

Wind Turbines and Property Values

As Pertaining to

City of Roses and Rolling Farms Wind Farms – Christian County, IL

Prepared for the Christian County Zoning Board

By

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July 6th, 2020

Craggs #1

Facts, analysis, exposure to industrial wind energy's real impacts



(/posts/50234-texas-turbine-fire)



(/posts/48001-wind-turbine-catches-fire-near-weatherford)



(/posts/46807-nextera-nebraska-turbine-collapse)



(/posts/46702-french-wind-project-contaminates-mexico-wildlands)



(/posts/46702-french-wind-project-contaminates-mexico-wildlands)



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opinion

Subsidizing the slaughter: Big wind kills another bald eagle, gets more federal subsidies

The extension of the PTC provides a stark reminder of how an influential industry can manipulate the Washington favor factory.

[more → \(/posts/51279-subsidizing-the-slaughter-big-wind-kills-another-bald-eagle-gets-more-federal-subsidies\)](#)





tell your story

Do you live near a wind turbine and want to share your story? Have you been involved in a wind fight in your community? Do you have experiences you'd like to share with our community?

We are accepting personal stories to be published on WindAction.org. [SUBMIT \(/contact\)](#) yours for consideration!

latest news and posts

- USA 🗨️ [Lies, Tricks, and Politics: Big Wind's assault on the truth \(http://www.windaction.org/posts/51429-lies-tricks-and-politics-big-wind-s-assault-on-the-truth\)](http://www.windaction.org/posts/51429-lies-tricks-and-politics-big-wind-s-assault-on-the-truth) 29 Jun
- Maryland 📄 [Group to continue opposing wind turbines; Action filed in Allegany County Circuit Court \(http://www.windaction.org/posts/51428-group-to-continue-opposing-wind-turbines-action-filed-in-allegany-county-circuit-court\)](http://www.windaction.org/posts/51428-group-to-continue-opposing-wind-turbines-action-filed-in-allegany-county-circuit-court) 27 Jun
- Kansas 📄 [Frankfort neighbors upset over company installing wind turbines \(http://www.windaction.org/posts/51427-frankfort-neighbors-upset-over-company-installing-wind-turbines\)](http://www.windaction.org/posts/51427-frankfort-neighbors-upset-over-company-installing-wind-turbines) 17 Jun
- 📄 [Wind Turbines: Why some families living in proximity to wind energy facilities contemplate vacating their homes: An overview of findings \(http://www.windaction.org/posts/51425-wind-turbines-why-some-families-living-in-proximity-to-wind-energy-facilities-contemplate-vacating-their-homes-an-overview-of-findings\)](http://www.windaction.org/posts/51425-wind-turbines-why-some-families-living-in-proximity-to-wind-energy-facilities-contemplate-vacating-their-homes-an-overview-of-findings) 28 Jun
- Ohio 📄 [Criticism of recent Lake Erie wind farm decision is misguided \(http://www.windaction.org/posts/51424-criticism-of-recent-lake-erie-wind-farm-decision-is-misguided\)](http://www.windaction.org/posts/51424-criticism-of-recent-lake-erie-wind-farm-decision-is-misguided) 28 Jun
- Colorado 📄 [Logan County faces quandary in urbanization of farm, ranch land \(http://www.windaction.org/posts/51419-logan-county-faces-quandary-in-urbanization-of-farm-ranch-land\)](http://www.windaction.org/posts/51419-logan-county-faces-quandary-in-urbanization-of-farm-ranch-land) 26 Jun
- USA Massachusetts 📄 [Environmental Impact Statement released for Vineyard Wind \(http://www.windaction.org/posts/51417-environmental-impact-statement-released-for-vineyard-wind\)](http://www.windaction.org/posts/51417-environmental-impact-statement-released-for-vineyard-wind) 25 Jun
- New York 📄 [In New York, the Town Of Freedom isn't free from big wind \(http://www.windaction.org/posts/51414-in-new-york-the-town-of-freedom-isn-t-free-from-big-wind\)](http://www.windaction.org/posts/51414-in-new-york-the-town-of-freedom-isn-t-free-from-big-wind) 25 Jun
- California 📄 [Lompoc Council seeks higher payment from Strauss Wind Farm \(http://www.windaction.org/posts/51413-lompoc-council-seeks-higher-payment-from-strauss-wind-farm\)](http://www.windaction.org/posts/51413-lompoc-council-seeks-higher-payment-from-strauss-wind-farm) 23 Jun
- California 📄 [Strauss Wind Energy Project; Still more questions than answers \(http://www.windaction.org/posts/51412-strauss-wind-energy-project-still-more-questions-than-answers\)](http://www.windaction.org/posts/51412-strauss-wind-energy-project-still-more-questions-than-answers) 24 Jun
- Germany 📄 [Prices near ceiling as another German onshore wind auction falls flat \(http://www.windaction.org/posts/51411-prices-near-ceiling-as-another-german-onshore-wind-auction-falls-flat\)](http://www.windaction.org/posts/51411-prices-near-ceiling-as-another-german-onshore-wind-auction-falls-flat) 25 Jun
- Ohio 📄 [Icebreaker developer appeals ruling after project approval \(http://www.windaction.org/posts/51410-icebreaker-developer-appeals-ruling-after-project-approval\)](http://www.windaction.org/posts/51410-icebreaker-developer-appeals-ruling-after-project-approval) 24 Jun
- USA 📄 [The Energy 202: House Democrats push aid for wind and solar in new infrastructure bill \(http://www.windaction.org/posts/51409-the-energy-202-house-democrats-push-aid-for-wind-and-solar-in-new-infrastructure-bill\)](http://www.windaction.org/posts/51409-the-energy-202-house-democrats-push-aid-for-wind-and-solar-in-new-infrastructure-bill) 23 Jun
- Illinois 📄 [Restrictions on crowd size stall Morgan wind project action \(http://www.windaction.org/posts/51408-restrictions-on-crowd-size-stall-morgan-wind-project-action\)](http://www.windaction.org/posts/51408-restrictions-on-crowd-size-stall-morgan-wind-project-action) 23 Jun
- Mexico 📄 [At least 15 dead in southern Mexico wind-farm feud killings \(http://www.windaction.org/posts/51407-at-least-15-dead-in-southern-mexico-wind-farm-feud-killings\)](http://www.windaction.org/posts/51407-at-least-15-dead-in-southern-mexico-wind-farm-feud-killings) 23 Jun
- USA Texas 📄 [Daniel Hoffman: China's assault on Texas – this project threatens US national security \(http://www.windaction.org/posts/51406-daniel-hoffman-china-s-assault-on-texas-this-project-threatens-us-national-security\)](http://www.windaction.org/posts/51406-daniel-hoffman-china-s-assault-on-texas-this-project-threatens-us-national-security) 23 Jun

- Ohio  Icebreaker Wind appeals OPSB's ruling (<http://www.windaction.org/posts/51418-icebreaker-wind-appeals-opsb-s-ruling>) 23 Jun
- Canada  US demand for clean energy destroying Canada's environment, indigenous peoples say (<http://www.windaction.org/posts/51405-us-demand-for-clean-energy-destroying-canada-s-environment-indigenous-peoples-say>) 23 Jun
- Nebraska  Nebraska Public Power District says R-Project route won't change after federal judge vacates permit (<http://www.windaction.org/posts/51404-nebraska-public-power-district-says-r-project-route-won-t-change-after-federal-judge-vacates-permit>) 19 Jun
- North Carolina  Changes to Chowan County's wind energy facility ordinance move forward (<http://www.windaction.org/posts/51403-changes-to-chowan-county-s-wind-energy-facility-ordinance-move-forward>) 18 Jun

[more latest posts → \(http://www.windaction.org/posts\)](http://www.windaction.org/posts)

Do Wind Projects Adversely Affect Proximate Residential Property Values?

The most basic law of economics is that things are valued based on the “Law of Supply and Demand.” It is exceedingly obvious, all things being equal, that many people (due to view, sound, flicker, etc) would choose NOT to buy a home where there are industrial wind turbines close by. (Whether they are right or wrong in their reasons is irrelevant.)

These beliefs would **reduce demand**, which clearly would have **some** negative impact on the price of such a property. Any report that concludes that there are zero negative property value effects related to wind projects simply can not be considered seriously. The only real question is *how much of an impact?*

This list is intended to identify just some of the more objective studies and commentary about the adverse effects of wind energy projects on home values near wind projects.

1 - Here are some more detailed analyses about wind project effects on property values, by independent professionals:

A 2013 [Study](#) of over a million homes by the *London School of Economics*, concluded that properties near turbines will decline in value.

[Searchlight wind farm could reduce property values by 25-60 percent, suggest studies.](#)

A 2012 study by Lansink Appraisers: [Diminution in Price.](#)

A 2012 Study by E.ON Energy Research Center (German Utility company): [The Impact of Wind Farms on Property Values.](#)

2012 [testimony](#) in Lee County, Illinois, by appraiser Michael McCann.

A 2011 study [Values in the Wind: A Hedonic Analysis of Wind Power Facilities](#) by Clarkson economics professor, Dr. Martin Heintzelman.

2 - These are some other analyses and commentary about wind project effects on property values:

[Wind farm 'blight' cutting value of homes by up to a third.](#)

["How do wind turbines affect property value?"](#)

[Property values are the new front line in the war over wind turbines
32 Lawsuits against wind developer — including property value loss](#)

[Falmouth Real Estate - "The Turbine Effect"](#)

[Turbines complicate sales of abutting homes.](#)

"Wind Industry [Big Lie](#): Your Property Value Will Not Be Affected."

[Vermont Wind Developer buys neighboring property after lawsuit](#)

"A new slant on wind projects" offers a very helpful [idea](#) as to put some of the economic benefits of wind projects into perspective.

This [site](#) has a fine collection of property value articles.

"Property Values decrease by 40% if view of wind turbines" is an [analysis](#) of a real estate broker on turbine impacts on residential values.

An excellent [discussion](#) by the Wisconsin Realtor Association about the adverse effects of wind development.

An [analysis](#) by an Illinois Realtor about effects of wind projects.

A [survey](#) by a Wyoming Realtor concluded that properties nearby a wind project were virtually unmarketable.

"Property values blowing in the wind" is a [report](#) done by a local Realtor about wind project effects in her area of northern NY.

See [here](#) and [here](#) where two Realtors make formal testimony about the effects of wind turbines on property values.

[Landowners say Turbines have Hurt their Property Values.](#)

[Wind turbines have reduced property values, court says.](#)

[Wind Turbine Compensation Stirring Discontent \(Denmark\).](#)

3 - This is specifically directed at landowners who are considering signing a wind lease:

[“Know The Facts BEFORE You Sign”](#) by the *Informed Farmers Coalition*.

4 - Here are some sample Property Value Guarantee agreements:

Note that despite the wind energy proponent’s continued claims that their projects have no adverse effects on property values, Iberdrola officially told this NNY community that they would not construct a project there if they were required to compensate land owners for property value losses. Most people would see that as being very hypocritical.

*In my view this brings up a KEY point. Wind developers often get approval based on specious claims (regarding jobs created, CO2 saved, etc.). They get away with this as there is no real penalty for exaggerations or stretching the truth. One of the best ways to counter this is to require that **all** these claims be legally guaranteed, in writing. Just like what happened in the above case, you will see an immediate back-tracking. This will reveal to citizens the accuracy and sincerity of the developer’s assertions.*

The Carteret County (NC) [Tall Structure Ordinance](#) includes an excellent property value guarantee. This was passed in February of 2014.

The Town of Newport (NC) also has a similar property value guarantee that was included in their wind law ([Article IX](#)), in late 2013.

This basic real [Property Value Guarantee](#) agreement was based on a plan drafted by Illinois lawyers.

DeKalb County (Illinois) Property Value Guarantee [Agreement](#). Some good [commentary](#) on the DeKalb Property Value Guarantee.

Property Value Guarantee [Agreement](#) from Adams County, Illinois.

An explanation of the fine Property Value [Agreement](#) created in Hammond, NY, and a later [version](#). [Wind developer for Hammond says [they will leave](#) if there is a Property Value Guarantee.]

Montville Maine [Wind Ordinance](#) includes a Property Value Guarantee.

[New Hampshire Town passes 3 mile Property Value Guarantee](#) (2014)

A detailed [critique 1](#) by appraiser Mike McCann, and a second one about a later Hoen report [critique 2](#).

“Turbine Effects on View Shed” are [observations](#) by engineer Chuck Ebbing (starts on page 20).

“False conclusions based on flawed real estate studies” are some fine commentaries [here](#), [here](#), and [here](#) by WindAction.

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A good [critique](#) of two earlier studies (similar to Hoen/Wiser) by Michael J. Miller, FCAS, MAAA.

[The Proposed Prairie Breeze Wind Project Will Harm the Property Values of Non-participating Owners.](#)

6 - Some Other Options:

In my view we should be piggybacking on ideas currently being employed by environmental groups to stop hydrofracking. Here is an example: [Sue Your Neighbor](#). Make sure to look at the part about an “anticipatory nuisance.” *Constructive condemnation* is another possibility, but appears to be a subset of the “anticipatory nuisance” legal definition.

Here is a relevant [case](#) where a Canadian homeowner sued to have his property assessment lowered due to nearby noise from a power station. He won the lawsuit and received a significant reduction.

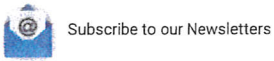
If you know of other good material, or there are errors of omission or commission here, please email these to John at: “aaprjohn at northnet dot org”.

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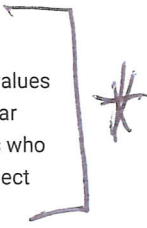
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Court decision paves the way for future lawsuits against wind turbine companies and lease holders

By Amanda Brodhagen, Farms.com

An Ontario Superior Court of Justice has determined that landowners living near industrial wind turbine projects do suffer from diminished property values. The court accepts that 22% to 55% loss of property values is occurring today. While the court found that residences may suffer from diminished property values near wind farms, Madam Justice S.E. Healey dismissed the claims made by the Collingwood area landowners who sued the wind company – Canada Corp. and lease holders, because the proposed eight-wind turbine project has yet to receive approval by the provincial government.



The claim was made by Sylvia and John Wiggins, who sued for \$2 million and argued that no one would buy their 48-acre horse farm once the wind project was announced for the area. The couple was also joined by other property owners.

The decision states that while the residence of Clearview Township cannot take action for reduced property values prior to the approval of the project, they could take action later. The ruling says "without prejudice to the plaintiffs' rights to commence an action for identical or similar relief when and if the Fairview Wind Project receives the necessary approvals to be constructed."

Eric Gillespie, the lawyer representing the landowners says the decision will clear the way for actions against both wind developers and lease holders. "It now seems clear that as soon as a project is approved, residents can start a claim. This appears to be a major step forward for people with concerns about industrial wind projects across Ontario," said Gillespie.

Wind Concerns Ontario, a coalition of community groups concerned about the negative impacts of wind projects, released a statement saying "...this is vindication for Ontario's rural and small urban residents, and for municipal councils who try to protect their citizens by declaring they are not 'willing hosts' to wind power generation projects," said Jane Wilson, president of Wind Concerns.

While Gillespie is calling this a major breakthrough for his clients, a spokesperson for the wind company - Kevin Surette, downplayed the significance of the courts findings saying that the ruling came early in the proceedings, noting that the court based its opinion on the evidence of the plaintiffs. Surette said that had the case proceeded, they would have challenged those claims.

The Ontario ministry of environment has six months to either approve the wind project or reject it.

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Experts offers insight to wind farm questions

By Cynthia Grau

Posted Feb 11, 2015 at 9:23 AM

An expert witness called by The United Citizens of Livingston County testified the majority of Tuesday evening during the ongoing Livingston County Zoning Board of Appeals hearing at the Walton Centre.

Michael McCann, of McCann Appraisal, LLC, a Chicago-based company, testified about property values and how they are negatively affected when wind turbines are installed.

He said he has 33 years experience in appraising many types of commercial real estate, land and special use properties. He also has extensive litigation experience, qualified as an expert witness in over 20 states, and has testified at federal and state trials, zoning hearings, utility siting boards and arbitration. He has also done work for other wind farm projects throughout the United States.

McCann presented a slide show with many maps and figures. He also illustrated reasons for people to sell property with a turbine on or near it include health impacts.

He said it's a "conspiracy theory" among neighbors when it comes to those health impacts, but he affirmed those events do occur.

He also listed issues he called "more physical in nature." These included trespass or intrusion, excessive noise, vibrations, odor, contaminants and flicker.

After describing the numerous studies done throughout recent years, including sale and resale analysis and repression studies, McCann said overall results showed a 25 percent lower value within three miles of the turbines as compared to control sales more than three miles away from turbines.

Property impact studies have been done throughout the world and one he described showed assessed values indicated a 20 percent deviation from assessed sale value.

McCann also said he came to some conclusions, including having a setback of less than three miles can cause a significant loss of value, as well as many of the health problems people have described to him in the past that qualified experts have agreed with.

"They (doctors) do find it happens," McCann said. "It doesn't happen to everybody."

McCann also noted that people should hire appraisers that comply with the Uniform Standards of Professional Appraisers Practice, especially in cases like this.

He also said it wasn't his job to decide what conditions are appropriate for turbines, but his

suggestions include having hours of operation and not 24/7 operation. He said this would lower many of the complaints of noise, flicker or vibrations caused from a running turbine.

The next hearing will take place at 6:30 p.m. Tuesday, Feb, 17, at the Walton Centre. Continuing testimony from people representing The United Citizens of Livingston County will take place, as will cross-examination and further questions.

A complete list of meeting dates, as well as a link to live streaming can be found at livingstoncountyil.gov.

SEP
22
2012

Article

An appraiser's perspective on property rights

*Michael S. McCann, CRA - September 22, 2012 * Opinion*

Impact on Economy Property Values Illinois USA

* [A wind "farm" creates an easement in gross over neighboring, non-participating property that impairs value. Thus, it is tantamount to an "inverse condemnation", or regulatory taking of private property rights.....an uncompensated taking.

The following article (opinions/36104) is a direct and practical explanation of what I have written and testified about numerous times now: A wind "farm" creates an easement in gross over neighboring, non-participating property that impairs value. Thus, it is tantamount to an "inverse condemnation", or regulatory taking of private property rights.....an uncompensated taking.

The eminent domain clause of the 5th Amendment to the Bill Of Rights specifically allows government to "take" property for public use, so long as the owner is paid just compensation for the loss of the property value. The US Supreme Court expanded the taking clause to include public "purpose", in *Kelo v. City of New London*,

Wind energy projects are often claimed to represent either public purpose or use, via (alleged) job creation, tax revenues, carbon reduction, etc.,...qualifying these projects as public projects. Further, the PTC's and other taxpayer supported funding, squarely puts part of the funding source as the federal government and sometimes the state(s). Thus, the public purpose is partially outsourced to the development community, making wind energy projects a public/private partnership.

As the Bureau County, Illinois article points out, the wind developers are given regulatory deference to the flow of wind over neighboring properties, as well as leased land, and I believe this represents a redistribution or taking of private property development rights. It assumes ownership or use rights of wind over private property,... without compensation, as it stands now.

Wind flow is just one aspect of impaired and partially taken property rights, as the right to quiet use & enjoyment is clearly impaired for a substantial number of nearby homeowners. Audible and LFN noise impacts have been the basis for widespread complaints, lawsuits, distressed sales and even home abandonment.

And even though one may not have a legal "right" to natural or unimpaired, aesthetically pleasing views over neighboring (leased) land, in any cases of shadow flicker, there is a definite invasion of the non-participating property. This differs from a regulatory taking, which does not require a physical invasion of a given property to invoke a takings claim for compensation. In my opinion, excessive noise (including LFN) also represents such a physical invasion.

Local zoning codes are not typically addressed from the perspective of eminent domain, but most DO require that a Special Use (SU) not adversely impact neighboring property values, future development or the character of the neighborhood, and approval of such a project claiming this SU standard is satisfied, on the basis of a generic report (LBNL) written by wind advocates who hold no professional appraisal license or qualifications, would seem to be negligent or ill-advised.

Similarly, it is hard to imagine any governmental body setting health code standards on the basis of recommendations from a non-doctor, or bridge construction codes on the basis of a non-engineer's report, developed by one who would gain from weak bridges.

Michael S. McCann, CRA

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mikesmccann@comcast.net (mailto:mikesmccann@comcast.net)

<http://www.windaction.org/posts/34954-an-appraiser-s-perspective-on-property-rights>

MAR
7
2016

Article

Wind farm and property values: continued

New Falcon Herald - Lindsey Harrison - March 7, 2016

Property Values Colorado

McCann said he was hired to appraise a house in June 2011 in Mason County, Michigan, where representatives from the Lake Winds Energy Farm Project had been negotiating leases with property owners; however, they had not yet applied for permits with the county. ...A 476-foot turbine was built 1,139 feet from the residence, and the 56-turbine Lake Winds Energy Farm Project became fully operational in November 2012, McCann said. "After three years on the market and several price drops, this house ended up being sold for 40 percent of what it was originally worth," he said.

Effects will take time

On Feb. 16, Steve Schleiker, El Paso County assessor, presented a report to the El Paso County Board of County Commissioners regarding the data he has collected on home and property sales near the Golden West Wind Farm Project in Calhan.

In that report, Schleiker cited data related to home and property sales from Jan. 1, 2015, to Dec. 31, 2015. In a separate interview with The New Falcon Herald, he said, "I tracked the sales from within the transmission line corridor and the actual map of the wind farm. I also included a 2-mile buffer outside that area."

Schleiker said he had specifically told residents in the county that he would study the data to determine any effects on sales from the 145 turbines and the 29-mile transmission line constructed by NextEra Energy Resources between March and September 2015. The wind farm became fully operational Oct. 12, 2015.

The data showed 816 sales, including agricultural grazing land, commercial, single family residential and vacant lots, that were completed during 2015 in the study area, he said. Of the properties sold, 712 were single family residential properties, and their combined 2015 sales price was more than \$42 million above their current assessor market value, he said.

According to the November 2015 issue of The New Falcon Herald, current assessor market values are derived from data gathered between July 1, 2012, and June 30, 2014, prior to the wind farm's construction. Data regarding home values from July 1, 2014, to June 30, 2016, which will include data from properties sold during and after the wind farm construction, will be included in the May 1, 2017, valuation notices.

"Properties are moving, and they are selling for more than what is currently on our assessor's records," Schleiker

said. "I am seeing an increase in the mean and median sales price, but it is important to remember that there is still five months more data to be studied. I have to consider that data, too -- and that data is critical."

Michael McCann, an appraiser from Chicago, Illinois, said he has been researching property values near wind farms for the past 10 years. "It (the data) is pretty consistent," he said. "From modest price ranges to upscale price ranges, the tendency is 25 percent, up to 40 percent, price reductions."

McCann said he was hired to appraise a house in June 2011 in Mason County, Michigan, where representatives from the Lake Winds Energy Farm Project had been negotiating leases with property owners; however, they had not yet applied for permits with the county. "The comparable sales did not show an impact even in anticipation of the project," McCann said. "The market was actually starting to make its way back up." A 476-foot turbine was built 1,139 feet from the residence, and the 56-turbine Lake Winds Energy Farm Project became fully operational in November 2012, McCann said. "After three years on the market and several price drops, this house ended up being sold for 40 percent of what it was originally worth," he said.

The same scenario has played out time and again for properties located near wind farms, he said. He cited a study conducted in Livingston County, Illinois, where three wind farm projects are located within 3 miles of the Livingston County and Woodford County, Illinois, border. The study used paired sales, which is comparing houses essentially the same, except for one or two issues that make the price difference easily attributable, McCann said. It showed that, on average, homes located closer to the project sold for about 25 percent less than their paired counterparts, he said.

A case study published in February 2013 (<http://www.windaction.org/posts/35047-case-study-diminution-in-value-wind-turbine-analysis#.Vt4BQpwrluU>), conducted by Ben Lansink, an appraiser located in Ontario, Canada, focused on the Melanchthon Wind Facility. The facility consists of 133 turbines and is located 67 miles from Toronto, the study indicates. Lansink found that homes within 2 miles of the wind turbines, on average, sold for 38 percent less than homes farther away. The facility has a 2-mile footprint, and homes within that area sold for about 58 percent less, according to the study.

Joe Cobb, a Calhan resident who lives within the Golden West Wind Farm's footprint, said he thinks the turbines are taking a physical toll on his property, which, in turn, will hurt its resale value. The concrete in front of his garage has dropped 2 inches, the mitered joints around the window frames and door jambs are coming out and the nails are backing out of the woodwork all around his house, he said. Additionally, the grout in the tiled backsplash Cobb installed in his kitchen is cracking between the tiles, especially near the window, he said.

Cobb said he and his family have lived in the house for more than eight years, and everything was in pristine shape when they moved in. The damage only appeared after the turbines began operating in October, he said.

"Our theory is that the vibrations coming off the turbines is kind of like a slow-motion earthquake," he said. "The house is basically being vibrated all the time. It seems like the house is slowly shaking apart."

Robert Rand, an acoustic engineer from Boulder, Colorado, said wind turbines like those in Calhan produce pulses, called infrasonic pressure pulsations. The pulsations penetrate the earth because they are so large, he said. "The instruments I use to measure infrasonic pressure pulsations are the same ones that are used to measure earthquakes," he said.

Schleiker said his data is still preliminary, and he will continue to study the values of the properties in and around the wind farm. "I will absolutely share all my data with the property owners and the county commissioners," he said.

**JUWI Wind
Prairie Breeze Wind Farm, LLC
Tipton County, Indiana**

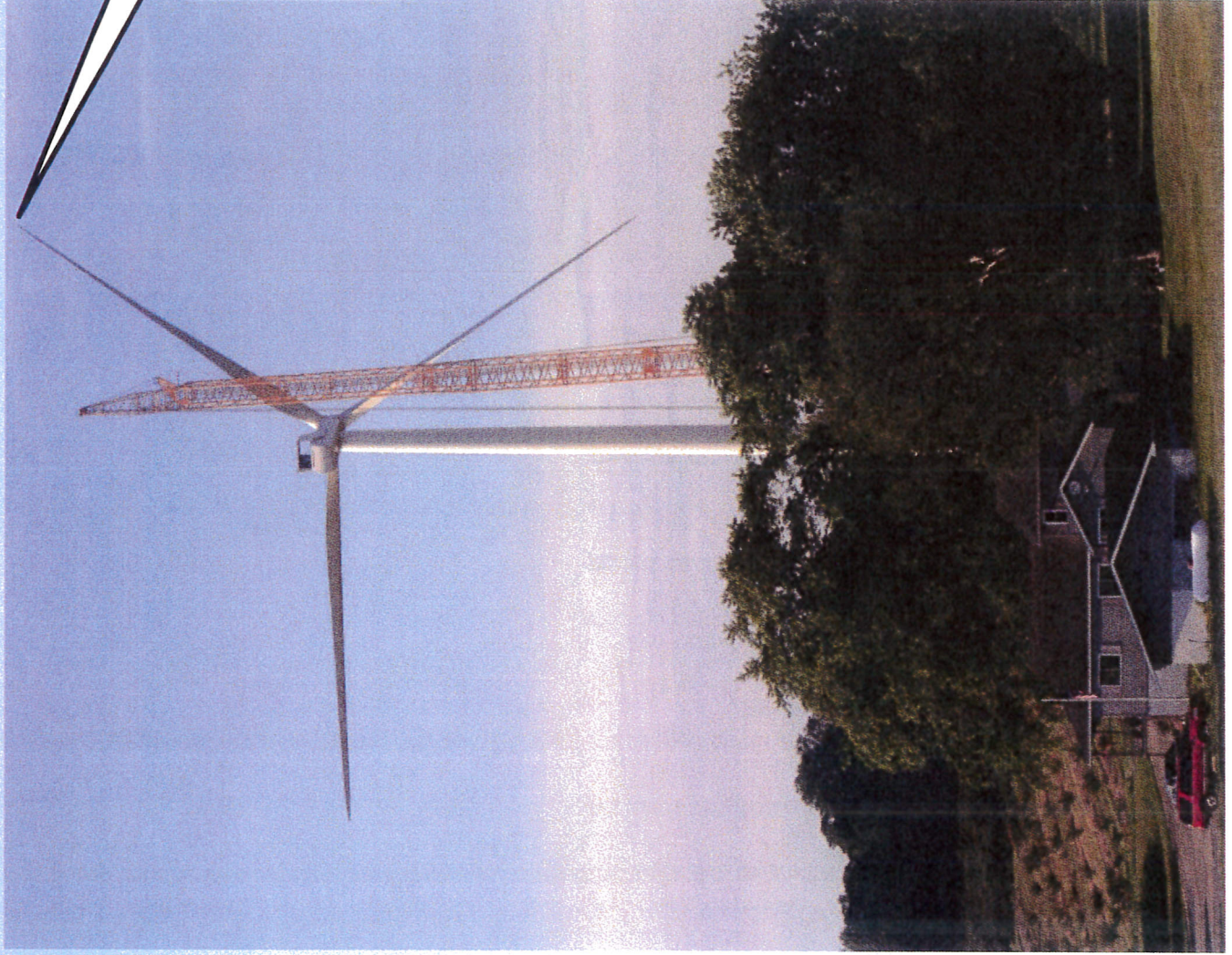
**PROPERTY VALUE IMPACT &
ZONING COMPLIANCE
EVALUATION**

**McCann Appraisal, LLC
March 20, 2013**

© 2013

476 ft.. height

1,139 ft.. setback



Qualifications

Michael S. McCann, CRA

- Over 30 years experience appraisal & consulting
- Most types of commercial, industrial & residential property
- State Certified General Appraiser, licensed multiple states
- Certified Review Appraiser (CRA)
- Member of Lambda Alpha International – Inducted on basis of expertise with property value impact studies
- Qualified as expert witness in 21+ states, state & federal courts
- Appraised variety of property value damage situations
- Consultant to governmental bodies, developers, corporations, attorneys, investors and private owners
- Appointed by Federal Court as a Condemnation Commissioner
- Appointed as arbitrator & umpire for property value disputes
- Evaluated & consulted 20+ wind projects in over a dozen states
- Prepared and presented a webinar regarding wind turbine impacts on property values for the Appraisal Institute – peer reviewed & approved for continuing education of Members

Anti-wind activist or lobbyist?

- No !
- Michael McCann is an independent appraiser, bound by USPAP
- Professional opinions are based on objective analysis of empirical data
- McCann asked to testify due to extensive experience regarding wind farm value impacts
- Characterization, claims or allegations to the contrary are *FALSE*

McCann Study

- ✓ Review of Tipton County Ordinance, proposed setbacks, Conditional Use approval criteria
- ✓ Review of existing character of project area
- ✓ Review of nuisance factors and stigma typically associated with nearby wind projects, established by existing residential and AG uses
- ✓ Review of prior McCann empirical value studies
- ✓ Literature review - wind projects impact on property values
- ✓ Recommendations to Tipton BZA & County Board regarding setbacks & impact mitigation

JUWI Project Summary

- 16,000 acres leased for “footprint”
- Up to 94 turbines & 150 MW (63 to 94)
- 1.6 to 2.4 MW each nameplate capacity
- 427 to 492 feet to tip of blade
- Setbacks of 1,250 feet

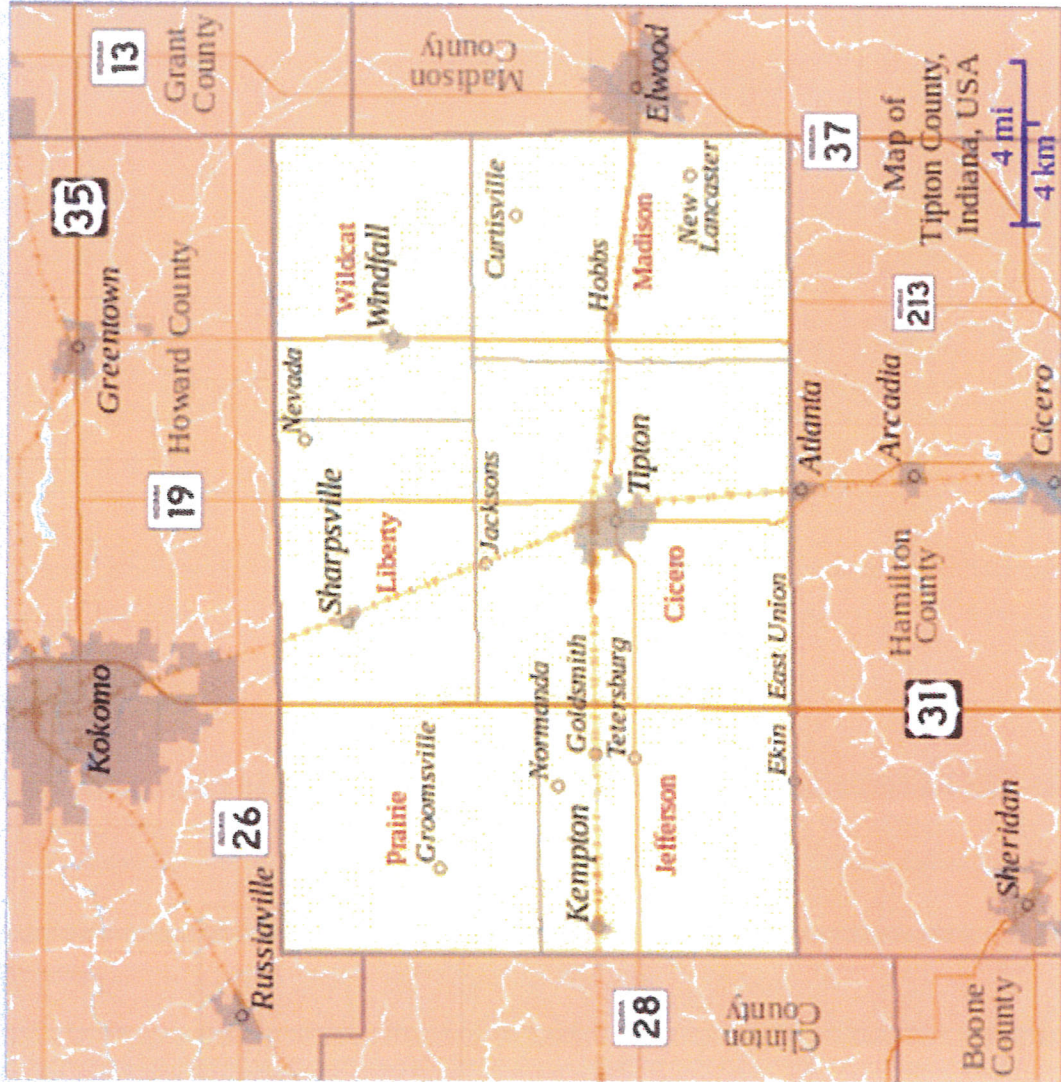
TIPTON COUNTY ZONING ORDINANCE

- **Section 808: Conditional Use**
 - C. *The use and value of the area adjacent to the property included in the Variance will not be affected in a substantially adverse manner.*

Location Map



Tipton County



Nuisance & Related Issues

- **Noise** – Audible & LFN
(Increases above ambient = nuisance)
- Pulsating nature (Amplitude Modulation)
- 24/7 potential
- **Visual** - Shadow flicker
- Aesthetics & Vistas
- FAA lights
- **Safety** - Blade throw & ice throw
- Aviation safety – aerial spraying
- **Essential character** of area changes to Industrial Overlay
- **Health stigma**
- Established via clinical studies & research by M.D.'s
- Annoyance has different clinical meaning – causes health impacts
- Sleep disturbances
- Many adverse health reports to 2 miles or more
- LFN impacts parallel health reports – Not limited to view
- LFN travels great distances, penetrates walls/roofs

Nuisance – Real Estate Issue

- Decreases desirability as a residential setting
(*both sides of market*)
- Sellers often can't sell. When they are able, prices usually reflect substantial discount
- Buyers typically avoid dominant industrial setting
- Introduces a “Detrimental Condition” for 25 square mile footprint plus 2-3 miles beyond footprint

What are the facts?

- Studies that focus on close proximity are relevant
- Studies that minimize or ignore nearby sale data are misleading or irrelevant
- “Pooling” data from multiple, diverse locations tends to set wide parameters that conceals actual impacts

2009 McCann Lee County Study

Sales > 2 miles

16	1310 Melugins Grove	Apr 2004	\$179,000	Lyons	Overton	2	1,952	\$91.70
17	2612 Shady Oaks Rd	Apr 2003	\$131,000	Smith	Paplech	1.5	1,208	\$108.44
18	3448 Cyclone Rd.	Mar 2003	\$105,900	Munyon	Pippenger	2	1,456	\$72.73
19	2524 Johnson St.	Aug 2004	\$61,800	Copeland	Lampson	1.5	948	\$65.19
20	741 Third St.	Feb 2004	\$63,500	Eckhardt	Rosales	1.5	868	\$73.16
21	613 Church Rd.	May 2003	\$115,000	Merkel	Parpart	1.5	1,458	\$78.88
22	3435 Willow Creek	Jun 2003	\$118,000	Swiatek	Brydun	2	884	\$133.48
23	3021 Cottage Hill	Mar 2005	\$182,000	Russ	Curtis	1.5	1,239	\$146.89
24	3385 Willow Creek	Mar 2003	\$180,000	McCoy	Carver	2	2,840	\$63.38
25	745 Second St.	Dec 2004	\$59,000	Wilson	Calderon	1.5	1,161	\$50.82
26	761 4th St.	Mar 2003	\$68,000	Stewart	Eisinger	1	724	\$93.92
27	2774 Weiland Rd.	Apr 2003	\$93,000	Batha	Crumpton	1.5	1,104	\$84.24
28	558 Earville Rd.	Jan 2003	\$145,000	Hodge	Ikeier	2	1,280	\$113.28
29	2505 Wood St.	Aug 2004	\$105,000	Janiak	Bullock	2	1,812	\$57.95
30	385 Earville Rd.	Aug 2004	\$280,000	Rago	Diehl	2	2,142	\$130.72
31	3095 Cyclone Rd.	Dec 2004	\$169,900	Summerhill	Rainbolt	2	2,048	\$82.96
32	742 Second St.	Jan 2003	\$103,000	Delhotel	Stewart	2	1,876	\$54.90
33	305 Angling Rd.	Mar 2005	\$119,000	BMV Prop.	Herendeen	1	690	\$176.00
34	2515 Wood St.	Apr 2004	\$80,000	Jones	Sarver	1	912	\$87.72
35	1218 Locust Rd.	Jan 2005	\$169,000	Wachowski	Gembeck	1	1,040	\$162.50
36	901 Melugins Grove	Aug 2003	\$228,000	Kidd	Rajan	1	2,000	\$114.00
37	1490 German Rd.	Aug 2004	\$85,000	Firfit	Challand	2	2,144	\$39.65
38	603 Ogee Rd.	Apr 2004	\$285,000	Anderson	Miller	1	1,920	\$148.44
39	546 Carnahan Rd.	Jan 2005	\$110,000	Coley	Sarabia	1	1,296	\$84.88
40	1353 County Line	Nov 2003	\$185,000	Vallejo	Bozaeth	1.5	1,338	\$138.27
41	2512 Johnson St.	Feb 2005	\$123,000	Montavon	Sutton	2	2,232	\$55.11
42	2509 Herman Rd.	Apr 2004	\$142,900	Bresson	Arjes	1	1,404	\$101.78
43	955 Woodlawn	Jul 2003	\$265,000	Swan	LaRosa	1.5	1,918	\$138.16
44	1279 Locust Rd.	Mar 2003	\$270,000	Witte	olin	1	2,156	\$125.23
45	648 Ogee	Nov 2003	\$225,000	Fickenscher	Rojas	1	1,768	\$127.26
46	1339 Woodlawn Rd.	Sep 2003	\$230,000	Howell	Barnhill	1	1,701	\$135.21
47	1349 Woodlawn Rd.	May 2003	\$207,500	Howell	Wiskari	1	1,809	\$114.70
48	711 O'Gee Rd.	Aug 2004	\$185,000	Groevengoed	Carabal	1	1,352	\$136.83
49	1295 Locust Rd.	May 2004	\$300,000	Hagan	Lowe	1	2,672	\$112.28
50	860 Paw Paw Rd.	May 2004	\$185,000	Wiskur	Pogreba	1	1,148	\$161.15
51	3011 Honeysuckle	Mar 2005	\$355,000	Abbott	Brandt	2	3,655	\$97.13
52	489 Earville Rd.	Nov 2004	\$165,000	Schiaffe	Fromhertz	2	1,400	\$127.86
53	2512 Shaw Rd.	Jun 2004	\$153,500	Hlavin	Kapinski	2	1,638	\$93.71
								Average sale price
								\$104.72

Sales located within 2 miles

Sale #	Address	Sale Date	Price	Grantor	Grantee	Style	Size SF	\$/SF
1	629 W. Chestnut	Oct 2003	\$37,000	Estes	Lipe	1.5	1,161	\$31.87
2	323 W. Chestnut	Oct 2004	\$40,000	Reed	Hovious	1.5	1,425	\$28.07
3	1019 Steward Rd.	May 2003	\$40,000	Houle-Ward	Reyns	2	1,408	\$28.41
4	91143 Paw Paw	Mar 2005	\$187,000	Zaylik	Pachero	2	1,571	\$119.03
5	1224 IL Rte. 251	Jun 2003	\$138,000	Gittleson	Kowalski	2	1,272	\$108.49
6	339 Chestnut St.	Jan 2003	\$72,000	White	Flynn	2	1,684	\$42.76
7	630 W. Chestnut	Sep 2003	\$126,000	Eddy	Morath, Sr.	1.5	1,728	\$72.92
8	427 Chestnut St.	Oct 2003	\$87,000	Hesik	Rourke, Jr.	1.5	1,380	\$63.04
9	138 Cherry St.	Sep 2004	\$80,000	Hammond	Alexander	1.5	1,326	\$60.33
10	536 W. Cherry	Oct 2004	\$63,500	Johnson	Fitzpatrick	1.5	999	\$63.56
11	885 Compton Rd.	Oct 2004	\$68,900	Boysen	Gellings	1	480	\$143.54
12	518 W. Cherry St.	Apr 2003	\$87,500	Allen	Beckman	1	927	\$94.39
13	222 Maple St.	Dec 2004	\$150,000	Clark	Cummings	1	1,852	\$80.99
14	444 W. Main St.	Mar 2005	\$109,900	Miller	Michaels	1	1,402	\$78.39
15	2874 Beemerville	Ju 2003	\$367,000	Finkboner	DGNB TRT	1	2,201	\$166.74
							Average sale price	\$78.84

2009 Study Summary

Avg Sale Price > 2 miles = \$104.72 SF

Avg Sale Price < 2 miles = \$ 78.84 SF

Difference in Sale Price = \$ 25.89 SF

Average Value Diminution Within 2
miles of turbines **25%**

Paired Sale Analysis

- “A quantitative technique used to identify and measure adjustments to the sale prices or rents of comparable properties; to apply this technique, sales or rental data on nearly identical properties are analyzed to isolate a single characteristic’s effect on value or rent.”

Recognized Methodology

- ***Real Estate Damages – An Analysis of Detrimental Conditions*** (pg. 19 -22), recognized methods of applying a Detrimental Condition Sales Comparison Approach includes the use of a Sale/Resale analysis or a Paired Sale Analysis.

McCann 2012 Study

Lee & DeKalb Counties

- Detailed Paired Sales analysis
- Target & Control sale data selected on basis of sales near turbines (Target) being paired with comparable sales (Control) at much greater distances
- Target sales average distance = 2,618 feet
- Control sales average distance = 10.1 miles
- Current empirical data finds 23% to 33% (**avg. 26%**) impact from inadequate setbacks

Paired Sale Analysis Summary

Lee County Study Area

Pair #	Target Area					Control Area				
	T#	Distance Feet	CDOM	SP/LP %	C#	Distance Miles	CDOM	SP/LP %	Impact %	
1	1-T	7,860	535	71.4	1-C	10.0	55	100.0	(27.0)	
2	1-T	7,860	535	71.4	2-C	16.0	167	87.2	(30.3)	
3	2-T	1,469	1,041	70.0	3-C	11.7	544	90.0	(11.9)	
4	2-T	1,469	1,041	70.0	4-C	16.3	176	101.0	(24.0)	
5	3-T	3,660	339	71.0	3-C	11.7	544	90.0	(15.5)	
6	3-T	3,660	339	71.0	4-C	16.3	176	101.0	(25.6)	
7	4-T	315	625	82.0	5-C	4.0	241	82.0	(22.5)	
8	4-T	315	625	82.0	6-C	4.8	601	94.0	(23.1)	
Lee Averages		3,326	635 1.74 yrs	73.6		10.5	297	92.4	(22.5)	

DeKalb County Study Area

1	1-T	1,000	712	51.0	1-C	10.3	138	90.0	(46.9)
2	1-T	1,000	712	51.0	2-C	5.0	1	95.0	(41.6)
3	1-T	1,000	712	51.0	3-C	11.7	409	90.0	(43.8)
4	2-T	2,139	815	75.0	4-C	11.4	379	81.0	(15.9)
5	3-T	1,880	386	74.0	4-C	11.4	379	81.0	(15.6)
DeKalb Averages		1,637	638 1.75 yrs	66.7		9.6	232	89.0	(32.8)
Lee & DeKalb combined		2,618	636	70.6		10.1	271	91.0	(26.4)₂₀

Related Study Results

- CDOM is 1 year longer near turbines
- Sale Price as a % of list price is 70.6% vs. 91%, or 20% lower near turbines
- DeKalb FPL turbines are larger and nearer Target residential sales, on average, and empirical appraisal results find greater impact with shorter Setbacks

**DeKalb County Paired Sale #3
1-T & 3-C**



Near Turbines = Target



Far from Turbines = Control

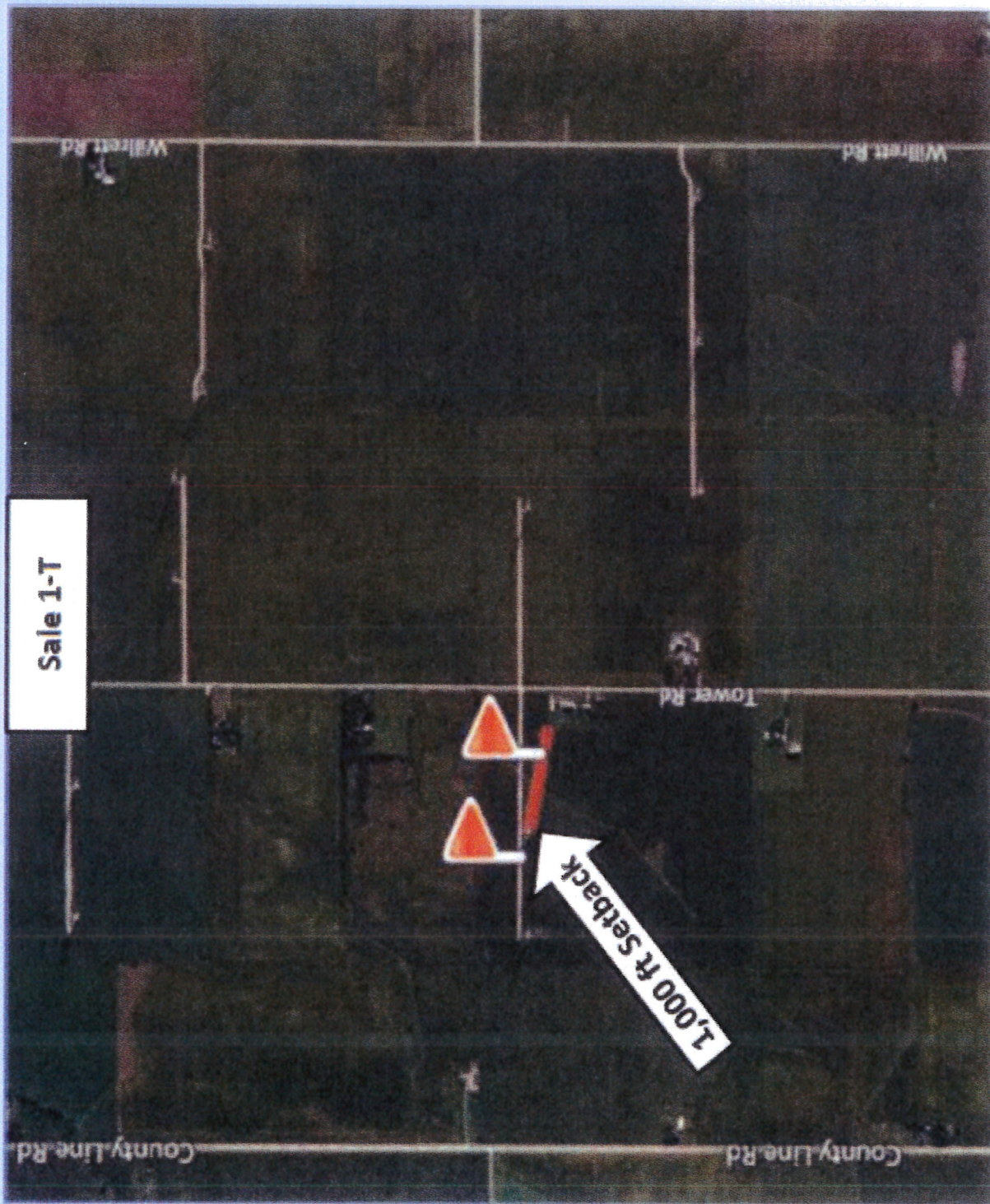
<u>Category</u>	<u>DeKalb Sale 1-T</u>	<u>DeKalb Sale 3-C</u>	<u>Adjustments + (-)</u>
Address	13801 Tower Rd., Lee, IL	27779 Five Points Rd., Sycamore, IL	
Turbine Distance	1,000 ft. approx. from NWC property line	11.7 miles SW of property	
CDOM	712 days; 3 listings	409 days	
OLP	\$275,000	\$239,900	
SP/OLP %	51%	90%	
Sale Date	Nov. 2012	Feb. 2012	DeKalb (7%) X 9 months = (5.25%) (\$11,300)
Sale Price	\$140,000	\$215,000	
GBA/SF	1,439	1,507	(Difference not relevant) 0
\$/SF	\$ 97.29	\$ 142.67	
Built	1979	1966	(13 yrs older X 1/2% per yr deprec) = 6.50% \$ 13,975
Tot/BR/B	5 rm/3 br/1 bth	6 rm/3 br/1 bth	(Dining Room) \$ (2,000)
Basement	2 br's, fam rm, bath	full, unfinished	(+ \$10/sf for subj. finish bsmt) \$ 15,070
Garage	2 car attached	2 car attached	0
Acres	5	4.18	at \$10k/acre \$ 8,200
Out Bldgs	4	1	(Est. contribution of 3 bldgs) \$ 10,000
Quality	Avg.	Avg.	0
Condition	Avg.	Avg.	0
			Net Adjustments
			\$ 33,945

Unadjusted Sale Price Analysis

Actual Sale Price Far Sale	\$215,000
Actual Sale Price Near Sale	<u>(\$140,000)</u>
Difference	(\$75,000)
% Difference	-34.9%

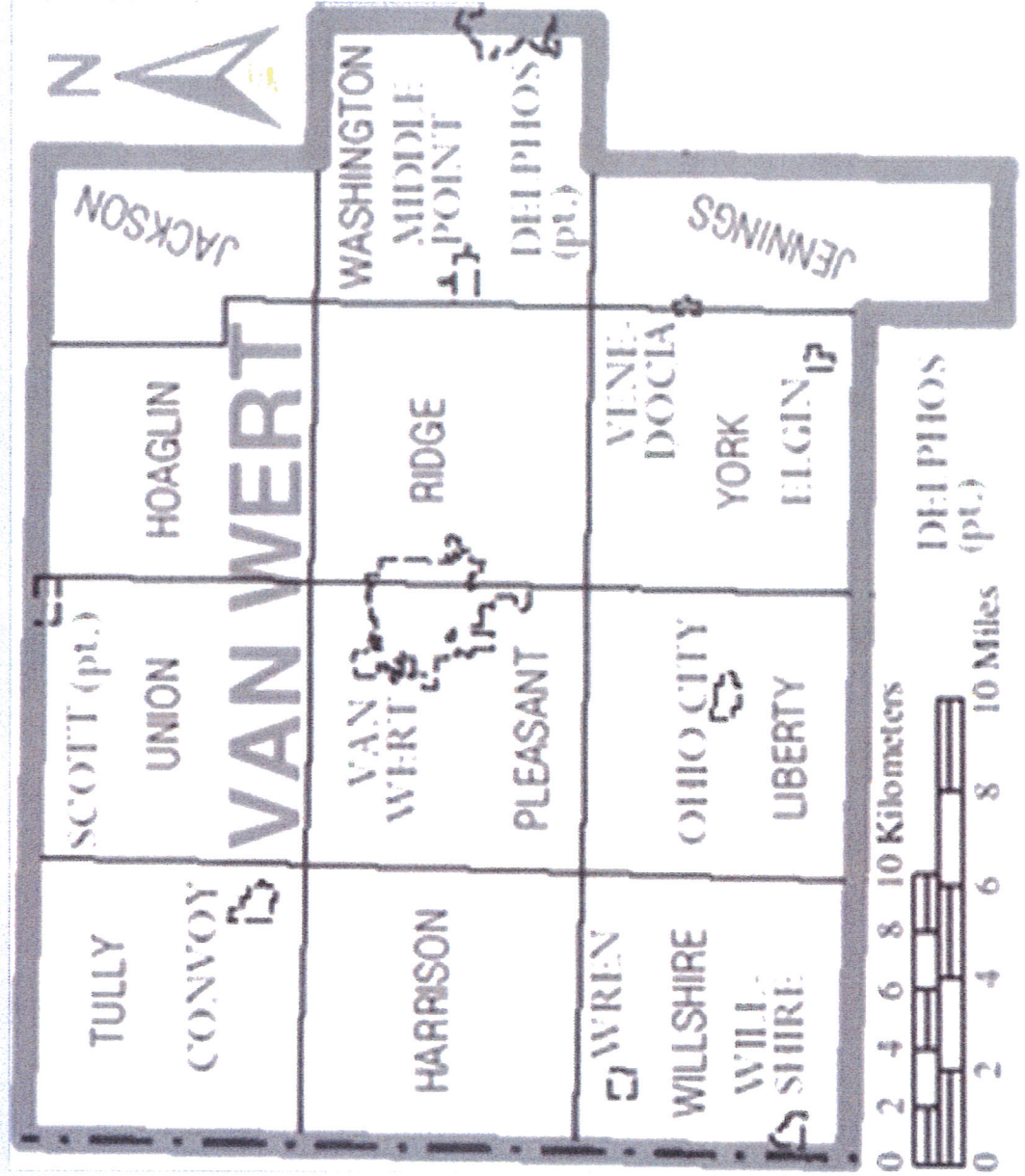
Adjusted Sale Price Analysis

Adjusted Sale Price (MV of near sale)	\$ 248,945
Near Sale Price	<u>\$ (140,000)</u>
Indicated Turbine Value Impact to Near Sale	\$ (108,945)
Impact %	-43.8%





McCann 2012 Study Van Wert County, Ohio



Van Wert County, Ohio 2012 Residential Sale Summary						
Township	# Sales	# Sales via Foreclosure	% via foreclosure	Avg. Price*	Avg. \$/Sq Ft*	Setting
York & Liberty	11	1	9%	\$78,980	\$41.08	6 miles away
Union & Hoaglin	15	7	47%	\$58,417	\$31.97	Footprint
Difference	+ 4	+ 6	+38%	(\$20,563)	(\$9.11)	
% Difference				(26%)	(22%)	

*Excluding related party – Family sales

LANSINK RESALE STUDY SUMMARY

Conclusion: Clear Creek, known as Frogmore-Cultus-Clear Creek, about 18 Wind Turbines		Conclusion: Melancthon, 133 Wind Turbines	
1	1480 Lakeshore Road, Norfolk	1	375557 6th Line, Amaranth
2	71 Norfolk County Road 23, Norfolk	2	97121 4th Line, Melancthon
3	47 Concession Road A, Norfolk	3	504059 Highway 89, Melancthon
4	43 Old Mill Road, Norfolk	4	582340 County Road 17, Melancthon
5	1575 Lakeshore Road, Norfolk	5	582328 County Road 17, Melancthon
6	1527 Lakeshore Road, Norfolk		
7	1921 Lakeshore Road, Norfolk		
	Median		Median
	Average		Average
	Low		Low
	High		High
	-44.17%		-48.27%
	-55.18%		-58.56%
	-22.47%		-23.24%
	-32.96%		-26.66%
	-27.67%		-37.30%
	-28.88%		
	-38.48%		
	-32.96%		-37.30%
	-35.69%		-38.81%
	-22.47%		-23.24%
	-55.18%		-58.56%

Ben Lansink Resale Study - 2012

Sale and Resale, Property: 504059 Highway 89, Melancthon

The average Orangeville & District Real Estate Board Residential MLS® price January 2007 was \$254,803 and August 2009 when 504059 Highway 89, Melancthon resold the average price was \$302,550 resulting in a Change of 18.74%.

Average Price January 2007	\$254,803
Average Price August 2009	\$302,550
\$Change	\$47,747
%Change	18.74%

The property, 504059 Highway 89, Melancthon, was purchased by Canadian Hydro Developers, Inc. in January 2007 for \$305,000 but would have resold August 2009 for \$362,153 as a result of the passage of time.

Actual Price January 2007	\$305,000
%Change	18.74%
\$Change	\$57,153
Adjusted Price August 2009	\$362,153

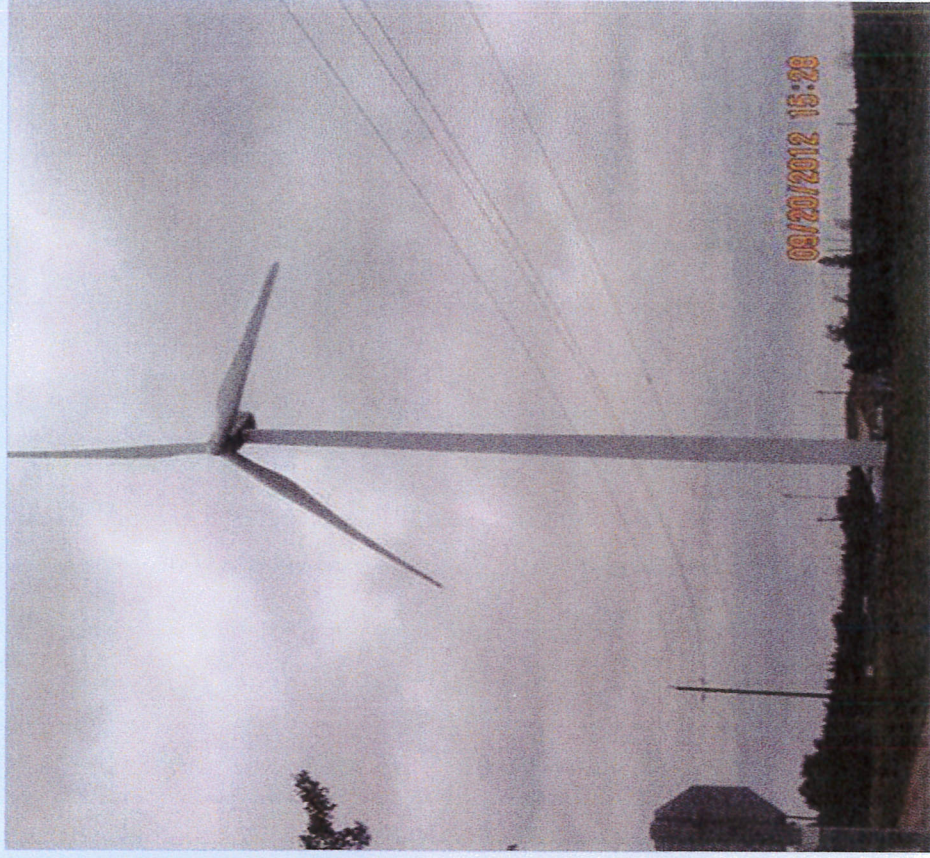
However the Actual Price when the property resold to Egresits / Gooder in August 2009 was \$278,000, a loss of -\$84,153.

Actual Price August 2009	\$278,000
\$Difference	-\$84,153

Diminution in Value: -23.24%.

%Difference	-23.24%
-------------	----------------

Sale and Resale Property Melancthon, Ontario



LITERATURE REVIEW

Summary

Wind Turbine - Property Value Impact Studies

Independent Studies

Author	Type	Year	Location	Method	Distance	Impact %
Lansink	Appraiser	2012	Ontario	Resale (1)	< 2 miles	(39%) Avg. 23%-59%
Sunak	Academic RWTH Aachen University	2012	Rheine & Neuenkirchen	OLS Geographic Weighted Regression (2)	2 Km	(25%)
Heintzelman	Academic	2011	Upstate NY	Regression	1/10 to 3 miles	Varies to > (45%)
Tuttle	Clarkson University			Resale & Census Block		
McCann	Appraiser	2009 - 2012	Illinois, (3) MI, MA, WI	Paired Sales & resale	< 2 miles	(25%) 20% - 40%
Gardner	Appraiser	2009	Texas	Paired Sales	1.8 miles	(25%)
Kielisch	Appraiser	2009	Wisconsin (4)	Regression & Survey	Visible vs. not visible	(30-40%) (24-39%)
Luxemburger	Broker	2007	Ontario	Paired Sales	3 NM	(15%) \$48,000
Lincoln Twp.	Committee (5)	2000- 2002	Wisconsin	AV ratio 104% v. 76%	1 mile	(28%)

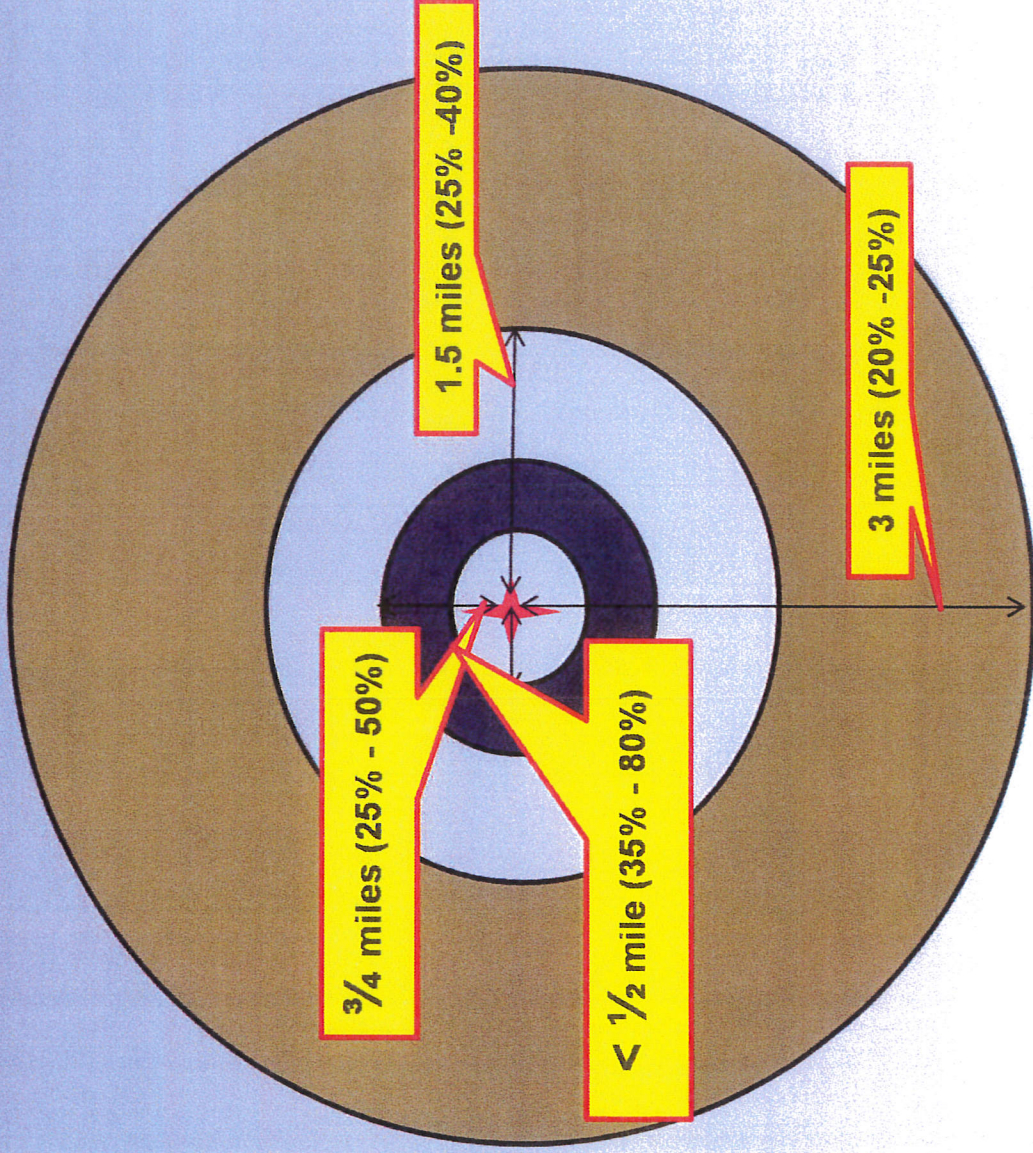
Wind Industry Funded Studies

Canning & Simmons	Appraisers (CANWEA)	2010	Ontario	Regression Paired Sales	Viewshed (6)	(7%-13%) (9%) No SS
Hinman	Academic ISU - REP Student thesis	2010	Illinois	Pooled Regression Realtor survey	3 miles ½ mile	No SS (11.8%) (7)
Hoehn	USDOE funded LBNL	2009	9 states	Pooled regression	5 miles 3k ft – 1 mile	No SS (5.6%) (8)

Literature Review Footnotes

- (1) Lansink Resale study uses resales from developer to private buyers, with Easement in Gross condition of sale. Buyer accepts noise impacts, etc., waives liability
- (2) Lots only. No pooling of data
- (3) McCann Illinois study & research updated, multiple states
- (4) Kielisch regression lot sales; Realtor survey residential
- (5) Committee compared actual sale prices vs. AV and found homes up to 1 mile sold @ 76% of AV, and > 1 mile @ 104% of AV
- (6) Usually cited as being a study that found no impact. However, all methods used yielded negative numeric indication. Author concludes no statistical significance.
- (7) Cites Realtor who believes no impact on value > 3 miles. Concludes some results indicate "wind farm anticipation stigma" (11.8%)/Pg.55. Author states "the results neither support nor reject the existence of a wind farm nuisance stigma after the wind farm achieved commercial operation.....likely due to only 11 properties selling during operations within 1 mile of wind farm." Good neighbor payments to some nearby neighbors. Values near wind farm appreciated \$13,524 after operation, following \$21,916 decline measured under anticipation stigma theory. (Net loss of \$8,392 pre- vs. post operation./Pg. 120.
- (8) Study excludes developer resales with 36% & 80% discounts from buyout price. Pooled data from 9 states 24 projects insures lack of statistical significance for value loss examples near turbines. Other sales nearby excluded due to deviation too far from mean and resale.

APPROXIMATE SETBACK IMPACTS



COMPREHENSIVE PLAN

Approval Criterion

“The proposed use shall promote the objectives of the zoning ordinance and shall be consistent with the comprehensive plan.”

Staff Report

“The central theme of the current Comprehensive Plan is farmland preservation.”

Conflicts with Comp Plan

- ✓ Aerial spraying of farmland impaired or eliminated as an option within $\frac{1}{2}$ mile to 1 mile of any turbine
- ✓ Applicators who will fly within $\frac{1}{2}$ to 1 mile have raised rates by 50%
- ✓ Some evidence that turbines change temp & moisture content of soils, and impact production
- ✓ 1.1 X setback creates a “no-build” zone or easement on farm land that is not participating

Fundamental Market Study

- Risk of ownership of non-participating farms is elevated by turbine proximity

Example

- Assume \$275/acre cash rent
- Assume \$7,500/acre land value – good soils
- $\$275 / \$7,500 = 3.67\%$ Cap Rate (ROI)
- Increased risk warrants 50 basis point premium
- $\$275 / 4.17\% = \$6,595/ \text{acre}$, or \$905/acre loss (12%)

Conclusions

- ✓ **Tipton County Ordinance setbacks are inadequate to avoid significant loss of value, or impaired use & enjoyment of neighboring property**
- ✓ **Project is not consistent with Comp Plan goal of farmland preservation, from a valuation perspective**

Basis for Professional Opinions

- ✓ Independent studies consistently find significant value diminution
- ✓ Appraisal studies are superior – Focus on paired sale data, resale studies, “nearby” data
- ✓ Wind Industry commissioned studies use only regression analysis
- ✓ Data “pooling” assures no statistical significance of any value loss examples
- ✓ Non-appraisers do not comply with USPAP, on several levels
- ✓ Industry favored LBNL study found to not be reliable for any public policy purposes
- ✓ Clarkson & Sunak studies use regression, but do not pool data
- ✓ Value loss conclusions are statistically significant
- ✓ Clarkson useful for distances as near as 1/10 mile
- ✓ McCann and other studies collectively support conclusion that proximity impacts values - (25%) to (40%)
- ✓ Nearest homes subject to value loss +/- (40%)
- ✓ Loss of aerial spraying option and other issues impair full rights of farm ownership (non-participating)

RECOMMENDATIONS

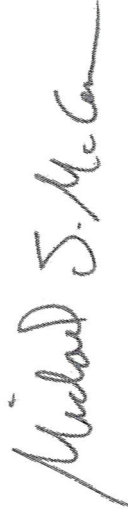
1. **Deny project for not meeting Conditional Use Zoning Criteria**
2. If approved, increase setback from neighboring residential to at least 2 miles (*Developer can negotiate waivers / easements within 2 miles*)
3. Limit hours of operation (*Exclude night time*)
4. Limit height
5. Limit noise to 5 dBa above ambient at neighboring property
6. Radar activated FAA lights
7. Condition annual license based on project nuisances eliminated and/or effective resolution
8. Condition Approval on a bonded Property Value Guarantee (PVG) out to 3 miles

PVG's are necessary

- Financial gain to developer and landowner/lessor should not be at expense of neighboring property owner equity.
- If applicant believes claim of no property value impact, then there will be no significant impact to them with a PVG requirement or condition.
- Several Illinois counties and numerous examples nationwide have required some form of PVG, for wind farms, landfills, etc.
- LBNL author recognizes need for PVG's to manage risks (*LBNL often cited as study claiming no value impact!*)

CERTIFICATION

- The undersigned, representing McCANN APPRAISAL, LLC, do hereby certify to the best of our knowledge and belief that:
- **FIRST:** The statements of fact contained in this consulting report are true and correct.
- **SECOND:** The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and represents the personal, impartial and unbiased professional analyses, opinions, and conclusions of the undersigned.
- **THIRD:** We have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to any of the parties involved.
- **FOURTH:** We have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- **FIFTH:** Our engagement in this assignment was not contingent upon developing or reporting predetermined results.
- **SIXTH:** Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- **SEVENTH:** Our analysis, opinions, and conclusions were developed, and this report has been prepared in conformity with the Uniform Standards of Professional Appraisal Practice.
- **EIGHTH:** Prior to testimony, a physical inspection was made by McCann Appraisal, LLC of the property that is the subject of this report. The undersigned also utilized photographs, maps and property record card data for characterizing and understanding the character of the subject property.
- **NINTH:** No one other than the undersigned provided significant real property appraisal assistance to the person signing this certification.
- **TENTH:** The undersigned McCann Appraisal, LLC has not previously consulted and testified regarding the subject property.
- **IN WITNESS WHEREOF, THE UNDERSIGNED** has caused these statements to be signed and attested to.



Michael S. McCann, CRA
State Certified General Real Estate Appraiser
License No. 553.001252 (Expires 9/30/2013)

Forensic Appraisal Group, Ltd.



Forensic Appraisal Group, Ltd.

Experts in Condemnation Appraisal

Do Wind Turbines Affect Property Values?

"Do wind turbines affect property values?"

With more wind turbines and wind farms being placed on or near personal property, **it's an important question** being asked by property owners, town officials and sitting committees.

Now, we're not talking about [small windmills](#) or [DIY windmills](#).

We're talking about industrial wind turbines (as seen on right). The turbines found in wind farms are typically 400 feet tall from base to blade tip. That's taller than the Statue of Liberty.

And the spinning diameter of the blades is wide enough to comfortably fit a Boeing 747.

You've probably seen industrial wind turbines in farmers' fields, on mountain ridges, or in windy valleys. Now imagine one or many of them in your backyard. For an increasing number of homeowners in the country, they're seeing wind turbines fill their viewshed. And that raises a commonsense question: **Do these large wind turbines impact property value?**

Wind turbine companies say it doesn't, and so do their advocates. But they have something to protect by saying so. After all, what company would ever admit that their products damage people's quality of life?

Groups against wind turbines and wind farms say it does. They cite noise, blinking lights at night, view obstruction, and other factors as proof. But they also have something to be gained by saying so. Maybe they just don't like change, or maybe they're just rebels looking for a cause.

With two sharply opposed and unyielding sides in this debate, **who do you trust?**

Neither. You turn to [an objective valuation expert like Kurt Kielisch](#), President of Forensic Appraisal Group. To know for sure how a wind turbine affects your property value, [contact us today](#).



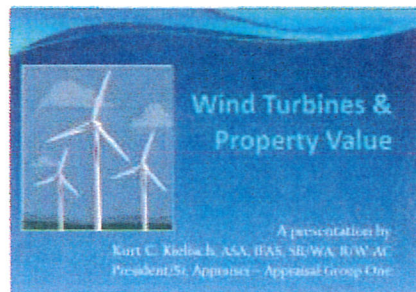
[for an unbiased appraisal.](#)

At Appraisal Group One, we guarantee an objective appraisal of market value. You can expect us to:

- Thoroughly investigate the market
- Interview real estate professionals
- Exhaustively research wind turbines' effect on property values

In 2009 we completed our Wind Turbine Impact Study - our first study of the effect of wind turbines on property values. To ensure the most comprehensive view, we approached this valuation issue **through three complementary components**, each looking at the value impact of the wind turbines from a different perspective. The three parts are:

1. **A literature study**, which reviews and summarizes what has been published on this matter found in the general media
2. **An opinion survey**, which was given to area Realtors to learn their opinions on the impact of wind turbines in their area
3. **Sales studies**, which compared vacant residential lot sales within the wind turbine farm area to comparable sales located outside of the turbine influence.



[Click here to download your free copy of our presentation on our Wind Turbine Impact Study](#)

Through our research **we've interviewed dozens of Realtors** because they have nothing to gain by taking sides on this debate, making them perfect barometers of the public's perception of wind turbines and their effect on property values. After all, a Realtor's job is to sell. If the market says a house with polka dots sells less than a house with a single color scheme, **a good Realtor adapts to the public's perception of value** and discounts the polka dot house accordingly **to make the sale.**

So what do most Realtors think of a property that once had an attractive viewshed but now looks at wind turbines? According to our research, **an overwhelming majority of Realtors says that wind turbines negatively impact property value.** They estimate the range of impact to be **from a 10% price reduction to being completely unsellable.**

We also investigate before-and-after sales data, and seek out research papers, reports, studies, and news stories about wind turbines. From this ever-growing wealth of data we know how the general public and academic and scientific communities view wind turbines. And, as any competent real estate professional knows, **perception determines value and perception is reality.**

Whether or not wind turbines are a reliable source of renewable energy is not the issue. The only issue we're concerned with is if wind turbines impact property values.

So, do wind turbines affect property values? Well, it depends. **In most cases, yes, they do.** Our research has shown that when a property's value depends on the viewshed, wind turbines

negatively affect property value. That just makes sense. If someone buys a property for its beautiful view, but now that view is filled with wind turbines, it's going to affect the appeal and thus the value of that property. **However, in other cases where the best use of the property does not depend on a view or noise, the effect can be negligible.** Like we said before, it depends.

Our livelihood depends on our objectivity. If an appraiser is ever found to tweak their results to achieve a certain outcome, they can lose their license...and their livelihood. An appraiser has a lot at stake when they give their opinion because the minute an appraiser makes an opinion, it's an appraisal by law. However, other individuals who are part of answering this value question (like economists, engineers, professors, social scientists, etc.) do not run this risk because they're not licensed. They may lose credibility, but they won't lose their livelihood.

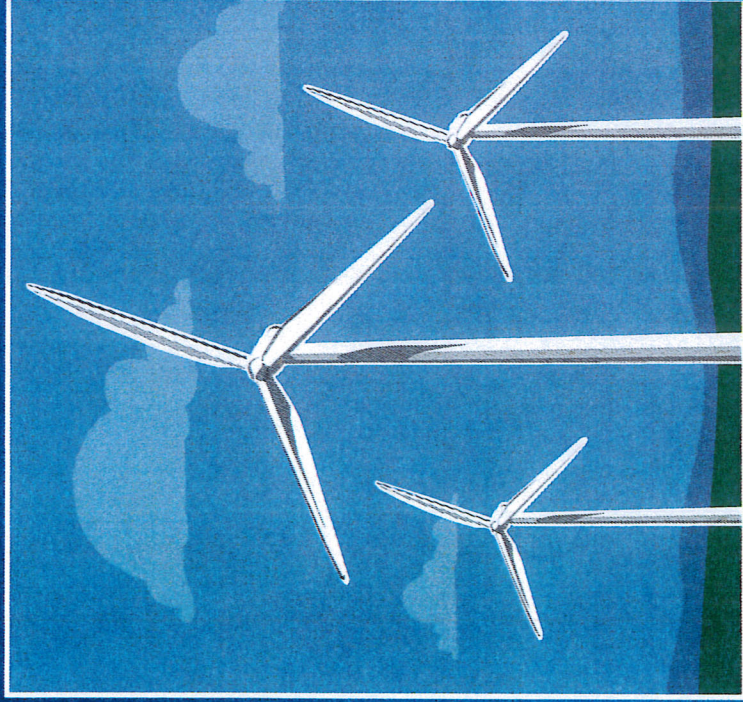
We take objectivity very seriously. **If there's an impact, we'll say so. If there isn't an impact, we'll say so.** And we'll publish our results either way.

Want to know if wind turbines are affecting your property values? Then [contact us today to take advantage of our wind turbine expertise.](#)



Forensic Appraisal Group, Ltd.
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Neenah, WI 54956
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Wind Turbines & Property Value



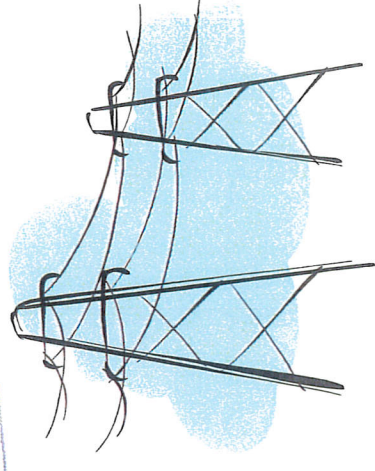
A presentation by
Kurt C. Kielisch, ASA, IFAS, SR/WA, R/W-AC
President/Sr. Appraiser – Appraisal Group One

A decorative graphic on the left side of the slide, consisting of several overlapping, wavy blue shapes that create a sense of movement and depth. The colors range from light blue to a darker, more saturated blue.

Focus on Value

- PERCEPTION = VALUE
- The key to understanding real estate value is to understand it is based on perception.
- Perception drives the buying decision.
 - E.g. perceived enjoyment of home.
 - E.g. perceived income stream of investment.
- Perception need not be based on a proven, scientific fact. (e.g. the haunted house or electric power lines)
- When the buyer acts on this perception through a buying action you have established value and the effects of this perception.

E.g. Perception of Electric Transmission Lines



Perception

- They cause health problems especially cancer.

Fact

- They are noisy.
- They are unsightly, and ruin the view shed.
- Not proven as a scientific fact, however the jury is still out and there is published literature on this issue.
- Sometimes, depending on humidity, power and distance.
- True both near and far.

A decorative graphic on the left side of the slide, consisting of a blue shape that tapers from the top and bottom, with a white diagonal line cutting through it.

What Drives Perception?

- Media
 - Printed media
 - Electronic media
 - Internet

To measure this perception of media
we conducted a Literature Review



Literature Review

- Health Issues
 - Articles found on health disorders including:
 - Sleep deprivation
 - Headaches
 - Dizziness
 - Anxiety
 - Depression
 - Vibroacoustic Disease (VAD) & Wind Tower Syndrome
 - WHO Community Noise Paper of 1995 counters claims.
 - Doesn't affect everyone.
 - Wind industry has counter claims stating “no health impact.”
 - Similar to the EMF issue relating to power lines.





Measuring Perception

- To measure the impact of this perception we did two things:
 - Conducted a **Realtor Survey** of Realtors who worked in a wind turbine area.
 - Conducted an **Impact Study** using sales of properties impacted by wind turbines compared to those that were not.

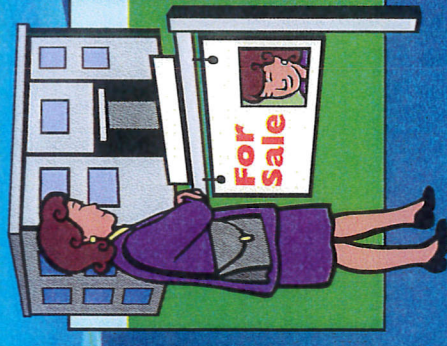
Realtor Survey

Purpose: learn from those in the trenches of buying and selling.

Focus: residential land use, both vacant and improved.

Visual field proximity: 3 different levels...

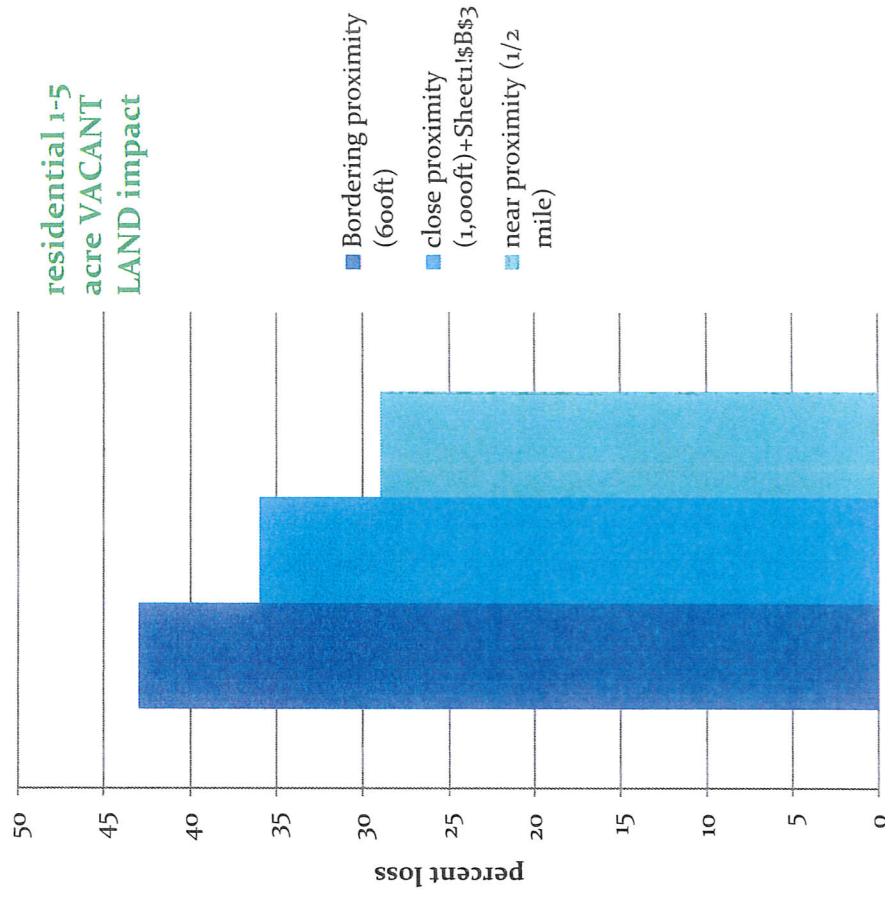
- 600ft from turbine (border)
- 1,000ft (close)
- ½ mile (2,640ft) (near)



- Survey utilized graphics and pictures to standardize the concept being portrayed.
- Survey used Realtors that were in a wind turbine area.
 - Fond du Lac County
 - Northeast Dodge County
- Surveys were given in person, on-site, verified with date, person's name and contact.

Realtor Survey results . . .

- Question to impact of wind turbine to vacant land:
 - 82% negative if border
 - Loss estimated at -43%
 - 69% negative if close
 - Loss estimated at -36%
 - 59% negative if near
 - Loss estimate at -29%



Realtor Survey results . . .

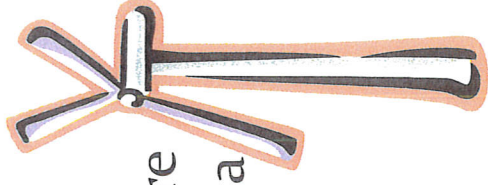
Hobby Farm



- Bordering proximity (600ft)
 - 70% said negative impact
 - 23% said no impact
- Close proximity (1,000ft)
 - 47% said negative impact
 - 47% said no impact
- Near proximity (2,640ft or half mile)
 - 44% said negative impact
 - 47% said no impact

Position of Turbines

- 83% said the impact was negative if the turbines are in the front yard of a 1-5 acre residential parcel.
- 71% said the impact was negative if the turbines were located in the back yard of a 1-5 acre residential parcel.

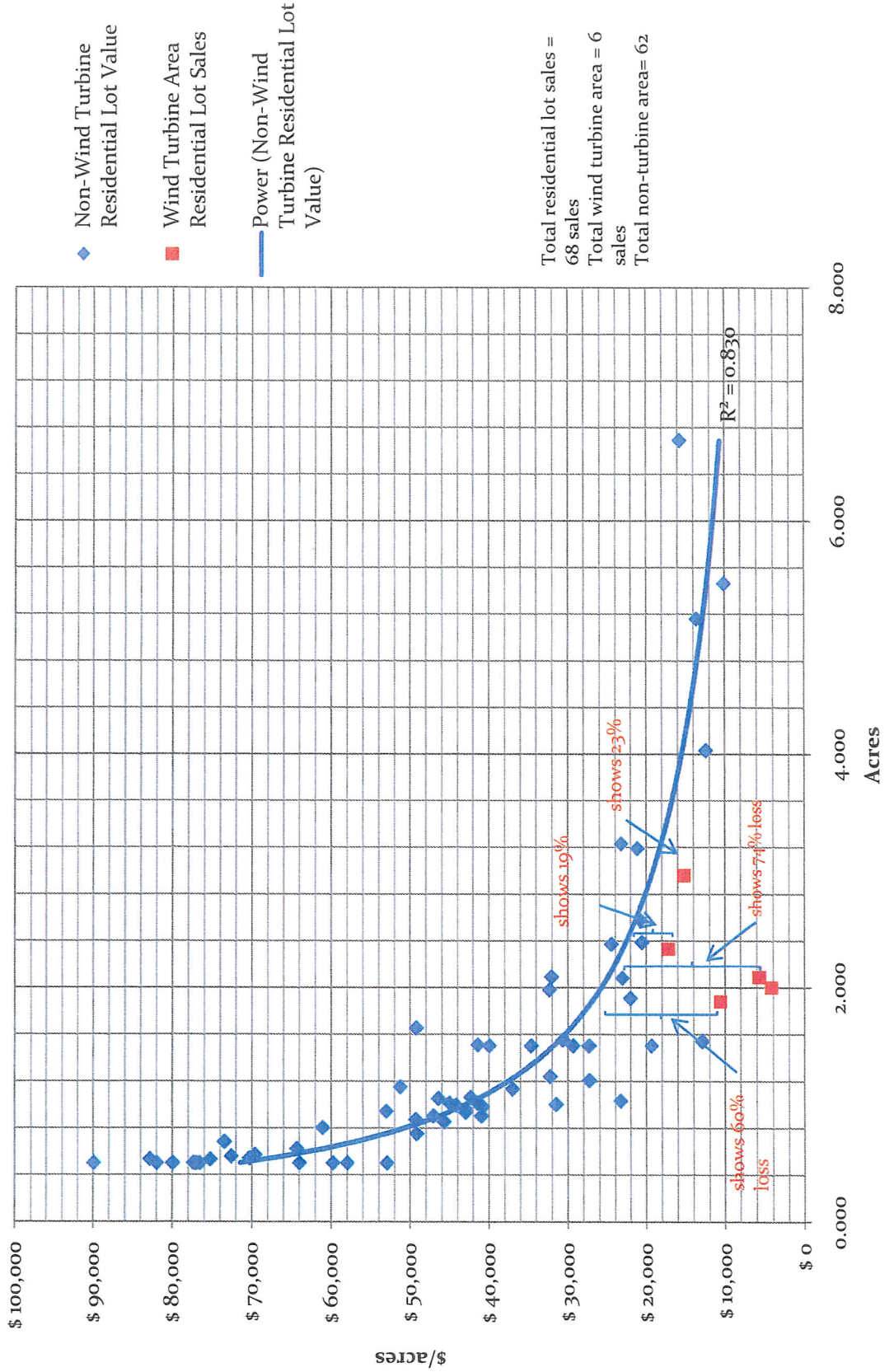


Impact Studies

Checking perception with buying action

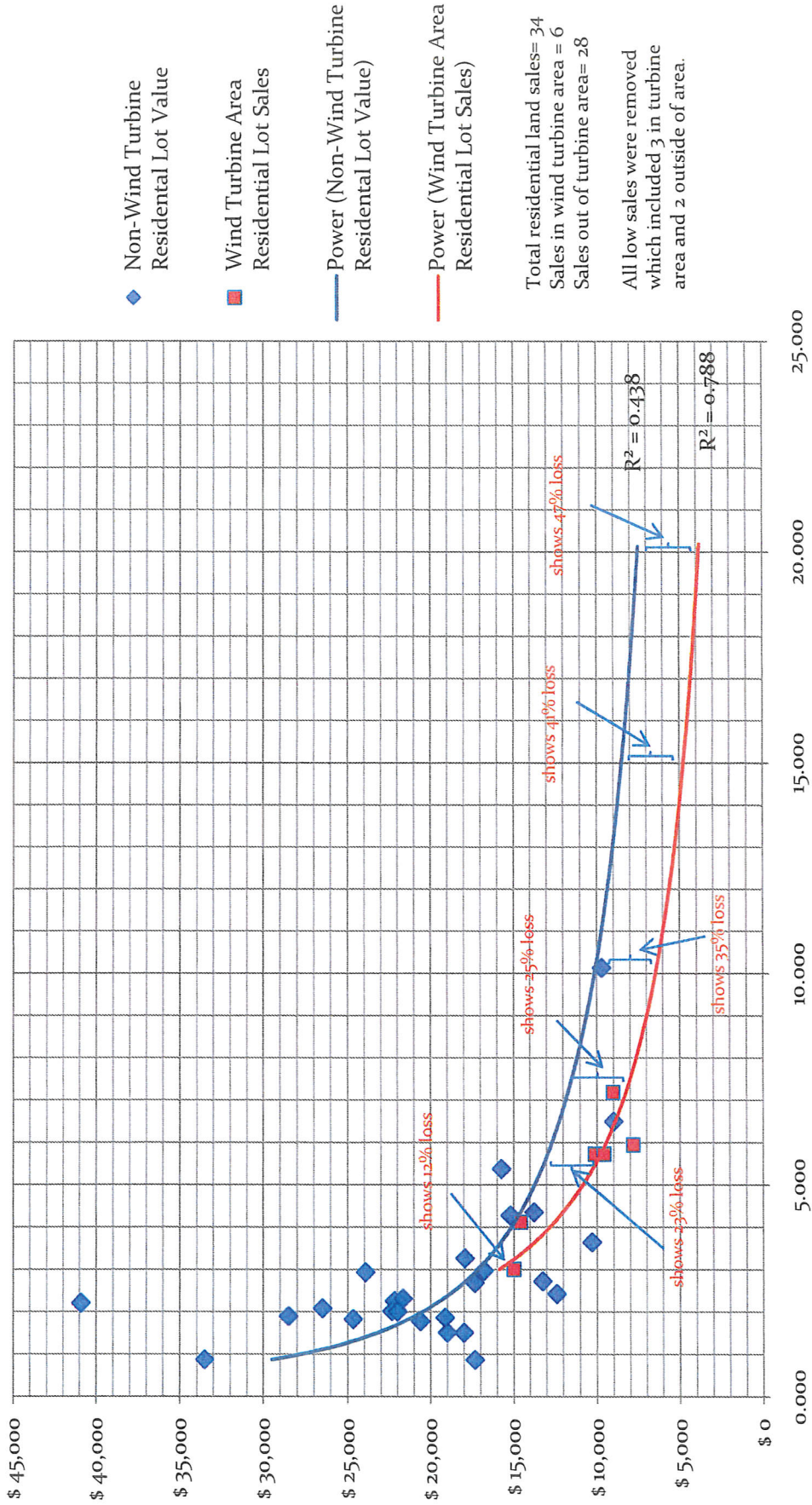
WE ENERGIES - BLUE SKY GREEN FIELD WIND FARM

1 acre to 8 acre residential land sales -- all sales included



INVENERGY - FORWARD WIND FARM

1 acre to 20 acre residential lot sales -- low sales removed



A decorative graphic on the left side of the slide, consisting of several overlapping, curved, blue shapes that resemble a stylized wave or a ribbon, with varying shades of blue and white highlights.

Blue Sky Green Field results . . .

- Sales within the wind turbine area sold for less than comparative sales outside of the turbine area.
- There were substantially less sales available within the wind turbine area than outside of it.
- The impact of the wind turbines on vacant residential land is in the range of -19% to -40%.
- This loss range corresponds with the Realtor survey.

Conclusion of Perception of Wind Turbines Impact to Property Value

1. Media has reported on negative health issues and value issues influencing a negative perception.
2. Realtor survey indicated that these perceptions are real in the market.
3. Impact studies suggest the values are substantially negatively impacted in the range of -12% to -40%.
4. The further away, the less the impact.



A blue abstract graphic consisting of several overlapping, curved shapes that resemble a stylized wave or a ribbon, located in the top left corner of the slide.

Forward Wind Farm results . . .

- Sales within the wind turbine area sold for less than comparative sales outside of the turbine area.
- There were substantially less sales available within the wind turbine area than outside of it.
- The impact of the wind turbines on vacant residential land is in the range of -12% to -30%.
- This loss range corresponds with the Realtor survey.

CASE STUDY

Diminution in Value

Wind Turbine Analysis



Hwy 89, Melancthon Township, Ontario, Canada

Photograph: Ben Lansink

Prepared by

Ben Lansink
AACI, P.App, MRCS

October 2012

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Background Melancthon Wind Facility

TransAlta Corporation owns and operates the Melancthon Wind Facility through its wholly-owned subsidiary Canadian Hydro Developers, Inc. Based in Calgary, TransAlta is a public company listed on the Toronto Stock Exchange.

Canadian Hydro Developers, Inc. constructed Ontario's first utility-scale wind facility consisting of 133 industrial wind turbines producing 200 megawatts of power. Located near Shelburne, Ontario, Canada, the project is known as the 'Melancthon Wind Facility'. This facility has the capacity to generate 545,000 megawatt hours each year and twenty-year Renewable Energy Supply contract is in place with the Ontario Government.

The Melancthon Technology is GE 1.5 MW turbines on 80 meter towers. Phase I of the project began commercial operation in 2006, with Phase II beginning commercial operation in late 2008.

In Ontario land use is controlled by the province through the *Planning Act, R.S.O. 1990, CHAPTER P.13*.

Municipalities control land use through their Official Plans and Zoning by-laws. However, the Government of Ontario passed the *Green Energy Act, 2009* with the result that land use control regarding wind turbines was taken away from municipalities on May 14, 2009. On October 1, 2009, set-back regulations for wind turbines were implemented by *Ontario Regulation 359/09*.

The Melancthon Wind Facility project began in 2005 and was not subject to the Green Energy Act, 2009 or the set-back regulations implemented by Ontario Regulation 359/09.

Set-back Regulations for Wind Turbines in Ontario 550 Meters = 1,804.4 Feet

Item	Column 1	Column 2	Column 3
	Number of wind turbines calculated in accordance with subsection (2)	Sound power level of wind turbine (expressed in dBA)	Total distance from wind turbine to nearest noise receptor of the wind turbine (expressed in metres)
1.	1-5	102	550
		103 – 104	600
		105	850
		106 – 107	950
2.	6-10	102	650
		103 – 104	700
		105	1000
		106 – 107	1200
3.	11-25	102	750
		103 – 104	850
		105	1250
		106 – 107	1500

Source: http://www.e-laws.gov.on.ca/html/source/regs/english/2009/elaws_src_regs_r09359_e.htm

 Document

CASE STUDY: Diminution in Value, Wind Turbine Analysis

Ben Lansink, AACI, P.App, MRICS - October 1, 2012

 Impact on Economy  Property Values  Canada

This case study investigates the impact of wind turbines on residential property values. The study looks at homes near the Melancthon Wind Facility located in Shelburne, Ontario, Canada. The project was built in two phases between 2006 and 2008. It consists of 133 GE 1.5 megawatt turbines with a total nameplate capacity of 200 megawatt. Excerpts of the report appear below. The full case study can be accessed by clicking on the link at the bottom of the page.

Introduction

Opinions about wind turbines - and their effect on property prices - are a relatively new phenomenon in Ontario (2005). Most people have an opinion regarding wind turbines and their effect on themselves, their surroundings, and society. The main concerns are the safety and health impacts of wind turbines.

If a wind turbine were erected on a property, would the neighbouring properties have the same market value as without the wind turbine? Does a wind turbine cause an increase or decrease in property value? There may be endless questions from a potential buyer and/or seller when dealing with a property affected by a wind turbine. When considering property value, these questions are difficult to quantify; however, the overall impact of a wind turbine can be analyzed within the actions of an open real estate market.

This study endeavours to isolate any loss in property price caused by a wind turbine. The construction and use of a wind turbine is an event over which a neighbouring property owner has no control. Each example in this study illustrates some type of 'harm' or 'injurious affection' that can be caused to a real property as a result of a wind turbine. The harm may be real or perceived and it may be different for each property and to each property seller and buyer.

This study analyzes specific examples that occurred within the open real estate market in order to isolate the impact on property value caused by a wind turbine.

Conclusion

Market evidence suggests that 'dwelling properties' will be harmed or injured by the construction, use, and maintenance of wind turbines situated on properties located in the vicinity. Real or perceived nuisances resulting from wind turbines produces buyer resistance that results in price diminution.

Price diminution due to the Melancthon Wind Facility: 133 wind turbines

1 ID 15797 – 375557 6th Line, Amaranth	-48.27%
2 ID 15798 – 97121 4th Line, Melancthon	-58.56%
3 ID 15799 – 504059 Highway 89, Melancthon	-23.24%
4 ID 15800 – 582340 County Road 17, Melancthon	-26.66%
5 ID 16339 – 582328 County Road 17, Melancthon	-37.30%
Median Loss in Market Price	-37.30%
Average Loss in Market Price	-38.81%

The erection of a wind turbine creates apprehension in the general public, which makes the property less desirable and thus diminishes the prices of neighbouring property. Continuing scientific uncertainty over the adverse health consequences of wind turbines only serves to perpetuate the debilitating effect of wind turbines on property prices.



Case Study Wind Turbines Diminution Injurious Affection Oct 12

Download file

(http://s3.amazonaws.com/windaction/attachments/1703/Case_Study_Wind_Turbines_Diminution_Injurious_Affection_Oct-12.pdf) (4.44 MB) pdf

<http://www.windaction.org/posts/35047-case-study-diminution-in-value-wind-turbine-analysis>

AUG
6
2015

Article

Vermont wind turbines harm property values

*Swanton-Albany Messenger - Melodie McLane - August 6, 2015 * Opinion*

Impact on People Property Values Vermont

The neighbors in Swanton will be just over 2,000 feet to the proposed turbines, which is more than 1,000' closer to the project than any homes on Georgia Mountain. The proposed turbines in Swanton are also nearly 60' taller than the ones here. So I think it's safe to say that they have a very valid reason to be worried about their property values.

This letter is in response to realtor Paul Martin's letter to the editor regarding the impact of turbines on the value of neighbor's properties.

Mr. Martin left out some very crucial information in his statistics of sales of homes here on Georgia Mountain.

Simply saying that they are on Georgia Mountain Road is not sufficient. How far from the wind project are they? Where are they in relation to the project, such as are they upwind or downwind? What is the elevation difference in relation to the project? Are they shielded by several thousand feet of forest from the turbines, or are they open to the project? How many realtors were those properties listed with before they were sold, and how long for each one?

We live on Georgia Mountain and are approximately 3,700 feet from the turbines. The following are some very specific examples of circumstances of home sales by neighbors close to us:

– The farm up the road is approximately 3,820 feet from the project. It is located to the east, closest in elevation of all the neighbors and it's a wide-open shot to the turbines.

It was on the market for five years (much of that while the wind project was in the permitting process) and they had four different realtors trying to sell it. Over the course of those five years they had several interested buyers who backed out when they found out about the proposed project. They told us that they finally ended up selling to the wind developer for about half of the appraised value.

– The neighbor down the hill next to us is approximately 3,980 feet from the project. Their home is located to the northeast of the project, downhill and downwind. The house is somewhat shielded by forest, but their barn and much of their property opens to the turbines. The town of Georgia dropped their property assessment by 8%, specifically stating the noise from the turbines as the reason for the drop in value. They had their home on the market for two years off and on and had two realtors trying to sell it for them.

- Another neighbor down the hill is approximately 4,390 feet from the project. Their home is located to the northeast of the project, downhill and downwind. The house and all of the property is shielded by forest. This house was on the market off and on for two years and at least two realtors tried to sell it.
- We are approximately 3700' from the turbines. Our home is located to the northeast of the turbines, slightly downhill and downwind. We have an open shot to the turbines. The town of Georgia has dropped our assessment by 12%, specifically stating the noise from the turbines for the reason of drop in value.
- Our neighbor across the road is approximately 3,400 feet from the turbines. His home is located more northerly of the turbines, slightly downhill and downwind. He has an open shot to the turbines. The town of Georgia has dropped his assessment by 15%, specifically stating the noise from the turbines for the reason of drop in value.

The neighbors in Swanton will be just over 2,000 feet to the proposed turbines, which is more than 1,000' closer to the project than any homes on Georgia Mountain. The proposed turbines in Swanton are also nearly 60' taller than the ones here. So I think it's safe to say that they have a very valid reason to be worried about their property values.

Melodie McLane, neighbor of Georgia Mountain Wind project

Source: <http://swantonwindvt.org/20...> (<http://swantonwindvt.org/2015/08/06/georgia-wind-turbine-neighbor-responds-to-realtors-letter/#more-138>)

<http://www.windaction.org/posts/43244-vermont-wind-turbines-harm-property-values>

MAY
25
2013

Article

Turbines complicate sales of abutting homes

South Coast Today - Ariel Wittenberg - May 25, 2013[Impact on Economy](#) [Property Values](#) [Massachusetts](#)

Realtor Susan Whitehead said she has been trying to sell a property on Weeden Road for two years. That property was put on the market for reasons unrelated to the turbines, but Whitehead said buyers ask about the machines, which are visible across Little Bay, "100 percent of the time." "They ask about the noise, they ask about the flicker, and then they don't put in an offer," she said.

FAIRHAVEN - When Peter Goben, 52, first met his wife Christine, he thought it was fate that they both had grown up in New Bedford but dreamed of living in Fairhaven. Together they built a house in town, raised five children there, and never thought they'd leave, Goben said, until the turbines came.

Goben's Teal Circle home is located just 1,200 feet from Fairhaven's two wind turbines at the wastewater treatment plant. He lives across the street from a home where the state conducted its noise testing of the turbines and found a violation.

Goben said he believes in the need for renewable energy, and was worried about noise but willing to give it a try when the town announced it was building two so close to his backyard.

Now, after a year of sleeping on the living room couch because the turbines are too loud in his bedroom, Goben is leaving Teal Circle and moving back across the harbor.

"The kids are upset because this is their home, but they don't live here anymore," he said. "It doesn't make sense to stay here when I can only use half my house."

Goben is not the only Fairhaven resident who, after months of complaining about the turbine noise with no relief, is looking to move.

Justin Downey has lived on Timothy Street his entire life, in a home built by his great grandparents. He said his fiancée and their three children moved to Martha's Vineyard to be with her parents six months ago because the turbines were keeping their 8-year-old son up at night and affecting his schoolwork.

Downey stayed behind until he can find a job on the island and sell his home.

"I used to see my kids all the time; now it's just when I can get on the ferry," he said. "It's sad, but going back and forth all the time is too expensive."

Downey said he tried selling his home and put it on the market for what he considered to be a low asking price of \$209,000.

After a few months of "watching buyers come by, look at the turbines and drive away," Downey took it off the market and said he is now hoping to find someone to rent it.

Realtor Susan Whitehead said she has been trying to sell a property on Weeden Road for two years. That property was put on the market for reasons unrelated to the turbines, but Whitehead said buyers ask about the machines, which are visible across Little Bay, "100 percent of the time."

"They ask about the noise, they ask about the flicker, and then they don't put in an offer," she said.

Because of this, the asking price of the home has dropped from \$389,000 to \$244,900, Whitehead said.

Trying to sell a home near wind turbines is something Falmouth real estate agent Margaret Gifford said is not easy. There, residents have been battling to shut the turbines off for the past two years, and Gifford said agents swap stories of houses languishing on the market for years at a time, being passed around from broker to broker.

"The houses near the turbines are not ones that sell quickly," she said.

Real estate agents are required to inform buyers of anything about a house that might depreciate its value. In the case of turbines, Gifford said they "disclose themselves" but she does caution buyers to make sure they see homes when the turbines are spinning.

Patricia Favulli, acting director of the Falmouth Assessor's Office, said she has not seen evidence that home values have been affected by the turbines and that houses near the Falmouth turbines have been sold "close to or more than" the assessed value.

On Teal Circle in Fairhaven, Goben considers himself lucky that his home was on the market for just two weeks before an offer came in, something he attributes to the newly built Wood Elementary School nearby. He expects the sale to close by the end of the month at a price 7 percent below what he asked. Since his house went on the market, Goben said some of his neighbors, who are also affected by noise from the turbines, have accused him of "abandoning" their cause.

"But I did my part. I voted, I went to meetings. Nothing is changing here," he said. "The only thing left to do was go."

Source: <http://www.southcoasttoday.com/apps/pbcs.dll/article?AID=/20130525/NEWS/305250341>

<http://www.windaction.org/posts/37265-turbines-complicate-sales-of-abutting-homes>

**JUWI Wind
Prairie Breeze Wind Farm, LLC
Tipton County, Indiana**

**PROPERTY VALUE IMPACT &
ZONING COMPLIANCE
EVALUATION**

**McCann Appraisal, LLC
March 20, 2013**



The WindAction Group (www.windAction.org)

Facts, analysis, exposure to industrial wind energy's real impacts

MAR
20
2013

 Document

Property value impact & zoning compliance evaluation

Michael McCann, McCann Appraisal LLC - March 20, 2013

 Impact on Economy  Property Values  Indiana

This presentation prepared by appraiser Michael McCann examines the various studies that look at property value impacts near operating wind energy facilities. In this case, Mr. McCann looks at the Tipton County, Indiana ordinance and the effects of the proposed Juwi Wind project known as Prairie Breeze Wind Farm. The project was ultimately approved by Tipton County but a condition was placed on the permit that requires the developer guarantee there will be no negative effect on property values. The full presentation can be accessed at the links at the bottom of this page.



Tipton County Bza Mccann Appraisal Presentation

Download file (<http://s3.amazonaws.com/windaction/attachments/1764/tipton-county-bza-mccann-appraisal-presentation.pdf>)
(2.41 MB) pdf

Source: <http://nevadajournal.com/as...> (<http://nevadajournal.com/assets/uploads/2013/03/tipton-county-bza-mccann-appraisal-presentation.pdf>)

<http://www.windaction.org/posts/36755-property-value-impact-zoning-compliance-evaluation>

Values in the Wind: A Hedonic Analysis of Wind Power Facilities*

Martin D. Heintzelman

Carrie M. Tuttle

March 3, 2011

Economics and Financial Studies

School of Business

Clarkson University

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*Martin D. Heintzelman is Assistant Professor, Clarkson University School of Business. Carrie M. Tuttle is a Ph.D. Candidate in Environmental Science and Engineering at Clarkson University. We would like to thank Michael R. Moore, Noelwah Netusil, and seminar participants at Binghamton University as well as the 2010 Thousand Islands Energy Research Forum and the 2010 Heartland Economics Conference for useful thoughts and feedback. All errors are our own.

3 Data and Methodology

Our data consists of a nearly complete sample of 11,369 residential and agricultural property transactions in the Clinton, Franklin and Lewis Counties from 2000-2009. Of these there are 1,955 from Lewis, 3,255 from Franklin, and 6,159 from Clinton counties. Each observation constitutes an arms-length property sale in one of the three counties between 2000 and 2009. Parcels that transacted more than once provide a greater likelihood of observing specific effects from the turbines on sales prior to and after installation. In total, 3,890 transactions occurred for 1,903 parcels that sold more than once during the study period.

Transacted parcels were mapped in GIS to enable us to calculate relevant geographic variables for use in the regressions. Turbine locations were obtained from two different sources. In Lewis County, a GIS shapefile was provided by the County which contained 194 turbines. According to published information on the Maple Ridge wind project, there are 195 turbines at the facility (Maple Ridge Wind Farm). Noble Environmental Power would not provide any information on their turbine locations so 2009 orthoimagery was utilized to create a GIS shapefile with the turbine locations in Franklin and Clinton counties.

Turbine locations in combination with several other datasets were merged using ESRI ArcView GIS software and STATA data analysis and statistical software to form the final dataset. Transacted parcels were mapped in GIS to determine the distance to the nearest turbine. Then buffers, ranging in size from 0.1 to 3.0 miles, were created around each parcel polygon and these were spatially joined with the turbine point data to compute the number of turbines

located within these various distances from the parcels. Buffer distances are used as a proxy to estimate the nuisance effects of the turbines (i.e., view-scapes and noise impacts). The distance to turbines and number of turbines by parcel were exported from GIS and combined with the other parcel level details in STATA. Table 3 summarizes the datasets that were used in the analysis and their sources. Table 4 provides summary statistics for many of the variables included in our analysis.

3.1 Methodology

Our analytical approach to estimating the effects of wind turbines on property values is that of a repeat sales fixed-effects hedonic analysis. We are attempting to estimate the 'treatment' effect of a parcel's proximity to a wind turbine. There are a number of difficulties in measuring the effect of turbines. First and foremost, there is a question of when a turbine should be said to 'exist.' The obvious answer is that turbines exist only after the date on which they become operational. However, there is a long approval process associated with development of these projects and local homeowners presumably will have some information about where turbines will be located some years before they actually become operational. To deal with this issue, we run our regressions with three different assumptions about the date of existence - the date the draft environmental impact statement was submitted to the New York State Department of Environmental Conservation, the date the final environmental impact statement was approved, and the date at which the turbines became operational.

The second regression equation uses the repeat sales approach:

$$\ln p_{it} = \lambda_t + \alpha_i + z_{it}\beta + \epsilon_{it} \quad (2)$$

where λ_t represents year dummies, α_i represents parcel fixed effects, z_{it} represents time varying parcel level characteristics, and ϵ_{it} is the error term. In effect, this analysis regresses the change in price over time on the change in any time-variant factors. In our case these time varying factors are the proximity of turbines, the age of any home on the parcel, and the year in which the sale takes place.

4 Results

We present our results beginning with the coarsest scale of fixed effects, the census block-group, before refining this approach by using census block and then parcel-level fixed effects. Keep in mind that these results are subject to endogeneity bias because of the selection effects discussed above. In Table 6, we display results of estimating Equation 1 including one wind variable at a time with each of the other covariates.¹⁷ The rationale for this is that, except for the distance variable, these measures are not exclusive of one another, and are thus highly collinear. All of the results presented here assume that turbines exist at the date the Final Environmental Impact Statement (EIS) is issued. This accounts for the fact that local residents and most other participants in real estate markets will be aware of at least the approximate location of turbines before they are actually constructed. In fact, most of the turbine locations

would be known, if not publically, well before this since developers typically negotiate with individual landowners before moving forward with regulatory approvals. Our results are quite robust to adjusting the date of 'existence' forwards to the date of the draft EIS. If we adjust this date backwards to the date of the permit being issued the results are qualitatively similar, but we lose significance - likely because we then have even fewer post-turbine transactions in the 'treatment' group.

First, notice that the covariate results are largely as would be predicted. Home owners in this region prefer larger homes, more bathrooms and fireplaces, and to be close to major roads. The road result may be counter-intuitive, but remember the rural character of our study area; distance to a major road is a measure of the relative isolation of a parcel. Home owners also take into account the value of included property, and appear to prefer to be outside of established villages. This may be a tax story as those home owners in outlying areas face considerably lower property taxes. However, homes outside of villages generally have larger lots. Lot size is, unusually, not a significant factor. This may be because of the large size of most parcels in our sample, but also may be related to the inclusion of the village identifier.¹⁸ Local buyers pay about 9% less than others.¹⁹ Residents appear to not value additional bedrooms, but since we are controlling for house size, this result is likely because, *ceteris paribus*, more bedrooms means smaller bedrooms. Not surprisingly, parcels with more dedicated agricultural land are priced lower, controlling for acreage, and homes with open water or wetlands are more valuable. These measures are partially proxying for a home being waterfront. The presence of multiple

families, including apartments, or mobile homes on a parcel also reduce the price, while 'estates' receive a premium.²⁰ Strangely, homes classified as having 'excellent' construction quality appear to sell for less than those with average quality in the block-group model while selling for more in the census block model. The negative, insignificant, result is likely to be due to the small number of homes with this classification and omitted variables bias that is corrected for in the census block model. Meanwhile, minimum and economy quality homes sell at substantial discounts of about 50.5% and 27% respectively relative to average quality homes. Finally, age has a negative but diminishing impact as older homes, all else equal, will sell for less.

The wind results are also broadly consistent with intuition. At the block-group level, the existence of turbines between up to 1 and 3 miles away negatively impacts property values by between 15.6% and 31%, while having at least one turbine on the parcel reduces prices by 65%. The significance of this last result is surprising given that only 3 parcels in our sample contain turbines at the time of sale and thus may be spurious. Effects for turbines at other distances are also negative though insignificant, and this is likely, and in part, because of a lack of variation in these variables; only 39 of the observations in our sample have turbines within 0.5 miles at the time of sale (about 0.3%). We also find that the marginal turbine has a negative effect at all ranges and is significant in the same ranges as above. At the block level we see many of the same effects, with turbines in the 0.1 mile range also having significant effects. At both scales, the $\ln(\text{inverse distance})$ measure is significant and negative. We will discuss the interpretation of this coefficient in Section 5.

Table 7 contains results from using two additional sets of variables to represent the effects of wind turbines. These are dummy variables and count variables representing the existence of turbines within concentric rings around each parcel.²¹ The ln (inverse distance) measure is also included as a covariate, and, as above, it is negative and significant. These measures show less consistent results than those above. At very small distances there appears to be a positive effect with the sign switching between positive and negative at larger distances. These results are robust to excluding the ln (inverse distance) variable. One reason for the inconsistent and generally insignificant results for these estimates is that even though these measures are not dependent on one another, there is still a high degree of collinearity between the number of turbines within each of the ranges.

All of the results in Table 6 and Table 7, however, are subject to endogeneity bias. If it is true that lower value parcels are more likely to contain or be near wind turbines due to selection effects, then these estimates would overstate the negative impact of turbine proximity. Tables 8 and 9 present results from the estimation of Equation 2 that control for these selection effects using parcel-level fixed effects. Specifically, Table 8 presents results from using each turbine measure individually in regressions with only year and month dummies and the age of the home and Table 9 presents results from using the distance measure with the concentric circle turbine dummies and count variables. Here we see a consistent negative impact from proximity to the nearest turbine, and little other significance. We do find a significant positive impact from having turbines within 0.1 miles when proximity measures are included individually,

and weakly significant positive impacts for turbines between 0.5 and 1 mile away as well as negative impacts for turbines between 1 and 1.5 miles away in the concentric circle model. These results are plausible if homeowners very close to existing turbines expect that future wind development may be possible on their parcels, which would necessitate easement payments.

The coefficient on age is now positive and significant. This sign reversal might be explained by the fact that, in the repeat-sales framework, this variable represents the change in age, or the number of years between sales for a parcel. We are controlling for the dynamics of the real estate market through year and month dummy variables, but this may be acting as an additional control for general appreciation over the sample period.

Throughout all of these regressions, however, the \ln (inverse distance) measure is strongly significant and negative, which indicates that wind turbines are negatively impacting property values in a way that is declining over the distance from the turbines. Notice that the effects are somewhat larger in the block-group model than in the census block or repeat sales models. This is suggestive of endogeneity bias in the block-group model.

We would expect there to be systematic differences in the effects of wind turbines across the counties in our sample. In particular, the turbines in Lewis County were installed in 2004-2005 and those in Clinton and Franklin County were only installed in 2008-2009. So, homeowners in Lewis County have more experience with the turbines and, in addition, we observe more post-turbine transactions in Lewis County with which to identify impacts. Table 10 reports repeat sales results by area - Lewis County vs. Clinton/Franklin Counties. We



Brad Barnes shared a link.

April 11, 2019 ·

Impact of Wind Farms on property value

2011 appraised at \$ 700,000 08/15 Relisted \$ 849,000

2/1/ 2016 sold for \$ 450,000 with Wind Stigma

Radford Run 2018, Now surrounded by Wind Towers

Realtor.com estimate dropped to \$ 347,000 now \$428,800

This is all the analysis you could ask for.

If the Wind Industry wants to build one in the 'footprint'

exactly like this, and within one-mile, do it, go ahead

here's your 'matched pair' real estate analysis.

It doesn't get much better than this. Game over.

302 W Hampshire Road, Maroa, IL

(Radford Run)





Like

Comment

See how you compare to your friends and family. [View your stats](#)



Jana Chamness shared a post.



December 4, 2019 ·

christian county



Brad Barnes shared a link.

April 11, 2019 ·

Impact of Wind Farms on property value

2011 appraised at \$ 700,000 08/15 Reliste... [See More](#)



REALTOR.COM

Check out the home I found in Maroa



[View 12 photos for 302 W Hampshire Rd, Maroa,...](#)

4

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See how you compare to your friends and family. [View your stats](#)



302 W Hampshire Rd Maroa, IL 61756

****NOT FOR PUBLIC DISTRIBUTION: MEMBERS ONLY****

Residential **Closed/Sold** LP: \$600,000
 MLS#: 6152925 **DOM: 204** OP: \$849,000
 SP: \$450,000



Year Bilt: 2004 **Tot Fin SF Area:** 8,124/\$55.39
PropSubType: Single Family **Tot Fin Abv Grd:** 5,213/\$86.32
Stories: 1.5
Style: Ranch **Main SF:** 4,504
Bedrooms: 6 **Upper 1 SF:** 709
Baths Full/Half: 4/1 **Upper 2 SF:**
Rooms: 12 **Lower SF:**
Bedrm on Main: Yes **Bsmt Total SF:** 4,504
Master Bath: Yes **Bsmt Finished SF:** 2,911
Lndry on Main: Yes **Bsmn Unfin SF:** 1,593
#Fireplaces: 2 **SqFt Source:** Other
Lake/Name: No **Lot SqFt:** 435,600
Bsmnt: Yes **Acres:** 10.00
Bsmnt Type: Finished, Unfinished, Walk-Out **Apx Lot Dim:**
Fnd Type/Mat: Full Basement/Poured Concrete
GarageSp/Type: 3 Spaces/3 Car Attached

Tax Information & Legal

County: Macon **Tax ID:** [10-02-22-400-004](#)
Taxes/Yr: \$16,959/2014 **Tax Exmptn:** Home Improvement
Legal: PT SE1/4 DESC AS: BEG AT PT ON S LN SE1/4 1323.92 W SE COR N 1601.80 E550 S300 SW452.17 SW 348.59 S 108.5 S625.81 NE 140 S TO PT ON S LN SE1/4 SW 190.1 TO POB

Schools

District: Maroa Forsyth Dist 2
Elementary: Maroa-Forsyth **Middle:** Maroa-Forsyth **High:** Maroa-Forsyth

Property Information and Features

Zoning: AGR **Water:** Well **Factory Built:** No
Subdivision: No **Sewer:** Septic Tank **Foreclosure:** None
Covnts/HOA: /No **Elec/Gas \$:** **CFD Avail:** No
Appliances Dishwasher, Disposal, Freezer, Microwave, Other, Oven, Range, Refrigerator
Heat/Cool/WH: Geothermal/Geothermal/Geothermal
Interior Feat: Breakfast Nook, Cathedral Ceiling, Central Vacuum, Fireplace Gas, Jetted Tub, **Driveway:** Concrete
 Pantry, Security System, Skylight, Sump Pump, Walk-in Closet, Wet Bar, Zoned Heat Sys
Exterior: Brick, Limestone, Stone, Vinyl, **Roof:** Other, Shingle **Porch/Dk/Patio:**
 Wood
Exterior Feat: Circle Drive, Outbuildings, Pond

Remarks and Showing Instructions

Public: HOLY COW! This home is an absolutely stunning, once in a lifetime opportunity for the family who wants room to roam, inside and out! This home sits down a winding drive surrounded by beautiful flora, lovingly planted by it's current homeowners. These plantings extend throughout most of the property, including around the 2 acre stocked pond! There are not enough words to describe this 2x6 constructed home with it's deluxe gourmet granite kitchen, pampering main floor master suite, gentleman's bar, barreled ceiling entry, or it's 2 economical geo-thermal units with 8 zoned areas, in this space.

Directions: 51 N. Through Forsyth past the Argenta Rd. to West Hampshire. Take a left. Second house on your right. Long drive.

Agent: There is an additional bath in the walk-out lower level and a large laundry room that is approximately 20x9. Man Cave Grain Bin with insulation and a wood burning stove. Covered patio and uncovered patio. There is a walk-thru Bar area in between the kitchen and the Great room. Additionally there is a warming drawer in the kitchen and a garden second sink. Home is Generator ready. . Please call Michael for the list of details included in this stately property.

Show Instructions/Lockbox: Call Michael for easy showing. 217.433.1062/None

Rooms

Room	Level	Dim	Features	Room	Level	Dim	Features
Kitchen	Main	21'6X15'	Ceramic Tile Floor	Family Rm	Lower	25'6X22'3	Carpet
Mstr Bed	Main	24'6X15'6	Carpet	Bed	Lower	12'5X11'8	Carpet
Bed	Lower	9'10X11'8	Carpet	Bed	Main	12'7X12'	Carpet
Bed	Main	12'7X12'	Carpet	Mstr Bath	Main	15X10	Ceramic Tile Floor
Bath			Toilet Shower&Tub	Bath			
Bath			Toilet Shower&Tub	Bath			Toilet Shower&Tub
Bath			Toilet Shower&Tub	Bath	Main		Ceramic Tile Floor
Bath	Main		Ceramic Tile Floor	Bath	Upper		Ceramic Tile Floor
Brkfst Nook	Main	12'6X17'	Carpet	Bonus	Upper	23'6X17'6	Carpet
Great Rm	Main	21'X27'6	Hardwood Floor	Laundry	Main		
Office	Main	12'6X18'	Carpet	Other	Main	17'6X15'	Ceramic Tile Floor

Listing Information

List Office: [Brinkoetter & Associates \(3850\)](#)
Office Phone: 217-875-0555
List Agent: [Michael Sexton \(082408906\)](#)
Phone: 217-875-0555
List Type: Exd Rt To Sell
Possession: Negotiable

Minimum CC: 3%
Variable: No
Owner Name: Ken and Terri Smithmier
2nd Owner:
Agt Owned: No

List Date: 07/13/2015
Expire Date:

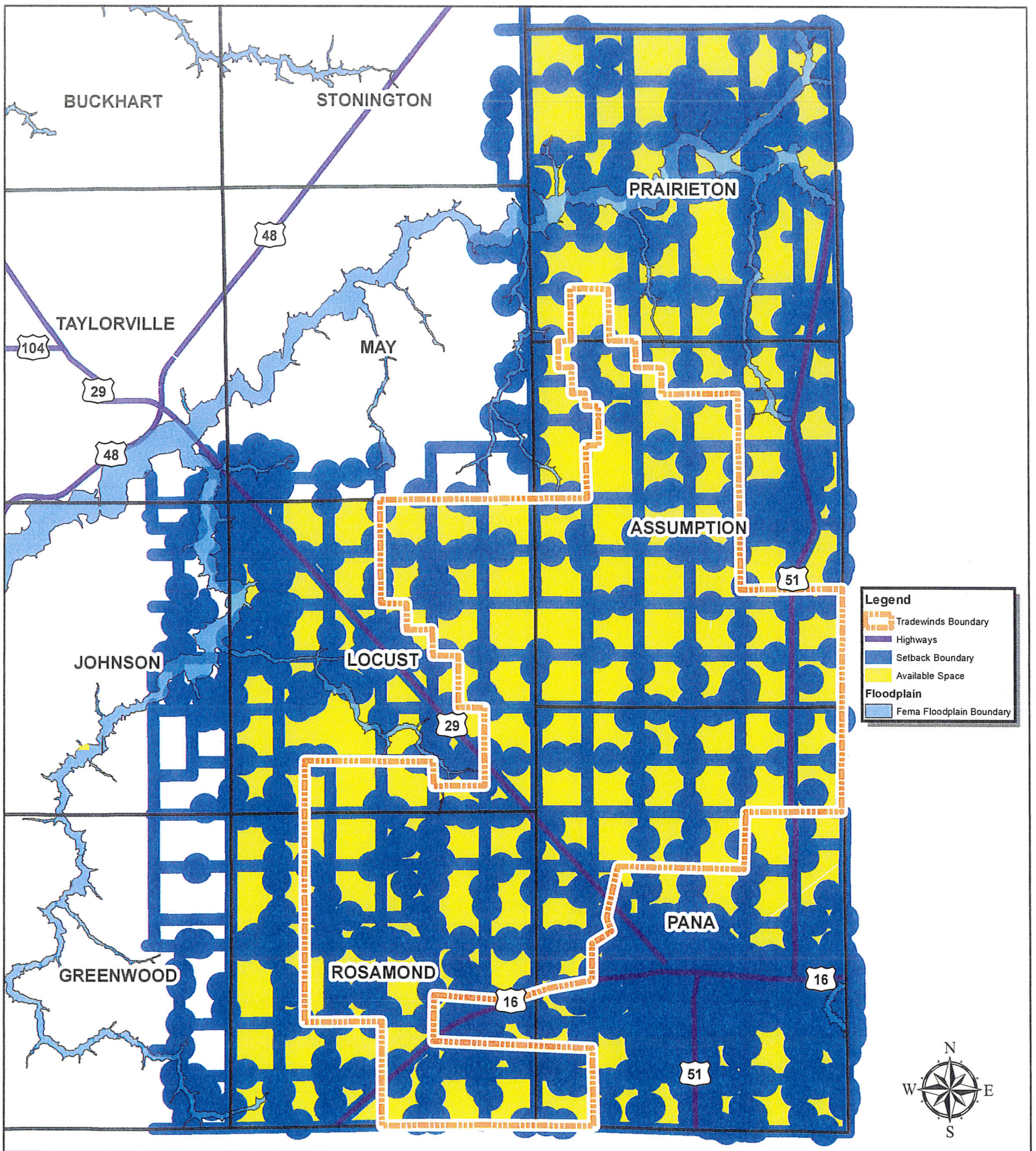
Selling Information

Selling Office: [RE/MAX Executives Plus \(4330\)](#)
Office Phone: 217-428-9500
Selling Agent: [Mindy Cook \(362000243\)](#)
Agent Phone: 217-875-0555

Buyer Name:
Financing: Conv
Concessions: No

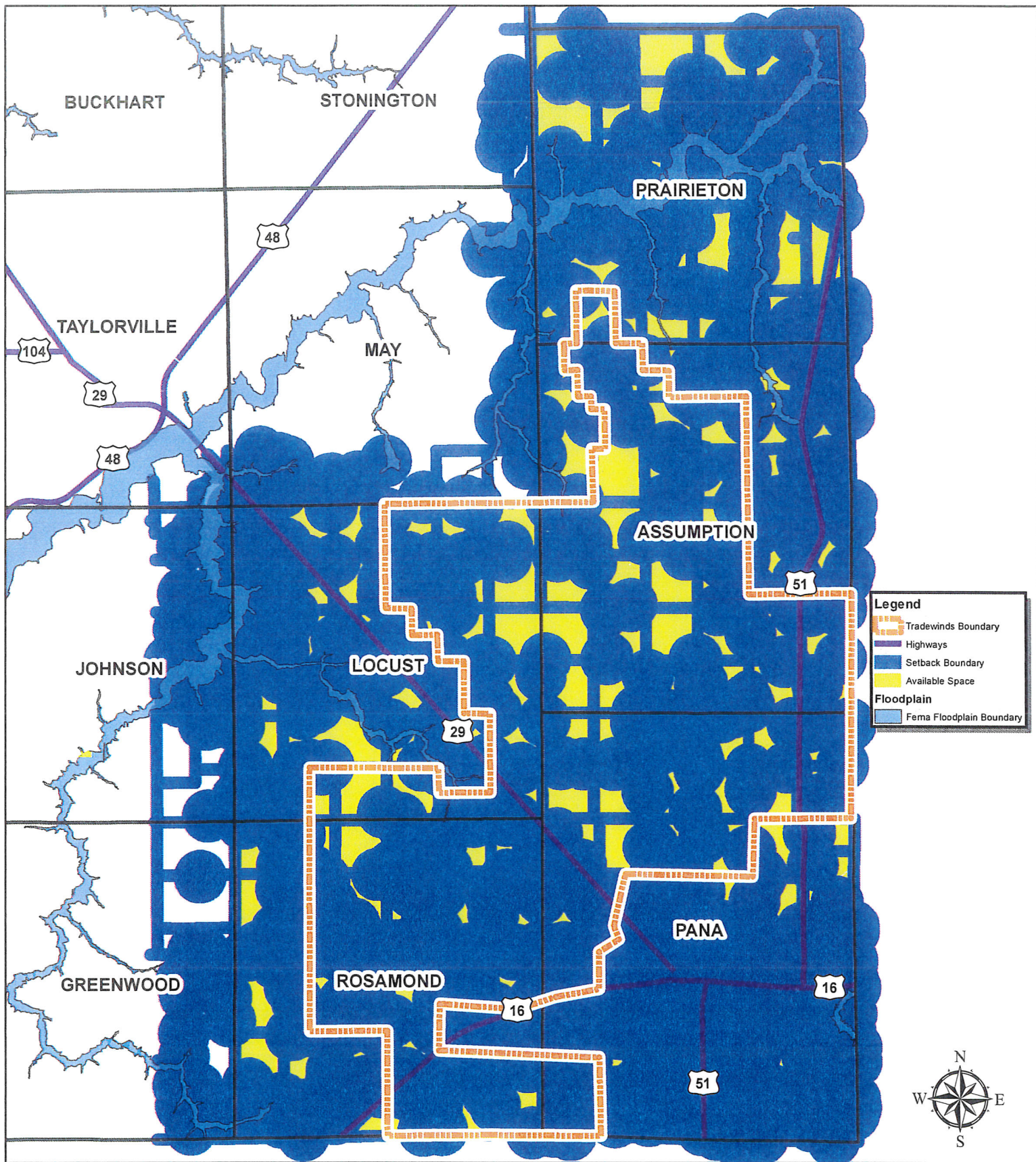
Sale Date: 02/02/2016
Sale Price: \$450,000
Contract Dt: 12/25/2015

Information herein deemed reliable but not guaranteed; buyer should verify school districts and all information. [Matrix.CIBRMLS.com](#)
Copyright 2020 06/22/2020 8:54 AM

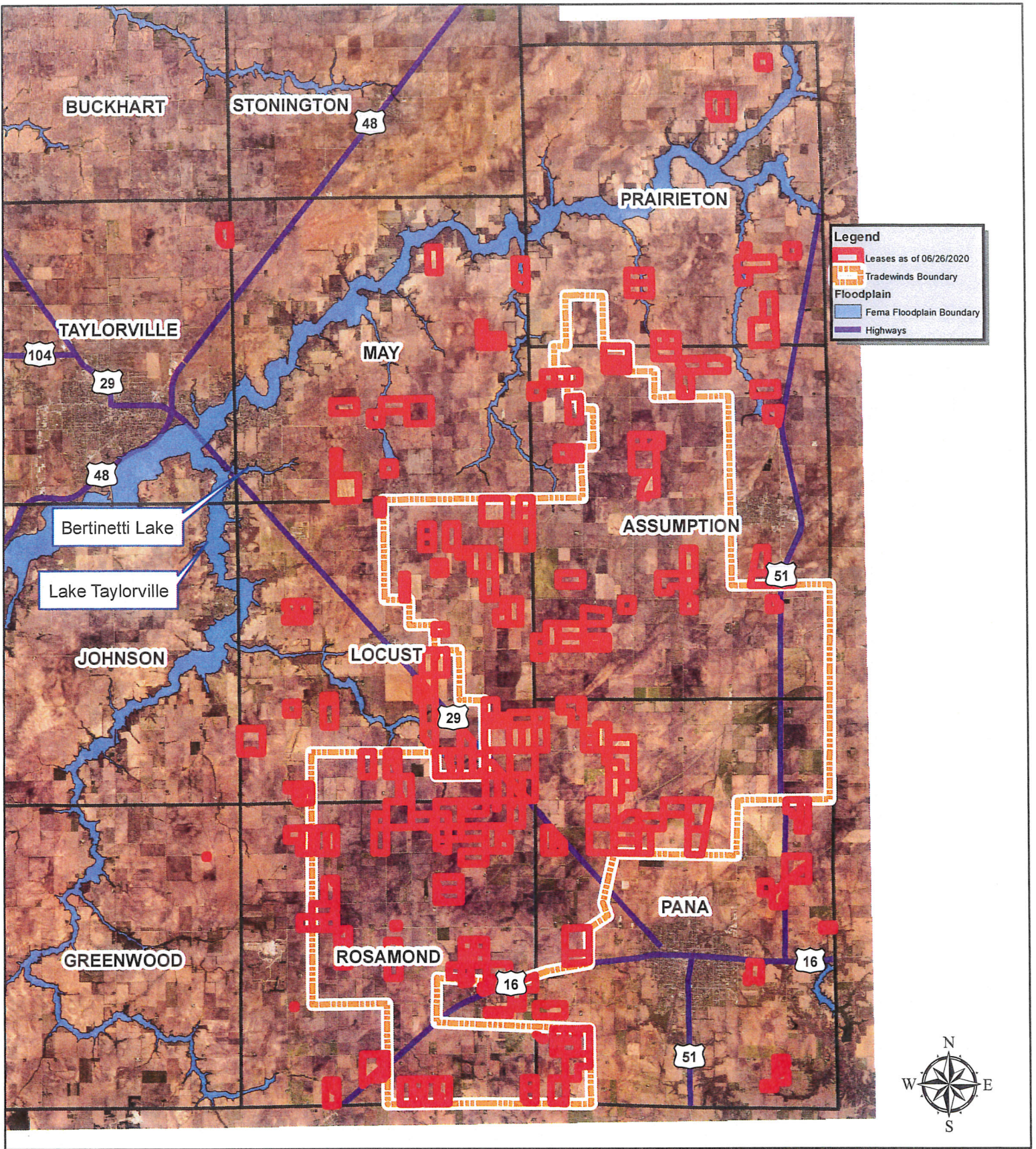


The blue represents the area restricted by a 1,500' set-back. The setback is from the center of the residential structure, not the property line. The yellow represents land available to build a commercial turbine on without a zoning variance hearing at this setback.

12,500 6,250 0 12,500 Feet



The blue represents the area restricted by a 2,640' set-back. The setback is from the center of the residential structure, not the property line. The yellow represents land available to build a commercial turbine on without a zoning variance hearing at this setback.



Wind Turbine Leases as of 06/26/2020

FEB
5
2019

📄 Article

Ford County Board intends to protect property values around wind farms

Paxton Record - Will Brumleve - February 5, 2019

📁 Property Values 📁 Illinois

The board's five-member zoning committee drafted a proposed revision to the county's ordinance regulating wind farms last Friday in order to protect the value of non-participating landowners' property. Under the proposal, before a special-use permit is issued for a wind farm, the owner/operator of the wind farm must guarantee to pay the difference if any non-participating property within two miles of the wind farm ends up being sold for less than its fair cash value or assessed value.

PAXTON — The Ford County Board intends to ensure that the construction of wind farms does not negatively affect the value of nearby land owned by people not leasing their property to a wind farm.

The board's five-member zoning committee drafted a proposed revision to the county's ordinance regulating wind farms last Friday in order to protect the value of non-participating landowners' property.

Under the proposal, before a special-use permit is issued for a wind farm, the owner/operator of the wind farm must guarantee to pay the difference if any non-participating property within two miles of the wind farm ends up being sold for less than its fair cash value or assessed value.

As stated, the owner/operator will guarantee the property is sold for within 5 percent of its fair cash value or assessed value. The guarantee will be based on a property's fair cash value unless the landowner requests and is granted a new assessment for their property from the Ford County Supervisor of Assessments Office before the wind farm's permit is issued.

Non-participating landowners would need to make a formal complaint to the Ford County Board in order to have... more [🔗](http://www.paxtonrecord.net/news/2019-02-05/ford-county-board-intends-protect-property-values-around-wind-farms.html) (<http://www.paxtonrecord.net/news/2019-02-05/ford-county-board-intends-protect-property-values-around-wind-farms.html>) *[truncated due to possible copyright]*

Source: <http://www.paxtonrecord.net...> (<http://www.paxtonrecord.net/news/2019-02-05/ford-county-board-intends-protect-property-values-around-wind-farms.html>)

NOV
3
2016 Document

Invenergy: Property Value Guarantee

- November 3, 2016

 Property Values  Rhode Island

Invenergy's proposal to construct a controversial 1,000 MW natural gas-fired combined cycle facility in Burrillville, RI includes a mandate to offer a property value guarantee to abutting property owners. Invenergy is steadfast in refusing to offer the same agreement to neighbors of its wind energy power plants. A portion of the PVG approved by the Burrillville's town council is provided below. The full agreement can be accessed by selecting the links on this page.

2. Property Value Guarantee.

a. Initial Appraisal. The Property was appraised by _____, a Qualified Appraiser (defined below), at Guarantor's sole cost, (such appraisal being the "Initial Appraisal") in the amount of \$_____. A copy of the Initial Appraisal is attached hereto as Exhibit B. The resale value of the Property, as determined by the Initial Appraisal, shall be referred to herein as the "Base Value".

b. Qualifying Sale. Guarantor shall pay to Property Owner, within sixty (60) days following the closing of the sale of the Property (the "Closing"), the difference between the sale price for the Property (the "Sale Price") and the Base Value (such difference being the "Property Value Guarantee Payment") in the event that: (i) the Closing occurs more than ten (10) business days after the commencement of construction on the Project ("Construction Commencement"), but in no event later than the seventh (7th) anniversary of the Construction Commencement (ii) the Property is sold to a bona fide purchaser for value in an arm's length transaction (excluding any short sale or other sale in exchange for the extinguishment of debt), (iii) the sale price for the Property is less than the Base Value, and (iv) at the Closing, the Property is in substantially the same condition as it was during the Initial Appraisal, reasonable wear and tear excepted. For the avoidance of doubt, this Agreement shall not apply to any sale of less than the entire Property. Upon the sale of less than the entire Property, this Agreement shall become null and void and be of no further force and effect.

c. Pre-Closing Appraisal. In the event that a written offer to purchase the Property by a bona fide third party purchaser is more than ten percent (10%) less than the Base Value, Guarantor shall have the right, at its sole cost, to engage a Qualified Appraiser to appraise the Property before the Closing (the "Pre Closing Appraisal"). If the Pre Closing Appraisal shows that the offer to purchase the Property is less than the Base value, Guarantor shall pay to Property Owner the Adjusted Property Value Guarantee Payment, to be paid within sixty (60) days following the closing of the sale of the Property. The term "Adjusted Property Value Guarantee Payment shall mean the difference between the Pre Closing Appraisal Price and the Sale Price. Notwithstanding the foregoing, Guarantor shall

PROPERTY VALUE GUARANTEE AGREEMENT

This Property Value Guarantee Agreement (“**Agreement**”) made and entered into as of _____ (the “**Effective Date**”), by and between Clear River Energy LLC, a Delaware limited liability company (“**Guarantor**”), having its principal offices at One South Wacker Drive, Suite 1800, Chicago, Illinois 60606 and _____, residing at _____, Burrillville, Rhode Island (“**Property Owner**”). Guarantor and Property Owner shall each be referred to as a “**Party**” or collectively as the “**Parties**”.

RECITALS

WHEREAS, Guarantor has been granted a license by the Rhode Island Energy Facilities Siting Board (“**RI EFSB**”) to develop, construct and operate a combined-cycle natural gas fired thermal energy facility in Burrillville, Rhode Island (the “**Project**”); and

WHEREAS, Property Owner owns certain real property in the town of Burrillville, Rhode Island, located within an agreed upon proximity (of the Project, as more particularly described on Exhibit A (the “**Property**”); and

WHEREAS, the Property is either a buildable lot upon which a permanent residential dwelling may be located in accordance with the local zoning ordinance or is a property upon which a permanent residential dwelling currently exists; and

WHEREAS, Guarantor desires to alleviate concerns about the preservation of values of residential property located in proximity to the Project; and

WHEREAS, Guarantor is also willing to allow Property Owner the option to waive the protections afforded by this Agreement and to instead accept a one-time payment from Guarantor on the terms of the Opt Out Agreement form attached hereto;

NOW THEREFORE, In consideration of the foregoing, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties hereby agree as follows:

1. **Recitals**. The foregoing recitals are hereby incorporated herein by this reference.
2. **Property Value Guarantee**.
 - a. **Initial Appraisal**. The Property was appraised by _____, a Qualified Appraiser (defined below), at Guarantor’s sole cost, (such appraisal being the “**Initial Appraisal**”) in the amount of \$_____. A copy of the Initial Appraisal is attached hereto as Exhibit B. The resale value of the Property, as determined by the Initial Appraisal, shall be referred to herein as the “**Base Value**”.

b. Qualifying Sale. Guarantor shall pay to Property Owner, within sixty (60) days following the closing of the sale of the Property (the “**Closing**”), the difference between the sale price for the Property (the “**Sale Price**”) and the Base Value (such difference being the “**Property Value Guarantee Payment**”) in the event that: (i) the Closing occurs more than ten (10) business days after the commencement of construction on the Project (“**Construction Commencement**”), but in no event later than the seventh (7th) anniversary of the Construction Commencement (ii) the Property is sold to a bona fide purchaser for value in an arm’s length transaction (excluding any short sale or other sale in exchange for the extinguishment of debt), (iii) the sale price for the Property is less than the Base Value, and (iv) at the Closing, the Property is in substantially the same condition as it was during the Initial Appraisal, reasonable wear and tear excepted. For the avoidance of doubt, this Agreement shall not apply to any sale of less than the entire Property. Upon the sale of less than the entire Property, this Agreement shall become null and void and be of no further force and effect.

c. Pre-Closing Appraisal.

In the event that a written offer to purchase the Property by a bona fide third party purchaser is more than ten percent (10%) less than the Base Value, Guarantor shall have the right, at its sole cost, to engage a Qualified Appraiser to appraise the Property before the Closing (the “**Pre Closing Appraisal**”). If the Pre Closing Appraisal shows that the offer to purchase the Property is less than the Base value, Guarantor shall pay to Property Owner the Adjusted Property Value Guarantee Payment, to be paid within sixty (60) days following the closing of the sale of the Property. The term “Adjusted Property Value Guarantee Payment shall mean the difference between the Pre Closing Appraisal Price and the Sale Price. Notwithstanding the foregoing, Guarantor shall use commercially reasonable efforts to have the Pre-Closing Appraisal conducted by the same appraiser who conducted the Initial Appraisal, provided that (i) such appraiser is still a Qualified Appraiser. To the extent that the Property Owner has made substantial improvements to the property after the Initial Appraisal, and if the Property Owner believes these substantial improvements have increased the property value then Property Owner may request a pre-closing appraisal to determine whether any adjustments to the Base Value are required, with respect to said improvements.

d. Reimbursement Expenses. There shall be a payment by Guarantor to the Property Owner a flat amount of \$1,500 for the time and convenience and/or future expenses of Property Owner when the Agreement is entered into.

3. Qualified Appraiser.

a. Qualified Appraiser. As used herein, “**Qualified Appraiser**” means a person

who (i) is licensed by the State of Rhode Island, (ii) is not related to the Property Owner, (iii) is not an employee or contractor of Guarantor or its affiliates, (iv) does not otherwise have a business relationship with Property Owner, Guarantor or its affiliates, (v) has not been subject to any suspension or revocation of license for any prior disciplinary action regarding their Rhode Island license by Rhode Island licensing authorities or from any professional association with which appraiser is a member or affiliated, (vi) has at least 5 years' experience in appraising residential property in Rhode Island in Providence County and/or any surrounding Counties, and (vii) is a Certified General Appraiser within the State of Rhode Island. The Qualified Appraiser shall be a person listed on Exhibit C, or a person agreed upon by mutual consent of the Guarantor and Property Owner; provided, however, that in the event that there are no appraisers listed on Exhibit C who are otherwise a Qualified Appraiser, then Guarantor (in its reasonable judgment) may select an otherwise Qualified Appraiser who is not listed on Exhibit C.

- b. Standards. Any appraisal conducted pursuant to this Agreement shall conform to the Code of Professional Ethics and Uniform Standards of Professional Appraisal Practice of the Appraisal Institute.
- c. Initial Appraisal. In conducting the Initial Appraisal, the Qualified Appraiser shall:
 - i. Use extraordinary assumption: Assume that the "Project" does not exist;
 - ii. Utilize comparable property, developed as the Property was developed as of the Effective Date and located a sufficient distance away from the Project so that, in the opinion of the appraiser, the selling price of that property was not influenced by the presence of the Project;
 - iii. Utilize comparable property, located approximately the same distance from major population centers (such as Providence or Woonsocket) where in the opinion of the appraiser the selling price of the comparable property was not overly influenced by the major population center (such as Providence or Woonsocket).
 - iv. Establish a fair market value which is based upon the Property as developed on the Effective Date (without considering any development or improvements, including new structures, after the Effective Date);
 - v. Prepare the appraisal in full compliance with any and all state and federal standards and state regulations which pertain to the preparation of an appraisal of the Property except those standards and regulations which conflict with these instructions; and

- vi. Note the condition of the Property, both interior and exterior, at the time of the appraisal.
- d. Appeal of Initial Appraisal Value. If the property owner is dissatisfied or disagrees with the Base Value as determined in the Initial Appraisal by the first appraiser, the property owner shall have the right to a second appraisal performed at Guarantor's expense by another approved appraiser affiliated with a different firm on the approved appraiser list, as selected by the guarantor or the property owner (with the approval of the guarantor).
 - i. The second appraisal is to be prepared to the same Initial Appraisal guidelines.
 - ii. The Base Value shall be the average of the two appraisals.

4. **Listing with Broker.** Property Owner shall utilize the services of a real estate brokerage firm who shall be licensed in Rhode Island, not be related to the Property Owner and, unless waived by the Guarantor, shall be a member of the Board of Realtors and the State-Wide Multiple Listing Exchange. The Listing Agent (entity in the brokerage firm who is identified as the Seller Representative) shall have at least 2 years of demonstrated experience in handling similar properties in the regional market (including Burrillville) and also not related to the Property owner. Property Owner shall give Guarantor notice of the broker with whom they wish to contract and shall obtain Guarantor's approval of said broker. Guarantor will not unreasonably withhold such approval. If the Guarantor objects to the Property Owner's choice of brokers, it shall state those objections, in writing, to Property Owner. In the event Guarantor reasonably objects, the Property Owner shall choose another broker, and proceed as described above. As sellers of the Property, Property Owner shall be responsible for the broker's fee. Nothing herein shall prevent the Property Owner from marketing the Property at a value higher than the Base Value as determined herein. The Listing Agent shall use commercially reasonable efforts consistent with accepted practices and methods utilized by MLS brokers and agents to sell the subject property, including but not limited to: advertising (internet and print), open houses, photos of property, and MLS listings.

In the event Property Owner accepts an offer for the Property by bona fide third party purchaser, purchaser shall deposit five percent (5%) of the Purchase Price of the Property to be held in escrow by an escrow agent mutually agreed upon by Property Owner and Guarantor.

5. **Term of Listing; Conditions of Listing.** Property Owner shall list the Property, utilizing the services of a real estate brokerage firm, at the Base Value as determined herein, or at a higher value. During the listing term, Property Owner shall accept any reasonable offer of purchase for the Base Value or higher. During the listing term the Listing Agent or the Property Owner shall provide notice to the Guarantor of every bona fide offer to purchase the Property. Property Owner shall maintain the Property in good and marketable condition during the listing period.

- (a) In the event the Property Owner has not received any bona fide offer to purchase the Property after 165 days of listing the Property for sale, Guarantor shall prepare a written offer to purchase the Property for the Base Value, unless Property Owner did not reasonably cooperate with the terms of a bona-fide sale contract, or that there are defects to title that the Property Owner has not sufficiently cured to the reasonable satisfaction of Guarantor. If Property Owner accepts the written offer to purchase the Property by Guarantor, Guarantor shall complete the terms of sale within 90 days.
- (b) Provided, however, if the Property has not sold within 165 days of the Listing agreement, and Guarantor provides Multiple Listing Service statistics that demonstrate a median Marketing Time for all Providence County and adjacent jurisdiction residential properties is in excess of 165 days, as of the original Listing date, then Guarantor has the option of notifying the Property Owner that they must extend the Listing or enter into a separate listing agreement with a new Broker for an additional period of 90 days. If the extended Listing option does not result in a bona-fide sale agreement within the second (2nd) 90 day Listing term, then Guarantor must abide by the terms of Section 5(a) above, and offer to purchase the Property for the Base Value.
- (c) The listing term may be modified by the parties in good faith negotiations in the event of extraordinary personal health considerations.

6. **Guarantor's Consent to Purchase.** Guarantor shall have the right to make counter offers on any offers of purchase which are below the Base Value. In the event the purchaser accepts any such counter offer made or requested by the Guarantor, or in the event the Guarantor otherwise consents to a sale of the Property below the Base Value, the Guarantor shall pay the Property Owner, at closing, the difference between the Base Value and the Sale Price.

7. **Opt Out Agreement Payment Option; Waiver.** Guarantor is offering Property Owner the option to receive a one-time payment pursuant to the terms of a Opt Out Agreement in the form attached as Exhibit D. In the event the Property Owner accepts the terms of the Opt Out Agreement the Property Owner expressly waives the rights afforded by the Property Value Agreement. Similarly, in the event the Property Owner accepts the terms of the Property Value Agreement the Property Owner expressly waives the rights afforded by the Opt Out Agreement.

8. **Termination of Guarantor's Obligations.** This Agreement shall terminate and Guarantor shall have no obligations hereunder from and after the earlier to occur of (i) the seventh (7th) anniversary of the Construction Commencement and (ii) the date that the Project is decommissioned and demolished, or operations at the Project have been permanently terminated as the result of an order, judgment, or decree issued by a federal, state, or local agency, court, or unit of government having jurisdiction under administrative code, statute, law or ordinance.

9. **Assignment.** This agreement is personal to _____. Neither this Agreement nor the rights under it may be assigned, conveyed, or otherwise transferred by Property Owner; provided, however, that this Agreement may be transferred by devise or descent. This Agreement shall only apply to a first sale by the Property Owner, and not to any

second or subsequent sales of the Property. This agreement shall be binding on Guarantor's successors and assigns.

10. **Confidentiality.** Property Owner agrees to keep confidential the existence, status, or terms and conditions of this Agreement, including, without limitation, the Property Value Guarantee Payment (collectively, the "**Confidential Information**"), and not to disclose or otherwise convey any portion of the Confidential Information to any person except to Property Owner's accountants, attorneys, employees and representatives (collectively, the "**Representatives**"), the Burrillville, Rhode Island town manager, and local, state, and/or national officials who need to know such information for the purpose of assisting Property Owner in connection with this Agreement, and in those instances only to the extent justifiable by that need (it being understood and agreed that such persons shall be informed by Property Owner of the confidential nature of all such information and shall direct all such persons to treat such information confidentially). It is further understood and agreed by Property Owner that money damages would not be a sufficient remedy for any breach of this confidentiality agreement, and that Guarantor shall be entitled to specific performance and injunctive or other equitable relief as a remedy for any such breach without the necessity of posting bond. Such remedies shall not be deemed to be the exclusive remedy for breaches of this confidentiality agreement, but shall be in addition to all other remedies that may be available at law or equity. It is understood and agreed that the Town of Burrillville will have to comply with all laws related to the disclosure of public documents, including but not limited to the Rhode Island Access to Public Records Act.

11. **IRS Form W-9.** Notwithstanding anything in this Agreement to the contrary, Guarantor shall have no obligation to make any payment to Property Owner otherwise required under this Agreement until Property Owner has returned to Guarantor a completed Internal Revenue Service Form W-9, such Form W-9 to either (i) have been provided by Guarantor to Property Owner prior to execution of this Agreement or (ii) be provided by Guarantor to Property Owner promptly upon execution of this Agreement.

12. **Application of Law; Disputes.** This Agreement shall be construed in accordance with and governed by the laws of the State of Rhode Island. Disputes concerning the application or terms of this Agreement shall be subject to the jurisdiction of the Providence Superior Court.

13. **Notifications.** For purposes of designating means to provide notice to the parties to this Agreement the following individuals or entities are designated:

For the Property Owner:

Name: _____

Address: _____

Phone Number: _____

Email Address: _____

Property Value Considerations

Facts:

- There are nearly 3000 owner occupied parcels within the 5 townships that the proposed wind farms foot print covers
- Total Assessed Taxable value for every property in the 5 townships that contain the wind farm footprint = \$165,068,777 - \$25,830,470 (exemptions) = \$139,238,307
- Total Taxable assessed value for only occupied residences Is: \$86,141,288 - \$25,830,470 (exemptions) = \$60,310,750 – this includes residential properties within city limits of Assumption, Pana, Moweaqua, Rosamond, Owaneco, and part of Taylorville in Locust twp.
- Residential taxable assessed value of the properties in the 5 townships but not city limits = \$53,346,937 - \$19,980,095 (exemptions) = \$33,366,842 taxable assessed value

Value Loss Estimates

Averaging the previously presented studies, I come up with a most probable values loss of 40% for those residential properties within the wind farm foot print.

\$53,346,937 (Residential taxable assessed value , not city limits) x . 40% projected value drop = \$21,338,775 taxable assessed value loss

These estimates represent assessed value, not actual market value.

Farm property values can also decrease due to :

- Aerial spraying of farmland impaired or eliminated as an option within ½ mile to 1 mile of any turbine
- Applicators who fly within ½ to 1 mile have raised rates by 50%
- Some evidence that turbines change temp & moisture content of soils, and impact production
- 1.1 x setback creates a “no build zone or easement on farm land that is not participating

Residential Property Outside the Footprint of the Wind Farm , but within 3 miles. Or within 3 miles of the negotiated lease options previously shown would include the east side of Lake Taylorville (Oakwood Subdivision), (Davis Subdivision), East Lake Shore Drive, White Oaks Subdivision, Eastwood Drive, Bertinetti Addition. According to one study previously presented , these properties could sustain a 20-25% value decrease.

*Property value data from Christian County Assessor June 29, 2020