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PUC Public Meeting for Clark County, SD Crocker Wind Farm

September 13, 2017

David Brouwer.....Respiratory Therapist.....

Thank you for the time you have given me tonight. I want to discuss the concerns over negative health effects caused by IWT's but want to take a moment to mention a couple other things that I ran across in the application for this project that was on the PUC website.

In this application they have mentioned 4 generalities that they must meet with this project. This includes that:

- The facility will not pose a threat of serious injury to the environment or to the social and economic condition of inhabitants in, or near, the Project Area;
- The facility will not substantially impair the health, safety, or welfare of the inhabitants;
- The facility will not unduly interfere with the orderly development of the region.

In their opinion this project will meet these requirements. I would stress this is in their opinion and this opinion is based on a developer and their associates who's only purpose is to make a profit for their investors. There is a wealth of unbiased information that is based on reality and not their perception that would tell you that this wind project is not able to meet these requirements and ignores the rights of non-participating land owners as well as the health, safety, and welfare of the county as a whole. In my experience, and of many across this state; project developers, as well as those associated with them, will say whatever they need to, whether it is fact or fiction, to further the project. I believe that you are well aware of this as you also have been told things that were not true or did not happen at different times among different projects across the state. There is a clear and consistent history of this and it is only increasing as the public is learning about the negative effects of the industrial wind energy industry.

How is this project not posing a threat to the social and economic condition of those who live in or near this project? This splits the community in two, the developers divide and conquer. How does it help the homeowner who has put their entire life into their property and the value of this property decreases by up to 40% and may be unsellable? Proponents of industrial wind will quote you a massive study that used the worst type of methodology available that limits the sales that are placed in the study and that has absolutely no regard for what the realtors and appraisers industry have been saying for years. These are experts and professionals who tell us there is property value loss if you live in or close to industrial wind projects. Just one of many of these unbiased studies was done by the Forensic Appraisal Group in Wisconsin (2009).

How this is economically beneficial to all when our cost of electricity goes up; at the same time a significant portion of our tax money is spent on incentives for industrial wind? We pay for the wealthy to make even more money, it is shameful! Just talk to your local electric cooperative managers who are under the umbrella of Basin Electric. The power source for this part of the region. They all say the same thing, our rates are going up due to the heavy investment into wind energy and other renewables. In addition we as a taxpayer are paying taxes that companies putting up wind farms avoid with tax credits. Now the next expense our cooperatives will be paying is the buildup of more base power to support the variability that occurs with an increase in wind energy. How economical is it to have a power source that runs at approximately 30% capacity, wind; compared to natural gas which operates at roughly 80-90% capacity. How economical is it to have to pay for a second power source because wind production isn't reliable enough. A new study in Europe states that in order to keep the volatility of the grid down there needs to be 100% backup power available for wind energy production (Linnemann & Vallana, 2017). These developers and industrial wind energy proponents are living in their own twisted perceptions and not reality at all.

Now let's talk about health.

Whether proponents of Industrial Wind want to admit it or not there is a negative health effect on people and animals that is caused by Industrial Wind Turbines (IWT's). This negative health effect is caused by both audible and inaudible sound. This inaudible sound is often referred to as infrasound. Sound is very complex and I am not going to pretend that I understand it on any serious level. What I do understand though is that community noise, such as that made by IWT's as well as planes, trains, and automobiles, to name a few, can and does have a negative effect on the health and welfare of those in close proximity to it. This is supported by experts again and again in the literature as well as by the World Health Organization (WHO). Not everyone is going to have negative effects but a significant portion of the population will and it will have a negative effect on their health, quality-of-life, work, and sleep.

Much of the health information that Industrial Wind proponents share with the public may be published information but it is comprised of literature searches and review that is often incomplete and limited when you compare their findings to that of the original authors of the studies being reviewed.

Let's look at what the WHO has found regarding noise and its effect on people. This information can be found in the *WHO's nighttime noise guidelines for Europe, (2009)*. Table 3 in the executive summary gives us the health effects observed in the public caused by noise at the A weighted decibel level, not taking into consideration the effects that low frequency and infrasound has on the population. At 30-40 dB a number of effects on sleep are observed with the more vulnerable being more susceptible. At 40-55 dB adverse health effects are observed among the exposed population. Many people have to adapt their lives to cope with the noise at

night. Vulnerable groups are more severely affected. How is this application by the developer, which allows 50 dB(A), in the best interest of those who have to live in and around this project? I will tell you it isn't and it is compromising the health, safety, and welfare of the citizens of Clark County.

What makes this even more significant is the differences between the environmental noise that the WHO looked at in this study and the increased severity that IWT noise has on the population. A piece of literature that is often cited by others, even in governmental white papers, is that of *Pederson and Waye, (2004)*. They found that the population was annoyed by IWT's at much lower sound levels than that of other environmental noise that the WHO studied, planes, trains, and automobiles. This is more than likely due to the high levels of low frequency noise and infrasound that is found in IWT noise. This annoyance that I am talking about includes sleeplessness, headache, tinnitus, poor concentration, etc. In addition, the WHO says "it should be noted that a large proportion of low-frequency components in noise may increase considerably the adverse effects on health." (WHO, 1999).

How is having a decibel level of 50 db(A) not having a negative effect on the health of those who have to live in and around this project? I will give you the answer, it ISN'T.

Proponents often use two literature reviews, or studies as they call them, to support their health claims. The *Massachusetts-Wind Turbine Health Impact Study* that was published in 2012. In addition to the MIT study that was published in 2014.

I am not going to quote every study that the 2012 Review that the state of Massachusetts did but have included a great testimony by Dr. Raymond Hartman when he critiqued this literature review in front of a Rhode Island zoning board in 2013.

The panel of this literature review claimed to have done an extensive search of health related articles and studies on the health effects of IWT's yet they reported on only 5 articles to support the research that they did. In addition the panel that wrote this for the state of Massachusetts seemed to have found different conclusions than that of the actual authors of the research they were reviewing. The panel concluded that there was limited, insufficient, or no association between IWT exposure and annoyance, sleep disruption, or psychological distress. Yet that doesn't appear to be what the authors of the original research found. All of the original studies found that there were negative effects to health and quality-of-life of those who have to live close to IWT's.

The MIT literature review sounds impressive, doesn't it? Well, I advise you not to be. It was paid for by a grant from the Canadian Wind Energy Association and the lead author fails to reveal the extent of his financial ties to industrial wind. This includes but is not limited to his consultant positions and support for his research at MIT. Would you consider this bias? I will leave that up to each individual to decide after they have looked at the entire picture.

Again, the conclusions of this literature review from MIT was much different than the conclusions of those who did the studies that they were reviewing. In addition a literature review from the Northern Ontario Medical School that was published in 2014 looked at all the same studies that the MIT review did and came to a very different conclusion too. They stated that "all the peer-reviewed studies captured in our review found an association between wind turbines and human distress. Two studies showed a dose-response relationship between distance from wind turbines and distress, and none of them concluded no association" (Arra, Lynn, Barker, et al., 2014).

This is an example of the limited and incomplete information wind proponents are sharing with the public. This shows the way they take bits and pieces out of the literature but fail to report the context and overall conclusions of the literature. Industrial Wind proponents choose their words carefully. You will notice they often use the blanket statement that IWT's don't have a *direct* adverse health effect. In other words, people aren't complaining about hearing loss. What they are complaining about is annoyance, sleep disturbance, symptoms similar to motion sickness, stress, decreased quality of life, cognitive impairment, etc. These symptoms are what they would call *in-direct* adverse health effects. Since they aren't a direct effect Industrial Wind proponents just ignore them and act as if they don't exist.

So where do we turn to find the information that is needed to protect the health, safety, and welfare of the citizens of South Dakota?

I would start with Punch and James, 2016, *Wind Turbine Noise and Health; a four decade history of evidence that wind turbines pose risks*. In this review of the literature they argue against the position that "many expert review panels and some individual authors, in the US and internationally, have taken the position that there is little literature to support concerns about adverse health effects from noise emitted from IWT's". They found that "the reviewed evidence overwhelmingly supports the notion that acoustic emissions from IWT's is a leading cause of adverse health effects in a substantial segment of the population" (Punch & James, 2016). Another article to read is titled *Industrial Wind Turbines and Adverse Health Effects* that was published in the Canadian Journal of Rural Medicine, (2014), by Jeffery et al. They concluded that if placed too close to residents IWT's can negatively affect the physical, mental, and social well-being of people.

Nissenbaum et al (2012) published a study that they did in Maine. It was titled *Effects of Industrial Wind Turbine Noise on Sleep and Health*. It can be found in *Noise and Health*, 2012. They used questionnaires that are used across the country by medical professionals to measure sleep health in people. In addition they had a control group. The control group was 3-7 km away from IWT's while the test group was 390-1400 meters away with a mean of 805 m. What they found was that those in the test group living near the IWT's had significantly worse sleep and poorer mental health compared to those in the control group living farther away. They concluded that the noise emissions of IWT's disturbed the sleep and caused daytime sleepiness and impaired mental health in residents living within 1.4 km of the two IWT installations

studied. IWT noise is a further source of environmental noise, with the potential to harm human health. Current regulations seem to be insufficient to adequately protect the human population living close to IWT's. Our research suggests that adverse effects are observed at distances beyond 1 km. Further research is needed to determine at what distances risks become negligible, as well as to better estimate the portion of the population suffering from adverse effects at a given distance.

We need to understand that the affect IWT's have on health and sleep is a concern that we all need to be looking at more closely. Poor sleep quality has been shown to effect the biological functioning of the body. It has been shown to increase the risks of cardiovascular disease, stroke, depression, obesity, and the list goes on. Recently the American Academy of Sleep Medicine came out with a consensus statement regarding recommendations of the amount of sleep needed to promote optimal health in children and teenagers to avoid the health risks of insufficient sleep. The panel found that not getting sufficient sleep is associated with attention, behavior, and learning problems. Insufficient sleep also increases risks for accidents, injuries, hypertension, obesity, diabetes, and depression (Paruthi, et al., 2016). Are we exposing our children to these risks with the current statutes? I would say yes, current ordinances are not taking into consideration the effects of sleep disruption and the possibility that current setbacks and sounds levels are creating sleep disruption in our population.

A source of information that was developed for the purpose of helping government bodies understand and help develop statutes regarding environmental noise is the WHO's Nighttime Noise Recommendations for Europe that was published in 2009. This is often considered the gold standard for noise and health. This is a document that you all have easy access to on the internet and is close to 200 pages long. There are a number of conclusions that occurred with this study of which the only one I need to present to you is this: *sleep is a biological necessity and disturbed sleep is associated with a number of adverse impacts on health.*

I would remind you of what Pederson found in an earlier study I mentioned. At the same decibel level people were much more annoyed by IWT noise than they were other environmental noise. The WHO recommends nighttime noise levels should be at 40 dB(A) or less. With IWT's being much more disturbing what level is safe for those who have to live among them? Definitely considerably less than what the WHO found with planes, trains, and automobiles.

Shepard reported that those living within 2 km of IWT's had significantly lower sleep quality as what was found by Nissenbaum at 1.4 km compared to >3.3 km.

I would like to leave you with just a touch of reality from a couple testimonies I have taken from a book that was written by a local author, Gregg Hubner (2017). Keith May, March 2017 who

lives in Holt County, Nebraska; "We were told the towers would be no closer than 4-5 miles; they are 1 3/8 miles from our home. They also said we would not hear them, we do when we are on the back side or the down wind direction. The sound is disturbing to our peaceful place". Then there is the Dr. who wants to remain nameless in March 2015 from Bloomfield, Nebraska. He states that the "closest tower is 5/8 mile, and when wind direction is right with high humidity, we can hear the whoosh with the windows closed and the TV on.

The parameters that are on this wind project in Clark County are disturbing when reading these and having read or heard so many more experiences like this from across the state and across the country. We all have a right to the quality-of-life we have come to expect and have spent our entire lives achieving and it is wrong for a developer to come in and take this away in an instant in the name of financial gains for a few who more than likely are much more wealthy than those who are having their quality-of-life and health taken away from them.

Thank you for this opportunity to share.....

Questions?

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