

To: **Inverness County Planning Advisory Committee  
Inverness County Council**

From: **Planning Staff (EDPC)**

Date: **July 6, 2023**

Reference: **County of Inverness' Municipal Planning Strategy and Land Use By-law Concerning  
the Regulation of Wind Turbine Development – Long Term Policy Options**

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**Recommendation:**

1. Council could direct Staff to draft amendments to the Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development documents based on the policy recommendations featured in this Staff Report.
2. Council could direct EDPC Staff to conduct public engagement regarding the “Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development”. The goal of this engagement would be to feel out concerns the public may have and what changes to the wind turbine regulations they would like to see. Staff could potentially have the community review the list of policy recommendations featured in this Staff Report.
3. Council could keep the Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development as is.

**Analysis:**

In addition to the research included in the complimentary Staff Report providing background information, examples of wind turbines disrupting nearby households were examined along with concerns of groups or individuals regarding proposed wind turbine developments.

Common themes and concerns were identified and used to create the table in Figure 1.

Council should consider that some of the concerns and issues that may be posed by the public are outside the scope of the planning department. In some cases, the concern or issue could be subjective such as the appearance of wind turbines. Some issues or concerns, like potential effects on tourism/recreation or property values, do not fall within the scope of planning but can be taken into consideration by Council when choosing setbacks and where turbines are permitted to be constructed. Finally, some of the topics on the list fall under the jurisdiction of the provincial government and are addressed by a provincial process. In this case, the provincial process would be the Environmental Assessment Approval process which examines things like well water protection, internet/telecommunication disruption and impacts on the environment/wildlife.

<b>Figure 1. Table of Concerns in Relation to Planning &amp; Recommendations</b>		
<b>Concerns</b>	<b>Relation to Planning</b>	<b>Recommendation</b>
Aesthetic Impacts	The aesthetic impacts of wind turbines are subjective	Consideration could be given in the determination of setbacks
Decrease of Property Values	Is not a planning concern	Consideration could be given in the determination of setbacks
Effects on Tourism & Recreation	Is not a planning concern	N/A
Noise & Infrasound	Can be addressed by policy	Include Low Frequency Noise level decibel requirements on top of mean sound pressure level Reduce mean sound pressure level decibel requirements to add a buffer for error in proponent calculations
Effect on Human Health	Wind Turbines are related to “Wind Turbine Noise Annoyance” which is correlated to self reported health effects	Consideration could be given in the determination of setbacks
Decommissioning & Site Remediation	Can be addressed by policy and/or a separate by-law	Require a Decommissioning Bond (or something similar) from proponents to ensure proper decommissioning and site remediation
Construction/Traffic During Development	Can be addressed by policy	Health Canada suggests that community consultation be undertaken to determine work schedules and to inform the public of times and durations of noisy activities (including blasting if applicable). Health Canada suggests that impulsive sources (e.g., hammering, pile driving) be avoided at night and in the early morning

Public Engagement/Notification	Can be addressed by policy  Is already addressed in Environmental Impact Assessments for turbines or wind farms that have a generating capacity at or more than 2 megawatts	Municipal planning tools, like land use by-laws, can promote early consultation.  The Wind Energy Fact Sheets for Nova Scotia Municipalities provides many tips and tools for community engagement.
Well Water Protection	Is already addressed in Environmental Impact Assessments for turbines or wind farms that have a generating capacity at or more than 2 megawatts	N/A
Internet & Telecommunication Disruption	Is already addressed in Environmental Impact Assessments for turbines or wind farms that have a generating capacity at or more than 2 megawatts	N/A
Impacts on the Environment and Wildlife	Is already addressed in Environmental Impact Assessments for turbines or wind farms that have a generating capacity at or more than 2 megawatts	N/A
Shadow Flicker	Is already addressed in Environmental Impact Assessments for turbines or wind farms that have a generating capacity at or more than 2 megawatts	N/A

In Figure 1, there are five concerns listed that are within the scope of planning and have been mentioned or addressed in other examples of policy and best practice guides. The five concerns are: effect on human health, noise & infrasound, decommissioning & site remediation, construction/traffic during development, and public engagement/notification. “Effect on Human Health” and “Noise” will be addressed under the same section. “Construction/Traffic During Development” will be touched on under the “Public Engagement/Notification” section.

***Effect on Human Health | Noise & Infrasound***

When discussing wind turbine effects on human health it is important to mention that a Health Canada study (last modified in 2014) found no direct link between wind turbine noise and adverse health problems in people. However, Wind Turbines and Wind Turbine Noise are statistically associated with annoyance. The study goes on to say that it is this Wind Turbine Noise annoyance that is related to several self reported health effects including but not limited blood pressure, tinnitus, dizziness, disturbed sleep, migraines, and perceived stress. Yet, the above associations were not dependant on the level of noise or distance from the turbines and were also observed in many cases of road traffic noise annoyance.

Having adequate setbacks should help reduce community annoyance. In the 2014 Health Canada study regarding WTN and Health, community annoyance was observed to drop at distances between 1km to 2km in Ontario, compared to PEI where almost all the participants who were highly annoyed by Wind Turbine Noise lived within 550m of a wind turbine. It should be noted that Inverness County's present setback of Utility Wind Turbines is only 50m more than the maximum distance residents in PEI who were highly annoyed by Wind Turbine Noise were from a turbine.

Health Canada acknowledges that many factors influence Wind Turbine Noise experienced by a residence, including wind turbine characteristics and the number of turbines at any given distance.

As per their studies example:

*"To illustrate, two similar homes may exist in similar environments located the same distance from the nearest turbine operating in areas with 1 small and 75 large wind turbines respectively. These homes would be treated the same if the analysis was conducted using only distance to the nearest wind turbine, however they would be completely different in terms of their WTN exposure level..."*

This information demonstrates that policy should be considering the number of turbines within a certain area of a residence. The Province of Ontario acknowledges that a home or property could face combined impacts from the siting of multiple utility scale wind turbines within a 3km radius. In the Province of Ontario, more utility scale turbines within a 3km radius of the house/dwelling will result in larger required setback distances from the nearest turbine.

CanREA has observed that the sound level regulations of Nova Scotia's 2021 revised Environmental Assessment guidelines is 40 decibels outside a home or dwelling. However, of the 22 Land Use By-laws regarding the regulation of the development of wind energy analyzed by Colchester County, the highest setback distance of 1000m or 1km and the strictest sound level restriction found was 35 decibels outside a home or dwelling. The more stringent 35 dBA sound

level restriction outside the home is in line with the Health Canada study which found a significant increase in Wind Turbine Annoyance when noise levels exceeded 35 dBA.

Another common concern was about infrasound produced by wind turbines. Infrasound refers to sounds with a frequency of less than 20 Hz. According to the Health Canada study (last modified in 2014):

- *“Infrasound could some sometimes be measured up to 10km but were in many cases below background infrasound levels”*
- *Infrasound levels begin decreasing significantly starting at 1km from the wind turbine*
- *“Infrasound levels measures near the base of wind turbines were around the threshold of audibility that has been reported for about 1% of people that have the most sensitive hearing”*

Given this information, Staff feel that a minimum setback of 1km from Utility Scale Wind Turbines should be mandatory. Based on the research conducted, Low Frequency Noise (LFN) appears to be more of concern than infrasound. According to Moller and Pederson (2011), large turbines - defined in this study as having a nameplate capacity of 2.3 MW to 3.6 MW – statistically produce significantly more LFN than smaller turbines. The study concluded that LFN notably contributes to the total noise neighbouring residents experience from wind turbines.

Presently, based on staff research, no Municipalities in Nova Scotia appear to have a sound level restriction on Low Frequency Noise. Given Health Canada’s feedback to the Westchester Wind Project Environmental Assessment Registration Document dated March 2022 connecting Low Frequency Noise and Wind Turbine Annoyance (which is related to several self reported health effects), more stringent and protective measures could include a sound level restriction on low frequency noise. Health Canada’s other comments in the report even suggest appropriate decibel levels for Low Frequency Noise that will prevent rattles and possibly the associated annoyance they may cause.

While Shadow Flicker was noted as outside the scope of municipal planning and is addressed under the Environmental Assessment Approval process; if it did pose a health risk then the impacts of Shadow Flicker would be taken into consideration regarding siting and setback policies. A 2012 study by the Massachusetts Department of Environmental Protection in collaboration with the Massachusetts Department of Public Health concluded that there is no scientific evidence to suggest that shadow flicker negatively effects health. Regarding concerns about shadow flicker triggering epilepsy:

*“Photosensitive epilepsy affects approximately 3 percent of people with epilepsy, where flashing lights can trigger seizures. The Epilepsy Foundation reports: “Generally, flashing lights most likely to trigger seizures are between the frequency of 5 to 30 flashes per*

*second (Hertz)."*

*The Massachusetts study found that for these individuals, shadow flicker from wind turbines does not pose a seizure risk due to the fact that shadow flicker from modern commercial wind turbines occurs at "flash" frequencies between 0.3 and 1 Hertz. Massachusetts Institute of Technology (MIT) researchers also concluded shadow flicker "would pose negligible risk to developing a photo epileptic seizure."*

Given this research, Staff conclude that the health risk of shadow flicker from wind turbines is to non-existent for the general population and therefore will not be considered in the drafting of municipal policy.

Inverness County only has a setback of 600 m (1969 feet) for Utility Wind Turbine(s) and neither considers wind turbines of the size requiring an Environmental Assessment nor the number of turbines within a 3km radius of a dwelling. Inverness County's wind turbine regulations do not include a sound level restriction outside the home but at the lot line and has no provisions addressing Low Frequency Noise.

In terms of Wind Turbine Noise (WTN), having policy that establishes appropriate setbacks, a maximum decibel of Wind Turbine Noise (WTN) that can be heard outside the home, and/or a Low Frequency Noise Restriction can adequately address these concerns.

### ***Decommissioning and Site Remediation***

Wind Turbines have a life expectancy and will inevitably become inactive, requiring replacement, removal or fixing. During the background research conducted, examples of wind turbines being abandoned were discovered. The abandoning of wind turbines was identified as a concern among individuals and groups in the province.

Some Municipalities in Nova Scotia do not address the decommissioning of a wind turbine or wind turbines in their wind turbine by-law at all. Municipalities that do address decommissioning sometimes require a decommissioning plan prior to the issuance of a development permit and/or have provisions stating that after a period of inactivity the turbine must be removed. Certain Municipalities even consider and address site remediation in their decommissioning policies. Yet these existing policies regarding decommissioning may be insufficient. These policies often lack strong provisions to ensure decommissioning is carried out. While many wind turbine by-laws mention penalties, the wording of these policies often put the onus on the Municipality and the community to notice if a wind turbine is inactive and has not been decommissioned. Pursuing fines or imprisonment for decommissioning violations could be lengthy and expensive for the Municipality.

Victoria County's Wind Turbine Licensing Development By-law includes a section on the enforcement of the decommissioning plan, with policy allowing the Municipality to carry out any

necessary steps for adequate decommissioning at the cost of the owner/operator if they have not conducted a satisfactory decommissioning in a timely manner. To help mitigate the upfront cost of the Municipality potentially decommissioning a wind turbine project, Victoria County requires a decommissioning bond or other acceptable financial guarantee, though the amount is not specified.

Colchester County, similar to Victoria County, has adopted a Wind Turbine Development By-law that requires the issuance of a separate wind turbine license and a decommissioning bond. Colchester County states its decommission bond shall be “in the amount of not less than one hundred and twenty-five (125%) percent of the estimated present-day cost to decommission the Wind Power Project, less the estimated present day scrap value of the Wind Power Project. The estimated values shall be provided by a licensed engineer licensed to practice in Nova Scotia and/or by another individual deemed appropriate by the Development Officer.” Colchester County Council adopted this by-law February 14, 2023, making it one of the most recent municipal policies in the province regarding the regulation of wind turbine development. Additional policy addressing the possibility of the bond not covering the cost of decommissioning the development further protects the Municipality.

Based on current research, Cumberland County is presently the only municipality with a decommissioning bond requirement in a Land Use By-law rather than a separate by-law. Cumberland County’s decommissioning bond requirement is the same as Colchester County’s decommission bond requirement.

Requiring a decommissioning surety bond is a proactive approach to the possibility of abandoned wind turbines. A decommissioning surety bond would ensure an owner/operator is motivated to properly decommission their wind turbine(s) at the end of a project’s lifespan. A decommissioning bond and supplementary policy regarding decommissioning if undertaken by the Municipality would protect the Municipality while guaranteeing wind turbine developments will be removed at the end of their lifespan no matter what.

***Public Engagement/Notification***

Several documents and organizations citing best practices express the importance of early and effective community engagement in relation to renewable energy projects.

The Wind Energy Fact Sheets for Nova Scotia Municipalities notes:

*“Community engagement should be part of the initial wind energy project planning and be maintained through commission, operation, maintenance and eventual decommissioning of the facility. Early and sustained involvement with the local community is essential to creating a successful project... When a community is well informed about wind energy and trusts its local processes, there is usually less opposition to a proposed*

*wind energy project. Early and open community involvement encourages logical dialogue based on mutual respect.”*

The importance of meaningful community engagement can even translate into health benefits. Earlier in the Staff Report it was cited that there is no direct link between wind farms and adverse health problems in people, but Wind Turbine Noise annoyance can cause several self reported and measured health effects. The Wind Energy Fact Sheets for Nova Scotia Municipalities state that community acceptance of wind turbines often determines perception of noise and annoyance; community acceptance correlating with community engagement.

It must also be considered that wind turbine projects with a generating capacity of 2 megawatts or more will be subject to the province’s Environmental Assessment Approval process which weighs and requires significant community engagement. Some examples of community engagement components in the Environmental Assessment Approval include, but are not limited to, the creation and operation of a Community Liaison Committee by the proponent, the creation and implementation of a comprehensive complaint resolution plan, consultation with the First Nations, collection of written comments, and ensuring that the proponent has taken steps and/or addressed public concerns.

What municipal government can do to help local communities is encourage early engagement and ensure the concerns of the public that can be regulated through municipal planning policy are addressed. Some examples of these policies include having the applicant notify property owners within so many metres (feet) of the subject properties when applying for a development permit, requiring public information meetings that are advertised via the paper, establishing a Citizen Monitoring Committee under the applicant or Council, ensuring that public benefits are tangible and more. Staff will be recommending several of the listed policies along with policies seen in other municipalities or best practice literature.

**Conclusions:**

Staff have noted that Inverness County’s MPS and LUB Concerning the Regulation of Wind Turbine Development should be updated with stronger policies regarding requirements for Utility Wind Turbines, especially projects over 2.0 megawatts or requiring Environmental Assessment Approval. Based on background research, several policy changes were proposed in the “Policy Recommendations” section.

Council has a few different options with how they could proceed from this Staff Report. Below are a few possibilities:

1. Council could direct Staff to draft amendments to the Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development documents based on the policy recommendations featured in this Staff Report.



2. Council could direct EDPC Staff to conduct public engagement regarding the “Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development”. The goal of this engagement would be to feel out concerns the public may have and what changes to the wind turbine regulations they would like to see. Staff could potentially have the community review the list of policy recommendations featured in this Staff Report.
3. Council could keep the Municipal Planning Strategy and Land Use By-law Concerning the Regulation of Wind Turbine Development as is.

**Appendix A: Policy Recommendations**

**Appendix B: Setback Examples Considering Number of Turbines in a Project**

<b>Appendix A: Policy Options</b>	
<b>Concerns</b>	<b>General Change Options</b>
A. Noise	<ol style="list-style-type: none"> <li>1. Include Low Frequency Noise level decibel requirements from residences.</li> <li>2. Include a mean value of sound pressure level from a wind turbine requirement from residences.</li> <li>3. Remove the mean value of sound pressure level from a wind turbine to an adjacent lot line requirement</li> </ol>
B. Setbacks	<ol style="list-style-type: none"> <li>1. Increase setbacks for Utility Wind Turbines</li> <li>2. Integrate setback(s) that consider the number of wind turbines within a certain radius or project</li> <li>3. Remove the setback exemption for adjacent lot boundaries and allow setback exemptions to residences up to the adjacent lot boundary setback.</li> </ol>
C. Decommissioning & Site Remediation	<ol style="list-style-type: none"> <li>1. Require a Decommissioning Surety Bond (or something similar) through the Land Use By-law/Municipal Planning Strategy or through a separate by-law.</li> </ol>
D. Public Engagement/Notification	<ol style="list-style-type: none"> <li>1. Include policy requiring the notification of property owners within so many metres (feet) of the subject property for wind turbine projects with a total rated capacity of 2 megawatts or more prior to the issuance of the development permit</li> <li>2. Require a complaint resolution program to address concerns for wind turbine projects with a total rated capacity of 2 megawatts or more in the application of a development permit</li> <li>3. Require the proponent to host public information meetings that are advertised in the newspaper for wind turbine projects with a total rated capacity of 2 megawatts or more in the application of a development permit</li> <li>4. Require the proponent to send a mailout to property owners within so many metres (feet) of the subject property for wind turbine projects with a total rated capacity of 2 megawatts or more addressing construction</li> <li>5. Require the proponent to offer the community the opportunity to establish a citizen monitoring committee for the construction phase of the project for Utility Scale Wind turbines.</li> </ol>

**Appendix B: Setback Examples Considering Number of Turbines in a Project**

<b>Table 1: Proposed Setbacks Based on Current Policy</b>	
<b>Number of Wind Turbines in a Wind Turbine Project with a Total Rated Capacity of 2 Megawatts or More</b>	<b>Proposed Setback</b>
1 – 5 Wind Turbines	1 km
6– 10 Wind Turbines	1.2 km
11 – 25 Wind Turbines	1.5 km
26 (+) Wind Turbines	Require a Noise Study to Determine Setbacks

<b>Table 2: More Restrictive Proposed Setbacks</b>	
<b>Number of Wind Turbines in a Wind Turbine Project with a Total Rated Capacity of 2 Megawatts or More</b>	<b>Proposed Setback</b>
1 – 4 Wind Turbines	1 km
5 – 10 Wind Turbines	1.5 km
11 – 17 Wind Turbines	2 km
18 – 25 Wind Turbines	2.5 km
26 (+) Wind Turbines	Require a Noise Study to Determine Setbacks