

March 4, 2015

SEC Chairman Honigberg
New Hampshire Public Utilities Commission
21 South Fruit Street
Concord, NH 03301

For the record my name is Nancy Watson and my home is in Groton NH.

My recommended revisions of the January 30th draft of the Site and Facility Rules proposed by the Site Evaluation Committee will address shadow flicker. The changes I request are taken verbatim from the Office of Energy and Planning report that was filed on August 12, 2014. The Pre-Rulemaking report was the culmination of the public stakeholder process to develop regulatory criteria for the siting of energy facilities. SB 99 made this process a legal requirement in the state of New Hampshire.

Last year, the OEP work groups documented that shadow flicker can be completely eliminated by project layout, setback distances and curtailment technology.

To allow shadow flicker at a residence, learning space, workplace, health care setting, public gathering area (outdoor and indoor), and roadways is a gross disrespect to the people of New Hampshire. Shadow flicker is a health and safety concern that can be completely eliminated by simply requiring developers to respect non-participating landowners. Do not allow developers the opportunity to exploit landowners by providing a rule using arbitrary numbers such as 30 hours per year and 30 minutes per day.

The four items in need of correction regarding shadow flicker are:

1. Site 102.39 The definition "Shadow flicker" means the alternating changes in light intensity that can occur when the rotating blades of a wind turbine are back-lit by the sun and cast moving shadows on the ground or on structures. This definition must be revised to include the moon as well.

2. Site 301.08 (2) "Effects on Public Health and Safety".

The current health and safety section only states "shadow flicker expected to be perceived at all buildings occupied or used for another purpose". This statement is not acceptable.

The OEP work group identified specific areas of public health concerns. "Shadow flicker assessments shall identify the astronomical maximum (worst case) and anticipated hours per year of shadow flicker for each residence, learning space, workplace, health care setting, public gathering area (outdoor and indoor), and roadway that falls within the study area". This section needs to be rewritten to be more comprehensive.

3. Shadow flicker modeling in general, assumes a maximum impact distance of 10-rotor diameters, the shadows of which for a 100-meter (328 feet) rotor diameter, would be expected to fully dissipate after 3,280 feet. The work group heard from representatives of Mason County, Michigan where turbines sited beyond 6,000 feet or 18+ rotor diameters were casting significant shadowing on homes.

(see: Reilly, Mary, Mason County Zoning and Building Director. Shadow Flicker Monitoring. <http://www.masoncounty.net/userfiles/filemanager/414/>)

The assumption of 10-rotor diameters may have been appropriate for shorter blades, however, the longer, wider blades on today's machines and different shadow profiles for different blade shapes (manufacturer dependent) suggest the 10-rotor limit is no longer an adequate standard.

I recommend that shadow flicker impacts be assessed assuming an impact distance of 1.5 - 2 miles.

4. Site 301.14 (f) (2) b. proposes a shadow flicker standard of 30 hours per year or 30 minutes per day within any occupied permanent residence of a non-participating landowner.

It is common to see the 30-hour limit codified in ordinances across the United States. However, Germany's 30-hour limit from which the limit is derived, refers to the astronomical maximum figure while the more realistic maximum of 8 hours per year is permitted at homes and places where people work, learn, and gather.

See: Minnesota Department of Commerce: Energy Facility Permitting (2011) International Review of Policies and Recommendations for Wind Turbine Setbacks from Residences: Setbacks, Noise, Shadow Flicker, and Other Concerns. Retrieved from http://mn.gov/commerce/energyfacilities/documents/International_Review_of_Wind_Policies_and_Recommendations.pdf

Once again, I will stress what I stated earlier-

Last year the OEP work groups documented that shadow flicker can be completely eliminated by project layout, setback distances and curtailment technology. Shadow flicker is a health and safety concern that must be eliminated. It is important the SEC give weight to the documented evidence of known problems of shadow flicker modeling and impact distances, as reported by county and state officials with more experience with wind turbine siting. To assume the relaxed standard of 30-hours per year of shadow flicker would be contrary to the public interest and the Committee would knowingly expose New Hampshire residents to impacts with no good justification.

I have attached a page listing Proposed Rules which include a Shadow Flicker Assessment, a Shadow Flicker Modeling Assumption for distance and a Shadow Flicker Standard. In the interest of time, the Committee may reference these recommendations later.

Thank you.

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Proposed Rules:

Include a shadow flicker assessment that identifies the astronomical maximum (worst case) as well as the anticipated hours per year of shadow flicker expected to be perceived at schools, day-care centers, health care facilities, residences, residential neighborhoods, places of worship, elderly care facilities, public gathering areas (outdoor and indoor), and roadways that fall within 2 miles of any turbine.

Shadow flicker modeling will assume an impact distance of 1.5 miles from each of the turbines.

Shadow Flicker Standard: Shadow flicker created by the applicant's energy facility during operations shall not occur more than 30-hours astronomical maximum per year with an actual number of 8 hours per year and a limit of 30-minutes per day at schools, day-care centers, health care facilities, residences, residential neighborhoods, places of worship, elderly care facilities, public gathering areas (outdoor and indoor), and roadways that fall within 2 miles of any turbine. If Shadow Flicker limits cannot be met via project layout and setback distances, curtailment technology or other mitigation tools may be considered.