

## 2. DEFINITIONS

**A-Weighted Sound Level (dBA)**: The sound pressure level in decibels utilizing the “A” weighted scale defined by ANSI for weighting the frequency spectrum to mimic the human ear.

**Blade Glint**: The intermittent reflection of the sun off the glossy surface of wind turbine blades.

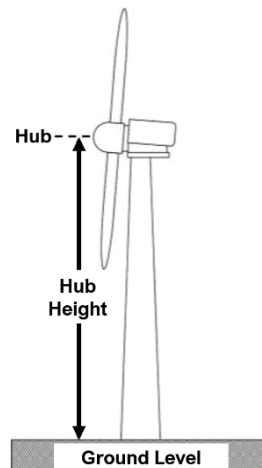
**Casualty Event**: The complete or partial destruction of property resulting from an identifiable event of a sudden, unexpected, or unusual nature.

**Cluster**: A group of WECS, contained within the same WECOD, that are geographically adjacent, and each tower is less than 1.25 times the minimum spacing distance from at least one other WECS in the group.

**Decibel (dB)**: The unit of measure used to express the magnitude of sound pressure and sound intensity.

**Furling**: Action by which the wind turbine is designed to limit its power output in high winds by changing the rotor’s plane of rotation to a plane that is not perpendicular to the prevailing wind direction.

**Height, Hub (Wind Energy Conversion System)**: The distance measured from the ground immediately adjacent to the tower foundation to the center of the rotor hub.



**Height, Total (Wind Energy Conversion System)**: The sum of the hub height and half of the turbines rotor diameter distance, measured at the highest point on the blade tip.

**Historical, Cultural, and Archeological Resources:** Places which have been listed on the National Register of Historic Places or designated as a National Historic Landmark

**Ice Throw:** Ice build-up that is thrown by the spinning blades.

**Nacelle:** The enclosure located at the top of a wind turbine tower that houses the gearbox, generator and other equipment.

**Property Line:** A line of record bounding a lot of record that divides one lot from another lot, or from a public street, or private street, or any other public space.

**Qualified Professional:** A person with experience and training in the pertinent discipline, and who is a qualified expert with expertise appropriate for the relevant subject and has been approved by the County Commission in consultation with the Director of Resource Management.

**Repowering Event:** A planned and County approved event in which the developer replaces older turbines with new turbines or retrofits existing turbines with more efficient components subject to an approved timeline.

**Rotor:** The rotating part of a turbine, including the turbine blades. Rotor diameter means the cross-section dimension of the circle swept by the rotating blades

**Shadow Flicker:** Alternating changes in light intensity caused by the moving blades of a wind energy system which cast a repeating pattern of shadows on the ground and stationary objects, such as a window of a dwelling.

**Sound Exposure, Adjusted Total Day-Night (Ldn):** Frequency-weighted sound exposure for a 24- hour day calculated by adding adjusted sound exposure obtained during the daytime (0700-2200 hours) to the adjusted sound exposure obtained during the nighttime (0000-0700 and 2200-2400 hours) with a penalty of 10 dB added as defined by ANSI (American National Standards Institute).

**Stall-Control:** A braking mechanism on wind turbines where the rotor blades are bolted onto the hub at a fixed angle. The rotor blade profile is aerodynamically designed to ensure that the moment the wind speed becomes too high, it creates turbulence on the side of the rotor blade that is not facing the wind. This stall prevents the lifting force of the rotor blade from acting on the rotor.

**Turbine:** A wind-driven machine that converts wind energy into electrical power, also known as a wind energy conversion system (WECS).

**Upwind Rotor:** A design in which the rotor on a wind turbine tower faces into the wind.

**Visual Dominance Zone:** A zone within or distance from which a turbine may be perceived as dominating the visual landscape, determined to be a zone surrounding a turbine that is twenty (20) times the total height of the turbine.

**Well Designed Braking System:** The primary braking system, which uses a mechanical brake, pitch-control of the turbine blades, or stall-control to bring the turbine to a stop in such a way that stall-induced vibrations/noise are avoided.

**Wind Energy Conversion System, Commercial (WECS-C):** A wind-driven machine that converts wind energy into electrical power for the primary purpose of sale, resale, or off-site use.

**Wind Energy Conversion System, Small (WECS-S):** A wind-driven machine, less than 175 feet in height, that converts wind energy into electrical power for the primary purpose of on-site use and not for commercial power production.

## SECTION 29 WIND ENERGY CONVERSION OVERLAY DISTRICT (WECOD)

### 29.1 Intent and Purpose:

29.1.1 The intent of the Wind Energy Conversion Overlay District is to establish an area or areas where Wind Energy Conversion Systems-Commercial (WECS-C) and associated maintenance facilities are allowed by Conditional Use Permit. Interested property owners in the area that is proposed for designation shall instigate the initiative for the designation.

This Section has been adopted for the following purposes:

- To assure that the development and production of commercial scale wind-generated electricity in Boone County assures the health, safety and general welfare of the public;
- To promote the safe, effective, and efficient use of commercial wind energy conversion systems (WECS-C);
- To minimize the degradation of the visual character of the area;
- To minimize impact to environmentally sensitive areas, wildlife, and wildlife habitat;
- To facilitate economic opportunities for local residents and the community;
- To facilitate the supply of renewable energy in a manner that respects the geographic, social, and environmental context of Boone County.

29.1.2 Careful consideration as to practicable suitability of an area requesting designation with respect to the existing and reasonably assumable future land uses should factor heavily in the decision of whether or not an area should be designated for WECOD status.

29.2 Qualifying Underlying Zoning Districts: A WECOD may be requested in Agriculture or Industrial zoning districts.

### 29.3 District Boundary Requirements:

29.3.1 Two Components: Each WECOD shall be composed of two parts, the Primary District and the Buffer.

#### 29.3.1.1 Primary District Area Requirements:

- The smallest component of a Primary District is one-quarter (1/4) Section as defined by the Public Land Survey System. Therefore, when any portion of a lot that is included in a WECOD falls

within a one-quarter section, the entire quarter section shall be included in the WECOD

- A Primary District must include a minimum of four (4) contiguous one-quarter (1/4) Sections

#### 29.3.1.2 Buffer Area Requirements:

- The Buffer shall extend 1,320 feet outward from the perimeter of the Primary District.

### 29.4 Procedures for Designating A Wind Energy Conversion Overlay District:

29.4.1 Application. Any Petition for Application for designation of a WECOD must be submitted to the County Commission through the Director. The Petition for Application shall be completed on forms provided by the Director and shall include information as required by Section 29.5 (Application Content, Fees, Costs).

29.4.2 Determination of Completeness. An application shall be deemed complete when the Director determines that all required application materials have been submitted and contain sufficient detail for review. An incomplete application will be returned to the applicant. The owner shall be responsible for the cost of shipping the returned application. The Director shall have up to 30 days to make a Determination of Completeness.

29.4.3 Application Review Period. The Director shall have 120-days from the Determination of Completeness to review the application materials and provide written comments to the owner. The owner shall have up to 120 days to address the comments.

29.4.4 Independent Third-Party Review. If the Director determines that the Department does not have the appropriate expertise to review any or all of the required application materials, they may contract with an independent third party to conduct such reviews. In such cases, the applicant shall be responsible for the cost of the external review.

29.4.5 Notice. When the Director and applicant agree that the application is ready for public hearing and at least 15 days prior to the next regularly scheduled Planning and Zoning Commission hearing, the Director shall give notice in a manner consistent with procedures described in Section 29.6. The applicant shall pay all costs of public notice prior to any public hearing regarding the proposal.

29.4.6 Planning and Zoning Commission Recommendation. The Planning and Zoning Commission shall hold a public hearing. Following the public hearing, the Commission shall vote on a recommendation to approve, modify, deny or table the request. In formulating its recommendation, the Commission shall make findings consistent with the criteria contained in Section 29.7 (Approval Standards).

29.4.7 County Commission Recommendation. Upon receipt of a recommendation from the Commission and before the adoption of a WECOD, the County Commission shall hold at least one public hearing thereon. The County Commission may approve, deny or remand the proposal back to the Commission for modification. In order to approve a WECOD, the County Commission must make findings consistent with the criteria contained in Section 29.7.

29.4.7.1 In cases where the Commission recommends denial of a request, the County Commission shall summarily endorse denial action of the Commission unless the applicant files a Notice of Appeal to the County Commission. The Notice of Appeal must be filed with the Director within 72 hours (three working days) following the Commission hearing. The Notice of Appeal shall state the grounds why the Commission recommendation for denial is in error. The applicant must appear before the County Commission in person or by a representative with written authorization by the applicant.

29.4.7.2 In cases where the Commission recommends approval of an application, the County Commission will summarily deny the application if the following two conditions occur: (1) the applicant does not appear at the County Commission hearing in person or by representative with the written authorization of the owner, and (2) there is opposition to the application expressed in person at the County Commission Hearing.

29.4.8 An applicant requesting the establishment of a WECOD shall have the responsibility to demonstrate to the Planning and Zoning Commission and the County Commission, by competent substantial evidence, that establishment of the WECOD is justified.

## 29.5 Application Content, Fees, Costs:

29.5.1 No action on the request will be taken until all of the required information has been submitted. Applications for establishing a WECOD shall include the following:

29.5.1.1 Satisfactory evidence that the applicant is the owner of the property or has written permission of the owner(s) to make such application;

29.5.1.2 Developer Information:

- Name, address, phone number, and e-mail address of the developer and the developer's contact person for the project;
- A statement from the developer providing relevant information regarding an overview of the company, the company's financial condition, the company's environmental management history, and the company's qualifications and experience in WECS-C development. Specific references regarding other WECS-C projects are required;
- An identification and description of the expected owner and builder of the proposed project and a complete financial statement for such owner and/or builder including audits or reviews, whichever are applicable, for three (3) years preceding the date of application;
- The name, address, phone numbers, and e-mail address of the project manager in the event the project is approved and the name, address, phone numbers, and e-mail address of any potential buyers of the project.

29.5.1.3 A Petition for Application on forms provided by the Director. For purposes of calculating the percentages described below, each legal lot will qualify for one signature. The product of all calculations shall be rounded to the nearest whole number. The petition shall contain the following:

- The notarized signatures of the owners of at least 75% of the real property, as identified by legal lot, within the proposed primary district. The following formula shall be used:
  - o  $\text{Total acreage of primary district} \times 0.75 = \text{total acreage for which signatures must be obtained}$
- The notarized signatures of at least 67% of the owners of real property, as identified by legal lot, within the proposed primary district. The following formula shall be used:
  - o  $\text{Number of legal lots} \times 0.67 = \text{number of signatures}$

- The notarized signatures of at least 67% of the owners of real property, as identified by legal lot, within the proposed buffer. The following formula shall be used:
  - o  $\text{Number of legal lots} \times 0.67 = \text{number of signatures}$
- A list including the name, address, and parcel number(s) of all property owners within the proposed primary district.
- A list including the name, address, and parcel number(s) of all property owners within the proposed buffer.
- A list including the name, address, and parcel number(s) of all property owners within one thousand feet (1000') of the boundary of the proposed overlay district.

29.5.1.4 Relevant background information on the project, including rationale and need for the project by the landowner and developer, timeframe and project life, phases of development, likely markets for the electricity produced, and the possibilities for future expansion;

29.5.1.5 A narrative explanation of why the proposed project site was chosen by the applicant over alternative locations for the project in the region and reasons for preferring the proposed site over the alternatives considered by the applicant. The region shall be defined as all counties adjoining and including Boone County;

29.5.1.6 The applicant's position regarding the consequences of not approving the project;

29.5.1.7 An overlay district plan, drawn to a scale where all features are legible, including the following:

- A legal description of the proposed Overlay District prepared by and bearing the seal of a Land Surveyor Licensed to practice in the State of Missouri;
- An aerial image showing the boundary of the proposed overlay district, displaying distinctly both the primary and buffer components of the proposed district. Image shall also distinctly display property boundaries of all legal lots within the proposed District and within one thousand feet (1000') of the boundary of the proposed District;
- The general vicinity of the project location within the County;
- Scale and north arrow;



- Acreage of the primary district;
- Acreage of the buffer;
- Location and physical dimensions of existing structures and general location and approximate physical dimensions of proposed structures, including all proposed individual wind turbines. If an exact number or dimensions of wind turbines is not known at the time of application, the site plan shall identify a maximum number and maximum dimensions that will be expected and a range from minimum number expected to the maximum;
- Identify potential staging and maintenance areas;
- Houses within one thousand feet (1,000') of the overlay district boundary and the approximate distance of such houses from the district boundary;
- Any additional houses within one-half (1/2) mile of the district boundary;
- Location of existing electrical lines and facilities, including transmission lines;
- Approximate location of proposed electrical lines and facilities, including transmission lines and whether underground or overhead;
- Existing topography;
- Approximate proposed areas to be graded;
- Approximate proposed removal of natural vegetation;
- Wind characteristics and dominant wind direction;
- Proposed setbacks of all proposed structures from the district boundary;
- Projected methods of traffic circulation within the proposed district;
- Anticipated ingress and egress locations for each proposed turbine location within the proposed district;
- Location of all public roads within the proposed district and the location and distance to public roads in all directions surrounding the proposed district boundary;

- Approximate location of any major known underground pipelines or other underground utilities;
- Approximate location of any major known utility easements;
- Location of any delineated 100-year floodplains, stream buffers, sinkholes, wetlands, and other environmentally sensitive areas.

29.5.1.8 A Visual Impact Assessment developed by a Qualified Professional. The study shall provide accurate and site-specific visualizations from key observation points and a detailed description of the methods and supporting information. The assessment shall include, at a minimum, the following:

- Virtual simulations which may include 3D Visualization Models, Photographic Simulations, and Animated Visualizations as determined necessary by Director of Resource Management;
- Viewshed Analysis to determine actual visibility and the characteristics of the views within the project area including different seasons, times of day and weather conditions;
- Inventory of Views to provide the basis for evaluating the extent of visibility. This inventory shall include written description of views, distance from proposed project, duration of view, and characteristics of the view from the following:
  - All houses located within one thousand feet (1000') of the District boundary;
  - All houses within the district whose owners did not sign the Petition for Application;
  - Any applicable historic, cultural, or archeological significant sites;
  - Any applicable public roads;
  - Any applicable government-designated scenic byways, government-designated scenic overlooks, public parks, Conservation Areas, or Wildlife Refuges.
- Photographic Simulations of key viewpoints shall be provided as determined necessary by Director of Resource Management;
- A summary of key findings and proposed mitigation techniques.

29.5.1.9 An estimated economic Cost/Benefit Analysis (CBA) describing the impact of the project on the local and state economy in the following respects:

- The amount of property taxes to be generated by the project;
- The amount of sales taxes to be generated by the project;
- The amount of other applicable taxes to be generated by the project;
- Any distinction in the amount of taxes that will be generated and the distribution of the tax revenue if the facility is privately owned or acquired/owned by a public entity or public utility.
- The construction dollars to be spent locally;
- The number of construction jobs and estimated construction payroll;
- The number of permanent jobs and estimated continuing payroll;
- The benefit of the electricity generated by the project;
- Any projected costs or benefits to tourism in the County;
- Other projected economic benefits and costs of the project;
- Costs associated with the impact on roads or other County infrastructure in the area and a draft Transportation Infrastructure Plan and Mitigation Agreement approved by the County Engineer and the Director.

29.5.1.10 An environmental assessment of the potential adverse impacts from the project and any proposed measures to mitigate or lessen the effects of the adverse impacts. The assessment and mitigation plan shall be conducted by a Qualified Professional and include, at a minimum, all of the following:

- Documentation that the owner/applicant has followed the United States Fish and Wildlife Service Land Based Wind Energy Guidelines and copies of all resulting studies and recommendations;
- Impact on wildlife and wildlife habitat on the site and in the proposed WECOD;

- Impact on any endangered or threatened species on the site and in the proposed WECOD;
- Impact on flora on the site;
- A report, bearing the seal of a Qualified Professional, detailing expected Adjusted Total Day-Night Sound Exposure (Ldn) at the nearest property line.
- Any wastes, either municipal solid waste or hazardous waste, generated by the project at any point in its lifespan;
- Electromagnetic fields and communications interference generated by the project;
- Risk of fire from the project, including threat of lightning strikes;
- Impact of the project on civilian and military aviation in the area;
- Impact of the project on soil erosion;
- Impact of the project on water quality and water supply in the area;
- Potential hazards from ice throws and debris throws;
- Dust from project activities;
- Potential hazards from collapse or damage of turbines or system components in severe storms;
- Impact on historic, cultural, or archaeological resources;
- Impact of shadow “flicker” on houses from any WECS-C and estimated duration of the shadow flicker (in hours per year);
- Potential hazards of "blade glint";
- A general discussion of any potential changes to the above assessment items that could be anticipated when considering the cumulative impacts of other wind energy projects in the region. The region shall be defined as all counties adjoining Boone County and including Boone County. When considering the cumulative impacts, only wind energy projects that are either existing, approved or applied for shall be considered. Speculative projects that are not publicly known are not required to be considered.

29.5.1.11 A copy of the written notification to the utility of the proposed interconnection;

- 29.5.1.12 Information, in as much detail as possible, on the type, size, maximum and minimum height, rotor size, rotor material, color scheme, rated power output, performance, safety, fire suppression systems, and noise characteristics of each proposed wind turbine model, tower and electrical transmission equipment;
- 29.5.1.13 A general description of the decommissioning and land reclamation strategy in the event the project is abandoned or upon the end of the useful life of the project. The applicant shall specify the anticipated useful life of the project;
- 29.5.1.14 The anticipated volume and designated route for traffic generated during the construction phase, including routes for oversized and heavy equipment, and the proposed method of providing assurances to the public entities responsible for the roads of repairs and on-going maintenance to the roads and bridges needed to support the project;
- 29.5.1.15 The anticipated volume and designated route for traffic generated during the utilization of the facilities, including routes for oversized and heavy equipment needed for maintenance and repairs, and the proposed method of providing assurances to the public entities responsible for the roads of repairs and on-going maintenance to the roads and bridges needed to support the project;
- 29.5.1.16 The anticipated operation and maintenance requirements (including estimated frequency of maintenance activities) for the turbines and internal transmission lines connecting the individual turbines within the project and the transmission lines connecting the system to the power “grid”;
- 29.5.1.17 The anticipated location, width and proposed method of acquisition of transmission line easements required, including access requirements to the easements and any associated necessary restrictions on land use, development, and access within said easements;
- 29.5.1.18 The anticipated timeline for completing construction of all proposed structures within the proposed WECOD;
- 29.5.1.19 A general description of the plan for securing the site and the various structures and facilities from access by unauthorized persons;
- 29.5.1.20 A description of the Federal Aviation Administration requirements applicable to the structures and facilities on the site and the proposed methods for meeting those requirements.

29.5.2 Fees. The applicant shall submit an application fee, as established by the County Commission, with the application.

29.5.3 Costs. The applicant shall be responsible for the costs of all required public notice and the preparation of the application materials, including but not limited to all required surveys and property descriptions.

## 29.6 Notice Procedures.

29.6.1 The Director shall give notice of the application in the following manner:

29.6.1.1 By certified mail to the owners of all property within the proposed overlay district.

29.6.1.2 By certified mail to the owners of all property within one thousand feet (1000') of the boundary of the proposed overlay district.

29.6.1.3 Publication of a locality map in a newspaper having a daily circulation.

29.6.1.4 Publication of a locality map in a newspaper having a weekly or daily circulation in the northern portion of the County (if any) if any part of the proposed district lies north of the north boundary of Township 49 North.

29.6.1.5 Publication of a locality map in a newspaper having a weekly or daily circulation in the southern portion of the County (if any) if any part of the proposed district lies south of the north line of Township 47 North.

29.7 Approval Standards. The following guidelines shall be considered by the Planning and Zoning Commission and the County Commission in evaluating the appropriateness of proposed locations for WECS-C and the proposed project components.

29.7.1 Purpose. The purpose of the guidelines is to assist decision-makers in uniformly analyzing the impacts of each proposed WECS-C project and thereby arrive at consistent and balanced decisions.

29.7.2 Natural and Biological Resources.

29.7.2.1 Biological Conflicts. WECS-C should not be located in areas that have a substantial potential for biological conflicts.

29.7.2.2 Vast Natural Landscape. WECS-C should avoid large intact areas, at least 640 acres in size, of native vegetation that has not been

significantly disturbed by man-made developments such as power lines, gas lines, oil or gas wells, public roads, etc.

29.7.2.3 Migration Paths. WECS-C should avoid areas that would interfere with important wildlife migratory corridors and staging areas.

### 29.7.3 Appearance.

29.7.3.1 Nature Areas. WECS-C should avoid sites that are readily visible from government-designated scenic byways, government-designated scenic overlooks, public parks, Conservation Areas, and Wildlife Refuges.

29.7.3.2 Visual Clutter. To avoid clutter, the visual effects of ancillary structures, roads, and fences on the site should be minimized.

29.7.3.3 Visual Unity. A WECS-C project should maintain visual unity among clusters of turbines.

29.7.3.4 Color. To promote visual uniformity, the rotors, nacelles, and towers of all turbines in an array should appear similar and shall be a shade of white in color.

29.7.3.5 Density. To avoid objectional density each WECS-C must be at least six (6) times its rotor diameter from another WECS-C beginning at the nearest point on the base of each tower.

29.7.3.6 Power Lines. To avoid visual clutter, intra-project power lines having a voltage of 34,500 volts or less shall be buried unless the applicant can sufficiently demonstrate that burying the lines will violate other governmental or industry-wide guidelines/standards, violate applicable law, or have demonstrated to the Commission that such lines will be hidden from public view.

29.7.3.7 Skyline. To avoid cluttering the skyline, transformers and other electric equipment should be hidden from view

### 29.7.4 Soil Erosion and Water Quality

29.7.4.1 WECS-C shall avoid construction activities on slopes that are steep or susceptible to erosion.

29.7.4.2 The number of improved private access roads and construction staging areas should be kept to a minimum.

29.7.4.3 The grading width of private access roads should be minimized. One-lane roadways with lay-bys are recommended.

29.7.4.4 The number and size of staging areas and crane pad sites should be minimized.

#### 29.7.5 Historical, Cultural, and Archeological Resources

29.7.5.1 WECS-C should avoid sites that are less than 3,070 lineal feet from any places that have been listed on the National Register of Historic Places or designated as a National Historic Landmark.

#### 29.7.6 Transportation Infrastructure Impacts

29.7.6.1 All impacts to the transportation network should be mitigated to the maximum extent practicable. The applicant shall work with the County Chief Engineer and, if applicable, the Missouri Department of Transportation, and local municipalities to develop a Transportation and Infrastructure Mitigation Plan.

### 29.8 Siting and Performance Standards.

29.8.1 Purpose. The following standards are to be achieved by each WECS-C project without exception. Because they are standards, they are considered to be requirements of any WECS-C project. The final decision on whether or not a particular standard is achieved by a WECS-C project shall be made by the County Commission after considering the recommendations of the Planning and Zoning Commission and the Resource Management Department.

#### 29.8.2 Noise Management

##### 29.8.2.1 Measurement, Modeling, and Analysis.

29.8.2.1.1 A noise study shall be conducted to demonstrate that the system does not exceed an Adjusted Total Day-Night Sound Exposure (Ldn) of 45 dBA measured from the property line.

29.8.2.1.2 The study shall be conducted by a Qualified Professional



29.8.2.1.3 Measurement, modeling, and analysis shall conform to the most recent version of ANSI S12.18<sup>1</sup>, ANSI S12.9-2005<sup>2</sup>, IEC 61400<sup>3</sup>, and ISO 9613<sup>4</sup>.

29.8.2.2 Sound Level. The noise level caused by the operation of the project shall not exceed fifty (50) dBA during any daytime hours and forty (40) dBA during any nighttime hours, as measured at the nearest property line. The average Adjusted Total Day-Night Sound Exposure shall not exceed 45 dBA Ldn.

29.8.2.3 Addressing complaints. Upon receipt of a complaint regarding noise from an existing WECS-C project by the Boone County Resource Management Department, which the Department determines to be reasonable, the project owner shall, within 30-days of notification, be required to provide a noise study conducted by a Qualified Professional to demonstrate that the system does not exceed the sound levels, specified in Section 29.8.2.2. If the WECS-C is determined to be out of compliance, it shall be shut down until compliance can be demonstrated.

29.8.2.4 Low Frequency Noise. To avoid disruptive low frequency noises, WECS-C shall be designed in accordance with good engineering practices including the following characteristics:

- At least three (3) blades
- Upwind rotor
- A well-designed braking system
- No furling

### 29.8.3 Natural and Biological Resources

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<sup>1</sup> **ANSI S12.18:** This standard describes methods for measuring sound pressure levels in the outdoor environment, taking into account the effects of refraction due to wind and temperature gradients, the effects of atmospheric turbulence, the effects of variable ground impedance, and wind noise.

<sup>2</sup> **ANSI S12.9-2005:** This Standard specifies methods to assess environmental sounds and to predict the potential annoyance response of a community to outdoor long-term noise from any and all types of environmental sounds from one or more discrete or distributed sound sources.

<sup>3</sup> **IEC 61400:** A set of design requirements made to ensure that wind turbines are appropriately engineered against damage from hazards within the planned lifetime. The standard concerns most aspects of the turbine life from site conditions before construction, to turbine components being tested, assembled, and operated.

<sup>4</sup> **ISO 9613:** This standard specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources

29.8.3.1 Vegetative Burning Buffers. In areas where grassland burning is practiced, appropriate “buffer” areas shall be used to enable infrastructure to withstand periodic burning of vegetation.

29.8.3.2 Avian Perches. No perches are permitted on the nacelles of turbines. WECS-C towers shall not use lattice-type construction or other designs that provide perches for avian predators.

#### 29.8.4 Visual Impacts

29.8.4.1 Blade Uniformity. To provide visual order to a WECS-C project, all individual turbines shall have the same number of rotor blades. All rotor blades shall spin in the same direction (i.e., clockwise or counterclockwise) in relation to the wind.

29.8.4.2 Height Uniformity. To promote visual uniformity, all turbines at a similar ground elevation shall have the same height from blade tip to the ground.

29.8.4.3 Clusters. Distinct groupings or clusters of turbines shall be limited to no more than 12 turbines per cluster. Each cluster must be greater than 1.25 times the minimum spacing distance from another cluster.

29.8.4.4 Locking. In light wind conditions, turbine rotor blades shall not be kept in a locked position except as necessary to meet operational or maintenance requirements.

29.8.4.5 Outdoor Storage. Except during construction, re-construction or removal, outdoor storage is not permitted provided that this restriction shall not apply to the project's designated operations and maintenance facility as approved by a Conditional Use Permit.

29.8.4.6 Repair Requirements. If turbines become inoperable for any reason, they shall be repaired within 90-days unless the County Commission approves an extension upon request of the operator and showing of good cause why such extension should be granted.

29.8.4.7 Internal Components. To avoid cluttering the skyline, inverters and pendant power cables shall be located inside the wind turbine tower, nacelle or structure.

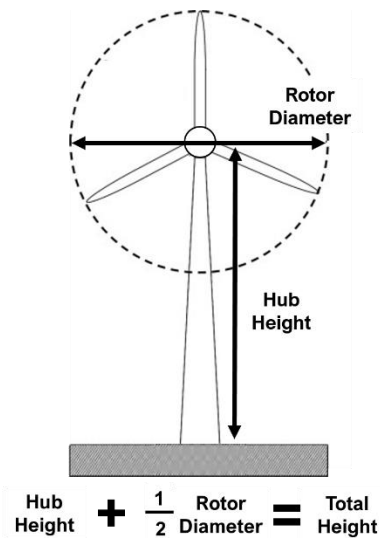
29.8.4.8 External Telecommunication. No telecommunications dishes, antennas, cellular telephone repeaters or other similar devices shall be attached to wind turbine towers unless mounted inside the tower.

29.8.4.9 Prohibited Markings. Aircraft obstruction markings of the turbines by use of alternating red and white bands shall be prohibited.

29.8.4.10 Prohibited Advertising. No billboards, logos, or advertising signs of any kind shall be located on the turbines.

29.8.4.11 Permitted Height. Height shall be determined by the Hub Height for each individual turbine. The maximum Hub Height shall be 80 meters (80 meters is approximately 263 feet).

29.8.4.11.1 Total Height. The overall height is determined by the sum of the Hub Height and half of the turbine's Rotor Diameter distance, measured at the highest point on the blade tip.



## 29.8.5 Soil Erosion and Water Quality

29.8.5.1 Minimize Impact. Construction and maintenance shall be done in strict accordance with the erosion and sediment control plan submitted with the building permit so as to minimize soil erosion and damage to native vegetation.

29.8.5.2 Restoration. If native vegetation is damaged during construction, it shall be restored after construction is complete in areas not occupied by the WECS-C and related facilities and roads.

29.8.5.3 Stormwater Ordinance. Compliance with Section 28 is required.

## 29.8.6 Safety

29.8.6.1 Property Setbacks. Individual wind turbines shall be set back 1,750-feet from all property lines of the single discrete undivided lot of record upon which it is located to the nearest point on base of

tower. Lease, easement, or other ownership interest of adjoining discrete lots does not remove the property lines between discrete lots from which the measurements are made.

29.8.6.2 Road Setbacks. Individual wind turbines shall be set back 1,750-feet from all public road rights of way to the nearest point on the base of the tower.

29.8.6.3 Minimum Spacing. Each WECS-C must be at least six (6) times its rotor diameter from another WECS-C beginning at the nearest point on the base of each tower.

29.8.6.4 Minimum Clearance. Each WECS-C must maintain a minimum clearance of 15-feet from the ground, immediately adjacent to the tower base, to the rotor tip at its lowest point.

29.8.6.5 Lighting. Lighting of turbines shall be radar activated and in compliance with current FAA Aircraft Detection Lighting System regulations. Any emergency reserve lighting shall follow “daytime white / nighttime red” standards.

29.8.6.6 Fire Suppression. All WECS-C shall be equipped with an automatic fire suppression system.

29.8.6.7 Markings. Individual wind turbine heights and markings shall comply with Federal Aviation Administration (FAA) regulations.

## 29.9 Decommissioning and Reclamation:

### 29.9.1 Security.

29.9.1.1 Purpose. The purpose of the security requirement is to ensure that adequate funding is available to be used to pay the costs of decommissioning and site reclamation, including removal of individual turbines and other above-ground project improvements subject to permit in the event of abandonment of individual turbines or abandonment of the entire project.

29.9.1.2 Submittal of Security. The project owner of a WECS-C shall, at its expense, and not later than 30-days before commencement of project construction, obtain and submit Security in favor of the County for approval by the County Commission.

29.9.1.3 Form of Security. Such Security shall be in the form of a letter of credit, a cash escrow account, a performance bond, or other form of Security which is acceptable to the County. Any entity providing Security must be authorized to provide such Security in the State of Missouri and must be acceptable to the County Commission. The

Security must contain such provisions, terms or conditions as the County deems to be necessary, including, but not limited to, those set out herein, unless specifically waived in writing by the County.

29.9.1.4 Amount. The Security shall be in an amount equal to one hundred fifty (150) percent of the estimated decommissioning and reclamation costs and shall provide for an annual adjustment of the amount of the Security based on the annual rate of inflation. Such amount shall be determined by the County Commission based upon estimates from knowledgeable contractors and such other information or factors that the Commission deems to be relevant.

29.9.1.5 Maintenance of Security. The Security may not be canceled, released, or in any way terminated without prior written approval from Boone County. The Security shall be maintained and continued in force as long as such turbines or other above-ground improvements exist and until all decommissioning and site reclamation has been completed and paid for.

29.9.1.5.1 Additional Security. When Required. If the County Commission has any reason to believe that the Security is insufficient, it may demand such other Security as it deems to be necessary.

29.9.1.5.2 Survival of Sale. The Security must be written so as to survive any sale or transfer of the turbines and related project property or the insolvency of the project owner. It shall further apply to all successors and assigns of the project owner. Any entity providing Security must be authorized to provide such Security in the State of Missouri and must be acceptable to the County Commission.

## 29.9.2 Abandonment.

29.9.2.1 Individual Turbine. An individual turbine shall be considered to have been abandoned when the turbine is incapable of producing more than 20% of the average amount of electricity produced by such turbine in comparable previous time periods (adjusted for actual wind conditions), as determined by the Resource Management Department, for a period of at least six (6) consecutive months and there is no demonstrated viable plan to restore the equipment to operating condition or if determined inoperable under Section 29.8.3.6.

29.9.2.2 Entire Project. An entire project shall be considered to have been abandoned when at least fifty percent (50%) of the individual

turbines in any WECOD are abandoned or considered to be abandoned in accordance with 29.9.2.1, and there is no demonstrated viable plan to restore the equipment to operating condition. Except for any Repowering Event or Casualty Event subject to a County approved schedule of completion not to exceed 5 years.

29.9.2.3 Extension. An extension of the 6-month time period may be granted by the County Commission upon the presentation of sufficient justification by the project owner.

29.9.2.4 Excavation. All underground equipment and foundation systems of WECS-C shall be removed to a depth of at least four feet (4') to allow for the cultivation of crops, restoration of pasture, or installation of underground utilities.

### 29.9.3 Reclamation

29.9.3.1 Owner Initiated. The owner/operator shall commence reclamation proceedings within 90-days of the date of abandonment of an individual turbine and/or the entire project. Reclamation activities shall be conducted in accordance with the reclamation plan and the standards contained in these regulations.

29.9.3.2 County Initiated. Upon determining that an individual turbine and/or entire project has been abandoned, the Director shall notify the owner/operator by certified mail. The notice shall allow 90-days for the commencement of decommissioning. The notice shall also inform the owner/operator of their right to request a hearing before the County Commission.

29.9.3.2.1 Abandonment and Reclamation Hearing. Upon request of the owner/operator or expiration of the 90-day deadline, the Director shall schedule a hearing with the County Commission and provide the owner/operator notice as to the time and location of the hearing.

29.9.3.2.2 Hearing Purpose. The purpose of the hearing is to determine the validity of the determination of abandonment, establish whether the owner/operator intends to reclaim, and whether to authorize the use of Security to complete the reclamation of the individual turbine site or the entire project.

## 29.10 Permit Procedures and Requirements

29.10.1. Permit Holder. All Commission Orders by the County Commission granting a conditional use permit for a WECS-C project shall specify that the conditional use permit is issued to the project owner.

29.10.2 Transfer of Conditional Use Permit- Approval Required. The holder of the conditional use permit for a WECS-C project may not transfer, assign, or otherwise convey the conditional use permit to another without prior approval of the County Commission. The County Commission shall give such approval upon its finding that the party to which the conditional use permit is to be conveyed will comply with all of the requirements of these regulations and all conditions of the conditional use permit.

29.10.3 Building Permit Issuance. Upon signing of the conditional use permit, the Resource Management Department may issue a building permit for the project following a 30-day waiting period and prior to the start of construction. In addition to the requirements outlined in the building code, as adopted by the County of Boone, the building permit application shall contain all of the following information to be provided by the project owner:

- All of the special conditions outlined in the conditional use permit approval;
- A site plan, in final detail, that includes all of the information required on the application site plan;
- A final grading plan;
- A final erosion and sediment control plan;
- A final plan for site security;
- A final decommissioning and reclamation plan;
- Documentation of the establishment of the Security for reclamation;
- Documentation that the project is in compliance with all of the requirements of the following:
  - Federal Aviation Administration;
  - Federal Communications Commission, if applicable;
  - Missouri Department of Natural Resources, if applicable;
  - Missouri Department of Conservation, if applicable;

- Any other federal or state agency that has regulations applicable to the project.

29.10.4 The Resource Management Department shall issue a separate building permit for the construction of each individual wind turbine structure and each related accessory structure and each structure within a staging area as determined by the Resource Management Director.

29.11 Procedures for Vacation (Removal) of the Overlay District:

29.11.1 Removal of a designated WECOD shall be accomplished by the same procedures as followed to establish the overlay district except as provided below.

29.11.2 Failure to Perform. Additionally, the County Commission shall have the authority, after a public hearing, to remove the overlay district if it is determined that no WECS-C have been constructed in the WECOD within a period of ten (10) years from the date of the County Commission Order that established the District.

29.11.3 Abandonment. If an entire project is deemed abandoned under Section 29.9.2, the County Commission shall have the authority, after a public hearing, to remove the overlay district.