TOWN OF KINGSTON BOARD OF HEALTH
WIND TURBINE SHADOW FLICKER REGULATION
G.L. c. 111, §31

The Kingston Board of Health held a hearing on this Regulation on ______. After receiving a substantial amount of testimony and documentation from owners/operators of existing turbines and interested members of the public, the Board determined that there can be adverse health risks and nuisances associated with so-called shadow flicker emanating from wind turbines. Accordingly, the Board adopted the following regulation in an effort to avoid and abate such risks, as follows:

1. Purpose

The purpose of this Regulation is to protect the public from adverse health effects and nuisances that can be associated with shadow flicker emanating from wind turbines. Chronic or repeated exposure to excessive shadow flicker may be a hazard to both physical and mental health. In addition to being an annoyance, it may cause a number of ailments including emotional stress, fatigue and high blood pressure. Shadow flicker at excessive levels may also cause a nuisance, as such term is contemplated under G.L. c. 111.

This regulation is enacted to protect, preserve and promote the health, safety, welfare and quality of life for the citizens of Kingston. Present state and local regulations are in the opinion of the Board inadequate to protect the residents of Kingston from the unique health risks associated with shadow flicker.

2. Applicability

a. This section applies to all utility-scale wind turbines. It does not apply to single stand-alone turbines under 60 kilowatts of rated nameplate capacity.

b. No person or entity shall construct or install a new wind turbine in the Town of Kingston unless it receives an approval of the Board of Health pursuant to the terms hereof.

c. Any and all owners operators of a wind turbine in Kingston that exists as of the effective date of this Regulation must, within sixty days from such effective date, obtain an approval from the Board of Health pursuant to the terms hereof.

3. Definitions

The term “shadow flicker” refers to the flickering effect caused when rotating wind turbine blades periodically cast shadows over neighboring properties as they turn, through constrained openings such as windows. The magnitude of the shadow flicker varies both spatially and temporally and depends on a number of environmental conditions coinciding at any particular point in time, including, but not limited to: the position and height of the sun; wind speed, direction; topography; intervening obstructions such as trees, fences and other structures; cloudiness, and position of the turbine to a sensitive receptor. For the purposes of this Regulation, shadow flicker only applies to shadowing affects within a distance from the turbine
that is ten times the diameter of the turbine’s blades. Shadow flicker is NOT the sun seen through a rotating wind turbine rotor nor what an individual might view moving through the shadows of a wind turbine. Shadow flickering cannot be perceived by the human eye if the angle of the sun over the horizon is less than 3°. Additionally, for shadow flicker to occur in regulable amounts, the blades of the turbines must cover at least 20% of the sun.

4. Regulations

No wind turbine shall produce shadow flicker in an amount that causes adverse health effects or regulable nuisances. There shall be a rebuttable presumption that shadow flicker on any particular habitable and improved residential property in excess of 30 minutes per day or 30 hours per year will cause an adverse health impact or regulable nuisance.

5. Procedures

Any existing or prospective owner or operator of a wind turbine shall submit an application to the Board of Health on a form that may be prepared by the Board. The Application shall include, at a minimum:

a. Basic information about the applicant, including the history/experience of applicant in relation to wind turbines;
b. An existing conditions plan which depicts both the property in question and existing lots of record within ten rotor diameters from the proposed or existing turbines;
c. Manufacturer’s specifications of the existing or proposed wind turbine;
d. A comprehensive study, using accepted industry methodology, describing flicker impacts on habitable and improved residential properties within ten rotor diameters from the existing or proposed wind turbine. Such study shall include the durational impacts of flicker, adjusted for the environmental criteria that may affect the occurrence of shadow flicker. In the event that such study concludes that shadow flicker occurs in amounts that exceed the presumptive limits imposed by this Regulation, the study shall contain either a rebuttal of such presumption or a mitigation plan to bring the turbine into compliance.

The Board of Health shall conduct a public hearing on such application within thirty days of receipt of the application. Notice of such hearing shall be posted by the Town Clerk and mailed, at the applicant’s expense to all abutters of record to the property on which the turbine is proposed.

The burden shall be on the applicant to demonstrate that the proposed or existing turbine does not produce shadow flicker in excess of the presumptive limits set forth herein, or in the alternative, that in the event of such exceedance, the shadow flicker that is produced will not adversely impact public health or result in a regulable nuisance. The Board may retain a consultant, at the applicant’s expense, in accordance with G.L. c 44, §53G to conduct peer review of the applicant’s application. The Board may charge a reasonable administrative filing fee for the application.
If, after a hearing, the Board determines that the wind turbine will not produce shadow flicker in excess of the presumptive limits imposed by this regulation, then the Board shall approve the application. If, after a hearing, the Board determines that the wind turbine will produce shadow flicker in excess of the presumptive limits imposed by this regulation and that such flicker will result in adverse health impacts, then the Board shall impose conditions on the operation of the wind turbine to abate and/or mitigate such impacts; or if no conditions are feasible or practicable, then Board may deny the application.

The Board’s decision shall be issued in writing, to the Applicant, with a copy to be filed with the Town Clerk within forty-five (45) days following the close of the public hearing.

6. **Effective Date**

This regulation shall become upon the later of filing with the Town Clerk and publication in a newspaper of general circulation, as required under G.L. c. 111.

7. **Enforcement**

The Town of Kingston Board of Health may issue further orders as appropriate to aid in the enforcement of this Regulation and may enforce these provisions in equity, including the request for injunctive relief, in a court of competent jurisdiction. Any failure to comply with any Order issued hereunder shall result in the issuance of a formal warning. Any failure to comply with such a warning shall result in a fine of not more than $100.00. Any failure to comply after the issuance of said initial fine may be punishable by a subsequent fine of up to $1,000.00. Each day of a continued non-compliance shall constitute a separate violation.