

**PLANNING COMMISSION REPORT**  
**Regular Agenda -- Public Hearing Item**

PC Staff Report  
3/21/16

**ITEM NO. 8                      TEXT AMENDMENT TO ZONING REGULATIONS; WIND ENERGY  
CONVERSION SYSTEMS (SLD)**

**TA-15-00571:** Consider a Text Amendment to the *Zoning Regulations for the Unincorporated Territory of Douglas County, Kansas* to add Wind Energy Conversion Systems. *Initiated by County Commission on 10/21/15.*

**RECOMMENDATION:** Staff recommends that the Planning Commission forward the proposed amendment, TA-15-00571, amending Sections 303, 319 and 321 of Chapter 12, Douglas County Zoning Regulations to establish *Wind Energy Conversion Systems* as a Conditional use with associated standards to the County Commission with a recommendation for approval.

**Reason for Request:** The County Commission initiated a text amendment at their October 21, 2015 meeting to add *Wind Energy Conversion Systems* to the Development County Zoning Regulations.

**PUBLIC COMMENT RECEIVED PRIOR TO PRINTING**

- Michael Almon, resident, expressed interest in topic.

**ATTACHMENTS**

Attachment A – Draft Language

**BACKGROUND**

In November of 2013, NextEra Energy, a renewable energy development company, submitted an application for a Conditional Use Permit (CUP) to install meteorological towers for wind speed measurements at two locations in southeastern Douglas County. Given the current lack of zoning regulations for large commercial wind development and questions raised by residents in that portion of the County, the Commission decided in December of 2013 to establish a temporary moratorium on Large Wind Energy Conversion Systems (Home Rule Resolution 13-12-5). In February of 2014, the County Commission held a study session on wind energy development and heard from the developers, staff, and regional experts.

Since that initial discussion in early 2014, the Commission has voted several times to extend the temporary moratorium on wind energy conversion systems. The moratorium will expire on July 31, 2015 (HR 15-12-5).

Also since that initial discussion, the applicant (NextEra) did not complete the required CUP process thus their application expired. In June of 2015, Jim Sherman (then Director of Zoning and Codes) discovered a meteorological tower close to N 400 and E 1000 that had been installed without a permit. He contacted NextEra and they subsequently removed the meteorological tower. In conversations with NextEra since then, they have indicated to the County Administrator that they do still intend to explore a potential wind energy project in Douglas County, but that their timeline for doing so has been extended.

The County Zoning Regulations do not specifically address *Wind Energy Conversion Systems*. This text amendment includes a two tiered system for the regulation of wind towers/turbines. This system would include applications for small personal wind turbines for residential or small commercial use separate from large commercial wind farms.

- Small wind turbines for personal or small commercial use could be handled through the building permit process, with design standards developed specifically for these technologies to address potential impacts to neighboring properties – setback, height, appearance, etc.
- Large commercial wind farm projects could be considered through the existing Conditional Use Permit (CUP) process upon revising the code to accommodate wind towers as a permitted use with potential use standards and/or application requirements. The CUP process could be utilized to address issues associated with wind energy projects such as visual impact, noise, soil erosion, water quality, cultural heritage, infrastructure, etc.

### **OVERVIEW OF PROPOSED AMENDMENT**

The following is a listing of the proposed code sections to be changed:

1. Section 12-303 Definitions.
2. Section 12-319 Supplemental Use Regulations
3. Section 12-321 Supplemental Height, Area & Bulk Requirements

This draft was prepared with input from County Counsel, the Director of Zoning & Codes and the Sustainability Coordinator. The portions of the Code being revised are attached to this staff report.

### **CRITERIA FOR REVIEW AND DECISION-MAKING**

The County Zoning Regulations do not offer guidance for the review of proposed code amendments. This report models the criteria outlined in the City Code which provides the following review factors:

#### **1) Whether the proposed text amendment corrects an error or inconsistency in the Code or meets the challenge of a changing condition;**

The purpose of this proposed text amendment is to provide a clear definition for an emerging use within the community that was not contemplated in the County Zoning Regulations. Lacking any clear land use regulations, the standards for communication towers have been use previously to evaluate wind energy related applications. This methodology did not account for special considerations related to the specific land use.

The growth of renewable energy as an industry and as a land use is not currently or adequately addressed in the current regulations. A distinction between commercial operations for the purpose of collecting, storing and transmitting energy vs. small individual applications such as found at a residence, farm or individual commercial business is needed in the code to reasonably facilitate changing technology. The proposed text amendment addresses a changing condition.

#### **2) Whether the proposed text amendment is consistent with the Comprehensive Plan and the stated purpose of this Code (Sec. 12-302)**

Wind, as a natural resource, is appropriately included in *Horizon 2020 Chapter 16 – Environment*. However, this chapter does not specifically address wind as commodity or described natural resource. The Plan speaks broadly to the following strategies:

- Identify and protect important environmental features in a manner that also:
  - Accommodates planned urban and rural growth,
  - Discourages urban sprawl,
  - Provides for efficient transportation systems,
  - Partners with economic development activities,
  - Considers private property rights,
  - Allows adequate open space for preservation and recreation,
  - Establishes a contiguous network of open space, and
  - Creates a sustainable community.
- Consider the impact upon environmental and natural resources in planning and development efforts.
- Establish effective incentives and regulations that promote sustainable and efficient management of environmental resources.
- Develop educational programs to foster community awareness of and support for the protection and enhancement of natural areas, efficient use of natural resources and appropriate waste management.
- Encourage environmental policies and programs to secure the community's future economic, ecological, animal, plant and human health.

The proposed text amendment is intended to be considered under the umbrella of these strategies.

### **Conclusion**

The *Wind Energy Conversion System* land uses and standards being proposed are in response to the increased interest in sustainability and wind energy as a local resource. These standards will provide clarity in the Code and insure compatibility with nearby land uses.

## **12-303 DEFINITIONS**

### **12-303-1.95 WIND ENERGY CONVERSION SYSTEMS.**

- a. Small Wind Energy Conversion System (SWECS). Small wind turbines for personal or small commercial use described as:
  - 1) Wind Turbine – a device or structure used to convert energy from the wind into electric power. May also be known as windmill or wind pump; devices used to power or run machinery or for pumping ground water.
  - 2) Maximum capacity to produce up to 50 kW of electrical power, for consumption on site and not for transfer or sale to a third party.
- b. Large Wind Energy Conversion System (CWECS). A single wind turbine or system, collection or group of large wind turbines, combined with transmission lines and energy conversion uses that collect, transmit and store electrical energy for use in a larger electrical network exclusive of individual use. Also known as Commercial Wind Energy Conversion System Project;
- c. Prescribed Burning. The controlled application of fire to naturally occurring or naturalized vegetative fuels under specified environmental (weather) conditions in accordance with a written prescription that is designed to confine the fire to a predetermined area and to accomplish planned land management objectives.
- d. Power Purchase Agreement (PPA). A contract between two parties, one of which generates electricity (the seller) and one which purchases electricity (the buyer).
- e. Road agreement for maintenance. An agreement executed between the applicant and governing body, having jurisdiction over said roads, identifying the responsibilities, cost, upkeep, fees for maintenance of a specific route used for the construction, operation, and decommissioning of a wind energy conversion system.
- f. Extraordinary Events. Any of the following with respect to an approved Large Wind Energy Conversion System: Tower collapse, Turbine failure, Thrown/broken blade or hub, Collector/feeder line failure, Injured worker or citizen, Kills of threatened or endangered species, or Discovery of an unexpectedly large number of dead birds of any variety on site.

- a. **12-319-4.36 Large Wind Energy Conversion System (Commercial Wind Energy Conversion Systems). Purpose of Regulations.** It is the purpose of this section to provide details related to any application for a Commercial Wind Energy Conversion System (CWECS) Project; create a process to permit the development of a CWECS; provide a basis for public discussion and informed comment on the CWECS; and identify significant environmental, social, and economic effects related to the CWECS.
- b. **Intent of Regulations.** It is the intent of this section to address major issues associated with the project; however, issues not listed may be deemed significant and issues may emerge as significant during the course of review.

These regulations are not intended to restrict installation of small wind energy conversion systems authorized and governed by section *[insert section reference for Building Code of County Code here]* of the County Code. Small Wind Energy Conversion Systems (SWECS) are expressly exempt from the Conditional Use Permit process.

These requirements specify the maps, information surveys, and studies that must be submitted as part of the Conditional Use Permit (CUP) application. If approved, one CUP will be issued for the entirety of real property included within the perimeter of the proposed CWECS Project. In the event the application includes multiple properties, the applicant shall provide written evidence of land owner consent for any parcel contained within the CUP application.

At the time of application for a Conditional Use Permit the applicant shall be required to make surrounding property owners aware of a potential development application. In addition to notifying property owners within 1,000 feet of the CWECS project per section 12-324, the applicant must provide written notice to all owners of record of unincorporated property located within one mile radius of the proposed request. The applicant shall submit a certificate of mailing for the notice required by this section, and a list of notified property owners at the time of the application. The notice shall be sent by regular mail and shall include a brief description of the project, proposed construction date, date the application will be submitted to the planning office, the person with contact information (phone, address) designated by the applicant to respond to questions concerning the proposed application and the following statement:

*This letter is being sent to the owners of nearby property for the purpose of informing the property owners and other interested parties about the proposed CWECS project described further in this letter. This letter does not grant the recipient and/or property owner any additional legal rights to challenge the proposed development, instead, it is being provided solely to advise property owner(s) of the pending development. For further information, contact the applicant's designated representative or the Lawrence-Douglas County Planning Office at 785-832-3150.*

- c. **Location Criteria.** The purpose of this section is to identify appropriate location criteria for siting wind turbines. Wind turbines shall be subject to section 12-328 of the County Zoning Regulations and are prohibited from location within any federally designated floodway [F-W Overlay District].
- d. **Conditions Required for Approval.** In addition to the findings of fact listed in section 12-319-1.02 the additional considerations shall be evaluated.
- 1) The applicant shall demonstrate its ability to strictly conform to all applicable performance standards detailed in these Regulations as well as applicable State and Federal law and regulations.

2) Key Issues. Key issues relating to CWECS include, but are not limited to:

- |   |  |
|---|--|
| a) Visual Impact  | h) Aviation/FAA  |
| b) Noise Impact   | i) Reception Interference                                |
| c) Wildlife Habitat/ Native Flora and Fauna/ "Heritage Habitat Areas" [Maps being processed by others as part of County Grant]. | j) Cultural Heritage                                     |
| d) Bird migration/strike  | k) Maintenance of the Rural Character                    |
| e) Endangered or Threatened Species   | l) Cumulative Impact                                     |
| f) Water Quality and Soil Erosion   | m) Company experience, reputation, and financial ability |
| g) Infrastructure, including roads and bridges for construction access  | n) Removal/Reclamation                                   |
|   | o) Bond agreement  |
|   | p) Specific requirements for building and construction   |

e. **Application Requirements.** As part of the CUP application, the applicant shall submit a CWECS Development Plan. Each application for a CWECS shall include the following documentation.

1) **Site plan per section 20-319A-4.**

2) **Contents of the CWECS Site Plan.**

- a) Name of the project.
- b) Name / address of land owner and land developer;
- c) Narrative describing phases of construction (if applicable).
- d) Concept plan showing the general location of turbines, electric collector and feeder lines, electrical equipment, substations, maintenance roads, and other associated facilities to be located on the subject property; equipment storage buildings or exterior storage areas.
- e) Extent of area of subject property to be disturbed or cleared for access, construction, operation and maintenance.
- f) Boundaries of the 100-year floodplain as identified on the Federal Insurance Administration's "Flood Hazard Boundary Maps" of Douglas County, Kansas; and,
- g) The location of any underground pipelines and other utility easements.
- h) Provision of the following notes on the plan that state:
  - i. *Decommissioned equipment shall be removed from the site and the foundations shall be removed to a depth of four (4) feet below the ground surface.*
  - ii. *The CWECS and its associated facilities shall not be operated so as to cause microwave, television, radio, telecommunications or navigation interference contrary to Federal Communications Commission (FCC) regulations or other law.*
  - iii. *During site clearance and construction, silt fences and other temporary erosion controls shall be installed and left in place until new native vegetation covers the bare ground around the turbines.*

iv. *This CUP shall not be transferred from one party to a different person or entity without approval of the Board of County Commissioners. Applicant shall notify the Board of County Commissioners and the Director of Zoning and Codes, in writing, of a transfer from one party to another. All CUP transferees shall be required to meet the same conditions as the original Applicant. The transferee shall also meet the surety bond/escrow requirement to ensure the CWECS is decommissioned and removed to CUP specifications at the end of the project's useful lifespan or in case of abandonment. The Commission may, in its discretion, provide for conditions that allow bank financing of a VWECS project, including a mortgage or lien on project assets, but any transfer or assignment of an interest in the CUP will remain subject to prior approval of the Board of County commissioners.*

3) **Supplemental information.** All detailed technical information that supports the proposal should be included in appendices.

a) **Vicinity Map.** Two (2) maps showing project location and vicinity within Douglas County.

b) **Demonstration of Qualifications** to include the following information:

- i. Name and address of the developer, and
- ii. Statement from the developer providing relevant information regarding:
  - a. Qualifications and experience in commercial wind energy development; Environmental management history of the company;
  - b. Financial information regarding the applicant's ability to construct, operate, and maintain the CWECS; and
  - c. Financial information regarding applicant's ability to meet the decommissioning escrow-bond requirements. (Note to Applicant: K.S.A. 45-221, Section 33 generally exempts financial information submitted by contractors in qualification statements from being open to the public.)

c) **Relevant background information** on the project, including a general overview of the project location, timeframe and project life, phases of development, and possibilities for future expansion.

d) **Map of residential** uses and structures within 1000' of the site boundary [for each individual wind turbine included in the application];

e) **Environmental guidelines and industry codes** of practice that will be followed if approved.

f) An **inventory of existing wildlife**, endangered and threatened species, wetlands, flora, fauna and geoconservation areas and other biologically sensitive areas within the site.

g) **Soil Erosion, Sediment Control, and Storm Water Runoff.** Applicant shall develop a Soil Erosion, Sediment Control, and Storm Water Runoff Plan, per the approval of the County Public Works Director or his designee.

h) **Archeological reconnaissance survey** within the site that will be impacted by the construction or operation of the CWECS. The survey shall be provided to the State Historic Preservation Office (SHPO) to determine if cultural resources are present. Any unrecorded cultural resources that are found shall be evaluated for integrity and potential listing on the National Register of Historic Places. Undocumented resources that are eligible for listing on the National Register of Historic Places shall be avoided. All archaeological investigations shall meet the SHPO standards and guidelines.

- i) A **transportation route plan** to be used for construction shall be coordinated with the Douglas County Department of Public Works. Execution of a road agreement, approved by the Department of Public Works, prior to issuance of a building permit for construction. Dust control plan to be implemented during construction phase and for regular maintenance as needed.
  - j) A plan detailing all **off-site construction improvements** needed for the project including, but not limited to, the following:
    - i. Requirements for new transportation infrastructure and/or upgraded, realigned, or new roads.
    - ii. Proposed agreement for road maintenance requirements as applicable for the development and continued operation of the CWECS.
    - iii. Changes to electrical substations.
    - iv. Changes to existing power transmission systems, including any upgrades to existing transmission lines.
    - v. Requirements for the realignment of other utilities affected by the project.
  - k) A plan detailing the **Mitigation Measures** used to demonstrate reasonable efforts to address the following:
    - i. Fire Safety: Show how the towers and equipment are protected from fire within the site and from fire originating from outside the site such as with prescribed burning and non-prescribed burning (natural or accidental).
    - ii. High angle rescue.
    - iii. Extraordinary Event response plan: Within 48 hours of the occurrence of an Extraordinary Event, the Applicant shall notify the Director of Zoning and Codes. In the event of extraordinary avian mortality, the Applicant shall, within 30 days of the occurrence, submit a report to the Director of Zoning and Codes, to the Kansas Department of Parks and Wildlife, and to the U.S. Fish and Wildlife Service describing the cause of the occurrences and the steps taken to avoid future occurrences.
    - iv. Noise impact.
- 4) **Operation and Maintenance Plan.** Operation and maintenance requirements (including frequency of maintenance activities) for the turbines and transmission lines. Width of transmission line easements required, and any restrictions necessary on land use, development, and access within said easement.
- f. **Design Standards.** The following design standards are applicable to Commercial Wind Energy Conversion Systems Projects (CWECS) and are not intended to be applicable to SWECS. The following design standards may be modified by the governing body (County Commission) following a public hearing held by the Planning Commission. It is the applicant's burden to demonstrate that the public health, safety, welfare, will be preserved and maintained if the standards are modified.
- 1) **Setback.** Additional or reduced setback requirements may be imposed as conditions to the project, depending on the circumstances.
    - a. The setback of tower from adjacent property lines not within the CUP. Interior setbacks of properties within the CUP may be reduced.
    - b. Setback shall be equal to height of tower plus length of blade 110%.
    - c. No turbine shall be located closer than 1500 feet to a residential structure.



- 2) **Lowest point.** The rotor blades shall be at least 100 feet above ground level at the base of the tower.
- 3) **Lighting.** All turbines and accessory facilities shall be sited to minimize adverse visual effect on the environment. Structures for wind turbines shall not be lighted except to assure human safety as required by the Federal Aviation Administration (FAA).
- 4) **Structure.** Structures for wind turbines shall be self-supporting tubular towers painted a neutral color such as a white or pale gray. A lattice structure shall be prohibited.
- 5) **Logos.** Logos or advertisements are prohibited on these structures.
- 6) **Identification Number.** Each structure for wind turbine shall be marked with a visible identification number located no higher than fifteen (15) feet above ground level.
- 7) **Turbine Access Roads. Access roads** shall be shown on the site plan and shall require approval of the County Public Works Director or his designee.
  - a. Access roads shall be low profile roads so farming equipment can cross them.
  - b. Where an access road is to cross a stream or drainage way, it shall be designed and constructed per the approval of the County Public Works Director or his designee and comply with applicable FEMA and Kansas Department of Agriculture — Division of Water Resources regulations pertaining to building a structure in a flood zone.

**g. Decommissioning/Restoration/Abandonment Plan.**

- 1) Applicant shall submit a Decommissioning Plan describing the manner in which the CWECS will be dismantled and removed from the site at the end of its useful life.
  - (a) All aboveground components of the CWECS shall be removed.
  - (b) Foundations shall be removed to four (4) feet below ground level. Remainder of foundation may be left intact.
  - (c) Access roads shall be removed unless specified by the property owner that they are intended to remain.
  - (d) Land shall be restored to pre-permit conditions, using either productive top soil or re-seeded in native grasses.
  - (e) Applicant shall submit documentation showing financial capability to carry out the decommissioning and restoration requirements.
  - (f) When a completed CWECS project does not produce any electric energy for a period of one (1) year, and there is no demonstrated plan to restore the equipment to operating condition, the Director of Zoning and Codes may notify the landowner and/or holder of the CUP that the CWECS project is deemed abandoned.
  - (g) If the landowner or holder of the CUP for the CWECS project does not cause the project to resume production of electricity within one (1) year from the date of the notice referenced above, the landowner and the CUP holder shall be jointly responsible to commence and shall complete abatement of the CWECS project as set forth in the Douglas County Zoning Regulations. The Board of County Commissioners may require Applicant (Holder of the CUP) to decommission any commercial abandoned turbine, even if other turbines in the project are active.
  - (h) At the end of the CWECS's useful life, or if CWECS is abandoned, the site shall be restored in accordance with the requirements of this condition within eighteen (18) months.

## **h. Bond Agreement.**

### **1) Bond Requirement:**

- a) Applicant shall obtain a surety bond naming Douglas County, Kansas, as payee in a form acceptable to the Board of County Commissioners. Applicant shall maintain said bond through the lifespan of the CWECS. Bondholder shall provide the County annual notification of bond status. Bondholder shall provide the County 30-days written notice of any cancellation thereof.
- b) In the event the Applicant or CUP holder is in non-compliance or default due to non-payment, the County shall have the right to call said bond and use it for decommissioning purposes. Should there be any remaining balance; the County shall have the right to withhold refund payment until the decommissioning process is completed to the County's satisfaction.

### **2) Liability on Termination or Expiration:**

- a) In the event of termination of this CUP for any reason, the CUP holder shall remain liable to the County for any expense incurred by the County that is above and beyond what is covered by the surety bond, escrow account, and/or insurance policy.
- b) The CUP holder shall remain liable to the County for any unspent funds, the expenditure or use of the funds in a manner or for a purpose not authorized by this agreement and/or damages as a result of any breach of this agreement by the CUP holder.
- c) The County shall have the right, at any time prior or subsequent to any remedies, including seeking injunctive or other equitable relief, to enforce the provisions of this agreement and/or recover funds, which are unspent, expended or used in an unauthorized manner, or for an unauthorized purpose and/or damages sustained by the County as a result of any breach of this agreement by the CUP holder.

- 3) Non-Liability: Nothing in this agreement or otherwise shall impose any liability or duty whatsoever on Douglas County or any of its agencies, including, but not limited to, any liability for taxes, wages, or any other employee benefits for any person or entity. Contractors, suppliers, or consultants accepting and relying on documents, materials, and other information from the Applicant or CUP holder will do so on their own responsibility and at their risk.

## 12-321 SUPPLEMENTAL HEIGHT, AREA & BULK REQUIREMENTS

### 12-321-3. MODIFICATION OF HEIGHT REGULATIONS

**12-321-3.01.** Except in an Airport Hazard District, the height regulations as prescribed in this Resolution shall not apply to:

- a. Belfries
- b. Chimneys
- c. Church spires
- d. Conveyors
- e. Cooling towers
- f. Elevator bulkheads
- g. Fire towers
- h. Flag poles
- i. Grain elevators
- j. Monuments
- k. Ornamental towers and spires
- l. Radio and television antennas
- m. Silos
- n. Smoke stacks
- o. Stage towers or scenery lofts
- p. Tanks
- q. Water towers and standpipes
- r. **Wind turbines when in conjunction with a residential or individual commercial use**
- s. **Wind turbines when operated as part of an approved Conditional Use Permit**

HOME RULE RESOLUTION NO. HR-15-12-4

A HOME RULE RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS  
OF DOUGLAS COUNTY, KANSAS EXTENDING A TEMPORARY  
MORATORIUM ON LARGE WIND ENERGY CONVERSION SYSTEMS

WHEREAS, on December 11, 2013, the Board of County Commissioners of Douglas County, Kansas ("Board") adopted Home Rule Resolution No. 13-12-5, placing a temporary moratorium on Large Wind Energy Conversion Systems, and

WHEREAS, on April 23, 2014, the Board adopted Home Rule Resolution No. 14-13, extending the temporary moratorium through September 30, 2014, and

WHEREAS, on September 17, 2014, the Board adopted Home Rule Resolution No. 14-9-2, extending the temporary moratorium through March 31, 2015, and

WHEREAS, on March 4, 2015, the Board adopted Home Rule Resolution No. 15-3-2, extending the temporary moratorium through December 31, 2015, and

WHEREAS, the Board and applicable Douglas County officials, agencies, departments, boards, and commissions require additional time to review the Zoning Regulations, receive public input, hold public hearings, and make recommendations for amendments to the Zoning Regulations to address adverse effects that wind farms may create.

NOW, THEREFORE, THE BOARD OF COUNTY COMMISSIONERS OF DOUGLAS COUNTY, KANSAS, SITTING IN REGULAR SESSION, DOES HEREBY RESOLVE AS FOLLOWS:

The temporary moratorium adopted in Home Rule Resolution No. 13-12-5 and extended by Home Rule Resolutions 14-13, 14-9-2 and 15-3-2 is hereby extended through and including July 31, 2016. This Resolution is effective from and after its adoption and publication one time in the official County newspaper.

ADOPTED the 2nd day of December, 2015.

BOARD OF COUNTY COMMISSIONERS  
OF DOUGLAS COUNTY, KANSAS

\_\_\_\_\_  
Jim Flory, Chair

ATTEST:

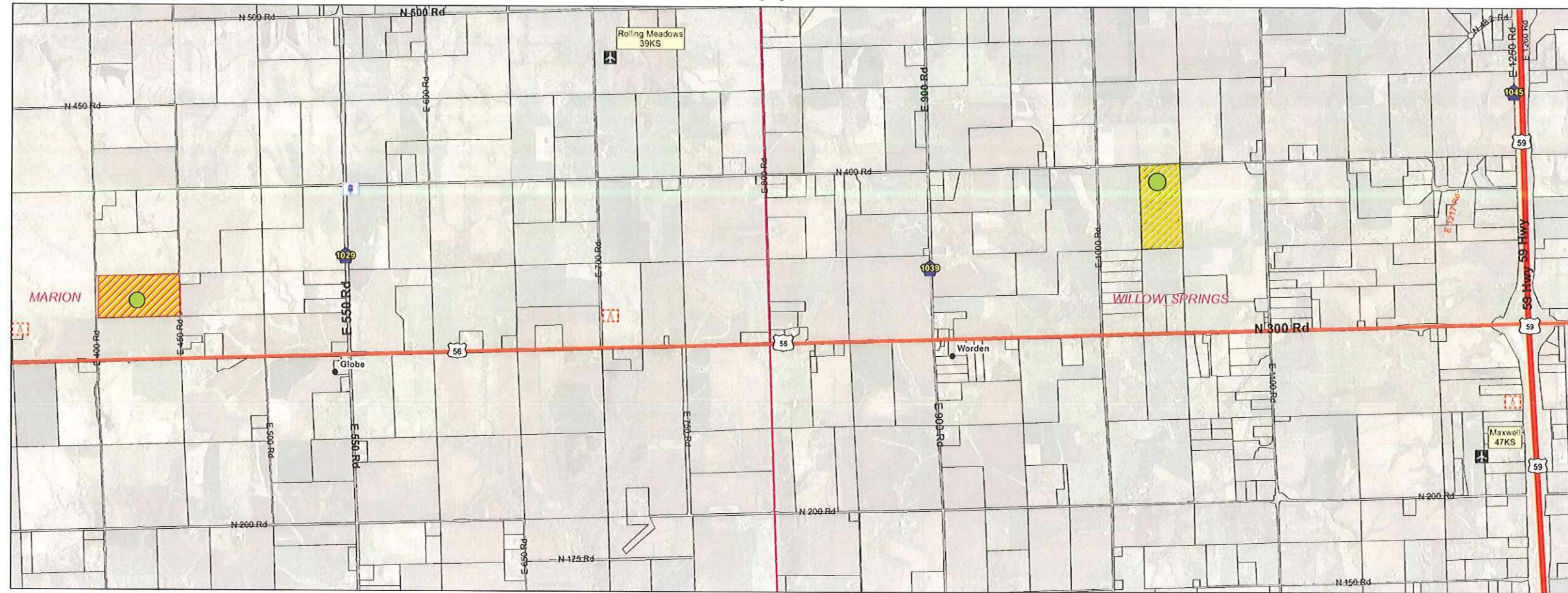
\_\_\_\_\_  
Mike Gaughan, Member

\_\_\_\_\_  
Jameson D. Shew, County Clerk

\_\_\_\_\_  
Nancy Thellman, Member






# Met Tower Applications



## Legend








### Towers

#### TYPE



-  COMMUNICATION
-  TV
-  WATER

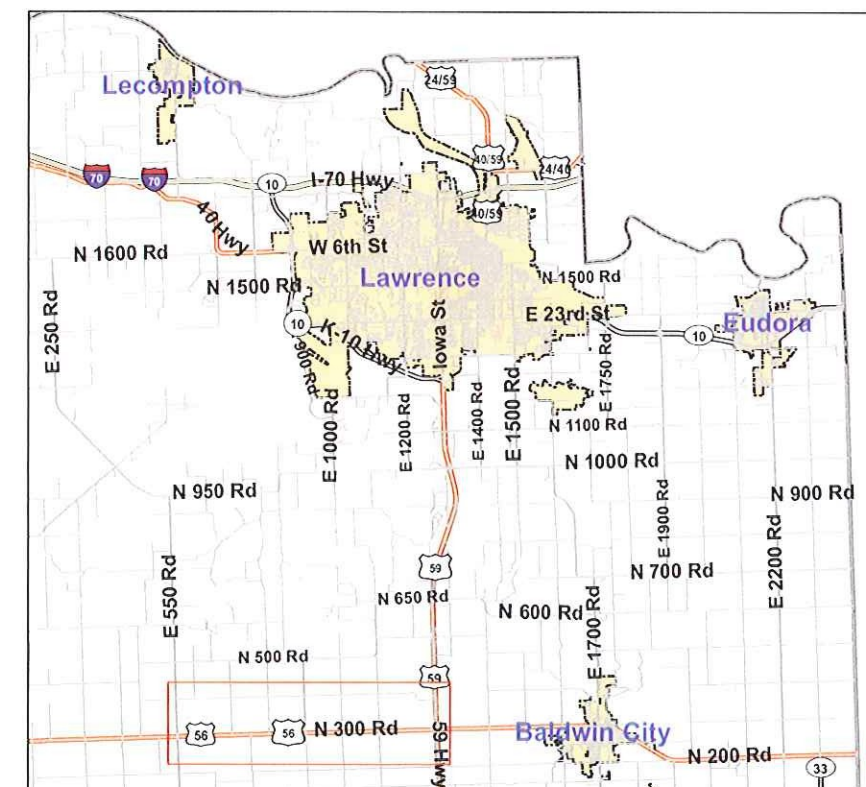
### County Airports / Helipads

#### Entity

-  Private
-  Public
-  City Limits - Douglas County
-  township
-  County Limits
-  Water Bodies
-  Townsites

## APPLICATIONS

-  CUP- 13-00480; N 400 RD & E 1000 RD
-  CUP- 14-00002; E 400 RD & N 300 RD





# Wind Energy Study Session

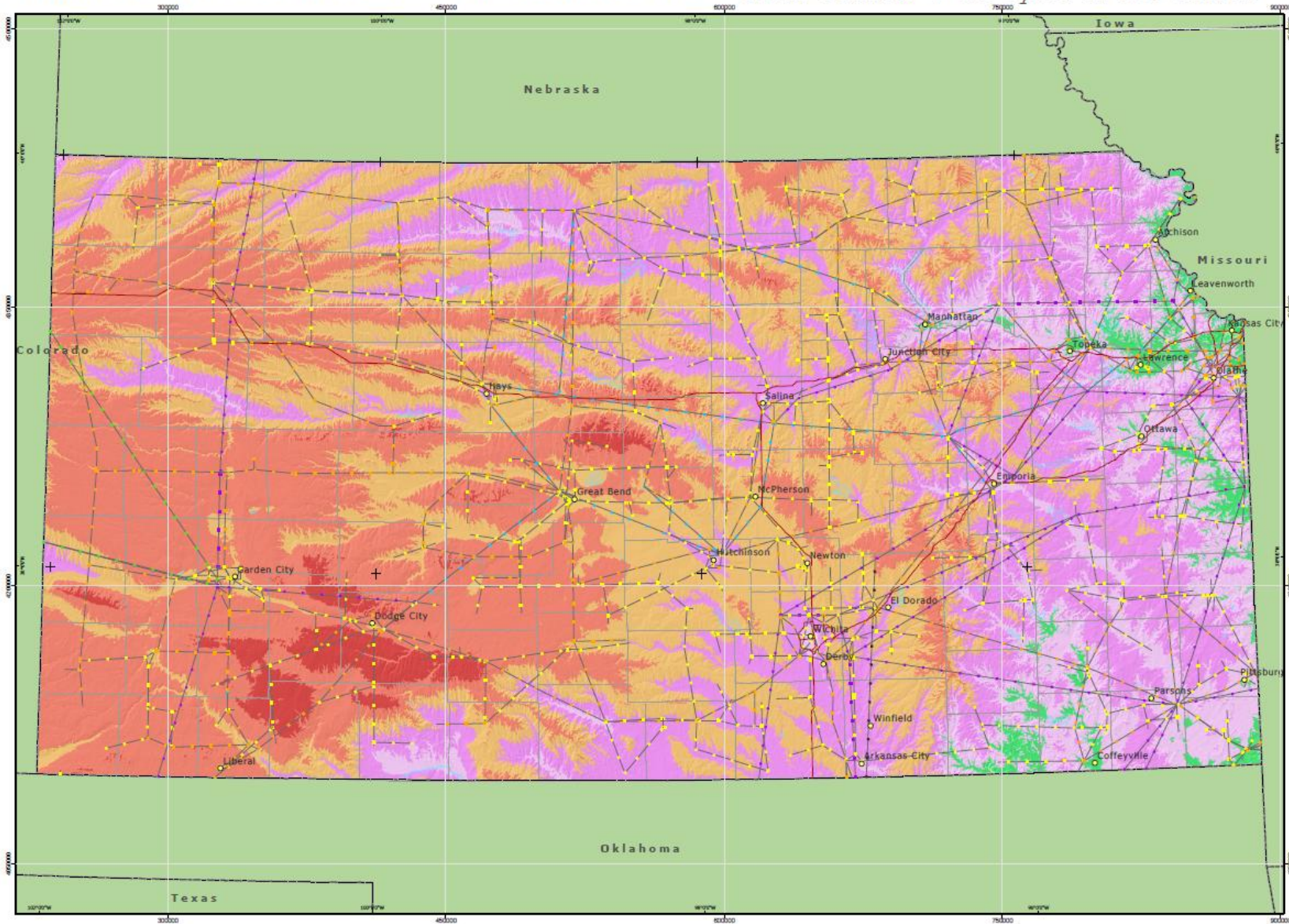
Presented  
to the  
Douglas County  
Board of  
Commissioners

February 5, 2014

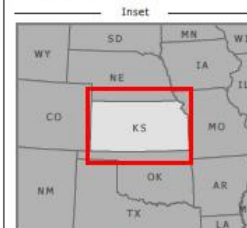




# WIND RESOURCE OF KANSAS *Mean Annual Wind Speed at 100 Meters*



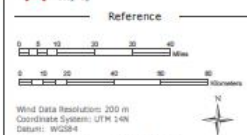
## MESOMAP



Legend

Mean Speed at 100 m	
mph	m/s
< 12.3	< 5.5
12.3 - 13.4	5.5 - 6.0
13.4 - 14.5	6.0 - 6.5
14.5 - 15.7	6.5 - 7.0
15.7 - 16.8	7.0 - 7.5
16.8 - 17.9	7.5 - 8.0
17.9 - 19.0	8.0 - 8.5
19.0 - 20.1	8.5 - 9.0
20.1 - 21.3	9.0 - 9.5
> 21.3	> 9.5

- City
- Interstate Highway
- State Boundary
- County Boundary
- Water Body
- Transmission Lines
  - Category
  - Under 100 kV
  - 100 kV-161 kV
  - 230 kV-287 kV
  - 345 kV
  - 500 kV
  - 735 kV +
  - Step-Up



Wind Data Resolution: 200 m  
 Coordinate System: UTM 14N  
 Datum: NAD83

**Disclaimer**  
 This map was created by AWS Truewind using the Mesomap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.

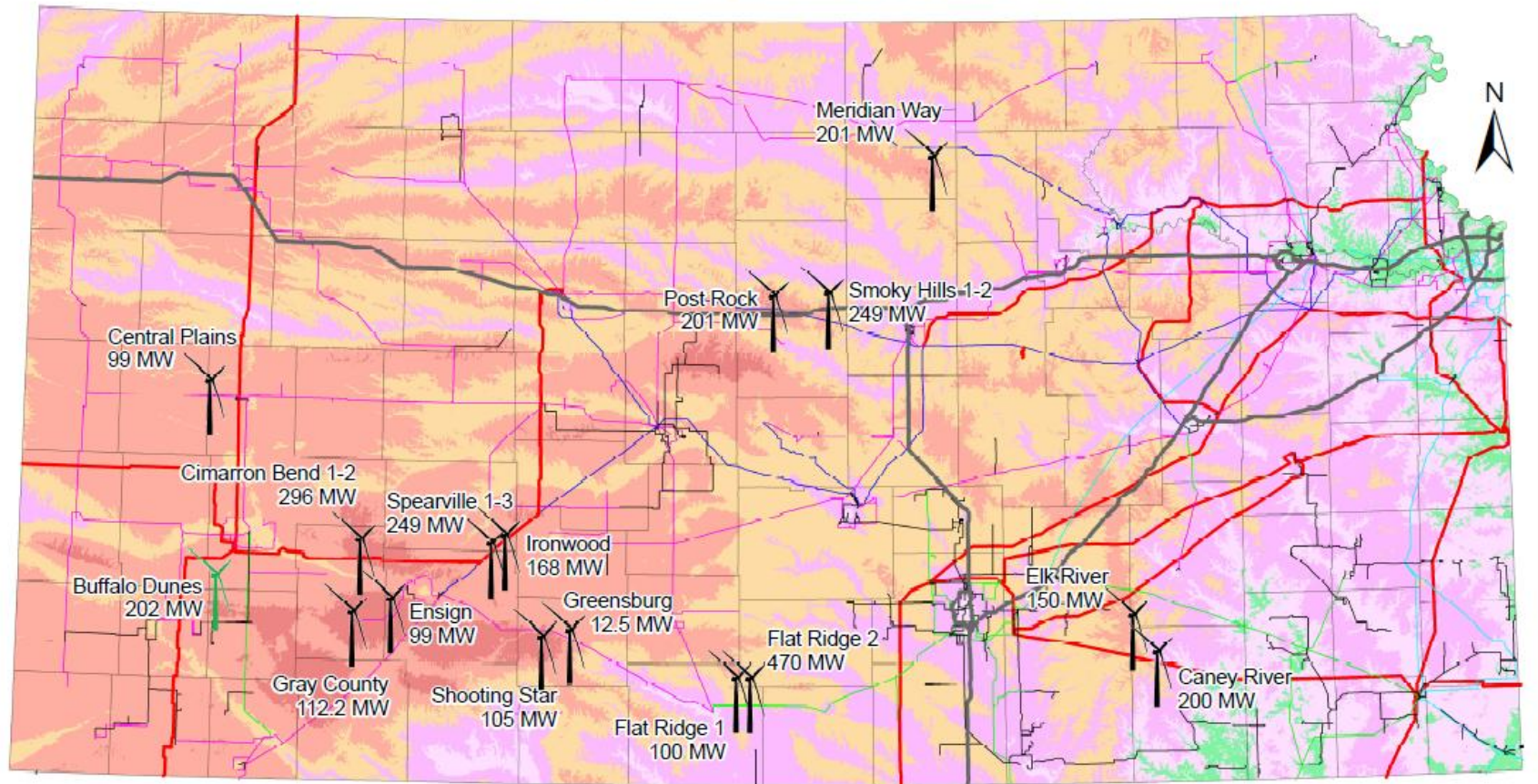
The generalized transmission line information was obtained by AWS Truewind from the Global Energy Decisions Velocity Suite. AWS does not warrant the accuracy of the transmission line information. Source Date: July, 2008

**Originator**  
 Date: 9/15/08  
 Department/Originator: Modeling/MPS  
 File Path: Kansas\_SPD100m.mxd  
 Map Class: FINAL, Confidential  
 Client: NREL

**AWS Truewind**  
 463 West 42nd St. Albany, New York 12245  
 518.213.0444 | www.awstruewind.com



# Kansas Wind Resources 2,712 MW Total



Windmills.mxd



Existing



Under Construction

## Transmission Lines

345 KV	138 KV
230 KV	115 KV
161 KV	69 KV

## Roads

Interstate

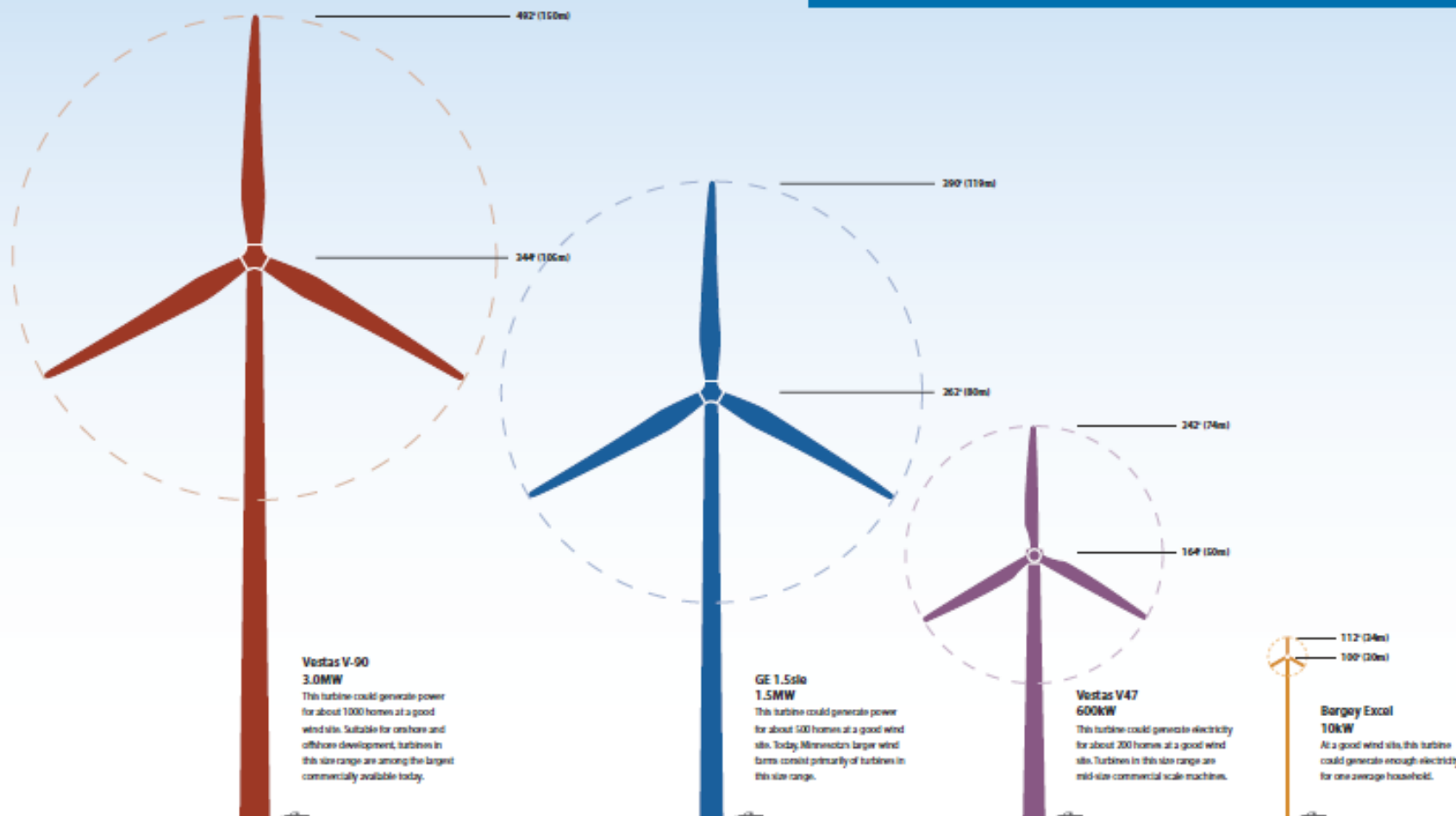
## Wind Speed at 100 m

4.0 - 5.5	7.5 - 8
5.5 - 6	8.0 - 8.5
6.0 - 6.5	8.5 - 9
6.5 - 7	9.0 - 9.5
7.0 - 7.5	9.5 - 12

Wind speed at 100 meters data layer was created by AWS Truewind using the MesoMap system and historical weather data. July 2008



## THE SCALE OF WIND POWER



# Kansas Wind Energy Statistics:

- **Installed Wind Capacity:** 2,712 megawatts (MW).  
*State Rank:* Kansas ranks 9th for total MW installed.
- **Number of Wind Turbines:** 1,592 turbines.
- **Wind Projects Online:** 23 wind projects.
- **Percentage of Kansas' electricity provided by wind in 2012:** 11.4 percent. *State Rank:* Kansas ranks 6th for percentage of electricity coming from wind energy.
- **Equivalent number of homes Kansas wind farms now power:** over 840,000 average American homes.

# Economic Benefits of Wind Energy in Kansas:

- **Total direct and indirect jobs supported in 2012:** 4001-5000. *State Rank:* Kansas ranks 5th for number of wind-related jobs.
- **Capital investment:** over \$5 billion dollars .
- **Annual land lease payments:** over \$7,900,000.
- **Number of manufacturing facilities in Kansas:** 7 facilities.

# Environmental Benefits of Wind Energy in Kansas:

- The **water consumption savings** from wind projects in Kansas total more than 2 billion gallons of water per year.
- The wind power installed in Kansas will **avoid over 5.6 metric tons of carbon dioxide** emissions annually, the equivalent of taking over 990,000 cars off the road.

# Wind Energy Potential Impacts:

- Sound and visual impacts
- Wildlife and habitat
- Infrastructure and roads
- Aviation/FAA
- Soil erosion and water quality
- Public health and safety
- Land use and property values
- Public infrastructure
- Etc.