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GETTING THE REAL FACTS

BROAD MOUNTAIN WIND PROJECT

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Wind power is an advanced energy technology that has been reliably supplying clean, affordable reliable electricity into the utility grid for decades. The proposed Broad Mountain Wind Project is an 80-megawatt development featuring 21 turbines in Packer Township and related transmission line access in Nesquehoning Borough. Upon completion, the project will produce enough clean electricity to power about 25,000 homes a year.

Unfortunately, a number of distortions and misconceptions have surfaced regarding the project. Here is a look at some of the key issues and the facts regarding the development of the Broad Mountain Wind Project. They include:

TURBINE SIZE:

As the renewable, clean wind energy industry has evolved, machines have become more efficient and larger, both in height and rotor diameter (swept area). **Fewer machines are required to deliver power, which lowers the cost of electricity for consumers while significantly minimizing environmental impacts because the footprint of the project is so much smaller.**

Consider that when the first wind project was proposed for Broad Mountain in the fall of 2013, a 200-megawatt (MW) project proposed to use 1.3 MW GE turbines, which would have meant over 150 turbines. A second wind proposal featured approximately 80 turbines. The Broad Mountain Wind Project is only 21 turbines producing 80 megawatts. This is a dramatic and significant reduction in impact.

While many individuals have no objection to the appearance of turbines, some critics of wind power often make a purely subjective objection regarding the visual impact. Some critics will go so far as to say that they are not opposed to wind power, but they do not want to look at turbines. Since you cannot have wind power without turbines, such critics cannot have it both ways. Nevertheless, the Broad Mountain Wind Project, by reducing the number of turbines from more than 150 to approximately 80, and now to 21 has significantly reduced that subjective impact.

Moreover, a recent flyer opposing the proposed Broad Mountain Wind Farm seriously distorted the potential visual effects of the clean energy project upon its completion. The flyer placed turbines on an image of Broad Mountain in a haphazard manner and at dimensions seriously misrepresenting the actual scale. Analysis of the visual notes by Digital Design & Imaging Service approximate the flyer to be using turbines that are 6.4 times larger than the actual turbines proposed for the project, projecting them at an unrealistic height of roughly 4,200 feet rather than their actual heights of 656 feet and 452 feet. Several other deficiencies severely distorted the optics of the image in the flyer as well.

At Broad Mountain Power LLC, we appreciate that residents have questions about what the final project will look like in their community once it is built. To help them understand the project more fully, factually accurate flyers are on display in our office in Weatherly or on our website.

PROPERTY VALUES:

Several prominent studies prove that wind farms post no negative impact on nearby property values.

In 2009, the U.S. Department of Energy's Lawrence Berkeley National Laboratory concluded a three-year study that found "neither the view of wind energy facilities nor the distance of the home to those facilities had any consistent, measurable, and significant effect on the selling prices of nearby homes. The conclusions reinforce other studies that found the same. A study of more than 50,000 home sales among 27 counties in nine states found no statistical evidence that home prices near wind farms were affected by the wind farm. (Wind Farm Proximity and Property Values: A Pooled Hedonistic Regression Analysis of Property Values in Central Illinois. Jennifer L. Hinman, (May 2010)).

A property value impact report was prepared and presented by a property value impact expert witness at the June 24 hearing of the Packer Township Zoning Hearing Board. The expert had studied what happened to property values after the construction of wind farms in two areas with similar

characteristics as the Packer Township and Nesquehoning areas. **The study and the expert concluded that the siting of a wind turbine does not have an adverse impact on the selling prices of residences and vacant land parcels in its vicinity.**

SHADOW FLICKER:

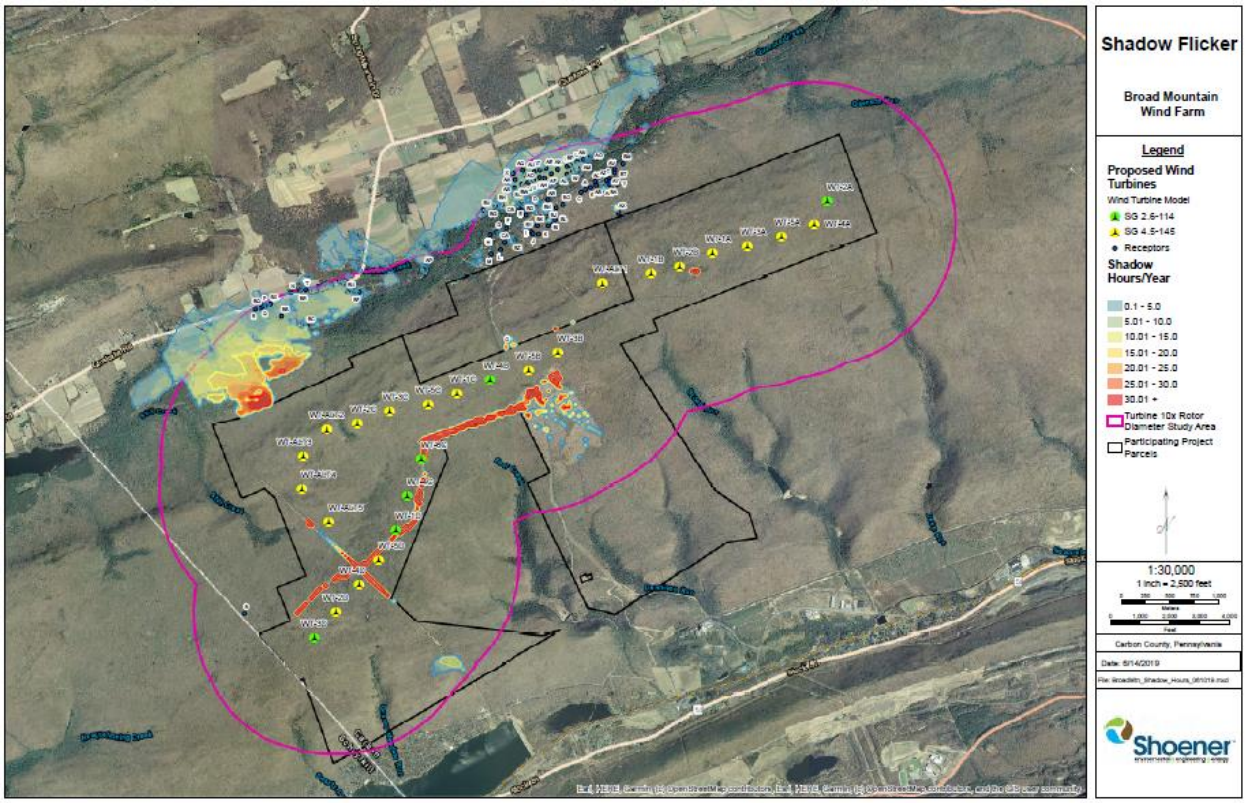
Shadow flicker refers to the moving shadows that an operating wind turbine may cast at certain times of the day when the turbine rotor is between the sun and a receptor's position. During specific circumstances of intervals of sunshine, wind turbines will cast shadows on the surrounding areas as the wind turbine blades pass in front of the sun, causing a flickering effect while the rotor is in motion. Shadow flicker occurs when the sun is at a certain position in the sky relative to the wind turbine and the right weather conditions are present. The amount of shadow flicker can be modeled utilizing specialized software, which determines the amount of shadow a receptor will receive in a given year.

Importantly, there are no human health impacts caused by shadow flicker from wind turbines, and in particular by the proposed Broad Mountain wind farm. Shadow flicker from wind turbines does not cause seizures, nausea, dizziness, sleep deprivation, etc. Shadow flicker may be described as a nuisance by some people. Shoener Environmental prepared a shadow flicker analysis, dated June 2019. As shown in Table 2, below, the analysis concluded that two homes may experience between 10 to 15 hours of shadow flicker per year, which is considered low. Shadow flicker hours decrease from there as follows: possibly 5 to 10 hours for 17 homes, 0.1 to 5 hours for 11 homes, and 0 hours for 49 homes in the study area. This shadow flicker report was presented as part of the Broad Mountain zoning hearings and concluded that no homes would receive over 20 hours of shadow flicker per year.

Table 2: Shadow Flicker Distribution at Receptors

Shadow Flicker (Hours/Year)	Number of Receptors	Receptor Status
30+	1	Participating (Hunt cabin)
25-30	0	Non-Participating
20-25	0	Non-Participating
15-20	0	Non-Participating
10-15	2	Non-Participating
5-10	17	Non-Participating
0.1-5	11	Non-Participating
0	49	Non-Participating

Because Lake Hauto Estates is south of the proposed wind farm, and because the sun rises in the east and sets in the west, **there is no shadow flicker at Lake Hauto Estates.** Shadow flicker is possible north of the proposed wind farm, for example, along Quakake Road. The map figure below is from Shoener's shadow flicker analysis.



RED LIGHTS ON TURBINES:

There are Federal Aviation Administration (FAA) requirements for line of sight for air traffic. Per the FAA Advisory Circular 70/7460-1L, wind turbines above 499' Above Ground Level (AGL) have to have two L-864 red lights on the nacelle of each turbine. It is a requirement to light every turbine above 499' AGL. The lights would be synchronized between the arrays. **This is an enhanced safety feature,** and the red lights are similar to those placed on other communication towers, smokestacks or other tall structures in and around the area.

ACCESS ROADS:

There are already access roads on the property, for example Fire Tower Road, and approximately 3.5 miles of existing roads will be utilized for construction of the project and maintained during operations. Approximately 6.5 miles of new road will be constructed in order to access the wind turbines sites. Construction of the new roads is guided by strict regulatory requirements. The proposed new roads for the project will be 16-foot wide gravel roads.

WATER QUALITY AND SOIL EROSION (NPDES):

There are no anticipated negative impacts to surface water or groundwater features related to this project. Surface water and groundwater protections are designed, implemented, inspected and maintained per the Pennsylvania Department of Environmental Protection (PADEP) guidelines. PADEP guidelines, in conjunction with the National Pollution Discharge Elimination System (NPDES) permit process, are intended to protect waters of the commonwealth during and after construction.

Stringent standards are met for stormwater management and sediment and erosion control measures during construction, as well as post-construction stormwater control measures. The PADEP as well as the Carbon County Conservation District have an integral part in the process of reviewing and approving the design. During construction, these agencies provide oversight of the work to ensure construction is done per the approved permit documents.

The total project footprint would use less than 8 percent of the total area that Broad Mountain has leased for development --- approximately 290 acres of the approximately 4,000-acre site. The owners of the land where turbines will be sited are able to continue using their land during and after construction.

SOUND EMISSION (NOISE):

Wind turbines emit sound --- they are a mechanical device; this has been recognized, measured, and studied in-depth by the scientific community. Wind turbines are virtually silent until the wind aloft begins to blow at about 10 miles per hour (mph). As winds aloft increase, the turbines produce more sound until they reach their maximum rotational velocity (at about 20 mph). **As wind speeds continue to increase the turbines do not spin any faster and do not produce any more noise.** Of course, as wind speeds increase so does the noise from the rustling of trees, bushes, and crops. When wind speeds are moderate, the sound of the turbines can at times be distinguished from other sounds in the environment. When the wind blows harder, the wind-driven noise of vegetation rustling continues to increase, but noise from the turbines does not. Under these conditions, the sound of the turbines is often completely drowned out by the background noise in the environment.

In fact, **at the residences located to north and south of Broad Mountain, the proposed wind turbines are expected to be completely inaudible a majority of the time.** At residences in the area turbine noise levels from the Broad Mountain Project will be lower than recognized standards and guidelines (World Health Org., U.S. Environmental Protection Agency, Health Canada, and U.S. and international health agency reviews). The turbines are predicted to produce less than 40 dBA at the closest residences, and less than that farther away. These are very low levels; lower than those on many wind farm projects operating in the United State, lower than those produced by two people talking in a normal voice, and lower than that produced by traffic and other existing sources of noise in the vicinity of the project.

Furthermore, it is understood that turbines produce low frequency noise (LFN), as do many sources both natural (wind blowing through trees) and man-made (traffic, trains, air conditioners). The levels of LFN produced by turbines at the nearest residences will be 1.) inaudible over that occurring today, particularly during a light wind, and 2.) an order of magnitude below the generally accepted standard.

INFRASOUND:

Several peer-reviewed studies have examined and analyzed the potential health effects related to infrasound sound near wind turbines. **There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.**

The **ground-borne vibrations from wind turbines are too weak to be detected** by, or to affect, humans.

Furthermore, the sounds emitted by wind turbines are not unique. In fact, infrasound is produced by many other man-made sources, such as conventional power plants, aircraft, agricultural equipment, and traffic. Infrasound is also produced by natural sources such as ocean waves or the wind blowing through trees and against houses. Wind turbine infrasound levels are far lower than the levels experienced riding inside a vehicle, such as a car or airplane. Environmental health studies confirm the absence of adverse health effects at the noise levels predicted for the Broad Mountain Wind project.

ELECTROMAGETIC INTERFERENCE:

Communications studies presented at the Packer Township zoning hearing state that **there would be no electromagnetic interference (EMI)** with microwave path systems, land mobile and emergency systems, AM & FM broadcast radio, cellular phones, WiFi/cable Internet, and cable/satellite TV. While the turbines may interfere with some over-the-air TV signals, Broad Mountain has a complaint procedure to address such issues.

An expert witness at a future zoning hearing will testify and state that there are no EMF impacts on medical devices, such as pacemakers, hearing aids, or insulin pumps. People experience much more EMF from household appliances, like toasters or hair dryers, compared to anything from the very low EMF levels at a wind farm.

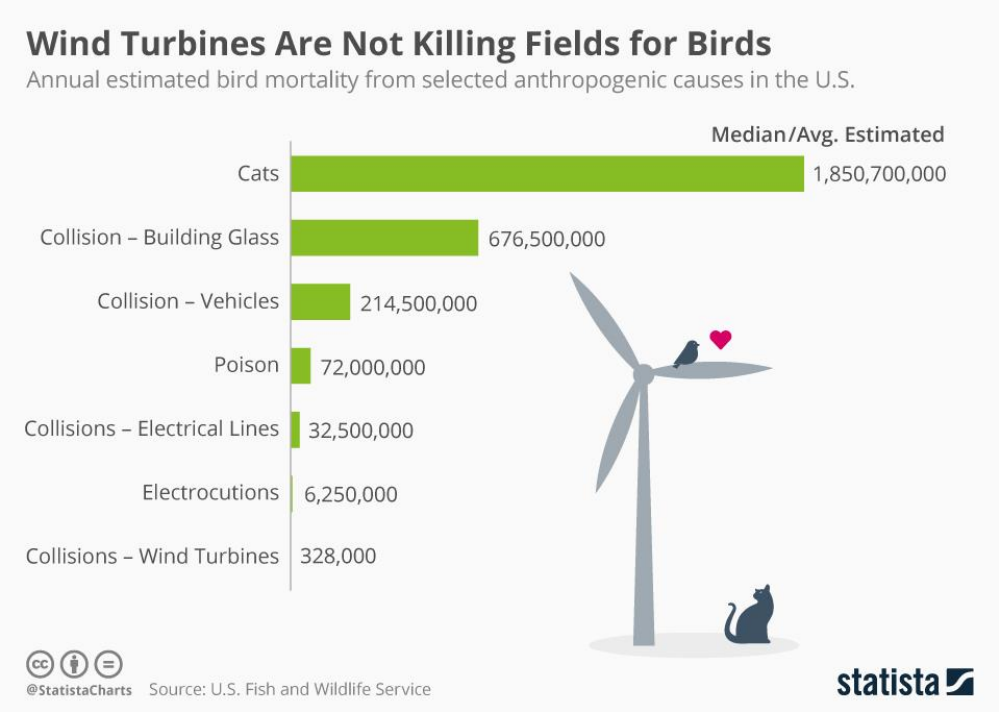
WILDLIFE MANAGEMENT:

Researchers routinely find that wind energy has one of the lowest impacts on wildlife and their habitats of any utility-scale way to generate electricity. That's why groups like the National Audubon Society and National Wildlife Fund support responsibly sited wind farms. Still, the wind industry is doing more than any other known mortality source to find ways to reduce its comparatively small impact --- and even find ways to offset others' impacts. Data from the Pennsylvania Game Commission's "Wind Energy Voluntary Cooperation Agreement, Third Summary Report" comes from pre- and post-construction wildlife surveys completed at the majority of wind sites in Pennsylvania. Only a few new wind sites have been constructed in Pennsylvania since this data were published. Among the findings:

- At least one pre-construction survey was conducted at 46 wind sites, and post-construction surveys were initiated at 16 sites.
- Most sites observed at least one bald eagle or golden eagle during pre-construction raptor surveys. However, no post-construction eagle mortality has been documented at any Pennsylvania wind site and overall raptor mortality is low regardless of raptor risk.
- The average estimated bat mortality for surveys that followed the game commission's protocol was 25 bats/turbine/year (Range: 5 – 59).

- The average estimated bird mortality for surveys that followed the game commission's protocol was 4 birds/turbine/year (Range: 1 – 10).

There is some potential for the local terrestrial wildlife to be affected, primarily in the form of avoidance during the construction phase of the project. However, during the operational phase of the project, disturbance would be minimal and the expected impact would be insignificant. Regarding birds, **wind energy is responsible for less than 0.01 percent of human-caused bird fatalities**. Additional information is available on this "Wildlife and Windpower" fact sheet.



MEDEVAC CORRIDOR:

According to an analysis of flight paths conducted by Capitol Airspace Group, the Broad Mountain wind farm could add between 12 and 55 seconds on a 20-22 minute flight, based on a helicopter flying at 90 knots from Hazelton to hospitals and landing sites in the Lehigh Valley. The Federal Aviation Administration (FAA) has jurisdiction, conducting aeronautical studies for all applications for tall structures, including wind turbines.

The Broad Mountain wind turbine applications are currently under review by the FAA.

ECONOMIC BENEFITS

The proposed 80-megawatt Broad Mountain Wind Project will **generate $93 million in economic activity in Carbon County during construction while supporting 270 direct, indirect and induced jobs with $6 million in earnings**, according to an analysis by Econsult Solutions Inc. Beyond the one-time economic impacts from construction, direct operating expenditures at Broad Mountain upon

completion will generate an estimated $3.1 million annually within Pennsylvania, with $2.7 million of that total occurring in Carbon County.

The Carbon County portion represents the largest portion of economic activity. Overall, the project will generate $128 million for Pennsylvania and support 420 annualized jobs with $16 million in earnings over the construction period because of spillover effects that stimulate business activity and support increased employment across a variety of sectors in the state. Construction also will generate one-time income, sales and business taxes to Pennsylvania totaling approximately $1.9 million from the direct, indirect and induced economic activity.

There are sustained, lasting benefits beyond construction. Each year, the direct operating expenditures at Broad Mountain will generate an estimated $3.1 million in economic impact within Pennsylvania and support 10 jobs with $1 million in earnings. Of this total impact, $2.7 million will occur in Carbon County. The increases in economic output and employment associated with the wind farm's operations also yield increases in state and local tax bases, with $57,000 annually to the state in income, sales and business taxes. In addition to taxes generated for Pennsylvania, approximately $100,900 in property tax revenues will be paid to local jurisdictions. Each year, $82,100 in property taxes will go to Weatherly School District, $17,760 to Carbon County, and $1,040 to Packer Township --- **a clear example of how wind projects like this generate long-term, predictable revenue streams for municipalities and schools through tax revenues.**

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