

**SPECIAL  
PUBLIC HEALTH, SAFETY & ZONING COMMITTEE  
FEBRUARY 29, 2012  
6:30 PM**

**AGENDA**

**Sign In  
Meeting Called to Order**

**New Business**

**I. Introductions**

**II. Staff Report**

**III. Public Comment**

**Next County Board**

**March 13, 2012 @ 7:00 pm**

**Adjournment**

PUBLIC HEALTH, SAFETY & ZONING COMMITTEE  
WIND FARM PUBLIC HEARING  
FEBRUARY 29, 2012  
6:30 PM

PRESENT: Tim Moore – Chairman, John Fulgenzi, Linda Fulgenzi, Jason Ratts, Sam Snell, Greg Stumpf and Linda Douglas-Williams.

EXCUSED: Abe Forsyth and David Mendenhall

OTHERS: Andy Van Meter, Chris Boyster, John O'Neill, Craig Hall, Tom Fraase, Sam Montalbano, Rose Ruzic, Dan Sausaman, Senator Sam McCann, Auditor Paul Palazzolo, Gray Noll, State's Attorneys Dwayne Gab and Dan Mosher, Chris Nickell, Norm Sims, Molly Berns, Cyndi Knowles, Charlie Chimento and Lou Robisch (Sec)

Chairman Moore called the meeting to order at 6:30 pm. He introduced members of the Public Health, Safety & Zoning Committee to the public body. Mr. Moore then laid out the procedures for the speakers to address the committee. He reported that his committee placed a nine month moratorium on the wind farm issue in order to take a closer look at the ordinance and there were some members of the public that were not happy about it. He and the committee had spent several years reviewing this issue. They have toured wind farms, read a tremendous amount of literature on the subject and attended informational conferences. He asked that anyone wishing to speak, sign up in advance of speaking. Mr. Moore noted that the committee was there to answer questions and listen to everyone's concerns.

Norm Sims gave a brief overview on the roll of the Regional Planning Commission pertaining to this process. Cyndi Knowles explained that she would answer any zoning questions anyone might have concerning the ordinance. Dwayne Gab explained that he would be drafting the amendments to the Zoning Ordinance after the staff and the committee made their recommendations. His office also will make sure there is compliance and enforcement of the code.

Jason Ratts told the audience that even though he didn't live close to the proposed area on the west side of Sangamon County, he was willing to listen to everyone's concerns.

District 1 county board member Tom Fraase presented his text amendment for Chapter 17.49 of the Zoning Code to the committee. (See attached) He proposed that the distance for a wind tower from a non-participating property owner be 9x the total height of the tower from the top tip of the blade to the ground and all electrical substations be no closer than 5000 feet from a residence. He wanted to see something added to the ordinance to limit the height of the towers.

Craig Hall said the he flew over the western portion of the county to see where the open areas were. There were a lot of homes and 9x the height of a tower of 487 feet totaled 4,383 feet. It wasn't feasible at those distances from any structure to build a wind farm.

Linda Fulgenzi asked about the height of the towers. Mr. Sims pointed out, that towers could not surpass 500 feet due to FAA regulations. Mr. Fraase's suggestion that towers were 600 feet tall was inaccurate at this time. In the future, it could be possible that a tower could reach that height but only after taller equipment was developed to reach those heights for installation.

The first speaker was Mike Neuman from Pleasant Plains. He thanked the board for hosting the hearing. He was a farmer in the area where the proposed wind project was to be built. He didn't feel that the Zoning Board should have any say over what he does on his personal property. He felt a one mile setback was too big. He had gone to Pittsfield and up near Peoria to check out the sound of a wind turbine and didn't feel it was loud enough to cause any concern. He thought this should be about property rights and it should be the owner's choice to do what he wishes with his land. When Mr. Neuman was asked how he thought wind towers would impact his farm, Mr. Neuman said it would be disruptive during construction but once the turbines were installed, the area should be much improved. He felt property values could drop during construction but should rebound and actually increase once the project was completed. Wind turbines could increase the value of the land and the area with better schools and roads. A person questioned whether Mr. Neuman had taken more than one trip to a wind farm. Wind speeds can affect the sound and turbines could make more noise depending upon the wind speed. Mr. Neuman urged people to listen for themselves.

Steve Neuman told the committee that he had lived in the western part of Sangamon County for 54 years and knew that 250 landowners had signed up to participate in the project and about 20-30 people that don't want it. He also didn't think others should be concerned about what he decides to do on his property. He noted that cell towers and grain bins were being built all over and no one complained about setbacks for them. He stressed that all home owners would benefit from the tax revenue that would come to the county in the form of better roads, schools and lower property taxes. Roads will be rebuilt after the installation and be better.

Laura Ryan of Pleasant Plains asked how her property value would increase as a non participant. She believed that her property value would go down because of the wind farm. Her home would become less valuable because it was close to a wind farm. Mr. Sims said that property values usually increase because of the improvements a wind farm brings to the area. Ms. Ryan noted that if her home value increases due to land development from a wind farm, then her taxes would then increase. Norm Sims said that immediate surrounding property to a wind farm could have affected values but there was no data available. Turbines were taxed on the amount of energy it generated not the value of the property. Mr. Moore suggested that Lou should check with Joe Lindley to get an answer on assessment of property tax values and if they would go up or down. The ordinance requires that a road improvement plan be in place and roads be replaced and updated to meet standards. All roads surrounding the site would be updated and in good working order.

Keith Wichterman is a land owner in the area of the proposed wind farm. He developed and is chairman of a land owner steering committee for those in the area to work with an attorney to help negotiate and review any contracts with AWEM. The steering committee supports the project and researched this new energy business. The attorney has worked with other wind farm participants for 17 wind farms in the state. He stated that wind farms were viable and the future for clean energy. He encouraged the committee use objective data to come to their final decisions. He urged that everyone look at this \$500 million dollar project which would bring millions of dollars of tax revenue to the county, and for the board to please use objective factual data to make decisions.

Laura Ryan addressed the committee and stressed that she was not a supporter of wind farms. She felt that many of the studies being reviewed by the committee were misleading everyone. The property value studies were conducted on homes 3 miles from a wind farm. There was no data available for homes sold within a wind farm or a half mile from a wind farm and she found that to be curious. She also found an ordinance in another state with a 1 mile setback. She would support a 1 mile setback. She also would like to see a section added to the code for "rights" for non-participants. She questioned why the ordinance included a paragraph saying the county could not be held liable or sued. Ms. Ryan felt that if the county was to approve a wind farm, they should be held liable. She would like to see a section added to the ordinance to address noise and health issues. The studies were misleading about the amount of noise a turbine makes and with no real data regarding property values near a wind farm. She wanted to see more studies done with data on property values closer to a wind farm before any wind farm was built here in Sangamon County. If a mile setback was not approved, then she wants to see a non-participant right clause. What concerns her most was constant noise, health risks and devaluation of the home.

John Woodruff was a supporter of wind farms. He believed that a 1 mile setback would kill a wind farm project. He was looking forward to seeing better roads and schools from the revenue generated by the wind farm. He quoted the Berkeley Study about property values. The study said there was no data for home sales within a mile of a wind farm. He urged the board to study the sound issue and AWEM to also prepare the homeowners for what the sound to truly expect. He passed out handouts regarding sound and noise. (See attached)

Mike Rapps from Rapps Engineering had worked with AWEM statewide and studied 110 locations for wind farms. They did preliminary studies for AWEM on wetlands, flora, birds and fauna. His business has benefited from having AWEM working here in Sangamon County. He said AWEM was a good company to work with and Sangamon County was lucky to have them here.

Chris Nickell, from Pleasant Plains, of American Wind Energy Management (AWEM), representing Sangamon One Wind Project addressed the group. He passed out a copy of AWEM's comments and suggestions for changes to the Sangamon County Ordinance. (See attached) The focus of the ordinance needed to shift from property line protection to home protection. Sangamon County currently had a setback of 1000 feet. AWEM was

willing to change the setback to 1800 feet to protect homes. This would make the setback the strictest in Illinois. 55 counties in Illinois use the 1.1 x the turbines height for setback. At 1800 feet, visual impact will be less, provide more protection to homes even with a taller turbine just less than 500 feet. He also passed out a breakdown of the tax impact figured for one township involved in the project.

Linda Douglas Williams asked what affect a tornado would have on the turbine structure. An F1-F2 tornado has proven to hold up with no damage. None have been subjected to and F3, F4 or F5. He did think there would be damage. The blades were made of fiberglass and would break. He didn't think they would cause any more damage than any other building materials thrown around by a tornado.

Greg Stumpf asked if AWEM had a decommissioning plan. Mr. Nickell said the current ordinance requires them to work with the county to development a decommissioning plan to get a permit. They must hire a 3<sup>rd</sup> party engineer to do an estimate on the financial requirements to decommission the wind farm and then present the decommissioning plan to the county. The wind company must pay for the decommissioning of the wind farm. His company has no problem providing a plan and will support any additions that may be added to the ordinance on this issue.

Greg Stumpf asked if AWEM had done any studies on property values. Mr. Nickell said they rely on the property tax assessors for the information. They have done no studies. Tim Moore asked what would happen if the county were to wait five or ten years until more data was available. Mr. Nickell said AWEM would not wait that long. They have been here trying to get the project going since 2008 and waiting even two more years was too long. They were willing to hold off for the nine month moratorium, so that the county could get its ordinance updated. If asked to wait longer than another year, AWEM would leave Sangamon County and move to another county.

Mr. Nickell said that the national average for farm land taken out of production is approximately a half acre. The cement base was about the same circumference as a grain bin. The service road makes up the majority of the crop land taken out of production. They ask farmers for a 30 year commitment, so they work very closely with the farmer to protect the productive farm land.

John Fulgenzi asked about the tax depreciation for a turbine. Mr. Nickell said the state had a standard tax allowance of 10% per year for depreciation to a stabilized baseline of 30% and was also tied to the CPI. The Illinois Department of Revenue had a formula for them to follow.

Mr. Nickell indicated there was no data on decommissioning yet. There was more data on recommissioning older, smaller wind farms. Company owners pay for the refurbishment.

Chris Boyster asked how long it took to build a wind turbine and how many jobs do they provide. Mr. Nickell said a 100 turbine wind farm took approximately one year to construct. The first ten months were used for prepping the site for each turbine and

making the roads. It usually took a week to put up 2-3 turbines. AWEM had five fulltime employees, a handful of subcontractors and part-time specialists.

John Fulgenzi made a motion to extend the time of the meeting another 15 minutes in order to get all questions answered. Jason Ratts seconded and the motion carried.

Craig Hall asked about seeing a map sometime soon. He wanted to see where the turbine locations would actually be. Could the project be broken down by township or to break the project in half to place towers closer to those that support the project. Mr. Nickell wanted a map as well. Everything was up in the air due to the moratorium and the finalized setback. He could show where the participants reside, as to where turbines would go. How and where the turbines go was based on economics and location to the electrical grid.

Jason Ratts asked if other counties have a non-participant rights clause. Mr. Nickell said very few ordinances have a non participant rights clause. The property line setbacks usually pertain to non participants.

#### **Public's Questions and Comments:**

Is AWEM aware of stray voltage (magnetic field) and how would this affect children or a diabetic? Mr. Nickell said that stray voltage could come from many sources, not just turbine generators. The setbacks involved plus the height of the generator should not provide any danger to humans. The speaker said he read a study that said stray voltage can affect 3% severely and 35% moderately within a mile radius of a wind turbine.

Mike commented that the noise comes from the blade and the turbine. Mr. Nickell said the majority of the noise comes from friction on the blades. Is that louder than wind? The noise is caused by the friction of the vibrations of dust particles or moisture on the blade. The vibration causes the noise but doesn't amplify noise.

Mr. Nickell was asked if the 1800 feet setback was from the home or the property line. He explained it would go from the residence home if zoned "A". If zoned residential they would go from the property line.

Ms. Ryan noted that according to the current ordinance, the county was exempt from liability or litigation. She wanted to know what her options would be to collect possible damages. Mr. Moore asked State's Attorney Dwayne Gab to address her question. Mr. Gab stated that the county was indemnified through the developer. Basically, the owner of the wind farm was responsible for paying on behalf of the county for any lawsuit damages through liability insurance, only if the plaintiff was able to prove that by law they had a right to damages. This clause in the ordinance pertains to all residents of the county, not just participants and non participants of this project.

Mr. Fulgenzi made a motion to extend the time of the meeting another 15 minutes in order to get all questions answered. Jason Ratts seconded and the motion carried.

Jane had lots of questions. She wanted to know the name of Mr. Nickell's company. He stated his company was AWEM Sangamon Wind One LLC. This project was a joint development with AWEM and Oak Creek Energy Systems from Escondido, California. She wanted to know who the manufacturer would be. He stated that they had not decided yet and would wait until closer to the time they were going to be purchased. She asked where the energy goes? It goes to the electrical grid, would be used locally or wherever there was demand. AWEM were seeking buyers at this time to sell the power to. She will call Mr. Nickell to get her other questions answered.

Dr. David Hepler addressed the committee. He is the Logan County Board Vice-Chairman and Logan County has the operational Rail Splitter Wind Farm. He said their county board also held open meetings and researched the project for a year. He wanted to share that their experiences with AWEM were very positive. The concerns many feared never materialized. All of the participants were pleased with the outcome. AWEM exceeded their expectations. Now they are getting ready to start a new project Sugar Creek One for 100 turbines. He is chairman of the Zoning Committee and the hearings this time have only gone for four weeks. No one is concerned this time around. They know what to expect. The schools, road commissioners and the Farm Bureau supported the projects. The setback in Logan County is 750 feet and the turbine height is 750 feet. They don't have a big airport, so the 500 foot FAA stipulation doesn't apply. Their ordinance allows for only 750 feet and the new project is going with even less at 450 feet.

Kyle Barry addressed the committee. He is an attorney for AWEM and has advised many counties on their ordinances. The standard setback is 1.1 x the turbine height. Sangamon County is strict in comparison to other counties. He made several perspective points as follows;

- Cell phone towers are 350 feet tall and can be 20 feet from a property line and 300 feet from a neighbors home
- 2500 hog facility can be 1,320 feet away from a neighbors home
- Need to balance out rights of landowners with what opponents want
- Top policy priority of the Farm Bureau is to have the State pass uniform wind farm policies for all counties to follow.

John Fulgenzi made a motion to extend the meeting another 20 minutes. Sam Snell seconded and the motion carried.

Bob Mosher told the committee that at night, a wind farm has red flashing red lights and the sound of the blades seems louder. It seems like an industrial area. He invited the committee to come out to west Sangamon County at night to see how beautiful it is. If the wind farm is built, everyone will lose that beauty, so please do not build it.

Josh Witkowski works for CWLP. He has been involved with wind energy and how it relates to the market. He's not speaking on behalf of the utility. He cautioned the committee not to let the developer and the wind consultants write the ordinance. He stressed to look at independent information as well. He compared it to a fox guarding a hen house. He feels an environmental impact study should be required and included in

the ordinance. He was glad AWEM has done one already. He stressed they also consider regulations for lightening. The towers attract lightening. Homes would be in the middle of a wind farm. Gear oil failures cause burning and falling debris with sparks. Fields are often dry and could start field and home fires. (See attached photos) The wind farm is highly dependent upon government regulations and tax credits. Consumers will pay higher costs and he didn't think this business model was sustainable. The board should look closely at decommissioning costs and require financial bond from the developer.

Kevin Borgia Director of IL Wind Energy Coalition, passed out a handout for review. (See attached) He has worked with expanding wind energy in Illinois. He has been to many hearings such as this one and worked on many wind projects. He pointed out, if a government regulates a business too much, the business will leave. He asked that the board keep that point in mind. The same goes to property rights. The horror stories have not materialized in other counties. He referred to the study he passed out last week. The property value study did take under account 31 home sales within a half mile of a wind farm. There were 3,851 residential property transactions from January, 2001 to December 1, 2009 with actual data on this. Economic data was provided on the positive impact a wind business can have on counties and participating homeowners. Subsidies to wind companies were nothing new and not nearly as high as oil and gas businesses receive.

Greg Stumpf asked that the committee hold one more hearing in the near future. Greg Stumpf made a motion to extend the meeting to 9:00 pm. Sam Snell seconded. Motion carried.

Cathy Bomke commented that everyone had the right to do what they want with their property. Her land was zoned agricultural now but she pointed out that the Zoning Board needed to look into the future for those homeowners that may want to subdivide their property to allow a family member to build a home on their land. If a wind farm is there, they cannot do that.

Brian Bomke stated he was a farmer in the wind farm area. If his neighbors have wind turbines, he will have to pay more to have his crops dusted from the air. Due to the height of the turbines, it will make it more difficult for a crop duster. Costs would increase 50%. His costs were currently \$9.00 per acre. He would see an increase of \$739.00 and if he sprays twice, it'd double. The plane can only fly half full due to the flying skill to fly between the turbines. He would like to see 1 mile setback from non participating homeowners. That would help him be able to spray his crops. He also supported decommissioning. Mr. Moore suggested that Mr. Bomke speak with AWEM about helping to defray the increased costs for his crop dusting.

Will Reynolds represents the Sierra Club, the nation's largest environmental organization. He hoped Sangamon County would consider looking at the energy future of the region for development of wind power. The coal industry does impact the environment and the county had recently given a coal company a special tax break despite EPA violations. Producing power always impacts the environment. He hoped that the county board would pass a non restrictive ordinance that will allow for wind

development in Sangamon County. The project would create new jobs with minimal environmental impact on the area.

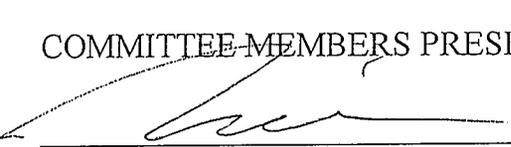
Ms. Ryan asked Mr. Reynolds how the Sierra Club could support wind farms and what wind turbines could do to endangered species? He said the Endangered Species Act was very important to the Sierra Club but the amount of danger to birds was very minimal compared to other power sources. There was no power source that didn't affect the environment.

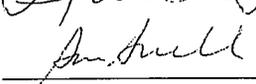
Sam Snell made a motion to adjourn and Linda Douglas-Williams seconded. Motion carried and the hearing adjourned at 8:55 pm.

PUBLIC HEALTH, SAFETY & ZONING COMMITTEE  
Sangamon County Board

Date 2-29-12 Place C Bd Time 6:30 Meeting \_\_\_\_\_

COMMITTEE MEMBERS PRESENT

  
\_\_\_\_\_  
Chair  
Tim Moore

 Linda Fulgenzi Member  
 Sam Snell Member

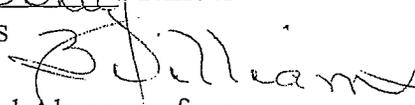
excused \_\_\_\_\_ V Chair  
Abe Forsyth

Jason Ratts - present Member  
~~Don Stephens~~

 John Fulgenzi Member

 \_\_\_\_\_ Member  
Greg Stumpf

excused \_\_\_\_\_ Member  
David Mendenhall

 \_\_\_\_\_ Member  
Linda Douglas Williams  


Committee Chairman or Acting Chairman will note Absence or Excused Absence of non-signing members and by the chairman's signature attest to the presence of those members shown.

OTHERS PRESENT Andy Van Meter, Paul Palagzolo, Senator

Sam McCann, Gray Nell, Charlie Clemente

Norm Simis, Molly Burns, Cyndi Knowles,

Aibly, Bybee, Tom Fracase, Dan Sausaman, Sam

Montalbano, Craig Hall, Rose Ruzic, Dwayne

Gab and Dan Mosher

SUBMITTED BY Ken Robusch  
SECRETARY

PUBLIC HEARING ON ZONING ORDINANCE

February 29, 2012

6:30 PM

PLEASE PRINT

NAME

ADDRESS

1. Mike Neuman 1190 S Pleasant Plains Rd Pleasant Plains IL 626
2. Steve Neuman 1257 Spring Creek Rd Pleasant Plains 62677
3. Keith Wichterman 2117 Greenside Springfield, IL 62704
4. Laura Ryan 4717 Robinson Rd Pl Plus Ill 62677
5. John Woodruff 12800 Walnut Woods Pl Plns 62677
6. Michael Rapps 821 S. Durkin Springfield 62604
7. Chris Nickell 401 W Main Pl Pl 62677
8. Dr David Hepler Logan Co Board Member

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PLEASE PRINT

NAME	ADDRESS
<del>9</del> Pat Hunt	1714 S. Spring; <del>Springfield</del> IL
10. Kyle Barry	1 North Old State Capital Plaza, Suite 410, Springfield IL
11. <del>Bob Mosher</del>	5350 Richland Rd Pleasant Plains. <sup>MO 631</sup>
12. Josh Witkowski	2500 W. Lawrence Ave Springfield IL
13. KEVIN BORGIA	3750 LAKE SHORE DR CHICAGO G06013
14. Cathy Bomke	2198 Yankee Town Rd. PLPL IL
15. BRIAN Bomke	2198 Yankee Town Rd PI. Plains IL
16. Will Reynolds	1037 N. 3rd St. Spc. IL

17.

18.

PETITION FOR AMENDMENT TO THE TEXT OF  
THE SANGAMON COUNTY ZONING ORDINANCE  
REGARDING SETBACK REQUIREMENTS FOR  
CHAPTER 17.49  
WIND ENERGY CONVERSION SYSTEMS

TO THE HONORABLE SANGAMON COUNTY BOARD OF SANGAMON  
COUNTY, ILLINOIS; AND

TO THE HONORABLE SANGAMON COUNTY ZONING BOARD OF APPEALS OF  
SANGAMON COUNTY

Here comes the petitioner, Harry "Tom" Fraase, Jr., hereby respectfully request that the proposed text amendments to the Sangamon County Zoning Ordinance, described in Exhibit A attached hereto and made a part hereof, be recommended for approval to the Sangamon County Board, and in support thereof state that:

1. The Sangamon County Board, pursuant to AN ACT IN RELATION TO COUNTY ZONING of the State of Illinois (Illinois Revised Statutes 1967, Chapter 34, Paragraphs 3151 through 3162) adopted a zoning ordinance in April of 1969.
2. In order to make the regulations more effective, it is necessary to make revisions from time to time which solve administrative problems and keep the zoning ordinance up-to-date with current development circumstances.

**WHEREFORE**, petitioner requests that the Zoning Board of Appeals of the County of Sangamon, after proper publication and hearing this petition, recommend approval of the text amendments to the Sangamon County Zoning Ordinance marked Exhibit A and attached hereto and made a part hereof, to the County Board of Sangamon County, Illinois.

## EXHIBIT A

17.49.040 D. Special Requirements WECS are subject to the following requirements:

### 3) Setbacks

- a) perimeter setback – one thousand two hundred feet (1,200'). If the distance from the WECS tower to the WECS site perimeter is less than one thousand two hundred feet (1,200'), the difference may be provided through a setback easement granted to the WECS owner allowing the easement property to be included as part of the one thousand two hundred foot (1,200') setback. The easement shall clearly state that the property may be subject to adverse impacts from the WECS and no habitable structure shall be constructed. The time limit of the setback easement shall be the same as the projected life of the turbine for which the easement is providing a setback. The easement shall not be automatically renewable.
- b) principal structures on each parcel – one thousand feet (1,000') or three (3) times the rotor diameter, whichever is greater.
- c) third party utility lines – 1.1 times the system height.
- d) public road – 1.1 times the system height.
- e) non-participating members property lines – nine (9) times the total height of the wind turbine, from the ground to the tip of the blade at its highest point.
- f) electrical substations – Five thousand (5000) feet from any residences.

**WHEREFORE**, petitioner requests that the County Board of Sangamon County, Illinois, after proper notice and hearing on the petition and recommendation by the Sangamon County Board of Appeals, adopt the text amendments herein requested.

Respectfully submitted,  
Harry "Tom" Fraase, Jr., Member  
of the Sangamon County Board.

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TIM MOORE, CHAIRMAN

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ABE FORSYTH, VICE CHAIRMAN

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GREG STUMPF

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JOHN FULGENZI

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LINDA FULGENZI

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DAVID MENDENHALL

---

SAM SNELL

---

JASON RATTTS

---

LINDA DOUGLAS WILLIAMS

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DATE

## Substantive Items for Discussion Concerning the Sangamon County WECS Ordinance

Prepared by the Springfield-Sangamon County Regional Planning Commission

### Definitions

**Urban Development:** While Sec. D.1. of the ordinance addresses location of WECS in regard to "contiguous urban development", this term is not defined. Since this relates to setbacks from incorporated areas, if left undefined it could have the effect of reducing urban setbacks. The inclusion of language like that offered would help clarify requirements.

Contiguous Urban Development. *Development adjacent or not adjacent to an incorporated area, that makes intensive use of land for the location of buildings, other structures, and impermeable surfaces to such a degree as to be incompatible with the primary use of such land for the production of food, fiber, or other agricultural products, or the extraction of mineral resources, and that, when allowed to spread over wide areas, typically requires urban services.*

**System Height:** The current ordinance does not take into account the full height of the structure inclusive of the turbine blade. Many, if not most, ordinances do. This language would address concerns about turbine blade length and increasing height of towers as newer equipment becomes available. It would also effectively increase setbacks based upon system height.

System Height: *The height above grade of the fixed portion of the tower, excluding the wind turbine itself tower structure plus the turbine blade at its full vertical extension.*

### Site Plan

**Visual Simulation:** Language is intended to help address concerns regarding scenic impact. The inclusion of this language would provide additional information during the review process.

i) A visual simulation of the site showing the placement and height above grade of each WECS tower within the project area such that the visual impact of the project can be reasonably ascertained.

### Location

**Location:** The current ordinance does not take into account the extraterritorial planning jurisdiction of smaller communities. This jurisdiction may exist regardless of municipal population size if certain conditions are met. The change would also reflect more recent changes in state law. While the Sangamon County ordinance appears to be exempt from the state's changes due to a 'grandfathering' provision, it seems reasonable to seek consistency. Please note the relationship of this section to the definition of Contiguous Urban Development offered above.

- 1) Location A WECS shall not be located within one and one-half (1½) miles of an incorporated area with a population over ten thousand (10,000) or within one-half (1/2) mile of an incorporated area with a population of less than ten thousand (10,000). WECS shall not be located so that they interfere with contiguous urban development.

### Setbacks

**Perimeter Setback:** The point has been made that the current ordinance does not take into account the potential growth in the height of turbines that new technology in the industry may allow. The 400' base height provided in this language was drawn from the average tower heights



reported on the market in 2010; the last year for which this data was found. With this language a WECS of 400' or less would require a 1200' setback. But, and as an example, a WECS of 500' would require a 1500' foot setback, or 25% more due to the proportional increase over 400'.

a) perimeter setback – one-thousand-two-hundred-feet (1,200'). For WECS system towers of four hundred feet (400') or less in height, one thousand two hundred feet (1,200'). For WECS system towers greater than four hundred feet (400') in height, the perimeter setback shall be increased in proportion to the height of the WECS above four hundred feet (400').

**Principal Structure Setback:** This language is added to make the section consistent with the proportionality of WECS height to setback established in the section immediately above. As with the previous language, a WECS of 400' or less would require a 1000' setback from a principal structure. But, and for the purpose of providing an example, a 500' WECS would require a 1250' setback, or 25% more due to the proportional increase over 400'.

b) principal structures on each parcel – For WECS systems of four hundred feet (400') or less in height, one thousand feet (1,000') or three (3) times the rotor diameter, whichever is greater. For WECS systems greater than four hundred feet (400') in height, the setback from principal structures shall be increased in proportion to the height of the WECS above four hundred feet (400').

### Annual Review and Reporting [New Section]

**Annual Review and Reporting:** This new language is intended to provide additional public oversight for the project, especially in areas where concerns have been voiced. It is also intended to provide a mechanism by which the County might be informed of operational problems that could affect residents, and the actions taken to address these problems. It establishes: a reporting requirement and the items to be included in the report; a required review by County staff, including on-site review; and requires that the WECS applicant, owner or operator provide access to the site for this review.

Since this is a new task for County staff, it also provides for an annual fee to cover the County's associated costs.

#### 5) Annual Review and Reporting.

a) The applicant, owner and/or operator of a WECS project shall submit to the Sangamon County Department of Zoning on the first Monday of July of each year following WECS project approval by the Sangamon County Board, a report regarding WECS maintenance and operation. This report shall address: (i) any physical modifications to the WECS and/or its infrastructure; (ii) complaints pertaining to setbacks, noise, appearance, safety, lighting, use of public roads, electromagnetic interference, and shadow flicker, received by the applicant, owner and/or operator concerning the WECS, and the resolution of such complaints; (iii) calls for emergency services, including the nature of the emergency and how it was resolved; (iv) status of liability insurance; and (v) any other information that the County might reasonably request.

b) Within 90-days of the receipt of this annual report, the Department of Zoning shall review it, conduct an on-site, field-review of the WECS project, and within 120-days of the receipt of the report, provide a summary of the report and its on-site, field-review to the Sangamon County Board.

c) The Department of Zoning shall charge a fee for this annual review in the amount of no more than one hundred and fifty dollars (\$150.00) per turbine located within the WECS project area. This fee shall be provided to the Department of Zoning by the WECS applicant, owner and/or operator at the time of annual report submission. Failure to provide the annual report and required fee shall be considered a cessation of operations.

d) The applicant, owner and/or operator of a WECS project shall provide that the Sangamon County Department of Zoning have access to the WECS project site for the purposes described in 17.49.040 (D)(5)(b) above. Failure to provide access shall be deemed a violation of this ordinance.

## Use of Public Roads [New Section]

**Public Road Use Plan:** This language is intended to address problems identified in other jurisdictions and allows for better planning of road use and scheduling to reduce user conflicts. It would also provide for improved communication with public safety agencies.

- 3) Submit a public road use plan identifying periods during which roads will be used for transporting WECS or substation parts and/or equipment for construction, operation, or maintenance of the WECS or any substation(s), and any additional information that the County Engineer may request relating to the use of public roads in connection with the construction and/or operation of the WECS project. The Sangamon County Engineer may revise this plan or set restrictions on it so as to establish road use priorities and provide for adequate traffic flow and safety.

## Decommissioning Plan

**Removal Sequence:** The current ordinance does not address removal sequence, and some engineering and planning professionals suggest that it should be addressed. This language would allow for better planning and scheduling of road impacts similar to that during construction.

- 1) Provisions for the removal of structures, debris and cabling on the surface and at least 5' below the surface, and the sequence in which removal is expected to occur;

**Employment of Engineer:** This language allows for the County, rather than the WECS owner/operator, to select the engineer so as to reduce any conflict of interest.

- 3) An estimate of the decommissioning costs certified by a professional engineer in current dollars. The engineer providing this estimate shall be engaged under contract by the Sangamon County Engineer and all costs associated with this engagement shall be born by the applicant;

**Financial Plan:** Concerns have been voiced in other jurisdictions as well as Sangamon County about the establishment of decommissioning costs only at project onset. This language is intended to allow for on-going consideration of decommissioning costs throughout the life of the WECS project as well as periodic adjustments of the decommissioning financial plan.

- 4) A financial plan approved by Sangamon County to ensure funds will be available for decommissioning and land restoration. The applicant shall provide the County with a new estimate of the cost of decommissioning the WECS project every five (5) years under the same conditions as set forth in 17.49.040(L)(3), above. Upon receipt of this new estimate, the County may require, and the applicant, owner and/or operator of the WECS project shall provide, a new financial plan for decommissioning acceptable to the County. Failure to provide an acceptable financial plan shall be considered a cessation of operations;

## Emergency Plan

**Emergency Plan:** This new language clarifies aspects of the required emergency plan, allows for review by affected fire districts, requires the involvement of fire districts in the development of emergency response plans, and establishes a training requirement to be borne by the WECS applicant, owner or operator. It is intended to address concerns voiced by some fire districts.

- f) Emergency plan.
  - 1) The site and emergency plan shall be submitted to the local fire protection district(s) and/or departments whose jurisdiction is included in whole or in part within the WECS project area.
  - 2) The WECS project applicant, owner and/or operator shall cooperate, at its expense, with these fire protection district(s) and/or department(s) in the development of an emergency response plan(s) for the district(s) and/or department(s), and such plan(s) shall be subject to review and approval prior to the issuance of a certificate of compliance.

3) The applicant, owner and/or operator shall take reasonable steps (at the applicant's, owner's and/or operator's expense) to assist any and all requesting district(s) and/or department(s) included in whole and/or part within the WECS project area, to provide training to personnel responsible for emergency response.

### Review

**Special Studies or Other Review:** This permissive language allows the County to recoup the cost of any studies or other staff work that may be required in the plan review process or to expedite plan review.

b) Due to the complexity of the project and the information submitted for review, the County may charge the WECS project applicant, owner and/or operator for the cost of any special analytic or other review needs deemed by the committee to be absolutely necessary and incidental to adequate and timely review.

### Indemnification and Liability

**Indemnification and Liability:** This new section is intended to address questions that have arisen concerning County liability and is intended to provide for County indemnification and establish some liability protection. It also is intended to ensure that the WECS owner/operator maintains insurance sufficient to address any damages to people or property that may be caused by the WECS.

1) The applicant, owner and/or operator of the WECS project shall defend, indemnify and hold harmless the County of Sangamon and its officials from and against any and all claims, demands, losses, lawsuits, causes of action, damages, injuries, costs, expenses and liabilities whatsoever, including attorney's fees, without limitation, arising out of acts or omissions of the applicant, owner and/or operator associated with the construction and/or operation of the WECS project.

2) The applicant, owner and/or operator of the WECS project shall maintain a current general liability policy covering bodily injury and property damage with limits of at least \$2 million per occurrence and \$2 million in the aggregate. Evidence of liability coverage must be reported to the Sangamon County Department of Zoning on an annual basis, and any loss of coverage must be reported within three (3) working days of loss. Failure to maintain coverage shall be considered a cessation of operations.

### Penalties

**Fine:** While no language is suggested for discussion, the County Board should consider whether a fine from \$25 to \$500 is sufficient for offenses committed by operators of WECS. Consideration might be given to establishing different fine limits for the three different classifications of wind energy systems provided in ordinance.

**Table 9. ISO 1996-1971 Recommendations for Community Noise Limits**

District Type	Daytime Limit	Evening Limit (7-11 PM)	Night limit (11 PM – 7 AM)
Rural	35 dB(A)	30 dB(A)	25 dB(A)
Suburban	40 dB(A)	35 dB(A)	30 dB(A)
Urban residential	45 dB(A)	40 dB(A)	35 dB(A)
Urban Mixed	50 dB(A)	45 dB(A)	40 dB(A)

The most comprehensive method combines the district method with specific limits for frequency components in each octave range. The Charter Township of Mundy, MI's noise ordinance contains two tables; one specifying an overall limit, and one specifying octave band limits for each type of district. Table 10 shows an excerpt from Mundy's ordinance.

**Table 10. Mundy Township Octave Band Noise Limits**

District Type		Frequency at center of octave band					Total Noise Limit
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	
Residential	Day	72 dB	71 dB	65 dB	57 dB	51 dB	55 dB(A)
	Night	67 dB	66 dB	60 dB	52 dB	46 dB	50 dB(A)
Agricultural	Day	82 dB	81 dB	75 dB	67 dB	61 dB	65 dB(A)
	Night	72 dB	71 dB	65 dB	57 dB	51 dB	55 dB(A)

Note: The standard practice among noise control engineers is to specify limits for octave band components as unadjusted dB, and limits for total noise exposure as dB(A).

### Engineering Standards

Several organizations have issued recommendations and standards related to noise measurement, assessment and control. Table 11 lists some of the applicable engineering standards.

**Table 11. Noise Control Engineering Standard**

Standard	Title
ASTM E1014-84	Standard Guide for Measurement of Outdoor A-Weighted Sound Level
ISO 9613	Predictive Modeling Standard
IEC 61400-11	Wind turbine generator systems –Part 11: Acoustic noise measurement techniques
ISO 1996-1971	Recommendations for Community Noise Limits
ANSI S1.4-1983	Specifications for Sound Level Meters
ANSI S12.18-1994	Procedures for Outdoor Measurement of Sound Pressure Levels

*WWW.MAINE.GOV/DOC/MRS/WINDPOWER/PUBS/PDF/  
ADDRESSINGWINDTURBINENOISE.PDF*

# About Decibels (dB)

Prepared by Gregg Vanderheiden Ph.D.  
Trace R&D Center University of Wisconsin-Madison

## What is a Decibel (dB)?

A dB or Decibel is a logarithmic unit of measure of the ratio between two numbers.

## dB and Power (20dB = 100x)

When talking about power, 3dB represents a ratio of two to one or a doubling of power.

- Thus, a gain of 10dB would represent a ratio of ten to one for power - so 10 dB be 10 times the power
- A 40dB power gain would be 10,000 times the power.

## dB and Voltage gain (20dB = 10x)

When talking about voltage, 6dB represents a ratio of two to one or a doubling of voltage.

- 20dB would represent a ratio of ten to one for voltage - so 20 dB would be 10 times the voltage.
- A 40dB voltage gain would be 100 times the voltage.

## dB SPL (Sound Pressure Level) (20dB = 10x)

The term "SPL" stands for sound pressure level. SPL measures are taken with respect to the minimum threshold for human hearing. A 20 dB difference in SPL represents a ratio of ten-to-one in sound pressure.

- Thus, a 40dB SPL would be a sound pressure level that is 100 times greater than the sound pressure level of the quietest sound that normal human hearing can detect.

## Perception of Loudness (20dB = 4x)

Interestingly, our perception of loudness is not the same as sound pressure level. Although the actual formulae is somewhat complex, as a rough rule of thumb, an increase of 10db SPL is perceived to be approximately twice as loud.

- Thus a 20 Db gain would seem to be about 4 times as loud.
- And a 40 Db gain would seem to be about 16 times as loud.

## dB SPL in Real Life

To give you an idea of how a dB SPL measurements relate to daily life, a listing of the approximate sound pressure level for various sounds is provided below. (From <http://www.state.me.us/spo/landuse/docs/NoiseTABulletin.pdf> - with the "Approximate Loudness" column added) (see also **dB SPL** and **dB(A) SPL** discussion on next page)

Sound Environment	Sound Pressure Level (dBA SPL)	Approximate loudness with regard to ordinary conversation
Threshold of hearing	0	Don't hear anything
Broadcast studio interior or rustling leaves	10	1/32nd as loud as conversation
Quiet house interior or rural nighttime	20	1/16th as loud
Quiet office interior or watch ticking	30	1/8th as loud
Quiet rural area or small theater	40	1/4th as loud
Quiet suburban area or dishwasher in next room	50	1/2 as loud
Office interior or ordinary conversation	60	Ordinary Conversation
Vacuum cleaner at 10 ft.	70	Twice as loud
Passing car at 10 ft. or garbage disposal at 3 ft	80	4 times as loud
Passing bus or truck at 10 ft. or food blender at 3 ft.	90	8 times as loud
Passing subway train at 10 ft. or gas lawn mower at 3 ft.	100	16 times as loud
Night club with band playing	110	32 times as loud
Threshold of pain	120	64 times as loud as conversation (twice as loud as night club)

## Where to get more information

A good resource on this topic (referred to from the [Acoustical Society of America Site](#))

- [Acoustics FAQ](#)

## What is difference between dB SPL and dB(A) SPL?

The following is from the [Acoustics FAQ](#). A sound level meter that measures the sound pressure level with a "flat" response will indicate the strength of low frequency sound with the same emphasis as higher frequency sounds. Yet our ear perceives low frequency sound to be of less loudness than higher frequency sound. The eardrum-stapes-circular window system behaves like a mechanical transformer with a finite pass band. In EE parlance, the "3 dB" rollover frequencies are approximately 500 Hz on the low end and 8 kHz on the high end. By using an electronic filter of attenuation equal to that apparently offered by the human ear for sound each frequency (the 40-phon response curve), the sound level meter will now report a numerical value proportional to the human perception of the strength of that sound independent of frequency. Section 8.2 shows a table of these weightings.

Unfortunately, human perception of loudness vis-à-vis frequency changes with loudness. When sound is very loud - 100 dB or more, the perception of loudness is more consistent across the audible frequency band. "B" and "C" Weightings reflect this trend. "B" Weighting is now little-used, but C-Weighting has achieved prominence in evaluating annoying community noises such as low frequency sound emitted by artillery fire and outdoor rock concerts. C-Weighting is also tabulated in 8.2.

The first electrical sound meter was reported by George W Pierce in Proceedings of the American Academy of Arts and Sciences, v 43 (1907-8) A couple of decades later the switch from horse-drawn vehicles to automobiles in cities led to large changes in the background noise climate. The advent of "talkies" - film sound - was a big stimulus to sound meter patents of the time, but there was still no standard method of sound measurement. "Noise" (unwanted sound) became a public issue.

The first tentative standard for sound level meters (Z24.3) was published by the American Standards Association in 1936, sponsored by the Acoustical Society of America. The tentative standard shows two frequency weighting curves "A" and "B" which were modeled on the response of the human ear to low and high levels of sound respectively.

With the coming of the Walsh-Healy act in 1969, the A-Weighting of sound was defacto presumed to be the "appropriate" weighting to represent sound level as a single number (rather than as a spectrum). With the advent of US FAA and US EPA interests in the '70's, the dBA metric was also adapted by them. (Along with the dBA metric has come an associated shortfall in precision in accurately representing the capacity of a given sound to produce hearing loss and the capacity to create annoyance.)

[Editor's Note: A single number metric such as dBA is more easily understood by legal and

administrative officials, so that promulgation, enforcement and administrative criteria and actions are understandable by more parties, often at the expense of a more precise comprehension and engineering action capability. For instance, enforcement may be on a dBA basis, but noise control design demands the octave-band or even third-octave band spectral data metric.]

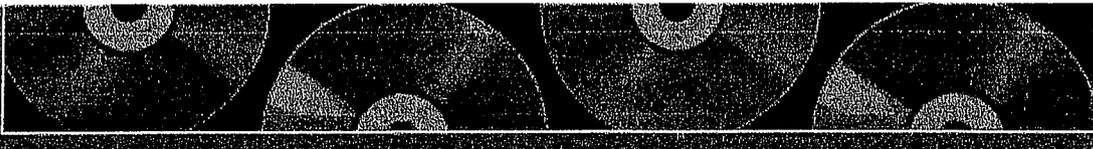
The most commonly referenced weighting is "A-Weighting" dB(A), which is similar to that originally defined as Curve "A" in the 1936 standard. "C-Weighting" dB(C), which is used occasionally, has a relatively flat response. "U-Weighting" is a recent weighting which is used for measuring audible sound in the presence of ultrasound, and can be combined with A-Weighting to give AU-Weighting. The A-Weighting formula is given in section 8 of this FAQ file.

In addition to frequency weighting, sound pressure level measurement can be time-weighted as the "Fast", "Slow" or "Impulse" response. Measurements of sound pressure level with A-Weighting and fast response are also known as the "sound level".

Many modern sound level meters can measure the average sound energy over a given time. this metric is called the "equivalent continuous sound level" (L<sub>sub eq</sub>). More recently, it has become customary in some circles to presume that this sound measurement was A-Weighted if no weighting descriptor is listed.

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## HOW-TO'S

### Decibel (Loudness) Comparison Chart

Here are some interesting numbers, collected from a variety of sources, that help one to understand the volume levels of various sources and how they can affect our hearing.

Environmental Noise	
Weakest sound heard	0dB
Whisper Quiet Library	30dB
Normal conversation (3-5')	60-70dB
Telephone dial tone	80dB
City Traffic (inside car)	85dB
Train whistle at 500', Truck Traffic	90dB
Subway train at 200'	95dB
<i>Level at which sustained exposure may result in hearing loss</i>	<i>90 - 95dB</i>
Power mower at 3'	107dB
Snowmobile, Motorcycle	100dB
Power saw at 3'	110dB
Sandblasting, Loud Rock Concert	115dB
<i>Pain begins</i>	<i>125dB</i>
Pneumatic riveter at 4'	125dB
<i>Even short term exposure can cause permanent damage - Loudest recommended exposure WITH hearing protection</i>	<i>140dB</i>
Jet engine at 100', Gun Blast	140dB
Death of hearing tissue	180dB
Loudest sound possible	194dB

OSHA Daily Permissible Noise Level Exposure	
Hours per day	Sound level
8	90dB
6	92dB
4	95dB
3	97dB
2	100dB
1.5	102dB
1	105dB
.5	110dB

.25 or less	115dB
-------------	-------

Perceptions of Increases in Decibel Level	
Imperceptible Change	1dB
Barely Perceptible Change	3dB
Clearly Noticeable Change	5dB
About Twice as Loud	10dB
About Four Times as Loud	20dB

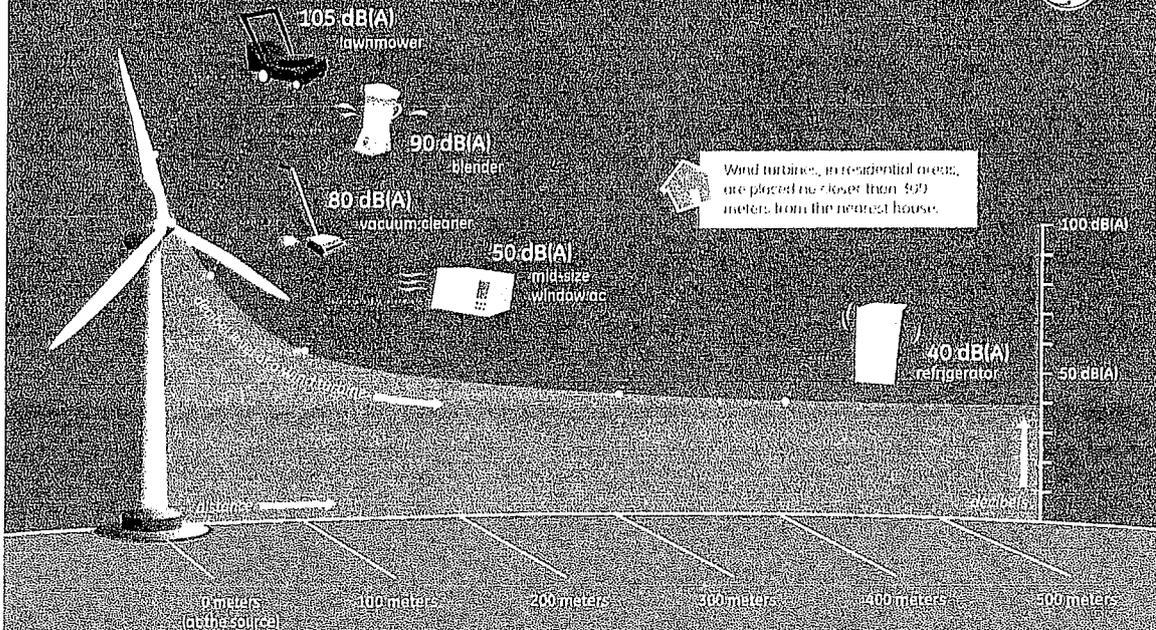
Sound Levels of Music	
Normal piano practice	60 -70dB
Fortissimo Singer, 3'	70dB
Chamber music, small auditorium	75 - 85dB
Piano Fortissimo	84 - 103dB
Violin	82 - 92dB
Cello	85 -111dB
Oboe	95-112dB
Flute	92 -103dB
Piccolo	90 -106dB
Clarinet	85 - 114dB
French horn	90 - 106dB
Trombone	85 - 114dB
Tympani & bass drum	106dB
Walkman on 5/10	94dB
Symphonic music peak	120 - 137dB
Amplifier rock, 4-6'	120dB
Rock music peak	150dB

## NOTES:

- One-third of the total power of a 75-piece orchestra comes from the bass drum.
- High frequency sounds of 2-4,000 Hz are the most damaging. The uppermost octave of the piccolo is 2,048-4,096 Hz.
- Aging causes gradual hearing loss, mostly in the high frequencies.
- Speech reception is not seriously impaired until there is about 30 dB loss; by that time severe damage may have occurred.
- Hypertension and various psychological difficulties can be related to noise exposure.
- The incidence of hearing loss in classical musicians has been estimated at 4-43%, in rock musicians 13-30%.

Statistics for the Decibel (Loudness) Comparison Chart were taken from a study by Marshall Chasin , M.Sc., Aud(C), FAAA, Centre for Human Performance & Health, Ontario, Canada. There were some conflicting readings and, in many cases, authors did not specify at what distance the readings were taken or what the musician was actually playing. In general, when there were several readings, the higher one was chosen.

# How Loud Is A Wind Turbine?



SOURCE: GE Global Research, National Institute of Deafness and Other Communication Disorders (NIDCD part of NIH)

## Sangamon Winds' Comments on the Sangamon County Ordinance

**Issue:** Focus of setbacks in current ordinance is on property lines instead of residences.

Currently the setback to "Primary Structures" is 1000ft while the setback to a non-participating property line is 1200ft ("perimeter setback").

**Proposed Improvement:** Increase setback to residences; adjust setback to property lines.

This would be accomplished through the following steps:

1. Replace the term "Primary Structure" in Section D(3)(b) with "Residential Structure."
2. **Increase** the setback to a "Residential Structure" in Section D(3)(b) to "1800ft or 3x the total WECS height, whichever is greater."
3. Remove the term "perimeter setback" and replace it with "setback to non-participating property lines."
4. Change the setback to non-participating property lines to 1.1x the total WECS height.

### **Justification For Changes:**

Most of the concerns raised about setbacks relate to proximity of the wind turbines to individual homes. To address these concerns, it seems logical to increase the setback to the homes. We propose an **80% increase** in the setback distance to individual homes and a height multiplier that will insure longevity of the rule change. This 1800 ft setback will be the largest in the State.

The adoption of an 1800 ft setback to residences also has the benefit of reducing the visual impact below that of the anticipated visual impact when the ordinance was adopted. The attached graphic is drawn to scale and it demonstrates that the additional distance will cause a 500ft turbine to appear smaller than a 390 ft turbine when viewed from a residence.

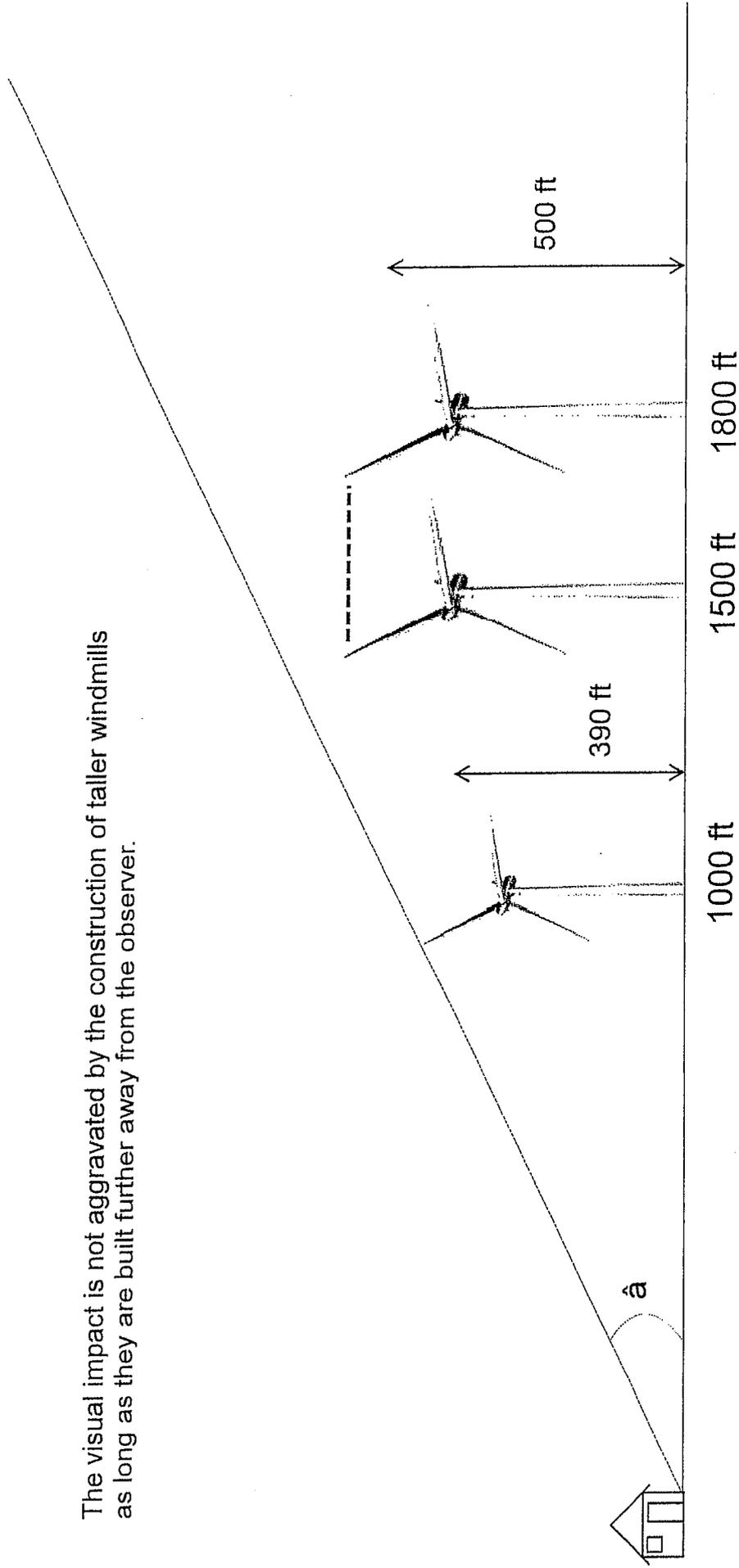
Adjusting the setback to non-participating property lines is consistent with standard practice in Illinois, standard operating procedures and supported by precedent. All other counties in the State of Illinois, including those with operational wind farms, use a much shorter property line setback. The Illinois Institute for Rural Affairs compiled information from the existing ordinances across Illinois. Of the 58 other ordinances in Illinois, only three had setbacks greater than 1.1x the height – one county uses a setback of 1.25x height, another uses a setback of height + 100ft, and Peoria County uses a setback of 750ft). The property line setback in Sangamon County's ordinance is therefore more than double the standard property line setback.

We therefore propose that Sangamon County adopt a setback to non-participating landowners of 1.1x the height of the WECS. This setback would align Sangamon County with the vast majority of other counties which use a standard that is widely accepted and working well in practice.

In addition, other county boards, including McLean County, have, in approving special use permits for wind projects, specifically found that similar property line setbacks have the positive effect of helping preserve farmland in areas zoned agriculture because they limit other types of development in those areas. These other counties have recognized that wind farms are not only compatible with agriculture, they complement agricultural uses.

# Windmills' Visual Impact

The visual impact is not aggravated by the construction of taller windmills as long as they are built further away from the observer.



**Tax Impact Estimate for Sangamon Wind**

According to the Illinois Department of Revenue, the assessed value for each wind energy device is \$119,988 per megawatt. This assessed value is based on fair market value (set by law at \$360,000 per MW) multiplied by 0.3333

To calculate the affect on a taxing district you would use the following formula:

$$\text{\$119,988 X Rate} = \text{Tax dollars per megawatt X number of megawatts in the particular taxing district}$$

For example purposes, assuing 100 turbines at 2 MW each in Cartwright Township:

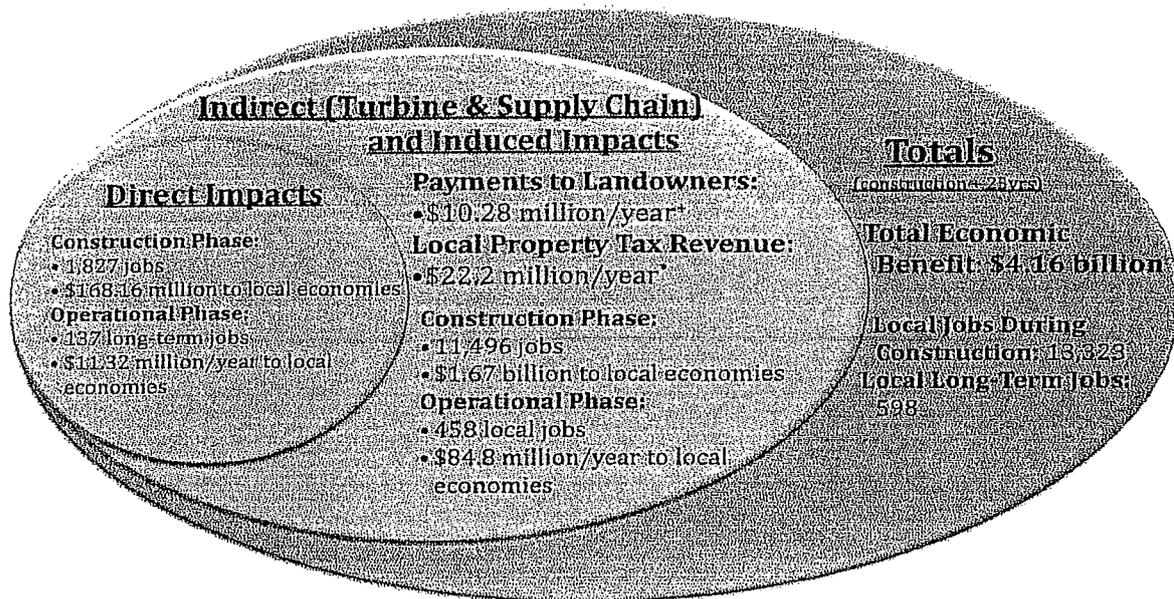
Assessed Value	Tax Rate	# of Turbines	MW rating for Turbine	Total Tax	Tax Per Megawatt
Pleasant Plains School Unit #8 119,988	0.051863	100	2	\$1,244,587.53	\$6,222.94
Sangamon County 119,988	0.006901	100	2	\$165,607.44	\$828.04
Cartwright Road and Bridge 119,988	0.008077	100	2	\$193,828.62	\$969.14
Cartwright Township 119,988	0.003866	100	2	\$92,774.72	\$463.87
Lincoln Land Community College 119,988	0.004604	100	2	\$110,484.95	\$552.42
Pleasant Plains Fire Dept 119,988	0.002572	100	2	\$61,721.83	\$308.61
Prairie Skies Library 119,988	0.001714	100	2	\$41,131.89	\$205.66
				\$1,910,136.97	\$9,550.68

This analysis does not factor in physical depreciation or trending factors, which are state-allowed factors that can either increase or decrease the assessed valuation of a turbine over time.

## Economic benefits of wind farms in the local community

According to an analysis<sup>1</sup> done by The Center for Renewable Energy at Illinois State University the 17 largest wind farms in Illinois<sup>2</sup>:

- Created approx. 13,323 full-time equivalent jobs during construction periods with a total payroll of over \$762 million
- Supports approx. 598 permanent jobs in rural IL areas with a total annual payroll of over \$35 million
- Supports local economies by generating \$22 million in annual property taxes
- Generates \$10 million annually in income for IL landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of \$4.1 billion over the life of the projects



3

“Wind turbines raise the property tax base of the county, creating a new revenue source...”<sup>4</sup>

Increased tax revenue can help the following public services:

- School districts
- Road improvements
- Hospitals
- Fire & Rescue

<sup>1</sup> The Center for Renewable Energy used data from wind farms and the Department of Energy's JEDI Model (Jobs and Economic Development) to come up with the impact of wind development in Illinois.

<sup>2</sup> The 17 largest wind farms are 50 megawatts or greater.

<sup>3</sup> Pg 7, *Economic Impact: Wind Energy Development in Illinois*, David Loomis, Ph.D. & Jason Carter, Center for Renewable Energy at Illinois State University

<sup>4</sup> Pg 23, *Economic Impact: Wind Energy Development in Illinois*, Loomis & Carter, Center for Renewable Energy at Illinois State University

REPORT ON THE IMPACT OF SETBACK REQUIREMENTS  
AND NOISE LIMITATIONS IN WIND ZONES  
IN MICHIGAN  
WWW.MICHIGAN.GOV/DOCUMENTS/MPSC/  
WERZB\_RPT\_01-2010\_309001\_7.PDF Appendix A

**Summary of Recent Economic and Employment Impact Studies  
for Michigan Energy Policy Analysis**

Study author(s), year, publishing organization	Synopsis: scope, major findings
Miller, Wie, and Rose, 2010, Michigan State University, Center for Economic Analysis.	Uses REMI <sup>1</sup> modeling to analyze economic and employment impacts of various measures included in Michigan Climate Action Council recommendations. Analysis includes estimates of impacts based on modeling the state's Renewable Portfolio Standard of 25% by 2025 and a Distributed Generation "Carve-Out" policy. Estimates this policy can be used to reduce greenhouse gas emissions by 12.88 million tons of carbon dioxide equivalent by 2025, at an average cost of \$41.14 per ton. Estimates between 2,000 and 6,000 added Michigan jobs associated with this measure, by 2025, and a positive net present value impact on the state's economy of \$1.4 billion.
U.S. Department of Energy, 2008.	Analyzes a scenario where 20% of U.S. electricity needs would be provided by wind energy by 2030. Appendix C covers <i>Wind Related Jobs and Economic Development</i> . Explores economic and employment impacts in wind energy manufacturing, construction, and operations, with some data presented by region. Expects Michigan would be one of eight states with more than 10,000 MW of installed wind capacity by 2030. Concludes Michigan is one of four states slated to gain more than 30,000 manufacturing jobs by 2030.
Edison, Elliott, Fischlowitz-Roberts et al., 2007, University of Michigan, Center for Sustainable Systems	REMI modeling of Michigan economy, primarily for greenhouse gas emissions reductions. Michigan RPS (10% by 2015 and 20% by 2025), plus stronger appliance and building energy efficiency standards. Modeling to reflect analysis in 21CEP. Average annual gain in gross state product: \$156.9 million. Average annual gain in employment (job-years): 1,962.
Laitner and Kushler, 2007, American Council for an Energy Efficient Economy	Uses IMPLAN <sup>2</sup> data for Michigan and modeling based on proposals presented in Michigan's 21 <sup>st</sup> Century Electric Energy Plan. When compared from 2008–2023 to a 'business-as-usual' plan involving traditional utility power plants, benefits of a portfolio incorporating energy efficiency and renewable resources include: net cumulative savings of \$2.6 billion or more; net annual employment increase between 3,900 and 10,000 jobs; and a reduction of air emissions from conventional power plants of 15-28%. The large range in outcomes results from modeling both the recommended scenario from Michigan's 21 <sup>st</sup> Century Electric Energy Plan and also roughly double the Plan's proposed energy efficiency program.
Madsen, Telleen-Lawton and Shriberg, 2007, Environment Michigan Research and Policy Center	REMI modeling of Michigan reflects a 25% RPS by 2025 plus \$225 million annual energy efficiency program spending. Results show cumulative Michigan energy cost savings of \$2.2 billion through 2020; \$3.3 billion in increased wages; and 88,000 person-years of new Michigan employment through 2020 (about 7,000 jobs).
Polich, Amlin, Levesque et al., 2007, Michigan Department of Environmental Quality and NextEnergy Center	REMI modeling of Michigan to reflect analysis in the state's 21 <sup>st</sup> Century Electric Energy Plan. Modeled 7% RPS by 2016 or 15% by 2025. Findings show: \$750 million to \$1.1 billion gain in gross state product (GSP); \$415 to \$664 million increase in disposable income. RPS alone would achieve \$200-\$500 million gain in GSP, but minus \$229 to \$100 million in real disposable income (0.006% to 0.002%), due to higher projected electricity costs. The RPS alone would net the state 2,000 to 6,400 jobs, compared to 11,000 to 17,000 jobs if combined with energy efficiency.

Study author(s), year, publishing organization	Synopsis: scope, major findings
Union_of_Concerned_Scientists, 2007	Analyzes Michigan impacts from national RPS of 20% by 2020. Concludes Michigan will gain: \$818 million new capital investment; \$377 million income to rural landowners; \$24 million local tax revenues; \$160 million lower electric and gas utility bills; and net 3,540 jobs. Estimates Michigan would rank 7 <sup>th</sup> in the U.S. for renewable energy manufacturing, with 1,625 Michigan jobs.
Sterzinger and Stevens, 2006, Renewable Energy Policy Project	Analyzes adding 18,500 MW of new renewable energy in the U.S. each year for 10 consecutive years, in order to create one global climate change stabilization wedge. <sup>3</sup> Assesses component parts of renewable electric generating technologies (biomass, geothermal, solar, and wind), and then analyzes manufacturers of each component, by NAICS code <sup>4</sup> and market share data, to assign national demand to states and then counties. Concludes Michigan ranks 9 <sup>th</sup> in the U.S. for renewable energy jobs gains and 7 <sup>th</sup> for potential investment. Finds Michigan currently has >2,000 firms in the relevant NAICS sectors. Estimates 34,777 Michigan jobs would be created, with \$5.3 billion invested in manufacturing components.
Tegen, 2006, National Renewable Energy Laboratory and Wind Powering America	Compares a new 250 MW, 80% capacity factor coal plant to 715 MW of wind generation with 28% capacity factor, for economic and employment impacts for Michigan. Uses the jobs and economic development impacts (JEDI) model. <sup>5</sup> Finds over 20 years, wind energy generates twice the economic and employment impacts as coal, not counting wind equipment manufacturing jobs. Wind scores slightly higher than coal during construction, but generates more O&M jobs.
Kammen, Kapadia and Fripp, 2004, Renewable and Appropriate Technology Laboratory, University of California, Berkeley	Reviewed 13 other studies from 1999 to 2004. Completed U.S. economy-wide analysis of a 20% RPS by 2020. Major finding: "Expanding the use of renewable energy is not only good for our energy self-sufficiency and the environment; it also has a significant positive impact on employment" (p. 1). Renewable energy, modeled in three scenarios and compared to two fossil fuel scenarios, creates 1.9 to 2.1 times more life-cycle jobs.
Union_of_Concerned_Scientists, 2004	Analyzes Michigan impacts from a national RPS of 20% by 2020, using 2004 EIA NEMS <sup>6</sup> model with UCS renewable energy assumptions. Benefits to Michigan of the added renewable energy include: \$1.2 billion in new capital investment; \$429 million in income to farmers and rural landowners; \$83 million in new local tax revenues; \$1.7 billion in lower electricity and natural gas bills; and 4,950 new jobs. Expects renewable energy produces 2.3 times as many jobs as fossil fuels.
Hewings, Yanai, Learner et al., 2001, Environmental Law and Policy Center	Modeled a 20-year implementation strategy including performance targets for efficiency (17% demand reduction by 2010; 28% by 2020) and renewables (8% by 2010; 22% by 2020). Covered ten Midwestern states, including Michigan. Michigan findings include: Energy efficiency modeled brings \$1.3 billion increased annual economic output and 16,100 new jobs by 2010. By 2020, \$2.4 billion annual economic output and 29,100 new jobs. Renewable energy modeled brings \$400 million and 4,100 new jobs by 2010 and \$1 billion and 9,100 new jobs by 2020.

