

# **Thunderhead Wind Energy Center Interconnection Project**

*Finding of No Significant Impact and Decision  
Document*

*Wheeler, Antelope, and Holt Counties,  
Nebraska*



**Western Area  
Power Administration**

*DOE/EA-2174  
July 2022*

**AGENCY:** U.S. Department of Energy (DOE), Western Area Power Administration (WAPA)

**ACTION:** Determination of Finding of No Significant Impact (FONSI) and selection of the Proposed Action for implementation.

**SUMMARY:** Thunderhead Wind Energy LLC (Thunderhead) has requested to interconnect its existing approximately 300-megawatt (MW) Thunderhead Wind Energy Center (TWEC) to WAPA's existing Grand Island-Fort Thompson 345-kilovolt (kV) transmission line in Holt County, Nebraska (Interconnection Project). The TWEC is located in portions of Wheeler, Antelope, and Holt Counties, Nebraska, near Neligh, Nebraska, approximately 135 miles northwest of Omaha, Nebraska, and 100 miles southwest of Sioux City, Iowa.

WAPA's decision on Thunderhead's Interconnection Project constitutes a major federal action under the National Environmental Policy Act (NEPA). Therefore, an Environmental Assessment (EA) (*Thunderhead Wind Energy Center Interconnection Project, DOE/EA-2174*) was prepared to analyze the potential environmental impacts of the action. The EA tiered from the analysis conducted in the Upper Great Plains (UGP) Wind Energy Final Programmatic Environmental Impact Statement (PEIS), a document prepared jointly by WAPA and the U.S. Fish and Wildlife Service (USFWS) (2015). Applicable material from the UGP PEIS was incorporated by reference in the EA, in accordance with 40 Code of Federal Regulations (CFR) 1501.11 and 1501.12. The EA is intended to be read in conjunction with the PEIS, and the EA and PEIS together comprise the NEPA documentation for this federal action.

**FOR FURTHER INFORMATION CONTACT:** A copy of all associated NEPA documents are available at the following website:

<https://www.wapa.gov/regions/UGP/Environment/Pages/environment.aspx>

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**PROPOSED ACTION:** The Proposed Action is for WAPA to allow Thunderhead to interconnect its TWEC facility to WAPA's existing UGP Region Grand Island-Fort Thompson 345-kV transmission line via the Nebraska Public Power District's (NPPD) Holt County Substation. WAPA would perform the following construction and commissioning work necessary to accommodate the interconnection:

- Installing two new steel monopole approach structures on existing foundations. One structure would be approximately 160 feet tall, and the second would be approximately 135 feet tall. Additionally, a 120-foot-tall steel lattice structure would be removed.
- Stringing 751 feet of conductor between WAPA's transmission line and NPPD's Holt County Substation.
- Installing and/or commissioning of any necessary protective relays, remote terminal units, etc. at the Holt County Substation and existing WAPA facilities.

These activities are expected to take approximately 3 weeks to complete, and all work would be accomplished within WAPA's existing right-of-way (ROW). No vegetation clearing or earth work is needed to complete the activities described above.

If the interconnection is allowed, Thunderhead would operate and maintain the TWEC and associated facilities for a period of 50 years.

**ALTERNATIVES:** The DOE requires that EAs include a No Action Alternative (10 CFR 1021.321(c)). The Interconnection Project EA presented a No Action Alternative which assumed that WAPA would not allow Thunderhead to interconnect its TWEC facility via WAPA's 345-kV transmission line and would not perform construction or commissioning work to accommodate the interconnection request. Under the No Action Alternative, WAPA expects that Thunderhead would seek an alternative interconnection; however, specific information regarding timing and location of that alternative interconnection is unknown at this time. For baseline comparison, the No Action Alternative assumes that the TWEC and associated facilities would remain as constructed but would be non-operational.

**PUBLIC INVOLVEMENT:** Multiple opportunities for public involvement were offered. Public involvement began with two virtual scoping meetings held on December 15, 2021, and individual letters were sent to agencies, tribes, and residents within and near the project area. The public scoping meeting documentation is included in Appendix J of the EA.

WAPA circulated the draft EA for public review and comment on April 13, 2022. Comments on the draft EA were accepted through June 8, 2022. Comments and responses are included in Appendix J of the EA.

**TRIBAL INVOLVEMENT:** Pursuant to Section 106 of the National Historic Preservation Act (NHPA), WAPA initiated tribal consultations by letter with the following 15 tribes on November 22, 2021:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes, Oklahoma
- Iowa Tribe of Kansas and Nebraska
- Oglala Sioux Tribe
- Omaha Tribe of Nebraska
- Otoe-Missouria Tribe of Indians
- Pawnee Nation of Oklahoma
- Ponca Tribe of Indians of Oklahoma
- Ponca Tribe of Nebraska
- Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota
- Sac and Fox Tribe of the Mississippi in Iowa
- Sac and Fox Nation of Missouri in Kansas and Nebraska
- Santee Sioux Nation, Nebraska
- Winnebago Tribe of Nebraska
- Yankton Sioux Tribe of South Dakota

WAPA received responses from six tribal entities. The Winnebago Tribe of Nebraska and the Pawnee Nation of Oklahoma requested to consult. On January 5, 2022, the Omaha Tribe of Nebraska requested more information on the Interconnection Project, and on January 6, 2022, WAPA sent the tribe the requested additional information. On February 18, 2022, WAPA sent a letter to all tribes outlining its efforts to identify cultural resources in the project area, its determination of effect, the supporting cultural resources reports (also provided to the Nebraska State Historic Preservation Office [SHPO]), and a request for comment and concurrence. On March 2, 2022, the Winnebago Tribe of Nebraska asked whether an informational meeting was planned. When WAPA informed the tribe that no meeting was planned, WAPA offered to meet with the tribe for further consultation. As of March 28, 2022, WAPA has received no response.

The Pawnee Nation of Oklahoma provided a letter on March 10, 2022, stating that the Interconnection Project should not affect the cultural landscape of the Pawnee Nation of Oklahoma and that if undiscovered properties are encountered, they must be immediately reported to the tribe.

The Santee Sioux Nation, Nebraska, provided a letter on March 13, 2022, stating that they did not wish to consult on the Interconnection Project and that if potential tribal artifacts or burial artifacts are discovered, proper precautions and notifications should be made.

The Yankton Sioux Tribe of South Dakota provided a letter on March 31, 2022, stating that they do not have an interest in the Interconnection Project but that if any items of cultural significance arise during Interconnection Project operations, they would like to be notified because the Interconnection Project is in an area of interest to their tribal nation.

The Iowa Tribe of Kansas and Nebraska provided an email on March 31, 2022, stating that the project area is outside the area of interest to the tribe.

**ENVIRONMENTAL IMPACTS:** The EA disclosed the potential environmental impacts of the Proposed Action and No Action Alternative. A summary of environmental impacts for each resource is described in Table 1. Note that the determination of these impacts is based on implementation of the environmental commitments as a required component of the Interconnection Project which are described in the respective resource sections of Chapter 3 of the EA. These environmental commitments include measures to reduce potential Interconnection Project impacts.

**Table 1. Summary of Environmental Impacts of Alternatives**

Resource Area	Proposed Action Impacts	No Action Alternative Impacts
Geology, Soil Resources, and Paleontology	WAPA’s construction and commissioning work would not impact geology, soil resources, or paleontological resources because no surface disturbance or subsurface work is planned. There is potential for soil compaction, soil erosion, and surface runoff in areas where vehicles, equipment, and human traffic cross the landscape.	Facilities would still be actively maintained. Soil compaction, erosion, and surface runoff as a result of vehicle, equipment and human traffic described for the Proposed Action would occur under the No Action Alternative as well.
Water Resources	WAPA’s construction and commissioning work would not impact surface water resources as they would not result in surface disturbance. O&M of TWEC facilities may affect groundwater quantity in nearby aquatic resources as a result of minor runoff and sedimentation or spills.  The TWEC O&M facility has running water for cleaning and drinking, which is provided by an existing private water well. The Interconnection Project would use approximately 30 gallons a day (7,800 gallons a year) for O&M facility usage and an additional 2,000 to 3,000 gallons during the summer months.	The existing TWEC facilities would remain in place but would not operate. These facilities would still be actively maintained; therefore, all the impacts described for the Proposed Action would occur as a result of the No Action Alternative as well.



Resource Area	Proposed Action Impacts	No Action Alternative Impacts
Air Resources	<p>Operating wind turbines and the gen-tie line would not directly result in air emissions because no fossil fuels would be combusted. Negligible amounts of dust, vehicle exhaust emissions, and combustion-related emissions from worker trips or diesel emergency generators would occur during TWEC facility maintenance activities and WAPA construction and commissioning activities. Additionally, negligible amounts of hazardous air pollutants from vehicle exhaust emissions, combustion-related emissions from worker trips and equipment use, and operation of the proposed collector station would occur during TWEC O&amp;M activities and WAPA construction and commissioning activities.</p> <p>These emissions would be negligible and would not cause exceedances of air quality standards, but they would incrementally contribute to overall greenhouse gas emissions.</p>	<p>The existing TWEC facilities would remain in place but would not operate. These facilities would still be actively maintained; therefore, the air quality impacts described for the Proposed Action would occur under the No Action Alternative as well.</p>
Noise	<p>Noise impacts would include impacts from wind turbine operation, gen-tie corona discharge, vehicle use, and heavy equipment required for O&amp;M activities. Operation of the TWEC wind turbines would result in the generation of mechanical and aerodynamic noise. The gen-tie line could cause corona discharge noise; however, this noise would be lost in the background noise at distances of 300 feet or more. The main sources of noise associated with a substation are the transformer and switch gear as a result of core vibration. Use of vehicles and other heavy equipment for O&amp;M activities would contribute to noise impacts, but these would occur intermittently, be short term, and would generally occur during regular business hours. All predicted noise levels would be below county thresholds as well as the level that the U.S. Environmental Protection Agency defines as an adverse impact.</p>	<p>The existing TWEC facilities would still be actively maintained. Noise impacts from maintenance vehicle traffic and the O&amp;M facility described for the Proposed Action would occur under the No Action Alternative as well. Noise impacts from wind turbine operation and gen-tie corona discharge would not occur.</p>
Vegetation	<p>Impacts to vegetation from TWEC O&amp;M activities and WAPA construction and commissioning activities would occur from the potential spread of noxious weeds by vehicle use and trampling, compaction, and/or uprooting during O&amp;M activities. These activities include routine vegetation maintenance to periodically trim and/or remove trees and bushes that could interfere with Interconnection Project infrastructure and contribute to wildfire risk.</p>	<p>Facilities would still be actively maintained. Vegetation impacts related to TWEC O&amp;M under the Proposed Action would continue to occur under the No Action Alternative. Impacts from TWEC operations and WAPA construction and commissioning activities disclosed under the Proposed Action would not occur under the No Action Alternative.</p>
Wildlife	<p>TWEC O&amp;M activities, including turbine operations, use of vehicles, noise, and presence of workers, could displace individual wildlife species into adjacent habitats. Additionally, direct wildlife strikes by vehicles during O&amp;M activities could occur.</p> <p>Turbine operation is estimated to potentially cause from 21 to 2,730 bird strike fatalities annually, with a median estimate of 450 bird strike fatalities annually.</p> <p>Turbine operation is estimated to potentially cause 60 to 5,700 bat strike fatalities annually, with a median estimate of 720 bat strike fatalities annually.</p> <p>Environmental commitments and adaptive management described in Section 3.0 of the Bird and Bat Conservation Strategy (Appendix E of the EA) would be implemented to reduce bird and bat impacts. In accordance, Thunderhead would conduct postconstruction carcass monitoring during TWEC O&amp;M. If the number of bird and bat carcasses were greater than expected, Thunderhead would meet and confer with the USFWS, and any applicable actions agreed upon would be carried out to prevent long term impacts to bird and bat populations.</p>	<p>The existing TWEC facilities would remain in place but would not operate. Under this alternative, there would be no increased risk of mortality due to bird and bat strikes from rotor operation, and bird avoidance behaviors would remain the same as under current conditions. TWEC facilities would still be actively maintained. Avoidance due to human activity and risk of mortality due to vehicle collisions would be the same as those described under the Proposed Action.</p>



Resource Area	Proposed Action Impacts	No Action Alternative Impacts
Threatened and Endangered Species	<p>WAPA has determined, and the U.S. Fish and Wildlife Services has concurred, that the Interconnection Project may affect but is not likely to adversely affect the American burying beetle, northern long-eared bat, and whooping crane; and would have no effect on the pallid sturgeon, piping plover, and western prairie fringed orchid. Environmental commitments and adaptive management would be implemented, as described in the Wildlife summary above.</p>	<p>The existing TWEC facilities would remain in place but would not operate. These facilities would still be actively maintained. Threatened and Endangered Species impacts related to this maintenance would continue to occur under the No Action Alternative. Impacts from TWEC operations and WAPA construction and commissioning activities disclosed under the Proposed Action would not occur under the No Action Alternative.</p>
Visual Resources	<p>Interconnection Project operations would have low to moderate visual impacts on surrounding communities due to rotor movement, blade glint, and shadow flicker. The Interconnection Project would contribute minimally to any changes in sky glow, if at all, because turbine lighting is existing and other facility lighting is downward facing and would be operated only when needed, using motion detectors or timers. Overall changes to the existing visual landscape would be negligible because of the presence of existing operating wind farms to the north, south, and east of TWEC facilities.</p> <p>None of the residence receptors within the 4,300 feet of TWEC turbines (10 rotor diameters plus an extra 130-foot buffer) would experience annual shadow flicker levels at or above 30 hours per year or 30 minutes per day. This is the accepted industry-wide standard for non-significant shadow flicker impacts.</p>	<p>The existing, lighted TWEC facilities would remain in place but would not operate. These facilities would still be actively maintained. Visual impacts under the Proposed Action would continue to occur under the No Action Alternative. The No Action Alternative would have no new visual impacts.</p>
Cultural Resources	<p>Interconnection Project operations could have visual effects on the Fairview Church and Cemetery historic property, as measured by shadow flicker, which would be transitory and non-significant due to the low frequency of passing shadow and the low amount of time of when potential shadow flicker could occur. Noise impacts on this historic property would also be non-significant as operational noise levels would be consistent with ambient noise levels of rural and undeveloped areas.</p> <p>Interconnection Project operations could also directly impact unknown archaeological and built environment historic properties through pedestrian, heavy equipment, or vehicular traffic. Implementation of environmental commitments (see Section 3.9.2.1 of the EA) would reduce potential impacts to such historic properties if encountered.</p> <p>Based on these analyses, WAPA determined that the Interconnection Project would have no adverse effect on historic properties and subsequently consulted with the Nebraska SHPO regarding this determination (see Appendix I of the EA). On February 25, 2022, the Nebraska SHPO concurred with WAPA's determination of effect (see Appendix I of the EA).</p>	<p>The existing TWEC facilities would remain in place but would not operate and would have no operational impacts on cultural resources. All maintenance activities for the existing facilities would be in previously disturbed areas and would not impact cultural resources. Thunderhead's unanticipated discovery protocol for cultural resources, would reduce potential impacts if resources are encountered.</p>
Land Use and Public Facilities	<p>There would be no changes to land use or land cover in the project area during TWEC O&amp;M activities. The addition of vehicles for O&amp;M activities would not cause impacts to traffic or existing roadway uses. Additionally, there would be no impact to commercial air traffic from the Interconnection Project. The Interconnection Project is in compliance with county use permits and consistent with county plans and county regulations and zoning ordinances.</p>	<p>There would be no impacts to land use or other public utilities.</p>

Resource Area	Proposed Action Impacts	No Action Alternative Impacts
Socioeconomics	<p>The Interconnection Project is expected to create long-term positive impacts on the local economy, including approximately \$94.3 million in direct economic benefits over the 50-year life of the Interconnection Project. The estimated number of O&amp;M jobs would not have a material effect on overall county median household income or meaningfully affect rental vacancy levels, employment/unemployment rate, state sales tax revenue, population, state and local government expenditures, state and local government employment, or state recreation sector income. Structures associated with the TWEC facility may have affected property values; however, it is anticipated that price differentials will be small, 5% or less, with slightly larger price impacts for agricultural, commercial, and industrial land.</p>	<p>Under the No Action Alternative, the existing TWEC facilities would remain in place but would not operate; however, these facilities would still be actively maintained. The wind lease payments would be made per the terms of individual lease agreements and applicable property tax would continue to be paid. The six employees that are currently maintaining the site would continue to be employed in that capacity.</p>
Environmental Justice	<p>No communities of concern have been identified in the project area, and thus no disproportionately high and adverse human health or environmental effects are expected from O&amp;M activities.</p>	<p>No communities of concern have been identified in the project area; thus no disproportionately high and adverse human health or environmental effects are expected from the No Action Alternative.</p>
Health and Safety	<p>The range of exposure of workers and the public to electric and magnetic fields would be far below ICNIRP 1998 Guidelines for Electromagnetic Field (EMF) occupational exposure (4,200 milligauss).</p> <p>All power poles, turbines, and ancillary support facilities and equipment were sited and built to prevent operational interference with any existing commercial or public safety communication towers, to be compliant with the Federal Aviation Administration’s final marking and lighting plan, and to minimize safety impacts from ice throw.</p> <p>Implementation of a fire education and prevention plan as part of the facility operation plan outlines measures that would lower the risk of a fire starting at the TWEC and ensures that, if one did occur, there would be an appropriate response to quickly extinguish the fire.</p> <p>Impacts of intentional damage would be reduced due to security measures and vigilance from resident landowners. Fire or spill impacts from intentional damage would be reduced by fire prevention and spill containment measures.</p>	<p>Under the No Action Alternative, the existing TWEC facilities would remain in place but would not operate. The No Action Alternative would not pose an EMF or ice throw hazard. However, these facilities would still be actively maintained, so the No Action Alternative would have the same impacts to communications, aviation, and fire as the Proposed Action. The No Action Alternative may be at a greater risk for vandalism because the project area would have less human traffic.</p>
Cumulative Impacts	<p>The Interconnection Project would incrementally contribute to impacts on various resources within the region. However, because the Interconnection Project does not include any construction-associated surface disturbance in undisturbed areas, these contributions would be limited to indirect impacts from TWEC O&amp;M. In particular, these would contribute cumulatively to impacts to wildlife in terms of potential bird and bad fatalities and indirect habitat loss due to wildlife avoidance of the area. Project operations would also contribute cumulatively to existing visual impacts, including shadow flicker, from existing wind farms in the general area. Table 4-1 of the EA summarizes potential cumulative effects associated with the Interconnection Project. With the implementation of environmental commitments, the Interconnection Project would avoid or reduce impacts to the resources described above and are not expected to measurably contribute to cumulative effects on resources from other past, present, and reasonably foreseeable future actions.</p>	<p>Continuation of impacts from the existing TWEC turbines would contribute to other present and future activities and associated impacts, at existing intensity.</p>

**ENVIRONMENTAL COMMITMENTS:** Environmental commitments have been embedded as a required component of the Proposed Action and are listed in Chapter 3 of the EA.

**FINDING:** WAPA evaluated the potential environmental impacts in a variety of contexts, including national, regional, and local scales and intensities. WAPA identified no significant impacts to environmental resources or the human environment, either individually or cumulatively with other actions in the general area, which would result from the Proposed Action or No Action Alternative.

WAPA has found that neither alternative constitutes a major federal action significantly affecting the quality of the human environment. As a result, a FONSI is warranted and an environmental impact statement will not be prepared. This FONSI was prepared in accordance with Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1501.6) and the DOE NEPA Implementing Procedures (10 CFR 1021.322).

Regarding the Proposed Action, WAPA has determined that the lack of significant environmental impacts is attributed to previous siting and construction environmental commitments undertaken for the TWEC (as described in Appendix B of the EA), as well as adherence to environmental commitments as a required component of the Interconnection Project (as described in the respective resource sections of Chapter 3 of the EA). In addition, the following apply:

- All Interconnection Project O&M activities within water resource areas will be conducted in conformance with stormwater pollution prevention plan requirements of General Permit NER160000 issued by the Nebraska Department of Environmental Quality (now the Nebraska Department of Environment and Energy) under the National Pollution Discharge Elimination System.
- Thunderhead has established and implemented unanticipated find provisions so that all site personnel are aware and understand procedures for unanticipated finds. This includes work stoppage and notification requirements. If a discovery were to occur during O&M and that discovery was determined eligible for the National Register of Historic Places, Thunderhead would consult with WAPA, the Nebraska SHPO, and applicable consulting parties on the need for further testing and/or data recovery.
- The TWEC would comply with the Antelope and Wheeler Counties' use permits, sound limits, and setback limits.
- Predicted noise levels from the Interconnection Project would be below county thresholds and the level that the U.S. Environmental Protection Agency defines as an adverse impact.
- The Interconnection Project itself is typical of wind generation projects across the nation. It is not unique or unusual and does not establish a precedent for future actions.
- Consultation with the Nebraska SHPO has been completed in accordance with Section 106 of the NHPA. The Nebraska SHPO has concurred with WAPA's determination of "no adverse effect."
- Consultation with the USFWS was completed in accordance with Section 7 of the Endangered Species Act and concurrence was received on WAPA determinations of "may affect, not likely to adversely affect."
- The Interconnection Project does not violate any known federal, state, local, or tribal law or requirement imposed for the protection of the environment. State, local, and tribal interests were given the opportunity to participate in the environmental analysis process.
- Under 10 CFR 1022, WAPA has determined that the Interconnection Project would not occur in and will not affect floodplains or wetlands.



**DECISION RECORD:** WAPA has selected the Proposed Action, including all environmental commitments described in DOE/EA-2174, for implementation.

Issued in Watertown, South Dakota 7/14/22, 2022.

Lloyd A.  
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Lloyd A. Linke

Senior Vice President and UGP Regional Manager

