

Proposed Amendments

Original Language:

None.

Proposed Amendment:

Provided below are two (2) options for amendment.

Proposal #1

2. Definitions

Shadow Flicker shall mean alternating changes in light intensity caused by the moving blade of a WECS casting shadows on the ground and stationary objects, such as but not limited to a window at a dwelling.

4. General Standards. The following standards shall apply to all Testing Facilities, Private and Commercial WECS in Shiawassee County unless otherwise specifically noted:

Shadow Flicker. Commercial WECS shall be designed, sited and operated in such a manner to minimize shadow flicker on any roadway, non-participating property, or habitable structure. Site plans and other documents and drawings for Commercial WECS turbines shall show mitigation measures to minimize potential impacts from shadow flicker, as identified in the Shadow Flicker Impact Analysis. Shadow Flicker may not fall on any portion of a habitable structure for more than 30 minutes a day or 30 hours per year.

5. Additional Standards for Commercial WECS Projects- The following additional standards shall apply to all commercial WECS in Shiawassee County:

Shadow Flicker Impact Analysis. All commercial WECS shall identify the locations of shadow flicker that may be caused by a WECS development (including but not limited to, all structures, roadways, and non-participating properties) and the expected durations of the flicker at these locations from sunrise to sunset over the course of a year. The analysis shall identify problem areas where shadow flicker may affect the occupants of a structure and show measures that shall be taken to eliminate or mitigate the problems.

Staff Comment: The shadow flicker standards set forth under Proposal #1 reflect common shadow flicker standards for large commercial wind developments from twenty (20) communities across Michigan. Of these communities, fifteen (15) required some type of mitigation effort to offset the effects of shadow flicker while five (5) did not contain any reference to shadow flicker. Of the fifteen (15) communities regulating shadow flicker, five (5) limited the duration of exposure on neighboring properties and/or buildings, five (5) implemented alternative mitigation efforts, four (4) required a shadow flicker analysis and proposed

mitigation efforts from the applicant, and one (1) community prohibited shadow flicker within 100' of an occupied structure.

Proposal #2

2. Definitions

Shadow Flicker shall mean alternating changes in light intensity caused by the moving blade of a WECS casting shadows on the ground and stationary objects, such as but not limited to a window at a dwelling.

4. General Standards. The following standards shall apply to all Testing Facilities, Private and Commercial WECS in Shiawassee County unless otherwise specifically noted:

Shadow Flicker. Commercial WECS shall be designed, sited and operated in such a manner to prohibit shadow flicker on any habitable structures and to minimize shadow flicker on any roadway or non-participating property. Site plans and other documents and drawings for commercial WECS turbines shall show mitigation measures to prevent or minimize potential impacts from shadow flicker, as identified in the Shadow Flicker Impact Analysis. Mitigation measures can include, but not be limited to:

1. Turn off the WECS (so the rotor(s) are not moving) during the period of time a habitable structure, non-participating structure, or roadway could experience shadow flicker; or
2. Screening (such as forest, other building(s), topography, etc.) identified as existing or implemented to shield the habitable structure from shadow flicker.
3. The WECS operator may obtain a written easement or other written agreement which specifically allows shadow flicker impact.

5. Additional Standards for Commercial WECS Projects- The following additional standards shall apply to all commercial WECS in Shiawassee County:

Shadow Flicker Impact Analysis. All commercial WECS shall identify the locations of shadow flicker that may be caused by a WECS development (including but not limited to, all residential dwellings, roadways, and non-participating properties) and the expected durations of the flicker at these locations from sun-rise to sun-set over the course of a year. The analysis shall identify problem areas where shadow flicker may affect the occupants of a structure and show measures that shall be taken to eliminate or mitigate the problems.

Staff Comment: The noise standards set forth in Proposal #2 reflect a shadow flicker standard slightly more restrictive than the average community surveyed.

Sample Zoning for Wind Energy Systems, produced by Michigan State University and the Greening Michigan Institute, suggests that “the distance [shadow] flicker travels is not well documented” and that many factors go into the presence or absence of shadow flicker at a given location (2017, page 19). It is for this reason staff believed it necessary to include a Shadow Flicker Impact Analysis. Without a survey of specific factors surrounding a WECS development the prediction of shadow flicker at any given time would be rough. Within the same study, it was determined that “the wind industry has the technology to control shadow flicker” and should therefore be required to reflect that (2017, page 19). In Mason County for example, established “a zero flicker policy because (1) it is easier to enforce... [and] (2) [it is] less burden on the landowner” and as a result this is reflected in Proposal #2 (2017, page 19).