Follow-Up on the 2022 Performance Audit:

# **Ontario Power Generation**

# Management and Maintenance of Hydroelectric Generating Stations

# // Overall Conclusion

#### 24 Recommended Actions

Ontario Power Generation (OPG), as of October 3, 2024, has fully implemented 67% of actions we recommended in our 2022 audit **Ontario Power Generation: Management and Maintenance of Hydroelectric Generating Stations**. OPG has made progress in implementing an additional 21% of the recommendations. However, OPG made little or no progress on 4% of the recommendations and will not implement 8% of the recommendations.

OPG has fully implemented recommendations such as consulting all potential partners regularly, including Hydro One, the Independent Electricity System Operator (IESO) and third-party vendors, to assess the ongoing viability of project development. OPG has also fully implemented recommendations such as establishing procedures that require staff to include due dates for work orders and conducting comprehensive post-projects review on all large projects to identify lessons learned and/or best practices.

OPG has made progress in implementing recommendations such as working with the IESO to develop a strategy to allow for open communication during the selection of new development projects, and measuring and overseeing all work orders against due dates to identify whether work orders are being completed on a timely basis. OPG made little or no progress on documenting the rationale and approvals for recommended work that is delayed or not completed by expected timelines.

OPG will not implement two of our recommendations, which are: collaborating with the IESO and the Ontario Energy Board (OEB) to assess options for more cost-effective ways to be compensated for surplus baseload generation conditions; and working with the OEB, the IESO and the Ministry of Energy (Ministry) to complete a fulsome review of the rate-setting processes for rate-regulated stations and non-rate-regulated stations.

The status of actions taken on each of our recommendations is described in this report (see **Appendix** for more details).

## **//** Status of Actions Taken on Recommendations

We conducted assurance work between April 2024 and August 2024. We obtained written representation from OPG that effective October 3, 2024, it has provided us with a complete update of the status of the recommendations we made in the original audit two years ago.

## 1. OPG Has Not Fully Utilized Its Hydroelectric Generating Capacity

In our original audit, we noted that there are numerous factors that can impact the actual amount of electricity a generating station can produce, such as water availability and flow, demand for electricity, and planned outages that result in generating units being out of service for periods of time. We found that OPG could have generated approximately 269 million megawatt hours (MWh) of electricity but only generated 226 million MWh, meaning about 43 million MWh of generating capacity went unused. In 2021 alone, OPG could have generated an additional 4.6 million MWh of electricity, or enough to power over 540,000 Ontario households for a year.

We also found that in January 2022, the government asked OPG to examine opportunities for new hydroelectric development in Northern Ontario, and asked the IESO to identify related transmission infrastructure and costs. While potential unbuilt capacity of about 3,000–4,000 megawatts (MWs) in Northern Ontario and up to an additional 1,000 MW in southern Ontario could provide opportunities for new stations, there were many challenges and uncertainties in terms of timing and costs. For example, it could take over 10 years (including assessments, construction and installation of transmission lines) with significant cost (ranging from \$5 million to \$22 million per MW of power capacity), depending on location and site conditions. It could cost even more after considering additional transmission-related costs.

#### **Recommendation 1: Action Item 1**

To maximize the use of current hydroelectric generating stations and prepare for increased energy demands in the future, we recommend that Ontario Power Generation work with the Ministry of Energy and the Independent Electricity System Operator to develop both a shortterm and long-term strategy to utilize the unused production capacity that exists within its current hydroelectric generating stations while also pursuing new hydroelectric opportunities.

Status: 🔘 In the process of being implemented by May 2025.

#### Details

We found that OPG has supported the IESO regarding the use of OPG's existing hydroelectric capability and the development of new hydroelectric opportunities. One example of this support is demonstrated through OPG's ongoing participation in the IESO's Market Renewal Program (MRP), which aims to modernize Ontario's electricity markets by addressing inefficiencies as well as supporting the integration of emerging and new technologies. In 2023, OPG attended all five meetings of the MRP's Implementation Working Group.

OPG will continue to provide support to the Ministry and the IESO through participating in the IESO's MRP, which has an estimated "Go-Live" date of May 2025.

#### **Recommendation 2: Action Item 1**

To economically and efficiently pursue new hydroelectric energy projects in the future, we recommend that Ontario Power Generation:

• work with the Independent Electricity System Operator (IESO) to develop a strategy to allow for open communication during the selection of new development projects;

Status: ( ) In the process of being implemented by December 2024.

#### Details

We found that OPG has worked with the IESO to ensure open communication during the selection of new hydroelectric projects. For example:

- OPG collaborated with the IESO in its work to identify potential transmission corridors to enable future clean energy generation.
- OPG engaged with the IESO to explore potential new hydroelectric opportunities such as the Little Jackfish Project north of Thunder Bay. Specifically:

- OPG met with the IESO on October 27, 2023, to provide it with an update on proposed hydroelectric projects and requested feedback from the IESO.
- OPG subsequently met with IESO on February 26, 2024, to share information about the Little Jackfish Project's cost optimization and system value.
- OPG contacted the IESO on February 27, 2024, to reinforce the need to collaborate better on exploring new hydroelectric development by recommending the establishment of an OPG-IESO working group that would meet regularly to respond back to the Ministry and to ensure further collaboration.
- OPG developed a Stakeholder Relations Engagement Plan to maintain open communication between OPG and the IESO in various areas, which includes informing the IESO of OPG's broader plans.

OPG will continue to advocate for a more streamlined approach with both the IESO and the Ministry and achieve a closer collaboration with them on long-term energy and transmission planning by December 2024.

#### **Recommendation 2: Action Item 2**

• consult all potential partners, including Hydro One, the IESO and third-party vendors, regularly to assess the ongoing viability of project development.

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has consulted with all potential partners, including Hydro One, the IESO, Indigenous communities and other relevant third-parties, in exploring new hydroelectric development projects and assessing the ongoing viability of project development. For example, OPG has:

- developed a Stakeholder Relations Engagement Plan with the IESO and Hydro One;
- worked with the IESO in December 2022 on its Pathways to Decarbonization report, which explores opportunities to decarbonize the electricity sector, including the potential for new hydroelectric development;
- met with the IESO to discuss future hydroelectric development of the Little Jackfish Project that included an Indigenous update;
- participated in standing meetings with the IESO's Chief Executive Officer to discuss common issues such as transmission planning and OPG projects that require assistance from the IESO;

- provided feedback to the Ministry of Energy's proposed actions to support critical transmission infrastructure in the Northeast and Eastern Ontario; and
- met with Hydro One regularly to discuss progress, alignment, risks and opportunities related to new hydroelectric development.

In February 2023, OPG also issued its Made-in-Ontario Northern Hydroelectric Opportunities report, which included input and advice from Indigenous communities and stakeholders such as the Ontario Waterpower Association (OWA), industry representatives and regulators. This report made four recommendations regarding new hydroelectric generation opportunities:

- accelerate the Little Jackfish Project as Ontario's most advanced new build hydroelectric generation opportunity;
- begin the process of exploring the Moose River Basin, in collaboration with Indigenous communities;
- leverage OPG's existing assets to deliver more value to the electricity system; and
- collaborate with the IESO, Indigenous communities, local utilities and the OWA to effectively and efficiently plan for the long-term development of potential hydroelectric generation.

## 2. OPG Recorded Approximately \$730 Million in Revenue Since 2015 for Spilled Water without Generating Any Electricity Due to Excess Power Supply in Ontario

In our original audit, we found that when electricity supply exceeded demand in Ontario, OPG might be directed by the IESO to reduce generation by spilling (or releasing) water, because there were no practical options to store hydroelectric energy for future use. For 54 of 66 hydroelectric stations, OPG was compensated at a fixed rate for spilling water. In 2021, the amount of electricity lost as a result of spilling was 1.9 million MWh, enough to power about 220,000 households for a year. Since 2015, OPG had spilled water that could have generated 25 million MWh of electricity. It recorded approximately \$730 million in revenue without generating any power. The current compensation method (which took both OPG's fixed costs and variable costs of operating stations into account) did not appear to be achieving value-for-money for ratepayers. When spilling water without generating any power, OPG incurred limited variable costs for operating the stations. Therefore, the compensation method should consider fixed costs while variable costs should be limited.

#### **Recommendation 3: Action Item 1**

To protect the interests of Ontario ratepayers, we recommend that Ontario Power Generation collaborate with the Independent Electricity System Operator and the Ontario Energy Board to assess options for more cost-effective ways to be compensated for surplus baseload generation conditions, such as covering only fixed costs when hydroelectric generating stations are requested to spill water in order to curtail production.

#### Status: 🔵 Will not be implemented.

The Office of the Auditor General of Ontario continues to support the importance of assessing options for more cost-effective ways to be compensated for surplus baseload generation.

#### Details

We found that OPG has not collaborated with the IESO and the OEB to assess options for more cost-effective ways to be compensated for surplus baseload generation conditions. This is because, outside of an OEB proceeding, OPG has no means to engage with the IESO and the OEB on the appropriate compensation mechanisms for forgone electricity production due to surplus baseload generation conditions. These conditions result in excess power supply when OPG has to spill water to reduce or stop its hydroelectric generation by allowing water to bypass a station without generating electricity.

While OPG anticipates that the OEB will review the methodology for calculating the Hydroelectric Surplus Baseload Generation Variance Account, this review will not include an assessment that will address this recommended action. This is because the methodology review is intended to assess options to reduce amounts recorded in the Hydroelectric Surplus Baseload Generation Variance Account instead of assessing options to adjust the compensation methodology.

## 3. Aging of Hydroelectric Stations and Equipment Has Led to a Continuous Backlog of Work Orders Which Could Result in Increased Maintenance Costs

In our original audit, we found that between 2015 and 2021, the number of maintenance work orders for OPG's hydroelectric stations increased by 83% (from 18,400 to 33,800). Most work orders were for preventative maintenance to avoid equipment failures that can lead to unplanned outages. We also found that OPG has had a continuous backlog of work orders over the last five years, and the backlog was approximately 9,500 work orders at the end of 2021.

#### **Recommendation 4: Action Item 1**

To better monitor, track and complete maintenance work on its hydroelectric generation fleet, we recommend that Ontario Power Generation:

• establish procedures requiring staff to include due dates for work orders;

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has reviewed and revised its work management procedures to ensure appropriate work prioritization and completion by due dates. For example:

- The Work Management—Master Data procedure was revised in June 2023 to incorporate additional details about critical equipment identification, which will be used to support work prioritization criteria. This procedure defines the process to maintain work management data (such as equipment records, bill of materials and master equipment list) consistently across OPG's Renewable Generation division.
- The Work Management—Assess, Plan and Schedule Work procedure was revised in February 2024 to incorporate stronger process direction regarding the requirement to use due dates when scheduling work and managing backlog. The due date field must be filled in for preventative maintenance work orders.

#### **Recommendation 4: Action Item 2**

• measure and oversee all work orders against due dates to identify whether work orders are being completed on a timely basis and implement corrective action when needed;

Status: ( ) In the process of being implemented by December 2024.

#### Details

We found that OPG has taken actions to measure and oversee all preventative maintenance work orders against due dates to identify whether work orders are being completed on a timely basis. For example, OPG publishes a monthly work management dashboard that shows preventative maintenance beyond its due date so as to highlight work orders that are intended to be executed within their required frequency range.

OPG has also explored options and plans to implement one of the following proposed solutions:

- enhancing the functionality of the work management dashboard; or
- re-programming the enterprise asset management software to incorporate due dates in the Preventative Maintenance Requirements, which are a set of rules to trigger or activate work orders.

OPG will implement the proposed solution by December 2024.

#### **Recommendation 4: Action Item 3**

• develop a strategy with a risk-based work prioritization methodology to address increasing maintenance work orders and the work order backlog.

Status: 🔘 In the process of being implemented by December 2024.

#### Details

We found that OPG has improved its work management program to address the increasing number of maintenance work orders and the work order backlog. For example:

- OPG scheduled Joint Maintenance Prioritization meetings regularly to support the prioritization and re-prioritization of maintenance work, incorporate stakeholder feedback into schedules, and monitor work order backlog.
- OPG developed a key performance indicator for monitoring the backlog of work orders to gauge the significance of the backlog in relation to scheduled work.
- OPG revised its Work Management—Assess, Plan and Schedule Work procedure (as noted in the first action item of **Recommendation 4**), which includes a Prioritization Table that has been updated to include equipment criticality and consequence ratings as factors to prioritize work orders. OPG will monitor the work order priority against the Prioritization Table. This work is expected to be completed by December 2024.

## 4. OPG Did Not Always Assess the Conditions of its Hydroelectric Stations and Address Engineering Recommendations on a Timely Basis

In our original audit, we found that conditions of hydroelectric stations were not always assessed at regular intervals. OPG did not complete assessments for approximately 20% (or 13) of its 66 stations within the last 10 years. The timing between assessments was inconsistent. For example, for Sir Adam Beck I and II Stations (two of OPG's largest stations), 18 years passed between their most recent assessment and the previous one, but for Cameron Falls Station, the gap was 10 years.

OPG also did not always address engineering recommendations of what work is required to maintain its generating stations and address any issues found in a timely way. For example, for Abitibi Canyon Station, of 37 major recommendations made in 2016, only three were fully addressed, another three were in the process of being addressed, and 31 had either been scheduled only or not yet addressed in the 2021 assessment.

#### **Recommendation 5: Action Item 1**

To comprehensively monitor hydroelectric generating station conditions as part of its updated assessment process, we recommend that Ontario Power Generation:

• develop and document criteria on how often assessments must be completed and include any rationale for situations where stations are subject to different timelines based on risk factors, if applicable;

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has taken the following actions to determine how often assessments must be completed and include any rationale for situations where stations are subject to different timelines based on risk factors.

- OPG implemented an Equipment Reliability Program to assess the health of system structure components and to issue health reports using a graded approach based on the level of the component being monitored.
- OPG's Health Group Teams defined performance indicators to measure the condition of various system structure components (for example, turbine and runner of turbines) for its inspection work, and set the frequency of updating these indicators.

#### **Recommendation 5: Action Item 2**

• include a comprehensive assessment aspect that allows senior management to periodically assess the conditions and risks of the stations in a more fulsome and timely manner.

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has taken the following actions that allows senior management to periodically assess the conditions and risks of the stations in a more fulsome and timely manner.

- OPG initiated Plant Health Committee (PHC) meetings to review the health and risks of system structure components. PHC meetings for large flagship generating stations, such as R.H. Saunders Hydroelectric Generating Station in Cornwall (Ontario's second largest hydroelectric station), will occur at least once a year.
- OPG initiated annual Renewable Generation Fleet Health Review meetings with the executive team to discuss the existing and emerging risk trends with respect to equipment reliability and system health.

#### **Recommendation 6: Action Item 1**

To efficiently address required work as per engineering recommendations made during its hydroelectric generating station inspections and assessments, we recommend that Ontario Power Generation:

• develop timelines for follow-up on the completion of recommendations made;

Status: 🔵 Fully implemented.

#### Details

We found that OPG has developed timelines for following-up on the completion of engineering recommendations made during its hydroelectric generating station inspections and assessments.

As noted in **Recommendation 5**, OPG has initiated PHC meetings. The PHC is designed to look at the health of the facility along with developing action plans to address declining health or risks in an appropriate time frame. Action plans include strategies to mitigate risks until the permanent solution is executed. The PHC also provides a forum for the engineers and OPG's management to challenge decisions and effectiveness of the strategies.

#### **Recommendation 6: Action Item 2**

• document the rationale and approvals for recommended work that is delayed or not completed by expected timelines;

#### Status: 🔵 Little or no progress.

#### Details

We found that OPG has not documented the rationale and approvals for recommended work that was delayed or not completed by expected timelines. However, OPG has started taking some actions to address this recommendation, such as:

- revising the Change Request Authorization (CRA) form to identify the need for the Senior Manager of Station Engineering to be included as "Reviewed By" for any CRAs that reflect a change in schedule;
- updating the Regional Programming Best Practices Guide; and
- establishing means of evaluating risks, which include the risk of work delayed or not completed by expected timelines.

Currently, OPG uses a risk-based approach to make decisions and changes during business planning while taking into consideration various risks (for example, safety, environment and financial). However, the process for documenting these risk assessments when making adjustments to planned work has not been formalized. The process is expected to be implemented by December 2024. This process will be standardized and have an approval workflow.

#### **Recommendation 6: Action Item 3**

• investigate and document the rationale for why cost estimates have increased significantly from previous assessments and regularly report that information to its Board of Directors.

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has developed the following mechanisms to investigate and document the rationale for why cost estimates have increased significantly from previous assessments and regularly reported that information to its Board of Directors.

- OPG has issued a Renewable Generation C55 Guide. The purpose of this document is to provide guidance to the users of the OPG Asset Investment Planning and Management (AIPM) software tool, called Copperleaf C55. Our review of this document noted that preliminary cost estimates (for class 4 or 5) should be included in investment requests.
- OPG has established a Renewable Generation Asset Management Oversight Committee (AMOC), which is a forum to challenge investment costs and schedules. The AMOC meets quarterly, or subject to business needs.
- Our review of sample reports noted that OPG has provided updates to the Major Projects Board Committee via its Enterprise Project Portfolio Performance reports. The committee is responsible for overseeing matters related to the planning and execution of major projects. The committee consists of seven Directors, meets quarterly, and monitors and reports to the Board on the progress of the major projects against Board-approved budgets and schedules.

# 5. OPG Can Further Improve the Reliability and Performance of Its Hydroelectric Generating Stations

In our original audit, our review of the amount of electricity production loss due to both planned and forced outages found that losses generally increased up to 2019, then decreased in 2020 and 2021. The loss in 2021 due to outages amounted to 623,000 MWh, more than three times higher than the loss in 2012 (198,000 MWh). This lost electricity would have been enough to power approximately 73,000 homes for a year in Ontario.

#### **Recommendation 7: Action Item 1**

To further improve and maximize the reliability of its generating stations, we recommend that Ontario Power Generation:

• review why various reliability metrics, such as availability and outage factors, have shown fluctuating results;

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has reviewed why various reliability metrics, such as availability and outage factors, have shown fluctuating results. For example, OPG performed various analyses to:

• identify major contributors to the Renewable Generation's Equivalent Forced Outage Rate (which is measured by the ratio of time a generating unit is forced out of service by unplanned events, compared to the amount of time the generating unit was available to operate) and to explain if and how adding more sensors for online monitoring would avoid the same failure happening in the future; and

• review two major 2023 events caused by defective or malfunctioning components.

OPG has also held monthly Equipment Failure Review meetings between different groups within its Renewable Generation division, including Station Engineering, Central Engineering, Monitoring and Diagnostic Centre, Operations, and Maintenance.

#### **Recommendation 7: Action Item 2**

• identify learning opportunities and adopt best practices for improving the reliability of generating stations through, for example, its participation in various peer groups.

Status: 🔵 Fully implemented.

#### Details

We found that OPG has identified learning opportunities and adopted best practices for improving generating station reliability. For example, OPG has:

- participated in the cost and performance benchmarking conducted by the Hydroelectric Productivity Committee within the Electric Utility Cost Group (EUCG), which is a forum for various international utility companies to share data and network with industry peers;
- collaborated with other utilities and research institutes to develop, adapt and implement technologies and systems to improve equipment reliability in the hydroelectric fleet, such as participating in the Hydropower Research Institute (HRI) Innovation Day to share innovative projects;
- participated in the generating unit performance benchmarking conducted by Electricity Canada (formerly the Canadian Electricity Association), which is the national forum and voice of the evolving and innovative electricity business in Canada; and
- signed a non-disclosure agreement with the Idaho National Laboratory funded by the US Department of Energy to collaborate on developing asset models to enhance equipment reliability.

OPG also plans to continue its membership with EUCG, HRI and Electricity Canada for the foreseeable future in order to identify learning opportunities and best practices from peer groups.

## 6. OPG Does Not Always Complete Capital Projects and Assessments in a Cost-Effective and Timely Manner

In our original audit, our review of large hydroelectric capital projects completed over the last 15 years found that OPG experienced delays of some projects and cost overrun of one project as a result of insufficient planning. For example, for the Niagara Tunnel Project, sub-surface geotechnical investigations carried out before the project started did not adequately note the rock conditions and work required. This resulted in a 62% increase in project cost (from \$985 million to \$1.6 billion) and a three-year delay in project completion (from 2010 to 2013).

OPG also did not always complete post-project reviews in a timely way. For example, for the Lower Mattagami River Redevelopment Project completed in 2014, OPG did not complete the post-project review until 2020, six years later.

#### **Recommendation 8: Action Item 1**

To plan and complete capital projects efficiently and cost-effectively, we recommend that Ontario Power Generation (OPG):

 work with potential vendors to conduct more thorough pre-project assessments to identify and reduce the risk of possible issues arising that could result in cost increases or project delays;

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has implemented a Project Excellence Initiative, including more front-end planning with vendors, to enhance its project management, risk management and controls. Specifically, OPG has put the following mechanisms in place to identify and reduce the risk of possible issues arising that could result in cost increases or project delays.

- The Risk Management Manual describes early involvement of vendors in project planning.
- The Renewable Generation Overhaul Program document recommends vendor engagement four years in advance of overhaul commencement.
- The Intelligent Requirements Process Guide describes vendor involvement in collaborative design planning.
- The Renewable Generation Programmatic Partnership Approach aims to secure vendors' capacity for hydroelectric generating stations' development and overhauls.

• The Front-End Planning for Programs and Strategic Projects Guide has a section that outlines the importance of relationships with key stakeholders and building engagement into the strategic project's lifecycle.

OPG has also engaged and involved vendors early during the planning stage of the projects. For example:

- The Coniston-Stinson Redevelopment project is currently in the planning phase. Contracts have been awarded to a turbine and generator supplier and a general contractor. The OPG project team has been working collaboratively with both the supplier and the general contractor to optimize the design. Financial incentives have been included in the general contractor's agreement to promote cost optimization.
- The Kakabeka Falls Redevelopment project has engaged the contractors in the front-end planning process. The OPG project team has completed four days of technical workshops to kick off the Front-End Engineering and Design (FEED) phase of the project.
- The Matabitchuan Redevelopment Project engaged key vendors early in the front-end planning phase to optimize the design and constructability of the project.

#### **Recommendation 8: Action Item 2**

• oversee and monitor project work more closely on a regular basis to identify and correct any potential delays as soon as reasonably possible;

Status: 🔘 In the process of being implemented by March 2025.

#### Details

We found that OPG enhanced its oversight and monitoring on project work more closely on a regular basis to identify and correct any potential delays as soon as reasonably possible. For example:

- OPG's Construction Centre of Excellence launched a pilot training program, called Cons-Pro, in September 2023. The pilot program included various topics related to project oversight and monitoring, including conflict and negotiation, contract management fundamentals, safety awareness, and labour relations. OPG has started conducting a review of the pilot program and will incorporate revisions to its training program accordingly.
- OPG initiated Renewable Generation Regional Projects Level 1 to Level 4 meetings to document a project review in a hierarchical model. Level 4 meetings report daily progress and tactical issues attended by Project Leads, while Level 1 meetings report project status, forecasts and risk mitigation plans on a monthly basis and are attended by various Directors and the Finance Controller.

OPG will complete its review of the pilot training program and start training all construction supervisors. This work is expected to be completed by March 2025.

#### **Recommendation 8: Action Item 3**

• review its contract terms (such as warranty conditions) to ensure they protect OPG in the event of issues caused by vendors.

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG's Law Division has reviewed the contract terms and confirmed that those terms adequately protect OPG in the event of issues caused by vendors.

It was determined that no change to the warranty provisions in OPG's standard terms and conditions are required to address the vendor's obligation to cover the costs to correct defective work. OPG's standard warranty provisions in its contract templates set out that the vendor is required to pay all costs related to the correction of any defective work, including:

- all costs and charges respecting correction or replacement of any defective part of the work;
- all incidental costs of the corrective services, including, as may be required for disassembly, removal, re-installation, re-erection, re-assembly, transportation, insurance and any applicable taxes; and
- all of OPG's reasonable out-of-pocket fees and charges of third-party engineers, architects, accountants, lawyers and other professionals advising OPG with respect to the correction of the defect.

While there may be certain circumstances under which OPG may agree to minimize the vendor's obligation to cover certain correction costs (for example, disassembly and re-assembly of equipment), this occurs only on a case-by-case basis.

While OPG has decided to keep the contract terms, on May 3, 2023, it rolled out a training program for its Supply Chain staff with the goal of preventing issues caused by vendors from re-occurring in the future.

#### **Recommendation 9: Action Items 1 and 2**

To evaluate capital projects and apply lessons learned to ongoing and future projects in a timely manner, we recommend that Ontario Power Generation:

- complete post-project reviews within one to two years after a project has been substantially completed using techniques such as monitoring ongoing record-keeping and/or completing project close-outs in steps throughout the project; and
- conduct comprehensive post-project reviews on all large projects to identify lessons learned and/or best practices, and then apply them to ongoing and future projects accordingly.

Status: 🔵 Fully implemented.

#### Details

We found that as part of its ongoing Project Excellence Initiative (as noted in **Recommendation 8**), OPG has incorporated post-implementation and lessons learned reviews from ongoing and past projects into future project work.

In late 2022, OPG revised and improved its Post-Implementation Review (PIR) process. Changes to the process included:

- digitizing the PIR form in OPG's Project Management Information System (ePMX);
- creating a PIR tracker report to better monitor the status of ongoing PIRs;
- implementing a PIR guide to outline the principles and processes, required documentation, and roles and responsibilities for completing PIRs;
- establishing target PIR completion timelines (12 months after the project completion date); and
- establishing a scaled approach to PIR requirements based on the cost and complexity of the project.

These changes to the PIR process have been communicated to OPG staff via website announcement, newsletters and email. A memorandum has also been issued with instructions detailing the transition to the new PIR process.

## 7. Rate-Setting Process is Not Regulated for 12 OPG Hydroelectric Generating Stations

In our original audit, we found that of OPG's 66 hydroelectric stations, 12 stations were not subject to the OEB's rate regulation because they contracted directly with the IESO. Their rates were significantly higher than those for rate-regulated stations. The rates for non-rate-regulated stations varied (from \$65 to \$250 per MWh), meaning that they were at least 1.5 to almost six times higher than the rate for rate-regulated stations (\$43.88 per MWh).

#### **Recommendation 10: Action Item 1**

To consistently and fairly set rates for hydroelectric generation, we recommend that Ontario Power Generation work with the Ontario Energy Board, the Independent Electricity System Operator and the Ministry of Energy to complete a fulsome review of the rate-setting processes for rate-regulated stations and non-rate-regulated stations, and determine whether the current methods of rate-setting are appropriate and in the interests of ratepayers.

#### Status: 🔵 Will not be implemented.

The Office of the Auditor General of Ontario continues to support a fulsome review of the rate-setting processes for rate-regulated stations and non-rate-regulated stations to determine whether the current methods of rate-setting are appropriate and in the interests of ratepayers. We encourage OPG to work with the Ministry on this recommendation.

#### Details

We found that OPG has no authority to establish or change the rate-setting process for its generation assets. OPG indicated that it can only provide input into a public consultation on the rate-setting process, and that the Ministry determines which OPG hydroelectric generating stations will be regulated and which will be contracted. As such, any request to review or reassess the treatment of the currently contracted stations can only be made by the Ministry; to date, no such request has been made.

OPG will continue to provide support to the Ministry when requested, and engage in any public consultations put forward by the IESO and the OEB that are relevant to hydroelectric generation.

## 8. OPG Has Followed Dam Safety Best Practices, but Should Continue Working to Reduce Public Safety Events

In our original audit, we found that over the last seven years, while dam safety (involving the dam structure or station itself) incidents decreased (from 41 events in 2015 to 19 events in 2021), events related to public safety increased and remained high in recent years (145 events in 2021). Most of these public safety issues arose because the public either ignored or did not notice warning signs.

#### **Recommendation 11: Action Item 1**

To protect its hydroelectric generating stations, dams and the public, we recommend that Ontario Power Generation:

• complete all dam inspections and reviews on a timely basis in accordance with policies and best practices to assess the safety and operations of its dams;

#### Status: 🔵 Fully implemented.

#### Details

We found that OPG has completed all dam inspections and reviews on a timely basis in accordance with policies and best practices to assess the safety and operations of its dams. Specifically, OPG has completed 202 dam safety general inspections and 44 dam safety reviews as planned in 2023. All these inspections and reviews were completed within the scheduled timelines.

OPG has also taken actions to streamline the dam safety review process in order to ensure timely completion and eliminate rework or change orders to the contracts, which can create delays while awaiting approvals. OPG has:

- revised its standard Request for Proposal document to clarify the full requirements of the dam safety review; and
- initiated bi-weekly meetings to verify that progress was being made, and that any requests for information were being addressed in a timely manner.

#### **Recommendation 11: Action Item 2**

• continue to review safety processes across its hydroelectric assets to raise public awareness and identify opportunities to implement additional safety measures, such as buoys or alarm systems, where necessary and feasible.

Status: 🔵 Fully implemented.

#### Details

We found that OPG has continued to review the safety processes across its hydroelectric assets to raise public awareness and identify opportunities to implement additional safety measures. Specifically:

- OPG updated 23 Public Safety Risk Assessments and 23 Public Safety Management Plans with corrective actions plans.
- OPG collaborated with stakeholders on public safety initiatives and completed Water Safety Campaign initiatives in 2023 to maintain public awareness of hazards associated with hydroelectric stations and dams.

For example, according to the Public Safety Management Plan for Caribou Falls Generating Station, its safety measures include an annual Public Education Plan, outlining the annual schedule or targets for:

- public safety media programs, including radio, television and newspaper spots;
- community events for OPG participation (for example, trade shows, regattas);
- school programs for educating children; and
- specific communications or presentations to community groups (for example, Campers Associations).

In order to facilitate public education work, OPG's Northwest Operations Corporate Relations Officer maintains lists of community contacts for each site, including government groups and agencies, local businesses and associations, recreation associations and clubs (for example, hiking, snowmobile and camping), schools, and other stakeholders.

### 9. OPG Needs to Continue to Monitor and Report on Its Foreign Acquisition and Investment Activities

In our original audit, we found that in addition to owning generating stations in Ontario, OPG had invested in generation assets in the US through a series of subsidiaries operating as Eagle Creek. OPG's rate of return on investment from its US-based hydroelectric generation assets was about 1.2% lower than expected at the time of acquisition in 2019.

#### **Recommendation 12: Action Item 1**

To protect the Province and by extension Ontario taxpayers and ratepayers, we recommend that Ontario Power Generation:

• complete an annual strategic review of its foreign investments and potential investment opportunities in Ontario and provide this information to both its Board of Directors and the Province;

#### Status: 🔵 Fully implemented.

#### **Details**

We found that OPG has assessed the potential for investment opportunities and engaged its Board of Directors and the Province as necessary. Specifically:

- OPG provided its Corporate Strategic Plan, which contains updates on foreign investment performance, to the Ministry as approved by the OPG Board in its annual forward-looking assessments of growth in November 2023.
- OPG provided the Ministry, through its existing quarterly financial reporting meetings at the end of each quarter, with updates on OPG financials with a specific focus on foreign investment performance as part of the meeting in the third quarter held on November 21, 2023.

#### **Recommendation 12: Action Item 2**

• regularly assess its acquisition framework, including a forward-looking risk analysis and potential investments (in both Ontario and other jurisdictions), and report those results to the Province.

Status: 🔵 Fully implemented.

#### Details

We found that OPG has discussed the effectiveness of its acquisition framework with the Ministry in its scheduled monthly meeting on June 6, 2023, with respect to the acquisition and divestment opportunities associated with OPG's international investments. The Ministry confirmed the effectiveness of OPG's existing framework. OPG updated the Ministry that it would reflect the June 6 meeting as the first annual assessment of the effectiveness of its acquisition framework. OPG intends to reassess its existing framework in June annually going forward.

# // Appendix

#### **Recommendation Status Overview**

	# of Action Items	Fully Implemented	In the Process of Being Implemented	Little or No Progress	Will Not Be Implemented	No Longer Applicable
Recommendation 1	1		1			
Recommendation 2	2	1	1			
Recommendation 3	1				1	
Recommendation 4	3	1	2			
Recommendation 5	2	2				
Recommendation 6	3	2		1		
Recommendation 7	2	2				
Recommendation 8	3	2	1			
Recommendation 9	2	2				
Recommendation 10	1				1	
Recommendation 11	2	2				
Recommendation 12	2	2				
Total	24	16	5	1	2	0
%	100	67	21	4	8	0