projects placed in service prior to 2016. The OEB is expected to review the HWSF project as part of a future application. In the decision, the OEB concluded that it is appropriate to evaluate OPG's performance on the Darlington Refurbishment project at an overall level rather than by individual cost component, with recovery of any increases over the approved in-service amounts subject to a future prudence review. The \$4.8 billion approved in-service amount upon return to service of Unit 2 includes expenditures incurred during the definition and planning phase of the project. The revenue requirement impact of differences between the approved forecast in-service additions and the actual in-service additions related to the Darlington Refurbishment project will be recorded in the Capacity Refurbishment Variance Account authorized by the OEB pursuant to *Ontario Regulation 53/05* under the *Ontario Energy Board Act, 1998*. In November 2015, the regulation was amended to require the OEB to accept the need for the Darlington Refurbishment project in light of Ontario's 2013 Long-Term Energy Plan (LTEP) and the related policy of the Province endorsing the need for nuclear refurbishments. The Province's support for nuclear refurbishments was reaffirmed in the 2017 LTEP. The 2017 LTEP is discussed in the section, *General Development of the Business* under the heading, *General Development – Ontario's Long-Term Energy Plan*. The Darlington Refurbishment project is discussed in the section, *General Development of the Business* under the heading, *Nuclear Business Development – Darlington Refurbishment*.

In its decision, the OEB also approved recovery of OPG's requested forecast costs of approximately \$292 million over the 2017-2021 period for activities to enable the commercial operation of the Pickering GS beyond 2020 and agreed to the inclusion of operating cost and generation impacts associated with planned continued operation of the station in 2021 in the nuclear revenue requirement. The differences between approved forecast enabling costs for continued operation of the Pickering GS and such actual amounts will be recorded in the Capacity Refurbishment Variance Account for future review and disposition by the OEB. Pickering extended operation to 2024 is discussed under the heading, *Nuclear Business Development – Extension of Pickering Commercial Operation to 2024*.

Excluding amounts that otherwise would have been recorded in OEB-authorized regulatory accounts for repayment to, or recovery from, customers in the future, the OEB's decision reduced OPG's proposed five-year nuclear revenue requirement by approximately \$0.6 billion. The main adjustments made by the OEB included a reduction of \$100 million per year to requested OM&A costs, a reduction of 10 percent per year from forecast non-Darlington refurbishment in-service capital additions entering rate base over the 2017-2021 period, an increase and expansion of the scope of the stretch factor for nuclear costs that further reduced the revenue requirement, and a rejection of OPG's request to increase the equity component of the existing deemed capital structure of 45 percent equity and 55 percent debt. The OEB increased the annual nuclear stretch factor to 0.6 percent and expanded its scope to include most of OPG's OM&A expenses incurred directly for, or allocated to, the nuclear facilities, as well as non-Darlington refurbishment in-service capital additions. The stretch factor is applied starting in 2018 and compounds in each year to 2021. OPG's actual capital structure contains a higher proportion of equity than has been reflected in the OEB-approved deemed capital structure, which has had the effect of reducing OPG's return on shareholder's equity.

In accordance with *Ontario Regulation 53/05*, the nuclear revenue requirement continues to be adjusted by the amount of OPG's revenues, net of costs, from leasing the Bruce nuclear generating stations to Bruce Power. As directed by the OEB, OPG's revenues and costs related to the Bruce nuclear generating stations continue to be determined in accordance with US GAAP for the purposes of establishing the nuclear revenue requirement and remain subject to the Bruce Lease Net Revenues Variance Account established by the OEB in accordance with *Ontario Regulation 53/05*. This includes costs related to the portion of OPG's liabilities for nuclear waste management and nuclear facilities decommissioning (Nuclear Liabilities) associated with the Bruce nuclear generating stations. The OEB's December 2017 decision maintained the previously approved cost recovery methodology for the Nuclear Liabilities for the prescribed facilities and for the Bruce facilities while directing OPG to file a future study examining such methodologies jurisdictionally and for OPG's assets specifically. The decision incorporated the impacts of the updated estimate of OPG's obligations for nuclear waste management and nuclear facilities decommissioning as at December 31, 2016, including through a new Ontario Nuclear Funds Agreement (ONFA) reference plan effective January 1, 2017 approved by the Province (2017 ONFA Reference Plan) and the change in the Nuclear Liabilities recorded in OPG's consolidated financial statements on December 31, 2016. OPG's obligations for nuclear waste management and nuclear facilities decommissioning are discussed in the section, *Description of the Business* under the heading, *Regulated – Nuclear Waste Management Segment*.

As proposed by OPG, the OEB set recovery of pension and OPEB costs in the nuclear revenue requirement on the basis of OPG's forecast cash payments for pension and OPEB plans, with differences between pension and OPEB accrual costs and cash payments continuing to be recorded in the Pension & OPEB Cash Versus Accrual Differential Deferral Account. The regulatory treatment of pension and OPEB costs is discussed further under the heading, *Pension and OPEB Cost Recovery Methodology*.

In November 2015, the Province amended *Ontario Regulation 53/05* to establish a deferral account to record, for future recovery, a portion of the annual OEB-approved revenue requirements for OPG's regulated nuclear facilities during the period from January 1, 2017 to the end of the Darlington Refurbishment project. The amended regulation requires the OEB to determine the revenue requirements for OPG's nuclear facilities on a five-year basis for the ten-year period beginning on January 1, 2017. The portion of the approved revenue requirement deferred in the account each year is to be determined by the OEB on a five-year basis during this ten-year period. The OEB's December

2017 decision authorized establishment of the Rate Smoothing Deferral Account as the deferral account required by the regulation.

As further amended in March 2017, *Ontario Regulation 53/05* requires rate smoothing through deferral of a portion of approved nuclear revenue requirements in the Rate Smoothing Deferral Account to be applied in a manner that makes changes in OPG's production-weighted average nuclear and hydroelectric regulated price more stable year over year. The November 2015 amendment to the regulation originally required that rate smoothing be applied with a view of making more stable year-over-year changes in OPG's nuclear regulated prices only. Per the regulation, the Rate Smoothing Deferral Account records interest at a long-term debt rate reflecting OPG's cost of long-term borrowing approved by the OEB, compounded annually. The regulation requires the OEB to authorize recovery of the balance in the Rate Smoothing Deferral Account on a straight line basis over a period not to exceed ten years following the end of the Darlington Refurbishment project. OPG recognizes positive amounts deferred under rate smoothing as an increase in net regulatory assets and an increase to revenue in the period to which the underlying approved revenue requirement relates. Negative amounts determined under rate smoothing are recorded as a decrease in net regulatory assets and a decrease to revenue.

On January 17, 2018, OPG submitted a draft payment amounts order to the OEB that proposed nuclear base regulated prices for each year of the 2017-2021 period, including a rate smoothing proposal that defers a portion of the nuclear revenue requirements in the Rate Smoothing Deferral Account, based on the December 2017 decision's findings. The rate smoothing proposal takes into account the near-term and future impacts on customers, while seeking to ensure that resulting nuclear regulated prices allow for sufficient cash flow to maintain the Company's investment grade credit rating and support availability of cost effective funding. The difference between the non-deferred portion of the nuclear revenue requirement, calculated by multiplying the nuclear regulated price determined under rate smoothing and the OEB-approved forecast of OPG's nuclear electricity production for the year, and the total approved nuclear revenue requirement for that year determines the portion of the revenue requirement deferred for future collection. The OEB's decision approved the nuclear production forecast as submitted by OPG.

Based on the OEB's direction, the draft payment amounts order also included proposed periods for recovery, through interim period shortfall rate riders, of the retrospective revenue shortfall amount for the period between June 1, 2017 and the implementation date of the new regulated prices based on proposed new regulated prices that would have been in effect during that period. The draft payment amounts order also included proposed recovery periods, through variance and deferral account rate riders, for regulatory account balances approved for recovery in this application, discussed below.

To reflect management's best estimate of the impact of the OEB's decision, in the fourth quarter of 2017, OPG recorded net revenue of approximately \$480 million for the June 1, 2017 to December 31, 2017 period, based on the draft payment amounts order. The revenue was recorded as an increase in regulatory assets for the June 1, 2017 to December 31, 2017 revenue shortfall period, based on proposed new regulated prices, net of a regulatory liability recognized in relation to OPG's rate smoothing proposal. The OEB's approval of the final payment amounts order, including the allocation of the approved revenue requirement between nuclear regulated prices and rate smoothing deferrals, is not expected to have a material impact on the amount of net revenue recorded in the fourth quarter of 2017 related to the OEB's decision. The OEB is expected to issue the final payment amounts order and implement new regulated prices in the first half of 2018.

In January 2018, OPG filed a motion asking the OEB to review and vary the effective date of the new regulated prices to January 1, 2017. The motion did not impact OPG's financial results for the year ended December 31, 2017.

#### *Base Regulated Prices Effective Prior to June 1, 2017*

The base regulated prices in effect during January 1, 2015 through May 31, 2017 were established by the OEB's November 2014 decision and December 2014 order, effective November 1, 2014, using a forecast cost-of-service methodology based on the OEB-approved revenue requirements for the 2014 to 2015

period, taking into account the OEB-approved forecasts of production and operating costs for the regulated facilities and a return on rate base. The regulated prices for the nuclear facilities and the hydroelectric facilities prescribed for rate regulation prior to 2014 were determined by the OEB based on approved 24-month revenue requirements for the 2014 to 2015 period totalling approximately \$7.3 billion, a reduction of approximately \$0.8 billion from OPG's request. The regulated price for the 48 hydroelectric facilities prescribed for rate regulation beginning in 2014 was established based on an approved 18-month revenue requirement for the period from July 1, 2014 to December 31, 2015 of approximately \$750 million, a reduction of approximately \$100 million from OPG's request.

The most significant adjustments made by the OEB to OPG's request in that proceeding included: limiting allowed pension and OPEB costs to cash expenditures over the higher accrual costs submitted by OPG; reducing requested OM&A costs by \$100 million per year; increasing forecast nuclear production by 0.5 terawatt hour (TWh) annually; limiting the Niagara Tunnel project rate base addition which resulted in a write-off of \$77 million of previously incurred capital expenditures in 2014; and reducing allowed income tax expense based on the amount of the regulatory tax loss calculated for 2013.

In December 2014, OPG filed a motion with the OEB asking it to review and vary the parts of its November 2014 decision related to the disallowance of the Niagara Tunnel project expenditures and the application of the 2013 regulatory tax loss against the 2014/2015 revenue requirement. In its January 2016 decision on the motion, the OEB reversed a portion of the Niagara Tunnel project disallowance and upheld the original tax loss decision. In the first quarter of 2016, OPG recorded a gain of \$22 million to recognize the expected future recovery from customers of the reversed portion of the Niagara Tunnel project disallowance.

#### *Variance and Deferral Accounts and Rate Riders*

Variance and deferral accounts are typically established by the OEB to capture, for subsequent review and approval, differences between actual costs and revenues and the corresponding forecast amounts approved by the OEB in setting regulated prices, or to record the impact of items not reflected in the approved regulated prices. Such accounts generally help to mitigate risks and uncertainties to the regulated entity and its customers.

The OEB has authorized several variance and deferral accounts for OPG, including those required by *Ontario Regulation 53/05*. Among others, the authorized accounts include those related to the gross margin impact of variability in regulated hydroelectric electricity production due to differences between the forecast and actual water conditions and due to the effect of SBG conditions, changes in Nuclear Liabilities, changes in revenues and costs related to the lease and related agreements with Bruce Power for the Bruce nuclear generating stations, and variances in the revenue requirement impact of capital and non-capital costs incurred to increase the output of, refurbish, or add operating capacity to the regulated facilities, including the Darlington Refurbishment project. A number of these accounts are subject to an OEB prudence review. There is currently no regulatory account related to the impact of generation performance of OPG's nuclear stations on revenue from the base regulated prices.

Approved balances in the variance and deferral accounts authorized by OPG are recovered or refunded through volumetric rate riders. The additional revenue from the riders is largely offset by a corresponding increase in amortization expense related to the variance and deferral account balances, which are typically recognized as assets (amounts recoverable from customers) or liabilities (amounts payable to customers) on the Company's balance sheet. Differences in amounts recovered or repaid through rate riders for variance and deferral accounts due to differences between actual and forecast production volumes are recorded in separate variance accounts for future disposition.

The OEB's December 2017 decision accepted all variance and deferral account balances proposed for recovery that were not already accepted as part of the Settlement Agreement, resulting in the approval to recover \$305 million recorded in these accounts as at December 31, 2015, without adjustments. The Settlement Agreement provided for the continuation of all applicable existing variance and deferral accounts. In addition to the Rate Smoothing Deferral Account, the OEB established, as of the effective

date of the new regulated prices, new variance and deferral accounts to record costs related to implementing the CNSC's new fitness for duty requirements and to record differences between forecast and actual amount of Scientific Research & Experimental Development investment tax credits attributable to the nuclear facilities. CNSC's new fitness for duty requirements are discussed in the section, *Description of the Business* under the heading, *Generation Operations – Nuclear (Regulated – Nuclear Generation Segment)*.

The variance and deferral account rate riders in effect in 2015 and 2016 included those authorized by the OEB's October 2015 order on OPG's application in 2014 to recover or repay most of the December 31, 2014 variance and deferral account balances, discussed below. The 2015 rate riders also included those established for the period January 1, 2015 to December 31, 2015 by the OEB's December 2014 order on OPG's application for new regulated prices. The December 2014 order allowed for recovery of \$189 million recorded in certain variance and deferral accounts as at December 31, 2013, without adjustments.

The total balances approved for recovery by the OEB's October 2015 order were approximately \$1.8 billion, of which approximately \$1.5 billion was the subject of an OEB-approved partial settlement agreement reached by OPG and intervenors. The remaining balances of \$263 million were approved by the OEB's September 2015 decision, without adjustments. The rate riders authorized by the October 2015 order were in effect from July 1, 2015 to December 31, 2016 and allowed for recovery of \$933 million of the total approved balances.

#### *Pension and OPEB Cost Recovery Methodology*

Using the methodology previously applied by the OEB in setting OPG's regulated prices, the revenue requirements submitted in OPG's 2014/2015 application for new regulated prices included a forecast of 2014 and 2015 pension and OPEB costs determined on an accrual basis in accordance with US GAAP. In its November 2014 decision and December 2014 order on the application, the OEB approved revenue requirements based on OPG's estimated minimum required contributions to its registered pension plan, and a forecast of OPG's expenditures on the OPEB and supplementary pension plans for the regulated business. In directing this reduction in the revenue requirement, the OEB agreed with OPG and certain other parties that a generic proceeding on the regulatory treatment and recovery of pension and OPEB costs would be beneficial. The OEB also indicated that a change in the recovery methodology for OPG's pension and OPEB amounts from the accrual basis, if required, would be addressed in a future OPG rate proceeding, informed by the outcome of the generic proceeding.

Pending the generic proceeding, the OEB established the Pension & OPEB Cash Versus Accrual Differential Deferral Account. Effective November 1, 2014, this deferral account records the difference between OPG's actual pension and OPEB costs for the regulated business determined on an accrual basis and the corresponding actual cash expenditures for these plans. The OEB's November 2014 decision indicated that the future recovery, if any, of amounts recorded in the deferral account would be subject to the outcome of a future generic OEB proceeding on the regulatory treatment and recovery of pension and OPEB costs.

In May 2015, the OEB began a consultation process to develop standard principles to guide its future review of pension and OPEB costs for rate regulated utilities in the electricity and natural gas sectors, including establishing appropriate regulatory mechanisms for cost recovery. On September 14, 2017, the OEB issued its final report on this consultation. The report established the accrual basis of accounting as the method of determining pension and OPEB amounts for rate-setting purposes, unless the OEB finds that this method does not result in just and reasonable rates in the circumstances of a particular utility. The report also provides for the establishment of a generic variance account to record asymmetric carrying charges in favour of ratepayers on the differences between the accrual costs recovered and the cash payments made by a utility in respect of pension and OPEB plans. Carrying charges on this differential are to be assessed at the OEB's prescribed interest rate, on a prospective basis from the effective date of the new variance account. For OPG, this differential will include amounts going back to November 1, 2014, with the charges calculated on the portion of the differential that has been recovered

through regulated prices. None of this differential has been recovered to date. The prescribed interest rate is set quarterly by the OEB based on the quarterly return of a mid-term corporate bond index yield.

The OEB's September 2017 report and the OEB's December 2017 decision on OPG's application for new regulated prices require OPG to continue to record differences between pension and OPEB accrual costs and cash payments in the Pension & OPEB Cash Versus Accrual Differential Deferral Account, until such time as the OEB decides on the approval and implementation of resumption of the accrual basis of recovery for OPG. The future recovery of amounts recorded in the account will be subject to this approval. The OEB's report did not impact OPG's financial results for the year ended December 31, 2017.

The Company recognizes the amount set aside in the Pension & OPEB Cash Versus Accrual Differential Deferral Account as a regulatory asset. Consistent with the expectations set out in the OEB's December 2017 decision, in 2018, OPG plans to file an application with the OEB requesting disposition of the Pension & OPEB Cash Versus Accrual Differential Deferral Account balance and the balances accumulated since December 31, 2015 in other regulatory accounts, as well as approval to resume the accrual basis of accounting as the recovery method for pension and OPEB amounts in future determinations of base regulated prices.

#### *Supreme Court of Canada's Decision on 2011 OEB Ruling*

In September 2015, the Supreme Court of Canada (Supreme Court) issued its decision upholding the OEB's disallowance of \$145 million of OPG's forecast nuclear compensation costs for the 2011 to 2012 period. The majority of these costs were based on previously negotiated collective bargaining agreements. This disallowance was part of the OEB's March 2011 decision on OPG's application for regulated prices effective March 1, 2011. The Supreme Court decision underscores that OPG must continue to establish the reasonableness of both committed and future costs as part of the rate-setting process.

#### Ontario's Long-Term Energy Plan

On October 26, 2017, Ontario's Ministry of Energy issued the 2017 LTEP that outlines the Province's plans for the future development of Ontario's electricity system. The 2017 LTEP focuses on the affordability, reliability and flexibility of a clean energy supply in the province. The 2017 LTEP replaces the previous LTEP issued in 2013.

As it relates to the supply of electricity, the 2017 LTEP recognizes the refurbishment of Ontario's nuclear generating stations as the most cost-effective option for producing emission-free baseload generation to meet Ontario's needs and reaffirms the Province's support for the refurbishment of the four units at the Darlington GS and the six units at the Bruce generating stations, subject to the principles established in the 2013 Long-Term Energy Plan. The 2017 LTEP also recognizes the value to customers of continuing to operate the Pickering GS until 2024, as planned. With respect to hydroelectric electricity generation, the 2017 LTEP highlights the opportunity to continue to invest in optimizing existing hydroelectric facilities, noting that pumped hydroelectric storage could play an important role in the reliability of the electricity system.

Additionally, the 2017 LTEP discusses the potential impact of a number of innovative technologies on the future of the electricity system. Among others, these include the increased electrification of the transportation sector, the emergence of energy storage, and the opportunity for Ontario to foster nuclear innovation technologies. OPG continues to assess how best to capitalize on potential business opportunities in these and other areas. The 2017 LTEP also recognizes the importance of Indigenous peoples' continuing role in shaping Ontario's energy planning, projects and policies. Over the past several years, OPG has partnered with Indigenous communities on a number of generation-related developments and other joint projects and will continue to seek additional opportunities to dialogue with and seek involvement of Indigenous peoples in the electricity industry's future.

## Ontario's Fair Hydro Plan

On March 2, 2017, the Province announced the Fair Hydro Plan aimed at reducing electricity bills for residential, farm, small businesses and other eligible consumers (Specified Consumers) in the province by refinancing a portion of the Global Adjustment costs over a longer period of time. The Global Adjustment includes the difference between Ontario's electricity market clearing price used to dispatch generation and the prices paid to contracted and regulated generators in the province, and the cost of conservation and demand management programs. On June 1, 2017, the Fair Hydro Act received Royal Assent and the associated general regulation came into force in June 2017. The Act established a framework under which the costs and benefits associated with the Government of Ontario's clean energy initiatives are to be allocated between present and future consumers of electricity under the Fair Hydro Plan. The general regulation provides details on the structural, operational and financial elements required to implement the Fair Hydro Plan.

Pursuant to the Act, effective May 1, 2017, the IESO began to defer a portion of the Global Adjustment costs. The Act allows the IESO to transfer a portion of the deferred balance to a financing entity that would fund the deferral in exchange for an irrevocable right to recover the balance and associated financing and other costs from Specified Consumers in the future (Investment Interest). The legislation appointed OPG as the Financial Services Manager under the Act and conveyed upon the Financial Services Manager statutory obligations, including the creation of one or more financing entities that may acquire an Investment Interest from the IESO.

In November 2017, OPG's Board of Directors provided its final approval regarding OPG's involvement as the Financial Services Manager under the Act on commercial terms, following the fulfilment of all conditions the Board of Directors established in May 2017. Accordingly, the Fair Hydro Trust was established as the financing entity contemplated by the Act in December 2017. The majority unitholder and beneficiary of the Trust is a wholly-owned subsidiary of OPG. The Trust is structured to be bankruptcy remote and ring fenced from OPG in order to protect the Company's assets and operations.

In order for the Trust to finance the acquisition of Investment Interest from the IESO, it will incur senior debt from capital markets and subordinated debt from OPG. The Trust's investment will attract financing amounts and other related fees, which, under the general regulation, will be payable by the IESO as carrying costs until July 2021 and by Specified Consumers through the Clean Energy Adjustment to be invoiced by local distribution companies commencing in May 2021, with the three-month overlap in 2021 intended to cover the billing and collection lag from the introduction of the Clean Energy Adjustment. The Clean Energy Adjustment payments by Specified Consumers will be remitted to the Trust through the IESO. The carrying costs include all financing and third-party costs other than repayment of debt principal.

Concurrent with every issuance of the Trust's senior notes, it is expected that OPG will purchase subordinated debt of the Trust in an aggregate amount not to exceed 49 percent of the Trust's total outstanding debt, with 44 percent to be provided by the Province through equity injections in OPG and five percent to be provided by OPG. The subordination level may vary over time, but must be at least equal to 35 percent of the Trust's total outstanding debt. Through OPG's control over the key activities of the Trust and its obligation to absorb losses through ownership of the Trust's subordinated debt, the Company consolidates the financial results of the Trust in accordance with US GAAP.

On December 21, 2017, the Trust purchased its first tranche of Investment Interest from the IESO in the amount of approximately \$1.18 billion. Fifty-one percent of the funding requirement or \$601 million was financed by the Trust through a revolving warehouse facility ranked as senior notes, and the remaining 49 percent was funded through the issuance of short-term subordinated debt to OPG. The Investment Interest has been classified as a financing receivable on OPG's consolidated balance sheet.

OPG's purchase of the subordinated debt issued by the Trust was funded through the following sources:

- The Province provided 44 percent of the funding requirement, or \$519 million, through an equity injection in OPG in exchange for approximately 12.2 million non-voting Class A shares at a price of \$42.46 per share. The Company's Articles of Amalgamation were amended effective December 1, 2017 to allow for the creation and issuance of Class A shares. Refer to the section, *Description of Capital Structure* for further details on the nature of the Class A shares; and
- OPG provided five percent of the funding requirement or \$60 million.

In February 2018, the Trust issued \$500 million of senior notes payable with a coupon interest rate of 3.36 percent and an effective interest rate of 3.44 percent, payable semi-annually until maturity on May 15, 2033. The proceeds were used to repay the majority of the outstanding balance of the revolving warehouse facility issued in December 2017. In March 2018, the Trust is expected to acquire another tranche of Investment Interest from the IESO, with 51 percent of the funding being sourced from the revolving warehouse facility, 44 percent through an equity injection from the Province, and five percent from OPG.

#### Renewal of Collective Agreements and Acquisition of Hydro One Limited Shares

Most of OPG's regular employees are represented by one of two unions: the Power Workers' Union (PWU) and The Society of Energy Professionals (The Society). As at December 31, 2017, the PWU represented approximately 53 percent of OPG's regular workforce, while The Society represented approximately 35 percent of the regular workforce.

The previous collective agreement between OPG and the PWU expired on March 31, 2015. In May 2015, the parties agreed to renew the collective agreement for a three-year term, expiring on March 31, 2018. The changes to the collective agreement included increases to employee pension plan contributions in each year of the agreement. The previous collective agreement between OPG and The Society expired on December 31, 2015. In November 2015, the parties agreed to renew the collective agreement for a three-year term, expiring on December 31, 2018. Changes to the collective agreement included increases to employee pension plan contributions in each of the first two years of the agreement. The changes in pension plan contributions apply to current employees and future employees of both unions, and do not have an end date.

The changes to both collective agreements provided existing employees with lump sum payments for each of the first two years of the respective contract and eligibility to annually receive shares in Hydro One Limited (Hydro One) for up to 15 years starting in the third year of the contract, as long as these employees continue to make contributions to the OPG pension plan and have less than 35 years of pensionable service. The lump sum payments and future share awards are intended to compensate current eligible employees, over a defined period, for their increased pension plan contributions.

In April 2016, OPG acquired nine million common shares of Hydro One at \$23.65 per share as part of a secondary share offering by the Province through a syndicate of underwriters. The acquisition, totalling \$213 million, was made for investment purposes to mitigate the risk of future price volatility related to OPG's future share delivery obligations under the collective agreements. The shares acquired in this transaction represent the substantial majority of OPG's currently anticipated purchases of Hydro One shares.

In addition to the regular workforce, construction work is performed through 19 craft unions with established bargaining rights at OPG facilities. These bargaining rights are established either through the Electrical Power Systems Construction Association (EPSCA) or directly with OPG. Collective agreements between the Company and its construction unions are negotiated either directly or through EPSCA. All of these collective agreements currently have multi-year terms, expiring on April 30, 2020.

Negotiations for a new labour agreement with the PWU are underway.

## Shareholder Declarations and Shareholder Resolutions to Sell Certain Non-Core Real Estate Properties

In December 2015, OPG received a Shareholder Declaration and a Shareholder Resolution requiring the Company to sell its head office premises and associated parking facility located at 700 University Avenue and 40 Murray Street in Toronto, Ontario. The sale was completed in April 2017, with a gain on sale of \$283 million, which is net of tax effects of \$95 million, recognized in net income in the second quarter of 2017. Pursuant to the Shareholder Declaration and Shareholder Resolution, and as prescribed in the *Trillium Trust Act, 2014* (Trillium Trust Act), OPG is required to transfer the proceeds from this disposition, net of prescribed deductions under the Trillium Trust Act, into the Province's Consolidated Revenue Fund. The amount of designated proceeds to be transferred into the Consolidated Revenue Fund is expected to approximate the after-tax gain on sale. The transfer is expected to take place as early as in the first quarter of 2018, through a special dividend authorized by OPG's Board of Directors in March 2018.

In June 2016, OPG received a Shareholder Declaration and a Shareholder Resolution that requires the Company to sell its former Lakeview GS site located in Mississauga, Ontario. OPG has entered into a purchase and sale agreement with a purchaser, with the sale scheduled to close in March 2018. An estimated after-tax gain on sale of approximately \$200 million is expected to be recognized in net income upon completion of the transaction. Pursuant to the Shareholder Declaration and Shareholder Resolution, and as prescribed in the Trillium Trust Act, OPG is required to transfer the proceeds from this disposition, net of prescribed deductions under the Trillium Trust Act, into the Province's Consolidated Revenue Fund. OPG anticipates the amount of designated proceeds transferred into the Consolidated Revenue Fund to approximate the after-tax gain on the sale. In accordance with the Shareholder Resolution, approximately one-third of the site is to be transferred to the City of Mississauga, by the purchaser, for parkland, institutional, and cultural uses.

Neither the former Lakeview GS site nor the Company's head office premises and associated parking facility are considered core assets to OPG's business.

For a complete list of Shareholder directives, refer to the section, *Interest of Management and Others in Material Transactions* under the heading, *Relationship with the Province and the OEFC – Shareholder Directives*.

## Efficiency Improvement and Cost Reduction Initiatives

OPG is focused on reducing costs by pursuing sustainable efficiency and productivity improvements across operating business units and support functions, while ensuring that there is no adverse impact on the safety, reliability and environmental sustainability of the Company's operations. Building on significant efficiency achieved since 2011 under a more scalable, centre-led organizational model implemented as part of the completed Business Transformation initiative, this includes streamlining of processes, simplifying governance, upgrading technology, optimizing service delivery models, and continuing to leverage attrition to achieve human resource targets aligned with business requirements. Strategies to improve cost performance and organizational capability are being implemented at the enterprise and business unit level. These strategies are supported by continuing efforts to embed an outcomes-driven culture that reinforces cost effectiveness, efficiency and organizational agility as part of business decision-making.

OPG is proceeding with an enterprise-wide process to evaluate the impact of the eventual shutdown of the Pickering GS on the Company's operating cost structure. This multi-year initiative, known as OPG25, involves identifying and implementing a coordinated set of plans and targets to ensure the optimization of the Company's longer-term operating model, business strategies and organizational design between now and the planned end of Pickering commercial operation in 2024. The overall aim of the initiative is to ensure ongoing cost effectiveness of the Company's operations after the eventual shutdown of the Pickering GS and to mitigate the cost impacts associated with the shutdown. Through this work and a continued focus on productivity enhancements, OPG expects to deliver increased value to customers and

achieve improvement in outcomes of future applications for regulated prices under the OEB's incentive regulation framework.

In 2017, OPG launched a strategy to accelerate the pace of digital transformation across the enterprise. The strategy is focused on making investments to modernize information technology infrastructure enhance mobility, connectivity and field and office productivity, and improve equipment reliability and station performance through data management and data analysis. The goal of the strategy is increase operational efficiency, reduce operating costs and help to enable optimization initiatives in support of OPG25.

## **Nuclear Business Development**

### Darlington Refurbishment

The Darlington generating units are approaching their originally designed end-of-life. Refurbishment of the four generating units is expected to extend the operating life of the station by approximately 30 years, into the 2050s. In January 2016, the Government of Ontario's support for the Darlington Refurbishment project was affirmed through the Ontario Minister of Energy's announcement endorsing OPG's plan to refurbish the four Darlington units at a total project budget of \$12.8 billion. The Province's announcement followed the approval of the project budget and schedule by OPG's Board of Directors in November 2015. The first refurbished unit is scheduled to be returned to service in the first quarter of 2020 and the refurbishment of the last unit is scheduled to be completed by 2026. *Ontario Regulation 53/05* requires the OEB to ensure that OPG recovers capital and non-capital costs and firm financial commitments in respect of the Darlington Refurbishment project, if the OEB is satisfied that the costs were prudently incurred and that the firm financial commitments were prudently made.

The refurbishment project is a multi-phase program comprising several sub-projects. The major work streams include: de-fuelling of reactors and refurbishment of the fuel handling equipment; removal and replacement of feeder tubes and fuel channel assemblies in each reactor (Retube and Feeder Replacement or RFR); inspections and repairs of turbine generator sets and replacement of associated control systems; mechanical cleaning, water lancing, and inspection and maintenance work on steam generators; and replacement or repairs of certain other station components referred to as balance of plant. The RFR is the largest sub-project and represents a majority of the critical path schedule.

In 2016, the Darlington Refurbishment project transitioned from the planning phase to the execution phase, as OPG commenced the refurbishment of the first unit, Unit 2, in October 2016 as planned. The unit was taken offline on October 15, 2016. De-fuelling of the reactor was completed in January 2017, with a total of 480 fuel channels de-fuelled. 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 second major segment includes preparatory work to support the removal of feeder tubes and fuel channel assemblies, followed by the removal of reactor components. The preparatory work was completed in the second quarter of 2017. The Re-tube Tooling Platform for hosting the tooling for the removal, inspection and installation activities, and the setup of specialized tooling and equipment needed for the removal and replacement of the reactor components were completed in the third quarter of 2017. The disassembly of reactor components commenced in August 2017, with the removal of all 960 feeder tubes completed safely in September 2017. The removal of fuel channel assemblies commenced in October 2017. The removal of pressure tubes as part of the fuel channel assemblies was completed in March 2018, with the removal of calandria tubes currently in progress. The removal of all reactor components is expected to be completed in mid-2018. Key projects in the second major segment completed to date in 2018 include the primary side steam generator layup and installation of steam generator access ports to support future inspections. Other key project activities being executed during the second segment include the continuation of the major turbine generator overhaul and continued execution of the major electrical scope.

Most of the pre-requisite projects, including construction of facilities, infrastructure upgrades and installation of safety enhancements, have been completed and placed in-service. Among others, this includes the completion of the Refurbishment Project Office in November 2015, the RFR Island Support Annex in February 2016 and the Re-tube Waste Processing Building in November 2017. Completion of the HWSF has been delayed due to challenges with construction. OPG suspended the project in the second quarter of 2017 to evaluate the best approach to optimize cost and schedule and complete the project. Construction to complete the facility recommenced in the fourth quarter of 2017. The HWSF is expected to be completed by the second quarter of 2019 and is not on the critical path for the Darlington Refurbishment project, which continues to track on schedule. The cost of the HWSF will be accommodated within the overall Darlington Refurbishment budget of \$12.8 billion. Taking into account the execution performance of the Unit 2 refurbishment and the cost to complete the HWSF, the overall Darlington Refurbishment project continues to track to the \$12.8 billion budget.

OPG is also continuing to execute work to support the requirements set out in the CNSC-approved Integrated Implementation Plan (IIP) for the station. The IIP contains actions previously identified as part of a series of assessments undertaken by OPG in line with CNSC's regulatory requirements related to life extensions of nuclear plants in effect at the time OPG began to undertake the Darlington Refurbishment project. These actions are designed to meet updated codes, standards and practices, and to ensure that the operation of the station continues to pose minimal risk to health, safety, security and the environment. The CNSC approved the regulatory scope defined in the IIP as part of the Darlington operating licence renewal in December 2015. Among others, activities undertaken in support of the IIP include the commissioning of two safety enhancements at the station, the Third Emergency Power Generator and the Containment Filtered Venting System, which were placed in-service in April 2017 as part of the pre-requisite projects. In December 2015, the CNSC granted the Darlington GS a ten-year operating licence effective for the period from January 1, 2016 to November 30, 2025, which spans most of the planned duration of the Darlington Refurbishment project.

In addition to the execution of refurbishment activities on Unit 2, OPG is continuing planning activities for the refurbishment of the second unit, Unit 3, and is entering into associated commitments to procure major components that require long lead times. These planning activities are being undertaken in accordance with the refurbishment project schedule. In February 2018, the Government of Ontario confirmed its commitment to proceed with the refurbishment of Unit 3.

On November 21, 2017, the Financial Accountability Office of Ontario issued a report, "*An Assessment of the Financial Risks of the Nuclear Refurbishment Plan*". The report assesses the impact of OPG and Bruce Power's respective nuclear refurbishments on customers and the Province based on mechanisms in place for the recovery of the costs to refurbish and subsequently operate these nuclear stations. The report concludes that refurbishment of the four units at the Darlington GS and the six units at the Bruce nuclear generating stations provides the most cost effective, low emission generation source available to meet Ontario's baseload electricity requirements.

#### Extension of Pickering Commercial Operation to 2024

In 2015, OPG completed the necessary work to demonstrate with sufficient confidence that the Pickering fuel channel life, a key life-limiting component of the station, will allow all six operating units of the station to operate to the end of 2020. OPG's early technical work at that time also showed that the Pickering GS can be operated safely beyond 2020. OPG's objective is to maximize the safe and reliable operating life of the Pickering units. As announced in 2016 and approved by the Province, OPG is continuing to execute on a plan to extend safe and reliable operation of the Pickering GS to 2024. Extending operations at the Pickering GS will provide Ontario with a clean, reliable source of baseload electricity during the Darlington GS and initial Bruce nuclear unit refurbishments, providing continued employment for over 3,000 employees at OPG.

OPG's current five-year operating licence for the Pickering GS was approved by the CNSC in 2013 and expires on August 31, 2018. This current licence was issued assuming that the station would shut down in 2020. On June 28, 2017, OPG confirmed to the CNSC that it intends to cease commercial operation of

all Pickering units on December 31, 2024. On August 28, 2017, OPG submitted a ten-year licence renewal application to the CNSC. The requested licence term spans the planned extended commercial operation period, through to the planned period of de-fuelling, de-watering and beginning to place the station in a safe storage state in 2028. In support of the licence renewal, OPG undertook a Periodic Safety Review (PSR), a comprehensive assessment of the station's design and operation to confirm that there is a high level of safety throughout the operating life and to determine what reasonable and practical enhancements can be made to further improve safety. The PSR also includes a component condition assessment of the station to identify the work required to support the station's continued operation. The PSR has confirmed that extending commercial operation of the Pickering units will continue to pose minimal risk to the health, safety and security of workers, the public and the environment. The final major component of the PSR was submitted to the CNSC in November 2017. The CNSC's review of the PSR submission and licence application is in progress. Based on the evidence and documentation submitted to the CNSC, OPG believes it is well positioned to obtain a licence renewal that would support its extended operations plan for the Pickering GS.

As part of the plan to extend Pickering operations, OPG has been continuing to undertake the required technical work to confirm that the station's pressure tubes, a key life-limiting component of the station, will remain fit for service for operation to 2024. In the fourth quarter of 2017, OPG has confirmed that technical assessments completed to date provide sufficient confidence in the programs and provisions in place to assure fitness-for-service of fuel channel components in line with the planned extended commercial operation period. This evaluation is consistent with the safety case reflected in OPG's operating licence renewal application for the Pickering GS submitted to the CNSC in 2017. OPG continues to execute the work required for the planned extended commercial operation of the station, including plant modifications and other work as identified through the PSR, station reliability initiatives, and equipment component inspections.

#### Bruce Power Refurbishment and Bruce Lease Agreement

OPG leases the four-unit Bruce A (Units 1 to 4) and the four-unit Bruce B (Units 5 to 8) nuclear generating stations and associated lands and facilities to Bruce Power on a long-term basis. Bruce Units 1 and 2 were refurbished by Bruce Power under a refurbishment agreement with the IESO and returned to service in 2012. While Bruce Power is responsible for operating all of the leased units, OPG is primarily responsible for the management of the nuclear used fuel and other nuclear waste associated with the Bruce nuclear generating facilities, as well as the decommissioning of the facilities at the Bruce site. Under the lease agreement between Bruce Power and OPG (Bruce Lease) and related agreements, OPG receives base rent and supplemental rent payments from Bruce Power, fees for nuclear waste management other than used fuel, and fees for certain other services. The output from the Bruce nuclear generating stations is not subject to rate regulation by the OEB.

In December 2015, the Province announced that the refurbishment agreement between the IESO and Bruce Power had been updated and that Bruce Power will proceed with the refurbishment of the six un-refurbished units of the Bruce nuclear generating stations. In order to facilitate Bruce Power's refurbishment plans, the Bruce Lease and related agreements were amended in December 2015 to extend Bruce Power's future options to renew the lease up to the end of 2064. To achieve better alignment with OPG's costs, the agreements were also amended to revise, starting in 2016, the approach for calculating supplemental rent payments and fees for nuclear waste management other than used fuel, and to modify the fee structure for OPG's heavy water detritiation services starting in 2017. Beginning in 2016, supplemental rent payments wholly represent fees for nuclear used fuel management. Amendments were also made to enable certain adjustments to future base rent, supplemental rent and other fees for potential future changes in OPG's decommissioning and nuclear waste management cost estimates related to the Bruce facilities, and to remove a conditional supplemental rent rebate provision effective December 4, 2015. Certain of the above amendments were executed by OPG pursuant to a Shareholder Declaration and Shareholder Resolutions issued in November 2015. For a complete list of Shareholder directives, refer to the section, *Interest of Management and Others in Material Transactions* under the heading, *Relationship with the Province and the OEFC – Shareholder Directives*.

The refurbishment of Bruce Power's Unit 6 is scheduled to commence on January 1, 2020. Any nuclear waste resulting from this refurbishment that is determined to be non-routine per the existing waste management contract between Bruce Power and OPG will require an additional agreement to compensate OPG for managing this waste. Pursuant to a Memorandum of Understanding dated November 12, 2015, OPG and Bruce Power have committed to ongoing collaboration to improve their respective nuclear refurbishment programs.

#### Ontario Nuclear Funds Agreement Reference Plan Update

OPG is responsible for the management of radioactive used nuclear fuel and low and intermediate level radioactive waste material (L&ILW) and the decommissioning of its nuclear stations and waste management facilities. Pursuant to the ONFA between OPG and the Province, OPG is required to set aside monies into two segregated funds, the Used Fuel Segregated Fund and the Decommissioning Segregated Fund, to fund the future life cycle costs of long-term nuclear used fuel and L&ILW management and nuclear facilities decommissioning. 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. As part of the reference plan update process, OPG estimates the total funding liabilities for future nuclear waste management and nuclear decommissioning based on life cycle cost estimates and a set of underpinning assumptions, including remaining useful lives of the nuclear stations, proposed methods and timing of nuclear waste disposal, and economic indicators. In accordance with US GAAP, OPG carries a present value asset retirement obligation on the balance sheet related to its nuclear waste management and nuclear decommissioning liabilities. In accordance with *Ontario Regulation 53/05*, the OEB is required to ensure that OPG recovers the revenue requirement impact of its nuclear waste management and nuclear decommissioning liabilities arising from the current approved ONFA reference plan.

In 2016, OPG completed a comprehensive update of the estimate for its obligations for nuclear waste management and nuclear facilities decommissioning, in line with the required ONFA reference plan update process. The results of the update were reflected in a new ONFA reference plan as well as a downward adjustment in the asset retirement obligation carried on OPG's balance sheet as at December 31, 2017. The new ONFA reference plan was approved by the Province in December 2016, with an effective date of January 1, 2017. Reflecting the funded status of the Used Fuel Segregated Fund and the Decommissioning Segregated Fund based on the revised lower life cycle liability estimates per the 2017 ONFA Reference Plan, no overall contributions to either the Used Fuel Segregated Fund or the Decommissioning Segregated Fund are currently required starting in 2017. Contributions may be required in the future should either or both of the funds be in an underfunded position when a new reference plan is approved. Such may be the case as a result of future variability in asset performance due to volatility inherent in financial markets and economic conditions. Future contribution levels also are dependent on changes in baseline cost estimates and underpinning planning assumptions used to establish the funding obligations in subsequent ONFA reference plans.

The overall reduction in OPG's nuclear waste management and nuclear decommissioning liabilities resulting from the comprehensive update was mainly due to a decrease in cost estimates to reflect a proposed new, more cost effective container design and engineered barrier concept to house used nuclear fuel for disposal, updated cost escalation rates, and a later expected in-service date for Nuclear Waste Management Organization's (NWMO) planned deep geologic repository for the long-term permanent disposal of Canada's used nuclear fuel. These decreases were partly offset by higher cost estimates related to station decommissioning, primarily due to a better definition of work required during the preparation for safe storage after station shutdown and a higher volume of waste expected to be generated during the decommissioning.

Further details on OPG's nuclear waste management and nuclear decommissioning obligations, the ONFA and proposed methods for long-term used fuel and L&ILW disposal are discussed in the section, *Description of the Business* under the heading, *Regulated – Nuclear Waste Management Segment*.

## **Hydroelectric Business Development**

### Peter Sutherland Sr. Hydroelectric Generating Station

In March 2015, OPG's Board of Directors approved a project to construct the Peter Sutherland Sr. GS, a new 28 MW hydroelectric station on the New Post Creek near its outlet to the Abitibi River, with a budget of \$300 million. The station was constructed through PSS Generating Station LP (PSS), a partnership between OPG and Coral Rapids Power Corporation (CRP), a wholly owned subsidiary of the Taykwa Tagamou Nation.

In March 2017, final testing and commissioning of the turbine and generator units were successfully completed and both units were declared substantially complete. On March 31, 2017, the project received a permit from the Ontario Ministry of the Environment and Climate Change (MOECC) to take water for operations to allow the station to operate commercially. This in-service date was well ahead of the originally planned schedule of the first half of 2018. The project's schedule had been accelerated to take advantage of favourable weather conditions. The project is expected to close below the approved budget of \$300 million. Project close-out activities are in progress. The Peter Sutherland Sr. GS is included in the Contracted Generation Portfolio segment.

OPG began to receive contracted revenue for the project following the IESO's confirmation of the station's commercial operations as of March 31, 2017, under a 50-year hydroelectric ESA.

In April 2017, the CRP exercised its right under the partnership agreement to increase its interest in PSS to 33 percent.

### Sir Adam Beck Pump Generating Station Reservoir Refurbishment

In August 2015, OPG's Board of Directors approved a project to refurbish the 300-hectare storage reservoir at the Sir Adam Beck Pump GS. The Sir Adam Beck Pump GS facility allows OPG to pump and store water diverted from the Sir Adam Beck generating complex during periods of low electricity demand to be used to generate up to 600 MW of electricity during subsequent periods of high electricity demand.

The refurbishment construction began in April 2016 and was completed in February 2017, ahead of the originally planned schedule date of April 2017 and below the approved budget of \$58 million. The reservoir refurbishment work included the installation of a partial new reservoir liner and construction of a grout curtain in the bedrock foundation of the reservoir dyke. The refurbishment is expected to add approximately 50 more years to the reservoir's life. The Sir Adam Beck Pump GS is included in the Regulated – Hydroelectric segment.

### Ranney Falls Hydroelectric Generating Station

In 2017, OPG began construction work on a 10 MW single-unit powerhouse on the existing Ranney Falls GS site. The new unit will replace an existing unit that reached its end of life in 2014. The existing forebay structure has been demolished and the new concrete structure has been completed. Excavation has been completed and construction continues in the expanded forebay, powerhouse and spillway area. The new forebay concrete wall has been completed, and concrete placement of the new powerhouse and the spillway integrated structure is in progress. The project's expected in-service date is in the fourth quarter of 2019, with a budget of \$77 million. The project is tracking on schedule and on budget. The Ranney Falls GS is included in the Regulated – Hydroelectric segment.

## **Thermal and Solar Business Development**

### Nanticoke Solar Facility

In March 2016, Nanticoke Solar LP, then a partnership between OPG, SunEdison Canadian Construction LP (SECCLP) and a subsidiary of Six Nations of the Grand River Development Corporation, was selected

through the first phase of IESO's Large Renewable Procurement (LRP) program to develop a 44 MW solar facility at OPG's Nanticoke GS site and adjacent lands in Haldimand County, Ontario. The LRP program was a competitive bidding process for procuring large renewable energy projects in Ontario. In March 2016, Nanticoke Solar LP and the IESO executed a 20-year LRP contract, which formalized the terms and conditions for the development and operation of the new solar facility. During 2017, OPG purchased SECCLP's interests in Nanticoke Solar LP and continued work to obtain approvals and permits required to enable the commencement of construction. Significant contracts for equipment and engineering construction services were executed in the first quarter of 2018. The construction of the solar facility will commence with site preparation work in March 2018. The 20-year term of the LRP contract takes effect once the station achieves commercial operation, which is expected in the first quarter of 2019. The budget for the project is \$107 million.

### Biomass Conversions

In April 2014, OPG ended coal-fired generation at the Thunder Bay GS, which marked the end of coal-fired generation in Ontario. Following the cessation of coal-fired generation, OPG completed the conversion of the Atikokan GS to biomass in August 2014 and one unit at the Thunder Bay GS to advanced biomass in January 2015. These biomass-generating units are among the world's leading in their innovation. The Atikokan GS is currently the largest generating station in North America fuelled by 100 percent biomass, a sustainable fuel recognized as beneficial to climate change mitigation, with an in-service capacity of 205 MW. The converted Thunder Bay unit has 153 MW of in-service capacity using advanced biomass fuel, a wood-based fuel that is thermally treated to allow it to be stored outdoors and withstand exposure to the weather. Both conversion projects were completed ahead of schedule and within the approved cost estimates, and are operating under ESAs with the IESO.

### Decommissioning of Lambton and Nanticoke Coal-Fired Generating Stations

OPG ceased coal-fired generation at the Lambton and Nanticoke generating stations in September 2013 and December 2013, respectively. In November 2016 and July 2015, respectively, OPG announced that it would decommission the Lambton and Nanticoke generating stations as it could not commercially support continued preservation of these sites in light of the outlook for long-term electricity demand in the province that does not support the need for their future conversion. OPG has begun executing decommissioning plans for these two stations, which will ensure that they are closed safely, securely, and in an environmentally responsible manner. The decommissioning of the Nanticoke GS will accommodate the construction and operation of the Nanticoke solar facility.

During 2017, OPG substantially completed the demolition of the Nanticoke coal yard equipment and structures and issued a contract for the demolition of the Nanticoke powerhouse and associated structures. In the fourth quarter of 2017, the demolition contractor had been mobilized to prepare for the removal of the powerhouse and associated structures and initiated the preparatory work for the demolition of the stacks. The demolition of the stacks took place in February 2018. A competitive bidding process for the demolition of the Lambton GS is in progress, with a contract for the removal of the powerhouse and associated structures expected to be issued during 2018. An update of the associated asset retirement obligations carried on the balance sheet related to the Nanticoke and Lambton sites has been completed.

## **DESCRIPTION OF THE BUSINESS**

### **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.

Electricity has traditionally been generated in large, multi-unit, centralized facilities. These facilities are usually classified by: (i) the type of fuel used; (ii) capacity, typically expressed in MW; and (iii) dispatch mode (being whether or not the electricity generated by a particular facility is dispatched to meet peak, intermediate or baseload demand). The energy produced by a facility is generally expressed as its output over the time the facility operates, typically in terms of MWh. New supply from smaller scale, largely intermittent, renewable sources such as wind, solar, and bio-energy is being integrated into the power system, connected either directly to the transmission system or embedded in distribution networks. Distributed generation involves production of electricity closer to end users and away from large scale production facilities that require more transmission. Electricity systems typically require new capital expenditures and processes in order to accommodate intermittent generators.

Electricity is an essential commodity that cannot be stored without converting to other forms, a process that is more difficult in large volumes. Therefore, electricity supply must instantaneously match demand to maintain the stability and reliability of the electrical power system. This is accomplished by coordinating the supply of and demand for electricity, a responsibility typically assigned to regulated regional system operators. Electricity systems have evolved on a regional basis and are connected to neighbouring regional power grids. Such connections enhance system reliability and permit the economic purchase and sale of electricity between electricity markets.

#### Ontario's Electricity Industry

OPG's predecessor, Ontario Hydro, served as a vertically integrated electric utility in Ontario. Following the adoption of a restructuring plan for Ontario's electricity industry pursuant to the *Energy Competition Act, 1998*, five principal successors to Ontario Hydro's integrated electricity business began operating as separate entities on April 1, 1999:

- OPG, which purchased and assumed the electricity generation, wholesale energy, and ancillary services businesses of Ontario Hydro;
- Hydro One, which purchased and assumed the transmission, distribution, and retail energy services businesses of Ontario Hydro;
- the Independent Electricity Market Operator (later renamed the IESO), which was formed to act as both the independent electricity system operator and the market operator. The IESO is responsible for the dispatch of generation to meet demand, the control of the Ontario transmission grid, and the operation of energy and ancillary markets;
- the Electrical Safety Authority, which was established to carry out electrical equipment and electrical wiring safety and inspection functions; and
- the Ontario Electricity Financial Corporation (OEFC), which is the legal continuation of the former Ontario Hydro and is responsible for managing the debt and certain other obligations not transferred to other successor companies of Ontario Hydro.

OPG purchased and assumed all of the interest of Ontario Hydro in and to all officers, employees, assets, liabilities, rights and obligations of Ontario Hydro directly or indirectly relating in any manner to the applicable activities carried on by Ontario Hydro as of April 1, 1999, pursuant to the transfer orders made by Order-in-Council under the *Electricity Act, 1998*. The transfer orders provide that if they fail for any reason to fully and effectively in law transfer any such asset, right, liability or obligation or that if such transfer would constitute a breach of the terms of the asset, right, liability or obligation or of any applicable law, such assets, rights, liabilities or obligations are not transferred, but are held by the OEFC for the benefit of OPG.

Ontario's competitive electricity market was opened by the IESO in 2002. The market is used to manage the purchase and sale of wholesale electricity in the province.

Since the opening of the competitive market, Ontario's power supply mix has experienced significant change. A significant amount of new capacity has been added, while coal-fired generation, which at its peak accounted for approximately 6,500 MW of capacity, has been eliminated. New natural gas powered capacity of over 5,000 MW as of the end of 2017 has largely replaced the peaking capacity previously provided by coal-fired generation, while the return to service of Units 1 and 2 at the Bruce A GS in 2012 added approximately 1,500 MW of baseload nuclear generation. New wind and solar capacity of over 7,000 MW has also been added as of the end of 2017.

While electricity supply in Ontario has increased, the province's electricity demand as reported by the IESO has fallen by approximately 13 percent over the last decade, largely due to changes in economic conditions and conservation measures, and also in part due to the addition of small scale solar generation embedded in the distribution system. Embedded generation reduces the demand supplied by grid-connected generation. Reducing electricity demand by encouraging conservation and demand management has been a key part of the Government of Ontario's plan to reduce greenhouse gas (GHG) emissions from the province's electricity sector. Shorter-term fluctuations in electricity demand are impacted by variations in seasonal weather conditions. Ontario's electricity demand as reported by the IESO was 132.1 TWh in 2017, which excludes electricity exports out of the province.

In October 2017, Ontario's Ministry of Energy issued the 2017 LTEP that outlines the Province's plans for the future development of Ontario's electricity system. For further details, refer to the section, *General Development of the Business* under the heading, *General Development – Ontario's Long-Term Energy Plan*.

### **Ontario Electricity Market Activities**

Real-time energy supply needs are met through the wholesale electricity market administered by the IESO, with the market clearing price, the Hourly Ontario Energy Price, set by offers or bids into the market. OPG offers its generation into this real-time energy market, or spot market, to be dispatched by the IESO. The IESO receives hourly offers from electricity generators and importers to provide energy, along with bids to withdraw energy from a few flexible loads and exporters, and then schedules the lowest-cost offers and bids needed to meet demand every five minutes.

Virtually all non-OPG generators in Ontario have bilateral contracts with the IESO that provide for payments that are different from the market price of electricity. In addition, the prices for all of OPG's nuclear and most of its hydroelectric stations are set by the OEB. The difference between the market price and the prices paid for regulated and contracted generation, as well the cost of conservation and demand management programs, are charged to Ontario electricity consumers through the Global Adjustment portion of the total price of electricity.

Maintaining power system reliability requires a continuous balance of supply and demand. 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 its 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.

SBG occurs when electricity production from the baseload facilities is greater than the market demand for electricity. Baseload generation supply surplus in Ontario is managed by the IESO, mainly through generation reductions at hydroelectric and certain nuclear stations and other grid-connected renewable resources. The prevalence of SBG conditions is impacted by weather conditions which affect electricity demand, wind and solar generation quantities, and through the impact on water flows, the availability of hydroelectric power. In 2017, OPG lost 5.9 TWh of hydroelectric generation due to SBG conditions. In each of 2016 and 2015, OPG lost 4.7 TWh and 3.2 TWh of hydroelectric generation due to SBG conditions, respectively. The gross margin impact of production forgone at OPG's regulated hydroelectric stations due to SBG conditions has been offset by a regulatory variance account authorized by the OEB.

During 2017, 2016 and 2015, production forgone at OPG's regulated hydroelectric stations due to SBG conditions was 5.2 TWh, 4.3 TWh and 2.8 TWh, respectively.

The OEB has previously authorized an additional pricing mechanism for OPG's regulated hydroelectric generation that provides a financial incentive to OPG to shift hydroelectric generation from lower market price periods to higher market price periods. This is intended to benefit customers through the displacement of generation from the relatively higher cost sources such as natural gas. The time-shifting is made possible by the ability to store water in reservoirs located at a number of OPG's hydroelectric facilities, including the Sir Adam Beck Pump GS.

The IESO also administers the operating reserve market and a market for ancillary services. The objective of the operating reserve market is to ensure that additional supplies of energy are available to maintain power system reliability following an unforeseen event. Ancillary services include regulation service, reactive support, black start capacity, and other services required to maintain the reliability of the Ontario electricity system. OPG participates in these markets.

The IESO is in the preliminary stages of a Market Renewal program, a series of coordinated initiatives expected to result in a fundamental redesign of Ontario's electricity markets and may impact OPG depending on the market design that is implemented. The IESO's stated goal for the Market Renewal program is to improve how electricity is priced, scheduled and procured in order to meet electricity system and participant needs reliably, transparently, efficiently and at lowest cost. OPG is actively participating in the Market Renewal stakeholdering process and continuing to collaborate with the IESO.

OPG and other Ontario electricity market participants are required to comply with market rules issued by the IESO. As an owner and operator of generating stations, OPG is also subject to reliability standards as set out by the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council (NPCC) and the IESO. NERC, NPCC and IESO are standards authorities with the ability to create or modify reliability standards. Such standards are binding on OPG pursuant to the OEB-issued electricity generating licence and the IESO market rules. The IESO monitors compliance with and enforces the market rules and coordinates with system operators and reliability agencies in other jurisdictions to ensure energy adequacy and security across the interconnected bulk electricity market in North America.

### **Interconnected Markets**

The interconnected markets are electricity markets in neighbouring provinces and states whose transmission systems are connected to the Ontario power grid, either directly or through other contiguous interconnected markets. Ontario's market is interconnected with New York, Michigan, Minnesota, Manitoba, and Québec. Market intermediaries wishing to import or export electricity between Ontario and the interconnected markets are required to schedule these transactions through the Ontario spot market. OPG and its wholly owned subsidiary, OPG Energy Trading (OPGET), participate in the interconnected markets. OPGET is discussed further under the heading, *Services, Trading, and Other Non-Generation Segment*.

Interconnection transmission capabilities between Ontario and the interconnected markets are subject to physical and weather dependent limitations. These limitations include planned or forced outages to transmission lines and other equipment that reduce transmission capacity. They also include wind and temperature conditions that affect the transfer capability of all transmission lines on the electrical system. For example, higher ambient air temperature lowers capacity, while higher wind speeds increase capacity. Overall power system parameters and conditions also can result in limitations on particular interties, being one or more transmission lines that connect Ontario to a neighbouring region. For example, high flow on one intertie may result in a reduction in the limit on another intertie.

## Water Rights

OPG's management of available water resources directly affects the generation output, efficiency, and ultimately return on investment for the Company's hydroelectric assets. The watersheds on which OPG's hydroelectric generating facilities are located are shared by many users and are subject to various governance requirements, such as international, federal and provincial agreements, water power leases, and regulations. Accordingly, OPG must balance the economic, environmental, social and legal requirements associated with the watersheds when utilizing water to optimize electricity generation.

### International Rivers

The six OPG hydroelectric generating stations subject to OEB rate regulation since 2008 are directly or indirectly supplied by two major international waterways, the Niagara River and the St. Lawrence River, and are subject to treaties with the U.S. relating to water use. These stations represent approximately 45 percent of OPG's total in-service hydroelectric capacity.

Through a series of agreements between the Government of Canada and the Province, and certain federal and provincial laws, OPG has been granted the right to exercise Canada's rights with respect to the construction, maintenance, and operation of generating facilities under the *Boundary Waters Treaty of 1909* and the *Niagara Diversion Treaty of 1950* between Canada and the U.S. Both of these treaties continue in perpetuity but are terminable by either party with 12 months prior written notice. Given the significance of these treaties, OPG does not expect either party to exercise their respective termination rights in the foreseeable future.

The *Boundary Waters Treaty of 1909* established the International Joint Commission with the mandate of regulating shared water uses and preventing and resolving disputes between U.S. and Canada. In December 2016, the International Joint Commission issued an order implementing a new plan to manage water levels and flows in Lake Ontario and the St. Lawrence River, effective January 7, 2017. The new plan, which replaced the existing plan in use since 1963, is intended to allow for more natural water levels, while minimizing impacts to other users, including hydroelectric power production. No significant changes in OPG's operations are expected as a result of the new plan.

The *Niagara Parks Act* (Ontario) gives the Niagara Parks Commission the authority to grant certain rights for the use of the waters of the Niagara River for purposes of power generation. By agreement with OPG, the Niagara Parks Commission has agreed not to grant any rights to third parties until after 2056.

Under an agreement between OPG and the St. Lawrence Seaway Management Corporation, a federal agency, the DeCew Falls generating stations use water that is transported along the Welland Canal from Lake Erie. The agreement has been renewed through June 30, 2038.

The Province has granted OPG the right to use water from the International Rapids section of the St. Lawrence River for power generation at the R.H. Saunders GS, subject to an agreement between the Government of Canada and the Province. The Government of Canada has the right, upon notice and after unsuccessful arbitration, to take over the operation of and title to the R.H. Saunders GS in the unlikely event of a breach of the agreement by the Province.

### Interprovincial Rivers

Four of OPG's hydroelectric stations are located on the Ottawa River, which forms part of the Ontario-Québec border. These stations represent approximately 12 percent of OPG's total in-service hydroelectric capacity. Three of these stations are subject to 999-year leases with each of the Provinces of Ontario and Québec. The fourth station is subject to a water power lease with the Province of Ontario, which is renewable to 2031, subject to certain conditions. OPG's use of water from the Ottawa River basin is subject to guidelines established by the Ottawa River Regulation Planning Board, comprised of government and industry representatives.

## Interior Rivers

Fifty-six of OPG's hydroelectric stations, representing approximately 43 percent of OPG's total in-service hydroelectric capacity, are located on 20 other Ontario river systems. OPG holds water power leases, Crown leases and licences with the Province on the river systems that supply 37 of these stations. These leases and licences have expiry dates, including renewal periods, ranging between 2023 and 2075. Certain of these leases provide that the leased property and any fixed improvements, including generating stations and dams, will revert to the Province on the expiry of the lease. OPG intends to work towards new leases and licences for these stations. Eight of the 56 stations are located on the Trent and Rideau Waterways and are operated pursuant to licences from the federal government. These licences expire in February 2020. The process to renew the licences is currently underway with Parks Canada. Ten of the 56 stations are not subject to leases or licences. A land use permit issued for the Peter Sutherland Sr. GS remains in effect while a water power lease for the site is prepared by the Ontario Ministry of Natural Resources and Forestry (MNRF). OPG's use of Ontario's interior watersheds is constrained by restrictions contained in certain of the water power leases and licences.

The current provincial regulatory framework requires the development of Operational Plans for new storage dams and generating stations in Ontario, except for those on international rivers, interprovincial rivers, or rivers under federal jurisdiction. These plans include any limitations on water flows and elevations, and historically have been a component of formal Water Management Plans (WMPs). WMPs were established under the *Lakes and Rivers Improvement Act* (Ontario) and *Water Management Planning Guidelines for Waterpower* (2002), on a watershed basis, in consultation with the MNRF, federal fisheries authorities, stakeholders, such as recreational and commercial users, local communities, environmental groups, and partners, such as Indigenous groups. In October 2016, the MNRF published a Technical Bulletin, *Maintaining Water Management Plans* (2016), eliminating the need for WMPs where they are not already in place, removing the expiry date from existing WMPs, and outlining the requirements for Operational Plans for new waterpower works going forward. Existing WMPs continue to be in effect. WMPs and Operational Plans may be amended as certain conditions change or new data becomes available. OPG operates in compliance with WMPs and Operational Plans.

The operations of certain OPG stations in northwestern Ontario can impact users in Manitoba and are subject to guidelines and directions provided by the Lake of the Woods Control Board, which is comprised of Ontario, Manitoba and federal government representatives.

## Dams and Waterways

In Canada, dams fall under provincial jurisdiction, with the exception of dams situated in interprovincial and international boundary waters and canals, and those owned by the Government of Canada. The majority of OPG's dams fall within the jurisdiction of the Province, with approximately 20 dams falling within the jurisdiction of the Province of Québec and 13 dams associated with the Trent-Severn and Rideau Waterways falling under federal jurisdiction. The International Joint Commission has an oversight role for dams and associated works on international boundary waters, including the St. Lawrence River and the Niagara River.

The Province regulates dams under the *Lakes and Rivers Improvement Act* (Ontario) administered by the MNRF. The legislation requires MNRF approval for activities such as the construction, alteration, improvement, or repair of dams.

In August 2011, the MNRF published a revised set of Technical Guidelines for dams, following a period of public consultation. The Technical Guidelines represent the government standards for dam safety. OPG was an active participant in developing the Technical Guidelines through the MNRF's advisory panel. In general, OPG practices in the area of dam safety and public safety around dams exceed the minimum requirements outlined in the Technical Guidelines. In cooperation with the MNRF, OPG is developing a new risk-informed approach to prioritize the outcomes of dam safety assessments.

Currently, there is no federal or provincial regulation with respect to public safety around dams that addresses dam public safety issues relating to changes in operating water levels, discharges from the hydroelectric or dam facilities, and other waterways-based hazards posed by such facilities. The *Navigation Protection Act* (Canada) does, however, require OPG to obtain approvals for the installation of all in-water works, such as safety booms and buoys associated with the OPG Waterways Public Safety Program. Additional details on OPG's Dam Safety and Waterways Public Safety Programs are found under the heading, *Workplace Safety and Public Safety – Dam Safety and Waterways Public Safety*.

## Generation Operations

### Nuclear (Regulated – Nuclear Generation Segment)

#### *Overview of Generating Facilities*

OPG owns and operates two nuclear generating stations, the results of which are reported in the Regulated – Nuclear Generation business segment. The Pickering GS, comprised of six operating units and two units in a permanent safe shutdown state, is located on the shore of Lake Ontario in Pickering, Ontario. As at December 31, 2017, the station's total in-service capacity was 3,094 MW. Four of the eight Pickering units originally went into service in the 1970s. A decision was made by Ontario Hydro in the late 1990s to place these four units in voluntary lay-up. In 2003 and 2005, respectively, two of the four laid-up units were returned to commercial operation, with the two remaining units placed in a permanent safe shutdown state. The other four operating units have been in service since the mid-1980s.

The Darlington GS, comprised of three operating units and one unit, Unit 2, undergoing refurbishment since mid-October 2016, is located on the shore of Lake Ontario in the Municipality of Clarington, Ontario. As at December 31, 2017, the total in-service capacity of the three operating units was 2,634 MW. Unit 2 has a capacity of 878 MW. All four Darlington units have been in service since the early 1990s. Both the Pickering GS and the Darlington GS have been designed to operate at full power as baseload facilities.

The performance of OPG-operated nuclear generating stations during 2017, 2016 and 2015 was as follows:

#### **Regulated – Nuclear Generation Performance (2015 to 2017)**

Station	No. of In-Service Units	Unit Capability Factor <sup>1</sup> (%)		
		2017	2016	2015
Darlington <sup>2</sup>	3	85.2	89.5	76.9
Pickering	6	80.0	75.2	79.4
Total	9			

<sup>1</sup> Unit capability factor is the amount of energy a generating unit is capable of producing as a percentage of its maximum output assuming no external constraints such as transmission limitations. The nuclear unit capability factor excludes unit(s) during the period in which they are undergoing refurbishment.

<sup>2</sup> Excluding Unit 2, which has been undergoing refurbishment since mid-October 2016.

The Unit Capability Factor is impacted by the number of outage days at each station. For example, the lower Unit Capability Factor at the Darlington GS in 2015 was primarily due to a planned four-unit vacuum building outage, which required the shutdown of all units, while the higher Unit Capability Factor at the Pickering GS in 2017 was primarily due to outage cycle optimization, favourable unit conditions and execution of planned outage work resulting in a lower number of outage days.

OPG's Bruce A and Bruce B nuclear generating stations have been leased on a long-term basis to Bruce Power. The stations are located in the Municipality of Kincardine, Ontario on the shore of Lake Huron.

OPG maintains a site preparation licence granted by the CNSC in 2012 in relation to the potential construction of two new nuclear reactors at the Darlington site. The licence expires in 2022.

For additional information on OPG's nuclear operations, refer to the section, *Core Business, Strategy, and Outlook* under the heading, *Operational Excellence – Electricity Generation Production and Reliability* in the Company's 2017 year-end MD&A.

### *Nuclear Generation Technology*

Nuclear generation harnesses the energy released during controlled nuclear fission reactions to produce steam that is used to drive turbines to generate electricity. Nuclear generation has two main advantages. It is a relatively low marginal-cost generation technology, and it produces virtually no GHG, sulphur dioxide, nitrogen oxide, or mercury emissions. The latter advantage has become more significant as governments implement climate change action plans and stricter air emission standards.

In contrast to other types of generating facilities, notwithstanding the lower fuel costs, nuclear generating stations incur nuclear waste management and decommissioning costs and greater operating and maintenance expenses. In addition, the construction of nuclear generating stations entails greater initial capital costs than other generation technologies. The higher initial costs reflect the complexity of the technical processes fundamental to nuclear electricity generation, and the additional design and safety precautions taken to protect the public from potential risks associated with nuclear operations.

All of OPG's nuclear generating stations use CANada Deuterium Uranium (CANDU) technology reactors. CANDU is a pressurized-heavy-water, natural-uranium power reactor, originally designed in the 1960s by a consortium of Canadian government agencies and private industry. CANDU reactors are unique in their use of natural-uranium fuel and deuterium oxide, or heavy water, as both a moderator to slow down the fission process and a coolant within the reactor. The refuelling system is also unique in that CANDU reactors can be refuelled at full power. This is due to the subdivision of the reactor core into hundreds of separate fuel channels, each holding a single string of natural uranium fuel bundles, allowing for greater fuel efficiency. In contrast, U.S. reactors, which use enriched uranium fuel, must be shut down during refuelling. All nuclear power reactors in Canada use CANDU technology. CANDU reactors are currently operating in Ontario, New Brunswick, Argentina, Romania, South Korea, India, Pakistan and China.

### *Nuclear Fuel Procurement*

OPG's nuclear fuel supply chain engages in the purchase of uranium concentrate, the purchase of services for the conversion of uranium concentrate to uranium dioxide, and the purchase of services for the manufacture of fuel bundles containing uranium dioxide pellets. OPG currently establishes contractual arrangements with each of these components separately and, as appropriate, maintains ownership of the uranium throughout the supply chain. OPG maintains a portfolio of multi-year supply contracts for uranium concentrate with domestic and foreign suppliers and commodity traders. Occasionally, short-term spot market purchases are made to support a portion of OPG's uranium concentrate needs. OPG's nuclear fuel bundles are supplied by a Canadian-based manufacturer.

### *Nuclear Regulation*

The *Nuclear Safety and Control Act* (NSCA) establishes the mandate and authority of the CNSC to make regulations governing all aspects of the development and application of nuclear energy in Canada. The NSCA grants the CNSC the power to act as a court of record, the right to make regulations, the power to require financial guarantees for nuclear waste management and nuclear facilities decommissioning as a condition of granting a licence, order-making powers, and the power to impose monetary penalties for licence infractions. The NSCA also grants the CNSC the power to require periodic re-certification of nuclear operators and to set requirements for various nuclear facility security measures. It also provides for regulatory authority over environmental matters, including a requirement that licence applicants make adequate provision for the protection of the environment. The NSCA grants the CNSC licensing authority for all nuclear activities in Canada, including but not limited to the issuance of new licences to operators,

the renewal of existing licences, protection of the environment arising from nuclear activities, and making regulations related to nuclear activities.

A fundamental principle in nuclear regulation is that the licensee bears the responsibility for safe operation, with the CNSC setting safety objectives in areas such as radiation protection and physical security for nuclear generating stations and the transport of radioactive materials. The CNSC verifies compliance with the licence and performs audits and inspections of the licensee's performance against these objectives. The CNSC also has issued guidance documents to assist licensees in complying with regulatory requirements. Requirements specified in these guidance documents have been incorporated into the design and operating documents for OPG's nuclear generating stations.

Since the operation and regulation of nuclear energy has transboundary impacts, Canada has become a signatory to various international conventions relating to nuclear energy and emergency responses and is bound by conventions that it has ratified. In addition, the CNSC has a bilateral information exchange and co-operation agreement with the U.S. Nuclear Regulatory Commission, which provides, among other things, for the prompt, reciprocal notification of reactor safety problems that could affect both U.S. and Canadian nuclear generation facilities.

The CNSC publishes an annual Regulatory Oversight Report on the safety performance of Canada's nuclear power plants. The report assesses how well plant operators are meeting regulatory requirements and program expectations in the areas of operational performance, safety analysis, radiation protection, waste management and conventional health and safety. On September 8, 2017, the CNSC issued an executive summary of its 2016 annual report, giving both the Darlington GS and the Pickering GS the highest possible safety rating of "Fully Satisfactory". The Darlington GS achieved this rating for the eighth consecutive year, while the Pickering GS achieved this rating for the second consecutive year.

In 2017, the CNSC approved regulatory document *REGDOC 2.2.4 – Fitness for Duty – Managing Alcohol and Drug Use* for use at Canadian nuclear power plants. This document sets out requirements for managing fitness for duty of workers in relation to alcohol and drug use at high-security sites, including for-cause alcohol and drug testing for workers in positions identified as safety-sensitive or safety-critical and random alcohol and drug testing for workers holding safety-critical positions. OPG intends to enhance its existing Fitness for Duty program to comply with these new requirements. OPG is working with its partners in the Canadian nuclear industry to develop a program suitable for Canada and its workers.

Pursuant to the *Emergency Management and Civil Protection Act*, a Provincial agency, Office of the Fire Marshal and Emergency Management (OFMEM), is required to periodically update the Provincial Nuclear Emergency Response Plan (PNERP). In 2016, the CNSC advised the OFMEM to consider more severe accidents in the update to the PNERP. In December 2017, the Province approved the updated PNERP Master Plan. The changes include a new 20-km Contingency Planning Zone around the Pickering and Darlington nuclear generating stations, which will improve protective actions for the public. The development of an Implementing Plan for the Pickering GS is in progress, with an expected approval by the Province by mid-2018. An Implementing Plan for the Darlington GS is expected to be drafted once the Implementing Plan for the Pickering GS is completed. The updated PNERP is not expected to have a significant impact on OPG.

All of OPG's nuclear power reactor operating licences and waste facility licences are current and up to date. In 2016, OPG submitted applications with the CNSC seeking a ten-year licence renewal for the Western Waste Management Facility (WWMF), located at the Bruce generating stations' site, to May 31, 2027, and a ten-year licence renewal for the Pickering Waste Management Facility (PWMF) to August 31, 2028. The licence renewal applications were presented to the CNSC at public hearings in April 2017. On May 30, 2017, the CNSC announced that the WWMF licence was renewed for a ten-year period and will be valid until May 31, 2027. On February 7, 2018, the CNSC announced that the PWMF licence was renewed for a ten-year period and will be valid until August 31, 2028. Further details on the operating licence for the Darlington GS are found in the section, *General Development of the Business* under the heading, *Nuclear Business Development – Darlington Refurbishment* and for the Pickering GS in the

section, *General Development of the Business* under the heading, *Nuclear Business Development – Extension of Pickering Commercial Operation to 2024*.

Details on Canada's nuclear liability regime and related insurance coverage can be found under the heading, *Insurance*.

#### *Fukushima Daiichi Response*

In response to the 2011 Fukushima Daiichi incident in Japan, OPG has confirmed that its stations are safe and that systems and procedures are in place to withstand significant emergencies. In 2013, a systematic review and verification of defences against external hazards was completed at OPG-operated stations. The review showed that:

- the nuclear safety systems and multiple back-up power systems in place at the stations are effective; and
- the current design of the stations is strong and the stations are able to withstand extreme external events.

The review also provided recommendations for further opportunities to enhance the safety margin and to develop preparedness for unexpected events that go beyond the extreme events already considered in the design of the stations.

OPG's action plan in response to the Fukushima Daiichi event is well aligned with the CNSC's Fukushima Action Plan, issued in mid-2012. In 2013, OPG submitted its plans for the majority of the CNSC's Fukushima Action Plan items applicable to OPG-operated stations to the CNSC. In January 2015, the CNSC recognized OPG's efforts in this area and confirmed that all of the Fukushima action items were closed. OPG's Fukushima Implementation Plan included a number of key safety enhancements for providing additional back-up capability to increase OPG's flexibility to respond to unexpected and highly unlikely external events that can impact either a single unit or multiple units at the same time. CNSC staff concluded that OPG had strengthened reactor defence and enhanced its emergency response at both the Darlington GS and the Pickering GS in response to the lessons learned from the Fukushima Daiichi incident.

#### *Nuclear Generating Station Life*

Service life predictions for OPG-operated nuclear stations are developed by assessing the impacts of a number of operating, technical, and regulatory considerations on both unit and station economics. A decision by OPG to remove a unit from service would be primarily an economic decision that becomes more likely as the number of components requiring replacement and the frequency and duration of inspections required to ensure a unit's fitness for service increases. The key life-limiting components at OPG's nuclear stations include fuel channels, feeder tubes, steam generators, and other reactor components. End-of-service life predictions are reviewed as new information on possible degradation mechanisms becomes available and as future generation expectations are revised.

In December 2015, OPG revised the accounting end-of-life assumptions for the Darlington GS, extending the estimated average service life of the four-unit station by one year, to 2052, to reflect the approval of the refurbishment schedule in 2015. In December 2017, OPG reassessed the accounting end-of-life assumptions for the Pickering GS, extending the estimated service life from December 31, 2020 for all six operating units to December 31, 2022 for Units 1 and 4 and December 31, 2024 for Units 5 to 8. The reassessment of the Pickering GS end-of-life assumptions took into account the technical assessments completed to date that provide sufficient confidence in programs and provisions in place to assure fitness-for-service of fuel channel components in line with the planned extended commercial operation period. Further information on extension of Pickering commercial operation can be found in the section, *General Development of the Business* under the heading, *Nuclear Business Development – Extension of Pickering Commercial Operation to 2024*.

## *Nuclear Facility Planning*

OPG uses a structured approach to identify and prioritize projects to optimize returns from nuclear station reinvestment within the constraints imposed by technical and financial requirements, while ensuring that safety, environmental, and other regulatory programs are of the highest priority. Input from predictive maintenance programs, life cycle management plans, and system health monitoring is used to determine the activities necessary to sustain and improve nuclear unit performance.

A structured framework modeled on the best practices identified by the Electric Power Research Institute, the Institute for Nuclear Power Operations and the World Association of Nuclear Operators (WANO) is used to optimize the maintenance of the nuclear generating stations and assess the health of the facilities. The structured framework includes predictive maintenance programs, which combine technologies and human expertise to analyze equipment performance, maintenance and design data in order to make timely decisions about the scope and timing of inspections and maintenance for major or critical equipment. The predictive maintenance program for each station is prioritized on the basis of the importance of the equipment for reactor safety. Life cycle management plans are maintained for critical station components and are updated annually to incorporate operating experience and new information. The life cycle plans define the inspection and maintenance programs required to ensure that these components perform in accordance with their design basis. In addition, system engineers conduct performance monitoring of station systems according to system performance monitoring plans that are based on a comparison of performance indicators against established targets to improve system performance. System performance is assessed by collecting, trending and analyzing station data. This information is reported in system health reports which are updated annually, at a minimum.

OPG's practices impacting the performance of the nuclear stations are audited regularly by WANO, with identified areas for improvement acted upon with priority. In May 2016, OPG hosted a WANO peer evaluation that compared the Darlington GS against standards of excellence through an in-depth and objective review by an international panel of industry experts. The review maintained Darlington's excellent standing as one of the top performing nuclear plants in the world. In December 2017, OPG hosted a WANO peer evaluation for the Pickering GS, which focused on the safe and reliable operation of the station while evaluating the plant material condition, and functional and cross-functional areas of the station. The results of the evaluation showed that the Pickering GS sustained its strong rating while demonstrating significant improvement since the last review, resulting in its best ever WANO peer review.

In September 2016, OPG hosted a team of experts from the International Atomic Energy Agency (IAEA) at the Pickering GS to conduct a standard Operational Safety Review Team mission. The team conducted an in-depth review of performance and adherence to international safety standards. In the second quarter of 2017, the IAEA's Operational Safety Review Team released the final report and confirmed that the Pickering GS demonstrates a strong commitment to safety.

Nuclear planned outages are necessary to execute inspection and maintenance work related to asset management and regulatory requirements for systems and equipment where access is not possible under normal operating conditions. Planned outages also give OPG an opportunity to perform system and equipment upgrades, project work, configuration changes, and other improvements and modifications. The nuclear generation plan, by reference to the station's life cycle management plans, establishes the number, frequency and duration of the outages for each year required to ensure the continued safe and reliable long-term operation of the plant and its compliance with CNSC regulatory requirements.

The outage cycle determines the number of planned outages at each station in a particular year. The Darlington GS is on a 36-month outage cycle, where each of the four units undergoes an outage every three years, resulting in one or two outages per year for the station. The Pickering GS was previously on a 24-month outage cycle. Supported by technical assessments undertaken as part of the plan to extend Pickering commercial operation to 2024, the outage cycle has been optimized and extended from 24 to 30 months. In addition, on a periodic basis all units at each station are required to be shut down to allow for inspection and maintenance on the station vacuum building, containment systems and other safety systems. The CNSC currently requires these outages every 12 years at the Darlington GS and every ten

years at the Pickering GS. The most recent vacuum building outage took place at the Darlington GS in 2015 and at the Pickering GS in 2010.

### *Nuclear Ancillary Operations*

OPG's nuclear generating units contain approximately 7,500 tonnes of deuterium oxide, or heavy water, not including heavy water contained at the leased Bruce stations. The heavy water is required to operate CANDU reactors. Ontario Hydro ceased the operation of its heavy water plants in 1997 and the plants were subsequently decommissioned. There are currently no heavy water plants in Canada. OPG believes that its existing inventory of heavy water will be sufficient to replenish supplies as a result of normal operating losses at its nuclear stations, including the refurbishment of the Darlington GS. OPG also believes that sufficient quantities of heavy water are available for possible changes in operating conditions or for new nuclear generating facilities. OPG seeks opportunities to sell available surplus quantities of heavy water from its inventory.

Tritium is a radioactive substance produced as a by-product of operating CANDU reactors, through the use of heavy water in the reactor moderator and heat transport systems. OPG operates a specialized facility at its Darlington site, the Darlington Tritium Removal Facility (TRF), which removes tritium from the tritiated heavy water (detrification) used at the nuclear generating stations, in order to control the occupational dose exposure to employees and limit the amount of tritium released to the environment. The extracted tritium is chemically immobilized, placed in special containers, and safely stored in a vault. The Darlington TRF is also expected to be used to detrify heavy water during the eventual decommissioning of OPG's nuclear generating stations. Some tritium is sold to government-approved organizations for authorized commercial and health industry uses. OPG also provides detrification services to Bruce Power. Opportunities for providing detrification services to other third parties are limited because of storage and capacity restrictions at the Darlington TRF.

Cobalt-60 produced and sold by OPG is used mainly in the health industry to sterilize surgical and medical supplies. Cobalt-60 is produced in Units 6, 7 and 8 at the Pickering GS. Cobalt-60 can be produced in reactors which, like the CANDU reactors, use adjuster rods to regulate power. The production process involves replacing the stainless steel rod by a rod containing Cobalt-59, which is isotopically converted into Cobalt-60 after lengthy exposure to the atomic reaction in the reactor core. During planned maintenance outages, the rods are removed, cut, and packaged for sale as Cobalt-60, and new rods are inserted in the reactor to continue the production cycle.

### Hydroelectric (Regulated – Hydroelectric and Contracted Generation Portfolio Segments)

#### *Overview of Generating Facilities*

Hydroelectric generating stations use the energy of falling water to drive hydraulic turbines that generate electricity. OPG's hydroelectric stations provide one of the Company's competitive advantages – a reliable, relatively low-cost source of renewable energy free of air emissions. Electricity generation from OPG's hydroelectric facilities depends primarily upon the availability of water, which is affected largely by natural factors such as precipitation and evaporation. It is also impacted by the prevalence of SBG conditions.

OPG currently owns and operates 66 hydroelectric generating stations and 241 associated dams located on 24 river systems across Ontario. The results of 54 of these stations that are rate regulated by the OEB are reported in the Regulated – Hydroelectric segment. The results of the remaining 12 stations are subject to long-term ESAs with the IESO and are included in the Contracted Generation Portfolio segment. The 54 regulated hydroelectric stations include the 48 stations prescribed for rate regulation beginning in 2014 and the six stations that have been rate regulated by the OEB since 2008.

As at December 31, 2017, OPG's regulated hydroelectric facilities had a total in-service capacity of 6,426 MW and the non-regulated hydroelectric facilities had a total in-service capacity of 1,042 MW.

OPG's hydroelectric generating stations range in age from the newly in-serviced Peter Sutherland Sr. GS to the DeCew Falls I GS, which is 120 years old.

Hydroelectric ESAs with 50-year terms are in place for the following hydroelectric facilities:

- Lac Seul and Ear Falls generating stations, with an expiry date of February 2059;
- Healey Falls GS, with an expiry date of April 2060;
- Sandy Falls, Wawaitin, Lower Sturgeon, and Hound Chute generating stations, with an expiry date of December 2060;
- Little Long, Harmon, Smoky Falls, and Kipling generating stations, with an expiry date of January 2064; and
- Peter Sutherland Sr. GS placed in-service in March 2017, with an expiry date of March 2067.

OPG operates and maintains hydroelectric facilities in regional operations groups. In 2017, the number of regional groups was reduced from five to four, by integrating the Central Operations work centers into three of the other existing groups. The following are the four regional operations groups that currently operate and maintain OPG's hydroelectric facilities:

- Niagara Operations – includes the three Sir Adam Beck stations located on the Niagara River and the two DeCew Falls hydroelectric facilities located on the Welland River, all of which have been rate regulated by the OEB since 2008, as well as seven regulated generating stations on the Muskoka, Severn and Beaver Rivers.
- Eastern Operations – includes 21 regulated and one non-regulated hydroelectric generating station. The regulated stations are: the R.H. Saunders GS on the St. Lawrence River; the Otto Holden, Des Joachims, Chenaux and Chats Falls generating stations on the Ottawa River; the Mountain Chute, Barrett Chute, Calabogie, Stewartville, and Arnprior generating stations on the Madawaska River; and eleven stations on the Trent, Mississippi and Rideau Rivers. The R.H. Saunders GS has been rate regulated by the OEB since 2008. The non-regulated station is the Healey Falls GS on the Trent River.
- Northeast Operations – includes 12 regulated and nine non-regulated hydroelectric generating stations in northeastern Ontario. The regulated stations are: the Chute and Lower Notch generating stations on the Montreal River; the Abitibi Canyon and Otter Rapids generating stations on the Abitibi River; the Matabitchuan GS on the Matabitchuan River; and seven stations on the Wanapitei and French Rivers. The non-regulated stations are: the Little Long, Harmon, Smoky Falls, and Kipling generating stations on the Lower Mattagami River; the Wawaitin, Sandy Falls, and Lower Sturgeon generating stations on the Upper Mattagami River; the Hound Chute GS on the Montreal River, and Peter Sutherland Sr. GS on the New Post Creek.
- Northwest Operations – includes nine regulated and two non-regulated hydroelectric generating stations in northwestern Ontario. The regulated stations are: the Pine Portage, Cameron Falls, and Alexander generating stations on the Nipigon River; the Silver Falls and Kakabeka Falls generating stations on the Kamanistikwia River; the Manitou Falls and Caribou Falls generating stations on the English River; the Aguasabon GS on the Aguasabon River; and the Whitedog Falls GS on the Winnipeg River. The non-regulated stations are the Lac Seul and Ear Falls generating stations on the English River.

These operations groups are also responsible for the operation and maintenance of OPG's thermal facilities discussed under the heading, *Generation Operations – Thermal (Contracted Generation Portfolio Segment)*.

The performance of OPG's hydroelectric generating stations during 2017, 2016 and 2015 was as follows:

### Hydroelectric Generation Performance (2015 to 2017)

	Regulated – Hydroelectric			Contracted Generation Portfolio – Hydroelectric			Total Hydroelectric		
	2017	2016	2015	2017	2016	2015	2017	2016	2015
Availability (%) <sup>1</sup>	<b>88.0</b>	89.0	91.2	<b>74.6</b> <sup>2</sup>	77.3 <sup>2</sup>	88.6	<b>86.2</b>	87.5	90.9

<sup>1</sup> Availability is represented by the percentage of time the generating unit is capable of providing service, whether or not it is actually generating electricity, compared to the total time for the respective period.

<sup>2</sup> Lower availability of the Contracted Generation Portfolio hydroelectric facilities in 2016 and 2017 was primarily due to a higher number of planned outage days at the Lower Mattagami River hydroelectric generating stations.

OPG's objectives for the hydroelectric operations include operating and maintaining the generating facilities in a safe, efficient and cost-effective manner, while increasing the output from the facilities and pursuing opportunities to increase the fleet's capacity. OPG aims to increase the output of the hydroelectric facilities by improving operational flexibility, enhancing reliability, optimizing outage planning and, subject to water conditions, increasing availability to meet electricity system demand. Where economical and practical, OPG also pursues opportunities to refurbish, expand or redevelop its existing hydroelectric stations.

The Company continues to evaluate and implement plans to increase capacity, maintain and improve operational performance, and extend the operating life of its hydroelectric generating assets. These plans are accomplished through multi-year capital investment and other programs, including replacements and upgrades of turbine runners, and refurbishment or replacement of existing generators, transformers, and control systems. Over the next four years, OPG plans to increase the total capacity of its hydroelectric generating fleet by approximately 100 MW, which, in addition to the runner replacement and upgrade program, includes the Ranney Falls GS project and the planned Sir Adam Beck I GS frequency conversion project. OPG is also planning to repair, rehabilitate, or replace a number of aging civil structures. The Ranney Falls GS project is discussed in the section, *General Development of the Business* under the heading, *Hydroelectric Business Development*.

For additional information on OPG's hydroelectric operations, refer to the section, *Core Business, Strategy, and Outlook* under the heading, *Operational Excellence – Electricity Generation Production and Reliability* in the Company's 2017 year-end MD&A.

#### Hydroelectric Facility Planning

Major components of hydroelectric facilities typically include: generating equipment such as turbines, generators and transformers; civil works such as powerhouses, dams, headworks, spillways and water conveyance canals and tunnels; and facilities required to operate and maintain the stations such as control rooms and work centres. Although there is a link between the age of a facility and the capital investment required to maintain it, age does not generally establish an upper limit on the expected useful life of a hydroelectric station. Regular maintenance and the replacement of specific components typically allow stations to operate for very long periods, especially for facilities built after 1925.

OPG currently operates six staffed control rooms across Ontario that provide remote control and monitoring for all of OPG's hydroelectric generating facilities. These control rooms are designed to minimize the number of staffed control rooms, reduce control system failures, and increase the amount of information available for production planning. The six control rooms include an amalgamated control room at the R.H. Saunders GS opened in 2017 to combine the Chenaux and Saunders control rooms.

OPG uses a structured portfolio approach to identify and prioritize projects for its hydroelectric asset investment program. Engineering reviews and station condition assessments are performed to determine short-term and long-term expenditure requirements to sustain or improve the performance of each facility. These may be followed by the preparation of a facility life cycle plan, which is performed on an as-needed basis for marginal assets or assets potentially requiring significant expenditures relative to the value of the facility. This approach is designed to identify necessary capital, operating and maintenance expenditures for each facility and to direct resources towards those facilities that can best maintain or enhance their value.

OPG utilizes a preventive maintenance program that provides a consistent method of identifying, scheduling, and executing maintenance activities at the hydroelectric facilities. The maintenance program is based on the concept of streamlined reliability-centred maintenance, whereby the type and frequency of preventive maintenance applied to an individual component is determined based on the nature and consequences of failure, balancing cost and risk.

The cornerstone of OPG's project prioritization and preventive maintenance approaches for the hydroelectric assets is that safety, environmental, and other regulatory programs are of the highest priority.

### *Water Management*

OPG's water management strategy for its hydroelectric facilities is to safely utilize available water for generation of electricity in conformance with legal, environmental, operational, and WMP and Operational Plan requirements. OPG uses hydrological and meteorological data to manage water levels, water flows and water storage, and strives to schedule water use for optimum utilization and to minimize controllable water spills due to SBG conditions.

### *Gross Revenue Charge and Water Rental Payments*

Hydroelectric generating stations in Ontario are subject to taxes and charges as prescribed by *Ontario Regulation 124/02* under the *Electricity Act, 1998*. These taxes and charges, referred to as Gross Revenue Charge (GRC), are based on station gross revenue, which, for this purpose, is determined as the product of annual station energy generation and the prescribed revenue rate of \$40/MWh (Gross Revenue). All OPG hydroelectric generating stations are subject to GRC Property Tax, which is determined by applying graduated tax rates, ranging from 2.5 percent to 26.5 percent through four tiers of production, to a station's annual Gross Revenue. GRC Property Tax payments are made to the OEFC. Hydroelectric generating stations that are subject to water power lease agreements with the MNRF are also subject to GRC Water Rental charges in addition to GRC Property Tax payments. The GRC Water Rental charge is determined as 9.5 percent of a station's annual Gross Revenue. GRC Water Rental payments are made to the Ontario Ministry of Finance.

Annual land rental fees are paid to the MNRF as prescribed by Crown leases and licences of occupation which authorize OPG's tenure (including flooding rights), typically at storage dam sites.

The eight OPG hydroelectric generating stations located on the Trent River and Rideau Canal are subject to rental charges prescribed by licences with Parks Canada. These licences authorize OPG to occupy the lands, maintain and operate the powerhouses and dams, and utilize water that is surplus to navigation needs for the generation of electricity.

Water conveyance charges are paid to the St. Lawrence Seaway Management Corporation as prescribed by a lease agreement providing for the withdrawal of water surplus to navigation needs from the Welland Canal for utilization at the DeCew Falls generating stations. The water conveyance charges apply to the transport of water from Lake Erie through the Welland Canal to OPG's intakes at Allanburg.

Water rental payments are made to the Government of Québec, as prescribed by an agreement dated January 2, 1943 and a rate amending agreement effective January 2, 1993. These agreements pertain to

the sharing of the water powers of the Ottawa River and were ratified by the Governments of Ontario and Québec. Water rental charges payable to the Province of Québec are based on one-half of the energy produced at the three regulated OPG hydroelectric generating stations located on the Ottawa River. The GRC payments made to the Province of Ontario with respect to these three sites are also based on one-half of the energy produced at the stations.

Under the aforementioned 1943 agreement, OPG also provides compensation to Hydro Québec for the generating value at OPG's stations on the Ottawa River attributed to the water diverted into the Ottawa River through the Dozois Reservoir in Québec. OPG shares in the operation and maintenance costs pertaining to the dam enabling the Dozois diversion.

The GRC and water rental payments for the regulated hydroelectric stations are recoverable through OEB-approved regulated prices applicable to these stations.

Further details on water rights can be found in the section, *Description of the Business* under the heading, *Water Rights*.

### Thermal (Contracted Generation Portfolio Segment)

#### *Overview of Generating Facilities*

Thermal generating stations use heat energy to drive steam turbines that generate electricity. OPG's wholly-owned operating thermal facilities are comprised of biomass-fuelled generating units at both Atikokan GS and Thunder Bay GS, and the dual-fuelled generating Lennox GS, which is capable of burning either oil or natural gas. The results of these facilities are reported in the Contracted – Generation Portfolio business segment.

The combined in-service capacity of the three operating thermal facilities was 2,458 MW as at December 31, 2017. The Lennox GS is located in Greater Napanee, Ontario and accounts for approximately 2,100 MW of this in-service capacity. The Atikokan GS is located in Atikokan, Ontario and has an in-service capacity of 205 MW. The Thunder Bay GS is located in Thunder Bay, Ontario and its advanced biomass fuelled unit has an in-service capacity of 153 MW.

Capacity and production from the Lennox GS are subject to an ESA with the IESO for the period from January 2013 to September 2022. Capacity and production from the Atikokan GS are subject to a ten-year ESA expiring in July 2024. For the Thunder Bay GS advanced biomass fuelled unit, capacity and production are subject to a five-year ESA expiring in January 2020.

OPG's three thermal generating stations operate as peaking facilities, depending on electricity demand. This provides Ontario's electricity system with the flexibility to meet changing daily system demand and capacity requirements and has enabled the system to accommodate the expansion of Ontario's renewable generation portfolio. The continued operation of these stations will continue to provide Ontario with capacity and peaking generation.

The three thermal generating stations are operated and maintained as part of the regional operations groups used to operate and maintain the Company's hydroelectric facilities. The Lennox GS is operated under Eastern Operations, and the Atikokan and Thunder Bay generating stations are part of Northwest Operations.

Former thermal stations that are no longer available to generate electricity are included in the Services, Trading, and Other Non-Generation business segment once they are removed from service. This includes the Lambton GS and Nanticoke GS sites, which ceased coal-fired generation in 2013.

The performance of OPG's wholly-owned thermal generating stations during 2017, 2016 and 2015 was as follows:

### Contracted Generation Portfolio – Thermal Performance (2015 to 2017)

	2017	2016	2015
Equivalent Forced Outage Rate (%) <sup>1</sup>	2.4	1.6	11.2 <sup>2</sup>

<sup>1</sup> Equivalent Forced Outage Rate is an index of the reliability of a generating unit at OPG's thermal stations. It is measured by the ratio of time a generating unit is forced out of service by unplanned events, including any forced deratings, compared to the amount of time the generating unit was available to operate.

<sup>2</sup> The higher thermal EFOR in 2015 was primarily due to an outage to perform repair work at the Lennox GS.

Additional information on OPG's thermal operations can be found in the section, *Core Business, Strategy, and Outlook* under the heading, *Operational Excellence – Electricity Generation Production and Reliability* in the Company's 2017 year-end MD&A.

#### *Thermal Fuel Procurement*

Due to the relatively low capacity factor of the Lennox GS, natural gas is purchased on the spot market, other than a small volume of fixed term natural gas required for non-generation operational services. Oil for the Lennox GS is contracted for and purchased on an as needed basis. Fuel switching at the station is based on market and fuel economics. Annual procurement of biomass fuel quantities for Atikokan GS and Thunder Bay GS is pre-determined by the corresponding ESAs. Agreements are in place with suppliers for the purchase of all biomass fuel pellets needed to provide fuel for the Atikokan GS for the duration of its ESA, and for most of the advanced biomass fuel pellets needed to provide fuel for the duration of the ESA for the Thunder Bay GS.

#### *Thermal Facility Planning*

OPG's facility planning approach is designed to identify necessary capital and operating and maintenance expenditures for each thermal facility. This planning approach aims to sustain facility availability for the remaining service life through station reinvestment within constraints imposed by technical, financial, safety, and system requirements, as well as regulatory and contractual limits. Periodic engineering reviews of major systems are conducted to identify performance issues, provide reinvestment recommendations where appropriate, and ensure that regulatory, safety and operating standards continue to meet expectations. OPG undertakes projects at thermal stations that are expected to achieve an appropriate return within the service life of the stations.

#### *Thermal Station Decommissioning*

OPG has recognized and carries on its balance sheet a liability to cover future expenditures to decommission and dismantle each of its wholly-owned thermal generating stations at the end of their estimated service lives. This provision is not funded and is estimated on the basis of station closure. OPG updated the decommissioning liability for these stations as of December 31, 2017, based on a review of required decommissioning, clean-up and restoration activities, underlying economic assumptions, and anticipated timing of these activities in line with current accounting end-of-life assumptions for the operating sites. For the former Nanticoke and Lambton generating stations, the update reflected the estimated cost of executing current decommissioning plans.

#### Portlands Energy Centre Partnership

OPG has a 49.95 percent partnership interest in Portlands Energy Centre L.P., a limited partnership formed with TransCanada Energy Ltd. (49.95 percent) and the general partner of the partnership, Portlands Energy Centre Inc. (0.1 percent). The shareholders of Portlands Energy Centre Inc. are OPG (50 percent) and TransCanada Energy Ltd. (50 percent). PEC is a 550 MW combined cycle generation

natural gas turbine electricity generating facility located on the former R. L. Hearn GS site in the port area of downtown Toronto, Ontario. The station was declared in-service in a combined cycle mode in April 2009. PEC operates under an Accelerated Clean Energy Supply contract with the IESO and trades electricity in the Ontario electricity market.

The Contracted Generation Portfolio segment includes OPG's share of equity income from its 50 percent ownership interest in the station. OPG's share of the in-service generating capacity and generation volume from its interest in the station are included in the operating statistics for the segment.

#### Brighton Beach Power Partnership

OPG has a 49.95 percent partnership interest in Brighton Beach Power L.P., a limited partnership formed with ATCO Power Canada Ltd. (49.95 percent) and the general partner of the partnership, Brighton Beach Power Ltd. (0.1 percent). The shareholders of Brighton Beach Power Ltd. are OPG (50 percent) and ATCO Power Canada Ltd. (50 percent). Brighton Beach is a 560 MW combined cycle gas turbine electricity generating facility located on the former J.C. Keith GS site in Windsor, Ontario. The station began commercial operation in July 2004. Brighton Beach operates under a tolling arrangement with Shell Energy North America (Canada) Inc. (Shell Energy), pursuant to which Shell Energy owns and trades the electricity produced by the facility in return for the supply of gas and the fees payable under the tolling agreement. Shell Energy's financial obligations are guaranteed by Shell Energy North America (US) L.P. (Shell L.P.), and Shell L.P.'s obligations are in turn guaranteed by Shell Oil Company.

The Contracted Generation Portfolio segment includes OPG's share of equity income from its 50 percent ownership interest in the station. OPG's share of the in-service generating capacity and generation volume from its interest in the station are included in the operating statistics for the segment.

### **Regulated – Nuclear Waste Management Segment**

#### Overview

OPG is responsible for the ongoing management of radioactive wastes generated by its nuclear operations. In addition, OPG has the obligation for decommissioning its nuclear generating stations and nuclear waste facilities after the end of their useful lives and for managing radioactive wastes that arise in connection with the decommissioning. The handling and disposal of radioactive waste in Canada is subject to federal legislation.

The radioactive wastes generated by OPG's nuclear operations include the following:

- Used nuclear fuel bundles;
- Intermediate-level waste – material that has come in close contact with the reactors, but is less radioactive than used fuel, such as ion exchange resins and reactor equipment and components; and
- Low-level waste – material used in connection with station operation that is not highly radioactive, such as tools and protective clothing.

The Company's Regulated – Nuclear Waste Management segment reports the results of the Company's operations associated with the following:

- management of used nuclear fuel and L&ILW;
- decommissioning of OPG's nuclear generating stations including the stations on lease to Bruce Power and other nuclear facilities;
- management of the Nuclear Segregated Funds established under the ONFA to fund OPG's obligation for nuclear facilities decommissioning and the long-term management of nuclear waste; and
- Other related activities including the inspection and maintenance of the waste storage facilities.

The nuclear accretion expense, which is the increase in the carrying amount of the present value liabilities for nuclear fixed asset removal and nuclear waste management liabilities reported on the balance sheet due to the passage of time, and the earnings from the Nuclear Segregated Funds are reported under this segment. The Regulated – Nuclear Waste Management segment is considered rate regulated because OPG's costs associated with nuclear waste management and nuclear facilities decommissioning liabilities are included by the OEB in the determination of regulated prices for production from the Pickering and Darlington nuclear generating stations.

### Federal Government Policy

In accordance with the requirements of the *Nuclear Fuel Waste Act* (Canada) (NFWA), in 2002, OPG and the other owners of nuclear fuel waste in Canada established a separately incorporated NWMO, with a mandate to manage and coordinate the full range of activities relating to the long-term management of nuclear fuel waste in Canada. This includes the design and implementation of Canada's plan for the long-term management of used nuclear fuel. In 2007, the federal government approved NWMO's submitted option, the Adaptive Phased Management (APM) plan, as the long-term solution for nuclear fuel waste. The APM plan contemplates the eventual long-term permanent disposal of radioactive nuclear fuel waste in a deep geologic repository (DGR) after a collaborative process of communication and engagement with Canadians aimed at selecting a suitable geological site with an informed and willing host community. The NWMO is in the process of undertaking a multi-year site selection process for the used fuel DGR.

The NFWA requires the nuclear fuel waste owners in Canada to establish and make payments into trust funds for the purpose of funding the implementation of the long-term management plan for used fuel. Accordingly, OPG has established the Ontario NFWA Trust (the NFWA Trust), which forms part of the Nuclear Segregated Funds under the ONFA. Additional details can be found under the heading, *Funding Mechanisms*.

### Current Practices

#### *Used Nuclear Fuel*

Used nuclear fuel bundles from OPG's reactors and leased reactors at the Bruce site are temporarily stored at each nuclear generating station in water-filled pools, known as wet bays, for a cooling-off period of at least ten years, during which time their radioactivity is substantially reduced. Each nuclear generating station has sufficient capacity to store used nuclear fuel bundles in the wet bays for approximately 15 to 20 years of operation.

After the used nuclear fuel bundles have been stored for the cooling-off period, the bundles are transferred from the wet bays to above-ground dry storage containers at the corresponding nuclear station site. Currently, there is used nuclear fuel bundles in dry storage at the Pickering, Darlington and Bruce sites.

OPG's planning assumption for the long-term management of used nuclear fuel bundles is consistent with the NWMO's APM concept of disposal in a deep geologic repository. The NWMO has indicated that it currently expects an in-service date of 2043 at the earliest for the used fuel DGR.

#### *Low and Intermediate Level Waste*

The majority of OPG's L&ILW is stored at the radioactive waste management facility at WWMF located on the Bruce site. This facility, which continues to be owned and operated by OPG following the lease of the Bruce generating stations, operates under a separate licence issued by the CNSC. A smaller volume of ILW is stored at each of the radioactive waste management facilities at the Pickering and Darlington sites. OPG's planning assumption for the long-term management of L&ILW is the placement of this nuclear waste in a separate L&ILW DGR.

Additional details can be found under the heading, *Deep Geologic Repository for Low and Intermediate Level Waste*.

#### *Station Decommissioning*

OPG's planning assumption for the decommissioning of its nuclear generating stations is a deferred dismantlement strategy. Under this strategy, each station will be de-watered and de-fuelled immediately after it has ceased operations and prepared for safe storage and monitoring. Thereafter, OPG intends to monitor the station for approximately 30 years while in safe storage, after which time the station will be dismantled and the site restored over a period of approximately ten years. This strategy has been communicated to the CNSC through regular updates of OPG's preliminary decommissioning plans and liability estimates for the nuclear generating stations. OPG's nuclear operating licences have been issued based on, amongst other considerations, CNSC's understanding of this strategy.

#### Deep Geologic Repository for Low and Intermediate Level Waste

OPG has proposed a DGR as the preferred solution for the safe long-term management of the L&ILW produced from the continued operation of OPG-owned nuclear generating stations and their eventual decommissioning. Agreement has been reached with local municipalities for OPG to develop the L&ILW DGR on lands adjacent to the WWMF in Kincardine, Ontario. Under the NSCA, OPG requires licences from the CNSC for activities to be undertaken with respect to the L&ILW DGR project. Before the CNSC can make licensing decisions for the proposal, an EA must be conducted.

The environmental effects of the proposed L&ILW DGR were examined by the CNSC and Canadian Environmental Assessment Agency (CEAA)-appointed Joint Review Panel (JRP) to meet the requirements of the *Canadian Environmental Assessment Act* as well as the project specific Environmental Impact Statement Guidelines. The JRP submitted its report and recommendations on the EA to the federal Minister of Environment in May 2015, concluding that, given mitigation, there is unlikely to be significant environmental impact from the project and recommending that the Minister approve the EA. In August 2015, OPG responded to the CEAA's list of potential environmental conditions relating to the JRP report.

In February 2016, the federal Minister of Environment and Climate Change requested additional information on certain aspects of the EA, including information related to alternate locations for the project. OPG submitted the requested information in December 2016. Following its review of OPG's submission and a period of public comment, the CEAA requested further information that OPG subsequently provided in May 2017. In June 2017, the CEAA notified OPG that it had sufficient and adequate information to proceed with the next step of the environmental assessment process and advised that a draft report and updated terms and conditions would be prepared for public review.

In August 2017, the federal Minister of Environment and Climate Change requested OPG to update its analysis of potential cumulative effects of the project on the Saugeen Ojibway Nation's (SON) physical and cultural heritage, including a description of the potential effects of the project on the Nation's spiritual and cultural connection to the land, taking into account the results of the SON Community Process. OPG continues its engagement with the SON towards securing support for the project and to formulate a response to the information request.

The L&ILW DGR at the WWMF site remains OPG's preferred solution for the safe long-term management of the L&ILW. The in-service date of the L&ILW DGR is expected to be approximately six to seven years from the start of construction.

#### Funding Mechanisms

On April 1, 1999, Ontario Hydro's obligation for nuclear facilities decommissioning and nuclear waste management was transferred to OPG. The responsibility for funding the obligations for nuclear facilities decommissioning and the long-term nuclear waste management between the Province and OPG is

described in the ONFA. The key provisions of the ONFA are: (i) for OPG to establish two segregated funds, the Used Fuel Segregated Fund to fund the future costs of long-term nuclear used fuel waste management and certain costs of used fuel storage incurred after the stations are shut down, and the Decommissioning Segregated Fund to fund the future costs of nuclear decommissioning and long-term L&ILW management, and certain costs of used fuel storage incurred after the stations are shut down; (ii) for the OEFC to be responsible for funding approximately \$2.4 billion present value as at April 1, 1999 that had been an accumulated liability of Ontario Hydro, which the OEFC has since then fully funded through an initial contribution to the Decommissioning Segregated Fund; (iii) for the Province to limit OPG's financial exposure in relation to the cost of used fuel management for the first 2.23 million bundles of used fuel; and (iv) for the Province to provide financial guarantees to the CNSC for OPG's nuclear decommissioning and nuclear waste management obligations, as required by the CNSC.

The Used Fuel Segregated Fund and the Decommissioning Segregated Fund are administered by a third party custodian and held in accounts segregated from OPG's other assets. OPG has granted a security interest in both funds to the Province. As a result, these funds are not available to satisfy the claims of OPG's creditors.

OPG's required contributions to the Used Fuel Segregated Fund and the Decommissioning Segregated Fund are determined based on reference plans and associated life cycle cost estimates periodically approved by the Province under the ONFA. These reference plans are prepared by OPG with the assistance of external consultants and based on external practices and international benchmarks. Under the ONFA reference plans, the total present value of OPG's future nuclear facilities decommissioning and nuclear waste management costs is determined based on baseline cost estimates and a set of underpinning major planning assumptions, including remaining useful lives of the nuclear stations, proposed methods and timing of nuclear waste disposal, and economic indicators. Given the long-term duration of these life cycle programs, the multiple assumptions involved and the evolving technology to handle nuclear waste, there is a significant degree of inherent uncertainty surrounding the measurement of the underlying costs, which may increase or decrease over time.

The limits to OPG's financial exposure under the ONFA with respect to the life cycle cost of long-term management of the first 2.23 million bundles of used fuel are as follows (all amounts are expressed in January 1, 1999 present value dollars): (i) OPG will bear all costs up to \$4.6 billion; (ii) OPG and the Province will share, on an equal basis, costs incurred between \$4.6 billion and \$6.6 billion; (iii) OPG will be responsible for 10 percent of the costs incurred between \$6.6 and \$10 billion, and the Province will be responsible for the remaining 90 percent; (iv) the Province will be wholly responsible for any costs above \$10 billion. As a result, OPG's funding liability for these used fuel costs under the ONFA is capped at \$5.9 billion in January 1, 1999 present value dollars, which is equivalent to approximately \$15.7 billion in December 31, 2017 present value dollars. OPG is responsible for all incremental costs relating to the management of used fuel bundles in excess of the 2.23 million threshold. As at December 31, 2017, approximately 2.6 million bundles of used fuel waste had been produced. The 2.23 million fuel bundles threshold represents the estimated total life cycle bundles based on the initial estimated useful lives of the nuclear stations assumed in the ONFA.

Under the ONFA, the Province guarantees OPG's annual return earned in the Used Fuel Segregated Fund at 3.25 percent plus the rate of change in the Ontario Consumer Price Index, as defined in the ONFA, for funding related to the first 2.23 million used fuel bundles. Upon approval of a new or amended ONFA reference plan, the Province is obligated to make an additional contribution to the Used Fuel Segregated Fund in relation to the first 2.23 million bundles if the fund's assets earned a rate of return that is less than the guaranteed rate of return. If the return on the fund's assets exceeds the Province's guaranteed rate of return, the Province is entitled to withdraw any portion of the excess related to the first 2.23 million bundles, upon approval of a new or amended ONFA reference plan. OPG is responsible for cost increases and investment returns for the portion of the fund attributable to the used fuel bundles in excess of the 2.23 million threshold. OPG also is responsible for cost increases and investment returns for the Decommissioning Segregated Fund.

The investments in the Nuclear Segregated Funds include a diversified portfolio of equities and fixed income securities that are invested across geographic markets, as well as investments in real assets including infrastructure, real estate and agriculture. As the Nuclear Segregated Funds are invested to fund long-term liability requirements, the portfolio asset mix is structured to achieve the required return over a long-term horizon. While the funds are managed to achieve, in the long term, the target return rate based on the discount rate specified in the ONFA, the rates of return earned in a given period may be subject to various external factors including financial market conditions and changes in the Ontario Consumer Price Index, which, in the short term, can be volatile and cause fluctuations in the Company's financial results. OPG jointly oversees the investment management of the Nuclear Segregated Funds with the Province.

Under the OEB-approved cost recovery methodology for OPG's nuclear waste management and nuclear facilities decommissioning liabilities, OPG's income is exposed to the rate of return risk for the portion of the Nuclear Segregated Funds related to the Pickering and Darlington nuclear generating stations.

#### Contributions to the Nuclear Segregated Funds

OPG's contribution requirements under the ONFA are recalculated each time there is an approved new or amended reference plan and under certain other events. Reference plans are required to be prepared at least every five years, or more frequently if there is an underlying change in the assumptions of the reference plan that both OPG and the Province agree are significant enough to trigger a recalculation of the contribution levels during the five-year period.

Prior to 2017, OPG made contributions to the Used Fuel Segregated Fund every quarter, including a one-time special payment in earlier years, as required by the ONFA. These contributions reflected ONFA requirements to fund the majority of the underlying used fuel liability by the end of the initial estimated useful lives of the nuclear stations assumed in the ONFA, resulting in significantly higher contributions to the Used Fuel Segregated Fund in the earlier years of OPG's existence. OPG has not been required to make contributions to the Decommissioning Segregated Fund, which was fully funded at its inception through the initial contribution made by the OEFC and, taking into account asset performance and changes in underlying funding obligations over time, at the time of every subsequent approved ONFA reference plan.

Based on the funded status of the Used Fuel Segregated Fund and the Decommissioning Segregated Fund reflecting the lower life cycle liability estimates per the 2017 ONFA Reference Plan, no overall contributions to either fund are currently required starting in 2017. Contributions to either or both funds may be required in the future should the funds be in an underfunded position when a new reference plan is approved. Such may be the case as a result of future variability in asset performance due to volatility inherent in financial markets and economic conditions. Future contribution levels also are dependent on changes in baseline cost estimates and underpinning planning assumptions used to establish the funding obligations in subsequent ONFA reference plans, as well as any changes in the tax treatment of fund earnings. OPG's required contributions could increase, for example, if cost estimates increased, if the operating lives of the nuclear stations were revised, if fund assets earned less than the target rate of return, or if the income earned in the funds became subject to tax.

OPG is required to make annual contributions to the NFWA Trust based on a funding formula approved by the federal Minister of Natural Resources for OPG and the other nuclear fuel waste owners in Canada. The NFWA Trust forms part of the Used Fuel Segregated Fund. Any OPG contributions to the Used Fuel Segregated Fund as well as any portion of the Used Fuel Segregated Fund currently not in the NFWA Trust can be applied to satisfy the trust's annual contribution requirements. The funds in the Ontario NFWA Trust will be used for the purposes of long-term management of nuclear used fuel waste, in accordance with the NFWA. OPG and the Province are beneficiaries of the NFWA Trust.

If there is a surplus in the Decommissioning Segregated Fund such that the funding liabilities, as defined by the most recently approved ONFA Reference Plan, are at least 120 percent funded, OPG may direct, at the time a new or amended reference plan is approved, up to 50 percent of the surplus over

120 percent to the Used Fuel Segregated Fund, with the OEFC entitled to a distribution of an equal amount.

If there is a surplus in the Used Fuel Segregated Fund such that the funding liabilities, as defined by the most recently approved ONFA Reference Plan, are at least 110 percent funded, the Province has the right, at any time, to access the excess amount greater than 110 percent. Neither OPG nor the Province have a right to direct any amounts from the Used Fuel Segregated Fund to the Decommissioning Segregated Fund.

Upon termination of the ONFA, the Province has the sole right to any excess funds in the Decommissioning Segregated Fund and the Used Fuel Segregated Fund.

OPG has the responsibility for the management and disposal of the used nuclear fuel and L&ILW generated by the Bruce generating stations and for the eventual decommissioning of these stations. These obligations on the part of OPG are recovered from Bruce Power through annual rent payments and volume based fees per the Bruce Lease and related agreements. Pursuant to the lease agreement, Bruce Power must return the two Bruce stations to OPG together, in a de-fuelled and de-watered state. As such, these de-watering and de-fuelling costs will not be funded by OPG. Further details on the 2015 amendments to these agreements are found in the section, *General Development of the Business* under the heading, *Nuclear Business Development – Bruce Power Refurbishment and Bruce Lease Agreement*.

#### Provincial Guarantee

In accordance with the NSCA, the CNSC requires OPG to have sufficient funds available to discharge its existing nuclear waste management and nuclear decommissioning obligations. The CNSC process requires the CNSC financial guarantee requirement to be updated once every five years and for OPG to provide an annual report to the CNSC on the assumptions, asset values, and resulting financial guarantee requirements. The CNSC financial guarantee requirement calculation takes into account nuclear waste expected to be generated to the end of each year.

In November 2017, the CNSC accepted OPG's proposed 2018-2022 CNSC financial guarantee requirement to be satisfied by the forecast fair market value of the Nuclear Segregated Funds without the requirement of a Provincial Guarantee for the 2018-2022 period. As provided for by the terms of the ONFA, the Province is committed to provide a Provincial Guarantee to the CNSC as required, on behalf of OPG, should there be a shortfall between the CNSC financial guarantee requirement and the value of the Nuclear Segregated Funds in the 2018-2022 period, as it has been done in the past. OPG pays the Province an annual guarantee fee equal to 0.5 percent of the outstanding amount, if any, of the Provincial Guarantee. The value of the Provincial Guarantee in effect through to the end of 2017 was \$1,551 million.

#### **Services, Trading, and Other Non-Generation Segment**

The Services, Trading, and Other Non-Generation segment is a non-generation segment that is not subject to rate regulation. It includes the revenue and expenses related to OPG's trading and other non-hedging activities.

As part of trading activities, OPG transacts with counterparties in Ontario and neighbouring energy markets in predominantly short-term trading activities of typically one year or less in duration. These activities relate to electricity that is purchased and sold at the Ontario border, financial energy trades, financial risk management energy product revenues, and sales of energy-related products.

In addition, the segment includes the results of OPGET, which engages in U.S.-based wholesale energy trading activities in the U.S. northeast. The activities of OPGET include trading electricity in the U.S. using over-the-counter energy-related derivatives. OPGET retains Federal Energy Regulatory Commission market-based rate authorization.

The segment also includes revenue from real estate rentals and non-regulated services, gains or losses on disposition of non-regulated real estate assets, costs associated with non-regulated business development activities, and costs related to the Lambton GS and Nanticoke GS sites.

### **Fair Hydro Trust Segment**

The Fair Hydro Trust segment is a non-generation segment that is not subject to rate regulation. It reports OPG's income related to its role as the Financial Services Manager under the Fair Hydro Act and holder of the Trust's subordinated debt, and includes the financial results of the Trust. Segment earnings include interest income from the Trust, recovery of third-party costs and fees for financial management and ongoing administration services, partially offset by interest costs on debt issued by OPG to fund its purchase of the Trust's subordinated debt, incurred third-party costs, and other costs incurred related to the management and administration of the Trust. OPG's fees for its services to the Trust, as the Financial Services Manager, are subject to an annual review by the OEB.

### **Indigenous Relations**

The Aboriginal and treaty rights of Indigenous communities are recognized and affirmed in the *Constitution Act, 1982*. OPG's corporate governance includes an Indigenous Relations policy to help build and develop mutually beneficial working relationships with Indigenous communities proximate to the Company's present and future operations. The policy focuses on building respectful relationships with Indigenous communities, businesses and organizations through partnership, collaboration and support for procurement, employment and educational opportunities. The Company seeks to establish and maintain these relationships based on a foundation of respect for the languages, customs, and political, social and cultural organizations of the indigenous communities.

OPG may be subject to claims by Indigenous communities or other Indigenous groups and individuals. These claims may stem from generation development activities, historic operations of Hydro Electric Power Commission of Ontario and Ontario Hydro that may have impacted Aboriginal and treaty rights, or the absence of legal permits, rights-of-way, or easements. Legal precedents created by court rulings may impact negotiations and resolution of past grievances. To date, OPG has resolved 23 past grievance claims with 21 communities, achieving final settlement agreements.

In line with the company's Indigenous Relations policy, OPG pursues generation-related developments and other joint projects with Indigenous communities. OPG currently has four generation development partnerships with Indigenous communities. OPG's first such partnership became operational in early 2009 as part of the Obishikokaang Waasiganikewigamig/Lac Seul GS project. The signing of the "Amisk-oo-Skow" Agreement with the Moose Cree First Nation (MCFN) in early 2010 marked the second such partnership. In 2011, the Lower Mattagami Limited Partnership agreement was amended and restated to include the MCFN and their wholly owned Amisk-oo-Skow Finance Corporation as limited partners. During 2014, the MCFN acquired a 25 percent interest in the assets of the Lower Mattagami River project through its investment in the Lower Mattagami Limited Partnership.

OPG and CRP, a wholly owned corporation of the Taykwa Tagamou Nation, established PSS in January 2015. The Peter Sutherland Sr. GS was constructed through this partnership. Following the placement in service of the station, the Taykwa Tagamou Nation, through CRP, increased its partnership interest in PSS to 33 percent in April 2017.

Following selection by the IESO in March 2016, OPG and a subsidiary of the Six Nations of Grand River Development Corporation have partnered to develop a new 44 MW solar facility at OPG's Nanticoke GS site and adjacent lands. The Nanticoke Solar Limited Partnership was formed in July 2015, and the Six Nations of Grand River Development Corporation, through its subsidiary, acquired a 10 percent ownership interest in August 2015.

Other joint projects with Indigenous partners include two shoreline remediation projects completed in 2016. The Whitesand First Nation, working closely with OPG, completed a project to remediate nearly

two kilometers of shoreline, while the Long Lake #58 First Nation undertook the management of a five-year shoreline remediation project. OPG also has been engaging proactively with Indigenous communities regarding the Company's nuclear waste management operations, through regularly scheduled meetings and an ongoing dialogue in connection with OPG's proposed L&ILW DGR, the re-licensing of the PWWF and the WWMF, as well as regarding the Pickering GS re-licensing. Engagement was also conducted with First Nations in southwestern Ontario regarding the demolition of the Lambton and Nanticoke generating stations and with the Mississaugas of New Credit regarding the sale of the former Lakeview GS site.

In 2017, OPG launched an Indigenous Business Engagement (IBE) Initiative. The purpose of this initiative is to increase access to procurement opportunities for Indigenous businesses interested in supplying materials and services to OPG. The IBE Initiative is based on a strategy that will identify opportunities in contracts, scopes of work and business plans for potential Indigenous business engagement; include criteria related to suppliers' ability to engage or partner with Indigenous people or businesses in assessing procurement proposals; and invest in relationships with Indigenous communities by increasing outreach efforts to enhance understanding of how to do business with OPG. OPG has been engaging with Indigenous businesses and communities as well as its suppliers to promote the IBE.

OPG has been actively developing recruitment plans targeting Indigenous peoples. As part of this initiative, during the fourth quarter of 2017, OPG participated in several Indigenous-specific career fairs, hosted a Day in the Trades event for Indigenous students and job seekers as part of an open house at the Darlington Energy Centre, and approved additional plans aimed at increasing the number of Indigenous apprentices as part of the nuclear operations' recruitment program.

In November 2016, OPG was recognized for its ongoing commitment to engaging local Indigenous communities with the Canadian Electricity Association's (CEA) 2016 Sustainable Electricity award for Leadership in External Collaboration and Partnerships.

## Workplace Safety and Public Safety

### Workplace Health and Safety

In the area of workplace safety, OPG is committed to achieving excellent performance through continuous improvement and a strong safety culture, with the ultimate goal of zero injuries. OPG utilizes an integrated health and safety management system and a set of operational risk control procedures to ensure continued monitoring of health and safety performance and to support continuous learning and improvement in this area. Oversight and reporting by corporate and site safety functions is in place to provide senior management with regular information on the effectiveness of the safety management efforts, compliance with legal and corporate requirements, and safety performance trends. OPG's incident management system requires that all incidents, including near misses, be reported and investigated and that corrective action plans be developed and completed in order to prevent reoccurrences. Over the past five years, OPG has repeatedly stood in the top quartile of its comparator Canadian electrical utilities in various safety performance metrics.

Workplace safety performance is measured using two primary indicators at OPG, All Injury Rate (AIR) and Accident Severity Rate (ASR). OPG's AIR and ASR results for employee workplace safety were as follows for the year ended December 31:

	2017	2016	2015
AIR ( <i>injuries per 200,000 hours worked</i> )	0.48	0.56	0.39
ASR ( <i>days lost per 200,000 hours</i> )	3.57	2.59	0.50

OPG's analysis of the events underlying its safety performance indicates that major contributors to the injuries and near misses included inadequate situational awareness and attention to detail, and

suboptimal risk-based decisions, rather than missing or inadequate standards or programs. OPG continues to implement a number of initiatives to target the injury trends based on the analysis of the safety events, with a focus on the use of human performance tools including increased field supervisory oversight, situational awareness, communication, and procedural use and adherence.

In order to strengthen its safety performance, OPG continues to progress an organization-wide “iCare Enough to Act” initiative launched in 2016 to renew employees’ commitment to their own and each other’s safety and well-being. Approaches to supervisory oversight, communication and safe work planning are being modified and updated to further strengthen safety as a foundational element of the Company’s values-based culture.

Contractors are required to conduct work safely at OPG sites. In support of this requirement, OPG utilizes an independent contractor pre-qualification process, provides on-site safety support for many of its major projects, and works with contract partners to improve their health and safety programs to meet OPG’s requirements. In the past nine years, OPG has consistently shown a better than average Construction Contractor AIR as compared to the Infrastructure Health and Safety Association Contractor AIR, a metric of construction contractor safety performance across Ontario. OPG has maintained this performance while engaging in the refurbishment of the Darlington GS, one of the largest infrastructure projects in Canada. The hours worked by contractors in 2017 were the largest in OPG’s history, largely attributable to this project.

OPG continues to promote a Total Health program aimed at embedding a health culture that supports employees and their families in their efforts to achieve an optimal level of health and functioning, through health education, health promotion, disease and injury prevention, and crisis intervention. In 2016, the Company launched the Mental Health First Aid training course for employees, an accredited training program facilitated by the Mental Health Commission of Canada. The training aims to increase awareness and empathy for mental illness, reduce stigma, support affected employees, and improve return to work outcomes. By the end of 2017, over 1,600 managers and supervisors had participated in this training.

### Nuclear Radiation Safety

OPG manages a radiation protection program designed to minimize detrimental health effects to employees and members of the public. OPG follows developments in the field of radiation protection as documented by the International Commission on Radiological Protection (ICRP), the United Nations Scientific Committee on the Effects of Atomic Radiation, and the U.S. National Council on Radiation Protection and Measurements. Widely recognized as the main source of expert advice regarding protection from the harmful effects of ionizing radiation, the ICRP periodically issues recommendations concerning principles of radiation protection. These recommendations are usually adopted by most countries without significant modification and are incorporated into the applicable laws. The Canadian Radiation Protection Regulations are based on the recommendations of the ICRP, and OPG’s nuclear facilities conform to these regulations. The CNSC is the federal agency that regulates radiation protection in Canada.

Radiation exposures to station personnel and the public are limited by station design and adherence to approved operating procedures. Over the years, OPG has been a leader in applying the principles of keeping radiation doses as low as reasonably achievable. OPG’s internal operating limits for occupational exposure are set well below the regulatory limits to ensure that the regulatory limits are not exceeded. OPG’s operating targets for radiological emissions are set at even more restrictive levels and typically represent small fractions of the regulatory limits.

To ensure continued public safety, radiation exposure to members of the public resulting from the operation of OPG’s nuclear generating stations is estimated on an annual basis for individuals living or working near the stations. The annual dose to the public resulting from operations of each nuclear facility is expressed in microsieverts (µSv), an international unit of radiation dose measurement. For 2015, the annual public doses resulting from the Darlington GS operations and the Pickering GS operations were

0.5 µSv and 1.2 µSv, respectively, which is approximately 0.1 percent of the annual legal limit of 1,000 µSv. For 2016, the annual public doses resulting from the Darlington GS operations and the Pickering GS operations were 0.6 µSv and 1.5 µSv, respectively, which is less than 0.1 and 0.2 percent of the annual legal limit, respectively. While the public doses from OPG's nuclear operations for the 2017 operating year will not be finalized until the second quarter of 2018, they are not expected to differ significantly from the 2016 levels.

As a condition of receiving operating licences for its nuclear facilities, OPG has developed comprehensive emergency plans that detail the Company's planned response to reactor accidents, as well as accidents involving the transportation of radioactive materials. These plans dictate how OPG will work with municipal, regional, provincial, and federal agencies to safeguard station personnel and members of the public in the unlikely event of a radiation emergency at one of OPG's facilities. Station staff are required to regularly participate in emergency exercises to maintain and continuously improve response capability for such events.

### Dam Safety and Waterways Public Safety

OPG manages dam safety and other risks associated with the production of hydroelectric power through OPG's Safe Operations Policy and Dam Safety Program. The Safe Operations Policy directs that dams be designed, constructed, operated, and maintained in a manner that meets all regulatory requirements, or, in the absence of regulations, the safety guidelines published by the Canadian Dam Association or other industry best practices. OPG is one of the first dam owners in Canada to have developed and implemented a dam safety program and is considered an industry leader in many aspects of the program.

In addition to effectively managing the safety of dams against catastrophic failure, OPG has developed a number of technical standards and procedures concerning public safety around dams, and materials to educate the public and raise awareness of the hazards associated with the operation of the hydroelectric facilities. This includes the implementation of control measures in the form of signage, safety booms, buoys, fencing and audible alerts at the appropriate facilities. These measures are actively managed to maintain their effectiveness. OPG also strives to entrench a "Stay Clear – Stay Safe" message as part of its public education program, through strategically placed advertisements and engagement of other agencies, such as the MNRF, Ontario Provincial Police, Life Saving Society, Ontario Waterpower Association, and other stakeholders.

Since 2007, OPG has engaged an independent advisory panel consisting of internationally recognized experts to conduct an annual review of its Dam Safety Program. The Chair of the independent panel establishes areas of in-depth review and presents the observations to OPG's Board of Directors. The panel has consistently found that the risks associated with the dams owned and operated by OPG are being managed in alignment with industry best practices and guidelines. OPG remains committed to high standards of public safety on waterways around hydroelectric generating stations and dams, and continues to make investments in waterway and dam safety upgrades.

Additional details on the regulatory regime related to dams and waterways can be found in the section, *Description of the Business* under the heading, *Water Rights*.

## **Environment**

### Overview

OPG is committed to meeting compliance obligations, including any environmental commitments that it makes, with the objective of surpassing these compliance obligations where it makes business sense. OPG's Environmental Policy specifically commits the Company to:

- Establish an environmental management system (EMS) and maintain registration for this system to the ISO 14001 Environmental Management System standard;

- Work to prevent or mitigate adverse impacts on the environment with a long-term objective of continual improvement;
- Strive to be a leader in climate change mitigation; and
- Manage sites in a manner that strives to maintain, or enhance where it makes business sense, significant natural areas and associated species of concern.

The policy is implemented through OPG's EMS. Within the EMS, OPG sets environmental objectives and maintains planning, operational control, and monitoring programs to manage its negative and positive impacts on the environment. The most significant environmental aspects of OPG's operations include: spills, chemical and thermal emissions to water, water flow and level changes, radiological emissions, L&ILW, displacement of fossil fuels, enhancement and disruption of wildlife habitat, and fish impingement and entrainment. The policy is reviewed annually as part of the EMS to ensure that it remains appropriate to the nature, scale and environmental impacts of OPG's activities. Environmental performance targets are set as part of the annual business planning process. These targets are based on past performance and external benchmarking to promote continuous improvement.

OPG communicates its environmental performance to external and internal stakeholders through a range of engagement methods such as reports and correspondence to regulators, meetings, newsletters, open houses, consultations, news releases, advertising campaigns, social media, and participation in community events.

Details of OPG's environmental performance and initiatives to fulfill the Environmental Policy can be found in OPG's annual *Sustainability Report*, which is available on the Company's website at [www.opg.com](http://www.opg.com). ***Unless otherwise specifically stated, none of the information contained on, or connected to the Company's website nor any of the contents of the Sustainability Report are incorporated by reference herein.***

#### Environmental Compliance

OPG must comply with a large number of environmental requirements contained in statutes, regulations, by-laws, licences, permits and approvals. Failure to comply with applicable environmental laws may result in enforcement action, including the potential for orders or charges. OPG reports any incidents of non-compliance to the appropriate federal, provincial or municipal authorities as required, with corrective action plans developed and implemented accordingly.

Changes in environmental regulatory requirements may result in existing operations being in a state of non-compliance, a potential inability to comply, and potential costs and liabilities for OPG. To ensure compliance, such circumstances may require OPG to install control technologies, develop new processes, allowances or offsets, or place constraints on electricity production.

#### 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 station equipment and fish larvae and eggs being entrained in the water as it passes through the station. The warmer water returned to the water body also 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, while physical barriers such as dams can prevent the migration of fish.

OPG utilizes measures such as fish ladders, trap and transport programs, 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. Potential regulatory changes being monitored and managed as risks by the Company include electricity production constraints and water flow management requirements to protect fish and fish habitat, and expanded fish passage requirements.

### Biodiversity and Habitat Stewardship

The generation of electricity can have an impact on biodiversity, either directly through habitat loss and fragmentation or indirectly through emissions to the environment. OPG is committed to managing its sites in a manner that strives to maintain 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's regional biodiversity program strategically funds and promotes efforts to protect and restore biodiversity in areas of Ontario where genetic, species or ecosystem diversity has been most impacted, and substantive threats remain. In November 2017, OPG's biodiversity program was recognized by the CEA with the 2017 Sustainable Electricity award for Commitment to Continuous Performance Improvement.

### Climate Change Mitigation and Air Quality

OPG's operational and growth strategies support reductions in GHG emissions and improved air quality. After safely ending coal-fired generation in the province, OPG has become Ontario's largest clean energy provider, producing and selling electricity that is 99 percent free of GHG and smog-causing emissions. The elimination of coal-fired electricity production at OPG's generating stations resulted in coal being reduced from one-quarter of Ontario's energy supply mix in 2003 to zero in 2014.

OPG monitors and reports GHG emissions from its facilities in accordance with the regulatory requirements set out by Environment and Climate Change Canada and the MOECC. In 2016, the Government of Ontario passed the *Climate Change Mitigation and Low-Carbon Economy Act, 2016* and the associated *Cap and Trade Program Regulation*. The legislation provides the foundation for regulating GHG emissions in Ontario and includes a cap and trade program, with the first compliance period being from January 1, 2017 to December 31, 2020. The cap and trade program is a market mechanism intended to give Ontarians an incentive to reduce GHG emissions by putting a price on carbon. OPG has an internal program to meet its GHG emissions compliance obligations. With OPG's low GHG emitting fleet, these obligations do not have a material financial impact on the Company.

OPG monitors actions being taken by the Government of Ontario and the Government of Canada to reduce GHG emission levels and transition to a low-carbon economy. In support of efforts to mitigate climate change, the Company continues to evaluate and implement plans to increase the generation capacity of its hydroelectric fleet, where economical, and invest in other low-carbon technologies, including nuclear innovation and energy storage, and take a leadership role in the electrification of Ontario's transportation sector.

OPG has a strategy to help position the Company as a leader in transportation electrification in the province. The strategy aims to leverage the Company's clean, reliable and cost-effective electricity to power transportation, capitalize on future commercial growth opportunities, and enhance the Company's social licence. OPG is pursuing initiatives to increase the use of electric vehicles within its operations, and is assessing vehicle grid integration and hydrogen applications for the transportation sector. Ontario's climate change plan aims for electric and hydrogen passenger vehicles to represent five percent of new vehicle sales in the province by 2020.

As part of its commitment to help de-carbonize Ontario's transportation sector, OPG is a founding sponsor of Plug'n Drive, a non-profit organization working to accelerate the adoption of electric vehicles and to maximize their environmental and economic benefits. In May 2017, Plug'n Drive announced the opening of the world's first experiential learning facility dedicated to electric vehicle education and awareness, with OPG sponsoring the Centre's training facility.

### Radiological Emissions

Very low levels of radioactivity are released to air and water as a result of operating the reactors at OPG's nuclear generating stations. OPG maintains an effluent monitoring and control program to ensure radiological emissions are kept well below the release limits specified in the station operating licences.

OPG also has environmental monitoring programs in the vicinity of the nuclear stations to ensure operations have no adverse impacts on human health and the environment. 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. Results from the monitoring programs have confirmed OPG's radiological emissions are a small fraction of the regulatory release limits.

In June 2016 and August 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.

Further details are discussed under the heading, *Workplace Safety and Public Safety – Nuclear Radiation Safety*.

## **People and Culture**

### Workforce Resourcing Strategies

Electricity generation involves complex technologies that require highly skilled and trained workers, and a well-trained and engaged workforce is fundamental to the achievement of OPG's strategic imperatives. The Company is focused on improving the capability of its workforce through leadership development, knowledge management, diversity and inclusion programs, and hiring in key areas. Ability to secure the right talent mix in order to effectively meet the Company's immediate and longer term business needs on a timely basis is supported through workforce planning, resourcing and on-boarding strategies, both to acquire external talent into the organization and to develop existing employees. The goal of resourcing strategies and workforce planning is to ensure that the Company's workforce is diverse and has the right skill set and capability for the safe and effective operation of the generating facilities and successful delivery of major projects, including the Darlington Refurbishment. These strategies are being designed to take into account anticipated staffing requirements to the end of planned commercial operation of the Pickering GS, through to the end of the planned period to de-fuel, de-water and place the station in a safe storage state. The end of commercial operation at the Pickering GS is expected to lead to a significant reduction in OPG's workforce.

As part of the strategy to develop and engage employees and to build leadership talent in support of the Company's long-term success, OPG has an active succession planning program with a focus on accelerating development. This includes a company-wide high potential leadership development program for qualified internal candidates. This 14-month cross-functional, competitive-entry program is designed to identify and develop candidates for future leadership positions while they are relatively early in their careers. OPG also has a talent management monitoring process to proactively assess staffing risks, challenges and opportunities.

Many positions at OPG have significant educational prerequisites and rigorous requirements for continuous training and periodic requalification. In addition to maintaining its internal training infrastructure, OPG relies on partnerships with government agencies, other electrical industry partners, and educational institutions to meet the required level of qualification.

Effective January 1, 2017, OPG implemented an Executive Compensation Program that is compliant with *Ontario Regulation 304/16: Executive Compensation Framework*, introduced in September 2016. The regulation sets out how all employers designated under the *Broader Public Sector Executive Compensation Act, 2014*, including OPG, must establish and post compensation programs for executives. The program must include the compensation philosophy, salary and performance-related pay caps, comparative analysis details, and a description of other elements of compensation. OPG's Executive Compensation Program is designed to provide compensation that is at the 50<sup>th</sup> percentile of the market and is focused on at-risk, performance based pay. The program aims to enable OPG to attract, align and retain the executive talent critical to delivering Shareholder and customer value, while ensuring continued safe and reliable operations. OPG's Executive Compensation Program was not affected by the two

regulations amending *Ontario Regulation 304/16* that were released in 2017, as the program continues to be subject to the original regulation's requirements. For further information, refer to the section, *Corporate Governance* under the heading, *Compensation*.

## Employees

OPG's average number of regular employees and average number of seasonal, casual construction and non-regular employees (Other Employees) in 2017 were as follows:

<b>Business Segment</b>	<b>Regular Employees</b>	<b>Other Employees</b>
Regulated – Nuclear Generation <sup>1</sup>	7,360	1,432
Regulated – Hydroelectric	1,125	54
Contracted Generation Portfolio	531	49
Services, Trading, and Other Non-Generation <sup>2</sup>	96	7
<b>Total</b>	<b>9,112</b>	<b>1,542</b>

<sup>1</sup> Including employees associated with the Regulated – Nuclear Waste Management segment.

<sup>2</sup> The Fair Hydro Trust segment, a non-generation segment that is not subject to rate regulation, was established in December 2017. As of December 31, 2017 there were three regular employees associated with the Fair Hydro Trust segment.

The majority of OPG's employees are represented by the PWU and The Society. The PWU includes most workers below the level of first line manager – from clerical staff to technicians and trades staff and station operators. The Society includes supervisors, professional engineers, scientists, and other professionals.

Bargaining rights with the 19 craft unions that perform construction work at OPG's generating facilities in addition to the regular workforce are established either through the EPSCA or directly with OPG. EPSCA is a voluntary association of owners and contractors who perform work in the electrical power systems sector. The primary purpose of EPSCA is negotiating and administering collective agreements on behalf of employers performing work on what is now OPG property. Collective agreements between the Company and its construction unions are negotiated either directly or through EPSCA. OPG currently has 17 agreements through EPSCA and two direct trade agreements. The two direct trade agreements are with the Canadian Union of Skilled Workers and the Brick and Allied Craft Union.

## **Insurance**

The principal types of discretionary insurance carried by OPG include directors' and officers' liability, excess commercial general liability, all risks property, boiler and machinery breakdown, including statutory boiler and pressure vessel inspections, and business interruption. In addition to providing coverage for OPG's non-nuclear facilities, this insurance applies to the conventional operations at OPG's nuclear generating stations. OPG also maintains nuclear property insurance, including nuclear boiler and machinery breakdown, for damage to the nuclear portions of its generating stations and for perils propagating from the nuclear to the conventional side of its assets. This coverage complements the conventional property insurance program.

OPG also purchases or requires contractors to purchase discretionary insurance for construction projects. For the Darlington Refurbishment project, the insurance coverage for the pre-requisite construction works was placed in 2013 and for refurbishment execution in 2016. The owner-controlled insurance program for the refurbishment consists of wrap-up liability, course of construction and marine transit insurance.

OPG purchases certain insurance coverage as required by statute, namely owned and leased motor vehicle liability, aviation liability (for drone operations) and nuclear energy liability insurance. The federal *Nuclear Liability and Compensation Act* (NLCA) that came into effect on January 1, 2017, and its predecessor legislation, the *Nuclear Liability Act* (NLA), impose absolute liability on a licensed operator of a nuclear generating station for any damage to property of, or injury to, the public arising from a nuclear

incident, other than damage resulting from sabotage or acts of war. As such, the legislation protects all other persons from liability, including suppliers of nuclear fuel and components used in nuclear reactors.

The NLCA requires all operators of nuclear generating stations in Canada to maintain specified amounts of nuclear liability insurance purchased from a federal government approved insurer or other equivalent forms of financial security approved by the federal government. Under the NLCA, OPG is required to maintain an initial \$650 million per incident of nuclear energy liability insurance for each of its nuclear installations as defined by the NLCA effective in 2017, for which there is no deductible amount, with successive annual increases to \$750 million, \$850 million, and \$1 billion over the 2018-2020 period. The Pickering GS site and the Darlington GS site are considered to be two separate nuclear installations under the NLCA. OPG is also required to maintain \$13 million per incident of nuclear energy liability insurance for the WWMF. OPG is not responsible for purchasing nuclear liability insurance for the Bruce nuclear generating stations. Previously, the NLCA required OPG to maintain \$75 million per incident of nuclear energy liability insurance for each of the Pickering GS site and the Darlington GS site and \$6 million for the WWMF, purchased from a federal government approved insurer. OPG continues to maintain nuclear liability insurance or other forms of financial security that have been approved by the federal government equal to the required liability limits.

Under Part I of the NLCA, an operator is liable for all damages resulting from a nuclear incident. If, in the opinion of the Governor in Council, OPG's liability could exceed the specified insured amount in respect of a nuclear incident, or it would be in the public interest to do so, the Governor in Council shall proclaim Part II of the NLCA as applicable in respect of a nuclear incident. Under Part II of the NLCA, OPG's liability would be effectively limited to the amount of required abovementioned insurance, and the Governor in Council may authorize additional funds to be paid by the federal government as may be specified in an order.

## **RISK FACTORS**

For details on risks faced by OPG, see section *Risk Management* in the Company's 2017 year-end MD&A.

## **DIVIDENDS**

The declaration and payment of dividends remains at the sole discretion of OPG's Board of Directors and is dependent on the results of OPG's operations, the Company's financial condition and cash requirements, securities legislation requirements, and other factors considered relevant by the Board of Directors in exercising its discretion and judgment on an ongoing basis. OPG did not declare or pay any dividends for the years 2015 to 2017.

There are no restrictions in the articles of the Company that could prevent the Company from paying dividends. However, the declaration and payment of dividends are subject to financial tests set forth in the OBCA.

## **DESCRIPTION OF CAPITAL STRUCTURE**

The authorized share capital of OPG consists of an unlimited number of common shares, the voting shares of the Company, and an unlimited number of non-voting Class A shares. As at December 31, 2017, OPG had 256,300,010 common shares and 12,217,616 Class A shares issued and outstanding, all of which are owned directly by the Province at a stated value of \$5,126 million and \$519 million, respectively. OPG is authorized to issue an unlimited number of common shares and Class A shares without nominal or par value. Holders of common shares are entitled to one vote per share at meetings of the shareholders of the Company.

The Company's Articles of Amalgamation were amended effective December 1, 2017 to allow for the creation and issuance of non-voting Class A shares to the Province in exchange for its equity injections. The Class A and common shares rank equally as to dividends on a share for share basis, and all

dividends declared by OPG shall be declared in equal amounts per share on all outstanding shares without preference or distinction. Upon the liquidation, dissolution or wind-up of OPG, whether voluntary or involuntary, the holders of Class A shares and common shares are entitled to share equally, on a share for share basis, in all distributions of property and assets without preferences or distinction. Any issuance of new shares is subject to the consent of the Province. OPG is entitled to redeem outstanding Class A shares as may be approved by OPG's Board of Directors.

As all of the Company's voting securities are held by the Province, the Company is controlled by the Province.

## **CREDIT RATINGS**

DBRS Limited (DBRS) and S&P Global Ratings (S&P) provide credit ratings for commercial entities. A credit rating generally provides investors with an independent measure of credit quality of an issue of securities. Credit rating categories for long-term debt instruments range from highest credit quality (generally 'AAA') to default in payment (generally 'D').

In April 2017, DBRS re-affirmed the long-term credit rating on OPG's debt at 'A (low)' and the commercial paper rating at 'R-1 (low)', each with a stable outlook. In July 2017, S&P re-affirmed OPG's long-term credit rating at BBB+ with a stable outlook. On July 7, 2015, S&P lowered OPG's long-term corporate credit rating from 'A-' to 'BBB+' with a stable outlook. S&P's rating action followed its July 6, 2015 downgrade to the Province's rating from 'AA-' to 'A+'. The link between the Province and OPG through ownership and financial support may impact OPG's credit rating. S&P's commercial paper rating for OPG is 'A-1 (low)'.

Long-term debt instruments that are rated in the 'A' category by DBRS are considered to be of good credit quality. The capacity for the payment of financial obligations by the obligor of such instruments is considered to be substantial, but of lesser credit quality than higher-rated entities. Entities in the 'A' category may be vulnerable to future events, but qualifying negative factors are considered manageable. The addition of a "high" or "low" modifier indicates relative standing within the rating category.

A 'BBB' rating category by S&P for long-term debt instruments means that the obligor has adequate capacity to meet its financial commitments, but is considered more subject to adverse economic conditions than higher-rated entities. The addition of a plus '+' or minus '-' designation after a rating indicates the relative standing within a particular rating category.

DBRS's commercial paper credit rating scale ranges from 'R-1(high)' to 'D', which represents the highest to lowest quality of such securities rated. The rating of 'R-1(low)' is the third highest and is considered to be of good credit quality. S&P's Canadian commercial paper rating scale ranges from 'A-1 (high)' to 'D', which represents the highest to lowest quality of such securities rated. The rating of 'A-1 (low)' is the third highest and is considered to be satisfactory.

There can be no assurance that a credit rating will remain in effect for any given period of time or that a credit rating will not be lowered, withdrawn or revised by either or both rating agencies if, in their judgment, circumstances so warrant. The rating of any securities is not a recommendation to buy, sell or hold such securities, and such ratings do not comment as to market price or suitability for a particular investor.

During the past two years, OPG has made payments to DBRS and S&P's credit rating agencies for their credit rating services and for other services. OPG reasonably expects such payments will continue in the future for the services acquired.

## **MARKET FOR SECURITIES**

In October 2017, OPG issued \$500 million of Series 1 Notes due in 2027, with a coupon rate of 3.315 percent. The Notes are currently outstanding and are not listed on any exchange or similar market for securities.

## **CORPORATE GOVERNANCE**

National Instrument 58-101 *Disclosure of Corporate Governance Practices* (NI 58-101), has been implemented by Canadian securities regulatory authorities to provide greater transparency for the marketplace regarding issuers' corporate governance practices. OPG's corporate governance practices align with NI 58-101 and National Policy 58-201 *Corporate Governance Guidelines*. In addition, OPG has reviewed its governance practices against the principles discussed in the 2013 Report on Building High Performance Boards, being the most current such report issued by the Canadian Coalition for Good Governance and concluded that OPG compares favourably to those principles that apply to OPG.

Information with respect to OPG's Board of Directors is as follows:

### **Board of Directors**

OPG's Board of Directors (Board) is made up of 14 individuals with the following capabilities:

- managing large businesses;
- managing and operating nuclear stations;
- understanding of the Canadian nuclear environment;
- engineering and/or project management, including large infrastructure project management;
- managing capital intensive companies;
- knowledge and expertise in mergers and acquisitions;
- overseeing regulatory, government and public relations;
- human resources management;
- financial, investment, legal and corporate governance expertise;
- knowledge of information technology/cybersecurity;
- knowledge of Indigenous communities; and
- stakeholder management.

The Board exercises its independent supervision over management as follows: all of the members of the Board are independent of the Company except for the Company President and CEO; meetings of the Board are held at least five times a year; a formal Charter for the Board and for each Board committee has been adopted and the charters are reviewed annually; the Board and each Board committee is chaired by an independent Director and each have a written job description; and a portion of each Board and Board committee meeting is reserved for independent Directors to meet without management present.

OPG has a written position description for the Chief Executive Officer (CEO). This 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 the By-laws, the Board Charter, the 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.

### Director Independence

On an annual basis, the Compensation, Leadership and Governance Committee of the Board reviews the disclosures made by Directors in the annual Director Questionnaire and reviews each disclosed affiliation's relationship with OPG in order to determine whether the Director is (or remains) independent. The Compensation, Leadership and Governance Committee reports on its review to the Board.

Based on the meaning of Independence in Section 1.4 of National Instrument 52-110 *Audit Committees* (NI 52-110) and a review of the applicable factual circumstances against this standard, the Compensation, Leadership and Governance Committee has determined that all Directors listed are independent, except for Jeffrey Lyash, who is considered to have a material relationship with OPG by virtue of his position as President and CEO of OPG.

The Board has a Board of Directors Conflict of Interest Policy and Procedure that governs the disclosure and mitigation of Director conflicts or potential conflicts of interest and has adopted an annual process of written disclosure by Directors in order to:

- (i) identify potential conflicts of interest for the purposes of complying with the Board of Directors Conflict of Interest Policy and the OBCA;
- (ii) validate the Directors' independence and financial literacy for the purposes of complying with securities regulations related to boards of directors and audit committees; and
- (iii) satisfy other disclosures and regulatory filings.

To further minimize potential conflicts of interest, the Board has a policy on interlocking directorships. This policy states that no more than two OPG Directors may sit on a board of directors of another reporting issuer at the same time. Directors must confirm that they are in compliance with OPG's policy on interlocking directorships when disclosing to the Board Chair appointments to other boards of directors.

### Strategic Planning

OPG's Board holds an annual strategy session and devotes a significant portion of each regular Board meeting to discussion of corporate strategic matters. Management is responsible for developing the strategy and presenting it to the Board for discussion.

In 2017, the Board received reports on key strategic issues, risks, competitive developments and corporate opportunities facing the Company. Management ensures that the key strategic elements are incorporated into OPG's annual budget and business plan, which are reviewed and approved by the Board. The Board also periodically receives briefings from external advisors on broad energy industry developments and/or special strategic matters.

### Overseeing the Management of Risk

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. To fulfill its risk oversight responsibilities, the Board has established an Enterprise Risk Management Policy and an Audit and Risk Committee, comprised of independent Directors. The committee's mandate includes oversight of the Enterprise Risk Management (ERM) framework that management uses to manage the Company's risk profile. The ERM framework assists the Board in understanding how risks may affect the Company and how they are being addressed by management. The Audit and Risk Committee receives quarterly reports from OPG's Chief Risk and Audit Executive (CRAE) on enterprise-wide risks. These are also reported upon to and considered by the Board on a quarterly basis.

Through the Compensation, Leadership and Governance Committee, the Board also monitors the risks associated with the Executive Compensation Program, to preclude the Company's decision-makers from taking excessive risk in order to achieve incentives under the compensation plans. The CRAE and

Senior Vice President, People & Culture and Chief Ethics Officer jointly review the executive compensation framework on an annual basis to identify any potential for unintended risk-taking. The CRAE and Senior Vice President, People & Culture and Chief Ethics Officer provide an annual joint report to the Compensation, Leadership and Governance Committee on the results of their review.

## Directors

The following tables set forth the name, age, municipality of residence, position with the Company and principal occupation of each of the Directors of the Company as of March 9, 2018. Each Director holds office until he or she resigns or a successor is elected or appointed. For a discussion of the Board Committee structure, refer to the heading, *Committees of the Board of Directors*.

**Bernard Lord**

Age: 52

Moncton, New Brunswick, Canada

Bernard Lord was appointed Board Chair for Ontario Power Generation on April 1, 2014. Mr. Lord is the CEO of Médavie, a not-for-profit Canadian medical care insurance company headquartered in Moncton, New Brunswick.

Mr. Lord earned a bachelor's degree with a major in economics as well as a bachelor's degree in common law from l'Université de Moncton. He has also received honorary doctorate degrees from University of New Brunswick, l'Université de Moncton and Saint Thomas University. He was admitted to the New Brunswick Law Society in 1993 and was appointed as Queen's Counsel in 2011.

Mr. Lord was the CEO of the Canadian Wireless and Telecommunications Association from October 2008 until August 2016. He also served on several other boards of directors.

In 1999, Mr. Lord became one of Canada's youngest Premiers at the age of 33. His majority government was re-elected in 2003 and he served as Premier of New Brunswick until October 2006. He was elected four times as a Member of the New Brunswick Legislative Assembly.

Mr. Lord's government introduced several new initiatives to support the development of natural resources while also protecting the environment, including a new energy policy that lead to the restructuring of NB Power and the refurbishment of the Point Lepreau nuclear generating station.

During Mr. Lord's terms as Premier, New Brunswick saw the lowest unemployment rate in 30 years and tax cuts each year, combined with balanced budgets and debt reduction. His government made record investments in health care and education while strengthening local democracy and modernizing the Official Languages Act.

**2017 Board/Committee Membership:**

Board (since November 2013) \*

Special Committee (since March 2017)

The Board Chair is not a member of any standing Committee. The Board Chair attends all Committee meetings.

**2017 Attendance:**

8 of 8 100%

14 of 15 93%

18 of 18 100%

**Principal Occupation:** CEO of Médavie

**Board Memberships for other Reporting Issuers:** None

**Independence from OPG:** Independent

**Interlocking Directorships on Boards of other Reporting Issuers:** None

\*Chair

**Jeffrey Lyash**

Age: 56

Toronto, Ontario, Canada

Jeff Lyash is the President and CEO of OPG. Mr. Lyash was formerly the president of CB&I Power, a position he held from 2013 to 2015, where he was responsible for a full range of engineering, procurement and construction of multi-billion dollar electrical generation projects in both domestic and international markets. He also provided operating plant services for nuclear, coal, gas, oil and renewable generation.

Prior to joining CB&I in 2013, Mr. Lyash served as Executive Vice President of Energy Supply for Duke/Progress Energy from 2008 to 2012. With Duke Energy, he led engineering, maintenance and operations of the company's 42,000-megawatt generation fleet, fuel procurement, power trading, major projects and construction, environmental programs, and health and safety programs.

Before the merger of Progress Energy and Duke Energy, Mr. Lyash served as Executive Vice President of Energy Supply for Progress Energy. In this role, he oversaw Progress Energy's diverse 22,000-megawatt fleet of generating resources including nuclear, coal, oil, natural gas and hydroelectric stations. In addition, he was responsible for generating fleet fuel procurement and power trading operations.

Mr. Lyash began his career in the utility industry in 1981, joining Progress Energy in 1993. Before assuming the role of Executive Vice President of Energy Supply, he served as Executive Vice President of Corporate Development, President and Chief Executive Officer of Progress Energy Florida, Senior Vice President of Energy Delivery Florida, and Vice President of Transmission. He also held a wide range of management and executive roles in Progress Energy's nuclear program, including Operations Manager, Engineering Manager, Plant Manager, and Director of Site Operations.

Before joining Progress Energy, Mr. Lyash worked for the U.S. Nuclear Regulatory Commission (NRC) in a number of senior technical and management positions throughout the northeast United States and in Washington, D.C., receiving the NRC Meritorious Service Award in 1987.

Mr. Lyash earned a Bachelor's Degree in Mechanical Engineering from Drexel University, and was honored with the Drexel University Distinguished Alumnus Award in 2009. He has held a Senior Reactor Operator License from the NRC, and is a graduate of the U.S. Office of Personnel Management Executive Training Program and the Duke Fuqua School of Business Advanced Management Program.

**2017 Board/Committee Membership:**

Board (since August 2015)

The President and CEO attends all Committee meetings, excluding independent Director in-camera meetings/sessions.

**2017 Attendance:**

8 of 8 100%

18 of 18 100%

**Principal Occupation:** President & Chief Executive Officer, Ontario Power Generation Inc.

**Board Memberships for other Reporting Issuers:** None

**Independence from OPG:** Not Independent

**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**William Coley**

Age: 74

Charlotte, North Carolina, U.S.A

Bill Coley served as Chief Executive of British Energy from 2005 to 2009 when he retired following the successful combination of British Energy and EDF Energy. He was President of Duke Power from 1997 until his retirement in February 2003, holding various officer level positions in engineering, operations and senior management during his 37-year career with the company.

Mr. Coley is a director of E.R. Jahna Industries. He also served on the WANO Fukushima Commission

**2017 Board/Committee Membership:**

Board (since January 2013)  
Compensation, Leadership and Governance Committee (since February 2016)  
Generation Oversight Committee (since February 2016)  
Darlington Refurbishment Committee (since May 2015)  
Special Committee (since March 2017)

**2017 Attendance:**

8 of 8	100%
5 of 5	100%
4 of 4	100%
4 of 4	100%
15 of 15	100%

**Principal Occupation:** Corporate Director

**Board Memberships for other Reporting Issuers:** None

**Independence from OPG:** Independent

**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**Elisabeth (Lisa) DeMarco**

Age: 50

Toronto, Ontario Canada

Lisa DeMarco is a senior partner at DeMarco Allan LLP with over two decades of experience in law, regulation, policy and advocacy relating to energy and climate change. Ms. DeMarco was previously a partner at Macleod Dixon LLP from 2002 to 2012, partner at Norton Rose Canada LLP from 2012 to 2013 and partner at Norton Rose Fulbright LLP from 2013 to 2014. She represents several governments and leading energy companies in a wide variety of natural gas, electricity, pipeline and energy storage matters before various regulatory agencies, including the OEB and the National Energy Board. She has been an adjunct professor at Osgoode Hall Law School, is a guest lecturer at a number of law schools and presents regularly.

Ms. DeMarco also assists leading Canadian energy companies and Indigenous business organizations on domestic and overseas power project development, renewable power projects, alternative fuel projects, cleantech development and finance, energy storage, carbon capture and storage, corporate social responsibility, environmental disclosure, clean energy finance, and sustainable business strategy.

She is ranked by Chambers Global as one of the world's leading climate change lawyers and regularly attends and advises on related United Nations negotiations. She is ranked and repeatedly recommended by LEXpert, Expert Guide, International Who's Who, and Chambers Canada as a leading energy (oil, gas, and electricity) and environment lawyer. Ms. DeMarco has worked for multilateral development banks and energy companies on deals and projects in India, Brazil, Sri Lanka, Thailand, Argentina, Chile, Ireland, Africa, Mexico, China, Russia, California, Alberta, Ontario, Nova Scotia, British Columbia, Saskatchewan, Prince Edward Island and Québec. She plays an ongoing and active role in the development and drafting of energy and greenhouse gas emissions policy, regulation and law throughout Canada, and in various countries around the world. She was also lead counsel on all aspects of the successful sale of an Ontario power distribution company to Hydro One. Ms. DeMarco was an appointed member of Ontario Premier's Clean Energy Task Force and Climate Action Group.

Ms. DeMarco is a member of the board of directors of the Advanced Energy Centre at MaRS. She is a graduate of the University of Western Ontario (BSc Hon. – 1990), the University of Toronto (MSc. – 1992), Osgoode Hall Law School, York University (LLB – 1995) and the Vermont Law School (MSEL, summa cum laude – 1995) and is called to the bar in England and Ontario.

**2017 Board/Committee Membership:**

Board (since April 2014)  
Audit and Risk Committee (since February 2016)  
Generation Oversight Committee (since February 2016)  
Special Committee (since March 2017)

**2017 Attendance**

8 of 8	100%
5 of 5	100%
4 of 4	100%
15 of 15	100%

**Principal Occupation:** Senior Partner, DeMarco Allan LLP

**Board Memberships for other Reporting Issuers:** None

**Independence from OPG:** Independent

**Interlocking Directorships on Boards of other Reporting Issuers:** None

**Jean Paul (JP) Gladu**

Age: 44

Toronto, Ontario, Canada

JP Gladu is currently the President and CEO of the Canadian Council for Aboriginal Business (CCAB) based in Toronto. Anishinaabe from Thunder Bay, Mr. Gladu is a member of Bingwi Neyaashi Anishinaabek located on the eastern shores of Lake Nipigon. Mr. Gladu has over two decades of experience in the natural resource sector including work with Aboriginal communities and organizations, environmental non-government organizations, industry and governments from across Canada, including involvement in business development for the Bingwi Neyaashi Anishinaabek Nation from 2009 to 2012. He has produced a number of publications related to Aboriginal issues including: forest certification, Native values collection, biofuel opportunities, First Nation community land use plans, criteria and indicators for sustainable forestry, and cedar product development.

Mr. Gladu holds a Forest Technician Diploma from the Sault College of Applied Arts and Technology, a Bachelor of Science degree in forestry from Northern Arizona University, and an Executive Masters of Business Administration from Queens University in Kingston. In 2014, he was a recipient of the Community Service Award – Transformation Awards from Diversity Magazine. Mr. Gladu was nominated for the 2013 Premier's Award for Outstanding Ontario College Graduates, was recognized as one of five Northern Leaders in 2012 by Northern Ontario Business and was elected Class President of the 2012 Queens Executive Masters of Business Administration.

Mr. Gladu currently serves on the Canadian Electricity Association's Public Advisory Panel and board of directors of Noront Resources Ltd. and as Chancellor of the Board of Governors of St. Paul's University College at the University of Waterloo. He has also held previous board positions with Colleges and Institutes Canada (previously the Association of Canadian Community Colleges), Northern Policy Institute, Canadian Foundation for Economic Education boards of directors, Centre for Research and Innovation in the Bio-Economy, Papasay Management Corporation, and Canadian Bioenergy Association. He also held advisory positions with the Canadian Association of Petroleum Producers Renewable Clean Energy Committee and the Ontario Provincial Forest Policy Committee.

**2017 Board/Committee Membership:**

Board (since November 2015)

Compensation, Leadership and Governance Committee (since February 2016)

Generation Oversight Committee (since February 2016)

**2017 Attendance:**

6 of 8 75%

5 of 5 100%

3 of 4 75%

**Principal Occupation:** President and CEO, Canadian Council for Aboriginal Business**Board Memberships for other Reporting Issuers:** Noront Resources Ltd. (TSX)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

**John Herron**

Age: 64

Punta Gorda, Florida, U.S.A.

John Herron retired from Entergy in April 2013 where he was the President, CEO and Chief Nuclear Officer of Entergy Nuclear, with responsibility for Entergy's nuclear plants located in New York, Massachusetts, Vermont, Michigan, Louisiana, Mississippi and Arkansas as well as the company's management service to the Cooper Nuclear Station for the state of Nebraska.

He previously served as Entergy's Senior Vice President for Nuclear Operations handling the operational side of fleet management. Mr. Herron joined Entergy in February 2001 as Vice President, Operations at the Waterford 3 Nuclear Station in Killona, Louisiana. He then moved to New York as the Senior Vice President of the Indian Point Energy Center in February 2002.

Mr. Herron began his career in nuclear operations in 1979 at Vermont Yankee Nuclear Power Corporation. His positions there included technical services superintendent, operations manager, technical programs manager, shift supervisor, and supervisory control room operator. In 1994, he moved to Brownville, Nebraska to become plant manager at Nebraska Public Power District's Cooper Nuclear Station.

Mr. Herron then joined the Tennessee Valley Authority as plant manager at Sequoyah Nuclear Plant in Soddy-Daisy, Tennessee, from October 1996 through July 1999. From July 1999 to February 2001, Mr. Herron served as site Vice President at TVA's Browns Ferry Nuclear Plant.

Prior to his career in utilities, Mr. Herron served in the U.S. Navy from 1972 to 1978. He was attached to the USS Tullibee and the S1C NPTU Windsor, where he was an instructor at the Nuclear Submarine Prototype School.

Mr. Herron holds a bachelor's degree in Business Management from Franklin Pierce College in Rindge, New Hampshire. He also attended the Advanced Management Program at the Harvard Business School in May 2005.

Mr. Herron currently serves on the board of directors for Duke Energy. He also served on the board of directors for the Institute of Nuclear Power Operations and on the Nuclear Strategic Issues Advisory Committee of the Nuclear Energy Institute. In the aftermath of Japan's 2011 earthquake, he was named to the WANO Post-Fukushima Commission and the U.S. nuclear industry's Fukushima response steering committee.

**2017 Board/Committee Membership:**

Board (since November 2013)  
Generation Oversight Committee\* (since February 2016)  
Darlington Refurbishment Committee (since May 2015)

**2017 Attendance**

8 of 8	100%
4 of 4	100%
4 of 4	100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** Duke Energy (NYSE)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

\* Chair of Committee

**Ani Hotoyan-Joly**

Age: 56

Markham, Ontario, Canada

Ani Hotoyan-Joly is a member of the Board of Directors of Women's College Hospital in Toronto. She is a member of the Executive Committee and Chair of the Governance and Nominations Committee. Most recently, Ms. Hotoyan-Joly was a member of the Board of Echelon Financial Holdings Inc. and the Chair of the Governance Committee and a member of the Audit & Risk Committee. She was also a member of the Board of Directors of Insurance Company of Prince Edward Island and Chair of the Audit and Risk Committee. Currently, she is a member of the Executive Board of Armenian Relief Society's Roubina (Toronto) Chapter and was the Past Chair of A.R.S. Armenian Private School's Board of Trustees.

Ms. Hotoyan-Joly is a successful finance executive with over 32 years of business experience in financial services including insurance and reinsurance industries.

Most recently, Ms. Hotoyan-Joly was the Chief Financial Officer and Corporate Secretary of Coventree Inc. Prior to that she was the VP Finance and Chief Financial Officer at Swiss Reinsurance Company Canada (P&C) and prior to that she held senior positions at Zurich Canada.

Ms. Hotoyan-Joly is a Chartered Professional Accountant and Chartered Accountant and holds a Bachelor of Commerce degree from the University of Toronto and the ICD.D designation from the Institute of Corporate Directors. She was elected as a 2016 Diversity 50 Candidate by the Canadian Board Diversity Council.

**2017 Board/Committee Membership:**

Board (since March 2017)

Audit and Risk Committee (since March 2017)

Compensation, Leadership and Governance Committee (since March 2017)

**2017 Attendance**

6 of 6 100%

4 of 4 100%

4 of 4 100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** None**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**Wendy Kei**

Age: 50

Toronto, Ontario, Canada

Ms. Wendy Kei currently serves on the board of directors of Guyana Goldfields, Inc. (TSX; GUY), as the Chairman of the Audit Committee, a member of the Human Resources & Compensation Committee and a member of the Corporate Governance & Nominating Committee. She is an accomplished Finance Executive with over 25 years of business experience in a variety of industries. For the past 14 years, Ms. Kei has been working within the mining industry and brings a strong focus on corporate governance and finance, risk management and a strong expertise in executing complex mergers and acquisitions.

Ms. Kei is a Chartered Accountant (CPA-CA) and previously served as Chief Financial Officer of Dominion Diamond Corporation (formerly Harry Winston Diamond Corporation and Aber Diamond Corporation).

Ms. Kei is a member of the Institute of Chartered Accountants of Ontario, and holds a Bachelor of Mathematics from the University of Waterloo. Ms. Kei was selected as a 2016 Diversity 50 Candidate by the Canadian Board Diversity Council.

**2017 Board/Committee Membership:**

Board (since March 2017)

Audit and Risk Committee (since March 2017)

Generation Oversight Committee (since March 2017)

**2017 Attendance**

6 of 6 100%

4 of 4 100%

3 of 3 100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** Guyana Goldfields Inc. (TSX)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**M. George Lewis**

Age: 57

Toronto, Ontario, Canada

From February 2007 until November 2015, George Lewis was a member of RBC's Group Executive, one of eight executives responsible for setting the overall strategic direction for Royal Bank of Canada, Canada's largest bank. In that capacity, he served as Group Head of RBC Wealth Management from 2007 and RBC Insurance from 2012. As Group Head, Wealth Management, Mr. Lewis led the RBC businesses that serve the wealth management needs of affluent clients globally, and units that provide asset management and trust products. He was also Chairman of RBC Global Asset Management Inc.

From July 2000 to May 2008, Mr. Lewis was Chief Executive Officer of RBC Global Asset Management, which under his leadership became Canada's largest single mutual-fund family (RBC Funds) and one of Canada's largest asset management firms. He previously served as Head of Wealth Management for the Canadian Personal and Business segment and, from 2003 to 2006, was Head of all banking and investment products for RBC's Canadian Business.

From 1998 to 2000, Mr. Lewis was Managing Director, Head of Institutional Equity with RBC Capital Markets, responsible for global institutional-equity sales, trading and research. He was previously a top-rated equity analyst and Director of Research. He began his career with RBC in 1986, in the investment banking division of RBC Capital Markets.

Mr. Lewis has extensive experience in the investment industry, a Masters of Business Administration degree with distinction from Harvard University and a Bachelor of Commerce degree with high distinction from Trinity College at the University of Toronto. He is also a Chartered Financial Analyst and an FCA/FCPA and has been certified by the Institute of Corporate Directors.

Mr. Lewis serves on the board of directors of Enbridge Income Fund Holdings Inc., the Canadian Film Centre and the Anglican Diocese of Toronto Foundation. He is a current member and past chair of the Bishop's Company of the Anglican Diocese of Toronto, as well as a patron and member of the Cabinet of the United Way of Toronto and York Region. Mr. Lewis also serves as the Honorary Colonel Commandant of the Royal Canadian Chaplain Service of the Canadian Armed Forces. Mr. Lewis is also a Fellow in Global Journalism at the Munk School of Global Affairs at the University of Toronto until May, 2018.

**2017 Board/Committee Membership:**

Board (since February 2005)  
Audit and Risk Committee\* (since February 2016)  
Compensation, Leadership and Governance Committee (since February 2016)  
Special Committee\* (since March 2017)

**2017 Attendance:**

8 of 8	100%
5 of 5	100%
5 of 5	100%
15 of 15	100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** Enbridge Income Fund Holdings Inc. (TSX)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

\* Chair of Committee

**Margaret (Peggy) Mulligan**

Age: 59

Cameron, Ontario, Canada

Peggy Mulligan was the Executive Vice President and Chief Financial Officer, Valeant Pharmaceuticals International, Inc. until December 2010. Prior to this, she was a Principal at Priiva Consulting, and before that she served as Executive Vice President and Chief Financial Officer of Linamar Corporation. Prior to Linamar, Mrs. Mulligan was with the Bank of Nova Scotia for eleven years as Executive Vice President, Systems and Operations and Senior Vice President, Audit and Chief Inspector. Before joining Scotiabank, she was an Audit Partner with PricewaterhouseCoopers in Toronto. She holds a B. Math (Honours) from the University of Waterloo and was named a Fellow of the Institute of Chartered Professional Accountants of Ontario in 2003.

**2017 Board/Committee Membership:**

Board (since December 2005)

Compensation and Leadership and Governance Committee\* (since February 2016)

Darlington Refurbishment Committee (since May 2015)

Special Committee (since March 2017)

**2017 Attendance:**

7 of 8 88%

5 of 5 100%

4 of 4 100%

14 of 15 93%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** Canadian Western Bank (TSX), ClearStream Energy Services Inc. (TSX) (previously Tuckamore Capital)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None\* Chair of Committee

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**Yezdi Pavri**

Age: 68

North York, Ontario, Canada

Yezdi Pavri retired as Vice Chairman of Deloitte Canada in June 2012 after a career of more than 30 years. Prior to being named Vice Chairman, Mr. Pavri was a member of the firm's national Management Committee for over ten years and was the Managing Partner of the Toronto practice since June 2004. He founded Deloitte's national Enterprise Risk Services practice in 1990 and led it for 15 years. He was a founding member of the global firm's India Steering Committee and co-chaired the firm's first Diversity and Inclusion Committee.

Mr. Pavri holds a Bachelor's degree in Aeronautical Engineering from the Indian Institute of Technology in Bombay and a Master's degree in Thermal Power Engineering from Imperial College in London. He is a Fellow of the Chartered Professional Accountants of Ontario.

Mr. Pavri currently serves on the boards of ICICI Bank of Canada, Enterra Holdings Limited (the global parent of Golder Associates) and MD Financial Services, and is a past member of the board of directors of Hydro One. Mr. Pavri is also a past Chairmen of the Board of Trustees of United Way Toronto and York Region.

**2017 Board/Committee Membership:**

Board (since September 2015)

Audit and Risk Committee (February 2016)

Compensation, Leadership and Governance Committee (since February 2016)

Special Committee (since March 2017)

**2017 Attendance:**

8 of 8 100%

5 of 5 100%

5 of 5 100%

15 of 15 100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** None**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**Gerry Phillips**

Age: 77

Ajax, Ontario, Canada

Gerry Phillips was the Member of Provincial Parliament in the Legislative Assembly of Ontario for the east Toronto riding of Scarborough-Agincourt from 1987 to 2011. He served in six cabinet portfolios, including twice as Ontario Minister of Energy, where he was OPG's Shareholder from 2007 to 2008 and again on an interim basis from November 2009 to January 2010, as well as, Minister responsible for Securities Regulation in Ontario. He was also the Chair of the Management Board of Cabinet from 2008 to 2011 and the Chair of the Select Committee on the TMX Transaction in 2011.

Before entering public life, Mr. Phillips graduated from the University of Western Ontario's School of Business and worked in the marketing department of Procter and Gamble. In 1970, he joined the consulting firm of Canadian Marketing Associates and became President in 1977. He later founded two successful spin-off companies – the Sales Development Group in 1979 and the Retail Resource Group in 1982. By 1987, he was Chair of all three companies, with a combined workforce of approximately 300.

Mr. Phillips has an Honours B.A. from the Western School of Business.

**2017 Board/Committee Membership:**

Board (since January 2013)

Audit and Risk Committee (since February 2016)

Darlington Refurbishment Committee (since May 2015)

**2017 Attendance:**

8 of 8 100%

5 of 5 100%

4 of 4 100%

**Principal Occupation:** Retired**Board Memberships for other Reporting Issuers:** None**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

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**Jim Reinsch**

Age: 74

Frederick, Maryland, U.S.A.

Jim Reinsch retired from the Bechtel Group where he was Senior Vice President and Partner, and past President of Bechtel Nuclear. In this role, he was responsible for the global profit/loss, customer relations, operations, project management, marketing and business development of Bechtel's three nuclear business segments: nuclear operating plant services, steam generator replacement, and operations of Bechtel's global nuclear activities. During his 40 years with Bechtel, he also presided over Bechtel Canada, and managed large regions in the United States and Asia. He served as the President of the American Nuclear Society, and was a member of the Nuclear Energy Institute as well as a member of their Executive Committee. Mr. Reinsch is also a member of several international nuclear energy organizations, including the WANO and the World Nuclear Association.

Mr. Reinsch holds a Bachelor of Science degree from the University of Maryland.

Mr. Reinsch currently serves on the board of directors for Frederick Memorial Hospital and the Hood College Board of Trustees, and is a past board member of Duke Energy and the Smithsonian National Portrait Gallery. Additionally, he serves on the Emirate Nuclear Energy Corporation's committee on nuclear power which reports to the board of directors, and is a member of the international advisory board of Terrestrial Power.

**2017 Board/Committee Membership:**

Board (since August 2015)

Generation Oversight Committee (since February 2016)

Darlington Refurbishment Committee\* (since August 2015)

**2017 Attendance:**

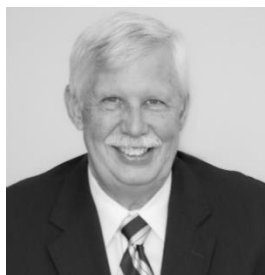
7 of 8 88%

4 of 4 100%

4 of 4 100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** None**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None\*Chair of Committee

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**James Sheppard**

Age: 69

Toronto, Ontario, Canada

Mr. Sheppard was appointed to the OPG Board in March 2017. He currently serves as an Independent Consultant. Mr. Sheppard served as Interim Senior Vice President for Southern California Edison Company and served as its Interim Chief Nuclear Officer from September 2010 to December 9, 2010. From 1993 to 2009, Mr. Sheppard held several senior positions associated with the South Texas Project nuclear power plant, including Chairman, President and Chief Executive Officer of STP Nuclear Operating Company, which operated the facility for its three owners. He served as Executive Officer of South Texas Project Electric Generating Station. He served as an executive at STP for ten years, holding positions of Vice President and Assistant to the President and Chief Executive Officer; Vice President of Engineering and Technical Services; Vice President of Business Systems; Assistant to the executive vice president; and General Manager of Licensing. He has been an Independent Director at Xcel Energy Inc. since March 2011.

Mr. Sheppard holds a Bachelor of Science degree in aerospace engineering from the U.S. Naval Academy and a master's degree in business administration from the Duke University.

**2017 Board/Committee Membership:**

Board (since March 2017)

Darlington Refurbishment Committee (since March 2017)

Generation Oversight Committee (since March 2017)

**2017 Attendance:**

6 of 6 100%

3 of 3 100%

3 of 3 100%

**Principal Occupation:** Corporate Director**Board Memberships for other Reporting Issuers:** Xcel Energy Inc. (NYSE)**Independence from OPG:** Independent**Interlocking Directorships on Boards of other Reporting Issuers:** None

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Nicole Boivin served as a Director from April 2014 to March 2017 and was a member of the Compensation, Leadership and Governance Committee and the Darlington Refurbishment Committee. Brendan Hawley was a Director from April 2014 to March 2017 and was a member of the Audit and Risk Committee and Darlington Refurbishment Committee. Ira Kagan was a Director from April 2014 to March 2017 and served as a member of the Audit and Risk Committee and the Generation Oversight Committee.

## **Orientation and Continuing Education**

The Compensation, Leadership and Governance Committee is responsible for reviewing and recommending appropriate orientation programs for new Directors. New directors are provided relevant documentation relating to OPG's governance practices and policies and to its business. Directors attend plant tours of OPG generating facilities, where they also receive comprehensive introductory briefings from OPG senior executives on OPG's operations and business activities.

The Board supports and sponsors the continuing education of OPG Directors, both in the business of OPG and in their duties as Directors. This includes plant tours of OPG's major facilities, site visits to projects with OPG's Indigenous business partners, and special presentations by internal and external experts on topical business-related issues or on specific aspects of OPG's operations. In 2017, such topics included pension plan governance, Ontario's cap and trade program and OPG's Dam Safety Program. Directors also are provided with articles and publications on current topics of interest. Board members have full access to all Board and Board committee materials and records. OPG has developed a Director Governance Handbook, which provides Directors with information necessary to fulfill their roles, including director duties and obligations under the OBCA, and relevant corporate policies and procedures. OPG also co-sponsors Director attendance at the Institute of Corporate Directors' Director Education Program, or equivalent, and sponsors attendance at the Goizueta Director program for members of Board committees responsible for oversight of nuclear operations.

## **Ethical Business Conduct**

The Board has adopted a policy for ethical business behaviour and a Code of Business Conduct. The mandate of the Audit and Risk Committee requires that it receive regular reports throughout the year on the Code of Business Conduct in order to satisfy itself that appropriate code of conduct and compliance programs are in place and are being enforced, and that remedial action is being taken. The Audit and Risk Committee receives quarterly reports from management on the Code of Business Conduct (including reports on any substantiated cases of fraud) and the disposition of cases including disciplinary action, as well as an annual report on the Code of Business Conduct and a report on the annual review of the Board policy. A copy of the Code of Business Conduct can be found on SEDAR at [www.sedar.com](http://www.sedar.com) and also is available on the Company's website at [www.opg.com](http://www.opg.com). The Audit and Risk Committee has procedures for the receipt, retention and treatment of complaints received pertaining to accounting, internal controls or auditing matters, and for the confidential anonymous submission by employees concerning such matters.

## **Nomination of Directors**

The Compensation, Leadership and Governance Committee, which is comprised of six independent Directors within the meaning of NI 52-110, is responsible for conducting an annual review of the OPG Board's principles and systems of governance, and oversight of annual Board, Board committee and Director evaluations. The Compensation, Leadership and Governance Committee maintains a robust Succession Plan for the orderly rotation of directors to ensure that the Board has the skills, experience and diversity required. The Succession Plan includes the following components: (i) core requirements for a high performing board, (ii) skill sets required by the OPG Board as a whole, (iii) skills profile for the current Board, (iv) tenure map of the current Board, (v) Board diversity target and implementation, (vi) "evergreen list" of potential Board candidates, and (vi) Board succession priorities. The Compensation, Leadership and Governance Committee recommends candidates to the Shareholder. Nominations of Directors by the Shareholder also may be considered by the Compensation, Leadership and Governance Committee. When considering a potential candidate, the committee considers the

qualities, experience, and skills that the Board, as a whole, should have in light of the business opportunities and risks facing OPG. The attributes the Compensation, Leadership and Governance Committee considers in a candidate include integrity, business judgment and experience, diversity, professional expertise, independence from management, financial literacy, and communication skills, as well as sufficient time available to fulfill his or her obligations as a Board member. Further, the Board ensures that a diverse candidate is interviewed for every vacancy on the Board. OPG defines diversity to include: women, aboriginal peoples, people with disabilities, and visible minorities. These four enumerated groups mirror the four enumerated groups in the definition of “designated groups” in the federal *Employment Equity Act*. The Board's diversity targets are set out below under the heading, *Diversity in Leadership*.

From time to time, the Compensation, Leadership and Governance Committee may engage outside advisors to assist in identifying potential candidates.

### **Director Tenure/Board Renewal**

The OPG Board Charter guidelines for board tenure is 10 to 15 years, with appropriate Committee and Committee Chair rotation. When considering board renewal, the Compensation, Leadership and Governance Committee regularly reviews the OPG's Board skills profile. The Board maintains an “evergreen list” of potential Board candidates. From time to time, the committee makes recommendations to add skills to the Board that reflect OPG's business opportunities and risks.

### **Diversity in Leadership**

#### Board of Directors

As noted under the heading, *Nomination of Directors*, the Compensation, Leadership and Governance Committee interviews a diverse candidate for every vacancy on the Board, where diversity is defined as: women, aboriginal peoples, people with disabilities, and visible minorities. The Board set a target for “diverse” representation on the Board of 50 percent, including a target of 40 percent women on the Board by 2019. In 2017, three members were added to the Board, two of whom meet the diversity definition. As of the date of this AIF, overall diversity of the Board is at 50 percent. Representation of women on the Board is 29 percent (four Directors) as of the date of this AIF.

#### Senior Management

OPG strives to create a workforce that reflects diverse populations of the communities in which it operates. As of December 31, 2017, women filled 25 percent of Corporate Officer roles and 26 percent of senior management (senior managers and above) positions. In total, there were three women in Corporate Officer roles and 153 women in senior management positions. OPG tracks and monitors diversity succession planning metrics and strives to have a diverse candidates list for senior management positions.

### **Compensation**

#### Executive Compensation Framework

In September 2016, the Government of Ontario introduced *Regulation 304/16: Executive Compensation Framework*. The regulation sets out how all employers, including OPG, designated under the *Broader Public Sector Executive Compensation Act, 2014* must establish and post compensation programs for executives. The regulation requires all designated employers to have a written Executive Compensation Program that describes the compensation they may provide to executives. The program must include the compensation philosophy, salary and performance-related pay caps, comparative analysis details, and a description of other elements of compensation. OPG met the requirements of *Ontario Regulation 304/16* and, effective January 1, 2017, implemented its Executive Compensation Program. OPG's Executive

Compensation Program applies to employees at the Vice President level and higher. A copy of OPG's Executive Compensation Program is available on the Company's website at [www.opg.com](http://www.opg.com).

#### Director Compensation

As at March 9, 2018, OPG's Director compensation framework provides each Director who is not an employee of OPG with an annual retainer of \$25,000. Directors also receive a \$3,000 retainer for each Board committee of which they are a member. There are four standing committees of the Board and Directors serve on at least two committees. Directors receive an additional retainer for serving as committee chairs. The retainer for the chair of the Audit and Risk Committee is \$8,000. The chairs of the other three committees receive retainers of \$5,000.

In addition to the above, Directors are compensated for each regular and/or special meeting that they attend and receive a fee of \$2,000 or \$1,000 for a long or short meeting, respectively. The Board Chair may also determine that no fee is warranted.

In order to retain national and international expertise, non-resident Directors are compensated in U.S. dollars and Directors who travel over certain distances receive a travel time fee to cover travel related to Board and Board committee meetings they attend.

Since 2004, the Chair of the Board, in his role as non-executive Chair, receives an all-inclusive annual fee of \$150,000 and is reimbursed for out-of-pocket expenses including travel and other expenses.

#### CEO Compensation

Among its other responsibilities, the Compensation, Leadership and Governance Committee oversees, on behalf of the Board, the setting of the CEO's annual goals and objectives and the annual review of CEO performance, and makes recommendations to the Board with respect to CEO compensation. The Committee may seek input from an independent advisor with regard to monitoring and benchmarking compensation trends.

The CEO's base pay and incentives compensation are compliant with *Ontario Regulation 304/16*. Other elements of the CEO's compensation will be compliant within the three-year period provided in the regulation to bring all elements of compensation into compliance.

For details regarding compensation paid to Directors and executive officers during the financial year ended December 31, 2017, see OPG's Statement of Executive Compensation, which is attached to this AIF as Appendix B.

#### **Committees of the Board of Directors**

The following are the current standing Board committees as at March 9, 2018:

##### Audit and Risk Committee

This committee is responsible for the integrity, quality and transparency of OPG's financial information, the adequacy of the financial reporting process, the systems of internal controls, and related principles, policies and procedures established by management. The Committee is responsible for the oversight of the Company's regulatory filings, financial statements, MD&A and press releases prior to their disclosures to the public, including approval of quarterly financial statements and recommending approval of the annual financial statements and various other annual disclosures to the Board. The committee is also responsible for recommending the appointment and compensation of the external auditor to the Board and for oversight of the external auditor.

The committee also provides oversight of OPG's corporate financing strategies including:

- policies related to financial exposure management;
- processes for identifying major financial risks;
- performance of the OPG Pension Fund, the Used Fuel Segregated Fund and the Decommissioning Segregated Fund;
- review and approval of the audited financial statements of the OPG Pension Fund, the Used Fuel Segregated Fund and the Decommissioning Segregated Fund; and
- review and approval of the statements of investment policies and procedures for the OPG Pension Fund and the Decommissioning Segregated Fund.

The Audit and Risk Committee also oversees risk and associated risk management activities, including the review of management's assessment of significant risks to achieving OPG's business plan objectives. The committee also is responsible for ensuring that an effective Code of Business Conduct is in place at OPG and monitors compliance with this code.

As of November 22, 2017, the Audit and Risk Committee assumed oversight responsibilities of OPG's role as Financial Services Manager under the Fair Hydro Act.

As of the date of this AIF, the Audit and Risk Committee consists of George Lewis (Chair), Elisabeth (Lisa) DeMarco, Ani Hotoyan-Joly, Wendy Kei, Yezdi Pavri and Gerry Phillips.

For further details regarding the Audit and Risk Committee, see *Audit and Risk Committee Information*.

#### Compensation, Leadership and Governance Committee

This committee provides oversight of OPG's human resources and compensation policies and practices, including CEO objectives and compensation, disclosure on compensation and human resources matters, leadership talent review, succession planning and collective bargaining negotiations. The committee also provides oversight of the design of OPG's benefit and pension plans.

The Compensation, Leadership and Governance Committee oversees the Board's governance program and practices to ensure that they are consistent with high standards of corporate governance, including annually reviewing and assessing the Board's system of corporate governance with a view to maintaining these high standards. The committee also is responsible for overseeing OPG's reputation management plan, and for identifying and recommending to the Board candidates for nomination to the Shareholder in consideration of the Board's Succession Plan and diversity targets. Finally, the committee oversees OPG's processes for Board, Board committee and Director assessments, as well as Director compensation and new Director orientation.

As of the date of this AIF, the Compensation, Leadership and Governance Committee consists of Margaret (Peggy) Mulligan (Chair), Bill Coley, JP Gladu, Ani Hotoyan-Joly, George Lewis and Yezdi Pavri.

#### Darlington Refurbishment Committee

The Darlington Refurbishment Committee is responsible for the oversight of the execution of the Darlington Refurbishment project, including retaining external independent oversight advisors. The committee was also responsible for making a recommendation to the Board with respect to a final budget and schedule for the Darlington Refurbishment project, which was subsequently approved by the Board of Directors in November 2015. The committee monitors and reports on the progress of the refurbishment program against the approved budget and schedule. The committee is responsible for making recommendations to the Board with respect to the refurbishment of subsequent Darlington units, and other recommendations for approvals related to the refurbishment program as may be required from time to time.

As of the date of this AIF, the Darlington Refurbishment Committee consists of Jim Reinsch (Chair), Bill Coley, John Herron, Margaret (Peggy) Mulligan, Gerry Phillips and James Sheppard.

#### Generation Oversight Committee

This committee is responsible for the oversight of safe, secure and efficient operations of OPG's generating facilities. Additionally, the committee is responsible for the development, risk management, financing and execution of the Company's major generation projects including those related to nuclear waste management but not the Darlington Refurbishment project. The committee also is responsible for the oversight of OPG's environment and dam safety management systems and OPG's Indigenous relations. The committee reviews reports of internal and external advisors/assessors in respect of OPG's generation operations and management's response to the findings from such assessments. The committee provides oversight to ensure that OPG's generating facilities are in compliance with nuclear safety, industrial and occupational health and safety, and environmental laws and regulations.

As of the date of this AIF, the Generation Oversight Committee consists of John Herron (Chair), Bill Coley, Elisabeth (Lisa) DeMarco, JP Gladu, Wendy Kei, Jim Reinsch and James Sheppard.

#### Special Committee of the Board

This Special Committee of the Board was established on March 10, 2017. The Special Committee was responsible for providing timely strategic and other guidance to OPG management in connection with the Province's announcement of Ontario's Fair Hydro Plan on March 2, 2017. The committee was also responsible for making recommendations to the Board with respect to OPG's participation in the Province's implementation of the Fair Hydro Plan. The mandate of the Special Committee concluded on November 22, 2017 when the Audit and Risk Committee assumed oversight of OPG's role as Financial Services Manager under the Fair Hydro Act.

#### **Assessments**

The Compensation, Leadership and Governance Committee is responsible for the annual process for evaluating the performance of the Board, its committees and individual Directors. The Board and committee evaluations are based upon the completion of confidential questionnaires regarding assessment of performance and compliance with the Board and Committee Charters. The individual Director evaluations are based on self-assessment questionnaires, which are submitted in confidence to the Board Chair and the Chair of the Compensation, Leadership and Governance Committee. In addition, the process includes a follow-up one-on-one meeting between each Director and the Board Chair. The Compensation, Leadership and Governance Committee reports the results of the evaluations to the Board and the results are discussed amongst the Board. The Compensation, Leadership and Governance Committee makes recommendations to the Board for enhancing the Board's governance and effectiveness.

#### **Further Information on OPG Governance**

OPG provides additional information on the Company's governance on its website ([www.opg.com](http://www.opg.com)) including:

- Memorandum of Agreement with the Shareholder
- Shareholder Directives
- List of Corporate Officers
- Board and Committee Charters
- Board and Committee Chair Position Descriptions
- Board of Directors Conflict of Interest Policy
- Indigenous Relations Policy
- Code of Business Conduct

- Disclosure Policy
- Environmental Policy
- Employee Health and Safety Policy
- Nuclear Safety Policy
- Safe Operations Policy
- Cyber Security Policy
- Executive Compensation Program

***Unless otherwise specifically stated, none of the information contained on, or connected to the Company's website nor any of the contents of the aforementioned additional information on OPG's governance are incorporated by reference herein.***

## **EXECUTIVE OFFICERS**

The following table sets forth the name, municipality of residence, position with the Company, and the date of commencement for each of the executive officers of the Company as of March 9, 2018:

<b>Name and Municipality of Residence</b>	<b>Current Position Held</b>	<b>Executive Officer Since</b>
Bernard Lord <i>Moncton, New Brunswick</i>	Board Chair	April 2014
Jeff Lyash <i>Toronto, Ontario</i>	President and Chief Executive Officer	August 2015
Carlo Crozzoli <i>Toronto, Ontario</i>	Senior Vice President, Corporate Business Development and Strategy	December 2011
Chris Ginther <i>Newmarket, Ontario</i>	Chief Administrative Officer	July 2012
Ken Hartwick <i>Milton, Ontario</i>	Chief Financial Officer & Senior Vice President – Finance	March 2016
Glenn Jager <i>Clarington, Ontario</i>	President, OPG Nuclear and Chief Nuclear Officer	November 2013
David Kaposi <i>Toronto, Ontario</i>	Vice President, Chief Investment Officer	November 2013
Barb Keenan <i>Toronto, Ontario</i>	Senior Vice President, People & Culture and Chief Ethics Officer	March 2010
Catriona King <i>Richmond Hill, Ontario</i>	Vice President, Corporate Secretary	February 2005
John Lee <i>Toronto, Ontario</i>	Vice President, Treasurer	July 2011
Mike Martelli <i>Etobicoke, Ontario</i>	President, Renewable Generation	July 2013

<b>Name and Municipality of Residence</b>	<b>Current Position Held</b>	<b>Executive Officer Since</b>
Dietmar Reiner <i>Clarington, Ontario</i>	Senior Vice President, Nuclear Projects	June 2014
Jennifer Rowe <i>Toronto, Ontario</i>	Senior Vice President, Corporate Affairs	January 2017

All of the executive officers of the Company have been engaged for more than five years in their current principal occupations, except as set out below:

- Mr. Lyash was Executive Vice President at Duke Energy from May 2008 to January 2012 and President at CB&I Power from July 2013 to July 2015.
- Mr. Crozzoli was Senior Vice President, Corporate Business Development and Chief Risk Officer at OPG from December 2011 to November 2015, Acting Senior Vice President, Finance, Strategy & Risk and Chief Financial Officer at OPG from November 2015 to March 2016 and Senior Vice-President, Corporate Business Development and Chief Risk Officer at OPG from March 2016 to August 2016.
- Mr. Ginther was Senior Vice President, Law and General Counsel and Chief Ethics Officer at OPG from July 2012 to January 2016 and Senior Vice President, Legal, Ethics and Compliance at OPG from January 2016 to February 2017.
- Mr. Hartwick was President and CEO at Just Energy Corp. from February 2008 to April 2014, Interim President and CEO at Atlantic Power Corporation from September 2014 to January 2015, Chief Financial Officer at Wellspring Financial Corporation from February 2015 to March 2016 and Senior Vice President, Finance, Strategy, Risk and Chief Financial Officer at OPG from March 2016 to February 2017.
- Mr. Jager was Senior Vice President, Pickering Nuclear Generating Station at OPG from January 2010 to November 2013 and Chief Nuclear Officer at OPG from November 2014 to March 2015.
- Mr. Kaposi was Global Head of Alternatives for Mercer (Canada) Inc. from November 2007 to June 2012 and Partner, Investor Relations at Bastion Infrastructure Group Inc. from July 2012 to September 2013.
- Ms. Keenan was Senior Vice President, People and Culture at OPG from March 2012 to January 2016 and Senior Vice President, People, Culture and Communications from January 2016 to February 2017.
- Ms. King was Vice President, Corporate Secretary & Executive Operations from May 2012 to March 2017.
- Mr. Martelli was Plant Manager for the Niagara Plant Group at OPG from June 2010 to July 2013, Senior Vice President, Hydro-Thermal Operations at OPG from July 2013 to January 2016 and President, Renewable Generation and Power Marketing from January 2016 to November 2017.
- Mr. Reiner was Senior Vice President, Nuclear Refurbishment at OPG from March 2010 to April 2014.
- Ms. Rowe was Senior Vice President and Chief Marketing Officer at Meridian Credit Union from October 2012 to April 2016.

#### **INDEBTEDNESS OF DIRECTORS AND EXECUTIVE OFFICERS**

As of the date of this AIF, no director or executive officer of the Company or any of its subsidiaries had any outstanding indebtedness to the Company or any of its subsidiaries except routine indebtedness or had any indebtedness that was the subject of a guarantee, support agreement, letter of credit or other similar arrangement or understanding provided by the Company or any of its subsidiaries.

## **CEASE TRADE ORDERS, BANKRUPTCIES, PENALTIES OR SANCTIONS**

To the knowledge of OPG, no director or executive officer is, at the date of the AIF, or was within 10 years before the date of the AIF, a director, chief executive officer, or chief financial officer of any company, that (a) was subject to an order that was issued while the director or executive officer was acting in the capacity as director, chief executive officer, or chief financial officer, or (b) was subject to an order that was issued after the director or executive officer ceased to be a director, chief executive officer or chief financial officer and which resulted from an event that occurred while that person was acting in the capacity as director, chief executive officer, or chief financial officer, except for:

- Ani Hotoyan-Joly was the Chief Financial Officer and Corporate Secretary of Coventree Inc. (Coventree) on November 8, 2011, when the Ontario Securities Commission issued an order that trading in any securities by Coventree cease and any exemptions contained in Ontario securities law do not apply to Coventree until such time as Coventree completes its winding up. The order was made on the basis that Coventree had contravened Ontario securities law by failing to issue and file certain news releases and material change reports in 2007. The events in question occurred before Ms. Hotoyan-Joly became the Chief Financial Officer and Corporate Secretary of Coventree in May 2009. Coventree continues in the process of a court-supervised winding up and the order is still in effect.

To the knowledge of OPG, no director or executive officer of OPG, or a shareholder holding a sufficient number of securities of OPG to affect materially the control of OPG (a) is, as at the date of the AIF, or has been within the 10 years before the date of the AIF, a director or executive officer of any company (including OPG) that, while that person was acting in that capacity, or within a year of that person ceasing to act in that capacity, became bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency or was subject to or instituted any proceedings, arrangement or compromise with creditors or had a receiver, receiver manager or trustee appointed to hold its assets; or (b) has, within the 10 years before the date of the AIF, become bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency, or become subject to or instituted any proceedings, arrangement or compromise with creditors, or had a receiver, receiver manager, or trustee appointed to hold the assets of the director, executive officer, or shareholder, except for:

- Bernard Lord was a director of AEA Technology from the fall of 2010 until the fall of 2012 when it became insolvent.
- Ani Hotoyan-Joly has been the Chief Financial Officer and Corporate Secretary of Coventree since May 2009. On February 15, 2012, Coventree announced that the winding up of the company would commence and that Duff & Phelpe Canada Restructuring Inc. (now known as KSV Advisory Inc.) was appointed as the liquidator of the company for the purpose of winding up its affairs. Coventree is continuing the process of court-supervised winding up.
- Peggy Mulligan was a director of MethylGene Inc. from May 2012 to June 2014. On May 9, 2013, MethylGene announced a plan of arrangement that was successfully completed on June 28, 2013.
- Bernard Lord was a director of Clean Air Power during September 2015 while it was subject to liquidation proceedings under the laws of Bermuda. Mr. Lord is no longer a director of Clean Air Power.
- William Coley was a director of Peabody Energy Corporation which declared voluntary Chapter 11 bankruptcy protection in April 2016 for most of its U.S. entities and is currently restructuring. As of April 13, 2017, Mr. Coley is no longer a director of the entity.

## **AUDIT AND RISK COMMITTEE INFORMATION**

NI 52-110 has been implemented by Canadian securities regulatory authorities to encourage reporting issuers to establish and maintain strong, effective, and independent audit committees, to enhance the quality of financial disclosure, and to foster increased investor confidence in Canada's capital markets. The Audit and Risk Committee's Charter is attached to this AIF as Appendix A. Information on OPG's Audit and Risk Committee is as follows:

## Composition of the Audit and Risk Committee

As at March 9, 2018, the members of the Audit and Risk Committee were George Lewis (Chair), Elisabeth (Lisa) DeMarco, Ani Hotoyan-Joly, Wendy Kei, Yezdi Pavri and Gerry Phillips. All members are independent within the meaning of NI 52-110 and have experience in business and financial matters. Each member has an understanding of internal controls and procedures for financial reporting. As part of OPG's Continuing Education Program for Directors, Audit and Risk Committee members are provided with access to both internal and external educational resources, including seminars and courses, in order to maintain or enhance their financial literacy.

## Activities of the Audit and Risk Committee

The Chartered Professional Accountants of Canada (CPA Canada) and the Canadian Public Accountability Board have recommended that audit committees perform a comprehensive review of the external audit firm at least once every five years. CPA Canada issued guidelines in early 2014 to assist audit committees in implementing these recommendations. The Audit and Finance Committee of the Board conducted its first comprehensive review of the Company's external auditor, Ernst & Young LLP (EY) in 2014, for the period from 2009 to 2013, using the guidelines and format recommended by CPA Canada. EY has been OPG's external auditor since the Company's inception in 1999. EY provides audit and audit related services to OPG, including the audit of OPG's annual consolidated financial statements, reviews of OPG's quarterly financial statements, and audits of the financial statements of OPG's consolidated subsidiaries and other financial information.

In conducting the 2017 review of EY's performance, the Audit and Risk Committee considered input from management, EY, and OPG's internal audit function. The Committee performed this review taking into consideration the information submitted by these parties, as well as their individual experience. The results of the 2017 annual review were discussed at the Audit and Risk Committee meeting in August 2017. As part of the review, the Committee considered factors such as the auditor's independence, engagement team quality including the Committee's involvement in the selection of EY's lead engagement partner, and communication effectiveness between EY and OPG. Upon completion of the review, the Committee was satisfied with the performance of EY, concluded that their reappointment was in the best interests of OPG, and, in November 2017, recommended that the Board reappoint EY as the Company's auditor for the 2018 fiscal year. The Board reappointed EY as the Company's auditor for the 2018 fiscal year in November 2017.

## External Auditor Service Fees

The following fees were accrued by OPG in connection with services rendered by EY:

<i>(thousands of dollars)</i>	<b>2017</b>	<b>2016</b>
Audit fees	<b>2,008</b>	1,959
Audit-related fees	<b>1,068</b>	554
All other fees	<b>17</b>	17

## INTEREST OF MANAGEMENT AND OTHERS IN MATERIAL TRANSACTIONS

### Relationship with the Province and the OEFC

#### Relationship with the Shareholder

As a corporation created under and governed by the OBCA, OPG's management is supervised by its Board of Directors, which is obligated by law to act in the best interests of the Company. The Company's

sole Shareholder, the Province, owns all of the Company's issued and outstanding common shares and thereby has the power to determine the composition of the Company's Board of Directors.

As one of several wholly-owned government business enterprises of the Province, OPG has transactions in the normal course of business with various government ministries and organizations in Ontario that fall under the purview of the Province.

#### Memorandum of Agreement

On August 17, 2005, OPG entered into the MOA with the Shareholder regarding OPG's role and responsibility as a power producer in Ontario. In July 2015, the MOA was revised. The MOA serves as the basis of agreement between OPG and the Shareholder regarding OPG's mandate, governance, performance, reporting and communications, and establishes the accountabilities between OPG and the Province. OPG's strategic imperatives are based on the Company's mandate as set out in the MOA. The MOA was reaffirmed for continuance by both the Ontario Minister of Energy and the OPG Board of Directors' Chair in the fourth quarter of 2016, as required by the MOA following a change in the Minister of Energy.

A copy of the MOA can be found on the Company's website at [www.opg.com](http://www.opg.com). ***Unless otherwise specifically stated, none of the information contained on, or connected to the Company's website nor any of the contents of the MOA are incorporated by reference herein.***

#### Shareholder Directives

The Shareholder may at times direct OPG to undertake special initiatives. A Shareholder directive is issued when the Shareholder finds it necessary to assume decision-making power and authority over certain aspects of the business operations of the Corporation. Under a Shareholder directive, the Shareholder assumes all the rights, powers, duties and liabilities of the Directors to manage or supervise the management of the business and the Directors are relieved of their duties and liabilities. Shareholder directives are communicated as written pursuant to section 108 of the OBCA. Copies of each Shareholder directive can be found on the Company's website at [www.opg.com](http://www.opg.com). ***Unless otherwise specifically stated, none of the information contained on, or connected to the Company's website nor any of the contents of the Shareholder directives are incorporated by reference herein.*** The Shareholder directives issued by the Shareholder to date are listed below in reverse chronological order:

- Sale of the Corporation's Lakeview site (June 9, 2016);
- Sale of the Corporation's Head Office (December 14, 2015);
- Bruce Power L.P. Lease Agreement and Used Fuel Agreement (November 30, 2015) – For further details, see *General Development of Business – Nuclear Business Development – Bruce Power Refurbishment and Bruce Lease Agreement*;
- Bruce Power L.P. Amended and Restated Heavy Water and Associated Services Agreement (November 30, 2015) – For further details, see *General Development of Business – Nuclear Business Development – Bruce Power Refurbishment and Bruce Lease Agreement*;
- Conversion of One Unit of Thunder Bay Generating Station to Advanced Biomass (May 1, 2014);
- Thunder Bay Generating Station Conversion (December 16, 2013);
- Early Closure of Ontario Power Generation's Lambton and Nanticoke Coal-Fired Generation Stations (March 7, 2013);
- First Nation Directive (April 1, 2011) – OPG was directed to pay a part of the Shareholder's portion of the settlement liability with a First Nation on its behalf;
- Atikokan Generating Station Conversion (March 8, 2011);
- Addressing Carbon Dioxide Emissions from the Use of Coal at Coal-Fired Generating Stations (May 20, 2010);

- Request for Indicative Prices for the Supply of Wood Pellet Fuel Declaration (Atikokan) (March 18, 2010);
- Request for Expressions of Interest for Supply and Transportation of Solid Biomass Fuel Declaration (January 13, 2009);
- Addressing Carbon Dioxide Emissions from the Use of Coal at Coal-Fired Generating Stations (May 15, 2008);
- Thunder Bay Gas Conversion Cancellation (July 12, 2006);
- Nuclear Directive (June 16, 2006) – OPG was directed to begin feasibility studies on refurbishing existing nuclear units, an environmental assessment on refurbishing Pickering B units, and federal approvals processes (including environmental assessment) for new nuclear units;
- Lower Mattagami River Agreement (May 23, 2006);
- Bruce Power Lease Agreement (October 14, 2005); and
- Thunder Bay Gas Conversion Declaration (October 6, 2005).

#### Ontario Nuclear Funds Agreement

The ONFA between OPG and the Province sets out the responsibility for funding the obligations for the decommissioning of OPG's nuclear facilities and the long-term management of OPG's used nuclear fuel and other nuclear waste. Pursuant to the ONFA, the Company has established a Used Fuel Segregated Fund and a Decommissioning Segregated Fund to fund the future costs of these activities. Additional details can be found in the section, *Description of the Business* under the heading, *Regulated – Nuclear Waste Management Segment – Funding Mechanisms*.

#### OPG Debt Held by the OEFC

OPG's long-term debt has been financed predominantly by the OEFC. As at December 31, 2017, the OEFC held approximately \$3.2 billion of OPG's long-term debt with maturities ranging from one month to 30 years. For additional details, see Note 6 to the Company's audited annual financial statements as at and for the year ended December 31, 2017.

#### Payments-In-Lieu of Corporate Income Taxes and Property Taxes

OPG and its wholly-owned subsidiaries are exempt from tax under the *Income Tax Act* (Canada) and *Taxation Act, 2007* (Ontario). However, under the *Electricity Act, 1998*, OPG is required to make proxy tax payments to the OEFC. These payments are calculated in accordance with the *Income Tax Act* (Canada) and the *Taxation Act, 2007* (Ontario), as modified by the *Electricity Act, 1998* and related regulations. This results in OPG paying taxes similar to those imposed under the federal and Ontario tax acts.

OPG is subject to income tax audits by the Ontario Ministry of Finance. As of the date of this AIF, income tax audits up to and including the 2013 taxation year have been completed.

The *Electricity Act, 1998* also provides that OPG and certain of its subsidiaries are required to make payments in lieu of property tax to the OEFC on their non-hydroelectric generating station buildings and structures. These payments generally equal the difference between property taxes that would be otherwise payable if these assets were privately owned, and the amount payable to municipalities in respect of these assets as determined under the *Assessment Act, 1990* (Ontario). As with other hydroelectric generators in Ontario, OPG's hydroelectric generation operations are not subject to payments in lieu of property taxes because they are subject to the GRC regime. Additional details on the GRC regime can be found in the section, *Description of the Business* under the heading, *Generation Operations – Hydroelectric (Regulated – Hydroelectric and Contracted Generation Portfolio segments)*.

## **LEGAL PROCEEDINGS AND REGULATORY ACTIONS**

### **Legal Proceedings**

OPG is potentially the subject of various legal proceedings and claims that arise in the ordinary course of business. The outcome of these proceedings and claims is uncertain. Based on information available as of the date of this AIF, management believes that none of the proceedings and claims, individually and in the aggregate, are expected to have a material impact on OPG.

#### **British Energy Claim**

On August 9, 2006, a Notice of Action and Statement of Claim filed with the Ontario Superior Court of Justice in the amount of \$500 million was served against OPG and Bruce Power by British Energy Limited and British Energy International Holdings Limited (together British Energy). The action is for contribution and indemnity of any amounts British Energy was liable for in an arbitration against it by some of the owners of Bruce Power regarding an alleged breach of British Energy's representations and warranties to the claimants when they purchased British Energy's interest in Bruce Power (the Arbitration). Both the action and the Arbitration relate to corrosion to a steam generator unit discovered after OPG leased the Bruce nuclear generating stations to Bruce Power.

In 2012, the arbitrator found that British Energy was liable to the claimants for some of the damages they claimed. The final settlement amount was valued by British Energy at \$71 million. In September 2014, British Energy amended its Statement of Claim (Amended Claim) to reduce the claim amount to \$100 million to reflect that the purchasers of British Energy's interest in Bruce Power did not receive the full damages they originally claimed in the Arbitration. British Energy also added an allegation to its Amended Claim that OPG breached a covenant to maintain the steam generator between the time of the initial agreement to lease and the effective date of the lease in accordance with "Good Utility Practices".

In November 2016, British Energy obtained consent to a timetable for the remaining steps in the litigation, pursuant to which the matter must be set down for trial by December 31, 2018. OPG has delivered a statement of defence in accordance with an extension of the original June 30, 2017 delivery deadline set out in the timetable.

### **Regulatory Actions**

OPG is not aware of any penalties or sanctions imposed by a court or securities regulatory authority or other regulatory body against the Company, nor has the Company entered into any settlement agreements before a court or with a securities regulatory authority.

## **MATERIAL CONTRACTS**

Except for contracts entered into in the ordinary course of business (unless otherwise required by applicable securities requirements to be disclosed), there were no material contracts entered into by the Company or its subsidiaries during the most recently completed financial year, or before the most recently completed financial year that are still in effect.

## **INTERESTS OF EXPERTS**

The external auditor of the Company is Ernst & Young LLP, Chartered Professional Accountants, located at 100 Adelaide Street West, P.O. Box 1, Toronto, Ontario M5H 0B3. Ernst & Young LLP has been the Company's auditor since OPG was formed in 1999, and is independent in accordance with the Rules of Professional Conduct of the Chartered Professional Accountants of Ontario.

## GLOSSARY

Adaptive Phased Management	Canada's plan for the long-term management for nuclear fuel waste, whereby nuclear fuel waste would be permanently placed in a deep geologic repository at a suitable geological site.
ancillary service	a service necessary to maintain the reliability of the IESO-controlled grid.
availability	when used in reference to a generating unit, a measure of mechanical reliability represented by the percentage of time a generating unit is capable of providing service, whether or not it is actually in-service, relative to the total time for the period.
baseload facilities	electricity generation facilities that produce a constant supply of energy.
bilateral contract	a contract for the purchase and sale of notional electricity usually entered into directly between a generator and an end-user, or between a generator or end-user and a market intermediary.
biomass	plant material from agricultural and forest sources that can be used to produce energy, including beneficiated biomass, which includes torrefied, carbonized, and steam exploded biomass.
black start capability	generator's ability to help restore the province's power system without relying on an external supply of electricity.
CANDU	an acronym for CANada Deuterium Uranium, a family of nuclear fission reactors developed in Canada which use pressurized heavy water coolant (deuterium oxide) as a moderating agent and natural uranium (uranium dioxide) as fuel.
capacity factor	the ratio (usually specified as a percentage) of the amount of energy that a generating asset actually generated over a period of time divided by the amount of energy that the generating asset would have produced over the same period of time if it had operated continuously at full capacity.
CNSC	Canadian Nuclear Safety Commission
decommissioning	actions taken in the interest of health, safety, security and protection of the environment to retire a facility permanently from service and render it to a predetermined end-state condition.
deep geologic repository	network of underground tunnels and placement rooms for used nuclear fuel containers. It is designed to safely contain and isolate Canada's used nuclear fuel over the long term.
detritiation	the removal of tritium from heavy water.
deuterium oxide	see heavy water.
distributed generation	production of electricity closer to end users and away from large scale production facilities that require more transmission.
equivalent forced outage rate	the hours of unit failure given as a percentage of the total hours of the availability of that unit.

energy supply agreement	agreement between IESO and an electricity generator covering the generation of electricity and/or electricity services, including capacity and ancillary services.
global adjustment	includes the difference between Ontario's electricity market clearing price used to dispatch generation and the prices paid to contracted and regulated generators in the province, and the cost of conservation and demand management programs.
government business enterprises	Government organizations that are separate legal entities with the power to contract in their own name, have the financial and operating authority to carry on a business, are principally focused on the selling of goods and services to individuals and non-government organizations, and are able to maintain their operations and meet their obligations through revenues generated outside the government reporting entity.
gross revenue charge	taxes and charges levied on hydroelectric generating stations in Ontario as prescribed by <i>Ontario Regulation 124/02</i> under the <i>Electricity Act, 1998</i> .
heavy water (deuterium oxide)	water containing significantly more than the natural proportion of heavy hydrogen (deuterium) atoms to ordinary hydrogen atoms, used as a moderator in CANDU reactors.
IESO	Independent Electricity System Operator
in-service capacity	the portion of installed capacity (the highest level of output which a generating unit is designed to maintain indefinitely without damage to the unit) that has not been removed from service.
interconnection	a transmission line which carries power across the service area boundary of geographically adjacent jurisdictions.
intermediate facilities	electricity generation facilities that are needed for intermediate load requirements to meet demand during peak hours of the day, adjusting output as consumer demand moves up and down.
intervenor	individuals or groups who have the OEB's permission to actively participate in a public hearing about a utility's application.
kWh	a kilowatt hour, the commercial unit of electric energy (the amount of electricity consumed by ten 100 watt light bulbs burning for one hour).
load	the quantity of electricity consumption measured as either the energy consumed over a given period of time or the rate of energy consumption at a given time by a particular customer or group of customers.
memorandum of understanding	an agreement between two or more parties outlining the terms and details of an understanding, including each parties' requirements and responsibilities.
microsievert	a measure of radiation exposure by an individual.
MW	a megawatt, equal to 1,000,000 watts or 1,000 kilowatts.
MWh	a megawatt hour, equal to 1,000 kWh.
OEB	Ontario Energy Board

OEFC	an acronym for the Ontario Electricity Financial Corporation, the legal continuation of the former Ontario Hydro. The OEFC is responsible for managing the debt and certain other obligations not transferred to other successor companies of Ontario Hydro.
ONFA	an acronym for the Ontario Nuclear Funds Agreement between OPG and the Province that sets out the responsibility for funding the liabilities for the decommissioning of OPG's nuclear stations and the long-term management of OPG's used nuclear fuel and other nuclear waste.
Ontario NFWA Trust	a trust established by OPG pursuant to the <i>Nuclear Fuel Waste Act</i> (Canada) for the purpose of funding the implementation of Canada's long-term nuclear fuel waste management plan.
operating reserve	the capacity that can be called upon on short notice by the IESO to replace scheduled energy supply that is unavailable as a result of an unexpected outage or to augment scheduled energy as a result of unexpected demand or other contingencies.
peaking facilities	electricity generation facilities that generally run only when there is a high demand for electricity.
prescribed facilities	OPG's electricity generating stations the output of which receives regulated prices determined by the OEB. OPG's prescribed facilities are the Pickering and Darlington nuclear generating stations and 54 hydroelectric generating stations located across a number of major river systems in the province.
rate rider	an amount which is added to or subtracted from the base regulated rate to recover or refund a specific amount of money for a temporary period.
reactive support	the control and maintenance of prescribed voltages on the IESO-controlled grid.
refurbishment	the work needed to extend the life of a reactor unit by replacing the major life-limiting components (such as pressure tubes, steam generators, etc).
regulation service	regulation service acts to balance total electricity system generation with total electricity system load demand (plus transmission losses) on a minute-by-minute or second-by-second basis, and acts to help correct variations in power system frequency. This service corrects for short-term changes in electricity use that might affect the stability of the power system.
Shareholder	the sole shareholder of OPG, the Province of Ontario.
surplus baseload generation	a condition that occurs when electricity generation from baseload facilities is greater than the electricity market demand.
tritium	a radioactive substance that is created within CANDU reactors as a result of heavy water in the reactor moderator and heat transport systems.
TWh	a terawatt hour, equal to 1,000,000 MWh.
unit	an electrical generator, together with its driving turbine and auxiliary equipment.

unit capability factor	amount of energy a generating unit is capable of producing as a percentage of its maximum output assuming no external constraints such as transmission limitations.
watt	a scientific unit of electric power representing the rate of work of one joule per second.

## **APPENDIX A**

### **ONTARIO POWER GENERATION INC. AUDIT AND RISK COMMITTEE CHARTER**

## **Audit and Risk Committee Charter**

### **Purpose**

The function and purpose of the Audit and Risk Committee is to assist the Board of Directors in their responsibility for oversight of matters relating to:

1. the integrity of OPG's financial statements and reporting, including with respect to OPG's role as Financial Services Manager of the Fair Hydro Trust
2. the integrity and adequacy of internal controls and standards of Codes of Conduct and ethics
3. the performance of OPG's internal audit function
4. the performance and independence of OPG's external auditors
5. business and financial planning
6. the performance of OPG's pension, nuclear decommissioning, and used fuel investment funds
7. OPG's Enterprise Risk Management
8. assessment of committee performance and board policies.

Management is responsible for the preparation, presentation and integrity of OPG's interim and annual financial statements and related disclosure documents. Management is responsible for maintaining appropriate accounting and financial reporting principles and policies and systems of internal and disclosure controls and procedures to comply with accounting standards and applicable laws and regulations which provide reasonable assurance that the assets of the Company are safeguarded and transactions are authorized, executed, recorded and properly reported.

Management is also responsible for the identification, assessment, monitoring, and management of the risks to achieving OPG's strategic and business plan objectives and the development and implementation of policies and procedures to respond to such risks.

The Committee's role is to provide oversight that ensures the Company's assets are protected and safeguarded within reasonable business limits and report such to the Board.

### **Committee Responsibilities and Duties**

The Committee shall perform the duties set out in this Charter and shall perform such other duties as may be necessary or appropriate under applicable law or securities rules, or as may be delegated to the Committee by the Board from time to time.

#### **1. The integrity of OPG's financial statements and reporting**

The Committee reviews and makes recommendations to the Board with respect to:

- a) appointment or replacement of the Chief Financial Officer.
- b) OPG's annual financial statements and external audit report, including financial statements, MD&A, related footnotes and any documentation required by the Securities Act to be prepared and filed by OPG or that OPG otherwise files with securities regulators.
- c) OPG's Annual Information Form, if required, prior to filing with securities regulators.

The Committee reviews and approves:

- d) OPG's quarterly financial statements and interim financial information and disclosures in the Management Discussion and Analysis (MD&A) and earnings press release, prior to filing.

In carrying out its responsibilities for oversight of the integrity of OPG's financial statements and reporting the Committee will include in its review:

- e) adequacy of procedures in place for the review of OPG's public disclosure of financial information extracted or derived from OPG's financial statements.
- f) the adequacy of OPG's role as Financial Services Manager of the Fair Hydro Trust, including in relation to the Management Oversight Committee (MOC) Charter and the continuing sufficiency of the MOC Charter as reviewed by the Committee from time to time.
- g) significant accounting principles and reporting issues and impact on the financial statements, including complex or unusual transactions, highly judgmental areas, major issues regarding or changes to OPG's selection/application of accounting principles, financial presentations, the effect of regulatory and accounting initiatives, as well as off-balance sheet arrangements on OPG's financial statements.
- h) analysis prepared by Management and/or the external auditor detailing financial reporting issues and judgments made in connection with the preparation of financial information, including analysis of the effects of alternative generally accepted accounting principles methods.
- i) whether any other matters related to conduct have come to the Committee's attention that causes it to believe that the financial statements contain an untrue statement of material fact or omit to state a necessary material fact.

## **2. Integrity and adequacy of Internal Controls and standards of Codes of Conduct and ethics**

In carrying out its responsibilities for the integrity and adequacy of internal controls, including compliance with legal and regulatory requirements and standards of codes of conduct and ethics, the Committee reviews:

- a) legal, tax, or regulatory matters that may have a material impact on OPG's operations and the financial statements, including, but not limited to, violations of securities law or breaches of fiduciary duty.
- b) the scope of review of internal control over financial reporting, significant findings, recommendations and Management's responses for implementation of actions to correct weaknesses in internal controls.
- c) disclosures made by the Chief Executive Officer and Chief Financial Officer during the certification process regarding significant deficiencies in the design or operation of internal controls or any fraud that involves Management or other employees who have a significant role in OPG's internal controls.
- d) procedures for the receipt, recording and treatment of complaints received by OPG regarding accounting, internal accounting controls, or auditing matters, and procedures for the confidential and anonymous submission by OPG employees of concerns regarding accounting or auditing matters.
- e) expenses of the Board Chair, Board of Directors, President/CEO and the President/CEO's direct reports on an annual basis, and of any other senior officers and employees the Committee considers appropriate.
- f) reports from the Chief Ethics Officer on independent reviews and investigations of fraud allegations, matters that may involve fraud and/or Codes of Conduct violations and compliance.

### **3. Performance of OPG's internal audit function**

The Committee reviews and makes recommendations to the Board with respect to:

- a) appointment or replacement of the Chief Risk and Audit Executive.

The Committee reviews and approves:

- b) the annual internal audit plan and all major changes to the plan, including the organizational structure, budget and the adequacy of resources.
- c) the charter of the internal audit function triennially.

In carrying out its responsibilities for the performance of OPG's internal audit function the Committee reviews:

- d) results of Internal audit reports, including: significant findings, the adequacy of the control processes, Management's response and the timetable for implementation of Management actions to correct weaknesses, any difficulties encountered in the course of their work (such as restrictions on the scope of their work or access to information).
- e) Internal Audit's confirmation of organizational independence and disclosure of any conflict of interest.
- f) Internal Audit performance relative to the annual internal audit plan.

### **4. Performance and Independence of External Auditor**

The Committee reviews and makes recommendations to the Board with respect to:

- a) the external auditor to be annually appointed on behalf of the Shareholder and related compensation, including results of a cyclical performance review, and a comprehensive review of the external audit firm at least once every five years.

The Committee reviews and approves:

- b) pre-approval of additional audit services and fees to be provided by the external auditors if such services are required further to the annual compensation approved by the Board. The Committee may delegate such pre-approval authority to the Committee Chair up to a limit of \$250,000. Any decisions of the Committee Chair to whom pre-approval authority is delegated must be presented to the full Audit and Risk Committee at its next scheduled meeting.

In carrying out its responsibilities for the performance and independence of OPG's external audit function the Committee reviews:

- c) the work and report of the external auditor engaged for the purpose of preparing or issuing an auditor's report or performing other audit, review or attest services for OPG, including the resolution of disagreements between Management and the external auditor regarding financial reporting.
- d) the independence and qualifications of the external auditor.
- e) the annual report by the external auditor describing the auditing firm's internal quality control procedures, any material issues raised by the most recent internal quality-control review or peer

review of the auditing firm or by any inquiry or investigation by governmental or professional authorities within the preceding five years respecting one or more independent audits carried out by the external auditor and any steps taken to deal with any such issues and all relationships between the external auditors and OPG.

- f) scope and approach of the annual audit plan with the external auditors.
- g) quality and acceptability of OPG's accounting principles including all critical accounting policies and practices used, any alternative treatments that have been discussed with Management as well as any other material communications with Management.
- h) external auditor's process for identifying and responding to key audit and internal control risks.
- i) rotation of the lead audit partner and other audit partners every seven years, and consider regular rotation of the audit firm.
- j) all related-party transactions.
- k) OPG's hiring policies regarding partners, employees and former partners and employees of the present and former external auditor of OPG.

## **5. Business and Financial Planning**

The Committee reviews and makes recommendations to the Board on:

- a) OPG's business plan, including overall financing plan in support of the Company's capital expenditures and medium – long term forecast.
- b) OPG's rate applications to the Ontario Energy Board, including proposed payment amounts and any agreement arising from a Settlement Conference with intervenors.
- c) corporate financing vehicles, credit facilities, including any plans to access capital debt markets and other related financing activities. The Board may delegate to an officer of the company authority to enter into such financing activities in such a manner as the Board shall determine at the time of such delegation. Any decisions of the officer to whom authority is delegated must be presented to the full Audit and Risk Committee at its next scheduled meeting.

## **6. Pension, Nuclear Decommissioning and Used Fuel Investment Funds**

The Committee reviews and makes recommendations to the Board on:

- a) the appointment or replacement of the Chief Investment Officer.
- b) the appointment of the auditor for the OPG Pension Fund and the Used Fuel Segregated Fund and Decommissioning Segregated Fund.
- c) the broad objectives, governance frameworks and risk posture for the OPG Pension Fund and the Used Fuel Segregated Fund and Decommissioning Segregated Fund and annual status report on these Funds.
- d) the tri-ennial valuation of the Pension Fund and annual valuation of the Supplementary Employee Retirement Pension Plans. *(The Committee provides advice to the Compensation, Leadership and Governance Committee on the affordability of proposed pension benefit changes.)*

The Committee reviews and approves:

- e) the appointment of the members of OPG's Pension Committee. In addition, the Committee may, at any time, remove or replace any member of the Pension Committee or fill a vacancy on the Pension Committee. The Pension Committee Chair may temporarily appoint a senior management employee to fill a vacancy on the Pension Committee until the next regularly scheduled Audit and Risk Committee meeting.
- f) the annual audited financial statements for the OPG Pension Fund, the Used Fuel Segregated Fund and the Decommissioning Segregated Fund.
- g) the investment policies and procedures, including the design of modifications, for the OPG Pension Fund, as required by the Ontario Pension Benefits Act and its regulations, and for the Decommissioning Segregated Funds, as required by the Ontario Nuclear Funds Agreement.
- h) the appointment of the Pension Plan actuary.

In carrying out its responsibilities for the oversight of financial planning and investment funds the Committee reviews:

- i) reports on a quarterly, annual or by exception basis, on compliance with and appropriateness of the asset mix policy; total fund and asset class returns relative to benchmarks; material compliance with breaches of policies or procedures; and work conducted by the plan actuary.
- j) periodic reports on the calculation of OPG's nuclear waste liability.

## **7. OPG's Enterprise Risk Management**

The Committee reviews and makes recommendations to the Board on:

- a) the appointment or replacement of the Chief Risk and Audit Executive.
- b) the Company's enterprise risk policy, framework, overall risk appetite and targets.

In carrying out its responsibilities for oversight of OPG's Enterprise Risk Management the Committee reviews:

- c) the processes employed by Management for identifying and assessing the Company's principal risks.
- d) periodic reports on Management's assessment of the principal risks to achieving the Company's strategic and business plan objectives, and the strategies for monitoring, managing and responding to those risks.
- e) periodic reports on significant emerging and evolving risks and relevant external events that could potentially impact OPG's risk profile.
- f) compliance metrics related to OPG's commercial operations trading, treasury, and fuels management.
- g) regular reports on OPG's cyber security position and programs.
- h) periodic reports on OPG's Insurance Program.

## **8. Assessment of committee performance and board policies**

In carrying out its responsibilities for assessment of committee performance and board policies the Committee shall:

- a) review and assess Committee performance, including a review of the adequacy of and its compliance with this Charter, in accordance with the evaluation process approved by the Board and taking into account all legislative and regulatory requirements applicable to the Committee as well as any best practice guidelines recommended by regulators with whom OPG has a reporting relationship.
- b) provide oversight of the implementation of the following Board of Directors' policies, and review these policies at least annually (or as otherwise noted below) to ensure their continuing adequacy:
  - i. Delegation and Exercise of Authority Policy
  - ii. Disclosure Policy
  - iii. Code of Business Conduct and Supplier Code of Conduct, including anti-bribery and corruption
  - iv. Enterprise Risk Management Policy (*reviewed every three years*)
  - v. Cyber Security Policy
- c) provide oversight of the development of any new policies deemed necessary by the Committee.

### **Organization**

#### **Members**

The Audit and Risk Committee shall consist of three or more Directors as determined by the Board of Directors. All members of the Committee shall be independent as defined by the Ontario Securities Commission, and not "affiliated" with OPG.

The Board shall appoint the members of the Committee and the Chair of the Committee annually. The Board may appoint a member to fill a vacancy which occurs in the Committee between annual elections of Directors. Any member of the Committee may be removed or replaced at any time by the Board.

If a member of the Committee becomes "affiliated" with OPG, the member may continue as a member of the Committee with the approval of the Board Chair, in consultation with the Corporate Secretary.

As a "venture issuer", OPG is exempt from the statutory requirements of National Instrument 52-110 requiring members of Audit Committees be independent and financially literate. However, OPG considers such independence and financial literacy to be "best practice" and therefore each of the members of the Audit and Risk Committee shall satisfy the applicable independence and financial literacy requirements of the laws and regulations governing Audit Committees.

The Board of Directors shall confirm that each member of the Audit and Risk Committee is financially literate; as such qualification is interpreted by the Board of Directors in its business judgment, and in compliance with National Instrument 52-110 and its Companion Policy.

#### **Meetings**

The Committee shall meet as frequently as it determines but not less than quarterly. During quarterly meetings, the Committee will hold separate in camera sessions with the external auditors, the Chief Internal Audit Executive, the Chief Risk Officer and Management to discuss any matters that the Committee believes should be discussed and to provide a forum for any relevant issues to be raised.

Notice of the time and place of each meeting of the Committee must be given to each member of the Committee not less than 48 hours before the time of the meeting.

A quorum of the Committee shall be a majority of its members, but not less than two. The powers of the Committee may be exercised at a meeting at which a quorum of the Committee is present in person or by telephone or other electronic means, or by a resolution signed by all members entitled to vote on that resolution at a meeting of the Committee. Each member is entitled to one vote in Committee proceedings.

The Chair shall preside at all meetings of the Committee at which he or she is present (or if not able to be present designate another member of the Committee to chair the meeting) and shall develop the agenda for each Committee meeting. The agenda for each meeting of the committee shall be delivered to each member of the Committee at least 48 hours prior to any meeting of the Committee, together with such other materials as the chair determines necessary.

Minutes shall be kept of all meetings of the Committee and shall be maintained by OPG's Corporate Secretary. The procedure at meetings is to be determined by the Committee unless otherwise determined by the by-laws of OPG, by a resolution of the Board or by this Charter.

The Committee may meet in camera (without management present) at any time during the meeting consistent with the Board guideline on the conduct of in camera sessions and the keeping of minutes from in camera sessions.

The Committee may invite any Director, officer or employee of OPG or OPG's counsel or any other person to attend meetings of the Committee to assist in the discussion and examination of the matters under consideration by the Committee.

### **Reports**

The Committee will report its activities and actions to the Board of Directors with recommendations, as the Committee deems appropriate.

The Committee will provide for inclusion in OPG's financial information or regulatory filings any report from the Audit and Risk Committee required by applicable laws and regulations and stating among other things whether the Committee has:

- (i) reviewed and discussed the audited financial statements with Management.
- (ii) discussed pertinent matters with the internal and external auditors.
- (iii) received disclosures from the external auditors regarding the auditors' independence and discussed with the auditors their independence.
- (iv) recommended to the Board of Directors that the audited financial statements be included in OPG's Annual Report.

### **Authority**

The Audit and Risk Committee shall have the authority to:

- a) conduct or authorize investigations into any matters within the Committee's scope of responsibilities.
- b) set and pay the compensation for any advisors employed by the Committee.
- c) to communicate directly with the internal and external auditors.

While the Audit and Risk Committee has the responsibilities and powers set forth in this Charter, it is not the duty of the Audit and Risk Committee to plan or conduct audits or risk assessments, or to determine that OPG's financial statements and disclosures are complete and accurate and are in accordance with

generally accepted accounting principles and applicable rules and regulations. These are the responsibility of Management and, as appropriate, the external auditor.

#### Delegation of Authority

The Committee may not delegate its oversight responsibilities. The Committee may delegate to a sub-committee, the Chief Executive Officer or any employee of OPG the authority to exercise any right, power or responsibility that the Committee may have on such terms and conditions and within such limits as the Committee deems appropriate provided that the sub-committee, Chief Executive Officer or employee subsequently advises the Committee of any right, power or responsibility so exercised.

#### Access to Management and Outside Advisors

The Audit and Risk Committee shall have unrestricted access to members of Management and relevant information.

The Audit and Risk Committee has the authority to retain legal counsel, accountants or other advisors to assist it in the conduct of any investigation, as it determines necessary to carry out its duties.

## Form 51-102F6

### Statement of Executive Compensation

(with respect to financial year ended on December 31, 2017)

#### Ontario Power Generation Inc.

### Compensation Discussion and Analysis

#### Executive Summary

This Compensation Discussion and Analysis describes the material elements of the compensation paid to the named executive officers (“NEOs”) of Ontario Power Generation Inc. (OPG). When we refer to the NEOs in this Compensation Discussion and Analysis, we are referring to the following individuals as a group:

Position	Name	OPG Title
Chief Executive Officer	Jeffrey Lyash	President & Chief Executive Officer
Chief Financial Officer	Kenneth Hartwick	Chief Financial Officer and Senior Vice President Finance
	Glenn Jager	Nuclear President and Chief Nuclear Officer
Next three most highly compensated executive officer	Dietmar Reiner	Senior Vice President Nuclear Projects
	Mike Martelli	President Renewable Generation

OPG’s compensation program for the NEOs includes both fixed and variable (i.e. pay-at-risk) components and is designed to provide total target compensation at the 50th percentile of the labour market within which we compete for talent (the “comparator group”). An overview of our philosophy and approach related to executive officer compensation is provided, followed by an analysis of the resulting compensation paid to each NEO during 2017 under “Summary Compensation Table”.

OPG’s compensation program for executive officers is also governed by legislation enacted by the Province of Ontario, OPG’s sole shareholder. This legislation has established compensation restraints and controls that affect Executive Officer compensation and other non-unionized employees.

#### Compensation Governance

The OPG Board of Directors (Board) follows compensation best practices and government requirements. There is a six-member Compensation Leadership and Governance Committee (CLGC). As of December 31, 2017, the members of the CLGC were Peggy Mulligan (Chair), , Bill Coley, JP Gladu, Ani Hotoyan-Joly, George Lewis, and Yezdi Pavri, all of whom are independent directors. Each of the members has direct or indirect experience that is relevant to their responsibilities in executive compensation. The members include individuals who were senior executives from large organizations. The skills and experience of the members include salary administration and oversight, executive compensation experience, and responsibility for compensation matters.

Additional information on CLGC membership and the annual performance evaluation for Board members can be found in OPG’s 2017 Annual Information Form and Analysis in the “Corporate Governance” section.

The CLGC meets a minimum of four times a year. Each meeting is presided by a Chair of the Committee, and minutes of the meetings are kept. Time is allotted at each meeting for the members to meet in camera without

management present. The CLGC reports on the proceedings of each meeting to the Board of Directors at the next Board meeting. When the Committee reaches a position on a subject, they will make a recommendation to the full Board for approval as needed and required.

The CLGC is responsible for overseeing all significant compensation matters including:

- Reviewing compensation structures, decisions and payouts (base salary, pay-at-risk incentive, etc.), and ensuring a strong link between pay and performance.
- Reviewing annually and approving the changes, as appropriate, to OPG compensation, including compensation principles and objectives for total compensation, desired competitive positioning and comparator groups.
- Ensuring that compensation programs and performance measures in the Corporate Balanced Scorecard appropriately reflect the corporation's approach to risk management.
- Ensuring that executive compensation levels and performance targets are consistent with the Board's compensation philosophy and aligned with and designed to achieve OPG's strategic and operating objectives.
- Overseeing senior executive pay, as it relates to corporate governance and legislation, including total compensation, individual contract provisions in senior executive employment offers, severance agreements.
- Overseeing succession planning for the CEO and senior executives.

### ***Compensation Related Fees***

The CLGC independently engaged Hugessen Consulting to provide support to the Committee in reviewing compensation matters. Decisions made by the CLGC, however, are the responsibility of the CLGC and may reflect factors and considerations other than the information and recommendations provided by Hugessen Consulting.

Hugessen Consulting has been engaged by the CLGC since 2013 to provide research and advice on compensation and benefits design and benchmarking, executive compensation including pay-at-risk incentive plans, and pension plans and policies. The aggregate fees for Hugessen Consulting for services provided to the CLGC in 2017 were \$ 8,818.82. This work continues into 2018.

In addition, OPG management engaged a number of consulting firms, including Willis Towers Watson, Hay Group and Aon-Hewitt to provide a variety of pension, benchmarking, compensation and competitive market reviews and recommendations for all levels of employees.

### ***Compensation Risk Assessment***

OPG conducts an annual review of its executive compensation framework to ensure an appropriate level of risk and reward is maintained, including minimizing opportunities for excessive risk taking. Annually the Board reviews and approves the MTIP Performance Plan, SRP Corporate Scorecard and CEO strategic objectives which ensures appropriate risk mitigation.

### ***Objectives of Executive Compensation***

OPG's compensation philosophy guides the development of all compensation elements and is a key consideration in the development of OPG's Executive Compensation Program (the "program"). The Philosophy is intended to ensure that OPG is able to attract, retain and motivate key talent in a manner that complies with the Regulation, is competitive and affordable, and aligns with OPG's business strategy.

OPG's compensation philosophy is comprised of five key principles:

- Drive organization results with a performance orientation that aligns with OPG's business strategy and risk tolerance, while taking into consideration affordability, market competitiveness as well as the context and environment in which OPG operates.
- Demonstrate fiscal conservatism through sustainability, sound financial management and defensibility while supporting the attraction and retention of top talent.
- Have a strong performance orientation linked to OPG's value creation and results while allowing individual compensation to be meaningfully differentiated based on performance, where appropriate.
- Recognize OPG's role as a significant Ontario employer; encourage long-term employment and development, a culture of trust and respect and a seamless integration with talent and succession management objectives.
- Be simple to understand and administer, sustainable and scalable; communicated in a way that is integrated with messages about other monetary and non-monetary rewards such that the perceived value of all programs meet or exceed program costs.

### **Comparator Group**

OPG seeks to offer a competitive total compensation package. In order to ensure that the NEOs are competitively compensated, OPG periodically reviews and benchmarks total compensation against the 50th percentile of the compensation provided by appropriate comparator groups. Comparator groups are established based on a mix of private and public sector organizations which are similar in size, scope and complexity, reflecting organizations from which OPG attracts and loses talent to. In order to tailor the external market comparisons effectively for each specific labour market, OPG categorizes its roles into three segments: Utilities (Nuclear and Non-Nuclear), Authorized Nuclear and General Industry, as described below.

Segment	Definition
<b>Utilities</b>	<ul style="list-style-type: none"> <li>• Requires specific education and in-depth knowledge in a unique discipline related to the theories, principles and methods associated with the generation, regulation or trading of energy. The requirement to apply this professional body of knowledge represents a significant portion of the job.</li> </ul>
<b>Nuclear Authorized</b>	<ul style="list-style-type: none"> <li>• Requires specific education and in-depth knowledge in a unique discipline related to the theories, principles and methods associated with the generation, regulation or trading of <i>nuclear</i> energy. The requirement to apply this professional body of knowledge represents a significant portion of the job.</li> </ul>
<b>General Industry</b>	<ul style="list-style-type: none"> <li>• Roles that do not meet the Utilities and Nuclear segment definition criteria.</li> <li>• These roles may require formal education and/or in-depth knowledge of a professional body of knowledge; however, this body of knowledge is not specific to energy generation.</li> <li>• Previous industry experience may support faster <i>contextual understanding</i>; however this can be learned "on the job".</li> </ul>

To establish the appropriate organizations against which to benchmark OPG positions in each of these segments, OPG formed selection criteria which mirror the selection criteria set out in the Regulation:

- The scope of responsibilities of the organization's executives
- The type of operations the organization engages in
- The Industries within which the organization competes for executives
- The size of the organization
- The location of the organization

## ***Components of OPG's Executive Compensation Program***

The components of the executive compensation program in which the NEOs participated during 2017 are described in the section that follows. Additional details about how decisions are made with respect to base salary and pay-at-risk incentives are provided in "Elements of Cash Compensation". Information on elements of a new pay at risk program introduced in January 2017 is also included.

Compensation Element	Type	Comments
Base Salary	Fixed	The base salary provides a competitive level of fixed compensation that reflects the market value of the position and recognizes the skills and experience the NEO brings to OPG.
Short Term Incentives (pay-at-risk)	Variable	All the NEOs participate in a short-term pay-at-risk incentive plan intended to deliver a portion of total compensation on a pay-at-risk basis. The NEOs can earn short-term cash pay-at-risk amounts if key OPG financial and operational objectives and individual performance measures are achieved.
Medium Term Incentives (pay-at-risk)	Variable	Currently all the NEOs except the CEO participate in a new medium term pay-at-risk incentive plan intended to deliver a portion of total compensation on a pay-at-risk basis. The NEOs can earn medium term cash pay-at-risk amounts if key OPG financial and operation objectives are achieved over a 3 year period.
Pension	Fixed	The pension plans in place are designed to provide retirement income to the NEOs based on their income and length of service to OPG.
Benefits	Fixed	The NEOs participate in health, dental & group life insurance benefit programs available to other management employees and also receive an annual non-pensionable executive allowance.

## ***Elements of Cash Compensation***

In September 2016, under the *Broader Public Sector Executive Compensation Act, 2014* the Ontario Government introduced *Regulation 304-16* Executive Compensation Framework. While the Province released 2 separate amendments, *Regulation 187/17* and *Regulation 400/17* in June and November 2017 respectively, OPG's Executive Compensation Program has been grandfathered under the original regulatory requirements.

- Regulation 304-16: Required all designated organizations, including OPG, to develop an Executive Compensation Framework by September 2017 and outlined a methodology and requirements for developing the framework. The Regulation established caps on cash compensation, parameters for providing base pay increases, restrictions and prohibitions on certain elements of cash compensation and required a 30 day period of public consultation prior to implementing. OPG developed an Executive Compensation Program (ECP) in compliance with the Regulation and posted it on our public facing web site for public consultation on November 30, 2016. Following the 30 day consultation period all comments received were dispositioned and the program was implemented effective January 1, 2017. The impacts of the new Executive Compensation program on each element of cash compensation are outlined in the following section.

### **Base Salary**

The CLGC establishes salary ranges for all non-unionized (Management Group) employees including NEOs. The OPG salary structure is very detailed and rigorously maintained with base salaries defined by job responsibilities and salary ranges defined for each job level. When reviewing executive salaries and pay-at-risk incentives, the CLGC consults its external compensation advisors to obtain information on the executive compensation market including external benchmarks. Under the new executive compensation program, effective January 1, 2017, NEO's are eligible for individual merit increases, based on their performance and placement within their salary band.

### Short-Term Incentives (pay-at-risk)

OPG's short term pay-at-risk incentive program (SRP) is intended to motivate and reward employees to achieve results that will benefit the people of Ontario, our largest stakeholder. This program provides compensation on a pay-at-risk basis if key financial and operational objectives of the Corporation and individual are met. Corporate objectives must be met in order for the pay-at-risk incentive amounts to be paid. In the event that corporate objectives are not met, the pay-at-risk incentive program will not be funded. The CEO and leadership team develop a proposed Corporate scorecard at the beginning of each year, outlining the expectations for performance. The corporate scorecard is reviewed by the CLGC and approved by the Board. The CLGC and the Board have the latitude to adjust the recommended amounts under the plan.

The CEO's pay-at-risk incentive amount is approved by the Board of Directors; 70% is based on the achievement of corporate scorecard results and 30% on achievement of strategic initiatives.

For the remaining NEOs, the amount of their annual pay-at-risk incentive under the program is determined by the following formula: base salary x individual performance rating (based on CEO's assessment of their individual results and performance) x corporate score.

The corporate scorecard results are used to set the envelope of SRP funds available for payout. An adjustment factor is used, if necessary, to ensure the total of individual pay-at-risk amounts does not exceed the available SRP funds.

The target level of pay-at-risk incentive opportunity varies according to position level. Individual scorecards are set at the beginning of the year describing performance expectations. Individual scorecards are based on expected performance in areas such as safety; environment and reliability; financial performance; operating performance; and project performance. The CEO's performance rating is approved by the Board. Individual performance ratings for other NEOs are approved by the CEO.

The new ECP implemented effective January 1, 2017 has no impact on NEO SRP.

### Medium-Term Incentives (pay-at-risk)

The pay-at-risk Medium-Term Incentive Plan (MTIP) is a component of OPG's Board approved Executive Compensation Program (ECP) effective January 1, 2017. The first three year cycle pay-out is expected in Q1 in 2019.

It is specifically designed to recognize the role Executives play in developing and delivering strategic objectives by providing cash pay-at-risk linked to achievement of OPG's medium term business targets. As a cornerstone of the ECP, MTIP helps ensure OPG has a market-competitive and sustainable compensation plan to help attract and retain top talent at executive levels. MTIP augments the SRP's focus on short-term, individual, performance with a focus on longer term, collective performance.

Each NEO's MTIP pay-at-risk is based on OPG's performance against goals over a three-year performance period. The individual's pay-at-risk opportunity is calculated based on the NEO's target, established at the beginning of the 3-year cycle, multiplied by OPG's performance against up to three key corporate performance measures adjusted by the Board's informed judgement. MTIP performance measures align with the longer term strategic objectives of the organization and focus on financial and operational criteria, for example Return on Equity (ROE), Total Generation Cost (TGC), and key project milestones.

The pay-at-risk cash awards are paid following assessment of performance at the end of the 3-year performance cycle. The first performance cycle closes at the end of 2018 with pay-at-risk, if any, paid early in 2019. The first performance cycle incorporates assessment of 2016 performance.

The table below shows the NEOs' SRP and MTIP pay-at-risk target opportunities as a percentage of base salary as determined by benchmarking:

Name	SRP Pay-At-Risk Target Opportunity (% of base salary)	MTIP Pay-At-Risk Target Opportunity (% of base salary)
J. Lyash	100%	N/A <sup>1</sup>
K. Hartwick	45%	25%
G. Jager	45%	70%
D. Reiner	45%	60%
M. Martelli	45%	55%

<sup>1</sup> Mr. Lyash does not currently participate in MTIP

The actual pay-at-risk amount paid can vary from those shown above, depending on whether performance met threshold levels or achieved exceptional performance. If individual or corporate performance is below threshold, no pay-at-risk incentives are paid. These target amounts were derived based on benchmark analysis for each of the positions.

Pay-at-risk amounts are determined by assessing performance as follows:

- The SRP pay at risk is based on the annual Corporate Scorecard which is communicated to all employees each year. Each measure has pre-set goals for threshold, target, and maximum performance. The targets are set carefully each year and are designed to align with OPG's business plan and meeting commitments made to the Province of Ontario, OPG's sole shareholder. Improvements on the previous year's performance are also factored in where possible. The measures are selected to support OPG's strategic and operational priorities. Performance is assessed from both a quantitative and qualitative perspective using measures related to financial and operating performance (including safety) and project-specific milestones. The Board approves the targets and measures and the corporate performance score at the end of the year based on the numerical data and the recommendation of the CEO.
- MTIP measures and targets for each 3-year cycle is communicated to each eligible employee at the beginning of the year which includes information on the individual's incentive target opportunity, the measures, and participation requirements. Each measure has pre-set goals for threshold, target, and maximum performance. The targets are set carefully each year for the coming 3-year performance cycle. The measures are selected to support OPG's longer term strategic and operational priorities. The Board approves the targets and measures. At the end of the 3-year performance cycle, the Board approves the corporate performance score based on the numerical data, the recommendation of the CEO and informed judgement of the Board.

**Short Term Incentive (SRP)** The structure of the annual scorecard is based on a predetermined scale of Threshold/Business Plan/Stretch targets and given a weighting. At year end, actual results are scored and given appropriate weighting to determine the final Corporate Score. The aggregate corporate SRP score for 2017 is 1.19 as summarized on the following table:

Corporate 2017 Balanced Scorecard - Final					Final Year-end Results		
Weight	Key Performance Indicators	Threshold (0.5)	Bus Plan (1.0)	Stretch (1.5)	Actual YE Results	Score <sup>1</sup>	Weighted
10%	Social Licence - Through building and maintaining public trust, positive indigenous relations and an engaged workforce						
10%	All Injury rate (AIR)	0.49	0.37	0.31	0.48	0.54	0.100
	Safety focus areas: o Continuing to develop and implement materials, initiatives and model behaviours that will progress and imbed the iCare Enough to Act for Safety culture o Enhance field oversight to monitor compliance to our safety initiatives and programs including contractors, with a focus on the Darlington Refurbishment Project o Continue to advance the Total Health culture in OPG through the implementation and execution of initiatives that will promote employee attendance, mental health and the adoption of healthy behaviours and lifestyles	CEO assessed at target: The organization made significant safety culture improvements. The iCare, attendance management, mental health, and wellness programs were implemented with high levels of employee engagement. Field oversight was strengthened and High MRPH events and LTI and were reduced. Nuclear and Darlington Refurbishment safety performance were excellent. The leadership team managed challenging issues with no adverse reputation impact, and ended the year with stronger Social License			1.5	1.46	
	No significant events that impact OPG’s reputation						
35%	Financial Strength - Through regulated asset revenue and expansion of our core business, risk management, commercial focus and financial flexibility						
20%	EBT, excl. nuclear waste management segment (\$M)	675	875	1075	1296	1.50	0.300
15%	Operating OM&A Expenses – Total OPG (\$M)	2675	2550	2425	2474	1.30	0.196
15%	Operational Excellence - Through efficiencies and optimized asset management in a safe and environmentally responsible manner						
15%	Production – Total OPG adjusted for SBG (TWh)	70.3	72.4	74.6	78.1	1.50	0.225
40%	Project Excellence - Through delivering project results on time and on budget and industry leading project management						
10%	Refurbishment Project Cost – 2017 actual expenditures (\$M) as a percentage of approved 2017 budget	100%	97.5%	95%	120% <sup>2</sup>	0.00	0.00
5%	Refurbishment Unit 2 Critical Path Execution – Commencement of Feeder cabinet removal (Milestone #A1012)	5-Aug-17	26-Jul-17	28-Jun-17	22-Jun-17	1.50	0.075
10%	Refurbishment Unit 2 Critical Path Execution - Progress of critical path on December 31, 2017	All Bellows Severed (Milestone #A1127)	50% of End Fittings Removed (Milestone #A1056)	400 Pressure Tubes Removed (Milestone #A1058)	45% of End Fittings Removed <sup>2</sup>	0.95	0.095
5%	Pump Generating Station In-Service and within budget	1-Jun-17	1-Apr-17	1-Mar-17	4-Feb-17	1.50	0.075
5%	Peter Sutherland Sr. Generating Station - Both units In-service and within budget	19-Oct-17	30-Jun-17	30-Apr-17	31-Mar-17	1.50	0.075
5%	Total In-service Capital - not including major projects otherwise on scorecard (DRP, PSS and PGS)	\$578 +/- 10% to +/- 15%	\$578 +/- 3% to +/- 10%	\$578 to +/- 3%	625 (+8%)	1.00	0.050
100%							1.19

<sup>1</sup> Note scores may not add due to rounding

<sup>2</sup> Overall project is tracking on budget and on schedule

### ***Material Terms of Employment Agreements and Arrangements with Named Executive Officers***

The following is a summary of the material terms of the employment agreements for the NEOs. For further information regarding the NEO's pension benefits and other post-employment compensation, see "Pension Benefits" and "Termination and Change in Control Payments".

#### ***Mr. Lyash***

OPG entered into a five-year employment agreement with Mr. Lyash, commencing August 4, 2015, as President & Chief Executive Officer. Mr. Lyash is provided with a \$24,000 annual executive (non-pensionable) allowance. The current terms of Mr. Lyash's contract are compliant with Regulation 304-16. Elements would become non-compliant if unchanged at the end of the 3-year compliance window. These elements are under review and adjustments will be made to ensure compliance within the compliance window. Mr. Lyash participates in the Short Term (SRP) pay-at-risk program. Mr. Lyash participates in the OPG registered and supplemental pension plans.

#### ***Mr. Hartwick***

Mr. Hartwick joined OPG as CFO and SVP Finance, Strategy & Risk on March 14, 2016. Mr. Hartwick is also provided with a \$20,000 annual executive (non-pensionable) allowance. The annual executive allowance will cease as of December 31, 2018. Mr. Hartwick participates in the SRP, MTIP and OPG registered and supplemental pension plans.

#### ***Mr. Jager***

Mr. Jager was appointed as Nuclear President and Chief Nuclear Officer on April 1, 2015. He is provided with a \$20,000 annual executive (non-pensionable) allowance. Mr. Jager is also eligible for an at-risk incentive amount of \$150,000, payable after March 31, 2018 provided established criteria are met. The annual executive allowance will cease as of December 31, 2018. Mr. Jager participates in the SRP, MTIP and OPG registered and supplemental pension plans.

#### ***Mr. Reiner***

Mr. Reiner was appointed as Senior Vice President Nuclear Projects on June 2, 2014. He is provided with a \$20,000 annual executive (non-pensionable) allowance. Mr. Reiner is also eligible for an at-risk incentive amount of \$100,000 payable after March 31, 2018 provided established criteria are met. The annual executive allowance will cease as of December 31, 2018. Mr. Reiner participates in the SRP, MTIP and OPG registered and supplemental pension plans.

#### ***Mr. Martelli***

Mr. Martelli was appointed President Renewable Generation and Power Marketing on January 1, 2016. He is provided with a \$20,000 annual executive (non-pensionable) allowance. The annual allowance will cease as of December 31, 2018. Mr. Martelli participates in the SRP, MTIP and OPG registered and supplemental pension plans.

## Summary Compensation Table

The following table summarizes the compensation paid by OPG to the Chief Executive Officer, Chief Financial Officer and to each of the other NEOs, for the three years ended December 31, 2017.

The information provided in the Summary Compensation Table below differs from that published under the *Public Sector Salary Disclosure Act, 1996* (Ontario) for the year ended December 31, 2017. The differences are due to the timing of payment of pay-at-risk incentive amounts. Salary disclosure under the *Public Sector Salary Disclosure Act, 1996* (Ontario) is limited to amounts reported on T4 forms for each year. Information in the Summary Compensation Table is based on the year the pay-at-risk incentive was earned. Under OPG's pay-at-risk program, incentives are generally earned in one year and paid in the following year.

## Summary Compensation

Name and Title	Year	Salary (\$)	Non-Equity Incentive Compensation (pay-at-risk) (\$)	Pension Value (\$)	All Other Compensation (\$)	Total Compensation (\$)
J. Lyash President & Chief Executive Officer	2017	\$775,000	\$947,825	\$421,000	\$30,864	\$2,174,689
	2016	\$775,000	\$755,459	\$460,000	\$38,138	\$2,028,597
	2015	\$319,841	\$352,564	\$230,000	\$470,119	\$1,372,524
K. Hartwick CFO and SVP Finance	2017	\$385,000	\$257,938	\$172,000	\$24,618	\$839,556
	2016	\$308,278	\$130,164	\$130,000	\$119,678	\$688,121
G. Jager Nuclear President and Chief Nuclear Officer	2017	\$577,500	\$340,175	\$337,000	\$53,620	\$1,308,295
	2016	\$550,000	\$232,279	\$299,000	\$51,102	\$1,132,381
	2015	\$525,000	\$236,401	\$947,000	\$46,095	\$1,754,496
M. Martelli President Renewable Generation	2017	\$379,600	\$223,603	\$169,000	\$61,446	\$833,649
	2016	\$365,000	\$154,149	\$800,000	\$57,951	\$1,377,100
	2015	\$295,000	\$132,750	\$(10,000)	\$51,329	\$469,079
D. Reiner SVP Nuclear Projects	2017	\$383,250	\$225,752	\$212,000	\$58,557	\$879,559
	2016	\$365,000	\$169,564	\$(16,000)	\$54,887	\$573,451
	2015	\$365,000	\$180,675	\$439,000	\$53,488	\$1,021,854

### Notes:

Mr. Lyash was appointed August 4, 2015 and received a \$450k signing bonus as per the terms of his employment contract (captured in 2015 All Other Compensation).

Mr. Hartwick was appointed March 13, 2016 and received a \$100K transitional bonus as per the terms of his employment contract (captured in 2016 All Other Compensation).

Mr. Jager was promoted to Nuclear President and Chief Nuclear Officer April 2015.

Mr. Martelli was promoted to President Renewable Generation Jan 1, 2016.

Mr. Reiner was appointed to his current role as SVP Nuclear Projects on September 1, 2016.

## Pension Benefits

The table below shows the following information for each NEO participating in OPG's defined benefit pension arrangements:

- Years of credited service as at December 31, 2017;
- Estimated annual benefit accrued, or earned, for service up to December 31, 2017 and up to the age of 65; and
- A reconciliation of the accrued obligation from December 31, 2015 to December 31, 2017.

Name	Number of years credited service at December 31, 2017 (#)	Annual benefits payable (\$)		Opening present value of defined benefit obligation (\$)	Compensatory change (\$)	Non-compensatory change (\$)	Closing present value of defined benefit obligation (\$)
		At December 31, 2017	At Age 65				
J. Lyash	2.4	\$60,000	\$270,000	\$780,000	\$421,000	\$479,000	\$1,680,000
K. Hartwick	1.8	\$20,000	\$110,000	\$150,000	\$172,000	\$138,000	\$460,000
G. Jager	36.1	\$410,000	\$470,000	\$8,700,000	\$337,000	\$763,000	\$9,800,000
M. Martelli	32.6	\$230,000	\$280,000	\$5,240,000	\$169,000	\$621,000	\$6,030,000
D. Reiner	31.3	\$240,000	\$290,000	\$5,190,000	\$212,000	\$518,000	\$5,920,000

### Notes:

#### Compensatory elements (things earned by the employee)

Compensatory changes are changes to the pension liabilities due to the impact of an additional year of service (always a positive change) that is attributable to OPG (i.e. net of member contributions) as well as the impact of any pay increases on the employee's total pension benefit for all service to date.

#### Non-compensatory elements include (changes in plan assumptions):

Non-Compensatory changes are changes to the Plan liabilities due to interest on the beginning of year liability, changes in assumptions (e.g. the discount rate), member contributions during the year, and the impact of any other non-pay related if different from assumed. Change in discount rate (decrease from 3.90% to 3.57% results in increase in liability)

Lump sum election assumptions (10% for retirement eligible and 50% for non-retirement eligible)

New assumption for Provision for Promotion and Merit (PPM) increases (see December 31, 2017 accounting report)

New retirement scale (non ESPS members) for years 2025-2028 (see December 31, 2017 accounting report)

Member contributions

Non-pay related experience such as termination payment/retirement pension commencement

Interest on obligation

OPG provides pension benefits to its employees through two pension arrangements: The Ontario Power Generation Inc. Pension Plan (the “Registered Plan”) and the Ontario Power Generation Inc. Supplementary Pension Plan (the “Supplementary Plan”). Details of these plans are provided in the table below:

	<b>Registered Plan</b>	<b>Supplementary Plan</b>
<b>Type of Plan</b>	Contributory defined benefit pension plan registered under the <i>Income Tax Act</i> (Canada) and the <i>Pension Benefits Act</i> (Ontario).  Pensions earned for service after 1992 are subject to limits under the Income Tax Act (Canada).	Provides benefits to those employees whose entire benefit could not be provided through the Registered Plan as a result of the limits under the <i>Income Tax Act</i> (Canada). Members of the Supplementary Plan earn benefits under one of three schedules: Supplementary Payment Schedule (“SPS”), Executive Supplementary Payment Schedule (“ESPS”) and the Designated Supplementary Payment Schedule (“DSPS”).
<b>Annual Pension Benefit</b>	2.0% of final average earnings less 0.5% of final average earnings up to the average of the Year’s Maximum Pensionable Earnings	Same as Registered Plan
<b>Bridge Benefit</b>	Temporary bridging pension is provided to age 65	Same as Registered Plan
<b>Indexing</b>	Fully indexed to CPI, to a maximum increase of 8% per annum.	SPS - Same as Registered Plan ESPS - Benefits are indexed at 50% of CPI (to a maximum of 4% per annum)
<b>What’s included in Pensionable Earnings?</b>	Base salary plus pay-at-risk incentive amounts (limited to 5% of base pay)	SPS - Same as Registered Plan ESPS - Base salary plus pay-at-risk incentive amounts (limited to target level)
<b>When eligible for an Unreduced Pension?</b>	Age plus continuous service equals 84 (if hired pre-June 30, 2014)  Age plus continuous service equals 90 (if hired post-June 30, 2014)  Effective Jan 1, 2025 age plus continuous service equals 90	SPS - Same as Registered Plan ESPS - Age equals 60

As at December 31, 2017, the NEOs participated in the following pension arrangements:

<b>Executive</b>	<b>Employment Agreement</b>
J. Lyash	Mr. Lyash participates in the Registered Plan and the ESPS provision of the Supplementary Plan.
K. Hartwick	Mr. Hartwick participates in the Registered Plan and the ESPS provision of the Supplementary Plan.
G. Jager	Mr. Jager participates in the Registered Plan and the SPS provision of the Supplementary Plan.
D. Reiner	Mr. Reiner participates in the Registered Plan and the SPS provision of the Supplementary Plan.
M. Martelli	Mr. Martelli participates in the Registered Plan and the SPS provision of the Supplementary Plan

### ***Termination and Change in Control Payments***

Based on the terms and conditions of the employment agreements of each of the NEOs, the following summarizes entitlements upon certain termination scenarios, and the potential or actual payments which each NEO would be eligible for in the event of termination without cause as at December 31, 2017.

<b>Executive Name &amp; Job Title</b>	<b>Employment Agreement</b>	<b>Total Payment (\$)</b>
<b>J. Lyash</b> President & Chief Executive Officer	Provides that upon termination without cause, his severance shall be a lump sum payment of two (2) times his total cash remuneration (i.e. his then current base salary and target short term incentive/pay-at-risk amounts).  Provides for moving expenses to relocate back to the United States up to \$50,000 USD, as he was recruited from the United States. These elements of Mr. Lyash's employment agreement will be brought into compliance with Reg 304-16 before end of compliance window (end of 2019)	\$1,550,000 Base + \$1,550,000 STI + \$50,000 Moving = \$3,150,000
<b>K. Hartwick</b> CFO and SVP Finance, Strategy and Risk	Provides that upon termination without cause, his severance shall be equivalent to 12 months base salary payable on a continuance basis, benefits will be maintained during the period other than short and long term disability benefits which will cease at the end of applicable statutory period	\$385,000 Base
<b>G. Jager</b> Nuclear President and Chief Nuclear Officer	The employment contract does not contain any specific termination clauses.	None
<b>M. Martelli</b> President Renewable Generation and Power Marketing	The employment contract does not contain any specific termination clauses.	None
<b>D. Reiner</b>	The employment contract does not contain any specific termination clauses.	None

## Director Compensation

The table below captures the fees and other compensation provided to OPG's Board of Directors. Amounts are shown in Canadian dollars unless otherwise specified.

Name	OPG Board Fees (\$)	Notes
Bernard Lord	\$150,000	Board Chair
Nicole Boivin	\$18,750	Not re-appointed
Bill Coley <sup>1</sup>	\$118,500	Non-resident director
Elisabeth (Lisa) DeMarco	\$79,000	
JP Gladu	\$60,000	
Brendan Hawley	\$16,750	Not re-appointed
John Herron <sup>1</sup>	\$89,500	Non-resident director
Ani Hotoyan-Joly	\$48,250	
Wendy Kei	\$49,250	
Ira Kagan	\$14,750	Not re-appointed
George Lewis	\$90,531	
Peggy Mulligan	\$94,000	
Yezdi Pavri	\$79,000	
Gerry Phillips	\$78,000	
Jim Reinsch <sup>1</sup>	\$99,500	Non-resident director
James Sheppard <sup>1</sup>	\$69,250	Non-resident director

<sup>1</sup> Non-resident directors are compensated in US dollars in order to retain national and international expertise. When compensating non-resident Directors, the Canadian dollar amounts are converted to US dollars at the prevailing rate of exchange on the date of payment.

Note: Table has been modified from prescribed format. OPG does not provide Directors with share-based awards, option-based awards, non-equity incentive plan compensation or a pension.

The total fees are contingent upon the number of committees the Director sits on, if they are a Chair of a Committee, and the number of meetings they attend.

Each director who was not an employee of OPG received:

- \$25,000 annual Board retainer
- \$3,000 annual retainer for each Committee membership
- Committee chairs received an annual retainer of \$5,000, except for the Chair of the Audit and Risk Committee received an annual retainer of \$8,000
- \$2,000 for a long meeting attended, or \$1,000 for a short meeting attended, as determined by the Board Chair. The Board Chair may also determine no meeting fee is warranted.
- Travel time allowance, based on the distance travelled to a meeting, of \$1,000 for travel of 160-645 kilometres, \$1,500 for travel of 645-2,415 kilometres, or \$2,500 for travel greater than 2,415 kilometres.

Information on committee membership and the annual performance evaluation for Board members can be found in OPG's year-end 2017 Annual Information Form under the "Corporate Governance" section.

The Chair of the Board, in his role as non-executive Chair, receives an all-inclusive annual fee of \$150,000. This amount is determined by resolution of OPG's shareholder and has remained unchanged since 2004.

Mr. Lyash does not receive additional compensation for serving as a director of OPG.

OPG director compensation was well below the 50<sup>th</sup> percentile of the compensation levels of comparator companies in 2017. From time-to-time the Board and Compensation, Leadership and Governance Committee may engage a third-party to review Director compensation.