

**Estimated Annual
Community Financial Net Impact
for the Proposed
APEX/EDF Wind Project:**

An Annual LOSS of \$4.4± Million

**An Economic Study
for
Clay County, Texas**

November, 2019.

To Local Legislators:

The primary rationale for Clay County to support the proposed APEX/EDF industrial wind project (projected to be 100 - 120± turbines, each 500± feet tall), is that the developer has claimed that this would be a financial windfall to our community.

Clearly, such an assertion is self-serving. The only way the County can make an informed decision about the community economics for this wind project, is to fully assess all of its local financial impacts, both positive and negative.

In other words, it is Clay County's responsibility to perform an objective and comprehensive assessment of all potential economic impacts on a community wide basis — *before* giving any approvals to this complex, long-term project. To date, we believe no such assessment has been performed by the County.

We would hope that such information would be readily available from State agencies. For example, the Dept. of Health should be monitoring wind turbine health effects on State citizens. Similarly, we would hope the same for other departments such as Agriculture, Tourism and others. Unfortunately, we find that no State agency is keeping such data.

Since our local, county and state representatives are not providing this information, concerned citizens have compiled this following analysis.

The estimates presented here are supported by over 100 sample studies and reports as referenced in this report. Note that these are typically from independent third-party experts — as compared to the self-generated material frequently cited by the wind industry. Additional references on any of the above-mentioned issues, are available on request.

Sincerely,

North Texas Heritage Association, LLC

Estimated Annual Community Financial Impact for the Proposed APEX/EDF Project

Subject	Comments	Annual Income/Cost	References
APEX/EDF Project (100± turbines, each 500± feet high)	We are accepting the community benefits claimed by the wind developer at face value — even though none are guaranteed.	+ \$2± Million Income from property taxes, lease payments, misc. employment, etc.	Developer's documents & statements
Agricultural Losses Due to Bats	<ul style="list-style-type: none"> • It is well-documented that turbines can kill large numbers of bats. • The main solution the wind industry has is to shut off turbines. • Bats are prodigious insect eaters. An individual bat can consume 1000± insects an hour. • When wind turbines come to a community, the bat population can take a substantial hit. • Decreased bat population means many more insects, which results in a decrease in crop yields. 	— \$1.04± Million <i>Note 1:</i> Bats can travel 100± miles a day, and easily 10± miles from a wind project site. <i>Note 2:</i> A 10 mile radius from the project site (+ site itself) equals roughly 1/3 of our county area. <i>Note 3:</i> Take mid-range county impact with 80% due to turbines (Reference #2). <i>Note 4:</i> Approximate annual loss: \$3.82±M x 34.1%± x 80%± = \$1.04±M	1-5
Agricultural Losses Due to Local Weather Changes	<ul style="list-style-type: none"> • Industrial wind turbines can alter the weather up to 14± miles away. • Temperature and humidity can be adversely affected. • Temperature and humidity changes can lower crop yields. 	— \$1± Million <i>Note:</i> There are no good numbers for this type of loss (as the Texas Dept. of Agriculture has not monitored or studied this), so this is a low, rough estimate.	6-10
Residential & Property Devaluation	<ul style="list-style-type: none"> • This is a major Property Rights issue. • The Town has the obligation to fully protect what is likely its citizens most valuable financial asset. • Due to negative visual impact, residential property value will decline within at least a two-mile radius of the project site. • As local property tax revenue is lowered due to lost home values, ALL local property owners will end up paying a higher property tax rate. • Some property abandonment has happened near other wind projects. 	— \$3.9± Million <i>Note 1:</i> Based on 325± homes within 5± miles of wind project. <i>Note 2:</i> Average home value in S Clay County is \$140,000±. <i>Note 3:</i> Assumes home value loss (10%±) = \$4.6± million. <i>Note 4:</i> Total property value loss: 244k@\$3Kx10%=±\$73.2 million Total loss \$77.8 million <i>Note 5:</i> Annual loss (averaged over 20± year life of project): \$77.8±M / 20± = \$3.9± M	11-15
Tourism Reduction	<ul style="list-style-type: none"> • Multiple studies indicate that tourism can decrease in communities with visible industrial wind turbines (esp those that are vacation destinations). • NC State University (a pro-wind source) did a very applicable survey. Their results were that 80%± of tourists would not come back to where turbines are visible (Ref #17). 	— \$0.6± Million <i>Note 1:</i> Per the State (ref #16), our county tourism is \$5.6±M/year <i>Note 2:</i> 33%+ of the county will see these tall wind turbines. <i>Note 3:</i> A very low impact of only 30% (vs 80%) is assumed. <i>Note 4:</i> Estimated Annual loss: \$5.6±Mx34.1% x 30% = \$0.6± M	16-20

Subject	Comments	Annual Income/Cost	References
Adverse Health Effects	<ul style="list-style-type: none"> The World Health Organization has gone on record saying that the effects of infrasound can be much worse than those of audible noise. Some impacts of infrasound and shadow flicker are cardiac effects, anxiety, sleep disturbances, mental and emotional health decline, etc. Studies show that these impacts can result in an inability to perform daily tasks, compromised quality of life, and an increased risk of suicide. 	<p>— \$.2± Million</p> <p><i>Note 1:</i> Not everyone is affected the same way by these health problems — just like not all smokers get cancer.</p> <p><i>Note 2:</i> Human health is priceless, so there is no accurate way to give the full value of wind turbine caused human ailments. Here, a very low, rough estimate was made.</p>	21-30
Hydrogeological Impacts (Drinking water and wells)	<ul style="list-style-type: none"> Turbine base excavation (which can be over 40 feet deep), and related project construction, has been shown to put water wells at risk. Some communities have experienced dramatic or yet-to-be reversed damage including sediment and contaminants in ground water. Risk of well water loss can result in the additional cost to connect more residents to town water. The seriousness of these issues depends on local aquifer depth, soil percolation, etc. 	<p>— \$.1± Million</p> <p><i>Note:</i> There are no hard numbers for this type of loss as it is a very localized matter (i.e. dependent on local hydrogeological conditions, quantity of private wells, depth of private and community wells, etc.). This is a conservative, approximate estimate based on drilling or deepening 10 wells.</p>	31-35
Ecological Impacts, e.g.: Wildlife Ecosystems	<ul style="list-style-type: none"> Disruption of wildlife (birds, deer, bears, etc.) habitats due to road, power line, etc. fragmentation. Displacement of animals (e.g. due to tree removal). Direct negative impact to organisms' environment. Increased parasitic infections in certain populations (e.g. raccoon). Permanent soil erosion can impact local species. A single significant change in an ecosystem can result in a chain reaction that can be irreversible. 	<p>— \$.2± Million</p> <p><i>Note:</i> This amount of this loss is very dependent on the local terrain, degree of forestation, bodies of water, etc. Since no study has been done locally, this is a low, rough estimate.</p>	36-40
Miscellaneous, e.g.: Agricultural (misc.) Livestock Communication	<ul style="list-style-type: none"> Loss of employment, plus less seed and equipment, etc., purchases due to reduced farming operations. Reduction of pollinating insects. A variety of livestock ailments. Hunting restrictions and reduced available wildlife. EMS and communication expenses. Losses to turbine leaseholders. 	<p>— \$.3± Million</p> <p><i>Note:</i> This is an approximate low estimate of the financial consequences of several other possible negative results of this industrial wind project.</p>	41-50
NET TOTAL	Community Net Amount:	— \$6.4± Million per Year	

Sample References for Some Wind Energy Local Economic Impacts

Agriculture and Bats —

1. <http://wiseenergy.org/Energy/Wind_Economics/Bats_and_Agriculture.pdf>
2. <http://wiseenergy.org/Energy/Bat_County_Data.pdf> (US agricultural loss data, by county.)
3. <https://www.dec.ny.gov/docs/administration_pdf/batsofny.pdf>
4. <<https://academic.oup.com/jmammal/article/94/2/506/914006>>
5. <http://wiseenergy.org/Energy/Wind_Economics/Bats_and_Turbines.pdf> (Collection of studies, etc.)

Agriculture and Local Weather —

6. <<https://www.sciencedirect.com/science/article/pii/S0167610510001467>>
7. <<https://www.nature.com/articles/nclimate1505>>
8. <<http://www.co2science.org/articles/V20/aug/a17.php>>
9. <http://www.atmos.albany.edu/facstaff/mathias/pubs/Slawsky_et_al_2015.pdf>
10. <<http://iopscience.iop.org/article/10.1088/1748-9326/11/4/044024/>>

Residential Property Values —

11. <http://wiseenergy.org/Energy/Wind_Economics/Clarkson_Henderson_PV_Study.pdf>
12. <<http://www.spatial-economics.ac.uk/textonly/SERC/publications/download/sercdp0159.pdf>>
13. <<https://tinyurl.com/y6cx2k7q>>
14. <<https://tinyurl.com/y4nhhcq6>>
15. <http://wiseenergy.org/Energy/Wind_Ordinance/REValues.pdf> (Collection of studies, etc.)

Tourism —

16. <https://tpwd.texas.gov/publications/nonpwdpubs/media/nature_tourism_in_the_lone_star_state.pdf>
17. <<https://cenrep.ncsu.edu/2016/04/03/offshore-wind-tourism/>>
18. <<https://cenrep.ncsu.edu/2016/04/03/offshore-wind-tourism/>>
19. <<https://www.sciencedirect.com/science/article/pii/S0301421515300495>>
20. <<https://tinyurl.com/y5tx4vr9>>
21. <http://wiseenergy.org/Energy/Wind_Economics/Tourism.pdf> (Collection of studies, etc.)

Human Health —

22. <<https://asa.scitation.org/doi/pdf/10.1121/2.0000653>>
23. <https://file.scirp.org/pdf/OALibJ_2018122013570614.pdf>
24. <<https://tinyurl.com/y2huzqgs>>
25. <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3653647/>>
26. <<https://www.intechopen.com/books/acoustics-of-materials/acoustics-and-biological-structures>>
27. <<https://docs.wind-watch.org/Zou-suicide-2017-Oct.pdf>>
28. <http://www.waziristan-calc.igsz.de/infra/Weichb_2017.pdf>
29. <http://www.epaw.org/documents/Wind_Turbine_Noise_Sleep_Health.pdf>
30. <<https://puc.sd.gov/commission/dockets/electric/2018/EL18-026/prefiledexhibits/davenport/i32.pdf>>
31. <http://wiseenergy.org/Energy/Health/Sample_Wind_Noise_Studies.pdf> (Collection of studies, etc.)

Hydro-geological —

32. <<https://tinyurl.com/z2sbyrs>>
33. <<http://www.windconcernsontario.ca/wind-turbines-to-blame-for-well-water-problems-hydrogeologist>>
34. <<http://windeis.anl.gov/documents/fpeis/maintext/vol1/vol1ch5.pdf>>
35. <<https://www.wind-watch.org/news/2017/02/22/could-wind-turbines-taint-area-aquifer>>
36. <<https://tinyurl.com/yyb2g9ek>>

Ecological —

37. <<https://www.nap.edu/read/11935/chapter/5>>
38. <<https://wcfm.org/2016/10/02/wind-turbines-effects-on-animals/>>
39. <<https://www.spectator.co.uk/2013/01/wind-farms-vs-wildlife/>>
40. <<https://wildlife.org/wp-content/uploads/2014/05/Wind07-2.pdf>> (Collection of studies, etc.)
41. <<http://npshistory.com/publications/sound/wildlife-noise-bibliography.pdf>> (Collection)

Miscellaneous —

42. <http://wiseenergy.org/Energy/Wind_Other/Wind&Hunting.pdf> (Collection of studies, etc.)
 43. <http://wiseenergy.org/Energy/Wind_Other/Wind_Energy_Communication_Interference.pdf>
 44. <<https://www.mprnews.org/story/2009/10/15/reimer>>
 45. <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5846843/>>
 46. <<https://www.ncbi.nlm.nih.gov/pubmed/24597302>>
 47. <<https://canadafreepress.com/article/open-letter-windfarms-and-animals-e.g.-birth-defects>>
 48. <<https://greenliving.lovetoknow.com/environmental-issues/effects-clear-cutting>>
 49. <http://wiseenergy.org/Energy/Military/Military-Wind_Overview.pdf>
 50. <http://swkroa.com/docs/wind_energy_speech_6.pdf>
 51. <<http://docs.wind-watch.org/CALT-Legal-Brief-Wind-Energy-Production.pdf>>
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