Submission on the Wesleyville New Nuclear Project

Regulatory Gaps, Deficient Need Assessment, and Failure to Assess Reasonable Alternatives

Submitted by: Climate Action Newmarket–Aurora
Process: Impact Assessment Act – Initial Project Description (Wesleyville New Nuclear Project)
Proponent: Ontario Power Generation (OPG)

Executive Summary

Climate Action Newmarket–Aurora (CANA) submits that the Initial Project Description (IPD) for the Wesleyville New Nuclear Project is yet to meet the evidentiary threshold required under the *Impact Assessment Act* (IAA) to justify proceeding toward a full impact assessment without substantial additional information.

International best practice, including guidance from the International Atomic Energy Agency (IAEA) and the UNECE Espoo Convention, requires that major nuclear proposals be evaluated in the context of reasonable alternatives, lifecycle impacts, and systemic risk. These requirements are not meaningfully satisfied in the current IPD.

The IPD frames new nuclear generation as a necessary and timely response to projected electricity demand growth in Ontario, arguably 11,200 -46,000 mWh by 2050. However, it is yet to show a rigorous demonstration of need, is without a comparative assessment of reasonable alternatives, and is without transparent disclosure of long-term environmental, health, cost, mid-term energy security and governance implications. Moreover, the proposal doesn't address the reduction in emissions in a detailed manner, which is the main goal of cleaner energy. As a result, the project description reflects more of a *policy preference* rather than an *unavoidable technical necessity*.

Specifically, this submission finds that:

- The need for new nuclear capacity at the proposed timeline is not demonstrated, given Ontario's existing reserve margins, planned storage uptake and demand-response resources, and the rapid deployability of renewable alternatives.

- Reasonable non-nuclear alternatives, including offshore wind, onshore wind, utility-scale solar, storage, and hybrid portfolios, are not rigorously assessed, despite their ability to deliver earlier emissions reductions at comparable or lower cost and risk.

- Long-term radioactive waste obligations associated with new reactors are not resolved, particularly given the finite capacity and extended timelines of Canada's proposed Deep Geological Repository.

- System-wide concentration risk, ratepayer exposure, and intergenerational governance burdens are understated.

- While reducing emissions is implied as a rationale for expanding nuclear capacity in Ontario and Wesleyville is referenced within a "clean energy" context, the public proposal so far including the initial project description doesn't yet contain specific quantified emissions reduction commitments for the Wesleyville plant itself. This should be apparent now rather than closer to construction.

Consideration of the purpose of and need for the project (Section 22(1)(a) of the *Impact Assessment Act*):

CANA believes Canada must strengthen energy independence while delivering clean, reliable electricity to meet its climate commitments. As new nuclear generation is proposed as part of Ontario's long-term electricity planning, it is essential that this option be assessed alongside reasonable, viable additions and alternatives as part of the formal project review process. This approach aligns with international nuclear safety and siting guidance, including IAEA Safety Requirements SSR-1 §4.15, which emphasizes the consideration of alternative options in the justification and evaluation of nuclear facilities. Best international practice, including the UNECE Espoo Convention and IAEA SSG-10 on environmental impact assessment, further recommends a thorough evaluation of reasonable alternatives, potential environmental and health impacts, and socio-economic consequences. These components are critical for a complete and responsible project assessment, particularly for mid-term energy solutions intended to accelerate the transition away from fossil fuels.

Climate Action Newmarket–Aurora recognizes that transitioning to a clean electricity grid at the scale of a new nuclear plant would require immediate, intense, and expansive procurement of renewable generation well beyond what Canada has undertaken to date, approximately 6000 wind turbines (less with newer models) and 110,000,000 solar panels. While this level of deployment would be unprecedented domestically, it is technically and logistically feasible, as demonstrated by jurisdictions such as California that are rapidly scaling renewable capacity while maintaining grid reliability - 2 million solar projects and 112 utility wind farms (the San Gorgonio Pass wind farm includes over 650 turbines at one site.

Assessing alternative pathways is particularly relevant because onshore and offshore wind and solar resources can be deployed on shorter timelines than new large-scale nuclear facilities. Even though the procurement would still have to be ongoing for over 20 years to meet the scale of energy diversification required, it would still enable earlier emissions reductions and contribute to near- and mid-term system resilience during a period of rapid transition. Considering these alternatives ensures that energy policy decisions are informed by both technical feasibility and system flexibility, rather than assumptions about a single dominant technology. Large-scale renewables must be in the portfolio now to transition away from gas-generated electricity otherwise emissions remain the same until well into the late 2040s.

This submission highlights gaps and underreported elements in the current Wesleyville project descriptions, presents reasonable renewable alternatives and emerging clean energy options relevant to Ontario's system planning context, and identifies key challenges associated with proceeding with a new large nuclear project. It emphasizes that current nuclear proposals reflect policy choices related to timing, risk allocation, and system concentration, rather than an unavoidable technical necessity, and that these considerations require more comprehensive evaluation to justify a project of this scale and duration.

Assessing New Nuclear in Light of Renewable Alternatives
(Section 22(1)(e) of the Act)

Providing further detail on the range of alternatives considered, along with the criteria used to evaluate them, would assist in understanding how the proposed approach was identified and how it performs relative to other reasonable options that may be available at this stage of system planning.

Provincial electricity system planning increasingly reflects generalized assumptions about renewable energy, particularly offshore wind, that do not fully align with established planning evidence or international operating experience. Variable renewable resources are often evaluated under assumed province-wide, multi-day low-output conditions coincident with peak demand, while firm generation technologies are assessed under steady-state operation without equivalent consideration of system flexibility, ramping capability, integration constraints, or the full lifecycle and financial risks associated with high baseload concentration. This imbalance can overstate the technical and economic barriers to renewable integration while understating the operational and financial implications of relying heavily on inflexible nuclear generation, including long construction timelines, extended capital recovery periods, decommissioning costs, long-term waste management obligations, and the system-level storage or integration costs that arise when nuclear output must be balanced with variable renewables. While the storage requirements for nuclear are typically lower than those for solar or onshore wind, they are non-negligible, particularly during periods of high renewable output or low system demand, and must be factored into total system cost and flexibility assessments.

Offshore wind is frequently characterized using onshore wind performance metrics, despite materially different capacity factors, production profiles, and correlation characteristics. In large freshwater bodies such as the Great Lakes, offshore wind benefits from strong and persistent wind regimes driven by temperature differentials, particularly during fall, winter, and shoulder seasons that align with Ontario's peak and near-peak electricity demand. Studies indicate that Great Lakes offshore wind resources can achieve capacity factors comparable to, and in some cases exceeding, 40%, with lower short-term volatility and reduced correlation with inland wind lulls. Emerging offshore energy systems that integrate wind generation with wave energy capture on shared platforms are at the demonstration stage. Early research suggests that co-located wave energy production may complement wind generation, smoothing output and improving overall utilization of offshore infrastructure. These technologies reinforce the value of preserving system flexibility and the ability to integrate cleaner, complementary resources as they mature.

From an IESO system-planning perspective, reliability, affordability, and emissions reduction objectives are best supported by a diversified resource mix in which no single technology is expected to provide energy, capacity, flexibility, and resilience simultaneously. Planning approaches that position large-scale nuclear expansion as the primary alternative to renewable growth risk underestimating both the operational inflexibility of high baseload concentration and the significant lifecycle and financial obligations it entails. Even firm nuclear generation can impose system-level storage and integration costs in high-renewable scenarios, particularly when output cannot easily be shifted to match demand. While these costs are generally lower than for variable renewables, they remain a meaningful component of total system cost and must be incorporated into planning assumptions. A portfolio emphasizing renewable generation, including onshore and offshore wind and solar, supported by existing hydroelectric capacity, demand-side resources, right-sized storage for short-duration flexibility, and a limited amount of firm nuclear capacity to meet non-dispatchable reliability requirements, can achieve system adequacy without expanded natural gas generation or excessive dependence on any single technology.

Need for greater Proposal transparency or clarification:

System Concentration Risk (Sections 22(1)(f) and 22(1)(h) of the Act)

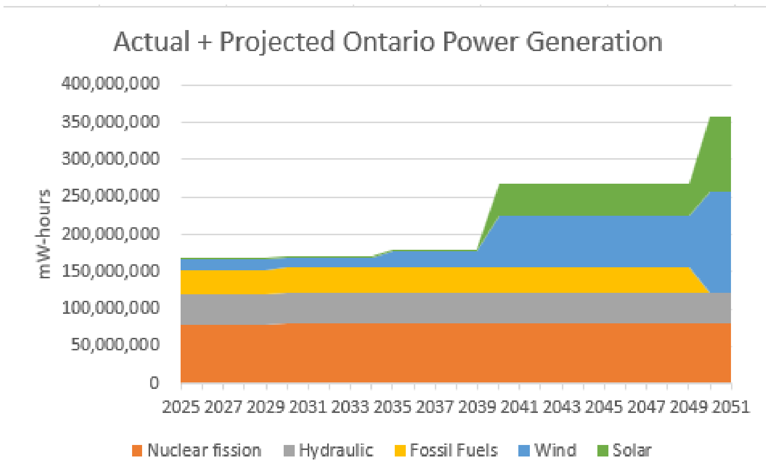
- Projected reliance on nuclear generation (approximately 75% by 2050) concentrates operational and financial risk, as outages, maintenance requirements, or technical issues affecting a limited number of large facilities could have system-wide impacts. Although low-probability, high-impact events are uncommon, experience in other jurisdictions demonstrates that failures at centralized nuclear facilities can result in widespread social, environmental, and economic consequences (e.g., Fukushima Daiichi, 2011).
- International experience suggests that diversified renewable portfolios can mitigate concentration risk by spreading capital investment and operational exposure across a larger number of assets, reducing the financial and system impacts associated with unplanned outages at any single facility. In this context, the timing and scale of renewable deployment in other jurisdictions illustrates an approach that can support both system resilience and risk mitigation.
- Grid planning should consider emissions reductions, economic benefits, and energy independence achievable from renewables before any nuclear commissioning.

Energy Independence, Reliability, and Resilience (Section 22(1)(i) of the Act)

- Ontario retains bulk control and revenue from Darlington SMRs, but reliance on foreign designs and expertise creates long-term technology dependence.
- Renewables may import components during construction but avoid multi-decade technology or fuel dependency and have less embodied carbon to manage.
- Ontario’s nuclear stations are mid-life; Pickering faces retirement or life extension decisions in the 2030s. Many hydro stations will require ongoing investment or replacement.
- Renewables, as demonstrated by Henvey Inlet Wind, Nanticoke Solar, and Wataynikaneyap Transmission, retain a higher share of economic value domestically and with many more immediate installations, near-term energy security and reduction of gas-generated electricity could be addressed while investing in the development of other clean energy technologies.

Assessment of Resource Diversity and Alternatives (Section 22(1)(e) of the Act)

- The Wesleyville proposal does not explicitly describe the timing or sequencing of alternative generation resources. The projected pathway illustrated in the accompanying analysis reflects broader system planning assumptions rather than commitments articulated within the proposal itself. As presented, the proposal does not assess flexible or distributed alternatives such as renewable generation paired with storage, demand-side resources, or other non-centralized options that could contribute to system reliability and capacity in the near or medium term.



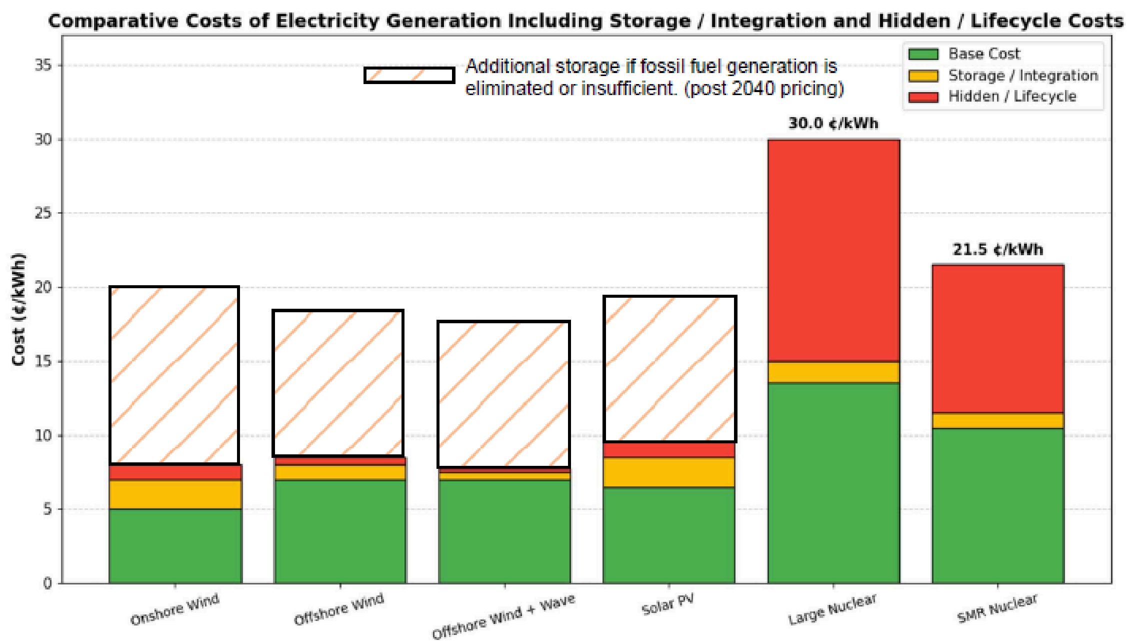
- Based on the extrapolated projections, renewable generation is expanded primarily in the later stages of the forecast period, with relatively limited growth in the near and medium term. Given the pace and scale of wind and solar deployment observed in comparable international electricity markets, it is not evident from the current planning materials why similar levels of near-term renewable development are not reflected in Ontario's projected pathway. This represents an informational gap in the assessment of alternative pathways and their potential contribution to system flexibility, risk mitigation, and economic prudence.

Economic Considerations (Sections 22(1)(f) and 22(1)(h) of the Act)

- Large nuclear projects require multi-billion-dollar capital investments, long construction timelines, and expose ratepayers to significant cost escalation and delivery risk. For example, the first SMR at Darlington is estimated at $7–8 billion CAD, excluding financing, waste management, decommissioning, and broader system integration costs.
- In an electricity system with declining or no reliance on gas-fired generation, nuclear facilities increasingly function not only as energy producers but as providers of firm capacity and system reliability. This role shifts cost exposure toward higher fixed and integration costs, including increased reliance on storage, demand flexibility, and export management during periods of low demand.
- When these system-level costs are accounted for, nuclear electricity remains among the highest-cost non-emitting options on a per-kilowatt-hour basis. By contrast, renewable

energy technologies continue to deliver lower average costs even after incorporating the additional storage, balancing, and transmission required to meet peak and off-peak demand.

- While both nuclear and renewable systems require investment in transmission, storage, and grid flexibility, renewable technologies benefit from modular, incremental deployment. This allows costs to be managed over time and reduces the financial risk associated with large, irreversible capital commitments.
- Renewable deployment also supports domestic job creation, particularly in rural and Indigenous communities, retaining economic benefits in Canada while supporting a more resilient and adaptable electricity system.



Possible Alternatives at the Wesleyville Site

- The Wesleyville site presents an opportunity to pursue a diversified portfolio of non-emitting generation options that leverage existing Hydro One transmission infrastructure and avoid the high cost concentration associated with a single large nuclear facility.
- Offshore wind development at this location could provide substantial energy output with higher capacity factors and improved alignment with seasonal demand. When storage and grid integration are included, offshore wind remains cost-competitive relative to nuclear while offering shorter construction timelines and lower exposure to cost escalation.
- Utility-scale solar development is also feasible. A 634-acre solar installation could supply electricity to approximately 11,770 homes in Port Hope. Even after accounting for

storage required to manage daily and seasonal variability, solar generation continues to deliver lower average costs than nuclear on a delivered-energy basis.

- Taken together, offshore wind and solar development offer a combination of lower delivered costs, faster deployment, and reduced long-term financial risk. In a system transitioning away from gas-fired generation, these alternatives distribute reliability and integration costs across multiple assets rather than concentrating them in a single, high-cost nuclear project.
- The Wesleyville site could support offshore wind and utility-scale solar using existing Hydro One transmission.
- Aside from Wesleyville, approximately 3,146 offshore 5 MW turbines, would produce energy comparable to the proposed nuclear project with a 0.3146 km² offshore footprint. India, China and the U.S. have wind farms of such sizing.

Suggestion: A Cleaner Future Alternative - Bridging Emerging Technologies

- Global investment for fusion energy is projected at approximately $350 B USD by 2050. While fusion is under development internationally, it is still not currently reflected in Ontario's electricity planning assumptions.Fusion is not explored as an alternative energy source in this proposal.
- Fusion could provide near-zero-carbon baseload power, potentially deployable in the 2030s. New fission reactors would not contribute materially until the late 2030s or 2040s. Ontario's electricity system is currently reliable; conservative reserves, interprovincial agreements, demand-side management, growing storage, and distributed resources maintain capacity. Rapidly deployable renewables could serve to deliver immediate emissions reductions and enhance energy security, providing a practical, lower-risk bridge while fusion and other emerging technologies mature. This type of bridging is missing from the proposal.

Key Takeaways

- Renewables could be operational 8+ years earlier than new nuclear, potentially providing earlier emissions reductions.
- Capital costs for a balanced renewable mix are comparable to or lower than nuclear, without long-term radioactive waste obligations.
- Modern wind and solar projects are efficient, scalable, and integrate well with agriculture and other land uses.
- Offshore wind, particularly in the Great Lakes, has higher capacity factors and lower variability than onshore wind, and emerging wind–wave co-generation could further reduce storage needs.
- Heavy reliance on nuclear (~75% by 2050) concentrates risk and increases vulnerability to outages or accidents.
- Even smaller Small Modular Reactors (SMRs), while reducing some upfront capital and construction risks, remain largely at the demonstration stage, require low-enriched uranium primarily imported from the U.S. and Europe, and therefore carry supply chain and energy security considerations.

- Severe nuclear events, though rare, have large social, environmental, and economic impacts (e.g., Fukushima Daiichi).
- Ontario's renewable growth has lagged globally; in 2024, 92.5% of new electricity capacity worldwide was renewable, while gas-fired generation in Ontario is increasing to 16.6%, projected to reach 25% by 2030.
- Rapid renewable deployment could serve to preserve flexibility for emerging clean technologies and help manage system risk during periods of rapid demand growth or energy transition.
- Diversified energy portfolios, combining renewables with a limited amount of firm nuclear energy, reduce systemic, financial, and operational risk, while supporting near- and mid-term energy security.

Part 2: Considerations for this New Nuclear project after alternatives are considered.

The following sections examine critical challenges and uncertainties associated with proceeding with a new nuclear project. These include lifecycle costs, long-term waste management, operational and environmental risks, and governance considerations. International best practices, including IAEA guidance on safety, environmental assessment, and risk management, underscore the need to fully consider alternatives, community consent, and flexible, lower-risk energy options before committing to a high-cost, long-lead nuclear project.

Independent Waste Management Complexity (Sections 22(1)(a), 22(1)(g), and 22(1)(s) of the Act)

- Canada currently stores spent nuclear fuel safely in interim facilities at reactor sites, requiring ongoing oversight and long-term financial commitment.
- The Wabigoon Lake/St. Ignace DGR cannot accommodate new facility waste, underscoring unresolved obligations created by nuclear expansion.
- Any Wesleyville reactor must have a pre-approved, long-term waste strategy. Existing repositories are insufficient for new waste streams.

Cost and Risk Management Transparency (Sections 22(1)(f) and 22(1)(h) of the Act)

- The Province is seeking OEB approval for electricity rate increases that could raise bills by ~70% in 2027 to cover Darlington and Pickering; *this excludes new projects.*
- Nuclear projects historically exceed initial cost projections. Full lifecycle costs, including construction, operation, refurbishment, decommissioning, and waste disposal, must be publicly disclosed and independently reviewed. The Wesleyville proposal requires greater transparency on the cost to consumers both now and when the plant is functioning.
- Risk management should explicitly address both the likelihood and magnitude of failure, as well as potential supply chain and geopolitical vulnerabilities. For example, reliance

on imported low-enriched uranium for SMRs could pose operational and national security concerns in the event of international disruptions.

Environmental and Intergenerational Impacts (22(1)(s) of the Act)

- Nuclear energy has a high embodied carbon footprint, including mining, fuel fabrication, plant construction, refurbishment, and decommissioning.
- Long-lived nuclear waste remains hazardous for tens of thousands of years, creating intergenerational health, environmental, and governance risks.
- The proposed Wabigoon Lake/St. Ignace DGR is designed for approximately 5.9 million fuel bundles from existing reactors, illustrating technical complexity, long timelines, and social controversy.
- Future waste from new reactors would require additional repositories, regulatory approvals, and community consent. This proposal requires the details on how the waste locations would be procured and when.
- Indigenous Peoples and host communities must have binding authority over siting, storage, monitoring, and long-term stewardship, with transparent and enforceable regulatory frameworks.

Conclusion

In accordance with IAEA Safety Requirements SSR-1 §4.15, a more detailed assessment of site and regional characteristics, alternatives, and system-level impacts is necessary. A diversified energy portfolio, combining renewables with a limited amount of firm nuclear and renewed emphasis on demand management options, maximizes economic and environmental benefits, preserves flexibility for emerging technologies, mitigates systemic risk, and supports a balanced approach to public, environmental, and financial interests while ensuring Canada's energy system is well positioned for the clean energy transition.

Mapping of Impact Assessment Act Information Requirements to Suggested Enhancements

Information Area	Relevant IAA Section	Information in IPD	Suggested Enhancement	Potential Benefit
Purpose of Project	**s.22(1)(a)**	**General policy framing**	**Clarify technical objectives distinct from policy goals**	**Improved understanding of project rationale**
Need for Project	**s.22(1)(a)**	**High-level statements**	**Provide demand and capacity scenarios**	**Clearer assessment of timing and necessity**
Alternatives to Project	**s.22(1)(e)**	**Limited discussion**	**Comparative assessment of non-nuclear and hybrid options**	**More robust alternatives analysis**

Alternative Means	**s.22(1)(e)**	**Not addressed**	**Consider phased or modular approaches**	**Reduced uncertainty and flexibility**
Economic Feasibility	**s.22(1)(f)**	**Partial**	**Lifecycle cost and risk allocation overview**	**Improved transparency**
System Risks	**s.22(1)(i)**	**Minimal**	**System resilience and concentration analysis**	**Better understanding of reliability implications**
Waste Management	**s.22(1)(g),(s)**	**Incomplete**	**Clarify governance and capacity for additional waste**	**Long-term stewardship clarity**
Indigenous Considerations	**s.22(1)(c),(d)**	**General**	**Clarify long-term roles and decision-making processes**	**Improved understanding of governance relationships**
Cumulative Effects	**s.22(1)(a),(i)**	**Limited**	**System-level cumulative effects discussion**	**More complete Planning Phase record**

Canada requires reliable, net-zero electricity yet the Wesleyville nuclear project involves high upfront costs, long construction timelines as well as substantial embodied carbon, huge water resources, and ongoing waste management responsibilities. The current project outline contains gaps, inconsistencies, and missing comparative information, particularly regarding the viability, costs, system integration, and lifecycle emissions of renewable alternatives.

Relying on nuclear for ~75% of Ontario's electricity concentrates the energy system in a single technology, increasing operational, financial, and security risks. Even smaller Small Modular Reactors (SMRs), while reducing some construction and capital risks, remain largely at the demonstration stage and require low-enriched uranium sourced primarily from the U.S. or Europe, introducing supply chain and energy security considerations. In contrast, rapidly deployable renewables, including solar, onshore and offshore wind with emerging wave integration, provide lower-cost, lower-risk pathways that can meet Ontario's and Canada's energy needs, deliver earlier and sustained GHG reductions, and strengthen long-term energy security.

A diversified energy portfolio, combining renewables with a limited amount of firm nuclear energy, preserves flexibility for emerging technologies, reduces systemic risk, and provides a balanced approach to managing public, environmental, and financial challenges.

As a final note: if immediate, cost-effective, cheaper energy options can deliver meaningful greenhouse gas reductions today, Climate Action Newmarket-Aurora seeks clarity on why federal and provincial policy is not increasingly prioritizing large-scale renewables to achieve near-term emissions reductions, mid-term energy security, and long-term careers in Canada.

Respectfully,

Climate Action Newmarket-Aurora

Sources

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