WS-4

Exibit for 18-053

Safety setbacks and negative impact on business and property

Some locations are heavily dependent on tourism dollars and employment. Let's use North Carolina's *Crystal Coast* (Carteret County) as an example.

Most states list tourism related economics. In this case, the North Carolina Department of Commerce* says the 2013 figures for Carteret County are:

$303± million in Tourism related revenue
3060± jobs in Tourism related businesses
$31± million in state and local tax revenues from travel to Carteret County. (This represents a $450 tax saving to each county resident.)

Almost all studies done by independent experts conclude that there will be Tourism business lost when industrial wind energy is introduced into a tourist area. Some play it down by saying that these loses are not "significant."

The most detailed study to date, funded by the Scottish Government (a wind proponent) concluded that the annual losses would be from 2% to 6%. A decrease of 4% in the *Crystal Coast* tourism business would amount to:

$12.1± million in Tourism related revenue lost annually, plus
122± Tourism jobs lost annually

It seems that most people would consider those losses to be significant. And this is just one economic burden to the community (see WiseEnergy.org) — but this just by itself, would result in any locally proposed wind project being a NET LOSS. In other areas, the significance of the impact will vary.

Here is a collection of **180±** articles & reports on the effects on Tourism from industrial wind energy being nearby. Below is a sample of these studies:

1-"80% would Not Come Back" (2016: NC University)

2-"Wind Turbines and Rural Tourism" (2003: VisitScotland)

3-"The Effect of Wind Power Installations on Coastal Tourism" (2010)

4-"Tourism Effect of Wind Turbines in Prince Edward County" (2012)

5-"Do wind farms affect tourism?" (2009: Quebec Government)

6-"Investigation in the Potential Impact of Wind Farms on Tourism in Wales" (2003: Wales Tourist Board)

7-"The Dorenell Wind Farm: Tourism Impacts & Implications" (2010)

8-66% say turbines make Scotland a less appealing place to visit (2014)

9-"Offshore Wind in Southern Europe – Tourist Preference and Acceptance"

10-The impact of wind turbines on tourism – a literature review (2012)

* "This study was prepared for the North Carolina Division of Tourism by the US Travel Association."

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From:	Chad Pepin [chad.pepin@gmail.com]
Sent:	Monday, November 01, 2010 2:44 PM
To:	William Cundiff
Cc:	Patricia Gates
Subject:	Wind Turbine Safety Setbacks and concerns
Attachments:	Info - Vestas V90 Safety Manual.pdf; ATT00031.htm

Mr. Cundiff.

I've read through the Nordex Safety Manual, as well as the Vestas Safety Manual. I consider the Vestas manual also a credible source of information since Vestas is the leading Wind Turbine manufacturer, with approx. 70% market share worldwide.

In the Nordex Safety Manual on Page 52 it states:
DANGER! FALLING TURBINE PARTS In case of a fire in the nacelle or on the rotor, parts may fall off the wind turbine. In case of a fire, nobody is permitted within a radius of 500 m (1640 ft) from the turbine.

In the Vestas (V90) Safety Manual on Page 8 it states:
Do not stay within a radius of 400m (1300ft) from the turbine unless it is necessary.

From an engineering point of view, I'd consider these absolute minimum parameters, since they are related to safety and hazard zones. Both manufacturers seem to agree that there is a real hazard zone where parts can "fall off" between 400m to 500m. Our research also concurs with this. However, the setbacks established by the Developer and the ZBA in the variance are 305m (1000' ft) from dwellings. (not property line). This is well within this hazard zone, which is a direct contradiction to the manufacturers recommendations. In most cases, this will waive any liability from the manufacturer if an accident occurred.

If I take this data at face value, I'd strongly advise the ZBA and the Planning Board to reconsider the 1000 ft setback in light of this information. At absolute minimum, the setbacks should be changed to 500m (1640) feet from all property lines (not dwellings) to assure safety of anyone at any point on their property in the event of a fire or other turbine failure. Anything closer is clearly within the manufacturer's hazard zone.

It is stated in the Variance Decision of May 13 2009 that:

"Although the Site Plan Review decision may dictate more extensive setbacks, in no event shall such decision decrease the number of turbines below 13 or decrease the aggregate wind efficiency of the project as presented by by the applicant and analyzed by the Board during the site plan review process."

The ZBA meeting of May 6, 2009 spent a lot of time on this specific language. It was agreed not to reduce the efficiency of the project, but the verbal discussion also said that a health or safety issue would likely take some priority over a "project efficiency" issue.
The Douglas Wind Bylaw also speaks from the position health and safety and not about "project efficiency".

We have submitted quite a lot of information stating turbine failure can result in flying debris over 1500 ft, in some cases up to 3000 ft. The Nordex safety manual validates all the information we've submitted.

I only see one way to interpret this:
1.) Keep the turbines a minimum of 500m (1640 feet)* from all property lines, not just dwellings. Any area of property where a person can stand, walk, play..... etc. should be out of the manufacturer's hazard zone. This includes state forest land where hikers and hunters can be found.
2.) Fence in the entire hazard zone to assure no one can wander into the hazard zone unknowingly. The current plan is to fence in only an area around the turbines. This doesn't protect hunters and hikers from wandering into the hazard zone.

* This is bare minimum. There should also be a "caution" buffer added to further assure safety. If the hazard (red) zone is 1640 feet, this doesn't mean safety (green) zone is at 1641 feet. There should be a caution (yellow) zone, (for instance 20% or 300 feet) to be established by the planning board or ZBA which will further ensure safety of nearby residents and wildlife.

A few words about the "Industry Standard" of 1000 feet: This is not an industry standard. This is a default the developers are using in the absence of a standard. USA has not established a comprehensive wind siting code yet. This is similar to the construction industry before 1974, when the BOCA code was first implemented. Plenty of structures were built prior to 1974, but construction is undoubtedly better and safer today. This has not yet happened with wind turbines.

The safety zone should not be reduced or compensated by any fire suppression or automatic failure reducing gadgetry. This equipment can fail. The hazard zone is established by the manufacturer as a passive safety measure in the event of total catastrophic failure. Suppression methods and damage control methods (such as on site water supply) should be added to this passive safety measure. If your car is equipped with an airbag, it doesn't mean you should drive faster and more recklessly. The goal is to reduce overall injuries to ZERO - not to have one safety measure substitute for another.

"Fires and accidents rarely happen" is not an acceptable way of thinking. Most of us drive airbag equipped cars. The reason we have airbags is because they are proven to reduce injury and they are there if we need them.
Allowing a wind project within the hazard zone of a residential area would be no different than ordering a new car with no airbags and hoping for the best.

I don't see how this can be interpreted in any other way. This is clearly safety/hazard issue, not simply a nuisance issue. Further, this Nordex manual does not take into consideration the heavily wooded site in Douglas. A burning turbine projectile flying 1640 feet could likely start a forest fire wherever it lands.

Attached is the Vestas Safety Manual for your reference. You already have the Nordex manual.

Best regards.

Chad Pepin

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