

- B. An engineering analysis of the tower showing compliance with official building code of the governing body and/or the State of Nebraska certified by a professional engineer licensed and certified in Nebraska shall also be submitted.
 - C. The manufacturer frequently supplies this analysis.
 - D. Wet stamps shall not be required.
6. Compliance with FAA and NDA Regulations
Small wind energy systems must comply with applicable FAA and NDA regulations, including any necessary approvals for installations close to airports.
7. Compliance with National Electrical Code
- A. Permit applications for small wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code.
 - B. The manufacturer frequently supplies this analysis
8. Utility Notification
- A. No small wind energy system shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected customer-owned generator,
 - B. Off-grid systems shall be exempt from this requirement.

	Wind Turbine – Non- Commercial	Meteorological Towers
Property Lines (other than right angle corners)	One times the total height	One times the total height
Neighboring Dwelling Units*	One times the total height	One times the total height
Road Rights-of-Way**	One times the total height	One times the total height
Other Rights-of-Way	One times the total height	One times the total height
Public Conservation Lands including Wildlife Management Areas and State Recreation Areas	NA	600 ft
Wetlands, USFW Types III, IV, and V	NA	600 ft.
Other structures not on the applicant's site	NA	One times the total height
River Bluffs of over 15 feet	NA	One times the total height

Section 8.08 Commercial/Utility Grade Wind Energy Systems

8.08.01 Purpose

It is the purpose of this regulation to promote the safe, effective and efficient use of commercial/utility grade wind energy systems while protecting natural resources and habitats within Otoe County.

8.08.02 Definitions

The following are defined for the specific use of this section.

Aggregate Project: Projects that are developed and operated in a coordinated fashion, but which have multiple entities separately owning one or more of the individual WECS within the larger project. Associated infrastructure such as power lines and transformers that service the facility may be owned by a separate entity but are also part of the aggregated project.

Ambient Noise Level: The all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any alleged offensive noise.

Anemometer: An instrument for measuring and recording the speed of the wind for

wind turbine construction.

CHURCH: A building that is the regular meeting place of a religious organization or congregation.

Clustering: The grouping of two or more WECS sited within one-half mile of one another.

Commercial WECS: A wind energy conversion system of equal to or greater than 100 kW in total name plate generating capacity.

Daytime Hours shall mean a time period from 8:00 a.m. local time to 8:00 p.m. local time.

Fall Fail Zone: The area, defined as the furthest distance from the tower base, in which a guyed tower will collapse in the event of a structural failure. This area is less than the total height of the structure.

Feeder Line shall mean any power line that carries electrical power from one or more wind turbines or individual transformers associated with individual wind turbines to the point of interconnection with the electric power grid, in the case of interconnection with the high voltage transmission systems the point of interconnection shall be the substation serving the wind energy conversion system.

Habitable Structure: See Article 2

Hub: The mechanical area sitting atop of a WECS structure containing the generation equipment and the point where the blades are connected to the system.

Hub Height: The overall height measured from grade of a WECS to the center point of the hub of the turbine.

Impact Easement: An easement or deeds restriction, recorded in the Office of the Otoe County Register of Deeds, which runs with the land and is granted to the owner of a WECS for the period of time that such use shall exist, by the owners of the adjoining property in which it is mutually agreed between the grantor and grantee that the grantor shall hold the grantee harmless from noise, visual or other legal impacts associated with such use on the grantor's property when such use is operated in accordance with the terms of such easement or deed restriction. This impact easement only relates to wind energy systems over 100 KW. One kilowatt (KW) is equal to 1000 watts.

Landowner, Non-participating: An individual or group of individuals not involved in the overall project via land leases and other such means that may or may not be directly impacted by the WECS project.

Landowner, participating: An individual or group of individuals involved, directly or indirectly, in the overall project via land leases and other such means.

Meteorological Tower: A tower which is erected primarily to measure wind speed and directions plus other data relevant to siting a Wind Energy Conversion System. Meteorological towers do not include towers and equipment used by airports, the NDOR, or other applications to monitor weather conditions.

Public Conservation Lands shall mean land owned in fee title by State or Federal agencies and managed specifically for conservation purposes, including but not limited to State Wildlife Management Areas, State Parks, federal Wildlife Refuges and Waterfowl Production Areas. For purposes of this regulation, public conservation lands will also include lands owned in fee title by non-profit conservation organizations. Public conservation lands will also include private lands upon which conservation easements have been sold to public agencies or non-profit conservation organizations.

Rotor Diameter: The diameter of the circle described by the moving rotor blades.

Shadow Flicker: The shadow cast from the rotating blades of a WECS system which moves with the blades. Strobe effect that occurs when sun is horizontal to wind turbine blades, ~~grader~~ which causes repetitive intermittent shadows that can affect people on nearby properties.

Small Wind Energy System shall mean a wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 kW and which is intended to primarily reduce on-site consumption of utility power.

School Definitions shall mean any public school, Private school, or exempt school, as provided in Nebraska Department of Education, Title 192, Nebraska Administrative Code Chapter 13.

Substations shall mean any electrical facility to convert electricity produced by wind turbines to a voltage greater than 35,000 (35 kV) for interconnection with high voltage transmission lines.



Total Height: The highest point, above ground level, reached by a rotor tip or any other part of the Wind Energy Conversion System.

Tower: The vertical structures that support the electrical, rotor blades, or meteorological equipment.

Tower Height: The height above grade of the hub portion of the tower, excluding the wind turbine itself.

Transmission Line: An electrical power line carrying voltages of at least 69,000 volts (V) and used to carry electricity over medium to long distances rather than directly supplying electric energy to retail customers.

Wind Energy Conversion Conservation System (WECS): An electrical generating facility comprised of one or more wind turbines and accessory facilities, including but not limited to: power lines, transformers, substations and meteorological towers that operate by converting the kinetic energy of wind into electrical energy. The energy may be used on-site or distributed into the electrical grid

Wind Turbines: Any piece of electrical generating equipment that converts the kinetic energy of blowing wind into electrical energy using airfoils or similar devices to capture the wind.

Wind Turbine Generator: A tower, pylon, or other structure, including all accessory facilities, upon which any of the following are mounted:

1. A wind vane, blade, or series of wind blades or other devices mounted on a rotor for the purpose of converting wind kinetic energy into electrical energy.

2. A shaft, gear, belt, or coupling device used to connect the rotor to a generator, alternator, or other electrical devices.
3. A generator, alternator, or other device used to convert the mechanical energy by the rotation of the rotor into electrical energy.

8.08.03 Requirements

Commercial/Utility Grade wind energy systems shall be permitted as **a Conditional Use Within the AG-1 District, only.** Conditional Use within the AG-1 District. Permanent Meteorological towers shall be considered part of the system. Temporary meteorological towers may be permitted in the AG-1 District by a Zoning (Building) Permit and limited to two years or less. When requesting a conditional use permit for a commercial/utility grade wind energy conversion system (also known as a WECS), and/or a zoning permit for a temporary meteorological tower; the following requirements and information shall be met and supplied:

1. The name(s) **and address** of project applicant.
2. The name of the project owner and **address.**
3. The legal description and address of the project.
4. A description of the project including; Number, type, name plate generating capacity, tower height, rotor diameter, and total height of all wind turbines and means of interconnecting with the feeder lines.
5. A site layout signed by a Professional Surveyor including the location of property lines, wind turbines, electrical grid, and all related accessory structures.
6. A soils report must also be presented based on soil borings, and a description of the proposed foundation size, materials, and depth. The layout must show latitude and longitude of individual wind turbines.
7. The Otoe County Road Department shall receive a set of the detailed plans as described above. The roads and bridges affected by the construction of the wind project must be addressed and any improvements needed will be paid by the owner/developer. All roads and bridges shall be in good working order before, during, and after the project is completed, as determined by the Otoe County Road Department or Board of Commissioners.
8. **Engineer / Land Surveyor Certification.** A registered engineer / land surveyor licensed in the State of Nebraska shall be required for the design/survey at the expense of the **landowner/developer.**
9. Documentation of land ownership or legal control of the property.
10. The latitude and longitude of individual wind turbines.
11. A USGS topographical map, or map with similar data, of the property and surrounding area, including any other WECS not owned by the applicant, within 10 rotor distances of the proposed WECS.
12. Location of wetlands, scenic, and natural areas (including bluffs) within 1,320 feet of the proposed WECS.
13. An Acoustical Analysis that certifies that the noise requirements within this regulation can be met.
14. FAA and NDA review and permit
15. Location of all known Communication Towers within two miles of the proposed WECS.
16. Decommissioning Plan including the financial means to implement the plan.
17. Description of potential impacts on nearby WECS and wind resources on adjacent properties not owned by the applicant.

8.08.04 Aggregated Projects

The following concerns an aggregated project(s).

1. **Aggregated projects may jointly submit a single application and be reviewed under joint proceedings, including notices, public hearings, reviews and as appropriate approvals. A detailed layout which includes the location of the property lines, wind turbines, electrical grid,**

and all related accessory structures designed and stamped by a registered licensed professional engineer or surveyor in the State of Nebraska. Permits may be issued and recorded separately.

2. Joint projects will be assessed fees as one project.
3. Setbacks to property lines, not road rights-of way, may be less when adjoining property owners are within the same aggregate project.
4. Clustering of WECS turbines shall be limited to no more than two WECS per participating landowner, non-participating landowner. More may be sited at or beyond one mile 4,000 of said non-participating property line, landowner.
5. Approval of an aggregated project shall give the applicant the approval necessary to begin final site locations within any variations allowed by the Planning Commission and County Board.
6. Approval of an aggregated project shall provide authorization to the developer to commence on the project unless specific conditions are applied during the review and approval process.

8.08.05 Setbacks

All towers shall adhere to the setbacks as measured from the hub established in the following table:

	WECS Wind Turbine – Commercial/Utility WECS	Meteorological Towers
Property Lines	1.5 times the hub height + the rotor diameter	One times the total height
Non-Participating property lines will be 1 mile from closest wind turbine	1 mile (1300')	One times the total height
Road Rights-of-Way**	1.5 times the hub height + the rotor diameter	One times the total height
Other Rights-of-Way	1.5 times the hub height + the rotor diameter	One times the total height
Public Conservation Lands including Wildlife Management Areas and State Recreation Areas	600 ft. or a distance established by any state or Federal agency.	600 ft. or a distance established by any state or Federal agency.
Wetlands, USFW Types III, IV, and V	600 ft. or a distance established by any state or Federal agency.	600 ft. or a distance established by any state or Federal agency.
Village and city limits will be 2 miles from any wind turbine.	2 miles	One times the total height
Churches and Schools	1 mile	One times the total height

** The setback shall be measured from any future Rights-of-Way if a planned change or expanded right-of-way is known.

8.08.06 Special Safety and Design Standards and Additional Requirements

Special safety and design standards for all towers and additional listed requirements are stated below, which shall be adhered to and are specifically written for this Section:

1. Clearance of rotor blades or airfoils must maintain a minimum of 30 15 feet of clearance between their lowest point and the ground.
2. All Commercial/Utility WECS shall have a sign or signs posted on the tower, transformer and substation, warning of high voltage. Other signs shall be posted at the entrance to the site with the 911 address and emergency contact information.
3. All wind turbines, which are a part of a commercial/utility WECS, shall be installed with a tubular, monopole type tower.
4. Consideration shall be given to Painted aviation warnings on all towers taller than 200 feet less than 200 feet.

5. **Controls and Brakes:** Each WECS shall be equipped with a redundant braking system, which may include aerodynamic over speed controls (variable pitch, tip, and/or other similar system and mechanical brakes). Mechanical brakes shall be operated in a fail-safe mode. Stall regulation shall not be considered a sufficient braking system for over speed protection. The manufacturer shall provide certification of compliance with this requirement.

6. **Color and finish**
All wind turbines and towers that are part of a commercial/utility WECS shall be white, grey, or another non-obtrusive color. ~~Blades may be black in order to facilitate deicing;~~ Finishes shall be matte or non-reflective.

7. **Lighting**
Lighting, including lighting intensity and frequency of strobe, shall adhere to but not exceed requirements established by the FAA and NDA permits and regulations. Red strobe lights shall be used during nighttime illumination to reduce impacts on neighboring uses and migratory birds. Red pulsating incandescent lights should be avoided. Air detection lighting systems (ADLS) shall be required when permitted by the FAA.

8. **Shadow Flicker**
A WECS shall be situated in a manner that will minimize shadow flicker on neighboring residential sites or adjacent land uses.
Shadow flicker on any participating or non-participating landowner shall not exceed 30 hours per year. The applicant shall provide the appropriate modeling as part of the application.

9. **Other signage**
All other signage shall comply with the sign regulations found in these regulations.

10. **Feeder Lines**
All communications and feeder lines installed as part of a WECS shall be buried, where feasible. Feeder lines installed as part of a WECS shall not be considered an essential service.

11. **Waste Disposal**
Solid and Hazardous wastes, including but not limited to crates, packaging materials, damaged or worn parts, as well as used oils and lubricants, shall be removed from the site promptly and disposed of in accordance with all applicable local, state and federal rules and regulations.

12. **Removal of Abandoned Wind Turbine Generators or Anemometer Towers.**
 - A. Applicants shall submit a decommissioning plan to the Otoe County Zoning Administrator, and the applicant or owner of the WECS shall be solely responsible for decommissioning and removal of the tower and all equipment. At such time that an on-site WECS is scheduled to be abandoned or discontinued, the owner of said WECS shall notify the Otoe County Zoning Administrator of the proposed date of abandonment or discontinuance of said operation. A WECS shall be considered a discontinued use after one year without energy production, unless a plan is developed and submitted to the Zoning Administrator outlining the steps and schedule for returning the WECS to service.

- B. Upon abandonment or discontinuation of use, the owner of the on-site WECS shall physically dismantle all above ground components of the WECS within twelve months from the date of abandonment or discontinuation of use.
- C. In the event that an owner of an on-site WECS fails to give Notice of abandonment or discontinuation of use, the WECS shall be considered abandoned and discontinued if the system is out-of-service for a period of three years. The Otoe County Zoning Administrator shall issue a written Notice of Abandonment by certified mail to the owner of the WECS at the address indicated for the site in the County Treasurer's Office. The owner shall have 30 days to reply to such notice. The owner will then have twelve months to remove the WECS or anemometer tower. The owner shall restore the site to its original condition and will be required to remove the foundation to a depth of 10 feet from existing grade. Any of the transmission equipment, buildings, or fences shall also be removed. If the owner does not comply with such order; the owner will be in violation of this regulation and the removal of the WECS or anemometer tower will be paid for as stated in #12 and #13 of this section.
- D. All WECS and accessory facilities shall be removed to ~~ten feet~~ ~~or four feet~~ below ground level within 180 days of the discontinuation of use.

13. Damages

If such structures are not removed within the required time limits, Otoe County may have them removed at the owners of the WECS expense, and Otoe County may sell any salvageable material subject to the requirements of items #11 and #13.

14. Irrevocable Letter Line of Credit or Escrow Account

Otoe County shall require the applicant to ascertain an irrevocable line of credit or an escrow bearing account equal to at least 10% of the original cost of the WECS to ensure sufficient funding is available for removal of same as described in #11 and #12 of this section. Inflationary cost shall be added yearly in accordance with the Consumer Price Index or set by the Otoe County Board of Commissioners. In the event that a surety bond is to be substituted for a cash bond, it shall be prepaid for a period of three ~~five years~~ at 10% of the original cost of the WECS, with the insurance carrier instructed to notify Otoe County Board of Commissioners of any delinquency in payment within 30 days of the occurrence of such delinquency, and to be renewed in (three)year increments at 3% yearly increases or per the Consumer Price Index, whichever is the greater of the two to cover the cost of inflationary effects or set by the Otoe County Board of Commissioners ~~(five-year increments)~~ until the project is decommissioned. Such delinquency shall be considered abandonment and full and sufficient grounds for Otoe County to dispose of the equipment as stated above.

If the applicant or any subsequent owner of the WECS intends to transfer ownership of the WECS, the proposed new owner shall provide Otoe County Board of Commissioners with adequate evidence demonstrating that substitute decommissioning security has been made as provided above prior to the transfer of ownership.

All WECS and accessory facilities shall be removed to ~~ten feet~~ ~~four feet~~ below ground level within 180 days of the discontinuation of use. This period may be extended by the Zoning Administrator following a written request by an agent of the owner of the WECS.

Each WECS project under this section shall have a Decommissioning Plan outlining the anticipated means and cost of removing WECS at the end of their serviceable life or upon being discontinued use. The cost estimates shall be made by a competent party; such as a

Professional Engineer, a contractor capable of decommissioning or a person with suitable expertise or experience with decommissioning. The plan shall also identify the financial resources that will be available to pay for decommissioning and removal of the WECS and accessory facilities.

15. Noise

No Commercial/Utility WECS shall exceed 50 dBA at the nearest structure occupied by humans. Exception: A Commercial/Utility WECS may exceed 50 dBA during periods of severe weather as defined by the US Weather Service. No WECS shall exceed 40 dba during daytime and 37 dba at night (night hours are 8:00 P.M. to 8:00 A.M.) at the nearest residence of a non-non-participating property or: Three (3) dba maximum 10- minute equivalent continuous sound level allowed above ambient noise level.

16. INTERFERENCE

The applicant shall minimize or mitigate interference with electromagnetic communications, such as radio, telephone, microwaves, or television signals caused by any WECS.

The applicant shall notify all communication tower operators within five miles of the proposed WECS location upon application to the county for permits.

17. Drainage System

The applicant shall be responsible for immediate repair or damage to public drainage systems stemming from construction, operation or maintenance of the WECS.

18. Emergency Services:

The applicant shall provide a copy of the project description and site plan to the local fire department, rescue services, and County Emergency Management Office having jurisdiction over the project area and shall coordinate with such local entities in the development of an emergency response plan.

19. Permit Fees

Applicant shall remit an application or conditional use fee set by the Board of Commissioners. The building permit fee will be \$3000.00 per site (or other fee as set by the Board of Commissioners for each turbine site). The Board of Commissioners may, at their discretion, request an independent Third-party commissioning report be provided to the County to assure that all components of the aggregate CWECs project have been installed and perform In accordance with all local, State, and federal jurisdictions and regulatory code requirements. All commissioning reports expenses will be paid by the developer. Said report shall be furnished to the County by the landowner / developer at no cost to the County. The report shall verify that the CWECs complies with all submitted drawings and specifications provided to the Board of Commissioners at the time the conditional use permit was approved.

SECTION 4.04 LAND Use Categories

Use category- Public/Private Utilities and Communication Services.

Use Type- Wind Energy Conversion Systems- Commercial Grade

The Wind Energy Conversion Systems will be located by Conditional Use in the AG-1 District, only. No other districts will allow Commercial Wind Energy Conversion Systems.