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Year in Review is published annually by the Ontario Waterpower Association (OWA). Electronic distribution is free of charge within North America. Subscription enquires or changes to subscriptions should be directed to info@owa.ca. The contents of this publication may not be reproduced in whole or in part without the prior permission of the publisher.

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Velcome from he President

elcome to the 2023 Year in Review. This year the OWA and its Board of Directors have been actively engaged in advocating for OWA's two core objectives: to sustain and enhance the significant contributions of Ontario's existing waterpower assets; and to provide new opportunities for waterpower development and industry growth across the province.

Over the last two (2) years, with strong policy support from the Ministry of Energy, the OWA Board of Directors and generator members have been negotiating the terms and conditions of a "Program" to recontract existing non-rate-regulated waterpower facilities to provide investment certainty and incentives for expansion. The successful conclusion of this work with the IESO and the government was a Minister's Directive on August 23, 2023, that instructed the IESO to:

Launch a Small Hydro Program by the end of 2023 to provide new or amended contracts to existing small hydroelectric facilities, whose installed capacity, as determined on a facilityspecific basis, is equal to or below 10 megawatts, and who either: (i) do not have any existing contracts with IESO or the Ontario Electricity Financial Corporation (OEFC); or (ii) have existing contracts with IESO or the OEFC that will expire on or before April 30, 2043.

This means that owners of more than one hundred (100) small hydro facilities will have much-needed investment certainty for the next twenty (20) years. For all our product and service provider members, this Program will incent renewed investment opportunities across the province. Investment in "Made in Ontario" hydroelectricity is investment that stays in communities, regions and the province. An estimated seventy-five percent (75%) of investment in new hydro and ninety percent (90%) of investment in sustaining existing assets remains in Ontario.

Our next focus will be on those facilities with an installed capacity of >10 MW, using the same approach to recontracting these assets through a dedicated >10 MW Program. There are twenty-two (22) of these facilities, all of which are located in northern Ontario (Northern Hydro Program (NHP)). The re-contracting of eligible hydroelectric facilities >10 MW in installed capacity will be in consultation with owners of these facilities collectively and/or bilaterally and the OWA will advocate for the application of the framework of the Small Hydro Program, with appropriate modifications incorporating the operational characteristics of these facilities (e.g., option for the Capacity/Energy contract). We are advocating that direction on the NHP be provided to the IESO concurrently with the launch of the SHP and the OWA intends to move this initiative forward quickly.

In addition, the OWA has been actively involved in the IESO's Market Renewal initiative for a number of years, focused on operational considerations and implications for the existing assets as well as minimizing potential impacts for current contracts. An internal OWA Task Team has been advancing hydro-specific operational parameters and considerations within the IESO's design. Now that the IESO has pushed out the "go live" date from 2023 to 2025, next year will be an important one and we will remain vigilant on behalf of our members as we draw nearer to the launch.

As importantly, Ontario, like other jurisdictions, is in the midst of charting a course for the long-term future of electricity supply in the context of economic growth and decarbonization objectives. I want to emphasize from the outset that our diversity of supply will continue to be a strength. The OWA contributed to OPG's Made-in-Ontario Northern Hydroelectric Opportunities Report (NOHO) - which identified 4,000 MW to 5,000 MW of untapped hydro potential, most of which is in the north. This report, coupled with the IESO's Pathways to Decarbonization Report, helped to form the foundation of the government's clean energy plan – "Powering Ontario's Growth", released in July. The Plan agrees that work needs to begin now on planning and siting new waterpower facilities and



enabling transmission. This will mean that aligning resource access policy (MNRF) with energy priorities is imperative. And it means taking a planned and predictable cadenced approach to predevelopment, procurement and permitting that begins now and is implemented over a period of a decade or more to best ensure a cost-effective build-out of hydroelectric resources.

There is no reasonable path to decarbonization without waterpower and there is no credible path to realizing northern Ontario's untapped potential without the engagement of and partnership with Indigenous Communities. As an industry, we have the benefit of lessons learned through existing successful partnerships.

This is indeed an exciting time to be in our industry. It is a time of renewal. It is a time of growth. And together we can ensure that future generations enjoy the same benefits from affordable, reliable, sustainable waterpower that we do.

Paul Norris President **Ontario Waterpower Association**

LITTLE LONG DAN SAFETY PROJECT **NEARING COMPLETION IN NORTHEAST ONTARIO BY ONTARIO**





At a Glance

OPG's Little Long Dam Safety Project will improve dam safety on the Mattagami River in the event of extreme weather.

The project supports **OPG's Climate Change** Plan and has led to increased business opportunities for Indigenous vendors.



The dam safety project is on schedule to be completed in 2024.

In northeast Ontario, a major dam safety project is heading into the home stretch.

OPG is nearing completion of the Little Long Dam Safety Project, about 90 kilometres north of Kapuskasing, which improves dam safety on the Mattagami River in the event of extreme flood events.

Since construction commenced in 2021, four additional sluice gates have now been added to the Adam Creek sluiceway structure, bringing the total number of gates from the original eight to 12. The project team also replaced end-of-life gates and associated equipment at both the Adam Creek sluiceway and the nearby Little Long Generating Station (GS) sluiceway structure.

The overall project is set to be completed in 2024.

This important work ensures extreme floodwater can safely bypass OPG's four Lower Mattagami River stations, which include the Little Long, Smoky Falls, Harmon, and Kipling hydro generating facilities. It also helps OPG comply with updated dam safety requirements established by the Province of Ontario.

"Being able to report that the project is nearing completion, on time and on budget, is a testament to the collaboration between various groups, including the OPG team, project contractors, Indigenous communities, local residents, and regulators," said Project Manager, Tranal Chow. "Once the remaining sluice gate work is complete, the focus will move to site rehabilitation phase. We will continue to manage water safely at our generating stations and control structures, in accordance with the Mattagami River Water Management Plan."

The project directly supports OPG's Climate Change Plan by fortifying and adapting the company's infrastructure to be more resilient against climate-related impacts.

At the same time, the project is also supporting OPG's Reconciliation Action Plan, with more than \$60 million in contracts awarded to Indigenous vendors. OPG continues to engage with local Indigenous communities on project updates and employment opportunities.

In 2015, OPG's Lower Mattagami hydro complex was redeveloped in partnership with Moose Cree First Nation. The \$2.6-billion project – the largest hydro build in the north in more than 50 years - involved adding a third generating unit to the Little Long, Harmon, and Kipling stations, and completely redeveloping Smoky Falls GS. In all, the project added about 450 megawatts of new clean generating capacity for Ontario.

The Little Long Dam Safety project, along with the similar Smoky Falls Dam Safety project underway at Smoky Falls GS, will help support this important hydro complex for decades to come.

NEW **CLEAN ENERGY** TAX CREDITS BOLSTER **CASE FOR** HYDROPOWER INVESTMENT

BY TREVOR DEBOER, PARTNER, AIRD & BERLIS LLP AND SHAUN PRETLI, ARTICLING STUDENT, AIRD & BERLIS LLP



his past year has included significant news about tax incentives and other financial developments designed to facilitate investments in lesscarbon-intensive electricity generation in Ontario. The Canadian government's 2023 budget introduced the Clean Electricity Investment Tax Credit ("CEITC") and the Clean Technology Investment Tax Credit ("CTITC"). More recently, the Ontario government's 2023 Fall Economic Statement announced the imminent creation of the Ontario Infrastructure Bank ("OIB"). While many of the granular details of these measures are still pending, taken together, they appear to significantly bolster the financial case for investments in hydropower projects.

Ontario Infrastructure Bank

Beginning with provincial developments, the Ontario government announced the formation of the OIB as a vehicle for raising private capital to support infrastructure projects in the province, alongside public financing.¹ The limited information regarding the OIB suggests that pension funds, Indigenous communities and other institutional investors will be eligible to invest, while the provincial treasury will provide the initial \$3 billion capital.² Although the OIB has not yet been given a mandate or formed a board of directors, many believe it is likely to be modelled on other public infrastructure banks, such as the Canada Infrastructure Bank. Ontario's 2023 Fall Economic Statement suggests that the OIB will target funding in part toward renewable energy generation projects, including new projects and expansions of existing operations.³ In addition, the OIB is anticipated to receive and assess "unsolicited ideas and proposals for infrastructure projects that come from gualified institutional investors, public sector entities, governments or Indigenous communities."⁴ This presents an opportunity for hydropower project owners and developers to - by themselves or in partnership with such institutions - submit proposals for new projects and expansions of existing operations.

Clean Technology Investment Tax Credit

On the federal side, the Canadian government has now issued draft legislation to govern the CTITC. The draft legislation was published on August 4, 2023, outlining parameters for eligibility. According to the draft legislation, the CTITC will be a refundable

investment tax credit of up to 30% of the capital cost of certain technology assets acquired after March 27, 2023.5 The CTITC will be reduced to 15% in 2034 and will be completely phased out thereafter.⁶ To qualify for the CTITC, a taxpayer would need to be a taxable Canadian corporation, including taxable Canadian corporations which are members of a partnership.⁷ For clarity, the draft legislation deems "clean technology property" not to have been "acquired" explicitly states that equipment used to generate electricity equipment used in many types of energy storage, such as pumped hydroelectric energy storage applications.9

Concerning the CEITC, while draft legislation is still pending, high-level details were revealed in the 2023 federal budget. According to the budget, the CEITC will be a refundable tax credit of up to 15% of the capital cost for certain investments in technologies necessary for generating and storing (including pumped hydro storage) clean electricity as well as transmission between provinces and territories.¹² The CEITC would be available to taxable and tax-exempt corporations, including conditions which must be met in order to receive the full publicly owned utilities. Crown corporations, corporations owned by Indigenous communities, and pension funds. Both new requirements, the available credit would be reduced to projects as well as refurbishments of existing facilities would 20% of the capital cost for property available for use be eligible.¹³ While the CEITC is anticipated to be available as of the day of the 2024 federal budget, there is a "political issue" that will need to be resolved first: namely, according and before 2035.10 to the budget, that access to the CEITC for expenditures in a given province will be contingent on the appropriate provincial authority making commitments "that the federal funding will During installation, workers must be compensated in be used to lower electricity bills, and...to achieve a net-zero accordance with a collective agreement applicable as electricity sector by 2035."14 In addition, the CEITC is anticipated appropriate to each worker. Alternatively, labourers to have prevailing wage and apprenticeship requirements¹⁵ involved in installation must be paid, at minimum, which will presumably be in line with the CTITC requirements. in accordance with the most recent multi-employer According to the budget, if these requirements aren't met, the collective bargaining agreement considered to be tax credit would be reduced to a maximum of 5%. Finally, it the industry standard for a given trade in a given region appears that it will not be possible to claim both the CTITC or in Ontario as a whole; and and the CEITC in relation to the same expenditures, and the Reasonable efforts must be made to ensure that CEITC will also be fully phased out after 2034.16

before it is available for use.8 In addition, the draft legislation from water energy would be eligible for the credit, as would However, the draft legislation also contains two key benefit of the CTITC. Should a claimant fail to meet these between March 27, 2023, and before 2034, and would be reduced to 5% for property available for use after 2033 The draft legislation describes these requirements as follows:

apprentices registered in a Red Seal trade perform at least 10% of the total work hours for the year at an installation site.11

The takeaway for hydropower project proponents is that their pro formas will need to consider the marginal tax

- ⁵ Department of Finance, Legislative Proposals Relating to the Income Tax Act and the Income Tax Regulations (August 2023), at s. 127.45(1), online: <ita-lir-0823-l-2-eng.pdf (canada.ca)>.
- 7 Ibid. ⁸ Supra note 5 at s. 127.45(4).
- ⁹ Supra note 5.
- ¹⁰ Supra note 5 at s. 127.46(2).
- Supra note 5 at s. 127.46(1).
- Department of Finance, Budget 2023: A Made-in-Canada Plan (March 2023) at p. 79, online: https://www.budget.canada.ca/2023/pdf/budget-2023-en.pdf>
- Ihid
- ¹⁴ Ibid at p. 80.
- 5 Ibid ¹⁶ Ibid at p. 79.

benefits available pursuant to the CTITC against the potential increased labour expenses associated with projects that are required to meet the CTITC conditions.

Clean Electricity Investment Tax Credit

The Energy Group at Aird & Berlis LLP advises a wide range of clients involved in Canadian and global projects. Please contact the authors or a member of the group if you have questions regarding hydropower projects or require assistance with any matter relating to sector-specific tax incentives.

Ministry of Finance, 2023 Ontario Economic Outlook and Fiscal Review (November 2023) at pp. 36-37, online: https://budget.ontario.ca/2023/fallstatement/pdf/2023-fall-statement-en.pdf

² Ontario Infrastructure Bank, About Us, online: <https://oibank.ca/>

³ Supra note 1 at p. 37.

⁴ Supra note 2.

The MATERPOWER Action Plan

s referenced in both the IESO's Pathways to Decarbonization Report (P2D) and Ontario Power Generation's Made-in-Ontario Northern Hydroelectric Opportunities Report (NOHO), there is 4,000-5,000 MW of untapped waterpower that could make a significant contribution to our emergent and enduring electricity requirements in the short, medium and long-term. Refurbishing and expanding existing facilities, repurposing water management infrastructure, realizing pumped storage opportunities and advancing new greenfield developments, led by and in partnership with Indigenous communities, are all possible with appropriate policy, planning and governance.

To realize Ontario's waterpower potential, there is a need for much greater certainty for new build hydro development opportunities. Capacity and energy targets should be clearly identified a decade in advance as they are for other long lead-time technologies. If an RFP or other mechanisms are to be employed, these should have regular cadence to them and be spaced out at predictable intervals so that developers will continue to invest in their respective projects. These procurements for hydro should allow 8-10 years from contract to in service date to enable appropriate permitting and construction in a lower risk environment as is currently allowed for rate regulated and other longer lead time assets.

Additionally, hydro assets have different planning, revenue and risk profiles depending on ownership type. The OWA would like to see universal recognition of planning requirements, including advanced procurement signals, contracting and cost recovery. Further, when comparing waterpower to other types of generation, waterpower costs should be amortized over a period of 50-80 years. Other technologies may be in the order of 20-30 years. This will help level the playing field for hydro development and ensure public, private, Indigenous and municipal investments are all fairly and fully considered in the future supply mix.



In response to the Environmental Registry posting of these Reports, the OWA proposed a five (5) point Action Plan comprised of the following strategic thrusts:

- · Secure existing waterpower facilities now for the future;
- Optimize and expand operating assets in the immediate term;
- Power up/retrofit water management infrastructure in the near term;
- Begin planning, siting and predevelopment work now to enable potential new hydroelectric projects; and
- Develop and implement a process to recover reasonable pre-development costs.

Applying this five (5) point Waterpower Action Plan will position Ontario as a leader in leveraging its significant existing hydroelectric advantage as we move forward to achieve our economic and decarbonization objectives. And progress is already being made in each of these areas.

After more than two years of collaboration and negotiation between the IESO, the OWA and generator members, the Minister of Energy directed the IESO to launch a procurement initiative, known as the Small Hydro Program, to provide new or amended contracts to existing small hydroelectric facilities for a term out to 2043, to be implemented before the end of 2023. This Program is to be available to all existing facilities with an installed capacity of 10 MW or less, regardless of existing contract type (HCI, RES, HESOP, RESOP, NUG) and to merchant facilities. An estimated 100 assets will be eligible and the Program will be "open", meaning generators can choose if and when to apply. Importantly, the Program principles and design can and should serve as the foundation for a similar Program to re-contract the 20+ facilities with an installed capacity of >10 MW. Once implemented, owners will have renewed investment certainty in sustaining and expanding these assets.

The government's "Powering Ontario's Growth Report", a response to P2D and NOHO, released in July 2023, notes that "with over 100,000 kilometers of rivers and streams, Ontario has a significant potential for hydroelectric power generation, which can be developed by individuals, businesses, or communities." While we lay the groundwork for new greenfield development, the early opportunities are at existing infrastructure and the good news is that much of the pre-development work has already been done. Waterpower control dams, Parks Canada infrastructure, Ministry of Natural Resources and Forestry assets and a number of Conservation Authority facilities have been assessed for waterpower potential and more than fifty (50) could be retrofitted in the near term. A targeted IESO procurement focused on this existing infrastructure would advance new hydro in the near term and re-invigorate the industry's capacity to build out Ontario's significant untapped potential over the coming years and decades. Importantly, the IESO has been asked to provide the government with advice on considerations for a potential separate procurement for resources with long lead times and long lifespans, such as hydroelectric generation.

Pre-planning and pre-development work for new greenfield waterpower and enabling transmission will necessarily involve the engagement and active participation of Indigenous communities within whose traditional territories these projects are proposed. Indigenous communities will be partners in or proponents of new waterpower. Again, progress is already being made in this area. As outlined in the NOHO report, OPG collaborated with the OWA in a series of listening sessions with Indigenous communities and their equity partners in existing waterpower projects. Though every community has unique needs and perspectives on specific projects, all of the Indigenous communities we had initial conversations with were generally supportive of hydroelectric development, provided it is done responsibly, there is meaningful, early participation, and community benefits that further economic and social progress.

It is very clear, however, that success in advancing these new opportunities will be premised on the provision of capacity to these communities to meaningfully participate in and benefit from the developments. It is also apparent that a predicable, paced and cadenced approach to new procurement will achieve the best results for ratepayers. In this regard, the IESO's consultation and report back on the priorities for the "Future Clean Electricity Fund" (FCEF) is incredibly important. The goals of the FCEF (estimated at \$300M per year by 2030) include relieving the financial burden on electricity ratepayers, empowering Indigenous communities to actively participate in clean energy development and addressing barriers to resource development. OWA's input to the IESO which re-enforced the Waterpower Action Plan noted that "it will be important that, particularly with respect to new hydro opportunities, the process(es) designed to recover predevelopment costs not only include those costs associated with regulatory processes, but the provision of capacity for Indigenous (and other) communities to effectively participate as project proponents or partners."

Re-contracting and expanding existing facilities will solidify investment confidence. Retrofitting existing structure will build back industry and community capacity. Investing in Indigenous participation and mechanisms to enable the recovery of reasonable pre-development costs will accelerate new waterpower. Together, and starting now, these actions will advance and contribute to a "Made in Ontario" approach to decarbonization and electrification.



Hydroelectric turbines operating in remote areas all over the world are producing enormous amounts of clean energy. Nonetheless, a large number of these generating stations have the potential of posing an environmental threat to local ecosystems. Oil and grease have long been considered as one of the primary methods of lubricating the lower turbine guide bearing. As environmental regulations become more stringent, any accidental or operational loss of oil or grease to the environment is not acceptable and can have grave repercussions. This can be a serious issue in remote areas where detection, monitoring and spill clean-up can be very difficult due to the poor accessibility or unmanned operation of the power station.

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Thordon turbine guide bearing designs allow easy installation and replacement without removing the split steel bearing housings or shaft. Thordon has over 35 years' experience supplying water lubricated turbine guide bearings, for rehabilitation and new projects.

For more information check out our video at: www.thordonbearings.com/hydro-power/new-hydro-video













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arlier this year, Stantec completed the Technical and Economic Potential Assessment of Pumped Storage Hydropower in Canada, a report commissioned by WaterPower Canada with funding support from Natural Resources Canada. The report was prepared by an alliance led by Stantec, in cooperation with the Australian National University, the Centre for Energy Advancement through Technological Innovation, and Power Advisory.

The goal of the report was to better understand the potential for, and strategic value of, pumped storage hydropower (PSH) facilities in Canada as the country presses forward with the energy transition in response to the Government of Canada's commitment to achieving a net zero emissions electricity supply by 2035 and a net zero economy by 2050.

Hydropower has played the role of the grid's primary supply and stabilizing backbone for over a century, and with the increasing penetration of non-dispatchable renewable generation from wind and solar power, will need PSH to supplement this role.

Over 8,000 gigawatts of potential at almost 1,200 site locations were identified in the report. Most potential locations are in British Columbia, Québec, and Newfoundland and Labrador, with some opportunities in Alberta and Ontario. These results demonstrate the importance of pumped storage projects to facilitate large-scale energy storage in Canada.

"This report shows that the potential for pumped storage hydropower, although not uniformly distributed across our country, is for all practical purposes inexhaustible," said Michael Morgenroth, Stantec's principal investigator on the project and business leader for hydropower and dams in Canada. "It is now a matter of identifying the need for pumped storage hydropower and selecting the most appropriate sites for development."

Pumped storage hydropower accounts for over 90 percent of global electricity storage and provides large-scale, high-capacity storage. It also affords grid operators a mechanism for frequency regulation, load following, inertia, reactive power, and black start capabilities. These features are becoming more critical with the integration of variable renewables in our electricity system allowing for a more reliable, sustainable grid.

The PSH "water battery" is uniquely versatile, proven and sustainable in that it stores unparalleled amounts of energy up to gigawatt-hour (GWh) levels over a wide range of time periods from seconds to days and longer. Depending on the prevailing need, it can serve a versatile range of purposes such as

- fulfilling scheduled short-term capacity and energy demands
- shifting load-demand imbalances
- energy arbitrage according to daily patterns of variable renewable (wind and solar) generation and consumer demand
- stabilize frequency and voltage of a power grid
- serve to stabilize the transmission system through spinning inertia.

"Canada has a tremendous pumped storage hydropower resource, and we are pleased to work with Stantec and its team to highlight this," said Gilbert Bennett, President, WaterPower Canada. "While Canada is the fourth largest hydropower producer in the world, pumped storage hydropower provides additional opportunities to integrate variable renewables reliably into the Canadian electricity system." The report includes several key recommendations, one of which is to study the Canadian context for transmission, hydro, wind, solar, and PSH in order to realistically implement a renewable generation mix aligned with the schedule for Net Zero Targets. International comparison suggests that deployment rates for renewable energy sources need to accelerate by an order of magnitude which will have significant effects on the future need for PSH.

A copy of the full report can be found here. https://waterpowercanada.ca/resources/ pumpedstoragehydropowerincanada/

OPG'S SIR ADAM BECK 1 GENERATING STATION TAILRACE DECK REPLACEMENT







ir Adam Beck 1 (SAB1) is a 10-unit, 550 MW generating station located in Niagara-on-the-Lake, Ontario. About 10,000 people were employed during construction of the station between 1917 and 1930 and, at the time, it was regarded as the first true hydroelectric megaproject in the world. The machinery and tools used to construct the station were developed in parallel as nothing similar had ever been built before. Station construction continued throughout the 1918-1920 Great Influenza Epidemic. Initially named the Queenston-Chippawa Hydroelectric Development, it was renamed Sir Adam Beck 1 in 1950.

Once completed, SAB 1 was considered to be the largest hydroelectric station in the world. Built roughly 9.5 kilometres downstream of the Falls, the station was able to take advantage of the higher elevation which increased hydraulic head. This location required the construction of an open cut canal from the Welland River near Chippawa to divert water to the station intake. Due to water requirements, the Welland River between the canal intake and the Niagara River was dredged to allow more water to flow.

The station was declared a National Historic site of Canada in 1990 because of its engineering accomplishments and the economic impact it had on the province of Ontario. OPG has since developed a Strategic Conservation Plan with the goal of selecting aspects of the iconic station for preservation from an architectural-heritage perspective. The selected features are intended to retain the original historic appeal of the 100-year-old exterior facade.

Based on these heritage requirements, it's integral that projects like the tailrace deck initiative, preserve the original aesthetic of the building, while also ensuring that new designs meet current Canadian Design Code requirements. Specific to the tailrace project, the conservation plan identified the original arched beams below the deck as key components to be carried into the new design.

The tailrace deck project is being undertaken by OPG in partnership with Hatch Ltd., Rankin Construction Inc., and Ellis Engineering. Detailed design and construction commenced in 2022 and is scheduled for completion in 2024. The new deck is being constructed to meet OPG's functional requirements, provide reliable long-term operation, and allow the safe passage of trucks, cranes, and people supporting the station.

With the scope limited to above the Niagara River waterline, the new design includes expanding the single-lane driving surface from its original width of 4.11 metres to 5.87 metres, covering the approximate 180 metre length of the tailrace. The height of the deck is being raised by 0.8 metres to provide increased freeboard above maximum tailwater levels. To address heritage requirements, precast deck beams were designed with the outermost beam being constructed as an arch. A permanent access platform at the south end of the tailrace was also introduced. The 20 metre by 12 metre platform is founded on circular piles and comprised of a reinforced concrete deck with a portion extending above the Niagara River. The platform will benefit OPG operations by providing a staging and parking area at river level.

The single-lane tailrace deck remains largely accessible only from the south side of the SAB1 facility. Therefore, staging and logistics are paramount to the success of the tailrace project. To address this constraint, the demolition and reconstruction phases of the project are being staged from a large sectional barge, roughly 49 metres long and

BY BRENDAN ARGHITTU, CET, PMP, PROJECT MANAGER / CONSTRUCTION SPECIALIST, HYDROPOWER & DAMS, HATCH AND ANDRE FRIEDMANN P. ENG, PROJECT LEADER – OPG NIAGARA OPERATIONS

12 metres wide. The barge accommodates an 85 ton crawler crane and two 35.5 ton excavators among other required equipment.

Due to the fast flowing and turbulent waters of the Niagara River, traditional methods of using spuds and tugboats to respectively anchor and move the barge was not practical. Consequently, a temporary mooring system was designed including heavy cables and winches connected to anchor points on shore.

The mooring system permits the barge to be shuttled longitudinally along the entire length of the tailrace throughout the project. When stationary, the barge is attached rigidly to the tailrace piers by two steel struts with hinged connections allowing constant movement with fluctuating tailrace water levels. The barge mooring system was designed to allow OPG to operate SAB1 primarily unhindered throughout the construction.

The project achieved a major milestone in September 2023 when the demolition phase was completed. Moving from north to south, controlled demolition was carried out using excavator mounted hydraulic equipment while a skip bucket, suspended by crane, captured all demolition debris. Proceeding from south to north, the reconstruction phase of the project started in October 2023. The tailrace deck reconstruction was quickly taking shape with the first sections of the new deck being placed at the south abutment during Q4.

The entire project team remains eager to see efforts coming to fruition on an iconic Canadian facility of historical significance to OPG, the hydropower industry, and the Province of Ontario.

Vale Canada's WABAGISHIK SPILLWAY SIDE DAMS Replacement Projects

ver the period from 1890 to 1910, the mining industry in the Sudbury area was transformed by the discovery of major resource deposits as well as the construction of The Canadian Pacific Railway's Algoma Branch. As a result, Sudbury quickly grew in reputation for its vast wealth of natural resources including nickel ore, copper and other precious metals as well as lumber.

Along with the industrialization boom came a large increase in the region's demand for electricity. Sudbury, with its rugged topography and numerous rivers across the landscape, presented itself as an ideal opportunity for the development of hydropower.

One such development was the Wabagishik Dam and Generating Station which was constructed on the Vermillion River approximately 50 km west of Sudbury, upstream of the river's confluence with the Spanish River System and the Town of Espanola. The original dam and generating station are believed to have been built around 1908. Over the period of 1913 to 1972, a number of modifications were carried out, including raising the dam height by 9-ft to increase available head (1913), constructing a new log chute (1947) and two major sluiceway alterations (1929 & 1972). In recent years, the Wabagishik Spillway and Side Dams were determined to have reached the end of their respective service lives and the decision was made by Vale Canada to construct replacement structures.

In 2017, Hatch completed a study to consider replacement options for the spillway including various gate configurations. The selected spillway arrangement included a new four-bay vertical wheeled gated structure with both increased flood capacity and a heightened crest elevation. Each gate is 5.2 m wide x 7.3 m high and is operated by an electric wire rope hoist. Heating is provided for the gate guides and an agitator system installed on the upstream side of each gate to permit operation during the cold Sudbury winters. The footprint of the new spillway was located approximately 12 m downstream of the existing dam which allowed the existing dam, spillway gates and stoplog bays to be used as a cofferdam during construction. The new facility includes a new spillway control building providing remote operations and full integration into Vale's SCADA system, as well as a hoist enclosure on the hoist support structure.

Project phasing and winter weather were important considerations for construction execution. Temporary training and closure walls were a critical aspect of project phasing as they allowed the project to maintain a wet side and dry side throughout construction. Temporary training walls were built so that three of the four spillway bays could be constructed and commissioned on the east side of the river while flows were passed on the west side. The subsequent project phase involved construction of a temporary closure wall extending from the existing spillway to the completed portion of the new spillway, allowing the Vermillion flows to be passed on the east side of the river via the existing spillway stoplog bays and the three newly constructed spillway passages. With the west side of the river dewatered, the last spillway bay was constructed, in addition to the gravity tie-in structure extending to the west abutment.

The Wabagishik side dam site is situated approximately 350 m to the east of the main Wabagishik facility and was originally constructed as saddle dams to provide closure of the Wabagishik head pond, also known



as Ella Lake. The original side dams included two structures, Dam A was a 60 m long concrete gravity structure and Dam B a 50 m long embankment. Similar to the Wabagishik Spillway construction approach, the selected option for the side dam project utilized the existing dams as a cofferdam during construction. With a total height of 13.5 m, and an increased crest elevation matching the replacement spillway, the new 160 m long concrete gravity structure was built at the same time as the new spillway (2019 to 2022). Once completed and fully commissioned, demolition of the original spillway and side dams was carried out as a marine operation staged from barges using heavy equipment and primarily mechanical means.

In undertaking these projects, Vale partnered with multiple organizations, including Hatch Ltd., Stuart Olson Industrial Constructors Inc., Mecan Hydro, M2i, EXP Engineering, and Cecchetto & Sons Ltd. along with other suppliers. All involved parties are extremely proud of what was accomplished on these two century old dam sites.

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SURVEY REVEALS FROM ONTARIO'S

Earlier this year, an OWA memberled committee was created to discuss and address the workforce challenges faced by Ontario's waterpower industry – particularly the retention and recruitment of talent. The Committee is comprised of the following individuals and member companies:

Merry Dang, KGS Group (Co-Chair) Jonathan Atkinson, Hatch Jason Hoskin, Peterborough **Utilities Inc.** Jean-Michel Julien, GTA Hydro

Sharon Mandair, Stantec

Bryan Moloughney, Equinox Construction Services Javier Viloria, CIMA+

MERRY DANG, DIRECTOR, BUSINESS DEVELOPMENT, KGS GROUP

At the outset, the Committee identified a need to better understand both the issues and opportunities so it could then determine how best the OWA could support its members. To do this the group developed a short survey, which was conducted throughout the summer, and completed by seventynine (79) participants ranging from students and recent graduates to seasoned professionals with over two decades of experience and employed in various fields within the waterpower sector. An Executive Summary of survey results can be found here https://owa.ca/wp-content/uploads/2023/10/ Workforce-Insights-for-the-Waterpower-Industry-2023.pdf

A prevalent belief among the survey participants was that the waterpower industry will continue to require a robust workforce in the foreseeable future, with 84% of participants indicating that their organization will have a need for new employees over the next three (3) years. However, this sentiment was accompanied by concerns regarding recruitment and retention efforts. The imminent wave of

84%

retirements within the industry adds urgency to the task of replenishing and sustaining the workforce.

of participants indicated that their organization will have a need for new employees over the next 3 years

An overwhelming 91% of survey participants expressed high levels of job satisfaction, with an inclination towards remaining in the waterpower industry for the next five years. Moreover, a substantial number of respondents indicated a willingness to endorse the industry to potential job seekers, highlighting a positive perception of the sector's career prospects. However, the survey also unveiled that a notable portion of respondents perceive their organizations to be performing only "good" or "average" in terms of recruiting and retaining talent for the waterpower industry. This suggests room for improvement in enhancing recruitment strategies and ensuring employee retention, particularly in light of the looming challenge posed by retirements.

91% of participants said they were satisfied or verv satisfied working in Ontario's waterpower industry

When asked how the OWA could best support its members facing workforce challenges, the participants expressed a need for increased promotion and advocacy efforts and a need to effectively communicate the industry's benefits and opportunities to a broader audience, including potential

job seekers. The OWA has already started to develop a strategy that it plans to fully implement in 2024. Key areas of the strategy include the development of execution of various communication initiatives, fostering of partnerships with colleges, universities and other organizations and the OWA will be participating in various career fairs throughout 2024 highlighting and profiling employment opportunities within Ontario's waterpower industry.

The survey has provided invaluable insights into the pressing workforce issues for our industry and by delving

into these issues the OWA hopes to make significant steps towards addressing the challenges and helping to shape the industry's future workforce.



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The year 2024 will mark the halfway point of the current provincial (and potentially federal) government's mandate and by all accounts will be a transformative time for the electricity sector in general and waterpower in particular. So, consistent with other "Year in Review" publications and predictions, here's a "Top 10" list of opportunities (alphabetically) that are on the OWA's radar:

Alternative Procurement for Waterpower

As directed by the Minister of Energy, the IESO is to report back by Q1 2024 on considerations for a potential separate procurement for resources with long lead times and long lifespans, such as long-duration storage, and hydroelectric generation. Decisions are also expected on the path forward for two (2) pumped storage projects. The OWA will continue to bring forward the unique attributes and value of these perpetual assets.

Clean Technology and Clean Electricity Investment Tax Credits

The federal government has begun implementing the Clean Technology Investment Tax (CTITC) Credit (up to 30% of eligible capital costs for hydroelectric facilities <50 MW) and has expanded the eligibility through the Clean Electricity Investment Tax Credit (CEITC) (no limitation of size, inclusion of refurbishments, both taxable and non-taxable entities included). Details of the CEITC are expected to be finalized in 2024. Given the current sunset of these programs in 2034/2035, it will be imperative that new investments in hydro be enabled by provincial policy and procurements as soon as possible.

Electrification and Energy Transformation Panel

In 2024 the Ministry of Energy will be considering and responding to the Report of the Electrification and Energy Transformation Panel, tabled at the end of 2023. The panel will advise the government on high-value short, medium and long-term opportunities in the energy sector including: enabling investment and job creation in Ontario by keeping energy rates low; creating a more predictable and competitive investment environment; building on the government's work to meet energy needs and ensure a reliable, affordable and clean electricity supply; and strengthening Ontario's long-term energy planning process by better coordinating the fuels and the electricity sectors.

Future Clean Electricity Fund

The government will be considering and developing a response to the IESO's Report back on options for a Future Clean Electricity Fund that would support the development of new clean electricity projects and/or programs. Indigenous and community capacity building and a mechanism to recover predevelopment costs are key priorities for the OWA.

Indigenous Loan Guarantee Program

The federal fall economic statement commits to an Indigenous Loan Guarantee Program, with next steps announced in Budget 2024. The document notes this mechanism is intended to help facilitate Indigenous equity ownership in major projects in the natural resource sector. This program will be informed by Natural Resources Canada's ongoing work to develop a National Benefits-Sharing Framework. Indigenous partnerships and proponency in waterpower could be significantly advanced through this initiative.

Long Term RFP 2 and beyond

Recently, the IESO published its "Evaluating Procurement Options for Supply Adequacy - A Resource Adequacy -Update to the Minister of Energy" report which outlines IESO's plans for a cadenced schedule of procurements for medium-term commitments for existing resources and longterm commitments for new build and upgraded resources. It identifies that the Long-Term RFP 2, is expected to seek about 2,000 MW of energy-producing resources, with future procurements every two years to secure the remaining 3,000 MW. This approach aims to provide investment certainty for different resource types, with varying forward periods to allow for project development. This provides an opportunity for developers and investors who wish to begin pre-development work and focus on a subsequent long-term procurement and for those who wish to submit a proposal for a future target in-service date.

Market Renewal Launch

2024 will be the "ready, set" precursor to Market "Go-live" in 2025. The OWA continues to work through hydro-specific considerations in Program and Rules design, including considerations for cascade systems, the approach to determining operations and maintenance costs and addressing potential impacts of increased unit starts and stops. For issues that remain unresolved, the OWA will work with the IESO to proactively develop a monitoring and adjustment framework.

So, while the past couple of years have been focused primarily on our strategic objective of sustaining and enhancing existing assets, 2024 and the years to follow will see an increased emphasis on our goal of providing new opportunities for waterpower development and industry growth across the province.

To borrow from the Warren Buffet quote on Opportunity "Someone is sitting in the shade today because someone planted a tree a long time ago. ..." -"Ontario has reliable, affordable, sustainable electricity today because someone built a hydro facility a long time ago". Time to build for tomorrow.

Ministerial Working Group on Regulatory Efficiency for Clean Growth Projects

Established in September 2023, this federal working group is tasked with coordinating government efforts to grow the clean economy and meet net-zero commitments by ensuring an efficient regulatory framework to support the development of clean growth projects. A number of Ministers with portfolios of relevance to waterpower are on the working group, including Finance, Fisheries and Oceans and Energy and Natural Resources. The OWA will pursue opportunities to inform and advocate to the working group in 2024.

Northern Hydro Program

Building on the successful efforts to develop the Small Hydro Program (SHP), the OWA anticipates a focused and expeditious effort with the Ministry of Energy and the IESO to re-contract hydroelectric facilities with an installed capacity of >10 MW. As the government has noted in its series of Directives, hydroelectric facilities of all sizes play an important role in meeting Ontario's electricity needs, as well as providing benefits such as flood control, irrigation, tourism and facilitating local employment and economic development. With the heavy lifting done through the SHP, the design of a Program to recontract these remaining perpetual assets, all of which are in Northern Ontario, should happen quickly.

Ontario Infrastructure Bank

Announced in the fall economic statement, the Ontario Infrastructure Bank is a new, arms-length, board-governed agency that will enable public-sector pension plans, other trusted institutional investors and Indigenous communities to further participate in large-scale infrastructure projects across the province. Initially, projects financed through the Ontario Infrastructure Bank will focus on the following priority areas: long-term care homes; energy infrastructure; affordable housing; municipal and community infrastructure; transportation. New waterpower and enabling transmission can and should be supported by this innovation.

Industry Events Listing

Rural Ontario Municipal Association Conference Toronto, Ontario January 21-23, 2024

OWA's Queens Park Advocacy Day Toronto, Ontario March 27, 2024

NHA's Waterpower Week in Washington Washington, D.C., USA March 13-15, 2024

CEATI International's Hydropower Conference California. USA March 19-20, 2024

Northwestern Ontario Municipal Association Conference Thunder Bay, Ontario April 24-26, 2024

Federation of Northern Ontario Municipalities Conference Sudbury, Ontario May 6-8, 2024

Power of Water Canada Conference Niagara-on-the-Lake, Ontario May 8-10, 2024

HydroVision International Denver, Colorado July 15-18, 2024

Association of Municipalities of Ontario Conference Ottawa, Ontario August 18-21, 2024

Canadian Dam Association Conference Niagara Falls, Ontario September 23-25, 2024

Canadian Waterpower Week (Waterpower Canada) Ottawa. Ontario September 25-27, 2024

Clean Currents Conference Portland, USA October 7-10, 2024

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