

# ONTARIO MINISTRY OF THE ENVIRONMENT NOISE GUIDELINES ON WIND POWER PROJECTS

John Kowalewski

Ontario Ministry of the Environment, Environmental Assessment and Approvals Branch  
2 St. Clair Ave W, Toronto, ON M4V 1L5

## ABSTRACT

In response to the anticipated introduction of large scale wind power projects for electricity generation in Ontario, the Ministry of the Environment (MOE) prepared specific guidelines for assisting proponents of such project to address the current environmental regulatory requirements. This article is a brief overview of the MOE review and approval process concerning environmental noise impacts of wind energy projects.

## RÉSUMÉ

En réponse à l'introduction prévue de projets d'éoliennes à grande échelle pour la production d'électricité en Ontario, le ministère de l'Environnement (MOE) a préparé des directives spécifiques pour aider les promoteurs d'un tel projet à adresser les obligations environnementales courantes. Cet article est une brève vue du processus de revue et d'approbation du MOE au sujet des impacts sonores dus à de tels projets.

## 1. INTRODUCTION

Under Section 9 of the Environmental Protection Act (EPA), it is required to obtain an approval before construction, alteration, extension or replacement of any equipment or structure that may emit, or from which may be emitted, a contaminant such as noise or vibration into the natural environment. Consequently, wind power projects require a Certificate of Approval (Air & Noise) from the MOE for the installation of wind turbine generating units including any associated equipment, such as power transformers, that emits noise or vibration. One of the purposes of the certificate is to allow clear enforcement of the noise and vibration limits indicated in the MOE guidance documents.

However, for wind power projects of 2 MW and greater generating capacity the proponent is required first to conduct an Environmental Screening Process in accordance with the MOE: "Guide to Environmental Assessment Requirements for Electricity Projects", dated March 2001 [1]. This process includes the environmental assessment requirements which are set out in Regulation 116/01, referred to as the "Electricity Projects Regulation", made under the Environmental Assessment Act (EAA).

Wind power projects of 2 MW and greater generating capacity may not receive approvals under the EPA, or commence construction, until it has met the Environmental Screening Process requirements under the EAA. Consequently, applications for Certificates of Approval should be submitted after this process has been completed.

Some municipalities may have additional requirements concerning wind power projects prepared under the Municipal Planning Act, above and beyond of the requirements of the provincial environmental legislation and guidelines. Similarly, some projects may be subject to the Canadian En-

vironmental Assessment Act. Therefore, in order to facilitate reviews of project proposals during the Environmental Screening Process, MOE encourages proponents to coordinate, if applicable, the provincial, federal, and municipal noise requirements and address them in one noise assessment study and report.

On the other hand, some selected types of residential and agricultural wind turbine generators, are exempted under Section 9(3) of the EPA and by the Certificate of Approval Exemption Regulation (O.Reg. 524/98).

## 2. REVIEW PROCESS

Unlike with most industrial facilities, noise abatement measures for large wind power developments, if necessary, may be problematic or impractical to implement. Proper planning of each wind turbine location relative to all noise sensitive receptors and supported by complete noise impact assessments are essential for demonstrating feasibility of compliance with the MOE noise limits. Consequently, the MOE advises proponents of wind power projects to assess noise impacts early in the Environmental Screening Process.

The results of the screening process can have significant impacts on necessary setback distances, and the number and location of wind turbines that could be constructed at a site, and would be of interest to nearby residents. Therefore MOE has set up a review process intended to facilitate the ultimate result by having reviews at an early stage along with public consultation. Specifically, MOE has offered to perform technical review of the complete noise impact assessment report at the stage of the Environmental Screening Process. This review should take place prior to issuing the notice of completion and initiating the public and agency commenting period.

The results of the MOE technical review of the complete noise impact assessment report at the screening stage, if found to be acceptable, will be later used during the subsequent review of the corresponding application for a Certificate of Approval under Section 9 of the EPA. Provided that the proposal is not changed and the completed report remains accurate, then the application will be processed based on the prior technical review. Any changes to the proposal or to the completed report at the time of the application for Certificate of Approval may require further review and/or consultation.

### 3. NOISE LIMITS

The MOE noise level limits applicable to sources and facilities in general are described in the Publications NPC-205 and NPC-232 [2, 3]. These limits are set with respect to Point of Reception, which is typically at residential properties that may be impacted by the noise(s) under review. For wind power projects the noise limits are consistent with those of References 2 and 3, but it includes an allowance for the wind generated background noise at wind speeds of 7 m/s and greater. All reference to wind speeds in the MOE documents correspond to data observed at the 10 metres height above grade.

At low wind velocities, below 8 m/s, there are two sets of sound level limits dependent on the general noise environment prevailing in the area at the Point of Reception. Areas generally characterized as “rural” are categorized as a Class 3 Area and would be subject to the lower sound level limits. This is the most usual categorization of Point of Reception encountered in the vicinity of wind power projects. However, in an “urban” noise environment the categorization becomes as Class 1&2 Area and the corresponding limits are higher. Furthermore, the noise limits apply for continuous operation at any time of day or night.

Proponents of wind power projects are required, therefore, to demonstrate compliance at the Point(s) of Reception with the following sound level limits, under specific wind speed conditions, and expressed in terms of the hourly energy-equivalent sound level,  $L_{eq}$  (1h):

The noise levels limits for wind turbines are shown in Table 1. Note that the values corresponding at wind speeds 7 m/s and greater were derived from average values of wind noise measured outdoors in terms of  $L_{90}$  plus 5 dB.

In situations where a particular Point of Reception is found to be affected by existing higher levels of background noise, such as from regular vehicular traffic adjacent to a highway, then the above noted limits may be increase accordingly. However, there must be sufficient supporting information, based on hourly noise monitoring or traffic counts

data, to allow an increase in the above noted criteria. This is consistent with the Publications NPC-205 and NPC-232 [2, 3].

### 4. NOISE IMPACT ASSESSMENT AND REPORT

Guidance for proponents of wind power projects for the preparation of noise impact assessments and report is given in a document titled “Interpretation for Applying MOE Technical Publications to Wind Turbine Generators” – July 2004. [4]. This brief document is intended to assist proponents in understanding the MOE requirements that would be expected when applying for the Certificate of Approval. It is advisable that proponents of such projects be familiar with this information early in their planning and public consultation activities.

Consistent with the Publications NPC-205 and NPC-232 all noise impact assessments are required to be considered under the principle of a “worst case scenario”. Some of the factors under this principle include:

- Reliable sound emission data (in octave bands) from all sources, at maximum operating capacity, including equipment associated with the project such as a transformer facility.
- Thorough identification of all Points of Reception up to at least 1000 metres from the nearest wind turbine generator unit.
- Accurate determination of the locations (x,y,z coordinates) of each wind turbine noise source and each Point of Reception and their corresponding distances between the two sets.
- Accounting for noise impact level at each Points of Reception due to the aggregate of all sources and propagation with downwind direction.

In the event that proposed layout of the entire wind power project is such that all wind turbine units are at a distance from any Point of Reception in excess of 1000 metres, then the report does not require including a noise impact assessment. However all other information must be included so that compliance with the MOE requirements can be verified.

### 5. CONCLUSIONS

In order to assist proponents of wind power projects to include in their design at the planning stage the necessary re-

Wind Speed at 10 m height, (m/s)	4	5	6	7	8	9	10	11
Class 3 Area	40	40	40	43	45	49	51	53
Class 1 & 2 Areas	45	45	45	45	45	49	51	53

Table 1. Wind Turbine Generated Maximum Sound Level Limits, Hourly  $L_{EO}$ , dBA

quirements that would facilitate achieving the MOE noise limits requirements and for ultimate compliance with Section 9 of the EPA, a guidance document was made available. A brief overview of the document and the required approval process as well as assessment procedures were highlighted in this article.

## 6. REFERENCES

1. "Guide to Environmental Assessment Requirements for Electricity Projects." Ontario Ministry of the Environment, March 2001 is available at [www.ene.gov.on.ca/envision/gp/4021e.pdf](http://www.ene.gov.on.ca/envision/gp/4021e.pdf)
2. "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)." Ontario Ministry of the Environment Publication NPC-232, October 1995.
3. "Sound Level Limits for Stationary Sources in Class 1 and 2 Areas (Urban)." Ontario Ministry of the Environment Publication NPC-205, October 1995.
4. "Interpretation for Applying MOE Technical Publications to Wind Turbine Generators." Ontario Ministry of the Environment, July 2004, is available on the MOE web site at [www.ene.gov.on.ca/envision/gp/4709e.pdf](http://www.ene.gov.on.ca/envision/gp/4709e.pdf)
5. "Wind Power Projects and the Approval Process." Ontario Ministry of the Environment, is available on the MOE web site at [www.ene.gov.on.ca/envision/gp/5135e.pdf](http://www.ene.gov.on.ca/envision/gp/5135e.pdf)

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