

**BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION****COMMENTS AND RECOMMENDATIONS OF THE  
MINNESOTA DEPARTMENT OF COMMERCE  
ENERGY ENVIRONMENTAL REVIEW AND ANALYSIS**

DOCKET NO. IP6997/WS-18-700

Date .....December 15, 2021  
EERA Staff ..... William Cole Storm | 651-539-1844 | bill.storm@state.mn.us

In the Matter of Plum Creek Wind Farm, LLC's *Request for Clarification* concerning language regarding the Shadow Flicker Management Plan contained within the LWECS Site Permit issued for the Plum Creek Wind Farm Project in Cottonwood, Murray, and Redwood counties in Minnesota

**Relevant Documents:**

1. Plum Creek's Request for Clarification.<sup>1</sup>
2. PUC Order granting certificate of need and issuing LWECS site permit.<sup>2</sup>

Relevant documents and additional information can be found on the eDockets website at <https://www.edockets.state.mn.us/EFiling/search.jsp> (enter the year "18" and the number "700" for the LWECS Site Permit docket).

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**Introduction and Background**

Plum Creek Wind Farm, LLC (Plum Creek or Permittee) filed three separate applications in support of its proposed up to 414-megawatt (MW) Plum Creek Wind Farm and 31-mile 345 kilovolt (kV) transmission line to be located in Cottonwood, Murray, and Redwood counties (collectively, the Project):

- a certificate of need application for the wind farm and the associated 345 kV transmission line (Docket No. IP6997/CN-18-699),<sup>3</sup>
- a large wind energy conversion system (LWECS) site permit application, (Docket No. IP6997/WS-18-700)<sup>4</sup> and

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<sup>1</sup> Plum Creek Wind Farm, LLC's Request for Clarification, October 13, 2021. eDocket ID 202110-178767-01, & -02.

<sup>2</sup> PUC Order granting certificate of need and issuing site permit, September 23, 2021. eDocket ID 20219-178198-03, & -06.

<sup>3</sup> Plum Creek Wind Farm, LLC, *Application for a Certificate of Need*, November 12, 2018. eDocket ID: 201911-1157472-01, -02, -03, -04 [hereinafter Certificate of Need Application].

<sup>4</sup> Plum Creek Wind Farm, LLC, *Application for a Large Wind Energy Conversion System Site Permit*. November 12, 2018. eDocket ID: 201911-157475-01, -02, -03, -04, -05, -06, -07, 08, -09, -10, 201911-157576-01, -02. [hereinafter Site Permit Application]

- a high-voltage transmission line (HVTL) route permit application for the proposed 345 kV transmission line (Docket No. IP6997/TL-18-701).<sup>5</sup>

On September 23, 2021, the Commission issued an Order granting the certificate of need and issuing an LWECS site permit.<sup>6</sup>

### Project Purpose

The Project will generate up to 414 MW of electric energy at the Plum Creek Wind Farm; the Applicant stated that the Project is needed to meet the growing demand for additional renewable resources required to meet energy sector needs, consumer demand, and renewable and other clean energy requirements in Minnesota and neighboring states.<sup>7</sup> The Applicant continued that given the demand for renewable energy, a market exists for independently produced electricity generated from wind and other renewables, including the up to 414 MW to be generated by the Project.<sup>8</sup>

Plum Creek also proposed to build a new 345 kV transmission line and associated facilities to connect the Wind Farm to the existing Brookings-to-Hampton 345-kV transmission line in Redwood County, Minnesota.

### Project Description

The Project consists of two major components, a LWECS of up to 414 MW, and the 345 kV HVTL of approximately 31 miles. The LWECS Site Permit is the subject of Plum Creek's request for clarification.

#### 414 MW LWECS

The Project will be located in northwestern Cottonwood, northeastern Murray, and southern Redwood counties, Minnesota. The Project will have up to 414 MW of nameplate capacity. Plum Creek continues to assess its turbine options, and for the site permit application evaluated wind turbines with rated nameplate power outputs ranging from 2.8 MW to 5.6 MW, corresponding to between 110 and 74 wind turbines at the site.<sup>9</sup>

A number of facilities will be constructed to support the operation of the wind turbines and facilitate the delivery of the electricity to consumers; these include the following associated facilities: permanent meteorological towers and other data collection systems, up to two ADLS radars, an electrical collection and communications system, access roads, temporary laydown, and staging areas, two collector substations and associated equipment, and an operations and maintenance facility.<sup>10</sup>

### Regulatory Process and Procedures

The Plum Creek Wind Project required three approvals from the Commission — 1) a certificate of need (covering both the wind farm and the transmission line), 2) a route permit for the transmission line, and 3) a site permit for the wind farm.

Item 3 and the language contained in the LWECS Site Permit are the subject of these comments and recommendations. The regulatory review process laid out in Minnesota Statutes, Chapter 216F-Wind Energy Conversion Systems, and

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<sup>5</sup> Plum Creek Wind Farm, LLC, *Application to the Minnesota Public Utilities Commission for a Route Permit for a 345 kV High Voltage Transmission Line*, November 20, 2018, eDocket ID: [201911-57483-01](#), -02, -03, -04, -05, -06, -07, 08. [hereinafter Route Permit Application].

<sup>6</sup> Plum Creek Wind Farm, LLC's Request for Clarification, October 13, 2021. eDocket ID 202110-178767-01, & -02.

<sup>7</sup> Certificate of Need Application, at p. 5.

<sup>8</sup> Certificate of Need Application, at p. 7.

<sup>9</sup> Site Permit Application, at Section 4.0.

<sup>10</sup> Site Permit Application, at Section 4.0.

Minnesota Rules, Chapter 7854-Site Permit, Large Wind Energy System were followed and culminated in the issuing of an LWECS Site Permit on September 23, 2021.

Following issuance of the LWECS Site Permit, Plum Creek requested clarification of the LWECS Site Permit language concerning the *Shadow Flicker Management Plan*, and suggested changes to the language.<sup>11</sup>

## EERA Staff Analysis and Recommendations

In response to the PUC's *Notice of Comment Period on Request for Clarification*,<sup>12</sup> issued on December 1, 2021, EERA staff reviewed Plum Creek's request, along with language contained in recent LWECS permits concerning *Shadow Flicker Management Plans*.

As was discussed, before the bench during the Commission's August 12, 2021, meeting regarding the final decision on Plum Creek's LWECS Site Permit, while shadow flicker is not a new notion, incorporating the concept of a *Shadow Flicker Management Plan* into LWECS Site Permits and the corresponding language (and the plans themselves) is evolving and will continue to evolve as the program gains more expertise balancing the needs of proponents and the host communities. The advent of larger and larger turbines, while more efficient, quieter, and smaller in footprint, will certainly be a factor in the consideration of shadow flicker.

Below is a summary of the permit language regarding shadow flicker from recent LWECS Site Permits:

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Language from the Walleye LWECS Site Permit contained in the Commission Order dated September 17, 2021.<sup>13</sup>

### **7.2 Shadow Flicker**

*At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize and mitigate shadow flicker exposure. The Permittee shall prepare a Shadow Flicker Management Plan detailing the results of any shadow flicker modeling, assumptions made, levels of exposure prior to implementation of planned minimization and mitigation efforts, planned minimization and mitigation efforts, and planned communication and follow up with residents. Mutual agreements between the permittee and landowners shall be considered a mitigation measure. The Shadow Flicker Management Plan shall be filed with the Commission at least 14 days prior to the preconstruction meeting to confirm compliance with conditions of this permit. Mutual agreements with landowners finalized after the preconstruction meeting shall be filed as amendments to the Shadow Flicker Management Plan.*

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<sup>11</sup> Plum Creek Wind Farm, LLC's Request for Clarification, October 13, 2021. eDocket ID 202110-178767-01, & -02.

<sup>12</sup> PUC Notice of Comment Period on request for Clarification, December 1, 2021. eDocket ID 202112-180271-01.

<sup>13</sup> PUC Order granting certificate of need and issuing site permit, September 17, 2021. eDocket ID 20219-178050-01.

*Should shadow flicker modeling identify any residence of a non-participating landowner that will experience in 30 hours, or more, of shadow flicker per year, the Permittee must specifically identify these residences in the Shadow Flicker Management Plan. If through minimization and mitigation efforts identified in the Shadow Flicker Management Plan the Permittee is not able to reduce anticipated shadow flicker exposure at a nonparticipating landowner's residence to less than 30 hours per year a shadow flicker detection systems will be utilized during project operations to monitor shadow flicker exposure at the residence. The Shadow Flicker Management Plan will detail the placement and use of any shadow flicker detection systems, how the monitoring data will be used to inform turbine operations, and a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one receptor. The results of any shadow flicker monitoring and mitigation implementation shall be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.9 of this Permit.*

*Commission staff and EERA staff will be responsible for the review and approval of the Shadow Flicker Management Plan. The Commission may require the Permittee to conduct shadow flicker monitoring at any time during the life of this Permit.*

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Language from the Plum Creek LWECs Site Permit contained in the Commission Order dated September 23, 2021.<sup>14</sup>

## **7.2 Shadow Flicker**

*The Permittee shall prepare a Shadow Flicker Management Plan. The plan shall be filed at least 14 days prior to the pre-operation meeting. The plan shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used; assumptions made; the anticipated levels of exposure from turbine shadow flicker for each residence; and documentation on the proposed methods to avoid, minimize, and mitigate shadow flicker exposure, including relevant communications with residents.*

*Should modeling identify any residence that will experience 30 hours or more of shadow flicker per year, the residence must be specifically identified in the Shadow Flicker Management Plan. If through minimization and mitigation efforts identified in the plan the Permittee is not able to reduce a residence's anticipated shadow flicker exposure to less than 30 hours per year, a shadow flicker detection system will be utilized during project operations to monitor shadow flicker exposure at the residence. The plan must detail the placement and use of any shadow flicker detection systems, describe how the monitoring data will be used to inform turbine operations, and include a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one residence. The Permittee may exclude from the Shadow Flicker Management Plan residences that exceed 30 hours per year by providing documentation that the landowners have reached an alternative agreement or a waiver as it relates to shadow flicker. If agreement is reached with a landowner regarding shadow flicker after the pre-construction meeting the Permittee may remove that residence from coverage under the plan.*

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<sup>14</sup> PUC Order granting certificate of need and issuing site permit, September 23, 2021. eDocket ID 20219-178198-03, & -06.

*The results of any shadow flicker monitoring, mitigation implementation, and notice of later agreements will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit. The Commission may require the Permittee to conduct shadow flicker monitoring and mitigation at any time during the life of this permit.*

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Language from the Grand Meadow LWECS Site Permit (Repower) contained in the Commission Order dated October 13, 2021.<sup>15</sup>

## **7.2 Shadow Flicker**

*At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize and mitigate shadow flicker exposure. The results of any modeling shall be filed with the Commission at least 14 days prior to the pre-construction meeting to confirm compliance with conditions of this permit.*

*The Permittee shall develop a project wide Shadow Flicker Management Plan that reduces shadow flicker exposure to less than 30 hours per year for all occupied residences. The Permittee may exclude from the Shadow Flicker Management Plan residences that exceed 30 hours per year by providing documentation that the landowners have reached an alternative agreement as it relates to shadow flicker. If agreement is reached with a landowner regarding shadow flicker after the pre-construction meeting the Permittee may remove that residence from coverage under the plan.*

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Plum Creek requested the following language changes to its LWECS Site Permit to “more closely match the Commission’s decision, reduce ambiguity, and clarify compliance expectations related to the required shadow flicker management plan”:

Language from the Plum Creek Request for Reconsideration (Permit Modification) dated August 13, 2021.

## **7.2 Shadow Flicker**

The Permittee shall prepare a Shadow Flicker Management Plan. The plan shall be filed at least 14 days prior to the pre-operation meeting. The plan shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used; assumptions made; the anticipated levels of exposure from turbine shadow flicker for each residence; and documentation on the proposed methods to avoid, minimize, and mitigate shadow flicker exposure, including relevant communications with residents.

Should modeling identify any residence that will experience 30 hours or more of shadow flicker per year, the residence must be specifically identified in the Shadow Flicker Management Plan. If through minimization and mitigation efforts identified in the plan the Permittee is not able

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<sup>15</sup> PUC Order issuing site permit, October 13, 2021. eDocket ID 202110-178766-01.

to reduce a residence's anticipated shadow flicker exposure to less than 30 hours per year, ~~a shadow flicker detection system will be utilized during project operations to monitor shadow flicker exposure at the residence. The plan must detail the placement and use of any shadow flicker detection systems, describe how the monitoring data will be used to inform turbine operations, and include the Permittee must include~~ a detailed plan of when and how turbine operations will be adjusted to mitigate shadow flicker exposure exceeding 30 hours per year at any one residence.

The Permittee may exclude from the Shadow Flicker Management Plan residences that exceed 30 hours per year by providing documentation that the landowners have reached an alternative agreement or a waiver as it relates to shadow flicker. If a waiver is obtained or an agreement is reached with a landowner regarding shadow flicker after the pre-construction meeting the Permittee may remove that residence from coverage under the plan.

The results of any shadow flicker ~~management plan monitoring, mitigation implementation,~~ and notice of later agreements will be reported by the Permittee in the Annual Project Energy Production Report identified in Section 10.8 of this Permit. ~~The Commission may require the Permittee to conduct shadow flicker monitoring and mitigation at any time during the life of this permit.~~

Having processed a few LWECS dockets incorporating the requirement of a *Shadow Flicker Management Plan* through the issuing of a site permit, the Department favors the language used in the Grand Meadow docket (see above). Comparing the Grand Meadow language with that contained in both the original Plum Creek LWECS site permit and that proposed in the request for clarification, EERA staff makes the following notations:

1. First paragraph, EERA believes requiring the submittal prior to the pre-construction meeting, rather than the pre-operation meeting allows for ample time to make slight adjustments to the project to accommodate unknown related issues before the site is physically developed.
2. Second paragraph, EERA believes the terms or issues in this paragraph are better dealt with inside the *Shadow Flicker Management Plan*, in fact they must be laid out in such a plan. The plan is a post-permit compliance deliverable that must be approved before construction can begin.
3. Third paragraph, the term "waiver" implies a right and adds unnecessary confusion when the term agreement is sufficient.

## Department Recommendations

The Department recommends that if the Commission decides to modify the language in the LWECS Site Permit for the Plum Creek Wind Farm, it delete the existing language and incorporate the language from the Grand Meadows LWECS Site Permit with one minor modification to clarify EERA's role:

## **7.2 Shadow Flicker**

At least 14 days prior to the pre-construction meeting, the Permittee shall provide data on shadow flicker for each residence of non-participating landowners and participating landowners within and outside of the project boundary potentially subject to turbine shadow flicker exposure. Information shall include the results of modeling used, assumptions made, and the anticipated levels of exposure from turbine shadow flicker for each residence. The Permittee shall provide documentation on its efforts to avoid, minimize and mitigate shadow flicker exposure. The results of any modeling shall be filed with the Commission at least 14 days prior to the pre-construction meeting to confirm compliance with conditions of this permit.

The Permittee shall develop a project wide Shadow Flicker Management Plan that reduces shadow flicker exposure to less than 30 hours per year for all occupied residences. The Permittee may exclude from the Shadow Flicker Management Plan residences that exceed 30 hours per year by providing documentation that the landowners have reached an alternative agreement as it relates to shadow flicker. If agreement is reached with a landowner regarding shadow flicker after the pre-construction meeting the Permittee may remove that residence from coverage under the plan.

Commission staff and EERA staff will be responsible for the review and approval of the Shadow Flicker Management Plan.

## **CERTIFICATE OF SERVICE**

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

**Minnesota Department of Commerce  
Comments and Recommendations**

**Docket No. IP6997/WS-18-700**

**Dated this 15<sup>th</sup> day of December 2021**

**/s/Sharon Ferguson**



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