# TACKLE ACOUSTIC ISSUES EARLY IN THE IESO PROCUREMENT PROGRAM





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Expanding renewables in Ontario is an exciting opportunity but is not without challenges. The noise standards in the province are complex and have undergone multiple changes over the years especially for repowering wind farms. Having an acoustical partner with the experience and knowledge of the regulations will be a key component to succeeding in the Independent Electricity System Operators (IESO) procurement process. Canada is focused on building a net-zero economy for 2050, and electricity is a key component. As the largest province, Ontario wants to do its part by making significant additions of non-emitting power generation to its future supply mix. <u>Electricity demand</u> in the province is predicted to double in the next 30 years, and the IESO has estimated it will cost <u>\$400 billion to decarbonize the power grid</u> by 2050.

To meet that anticipated demand, the IESO has started a massive power procurement effort that is expected to run with a regular procurement cadence of every two years from 2025 to 2029. As of 2024, the IESO is working through stakeholder consultation and contract drafting for the second stage of this long-term procurement (LT2). Current and future stages will address energy and capacity needs, which positions both generation and storage assets as possible participants in the process. On the energy side, the IESO is looking for new, refurbished or expanded energy-producing resources including wind, solar, bioenergy, and hydro, with 2,000 MW targeted to come online as early as 2030. The target is 500 to 1,000 MW in capacity-based assets, like energy storage.

It is an exciting time for renewable energy developers on the forefront of Ontario's electricity transformation. Developers will need to skillfully navigate the procurement process, currently in the LT2 stakeholder engagement phase, as their projects move from greenfield concepts, to submitted proposals, to hopefully operating assets. Noise constraints and the path to compliance is a major part of the financial considerations. Understanding the noise risks and cost implications before submitting a project proposal is key. Participants should expect a dynamic and changing process, as the IESO progresses through its procurement cadences, as there will most likely be adjustments to the RFP process and requirements based on lessons learned from the previous stages.

Old grievances persist in many communities still angry about the curtailment of municipal decision-making authority that was a hallmark of the previous Green Energy Act.

Some municipalities have now passed resolutions barring wind turbines within their boundaries. Overcoming this gap means working with experienced partners who know the industry and can leverage the wealth of data available to get projects moving forward.

Ontario has strict noise regulations, and the Ministry of the Environment,

Conservation and Parks (MECP) is responsible for enforcing them. All the projects under this IESO procurement will need to adhere to the noise regulations or risk heavy penalties and delays. Proactive noise management ensures compliance and safeguards a project's timeline and financial outcomes. Trying to solve noise issues after construction always impacts costs and revenues.

It will be important to understand noise constraints and the pathway to compliance to accurately assess noiserelated risks and costs. This is crucial for refining project proposals and ensuring competitive pricing, as noise constraints and mitigation strategies can have a major influence on costs and viability. Gaining early insight is essential for submitting a well-informed and financially sound project.



Whether building new or repowering an existing asset, developers want to maximize the generating potential of a site within the confines of available land. For wind power, companies need to balance a range of constraints when siting turbines across the available land.

Ontario's <u>noise control</u> guidelines for wind turbines have undergone multiple revisions since the first wind farms were built over 15 years ago, with each revision making the noise measurement and modelling regulation more stringent and conservative. Noise rules can feel like a complex web of requirements that are difficult to interpret, and missing a detail early, such as setting the wrong ground factor, could spell the end of a site. This could lead to unexpected layout changes or mitigation during the permitting phase that impacts the commitments in the bid submission.

The complexity increases for sites that are being repowered, as they were probably designed to old modelling parameters, and updated regulations may make it seem like changes are impossible. This is not the case, as even the current noise rules have allowances for established wind farms to make changes, but their requirements are nuanced and significant risks can exist that may not materialize until commissioning.

For solar farms, there is a need to balance permitting certainty and flexibility. Permits are often sought early to meet financing conditions, but sites have layout changes that can be ongoing right up to construction. Solar farms fall under the Renewable Energy Approval (REA) permitting structure, which is not easy to amend. To balance those two conflicting needs, a permit that provides for flexibility in a solar layout is essential to preserve the ability to make tweaks right up until final construction. The right acoustical partner can secure an early permit with the flexibility to revise the layout. This insulates your permit against minor layout iterations.

Energy storage sites are a new beast in the power landscape, coming with their own set of unique challenges. Noise data is an afterthought for equipment providers, and developers need certainty that a site can comply with the limits before they submit proposals. So, expert review is essential to ensure different equipment is being compared apples-to-apples. Maximizing site capacity can require a deep dive into operational parameters, layout optimization, and even adjacent land acquisitions. It is an emerging industry, so having the experience to optimize the noise performance of a site is essential.

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Speed is key for developers looking to participate in the procurement program. There are hundreds of decisions to make throughout the development process, and none should be held up by the noise modelling. The sooner developers know their noise constraint parameters, the faster they can make other decisions. For wind farms, layout iterations can have big impacts on available noise budgets, and it is tempting and rational to try and keep the early iterations inhouse, especially when many planning software packages like windPRO offer noise modelling as a module. These modules provide generic modelling parameters that may not be appropriate for the local jurisdiction, including missing transformer noise contributions.

## THERE ARE HUNDREDS OF DECISIONS TO MAKE THROUGHOUT THE DEVELOPMENT PROCESS, AND NONE SHOULD BE HELD UP BY THE NOISE MODELLING.

One possible compromise is to get the windPRO layout compared to a proper noise model early in the process, so there is some certainty on whether an off-theshelf model is predicting accurately. While it may be tempting to simply set a noise model to the most conservative settings, this approach could limit a project to fewer turbines.

Once a design gets more concrete, developers should have layout iterations conducted by qualified acousticians so there is confidence the results are compliant with all the local regulations. If all goes well, the final permit application is a simple matter, because preparatory work is complete.

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The procurement system does not allow the engineer authoring the noise report to then complete the eventual noise audits. Keep this in mind if there is a preferred consultant to complete the onerous postconstruction compliance noise audits.

Solar and energy storage facilities are similar, since their total footprint is much smaller. This means layout changes do not drastically alter constraining receptors the way they can for wind farms. That said, there are still many different options to evaluate. Early in the development process, developers may have many options for potential sites and need to know as soon as possible which ones have big noise constraints. Equipment vendors have new products or noise data that may need a seasoned eye to review for deficiencies, and later in the process warranties and contracts need a careful review to ensure the noise obligations for the vendor are appropriate for your site.



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The IESO procurement program requires all sites to have municipal support. Community engagement is very important, and developers will want to drive the narrative around noise. Being clear and upfront with the residents about the impacts is the best approach.

Support resolutions are required at the proposal stage and, as a result, municipalities can be inundated with proposals for a project. Do not let noise be the issue that pulls public engagement off track, and do not come unprepared. For wind turbine noise, there is exponentially more data available on wind and the potential impacts on the community to help support the expansion of this type of power. International standards have been refined, health studies have been conducted, and a great deal of data has been added to correlate the modelling with the measurements. Aercoustics alone has authored more than 15 research papers on the subject, with topics including low frequency noise, modelling to measurement validation, amplitude modulation, and environmental effects on sound propagation. Health and community impact studies have also been conducted across the world, all adding to the large body of work that supports the regulations of today.



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The MECP will require an extensive noise audit for wind and solar projects. A wind compliance audit can cost hundreds of thousands of dollars, so it should not be an afterthought in the process. The audit cannot be performed by the same company who submitted the permitting materials, so there needs to be a plan for managing the process. Having someone with audit experience can pay dividends during a complex audit process. Experienced partners can also provide consulting expertise on warranties between a developer and an OEM. By understanding the modelling and measurement, acoustical consultants can usually negotiate better terms around warranty noise and help reduce the risk. For example, an OEM will have its own noise thresholds for a wind turbine which may not match the thresholds from the MECP. Not understanding this nuance can leave developers with noisy equipment that is not covered by a warranty.

### GAINING EARLY INSIGHT IS ESSENTIAL FOR SUBMITTING A WELL-INFORMED AND FINANCIALLY SOUND PROJECT.

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The long-term procurement process presents a special opportunity for developers looking to be on the forefront of the next stage of Ontario's energy transition. But it is important to have the right partners be part of the process to ensure all opportunities are maximized. There is a wealth of data and information available to support even the most ambitious plans. Navigating noise risk in the IESO procurement program is the key to success and unlocking revenue potential.





#### **ABOUT AERCOUSTICS**

Aercoustics is uniquely qualified to perform acoustical services and studies, as required by the MNRF, MECP and other reviewing authorities, efficiently, accurately and on schedule. Our combination of practical knowledge, familiarity with applicable MECP noise guidelines, and significant experience in producing Acoustic Assessment Reports to support our clients has maintained our position as a go-to consultant for environmental acoustical engineering services throughout North America, and abroad.

Our team has a thorough understanding of applicable guidelines and regulations, but we also know each project faces its own noise modelling and mitigation requirements. We look at every site holistically, working closely with our clients to understand their goals before delivering practical solutions that balance client priorities and community standards. For Aercoustics, every project is an opportunity to improve the soundscape of the world around us. For more information, please visit www.aercoustics.com.

To book a free consultation with a member of the Aercoustics team, or for more information, please contact:

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### REFERENCES

The Globe and Mail. (n.d.). Ontario opens door to new wind, solar power projects as electrical needs soar. The Globe and Mail. Retrieved October 7, 2024, from https://www.theglobeandmail.com/canada/article-ontario-opens-door-to-new-wind-solar-power-projects-as-electrical/?login=true

Independent Electricity System Operator. (2023). Pathways to decarbonization report. https://www.ieso.ca/en/ Learn/The-Evolving-Grid/Pathways-to-Decarbonization

Independent Electricity System Operator. (n.d.). Long-term RFP. https://www.ieso.ca/Sector-Participants/ Engagement-Initiatives/Engagements/Long-Term-RFP

Ontario Ministry of the Environment, Conservation, and Parks. (n.d.). Noise guidelines for wind farms. Government of Ontario. https://www.ontario.ca/page/noise-guidelines-wind-farms

Ontario Ministry of the Environment, Conservation, and Parks. (n.d.). Compliance protocol for wind turbine noise. Government of Ontario. https://www.ontario.ca/page/compliance-protocol-wind-turbine-noise

International Conference on Wind Turbine Noise. (2021). Proceedings featuring Aercoustics' research [Conference proceedings]. https://www.windturbinenoise.eu/files/wtn2021-conference-proceedings-v2-1.pdf

International Conference on Wind Turbine Noise. (2019). Proceedings alphabetical papers [Conference proceedings]. https://www.windturbinenoise.eu/files/wtn2019-papers-alphabetical.pdf

International Conference on Wind Turbine Noise. (2017). All papers [Conference proceedings]. https://www. windturbinenoise.eu/files/wtn2017-all-papers.pdf

International Conference on Wind Turbine Noise. (2015). Proceedings [Conference proceedings]. https://www. windturbinenoise.eu/files/wtn2015\_proceedings.pdf

International Conference on Wind Turbine Noise. (2013). All papers alphabetical [Conference proceedings]. https://www.windturbinenoise.eu/files/wtn2013-all-papers-alphabetical.pdf

International Conference on Wind Turbine Noise. (2011). Portfolio of papers [Conference proceedings]. https://www.windturbinenoise.eu/files/wtn2011\_portfolio\_of\_papers.pdf

International Conference on Wind Turbine Noise. (2009). All papers alphabetical [Conference proceedings]. https://www.windturbinenoise.eu/files/wtn2009-all-papers-alphabetical.pdf

Shepherd, D., McBride, D., Welch, D., Dirks, K. N., & Hill, E. M. (2016). Exposure to wind turbine noise: Perceptual responses and reported health effects. Journal of Environmental Health Research, 25(4), 397-407. https://pubmed.ncbi.nlm.nih.gov/27036283/

Knopper, L. D., & Ollson, C. A. (2011). Health effects and wind turbines: A review of the literature. Environmental Health, 10(1), 78. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/

Pekkonen, M., Salminen, N., & Hirvonen, K. (2021). Self-reported health in the vicinity of five wind power production areas in Finland. Journal of Environmental Research and Public Health, 18(5), 2760. https://pubmed.ncbi.nlm.nih.gov/33706126/

Bolin, K., Bluhm, G., Eriksson, G., & Nilsson, M. E. (2015). Health-based audible noise guidelines account for infrasound and low-frequency noise produced by wind turbines. Frontiers in Public Health, 3, 31. https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2015.00031/full