

**MINUTES
LANCASTER COUNTY BOARD OF COMMISSIONERS
COUNTY-CITY BUILDING, ROOM 112
TUESDAY, FEBRUARY 19, 2019
9:00 A.M.**

Advance public notice of the Board of Commissioners meeting was posted on the County-City Building bulletin board and the Lancaster County, Nebraska, web site and emailed to the media on February 15, 2019.

Commissioners present: Jennifer Brinkman, Chair; Roma Amundson, Vice Chair; Sean Flowerday, Deb Schorr and Rick Vest

Others present: Kerry Eagan, Chief Administrative Officer; Ann Ames, Deputy Chief Administrative Officer; Jenifer Holloway, Deputy County Attorney; Dan Nolte, County Clerk; Cori Beattie, Deputy County Clerk; and Monét McCullen, County Clerk's Office

The meeting was called to order at 9:00 a.m., the Pledge of Allegiance was recited and the location of the Nebraska Open Meetings Act was announced.

1) MINUTES:

- A. Approval of the minutes of the Board of Commissioners meeting held on Tuesday, February 12, 2019.**

MOTION: Schorr moved and Vest seconded approval of the minutes. Schorr, Flowerday, Amundson, Vest and Brinkman voted yes. Motion carried 5-0.

2) CLAIMS:

- A. Approval of all claims processed through February 19, 2019.**

MOTION: Amundson moved and Schorr seconded approval of the claims. Vest, Schorr, Flowerday, Amundson and Brinkman voted yes. Motion carried 5-0.

- 3) CONSENT ITEMS: These are routine business items that are expected to be adopted without dissent. Any individual item may be removed for special discussion and consideration by a Commissioner or by any member of the public without prior notice. Unless there is an exception, these items will be approved as one with a single vote of the Board of Commissioners. These items are approval of:**

- A. Amendments to the following County contracts:**

- 1. C-15-0199 with Midwest Floor Covering, Inc., for Floor Coverings. (The County is using the University of Nebraska RFP No. 2483-15-7215. The amendment renews the contract from March 1, 2019 through February 29, 2020. The estimated cost to the County is not to exceed \$2,500.) (C-19-0088)**

2. **C-17-0181 with Sunset Law Enforcement for Annual Supply - Ammunition. (Bid No. 17-036. The amendment renews the contract from March 7, 2019 through March 6, 2020 with a price increase. The cost to the County is not to exceed \$18,000.) (C-19-0089)**
 3. **C-16-0069 with Matheson-Trigas for Annual Service – Rental and Service of Industrial Gases. (Quote 5201. The amendment renews the contract from February 11, 2019 through February 10, 2020 with a price increase. The cost to the County is not to exceed \$5,000.) (C-19-0092)**
 4. **C-18-0111 with Mid-Continent Safety, DXP (DXP Enterprises INC) for Annual Supply - Personal Protective Equipment (PPE) and First Aid Supplies. (Bid No. 18-021. The amendment renews the contract from March 20, 2019 through March 20, 2020. The cost to the County shall not exceed \$1,200.) (C-19-0093)**
 5. **C-18-0167 with Inteconnect for the Commercial Grade Door Security Access Control System and Service. (Bid No. 18-044. The amendment renews the contract from March 1, 2019 through February 29, 2020. The estimated cost to the County is not to exceed \$15,000.) (C-19-0094)**
 6. **C-16-0526 with Information First, Inc., for professional services on an as needed basis to support the County’s use of HPR RM. (The amendment extends the contract term from March 6, 2019 through March 5, 2020. The cost to the County is not to exceed \$5,000.) (C-19-0095)**
 7. **C-17-0021 with The Overhead Door Co. of Lincoln, Inc., for Unit Price – Overhead Door - Repair and Replacement Services. (Bid No. 16-289. The amendment renews the contract from March 1, 2019 through February 28, 2021. The cost to the County is not to exceed \$60,000.) (C-19-0098)**
 8. **C-18-0668 with Schmader Electric Construction for Outdoor Warning Siren and Installation. (Bid No. 18-240. The amendment extends the contract from February 15, 2019 through March 15, 2019. There is no additional cost to the contract for this extension.) (C-19-0099)**
- B. Change Order to County Contract C-18-0610 with Intuition & Logic Inc., for an increase of \$2,500 due to the Lower Platte South Natural Resources District requested the construction oversight service costs be split based on construction area. (C-19-0096)**
- C. Received and placed on file notice of termination of County Contract C-15-0147 with Uniforms Manufacturing Inc.**

MOTION: Vest moved and Amundson seconded approval of the consent items. Amundson, Vest, Schorr, Flowerday and Brinkman voted yes. Motion carried 5-0.

4) SPECIAL PRESENTATION:

- A. City/County Employee Health & Wellness Fair – Sue Eckley, Lancaster County Risk Manager; and Angelina Stovall-Amos, City-County Employee Health & Wellness Coordinator.**

Sue Eckley, Lancaster County Risk Manager, said the Wellness Fair has vendors that range from food, nutrition and financial wellness. This event is also open to the public.

Angelina Stovall-Amos, City-County Employee Health & Wellness Coordinator, gave a brief overview of the Health & Wellness Fair.

B. Recognition of National Engineers Week – Pam Dingman, County Engineer.

Pam Dingman, Lancaster County Engineer, said this year's sponsoring organization is the Society of Women Engineers. Dingman gave a brief overview of the history on female engineers.

5) NEW BUSINESS:

A. Contracts for Unit Price - Security and Surveillance Installation, Maintenance, Service and Repair (Bid No. 19-022). The contracts are for a two-year term effective upon execution. The cost to the County shall not exceed a total amount of \$30,000 with the following:

- 1. Audio Marketing Solutions dba Americom Communications Corporation. (C-19-0090)**
- 2. Inteconnect Inc. dba Inteconnex (C-19-0091)**

MOTION: Amundson moved and Vest seconded approval of the contracts. Flowerday, Amundson, Vest, Schorr and Brinkman voted yes. Motion carried 5-0.

B. Agreement with Felsburg Holt & Ullevig for NEPA services for a federal-aid transportation project between South 27th Street and South 68th Street on Saltillo Road (Project No. HSIP-5280(2)). The cost to the County is \$113,571.88. (C-19-0097)

MOTION: Schorr moved and Amundson seconded approval of the agreement. Schorr, Flowerday, Amundson, Vest and Brinkman voted yes. Motion carried 5-0.

C. Recommendation from the Purchasing Agent and Lancaster County Engineer to award a contract to Yost Excavating, Inc., for culvert maintenance 2019 (Phase I, Project 19-07, Bid No. 19-049.) The total amount is \$577,733.61. (B-19-0049)

MOTION: Flowerday moved and Vest seconded approval of the recommendation. Vest, Schorr, Flowerday, Amundson and Brinkman voted yes. Motion carried 5-0.

D. Resolution regarding County Text Amendment No. 18016 amending the Lancaster County Zoning Resolution, Section 13.048 Commercial Wind Energy Conversion Systems, as provided in Attachments A and B. (R-19-0010) (Note: Action on this Item will follow correlating item 8A – Public Hearing)

Action on this item was deferred until after the public hearing (See item 8A)

- 6) **PUBLIC COMMENT:** Those wishing to speak on items relating to County business not on the agenda may do so at this time.

No one appeared for public comment.

Commissioner Schorr left the room at 9:11 a.m. and returned at 9:12 a.m.

7) **ANNOUNCEMENTS:**

- A. **The Lancaster County Board of Commissioners will hold a staff meeting on Thursday, February 21, 2019 at 8:30 a.m., in the Bill Luxford Studio (Room 113) of the County-City Building (555 S. 10th Street, Lincoln).**
- B. **The Lancaster County Board of Commissioners will hold its next regular meeting on Tuesday, February 26, 2019 at 9:00 a.m., in Room 112 of the County-City Building (555 S. 10th Street, Lincoln).**
- C. **The Lancaster County Board of Commissioners will hold a public hearing on Tuesday, February 26, 2019 at 9:00 a.m. in Room 112 of the County-City Building (555 S 10th Street, Lincoln) regarding a manager application for Fred A. Gertsch in connection with a Class Y liquor license for Prime Country Winery LLC, 12120 Southwest 142nd Street, Denton.**
- D. **County Commissioners can be reached at 402-441-7447 or commish@lancaster.ne.gov.**
- E. **The Lancaster County Board of Commissioners meeting is broadcast live on LNKTv City. For the rebroadcast schedule visit lincoln.ne.gov (keyword: LNKTv). Meetings are also streamed live on LNKTv and can be viewed on YouTube (LNKTvcity).**

8) **PUBLIC HEARING:**

- A. **County Text Amendment No. 18016 amending the Lancaster County Zoning Resolution, Section 13.048 Commercial Wind Energy Conversion Systems. (See correlating item 5D)**

The Chair read opening remarks and opened the public hearing.

Tom Cajka, Lincoln-Lancaster County Planning Department, was administered the oath and reviewed the original proposed changes (Exhibit A) and the recommended alternative proposal that was approved by Planning Staff and the Planning Commission (Exhibit B).

Ann Post, Baylor Evnen Law, 1248 O Street, was administered the oath and appeared on behalf of the applicant, Prairie Wind Watchers. She discussed the original and alternative proposals and noted the applicant is also requesting an additional amendment which will be further addressed by her colleague.

Mark Hunzeker, Baylor Evnen Law, 1248 O Street, was administered the oath and appeared on behalf of the applicant, Prairie Wind Watchers. He discussed a proposed new amendment which includes a one-mile setback from a dwelling on a non-participating lot. (Exhibit C).

The following individuals appeared in support and were administered the oath.

Yvonne Mihulka-Poole, 2331 W. Ash Road, Cortland (Exhibit D). Mihulka-Poole read a letter into the record by Stephanie Hamel (Exhibit E)

Joe Dabbs, 26240 SW 86th Street, Hallam, Nebraska

Joetta Schwaninger, 3750 W. Hallam Road, Hallam, Nebraska (Exhibit F)

Curtis Schwaninger, 3750 W. Hallam Road, Hallam, Nebraska (Exhibit G)

Mike Woodward, 2750 SW 14th Road, Cortland, Nebraska (Exhibit H)

Larry Alder, 2498 W. Ash Road, Cortland, Nebraska (Exhibit I)

Charlotte Newman, 1500 Pella Road, Martell, Nebraska (Exhibit J)

Larry Newman, 1500 Pella Road, Martell, Nebraska (Exhibit K)

The following individuals appeared in opposition and were administered the oath.

Russell Miller, 341 S 52nd Street, Lincoln, Nebraska (Exhibit L)

Matthew Gregory, Nebraska Farmers Union, 1305 Plum Street, Lincoln, Nebraska

David Levy, Baird Holm Law, 1700 Farnam Street, Omaha, Nebraska, appeared on behalf of Next Era, and said Next Era supports the Planning staff's alternative recommendation, but requested the Board not to add the additional one-mile setback as there are a number of regulations in place that will protect property owners of any noise annoyance.

Vest asked how much of an impact the one-mile setback would have on Next Era. Levy said there could be some negative impact, although, that is difficult to determine at this time. Quieter turbines could be available in the future and a one-mile regulation could limit Next Era's options.

Schorr questioned whether the one-mile setback would make monitoring easier since decibel levels can vary and the cost for noise models falls on the applicant. Levy said that would only make sense if the one-mile setback was being replaced with the noise decibel level, otherwise, it is a dual standard.

Brinkman asked for clarification regarding previous testimony on noise levels. Levy stated there are professionals and computer programs which perform conservative noise modeling. He added while this can be a complex process, it is commonly used and, in his opinion, it is not too difficult.

David Kuhn, Next Era Energy, 700 Universe Boulevard, Juno Beach, Florida, discussed turbine models and noise levels. He clarified that the louder turbines were used for the noise study and felt if a turbine was quieter and met all other requirements to protect non-participating land owners, then there should not be the additional one-mile setback.

In response to Vest's inquiry about the setback impact, Kuhn explained it would remove the developer's flexibility to choose a quieter turbine and be able to gain any type of benefit in terms of siting criteria.

No one appeared in a neutral position.

The Chair invited the applicant to provide rebuttal.

Hunzeker said this is the first that Next Era has mentioned the potential of new technology and quieter turbines. The one-mile setback still gives the property owners some assurance that they will not be impacted.

Amundson asked when Next Era was working with the Health Department was there ever any indication of future technology or the type of turbine that would be used.

Chris Schroeder, Lincoln-Lancaster County Health Department, was administered the oath and said Next Era did indicate they planned to use one of the louder turbines currently available.

Flowerday agreed that new wind farm technology is possible in the future. He felt there is no harm from distance and he encouraged his colleagues to vote on the actual danger which is the sound levels as the distance could become irrelevant in the future.

The Chair closed the public hearing.

The Clerk read correlating item 5D.

MOTION: Flowerday moved and Brinkman seconded to deny the original text amendment and accept the recommended alternative proposal approved by the Planning Commission without further setbacks.

MOTION TO AMEND: Schorr moved to accept the compromise proposed by the applicant.

Schorr agreed that technology will change and turbines may get bigger and quieter. She said the setback not only deals with noise but also quality of life and she felt an obligation to protect the property rights of Lancaster County residents.

Amundson seconded the motion to amend.

Amundson said the additional setback would still allow Next Era to conduct business but would also meet the needs and desires of County residents.

By order of the Chair the meeting recessed at 10:51 a.m., and reconvened at 11:00 a.m.

Discussion continued on the amendment to the main motion which included a one-mile setback from a dwelling.

Flowerday said he did not agree with the amendment. He noted safety setbacks and noise parameters are in place for non-participating landowners and this change could interfere with the land rights of participating owners.

Amundson felt today's decision should be based on current information and not future technologies.

Schorr said this is a quality of life setback which is important to her and may help support community buy in.

Vest said it appears there would be less controversy by adopting the one-mile setback and still the likelihood of the project moving forward which is a desirable outcome in his opinion.

Brinkman added that she is not in support of the additional one-mile setback as it does not change the noise regulations that were implemented in December.

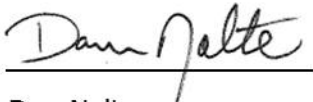
ROLL CALL ON MOTION TO AMEND: Schorr, Amundson and Vest voted yes. Flowerday and Brinkman voted no. Motion carried 3-2.

The Chair clarified that the motion on the floor is to adopt the alternative proposal as Attachment B as amendment by the previous vote.

ROLL CALL ON MAIN MOTION: Amundson, Vest, Schorr and Brinkman voted yes. Flowerday voted no. Motion carried 4-1.

9) ADJOURNMENT

MOTION: Schorr moved and Amundson seconded to adjourn the Lancaster County Board of Commissioners meeting at 11:08 a.m. Schorr, Flowerday, Amundson, Vest and Brinkman voted yes. Motion carried 5-0.



Dan Nolte
Lancaster County Clerk



EXHIBIT A

Proposed Amendments to County Zoning Regulations

Article 13 Special Permit

13.048. Commercial Wind Energy Conversion System

A Commercial Wind Energy Conversion System (CWECS) may be allowed in the AG District by special permit under the conditions listed below:

- a. In cases where CWECS wind turbines are part of a unified plan, parcels which are separated from one another only by the presence of public right-of-way may be combined into one special permit application. When a special permit covers multiple premises, the lease or easement holder may sign the application rather than the lot owner.
- b. Turbines shall meet all FAA requirements, including but not limited to lighting and radar interference issues. Strobe lighting shall be avoided if alternative lighting is allowed. Color and finish shall be white, gray or another non-obtrusive, non-reflective finish. There shall be no advertising, logo, or other symbols painted on the turbine other than those required by the FAA or other governing body. Each turbine shall have onsite a name plate which is clearly legible from the public right-of-way and contains contact information of the operator of the wind facility.
- c. Each application shall have a decommissioning plan outlining the means, procedures and cost of removing the turbine(s) and all related supporting infrastructure and a bond or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment. Each tower shall be removed within one year of decommissioning or revocation of the special permit. Upon removal of the tower, there shall be four feet of soil between the ground level and former tower's cement base.
- d. ~~Any proposed turbine which is within half mile of any non-participating dwelling shall provide shadow flicker modeling data showing the expected effect of shadow flicker on non-participating properties. Shadow flicker shall not fall upon any non-participating dwelling, or other building which is occupied by humans, for more than a total of 30 hours per any calendar year. If shadow flicker exceeds these limits, measures shall be taken to reduce the effects of shadow flicker on buildings, which may include shutting the turbine down during periods of shadow flicker. If a turbine violates this standard on a non-participating dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use.~~
- e. Construction and operation shall not adversely impact identified State or Federal threatened or endangered species such as saline wetlands, or rare natural resources such as native prairie and grasslands.
- f. No turbine shall obstruct or impair an identified view corridor or scenic vista of public value, as mapped on the Capitol View Corridors map in the Lincoln/Lancaster County Comprehensive Plan. The views from prominent environmental areas, such as Nine Mile Prairie and Spring Creek Prairie, shall also be protected from adverse visual or noise impacts. Any application which, upon initial review, poses a possible impact to these views will be required to be

relocated or provide view shed mapping, and visual simulations from key observation points for review and approval by the Lincoln-Lancaster County Planning Department.

g. Setbacks to the turbine base:

1. For the purposes of this section, "turbine height" shall be equal to hub height plus the rotor radius.
2. For a non-participating lot, the setback shall be ~~5280 feet 2 times the turbine height~~ measured to the property line, ~~or 3 1/2 times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater, but at a minimum 1,000 feet to the property line.~~
3. For participating dwelling units, the setback shall be 2 times the turbine height measured to the closest exterior wall of the dwelling.
4. The setback to any public right-of-way or private roadway shall be no less than the turbine height.
5. Setbacks to the external boundary of the special permit area shall be no less than as stated above, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.

~~h. The turbine(s) shall not impact a non-participating lot, (vacant or occupied; of any size), to the extent that, because of the location of turbine(s), the lot owner is left with less than 3 acres of land outside of the CWECS setbacks and or the noise impact area in Section (i) below, unless they are part of an agreement with the CWECS owner/operator.~~

hi. Noise: No CWECS or combination of CWECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the a participating property or at the property line of any non-participating property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For both participating and nonparticipating properties:

1. From the hours of 7 am to 10 pm:
 - i. Forty (40) dBA maximum 10 minute Leq or;
 - ii. Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.
2. From the hours of 10 pm to 7 am:
 - i. Thirty-seven (37) dBA maximum 10 minute Leq or;
 - ii. Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

For participating properties:

1. Fifty (50) dBA maximum 10 minute Leq for all hours of the day and night.

ij. Each application shall include aA professional pre-construction noise study shall be conducted which includes all property within one mile of a tower support base. The protocol and methodology for such studies shall be submitted to the Lincoln-

Lancaster County Health Department for review and approval. Such studies shall include noise modeling for all four seasons and include typical and worst case scenarios for noise propagation. The complete results and full study report shall be submitted to the Lincoln-Lancaster County Health Department for review and approval.

- jk. Each application shall include ~~Prior to the commencement of construction of any turbine, a~~ pre-construction noise monitoring ~~may be conducted~~ study to determine ambient sound levels in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department. The complete results and full study report shall be submitted to the Lincoln-Lancaster County Health Department for review and approval.
- kl. Prior to the commencement of construction of any turbine, the applicant shall enter into an agreement with the County Engineer regarding use of County roads during construction.
- lm. ~~At the discretion of the County Board,~~ Post-construction noise level measurements may be required to shall be performed in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department within one year of completion of construction and every two years thereafter to determine if the permittee is in compliance with this title and the terms of its special permit. Noise level measurements shall be taken by parties and in accordance with procedures as approved by the Lincoln-Lancaster County Health Department and shall be performed at the expense of the holder of the special permit. Any report, information or documentation produced in accordance with such study or measurements shall be provided directly from or party or parties conducting the study or measurements to the Lincoln-Lancaster County Health Department and shall be a public document subject to Nebraska's public records laws.
- mn. All noise complaints regarding the operation of any CWECS shall be referred to the County Board. The County Board shall determine if noise monitoring in addition to that required under the paragraph above shall be required to determine whether a violation has occurred. If the Lancaster County Board of Commissioners determines that such noise monitoring shall be required, it shall be done at the expense of the holder of the special permit in accordance with procedures and by parties approved by the Lincoln Lancaster County Health Department. The results of such monitoring shall be provided directly from the party or parties conducting the monitoring to the Lincoln Lancaster County Health Department for review and reporting to the Lancaster County Board of Commissioners.
- n. Agreements entered into between participating property owners and an applicant regarding any CWECS, before and after the issuance of a special permit shall be provided to the Lincoln-Lancaster County Planning Department and shall be public documents subject to Nebraska's public records laws.

ATTACHMENT B

RECOMMENDED ALTERNATIVE PROPOSAL

13.048. Commercial Wind Energy Conversion System (CWECS)

A Commercial Wind Energy Conversion System (CWECS) may be allowed in the AG District by special permit under the conditions listed below:

- a. In cases where CWECS wind turbines are part of a unified plan, parcels which are separated from one another only by the presence of public right-of-way may be combined into one special permit application. When a special permit covers multiple premises, the lease or easement holder may sign the application rather than the lot owner.
- b. Turbines shall meet all FAA requirements, including but not limited to lighting and radar interference issues. Strobe lighting shall be avoided if alternative lighting is allowed. Color and finish shall be white, gray or another non-obtrusive, non-reflective finish. There shall be no advertising, logo, or other symbols painted on the turbine other than those required by the FAA or other governing body. Each turbine shall have onsite a name plate which is clearly legible from the public right-of-way and contains contact information of the operator of the wind facility.
- c. Each application shall have a decommissioning plan outlining the means, procedures and cost of removing the turbine(s) and all related supporting infrastructure and a bond or equivalent enforceable resource to guarantee removal and restoration upon discontinuance, decommissioning or abandonment. Each tower shall be removed within one year of decommissioning or revocation of the special permit. Upon removal of the tower, there shall be four feet of soil between the ground level and former tower's cement base.
- d. Any proposed turbine which is within half mile of any non-participating dwelling shall provide shadow flicker modeling data showing the expected effect of shadow flicker on non-participating properties. Shadow flicker shall not fall upon any non-participating dwelling, or other building which is occupied by humans, for more than a total of 30 hours per any calendar year. If shadow flicker exceeds these limits, measures shall be taken to reduce the effects of shadow flicker on buildings, which may include shutting the turbine down during periods of shadow flicker. If a turbine violates this standard on a non-participating dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use.
- e. Construction and operation shall not adversely impact identified State or Federal threatened or endangered species such as saline wetlands, or rare natural resources such as native prairie and grasslands.
- f. No turbine shall obstruct or impair an identified view corridor or scenic vista of public value, as mapped on the Capitol View Corridors map in the Lincoln/ Lancaster County Comprehensive Plan. The views

from prominent environmental areas, such as Nine Mile Prairie and Spring Creek Prairie, shall also be protected from adverse visual or noise impacts. Any application which, upon initial review, poses a possible impact to these views will be required to be relocated or provide view shed mapping, and visual simulations from key observation points for review **and approval by the Lincoln-Lancaster County Planning Department.**

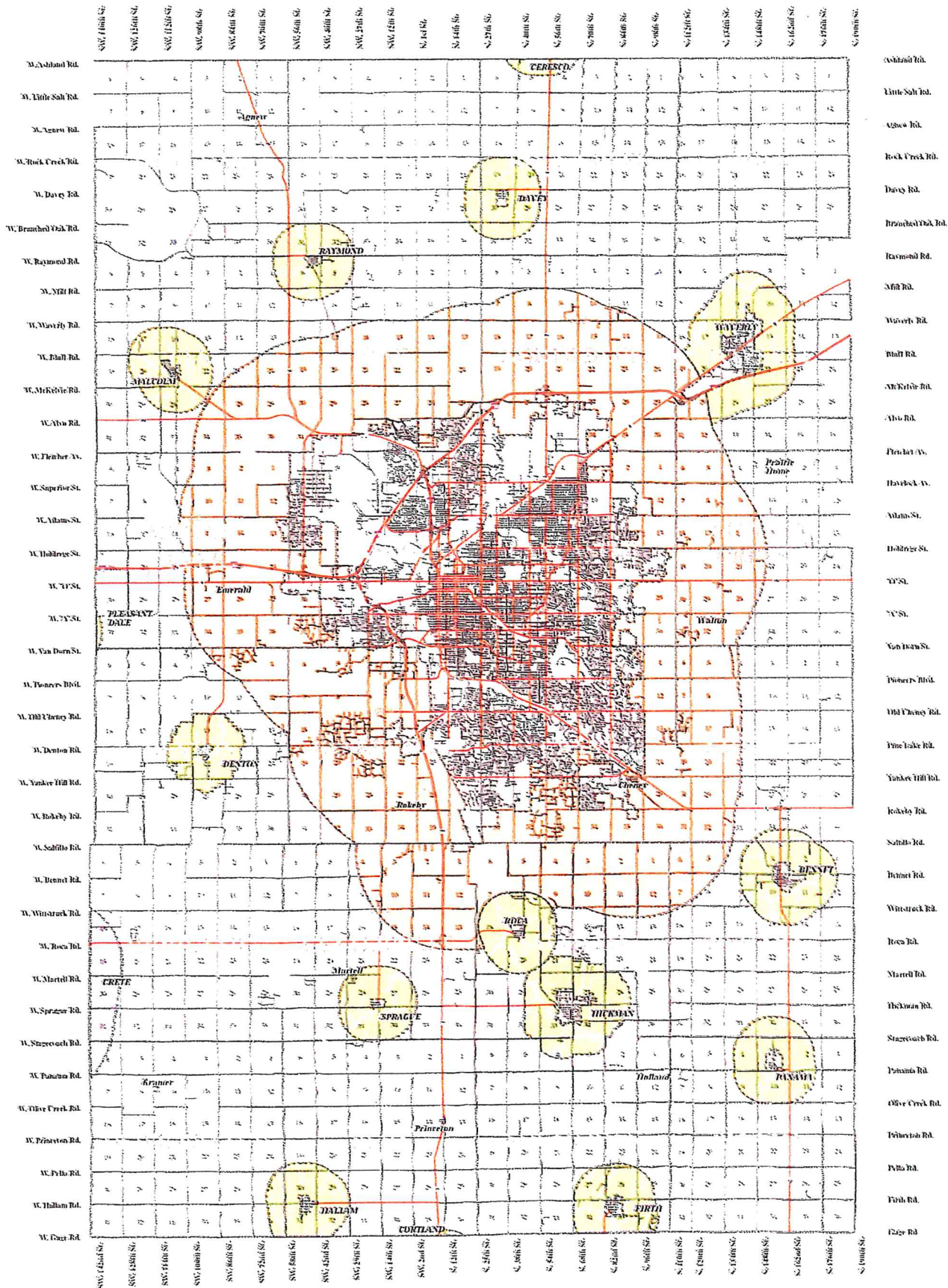
- g. Setbacks to the turbine base:
 - 1. For the purposes of this section, "turbine height" shall be equal to hub height plus the rotor radius.
 - 2. For a non-participating lot, the setback shall be 2 times the turbine height measured to the property line, or 3 ½ times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater, but at a minimum 1,000 feet to the property line.
 - 3. For participating dwelling units, the setback shall be 2 times the turbine height measured to the closest exterior wall of the dwelling.
 - 4. The setback to any public right-of-way or private roadway shall be no less than the turbine height.
 - 5. Setbacks to the external boundary of the special permit area shall be no less than as stated above, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.
- h. The turbine(s) shall not impact a non-participating lot, (vacant or occupied; of any size), to the extent that, because of the location of turbine(s), the lot owner is left with less than three (3) acres of land outside of the CW ECS setbacks and the noise impact area in Section (i) below, unless they are part of an agreement with the CW ECS owner/operator.
- i. Noise: No CW ECS or combination of CW ECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For nonparticipating properties:
 - 1. From the hours of 7 am to 10 pm:
 - i. Forty (40) dBA maximum 10 minute Leq or;
 - ii. Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 15 hour period.
 - 2. From the hours of 10 pm to 7 am:
 - i. Thirty-seven (37) dBA maximum 10 minute Leq or;
 - ii. Three (3) dBA maximum 10 minute Leq above background level as determined by a pre-construction noise study. The background level shall be a Leq measured over a representative 9 hour period.

For Participating Properties:

1. Fifty (50) dBA maximum 10 minute Leq for all hours of the day and night.
- j. **Each application shall include a** A professional pre-construction noise study ~~shall be conducted~~ which includes all property within at least one mile of a tower support base **and must be able to demonstrate compliance with the noise standards in paragraph (i).** The protocol and methodology for such studies shall be submitted to the Lincoln-Lancaster County Health Department for review and approval. Such studies shall include noise modeling for all four seasons and include typical and worst case scenarios for noise propagation. The complete results and full study report shall be submitted to the Lincoln-Lancaster County Health Department for review **and approval.**
- k. Prior to the commencement of construction of any turbine, pre-construction noise monitoring may be conducted to determine ambient sound levels in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department.
- l. Prior to the commencement of construction of any turbine, the applicant shall enter into an agreement with the County Engineer regarding use of County roads during construction.
- m. ~~At the discretion of the County Board, p~~ Post-construction noise level measurements ~~may be required to~~ **shall** be performed in accordance with procedures acceptable to the Lincoln-Lancaster County Health Department. **within one year of completion of construction to determine if the permittee is in compliance with this title and the terms of its special permit. Noise level measurements shall be taken by third party professional acousticians or engineering firms specializing in noise measurements and in accordance with procedures as approved by the Lincoln-Lancaster County Health Department and shall be performed at the expense of the holder of the Special Permit. Any report, information or documentation produced in accordance with such study or measurements shall be provided to the Lincoln-Lancaster County Health Department and shall be a public document subject to Nebraska's public records laws.**
- n. All noise complaints regarding the operation of any CWECs shall be referred to the County Board. The County Board shall determine if noise monitoring **in addition to that required under the paragraph above** shall be required to determine whether a violation has occurred. **If the Lancaster County Board of Commissioners determines that such noise monitoring shall be required, it shall be done at the expense of the holder of the Special Permit in accordance with procedures and by third party professional acousticians or engineering firms specializing in noise measurement approved by the Lincoln-Lancaster County Health Department. The results of such monitoring shall be provided directly from the party or parties conducting the monitoring to the Lincoln-Lancaster County Health Department for review and reporting to the Lancaster County Board of Commissioners.**

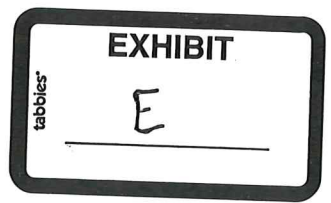
nonparticipating dwelling unit, constructed after the turbine is approved, then the turbine becomes a nonconforming use.

- e. Construction and operation shall not adversely impact identified State or Federal threatened or endangered species such as saline wetlands, or rare natural resources such as native prairie and grasslands.
- f. No turbine shall obstruct or impair an identified view corridor or scenic vista of public value, as mapped on the Capitol View Corridors map in the Lincoln/ Lancaster County Comprehensive Plan. The views from prominent environmental areas, such as Nine Mile Prairie and Spring Creek Prairie, shall also be protected from adverse visual or noise impacts. Any application which, upon initial review, poses a possible impact to these views will be required to be relocated or provide view shed mapping, and visual simulations from key observation points for review **and approval by the Lincoln-Lancaster County Planning Department.**
- g. **Setbacks to the turbine base:**
 - 1. For the purposes of this section, "turbine height" shall be equal to hub height plus the rotor radius.
 - 2. **For a non-participating lot, the setback shall be one mile 2 times the turbine height measured to the property line, or 3 1/2 times the turbine height, measured to the closest exterior wall of the dwelling unit, whichever is greater, but at a minimum 1,000 feet to the property line.**
 - 3. For participating dwelling units, the setback shall be 2 times the turbine height measured to the closest exterior wall of the dwelling.
 - 4. The setback to any public right-of-way or private roadway shall be no less than the turbine height.
 - 5. Setbacks to the external boundary of the special permit area shall be no less than as stated above, except that the owner of the adjacent property may sign an agreement allowing that setback to be reduced to the rotor radius plus the setback of the zoning district.
- h. The turbine(s) shall not impact a non-participating lot, (vacant or occupied; of any size), to the extent that, because of the location of turbine(s), the lot owner is left with less than three (3) acres of land outside of the CW ECS setbacks and the noise impact area in Section (i) below, unless they are part of an agreement with the CW ECS owner/operator.
- i. Noise: No CW ECS or combination of CW ECS turbine(s) shall be located as to cause an exceedance of the following as measured at the closest exterior wall of any dwelling located on the property. If a turbine violates a noise standard on a dwelling unit, constructed after the turbine is approved, then the turbine becomes a non-conforming use. For nonparticipating properties:



ZONING JURISDICTIONS IN LANCASTER COUNTY





2018

Dear Lancaster County Planning and Zoning Board members,

I am writing this letter after laying awake half the night last night, (November 25th) listening to the wind turbine just to the north of my house (1480' from the corner of my bedroom), thumping and whooshing in the blizzard conditions, 45 mph winds and snow. This isn't the first time over the last year that I have been awakened during the night because of the constant loud whooshing sounds. I am one of the non-participants living within the Cottonwood Wind project in Webster county, which has been operational for a year now. After living through 7 plus months of hell (constant traffic of pickups, bulldozers, cement trucks, semis hauling dirt, semis hauling limestone, cranes, at ALL hours of the day and NIGHT) during the construction process of this project, there are now 4 giant wind turbines within a half mile of my home.

The turbine directly to the north of my house is the one that affects me the most. Webster county zoning regs allow a decibel level of 55 day or night and only has a setback distance from a non-participants residence of 1000'. We tried to get our zoning board and commissioners to change these but they were already under the influence of NextEra. So I am urging you to please listen to me, as one who had absolutely no say in this project that now surrounds me, you are the only ones that can protect the residents of your county. You have the ability to say no to NextEra and any other wind company that wants to come into your county. All these big out of state companies want is to put as many turbines in the ground as they can before the tax subsidies expire. Please protect the residents in your county from having to put up with the same crap that I am having to deal with now.

I started doing a nightly sound level check not long after this project started. Out of the 246 total nights that I have checked, 82 have been at our counties decibel level of 55 or below. 164 have exceeded the 55 decibel level. That is TWO-THIRDS of the time!! I have neighbors (also non-participants) who built a new house just prior to the wind project being constructed that have a turbine directly to the SE of their home and they are having to deal with the horrible shadow flicker now inside their home and on their property. Some other friends that had a beautiful home on an acreage on their grandmother's pastureland are now moving into town and will be trying to sell their home due to the noise and shadow flicker issues. Another couple sold their house and moved out of the county before the turbines were constructed because there was going to be a turbine near their home.

So please look out for the health and safety of the residents of Lancaster county.

Sincerely,

Stephanie Hamel,
Rural Webster County Nebraska

	<u>Mon Days Tested</u>	<u>Number days ^{at} 55 or below</u>	<u>Days ^{at} 56 or above</u>
JAN 28 - Feb 28	29	8	21
Mar 1 - 31	30	8	22
Apr 1 - 30	26	8	18
May 1 - 31	26	11	15
June 1 - 30	25	7	18
July 1 - 31	31	17	14
Aug 1 - 31	13	3	10
SEPT 1 - 30	<u>27</u>	<u>5</u>	<u>22</u>
	207	67	140
		32%	66%
OCT 1 - 31	28	10	18
Nov 1 - 30	17	8	9
Dec 1 - 31	27	8	19
Jan 1 - 31	<u>29</u>	<u>11</u>	18
	308	104	204
		.337	.66

The pilot study does not show any significant reduction in damage caused by infrasound until over 15 kilometers from wind farms

The pilot study carried out in Satakunta and Northern Ostrobothnia in Finland shows that the damage caused by infrasound from wind power plants will only decrease significantly more than 15 kilometers away from wind turbines. The study was carried out by the Finnish Association for Environmental Health (SYTe) in the spring 2016.

- It has been noticed from experience that after the construction of wind power plants, usually within a few months, people in the surrounding area have begun to get a wide range of symptoms, says Markku Mehtätalo, Chairman of the Finnish Association for Environmental Health.
- It is possible to study the matter quite easily and the Finnish authority responsible for the public health, the Department of Health and Welfare (THL), has tried to do this, for example, Mehtätalo continues. However, in THL's study in 2016, it was assumed that the symptoms would decrease significantly in the first 10 kilometers, with more symptoms near the wind turbines. The study did not take into account the impact of wind farms elsewhere in the environment.
- But it is known from experience that the symptoms of people do not usually decrease at this distance, says Mehtätalo. Measurements have also shown that the infrasound pulses from the wind turbines that are currently being built will not be significantly reduced at this distance. Other risk factors very close to the wind power plants are audible sound and electromagnetic fields.

The research material was collected from Satakunta and Northern Ostrobothnia

The sample of the pilot study meets the requirements of a statistical analysis. The data was collected from Satakunta and Northern Ostrobothnia, mainly from areas where wind turbines were built 0.5–1.5 years before the interview (see Figure 1 from Northern Ostrobothnia). The subject of the study was about 50 families, with symptoms of each family member found out. A total of about 200 people were involved in the study.

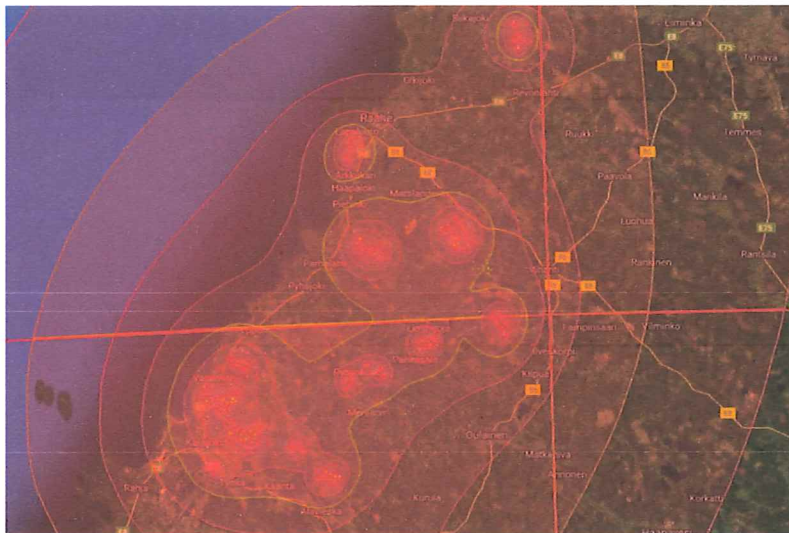


Figure 1. In the yellow-bounded area, the infrasound from wind turbines is almost continuous. The area is located in the south of Oulu Province in Finland.

– In addition, the pilot study took into account the location of all wind power plants in Finland and did not exclude beforehand the possibility that the effect of the wind farms could be greater and reach longer than the impact of a single, clearly separated area, says Mehtätalo.

Nocturnal disturbance is a typical symptom caused by infrasound

The basic research question was whether the family had noticed changes in health status in the last six months or a year within. The wording of the question regarding the time was dependent on when the impact of the nearest wind turbines could have started. The interviewees were not told in advance about the possible connection with wind turbines.

– The majority of respondents were unable to name a change in their overall health status. However, they gave many responses to separate symptomatic questions, says Mehtätalo.

– The most typical was sleep disturbance or change in the need for night’s sleep, fatigue and various pains. Only very few, some respondents, considered wind power plants as a possible cause.

Harmful or severe symptoms three times more common near wind turbines

The responses were categorized according to the severity of the symptoms and subjected to a statistical analysis. There were about three times more harmful or more serious symptoms near wind turbines (less or about 15 km from wind power plants) than further away (see Figure 2).

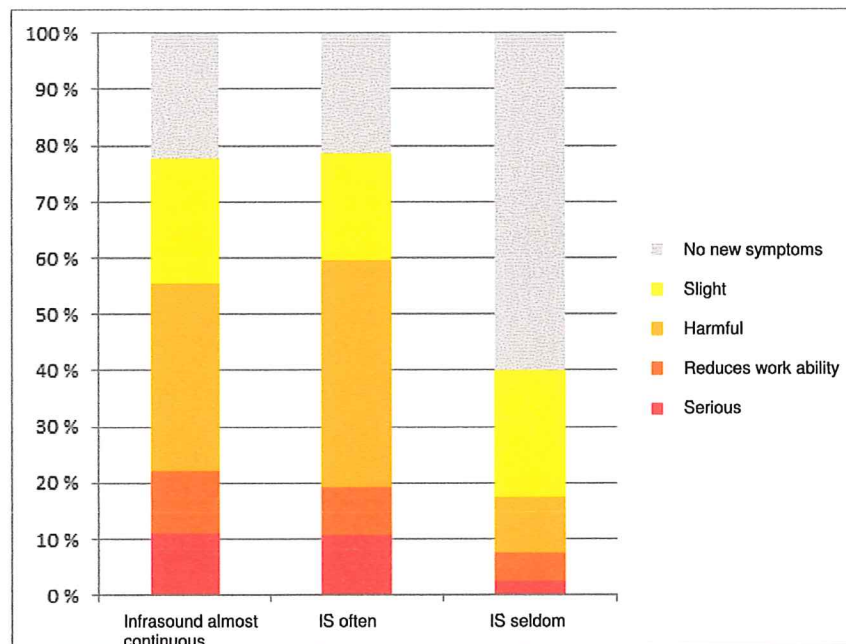


Figure 2. Symptoms of almost continuous or often persistent infrasound exposure (less or about 15 km from wind turbines) and further (over 15 km) from wind power plants.

– Based on the analysis, it seems strongly that, after the construction of wind power plants, the majority of people in the surroundings of wind turbines are having concomitant symptoms. Most of the symptoms are typical stress symptoms, says Mehtätalo.

Although some people have suspected that the symptoms are caused by wind turbines, especially if the wind power plants are visible or if they have heard beforehand about their potential harmful

health effects, people have symptoms regardless of attitude. – The pilot study shows that the symptoms are not caused by attitudes, says Mehtätalo.

The occurrence of symptoms decreased significantly only over 15–20 km from the wind power plants (see Figure 2). If there are wind turbines in different directions and a person stays a lot in the area, the risk of symptoms increases.

The harmful area caused by infrasound is assumed to be too small

– Later in 2017, based on infrasound measurements made in different parts of Finland, it has been found out that 15–20 km is a typical distance where the infrasound pulses of wind turbines can be detected by measurements to travel in almost all circumstances, says Mehtätalo [1–4]. According to an American study, infrasound travels under favorable conditions to a distance of 90 km from wind farms [5].

If the sample of the pilot study is representative, about 400,000 of the Finns suffer from symptoms due to wind turbines and only about 10,000 of them combine the symptoms with wind power plants. Because of the small amount of research data, strong conclusions must be taken with caution.

– However, the study clearly shows that in all previous studies, the harmful area has already beforehand been presumed to be too small, says Markku Mehtätalo. – Among other things, the extensive, in-depth material of another American study, used in several publications, has been gathered within a radius of 11.7 km from wind turbines. For this reason, the harmful health effects cannot be found in the studies, because the symptoms do not vary at this distance, he concludes. - syte

Completed translation of the original text: SYTe (2019). “Pilottitutkimus osoittaa infraäänihaitan vähenevän merkittävästi vasta yli 15 kilometrin päässä tuulivoimaloista.” 2016. Available: <https://syte.fi/2019/01/10/pilottitutkimus-osoittaa-infraaanihaitan-vahenevan-merkittavasti-vasta-yli-15-kilometrin-paassa-tuulivoimaloista/>

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- [4] Auniogroup (2017). Start of the Wind Turbines in Kokkola. Available: <https://www.auniogroup.com/en/2017/12/30/kokkolan-tuulivoimaloiden-kaynnistyminen/>
- [5] Marchillo et al. (2014). On infrasound generated by wind farms and its propagation in low-altitude tropospheric waveguides. *Journal of Geophysical Research: Atmospheres*. Available: <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2014JD022821>

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Infrasound effects

| Credit: The Advertiser-Tribune | Dec 1, 2018 | www.advertiser-tribune.com ~

I congratulate Seneca County for being selected to participate in one of the largest experiments to determine the effects of infrasound on human organ systems. With large numbers of massive wind turbines planned in this densely populated county, medical effects on internal organs can be analyzed.

The size of the proposed wind turbines ensures the generation of low-frequency infrasound. The proximity of wind turbines to schools guarantees that as children age, internal organ deterioration can be compared to child control groups from similar demographic locations lacking wind turbines. After 10, 20 and 30 years, researchers can evaluate effects on human internal organs from infrasound. This is important, because western scientific research and medical literature has little written concerning short, or long-term infrasound effects on human organs such as lung, heart and kidney.

However, infrasound effects on internal organ tissue have been studied by numerous researchers in the former Soviet Union. They found that infrasound waves cause significant changes to heart tissue and other internal organs.

In the 1990s, European investigators studied internal organs in animal subjects and human workers exposed to infrasound. They found significant changes in lung tissue and heart pericardium. The authors also were concerned with potential damage to internal kidney structures.

In January 2018, German researchers presented results concerning infrasound effect on cardiac tissue contractility. They found cardiac tissue exposed to infrasound decreased tissue contractility by 25 percent.

Seneca County wind farm companies state that wind farm sound levels will only approach 55dba. That information is misleading concerning infrasound. The "A" designation is a filtration formula including only audible sound between 20Hz and 20,000Hz. Infrasound is defined as occurring between 0-20Hz and is not identified with the dbA formula.

With multitude turbines planned, decibel level determination may be problematic. Overlapping sound wave energies add

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Rural Victoria's power networks set to buckle under weight of wind energy

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human quinea-pigs!!!

together, similar to overlapping ripples on water from multiple stones dropped simultaneously. Some waves cancel out. Other waves enlarge. Wind turbine numbers become directly proportional to infrasound wave energy multiplication. Also, infrasound waves are stable, traveling great distances.

For those interested in their own personal research on infrasound effects, information was obtained for this letter from the PubMed website (Key words: infrasound AND heart, or infrasound AND physiological effects) and the Wikipedia website. Soviet research, translated from Cyrillic, was obtained from the archives at The National Library of Medicine at the National Institutes of Health, Bethesda, Maryland.

Retired Capt. Michael T. Curran,

U.S. Navy,

New Riegel

Source: The Advertiser-Tribune | Dec 1, 2018 | www.advertiser-tribune.com

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hearing may draw crowd

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Attorney calls Invenergy Alle-Catt application 'slipshod'

Missouri:
Wind farm planned for northwest Boone County

Ohio:
County working on agreement to protect roads from wind turbine development

Ireland:
Wind farm campaign to be powered by greyhounds

Australia:
Tamworth candidates weigh in on divisive Nundle wind farm

Maine:
Janet Mills lifts LePage ban on new wind power permits in Maine

Ontario:
Wind farm equipment removed

Press releases, South Dakota:
South Dakota PUC approves construction permit for Dakota Range III wind energy project

Massachusetts:
Feds hear SouthCoast voices at Vineyard Wind hearing

Scotland:
Wind farms refused locally win Scottish Government appeals on 13 occasions in Tayside and Fife

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New York:
Equinor, 3 JVs vie
for offshore wind
power park in New
York

Ohio:
OPSB resets
Republic Wind
public hearing for
May 14

Ohio:
Officials reject 400-
foot wind turbines
in Findlay

Kansas:
Kansas bill setting
minimum setbacks
for commercial
wind turbines to
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Wind project
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superintendent
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Follow:

Good environmental policy starts with safeguarding the health and safety of the people. FIRST and FOREMOST. That is why I think you should put the setback of wind towers 1 mile from the property line of the non participants.

Wind towers put out about 60% of its noise as infrasound. Infrasound is not a sound you can hear, less than 20 Hertz, but a pressure. Infrasound can travel over 4 miles and it penetrates houses and is felt as a pressure for both humans and animals that can cause serious health issues to both, according to Dr. Mariana Aleves-Pereira, who has a Bachelor of Science in physics, a masters Degree in Bio-Medical Engineering and a PHD in environmental sciences, and who has studied infrasound and low frequency noise for 30 years. That the Health Dept did not mention the health concerns from infrasound is hard to understand unless someone didn't want them to mention it

Loud noises you hear, "trucks, trains tractors, etc" is called White noise because you only hear it for a little while, and you can get away from it. Wind tower noise is a modulating constant whoosh every 2 or 3 seconds. 24 hours a day or as long as long as the wind blows. You cannot get away from it if you live too near it.

These are the reasons a 1 mile set back is necessary in highly populated areas, such as southern Lancaster

county and northern Gage county & it does not keep Wind towers from being placed in more open areas

1) How many and what percent of participating residential dwelling units will be exposed to dBA levels of: <=35; 36 to 40; 41 to 45; and 46 to 50?

The table below presents the percentage of modeled residential homes exposed to short-term Leq sound levels of: <=35; 36 to 40; 41 to 45; and 46 to 50 dBA from the proposed wind turbines.

Short Term Leq Broadband Sound Level (dBA)	Minimum Distance (ft)	Minimum Distance (mi)	Maximum Distance (ft)	Maximum Distance (mi)	Average Distance (ft)	Average Distance (mi)	Number of Receptors	% of Project Receptors
46 - 50	1,479	0.28	3,243	0.61	1,966	0.37	40	24%
41 - 45	1,934	0.37	4,861	0.92	3,308	0.63	46	28%
36 - 40	3,615	0.68	8,431	1.60	6,072	1.15	61	37%
<=35	6,547	1.24	15,583	2.95	11,093	2.10	20	12%
37	5,326	1.01	7,656	1.45	6,552	1.24	12	

The sound levels presented above are cumulative levels (i.e., multiple wind turbines at different distances contributing to the modeled sound level); therefore, no specific distance corresponds to a given sound level. Receptors modeled at 37 dBA ranged from 5,326 ft (1 mile) to 7,656 ft (1.5 mi) from the closest wind turbine with an average setback distance of 1.24 mi.

2) Can you also provide the number and percent of participating residential dwelling units that will be exposed to Lden levels of: <=35; 36 to 40; 41 to 45; and 46 to 50?

The table below presents the percentage of modeled residential homes exposed to annual Lden levels of: <=35; 36 to 40; 41 to 45; 46 to 50; and >50 dBA.

Sound Level Bin	Day Evening Night (L _{den} , dBA)	
	Number of Receptors	% of Project Receptors
<= 35	10	6.0%
36 to 40	43	25.7%
41 to 45	57	34.1%
46 to 50	49	29.3%
51 +	8	4.8%

The Lden level was calculated by adding a 7 decibel correction factor to the modeled Annual Leq sound level at each receptor (see response to Question 3 for annual calculation details). This approach takes into account the 5 decibel evening penalty and 10 decibel nighttime penalty by assuming that the average annual wind speed does not differ between the daytime, evening, and the nighttime.

It is noted that Lden is typically used in Europe for continuous sound sources, which wind turbines are not. It is not a common metric applied in the United States, nor is the medical or annoyance literature for wind turbines typically provided in Lden. More commonly it is provided as a short-term Leq as provided in response to Question 1 and the same metric required for reporting in the County ordinance.

project.

6. Further analysis and conclusions from LLCHD can be found in the attached memo, See Exhibit 1. The memo references LLCHD Recommendations for Noise Levels from Commercial Wind Energy Conversion Systems from the original study done in May 2015. See Exhibit 2 for the study.
7. NextEra submitted an analysis of noise impacts conducted by Olsson Environmental Health Management, See Exhibit 4. The conclusion of the analysis is that there is scientific justification to allow commercial wind energy conversion systems to have a noise limit of 50dBA maximum 10 minutes Leq for participating properties.
8. NextEra had Epsilon Associates conduct a sound level modeling analysis on a hypothetical, but realistic layout that involved 54 wind turbines. See Exhibit 5. The turbines had a total blade tip height of 500 feet. A total of 157 homes were used in the analysis. The analysis found that to maintain the 37 dba required for non-participating dwellings the turbines would need to be a minimum of one mile from the dwelling. See attached, "Additional Wind Energy Information Requested" Page 2, Table 1.
9. This request does not change any of the protections given to non-participating properties. Based on the analysis performed by Epsilon Associates all property owners within a one mile radius would have to participate for a wind turbine to be allowed.

Prepared by

Tom Cajka, Planner

Date: November 14, 2018

Applicant: Blue Prairie Wind, LLC
700 Universe Blvd.
Juno Beach, FL 33408
561-691-7122

Contact: David Kuhn
700 Universe Blvd.
Juno Beach, FL 33408
561-691-7122

F:\DevReview\TX\18000\TX18011 Blue Prairie Wind.Llc.docx

What has changed from 2015

In 2015 the turbines that were being used were much shorter than the 500 foot turbines planed in 2018.

In 2015 a working group was formed and a lot of hard work went into setting safe set backs.

In 2015 there were a lot of peered reviewed studies used that are still on the ne. Gov website in making the decisions for the regulations.

in 2018 the wind developer supplied the health and Planning the department with three studies in which they relied on heavily for making their decisions.

In 2015 it was emphasized that wind turbine noise is unique and transmits low frequencies sound that can travel for many miles.

In 2018 low frequency sound was mentioned but the health department said that it was too hard and too expensive to study. MEASURE

In 2018 the wind developer supplied the health and planning department with noise modeling for our area that shows that for 37 decibels the minimum setback needed is 1.1 miles.

In 2018 both the wind developer and their attorney said that they would cite turbines on the side of caution so that they will meet the noise set back.

I believe their attorney said these are very expensive pieces of equipment and they can't be just scooped over a little bit in case we cite them to close.

In 2015 leaseholders had turbines cited on their property.

In 2018 there is a lot of emphasis on Good neighbor contracts in which people can sign up to be a participating party without a turbine on their property which will make it much easier to cite wind turbines in this populated area.

I live in the country I understand the sounds and smells of the country and I spend a lot of time outdoors.

I enjoy our sunrises and sunsets and my view of the countryside. and one of the last things I want to do is look at the sunset and see a wind turbine in the middle of it.

I didn't move next to a wind turbine a wind turbine is trying to move next to me I'm not getting paid and do not want to get paid for giving up anything for a wind turbine.

The 1.1-mile minimum setback that is shown in the studies would greatly help protect my property rights. And we need to use that to update our regulations.

These Turbines are fall [↓] ~~and will~~ greatly affect my property value

Oh yeah one more thing for the people that think these wind turbines will shut down our coal plants let's remember that wind energy at best and I'm giving a lot here people is 50% efficient. So what half of the time do you not want electricity maybe tonight when the temperature drops below zero your furnace quits and your lights go out you can just light a candle and throw on another blanket.

7 Noise, shadows and flicker

The sound of a wind turbine generating electricity is likely to be about the same level as noise from a flowing stream about 50-100 metres away or the noise of leaves rustling in a gentle breeze. (BWEA website)

E.ON has today announced that it no longer intends to continue to develop an eight turbine wind farm near Ferndale because of concerns that the project's original design could potentially pose a noise nuisance to nearby homes. (Press release, 2 July, 2008)

Not all wind farms cause a problem of noise. Many earlier ones were remote from homes and their sound irritated only a few walkers and other users of the countryside, though even then there were complaints that quite distant machines made sufficient noise to disrupt sleep and cause annoyance during daytime. The situation is changing, however. As the developers have grabbed (or been denied) the remote lands of Britain, so their flailing blades perforce creep closer to habitations. The E.ON development, Ty'n Tyle wind farm, cited in the chapter header, is about a kilometre from each of the South Wales' valley communities of Ferndale and Ystrad. Many current developments will be at this sort of distance from homes, but denial is endemic: Gordon James, director of Friends of the Earth Cymru, dismissively responded to E.ON's release, "Noise isn't a problem . . . Modern wind turbines are very quiet."

Sound attenuates with distance from source by an approximate inverse square law so, if distance is halved, perceived noise

increases by about four times. The remarkable push for renewable energy which has been imposed by the regional planning advice notes will allow many more turbines to be built close to habitation and there will thus be a growing impact of noise on human health, happiness and prosperity. This will all be done under the umbrella guidelines of the cryptically named ETSU-R-97¹ which was prepared by The Working Group on Noise from Wind Turbines comprising developers, noise consultants, environmental health officers and others set up by the DTI (now DBERR).

There are two potential sources of noise: that from turbine blades passing through the air at the speed of a light aircraft, and from the gearbox and generator in the nacelle. According to the industry, blade design can reduce the first problem of aerodynamic sound, whilst gear design, sound insulation and isolation suppresses mechanical noise. This is to an extent a clever exercise in concealment.

It is true that engineering can suppress mechanical noise but an aerofoil blade, the size of a Jumbo's wing, travelling at 150 mph and harvesting 0.6 MW of power or more, inevitably makes substantial sound! The air passing through the rotor is swept into turbulent wake-vortices, the source of much of the sound, and within a few feet encounters the obstruction of the tower. As a blade passes a tower every one to two seconds this imposes a pulsating quality to the aerodynamic sound which many people find deeply disturbing. Other periodic sounds arise as the blades sweep down into the region of wind shear so that the lowest blade position experiences not only different wind speed but also varying turbulence. It is a deliberate untruth that "Noise isn't a problem" and as we shall see ETSU-R-97 is not a fit instrument to assess it.

In the case of wind farm clusters of turbines there are further possibilities of interaction of sound periodicity. As the rotors of different machines come into and go out of phase, they can create periodic "beat" sounds (aerodynamic or amplitude modulation) allowing the rhythmic "whoomp, whoomp" at one to two second intervals to rise and fall in loudness, an effect which so disturbs

some people. This sound is of low but audible frequency – comparable to the base – “woofer” speaker output of a sound system.

In addition to normally audible sound, any machinery will generate a degree of low frequency sound (effectively mechanical vibration) which ranges from just audible “sub-woofer” frequencies (below 200 Hz) down to wavelengths which cannot be heard but are often sensed as bodily discomfort (below 20 Hz) and are often referred to as infrasound which is particularly difficult to measure instrumentally. The industry and several independent reports claim that it is not a problem but this is controversial.

The measurement of noise

Noise is measured in decibels (dB). The decibel is a measure of the sound pressure level, i.e., the magnitude of the pressure variations in the air, expressed as a ratio to a reference pressure. The scale is logarithmic so an increase of 3 dB is a doubling of sound pressure. Measurements of environmental noise are usually made in dB(A) which includes a correction for the frequencies (different pitches), best-heard by the human ear. Unfortunately the A-weighting tends to devalue the low frequency end of the spectrum and has been criticised where low frequencies are important – repetitive base notes in music and of course the pervasive aerodynamic “whoomph” of wind turbines. The C-weighting curve is more satisfactory as it is less selective against low frequency but ETSU-R-97 mandates dB(A) as do many other sound measuring conventions.

The noise a wind turbine creates can be expressed in terms of its sound power level at source. This is a measure of the noise emitted by the machine and is also expressed in dB(A). BWEA claims that a single wind turbine usually emits between 90 and 100 dB(A) and creates a sound pressure level of 50-60 dB(A) at a distance of 40 metres from the turbine² and that:

Ten such wind turbines, all at a distance of 500 metres would create a noise level of 35-45 dB(A) under the same

conditions. With the wind blowing in the opposite direction the noise level would be about 10 dB lower.

To put this in perspective some comparable noise sound pressure levels in dB(A) are:

Rural background:	20-40
Bedroom at night:	25
Quiet home interior:	35-40
Wind farm at 500 m:	35-45
Car at 40mph at 100 m:	55
Vestas V80 2 MW wind turbine	
close-up (wind 10 m/s):	98-99
Jet aircraft take-off at 100 m:	125

Use of the dB scale tends to confuse the lay person and this has been deliberately exploited in many of the wind industry's planning applications. In recent years several of these have been ruled inadequate. It is useful to know that in the open air, a change of 3 dB is barely discernable but a 5 dB change will cause most people to comment and a 10 dB increase, perceived as an approximate doubling of noise, will result in complaints from most people. The use of the dB(A) frequency scale, biased for human hearing, also implies that perception of sounds as unpleasant, neutral or pleasing, simply relates to loudness. This is not so, and one has to ask how a single noise-level reading relates to the range of subjective experiences described below which include periodic sounds, their variation in pitch (frequency) and vibrations close to the lowest audible frequency.

It has been noted that music and noise from discos and the like have a totally different sound character to either steady or sporadic sounds and an A-weighted level has been found to be “inappropriate to assessing the intrusion inside a dwelling from low frequency thumping bass” (noted in an acoustician's response to a proposed wind power station at Bald Hills, Victoria, Australia).

However, a report from Keele University on infrasound¹⁰ says:

We have clearly shown that both fixed speed and variable speed turbines generate low frequency vibrations which are multiples of blade passing frequencies and can be detected by seismometers buried in the ground

Detection was possible at distances up to many kilometres and in the presence of background seismic noise. In the absence of peer-reviewed medical evidence concerning low frequency sound from wind turbines, these two statements make uncomfortable bedfellows and so, as with many other aspects of this industry, we have a "Catch 22" in which proof of a problem can only come when it is too late. However it is significant that the few medical workers looking at low-frequency noise from wind turbines on three continents are in agreement to the extent of christening the health consequence "Wind Turbine Syndrome"¹¹ and now in a forthcoming book of eponymous title. The syndrome includes sleep disturbance, headache, dizziness, nausea, rapid heart rate, panic attacks and significantly, if the families Pierpont studied moved away from the turbines (sometimes abandoning their homes), the symptoms, significantly, went away.

The BWEA followed-up the publication of the Keele University report with a rebuttal of any suggestion that infrasound was a health issue. In this rebuttal two of the original authors, Styles and Toon, wrote:

To put the level of vibration into context, they are ground vibrations with amplitudes of about one millionth of a millimetre. There is no possibility of humans sensing the vibration and absolutely no risk to human health.

However, a more recent development has been the publication in 2008 of a study which has shown

for the first time that the human vestibular system is also extremely sensitive to low-frequency and infrasound vibrations by making use of a new technique for measuring vestibular activation.¹²

Perturbation of the vestibular apparatus is a core response underlying Pierpont's Wind Turbine Syndrome. This demonstration of extreme sensitivity to low frequency vibration suggests that Styles and Toon's dismissive "no possibility of humans sensing the vibration" may not be correct and that government's refusal to commission further work is, at the least, premature. Coupled with recent findings by Alves-Pereira & Branco that "In-Home Wind Turbine Noise Is Conducive to Vibroacoustic Disease"¹³ this appears to support the former Dean of Medicine at the University of Western Ontario who is calling for health studies into the wind turbine farms being built in the Province and suggests that if there is enough evidence, a formal epidemiological study should be made.¹⁴ Alves-Pereira & Branco's conclusion was that infrasound and low frequency noise generated by WT blades can lead to severe health problems, specifically, VAD, and efficient zoning for WT must be scientifically determined, and quickly adopted, in order that Public Health may be properly protected.

Perception

In no part of the confrontation between the wind power industry and people have there been more attempts at misrepresentation than in relation to noise and visual intrusion. The following quotations from Pedersen & Waye's (2005) paper to the 1st International Meeting on Wind Turbine Noise sums up the subjective feelings of countless people, that exposure to wind turbine noise, shadows and the rotating movement of the rotor blades, were an intrusion into the "private domain".

The wind turbine noise was by some of the informants perceived as intruding into private domain, physically into

the garden and the home, but also as intruder into themselves.

The experience of lacking control, being subjected to injustice, lacking influence, and/or not being believed.

The noise . . . was to those who could not mentally shut it out, an obstacle to pleasant experiences decreasing the joy of daily life at home . . . creating a feeling of violation that was expressed as anger, uneasiness, and tiredness.

That such feelings are not amenable to interpretation by noise metering is the crux of the problem. A dripping tap making a sound near the lower threshold of hearing can be more infuriating than the continuous hum of traffic on a nearby road.

As the science of acoustics has developed, sociological surveys have become an important aspect in developing noise criteria. These surveys, combined with accurate measurements of the noise, enable a reliable assessment of the percentage of people likely to be annoyed to be developed.¹⁵

The setting of levels in ETSU-R-97 in no way made this sort of approach. It does appear to be true that a significant proportion of people are much more seriously affected by noise than others. In our twenty-first century society a similar proportion of people also suffer from a range of disabilities which reduce the quality of their lives and Government has been wise in making it a legal requirement that such unfortunates should not be prevented from leading a normal life. However, the same government has engendered a subsidy system without which wind turbines could not be built. The consequence is that a sensitive minority may be tormented by the legal, but in my view quite unreasonable, activity of wind power developers.

Unfortunately, despite 20 years of complaint about noise, most of the evidence is still dismissed by government as apocryphal and it will remain true that there is little clinical evidence until proper independent research is financed. The repeated reference to compliance with ETSU-R-97 which appears in countless government statements and planning documents is little more than an escape clause. The noise problem of wind turbines, both modulation effects and low frequency sound, is not addressed by the provisions of ETSU-R-97 and the document seems not to be a fit instrument for purpose.

I close this account of wind farm noise with sympathy for the thousands of people, worldwide, who could write, as has the Marton, Askam & Ireleth Windfarm Action Group (MAIWAG):

The windfarm is noisy, it is a visual blight, it does create shadow flicker, it has resulted in very little benefit to the local economy, it has not resulted in an increase in tourism and negotiating with PowerGen Renewables and Wind Prospect to try to resolve the problems has been a most unpleasant experience for all those involved. Simply put, we want our quality of life back.

(<http://www.windfarm.fsnet.co.uk/index.htm>)

Shadow flicker, reflection and silhouetting

Shadow flicker occurs when the sun passes behind the hub of a wind turbine and shadows of the rotating blades pass repeatedly over neighbouring properties. The seasonal timing and duration of flicker can be calculated from the geometry of the turbine, its orientation relative to nearby houses and the latitude of the site. Quite detailed information and a calculator are given on the Danish Wind Industry Association (DWIA) website.¹⁶ Wind power developers claim to use commercially available software to minimise the risk of shadow flicker affecting homes. According to the DBERR website, flicker "has only been recorded occasionally at one site in the UK. The effect must depend to some extent on

Kelly S. Lundgren

From: larry newman <4necola6@gmail.com>
Sent: Tuesday, February 19, 2019 10:59 AM
To: County Clerk
Subject: Fwd: Wind Farms Yuk!

----- Forwarded message -----

From: larry newman <4necola6@gmail.com>
Date: Fri, Feb 15, 2019, 3:20 PM
Subject: Re: Wind Farms Yuk!
To: JD Trucking <ayrjdtr@gmail.com>

Rhonda, we had a meeting with 2 of our commission members yesterday at noon, just when your email came in, I'm sure they are pro wind don't know if we had any effect on them, all we want is a 1 mile set back from our dwellings, I know that isn't enough. Would like to talk and maybe get some ideas, we went through this 3 years, got them stopped with noise levels and now their back trying to get the noise levels changed, just for participating, left non participating the same. Any way would like to pick your brain, we know the fight is far from over. Number here is 402 209 2414, call at your convenience or will try to call you!! They vote next week on Tuesday.

On Thu, Feb 14, 2019 at 11:56 AM JD Trucking <ayrjdtr@gmail.com> wrote:

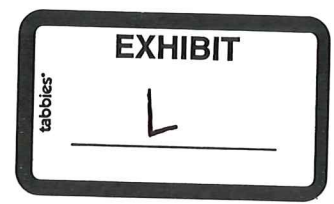
Larry,

Ron Richards sent me your email address. We fought a valiant battle with a wind "farm" developer for years. Unfortunately our outcome was devastating. I did not bring my reams of information to Arizona with us. In fact, I had such hard feelings that I disposed of all my files after we moved. Then, guess what?? Our new county had wind developers courting them. So I answered their invitation to come and speak to the Planning Commission. I would be happy to talk with you. My cell number is 402-661-1711. We are frequently away from the phone, but feel free to call and I will get back to you.

We (in our heavily populated corridor along Highway 4) not only battled Infinity, the developer, but we battled our county officials, zoning commission members, and some neighbors. It is a long story, but I may have some information that could be helpful.

We love Candy and Ron and go way back to grade school. Call or email if you wish.

Rhonda Rutt



From : Russell Miller
341 S. 52
Lincoln, Nebraska 68510

18 February 2019

To : Lancaster County Commissioners

Enclosure 1: Sheldon's power plant 2017 emissions

Subject : Text Amendment 18016 (concerning wind turbines)

Hello,

As a resident of Lancaster County I am in favor of wind farms because of the positive impact it will have on our air quality AND Lancaster County tax base. Despite the opposition of a small group of County residents, the entire County population will benefit from wind farms and I hope you consider what is best for all 300,000 of our citizens.

The first benefit is that the coal burning electric generation plant located near Hallam will not have to be used as much. In the year 2017, Sheldon, which will be a next-door neighbor to a wind farm, emitted 1,400 tons of nitrogen oxides and 1,900 tons of sulfur dioxide. It is well documented both of these pollutants are particularly harmful to children under 5 years of age, elderly persons, and all persons with breathing problems. These two pollutants cause or magnify asthma, COPD and other lung diseases.

The second benefit will be for all of Lancaster County residents because of the increased tax base that wind farms will produce. It is expected the the proposed project by NextEra will generate about \$800,000 in new tax revenue annually. The big winners from these new taxes will be Norris and Crete Public Schools which receive about 70% of the total assessed taxes. The rural fire departments will also benefit.

The obvious intent of this text amendment as proposed by the applicant is to make it very difficult to have wind farms. This is because of their opposition to the towers. It has nothing to do with safety or health. I urge this Commission to vote against the entire request or accept only the changes as recommended by your staff.

Thank you,

Russell Miller

Enclosure 1: Sheldon's power plant 2017 emissions

On Aug 21, 2018, at 3:17 PM, Gary R. Bergstrom <gbergstrom@lincoln.ne.gov> wrote:

Mr. Miller,

The most recent full year of plant-wide emissions from the Nebraska Public Power District's (NPPD) Sheldon Station that we have available is for calendar year 2017. I have provided that information in the table below.

Pollutant	Emissions (tons)
PM10 (particulate matter >10 μ m)	7.42
NOx (Nitrogen oxides)	1,406.13
SO ₂ (Sulfur dioxide)	1,961.79
VOC (Volatile Organic Compounds)	26.31
CO (Carbon Monoxide)	665.49
HAPs (Hazardous Air Pollutants - Combined)	32.34
Total	4,099.48

Additionally, I do want to correct one misconception on the plant's operations. NPPD Sheldon Station has not yet converted either of its two coal-fired boilers to hydrogen, and that conversion is not anticipated to occur for at least the next couple of years.

We do not have any data on how far the pollutants travel, as air pollution dispersion is heavily dependent on weather patterns. Some emissions may impact the nearby area, while some emissions may be transported hundreds of miles or more.

I hope you find this information helpful. Please let me know if you have any questions.

Gary R. Bergstrom august 13, 2018 at 1:37pm

RE: request for Sheldon's power plant air pollution
To : Russell Miller

The reduction in emissions at Sheldon Station is due to a combination of factors. They did add emission controls to reduce their emissions air pollution emissions, but they have also seen lower levels of operation due to being part of the 'Southwest Power Pool'. I don't know exactly how much impact wind and solar power generation have had on power generation at Sheldon Station, but I would recommend contacting NPPD for questions on that matter.

The emissions of mercury are included in the 32.34 tons of HAP emissions. Mercury emissions in 2017 came to a total of 3 pounds, substantially lower than the 36 pounds emitted in 2014. Again, that reduction is due to a combination of emission controls and reduced power generation. For reference, 3 pounds of mercury equates to just under 7 tablespoons.

MINUTES
LANCASTER COUNTY BOARD OF EQUALIZATION
COUNTY-CITY BUILDING, ROOM 112
TUESDAY, FEBRUARY 19, 2019
IMMEDIATELY FOLLOWING THE LANCASTER COUNTY
BOARD OF COMMISSIONERS MEETING

Advance public notice of the Board of Commissioners meeting was posted on the County-City Building bulletin board and the Lancaster County, Nebraska, web site and emailed to the media on February 15, 2019.

Commissioners present: Jennifer Brinkman, Chair; Roma Amundson, Vice Chair; Sean Flowerday, Deb Schorr and Rick Vest

Others present: Kerry Eagan, Chief Administrative Officer; Ann Ames, Deputy Chief Administrative Officer; Jenifer Holloway, Deputy County Attorney; Dan Nolte, County Clerk; Cori Beattie, Deputy County Clerk; and Monét McCullen, County Clerk's Office

The meeting was called to order at 11:09 a.m., the location of the Nebraska Open Meetings Act was announced.

1) MINUTES:

A. Approval of the minutes of the Board of Equalization meeting held on Tuesday, February 5, 2019.

MOTION: Amundson moved and Schorr seconded approval of the minutes. Schorr, Flowerday, Amundson, Vest and Brinkman voted yes. Motion carried 5-0.

2) ADDITIONS AND DEDUCTIONS TO THE TAX ASSESSMENT ROLLS

MOTION: Schorr moved and Amundson seconded approval of the additions and deductions. Vest, Schorr, Flowerday, Amundson and Brinkman voted yes. Motion carried 5-0.

3) PUBLIC HEARINGS:

A. Motor Vehicle Tax Exemption Applications (See correlating item 4)

MiddleCross Church of the C&MA

Pius X High School

The Chair opened the public hearing.

No one appeared in support, opposition or in the neutral position.

The Chair closed the public hearing.

4) ACTION ON MOTOR VEHICLE TAX EXEMPTION APPLICATIONS

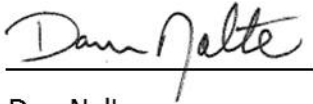
MOTION: Amundson moved and Schorr seconded to approve the motor vehicle tax exemption applications. Amundson, Vest, Schorr, Flowerday and Brinkman voted yes. Motion carried 5-0.

5) PUBLIC COMMENT: Those wishing to speak on items relating to County Board of Equalization business not on the agenda may do so at this time.

No one appeared for public comment.

6) ADJOURNMENT

MOTION: Schorr moved and Amundson seconded to adjourn the Lancaster County Board of Equalization meeting at 11:11 a.m. Flowerday, Amundson, Vest, Schorr and Brinkman voted yes. Motion carried 5-0.



Dan Nolte
Lancaster County Clerk

