MDH

Minnesota
Department
of Health

PROTECTING, MAINTAINING & IMPROVING THE HEALTH OF ALL MINNESOTANS

May 2nd, 2017

Dan Litchfield
Senior Manager, Project Development
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c/o Invenergy LLC
One South Wacker Drive
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RE: Request for Comments on Freeborn Wind Farm in Freeborn County, Minnesota

Dear Mr. Litchfield,

Thank you for providing the Minnesota Department of Health (MDH) with the opportunity to comment on the Minnesota portion of the Freeborn Wind Farm project in Freeborn County, Minnesota. The mission of MDH is to protect, maintain, and improve the health of all Minnesotans. The careful planning and development of projects such as this one supports this mission and is an important step in ensuring health in all policies.

Wind turbine noise and shadow flicker effect are the two areas related to wind turbines that generally receive the most complaints. MDH reviewed available data on the generation and propagation of turbine noise; the potential for exposure to shadow flicker from wind turbines; and studies of health impacts from exposures to wind turbine noise. Findings are discussed in detail in the 2009 report, ***Public Health Impacts of Wind Turbines.*** (http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf)

From MDH's 2009 report *Public Health Impacts of Wind Turbines*, complaints about wind turbine noise appear to rise with increasing noise levels above 35 dB(A) when measured outdoors. Sleeplessness and headache are common health complaints and complaints in general are more likely when turbines are visible or when shadow flicker occurs. Most available evidence suggests that reported health effects are related to audible low frequency noise.

Wind turbines generate a broad spectrum of low intensity noise. At typical setback distances higher frequency (or higher pitch) noises may be muted. Walls and windows of homes decrease the loudness of high frequencies, but the effect on low frequencies is more limited. Low frequency noise has been identified as a potential wind turbine issue that may affect some people indoors, especially at night.

Regulations regarding placement of wind turbines are intended to assure that Minnesota Pollution Control Agency (MPCA) noise guidelines are not exceeded. The MPCA nighttime standard for noise intensity of 50 dB(A), not to be exceeded more than 50% of the time in a given hour, appears to underestimate how much low frequency noise can enter into dwellings. Prior to site development, MDH recommends that low frequency noise and total noise from turbines be evaluated.

Unlike low frequency noise, shadow flicker can affect individuals outdoors as well as indoors. Shadow flicker is a potential issue in the mornings and evenings, generally within 0.6 miles (1km) of a source. Annoyance, or concern about the potential for other impacts from shadow flicker, can be eliminated by placement of wind turbines outside of the path of the sun as viewed from areas of concern, or by appropriate setbacks.

Potential exposures to shadow flicker and noise are at their highest closer to wind turbines. As the distance from a wind turbine increases, reported complaints and health effects generally decrease. This suggests that the use of appropriate setback distances of homes from wind turbines can minimize or eliminate health complaints. In addition, placing wind turbines in areas where wind shear is minimal and aerodynamic noise is minimized can likely reduce the potential for health complaints.

Again, a more in depth discussion of the above concepts and conclusions can be found in the MDH 2009 report *Public Health Impacts of Wind Turbines* (linked above). MDH encourages you to reference this report when considering the potential health impacts that could be associated with this wind farm project as you move forward with your development plans.

MDH is also following a study being conducted at the University of Minnesota, the Minnesota Study on Wind Turbine Acoustics (http://mnsowta.safl.umn.edu/). The study is intended to evaluate the source and characteristics of wind turbine sound, develop techniques for measuring wind turbine noise, and to better understand the human response to wind turbine generated sound. The study is expected to be completed in 2018.

Recommendations:

- Prior to development, low frequency noise and total noise from turbines should be evaluated by qualified acoustical engineers to determine measurable noise components from wind turbines that engender complaints and to assess noise impacts from proposed wind farms.

- Wind turbine noise estimates should include cumulative impacts (40-50 dB(A) isopleths) of all wind turbines.

- Isopleths for dB(C) – dB(A) greater than 10 dB should be determined to evaluate the low frequency noise component.

- The impacts of aerodynamic modulation noise and shadow flicker should be modeled and evaluated.

- Evaluations of turbine noise generation and shadow flicker should be incorporated into decisions when determining the appropriate setback distances of homes from wind turbines.

- Any noise criteria beyond current state standards used for placement of wind turbines should reflect priorities and attitudes of the community.

- Recognizing that it is unknown whether reported health impacts are direct health effects or indirect stress impacts from annoyance and/or lack of sleep resulting from turbine noise or shadow flicker, potential health impacts from wind turbine projects should be acknowledged, and provision should be made to mitigate these effects for residents within and near proposed project areas.

- The project should be designed so that exposure to residents is minimized and inclusion of all potentially impacted residents as compensated participants should be considered.

Health starts where we live, learn, work, and play. To create and maintain healthy Minnesota communities, we have to think in terms of health in all policies. Thank you again for the opportunity to provide comments on the Freeborn Wind Farm project in Freeborn County. Please feel free to contact me at (651) 201-5711 or Paul.Allwood@state.mn.us if you have any questions regarding this letter.

Sincerely,

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Assistant Commissioner
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PO Box 64975
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cc: James Kelly, MDH Environmental Surveillance and Assessment Manager
Sue Yost, Freeborn County Public Health Director