

## McCann Appraisal, LLC

December 14, 2009

Mr. Ben Hoen  
Ernest Orlando Lawrence  
Berkeley National Laboratory

Re: The Impact of Wind Power Projects on Residential Property  
Values in the United States: A Multi-Site Hedonic Analysis

Dear Mr. Hoen:

I have prepared this follow up Certified Review letter after reading your group's published study (Report). Perhaps the LBNL research team will be doing supplemental or ongoing work that will incorporate corrections, additions and shift the focus to reflect proportionate relevance, and these review comments and concerns can be given due consideration.

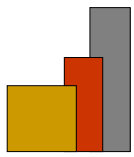
With all due respect, the final Report falls short of being a truly objective and reliable real estate value study of the issue at hand, in my professional opinion, the reasons for which I will begin to describe in this follow up review.

### **Intended Users of Report**

As I predicted in a prior communication with you, your final Report would get a lot of exposure and probably be cited as justification for zoning and land use application approval requests for wind energy projects, on a far reaching scale.

For that reason, an abundance of caution should have been utilized to emphasize any reasonable and logical interpretation of the "nearby property" study data, even when that is contrary to, or significantly differs from, the thrust of the general conclusion that is based on the 5-mile and beyond data.

In this day and age of questionable "science" being applied regarding predictions of global warming, any appearance of omitting relevant data or painting "targets around bullet holes" does little to solve controversies or facilitate sound, well informed planning and decision making. With that preface, my review comments are, as follows:



### **Turbine Height**

First, I direct your attention to Report *Table 2*, which cites study locations and the “hub” height of turbines. This is misleading to a typical reader, as zoning standards usually include the height as fully extended by the turbine blades. The height of the structures does not peak at the “hub” and there is obviously a greater height, often approximately 400 feet and current projects proposed up to 500 feet; by any objective measure more significant than the lower hub height.

### **First McCann Review of LBNL Draft report**

The Report omitted the fact that in the written review of the Draft Report, I cited to you in particular as my opinion basis for value impact 40 sales that demonstrate on their face a 25% lower value of homes in close proximity to the Mendota Hills turbines.

The two (2) “sales” you DO attribute to McCann (*Report Table 1, page 9*) as my opinion basis are, in reality, (pre-draft Report) examples I provided of inordinately long and on-going marketing times, at otherwise market-based asking prices.

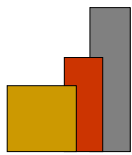
The deterrent to sale of the homes directly attributable to the wind farm project is well understood by the local Realtor who had the listings and who, at the time of my communication with you, had reported to me the consistent rejection rationale of over 100 otherwise interested would-be buyers and their agents. Interest that evaporated once potential buyers visited the properties and saw the nearby and surrounding turbines.

The Report also misstated an important fact: The two (2) homes never actually sold, although the text of the Report implies it was just a long marketing time BEFORE they sold. (*See Report page 7, 2<sup>nd</sup> paragraph*) Clearly, this error distorts the market reaction indicated by the actual facts.

Such a stigma deterrent to the sale of homes, while not perhaps statistically significant or measurable via the methodology employed and data utilized in your study, is entirely significant to an owner unable to reasonably convert their home equity to cash. That real-world experience is virtually mute and is mischaracterized in the Report.

As demonstrated by the two (2) homes, if one was unable to sell their home or even elicit an offer at any price, despite reducing the asking price by 10%, 20% or more from the going in basis and/or current market rates, and if the reason for the loss of reasonable liquidity is isolated as a single factor or influence, then that impact is many things, but “insignificant” is not the phrase that comes to mind.

And while marketing experience for the two (2) homes is only *part* of the basis for opinions I have developed thus far, the Report is inaccurate since I disclosed the 40 recorded, closed sale basis to you (*see McCann review letter*) and that is not mentioned in the Report on *Table 1*, where other such outside input is shown.



I suspect I will need to go on the record at some point to clarify that Report mistake, given the opposite direction of the indication of both the Mendota Hills sale and separate unsold listing data to the Report findings.

On balance, I acknowledge that the Report gave some limited comment to the “possibility” that some properties “may” have had negative effects from proximity to turbines.

However, based on the size of the < 1 mile data sample, I am surprised that the Report does not unequivocally state that nearby properties “**have shown a discernible and measurably lower**” sale price than the base line data located > 5 miles from the projects studied.

While the qualifying words in the Report may have been intended by the authors to reflect the somewhat lower mathematical certainty of drawing the indicated adverse conclusion, vis a vis the much larger database of sales in the 5+ mile distance, the framing of the comments minimizes the real and significant impacts shown in the Report for the nearest properties sold.

In fact, the Report Executive Summary states: “....neither the view of the wind facilities **nor the distance** of the home to those facilities is found to have any consistent, measurable, and statistically significant effect on home sales prices”. This claim simply does not comport with the data results.

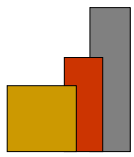
### **Report Results – Actual Impact**

Contrary to the study conclusions, the Report charts and data are in fact supportive of a distinctly MEASUREABLE reduction in value, on the order of **5.3% to 5.5%**, for homes up to 1 mile away from the nearest turbine(s) (*Report Figure ES-1*).

The data within the 1 mile distance included 125 sales, compared to 870 baseline sales that were greater than 5 miles in distance. As I understand basic statistical analysis, data in excess of 50 measuring points is generally accepted and deemed statistically “significant”.

In the Report, however, this difference is dismissed as “statistically insignificant”. The minimization and dismissal of these facts leads the reader to the incorrect belief that wind farms do not reduce nearby property values. Further, the Report Executive Summary (*page ix*) emphasizes the word “possible”, rather than draw attention to the factual basis of actual negative impact measured at the nearest properties.

Similarly, your report (*Figure ES-2*) reveals that 310 sales with a vista rated as poor compared to 2,857 sales with an average vista, sold for 21% lower than the average view properties.



The poor vista measurement in the Report, however, is perfectly consistent with the Mendota Hills data I cited to you and the 25% value loss indicated. It follows then, under circumstance whereby the property in question possesses an above average vista and attendant higher than average value (*>10%, per Report*), and will end up with a below average or poor vista post-turbine development, a value loss of 25% may very well understate the damages in those instances.

While the rating of any vista has some subjective elements to it, it is well established that the subjective rating of turbine views is disproportionately negative by residents of immediate project areas who have no turbine lease agreement or financial interest in the project(s). Again, the Report conclusions are contrary to data contained within.

While the vista or view from a given property is a well recognized value influencing factor, the Report conclusions fail to proportionately reflect the findings contained in Figures ES-1 and ES-2.

## **Literature Review – Hedonic Analysis**

A true peer reviewed article (*supporting data available for peer review*) written by Dr. Sandy Bond, (*acknowledged in the Report*), found an even lower impact on residential property value from cell towers in Florida than the 5% indicated in the Report, and the Appraisal Journal indeed published those findings as being statistically significant. A different determinant standard of significance must be the explanation for these contrary conclusions.

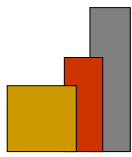
I would also suggest that a single cell tower with a height of 80 to 150 feet is far less likely to impact neighboring property use, enjoyment and value than dozens of 400 foot tall turbines with spinning blades, noise, flicker effect, etc.

Thus, the Report conclusions are completely inconsistent with an existing published study, and which was peer reviewed by the leading real estate valuation journal. At a minimum, this important conclusion difference establishes that there was some subjective determination as to what constitutes statistical significance.

Again, with all due respect, the leading real estate valuation journal must be considered as more reliable regarding property value issues than an academic study conducted by researchers untrained in professional real estate evaluation issues. At any level, an appraisal must accurately reflect the market, and any opinion related to value constitutes an appraisal opinion.

## **Report Findings – Applied**

In this review, I have applied the measured proximate Report study area loss of (*rounded*) 5% into a generic (Illinois) project area, encompassing thousands of acres of



land. Using simple projections, Report conclusions may not stand a reasonable test of what is or isn't significant, in the context of a zoning standard being met or failing to satisfy the legal requirement of *no substantial impact on "neighboring" property value*.

Please note that neighboring values are the relevant baseline in all zoning standards addressing this issue....not the value of homes 5 or 10 miles distant from a proposed project. Simply put, the homes located in the footprints of these projects are the real "ground zero" on this issue, and what is mathematically measured at distances beyond 1 mile, etc, is inapplicable as a basis for determining ground zero impacts.

Applying a (rounded) 5% reduction of value to a "typical" residential market value of \$175,000 to homes within one (1) mile of a project footprint, and 25% impact within the project footprint, and projecting the rural housing density on the basis of 1 house per 40 acres and a 6,000 acre footprint, (10,240 acres within 1 mile) **value loss of \$8.8 million** is indicated for a typical Illinois project. (See attached McCann illustration; *PROJECTED TYPICAL IMPACT*)

The actual Report measured loss of 5% includes data up to 1 mile distant but appears to be silent as far as measured value loss for the typical ground zero (footprint) residence. The direction of impact must be logically concluded as greater than 5% in the footprint.

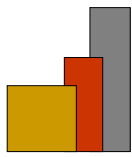
Thus, if the Mendota data indication of 25% value loss is applied to the preceding example (*as also supported by poor vista lower values in Report Figure ES-2*), the impact is **\$8.8 million** of diminished home equity. If this is repeated for 10 new projects in rural residential areas, \$88 million in losses can be reasonably forecast.

I suggest that no one could reasonably conclude the collapse of an \$88 million office tower or shopping mall and complete destruction of its value would be "insignificant", even with no loss of life. I also suggest that rural residential property is no less deserving of a fair characterization of actual value loss.

As a professional appraiser, it boggles the mind to consider the total property value losses that will result if the renewable energy policy goals are completed via development of utility scale wind energy projects, in rural residential areas.

This magnitude of loss is significant on so many levels that the term "statistically insignificant" is misleading because it ignores the harsh, localized reality, when the projects are developed surrounding and interspersed with homes in rural residential areas.

In these "overlaid" locations, turbine views are not just on the distant horizon, as with the greatest majority of Report data locations and distant proximity to turbines upon which the Report conclusions focus.



### Hole in the Doughnut

The most impacted properties are simply not proportionately reflected in the Report, the importance of which is contrary to the Report claim that the number is again, “statistically insignificant”. The “hole in the doughnut”<sup>(1)</sup> of the Report database and stated conclusions is, in my opinion, the most important indication, and it is disproportionately minimized or even misleading via the terminology used.

Any reduction of equity (value) beyond normal negotiation of price and sale commissions must be considered significant, from a land use and zoning standard perspective. Further, since the Report will be utilized for **exactly that purpose** rather than as an academic exercise in statistical analysis techniques, I do firmly believe more care should have been given to understanding the members of the public that the Report would be advising, influencing and affecting.

### Property Value Guarantee (PVG)

Given the actual value loss to nearby properties shown in the Report, I must question why the Report did not even mention the prudence of Property Value Guarantees.

Such guarantees are used sometimes in high profile and controversial zoning matters such as landfills, quarries and indeed, other wind farms (*See DeKalb, Illinois record, et al*) and are certainly appropriate when value impacts are measurable and predictable with a high degree of certainty, as shown in the Report.

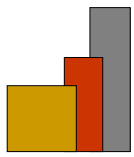
The Report modestly mentions homes bought out by wind farm owners/developers. And while this may be driven by health impact liability reasons, health issues are beyond the scope of the Report, this review and the reviewer’s expertise. This area of neighboring owners reported experience, concern and the publicized controversy, however, has a stigma effect that is an appropriate property value issue to be considered even if the stigma effect is not measurably isolated between view and health concerns, or other nuisance-type issues.

With all the other policy and non-mathematical commentary and background cited in the Report, the “statistically insignificant” cost of implementing a property value guarantee, as measured against the huge cost of these projects, would have been a balanced and objective recommendation.

Industry may not embrace that idea nor the funding sponsor of the Report. However, there is no down-side to either of them if the “*no measurable impact on value*” Report conclusion proves out to be applicable at ground zero properties.

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(1) A graphic depiction of this type of data “doughnut hole” is contained in the 2006 *Impacts of Windmill Visibility on Property Values in Madison County, New York* and attached to this review. The Lee County, Illinois study Area Map contained in the Report (Figure A-6) is another such example.



## **PVG Costs are Insignificant**

In the generic Illinois project example, value loss of homes located in the project footprint and within one (1) mile equates to \$8.8 million in property value loss compensation, via a legitimate PVG. In proportion to a cost for a 100 turbine development at \$3 million per turbine, a cost of 2.9% could easily be absorbed as a cost of doing business, or a simple contingency line item on the development financial proforma.

If 5% value loss experienced by nearby homes can be concluded in the Report as “statistically insignificant”, then certainly 2.3% additional project costs is far from onerous as to the financial feasibility of wind farm development.

From a policy and planning perspective, which is apparently the intended advisory purpose of the Report, an insignificant PVG cost of that magnitude to protect property values should not have been ignored, since residential values are the fundamental issue and question at hand. The report conclusions within 1 mile and the “doughnut hole” lack of data fully warrant such a recommendation.

## **Marketing Time**

Finally, and with some limited acknowledgement by Report authors of further study being needed, the Report is completely irrelevant to the issue of marketing times. This “variable” is well understood in all real estate professions as a value-related and value-influencing issue, and the opportunity to collect such data was apparently missed during the multi-year research period while LBNL was conducting the study.

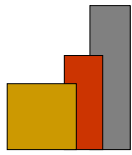
The Report also does not state data I provided regarding 800+ day marketing time of a ground zero home, which commenced in the most dynamic residential market of the modern era. Other examples of ongoing marketing times beyond 2 years were omitted as well.

Beyond a property getting “stale” on the market thereby motivating inordinate price reductions, the time-value of money is easily understood, i.e., one dollar (\$1) to be received in 3 months has a higher present worth (value) than \$1 to be received in 3 years.

The adverse impact on marketability is only mentioned in passing in the Report as a “possibility” rather than a historic fact or trend, notwithstanding that such experience is clear and documented. Future potential research of this issue is suggested as an apparent afterthought.

The report data is not accepted under objective appraisal review as being “rich”, since it is incomplete on such an important point.





## **Focus of Report**

In closing, and if you will forgive my analogy, if one wishes to learn the “price of tea in China”, then that is where one must look. To apply the analogy, it follows that one is not likely to find the true answer to the question of ground zero impacts if focusing on greater distances.

I suggest that the Report reflects exactly that imbalanced focus, yet leads the reader to apply the findings pretty generically to all properties, whether or not located at “ground zero”.

As a statistical analyst and researcher, I hope you find the focused real estate review useful to any updated Report you may ultimately prepare, and which I believe is still warranted.

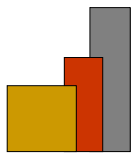
I trust that you will take my review comments in the intended spirit; that of seeking the truth for this important issue, regardless of the position or agenda of concerned parties on either side of this issue.

Respectfully submitted,

McCANN APPRAISAL, LLC

Michael S. McCann, CRA
<i>State Certified General Real Estate Appraiser</i>
<i>License No. 553.001252 (Expires 9/30/2011)</i>





## PROJECTED TYPICAL IMPACT

### Combined Nearby Impact Zone

1	2	3	4	5
16	1	2	3	6
15	4	5	6	7
14	7	8	9	8
13	12	11	10	9

9 = square miles in 6000 acre footprint

16 = square miles or 10,240 acres within 1 mile of footprint

### Generic Wind Farm Land Area Impacted

Footprint: 6,000-acres / 640 acres per square mile = 9.375 square miles  
(*Rounded to 9 square miles*)

Within 1 Mile: 16 square miles X 640 acres per square mile = 10,240 acres

### Wind Farm Neighboring Homes

Footprint = 150 homes at 40 acres per home rural density (6,000 / 40 = 150)

Within 1 Mile = 256 homes at 40 acres per home rural density (10,240 / 40 = 256)

### Value Baseline

Footprint = 150 homes X average value of \$175,000 = \$26,250,000

Within 1 Mile = 256 homes X average value of \$175,000 = \$44,800,000

### Projected Value Impact

Footprint: \$26,250,000 X <sup>(1)</sup> 25% value loss = \$6,562,500

Within 1 Mile: \$44,800,000 X <sup>(2)</sup> 5% value loss = \$2,240,000

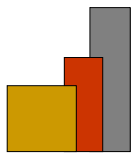
Neighboring Properties; Total Impact = **\$8,802,500**

(1) Per Mendota Hills data & as supported by Poor View Vista, Report figure ES-2

(2) Per Report Figure ES-1

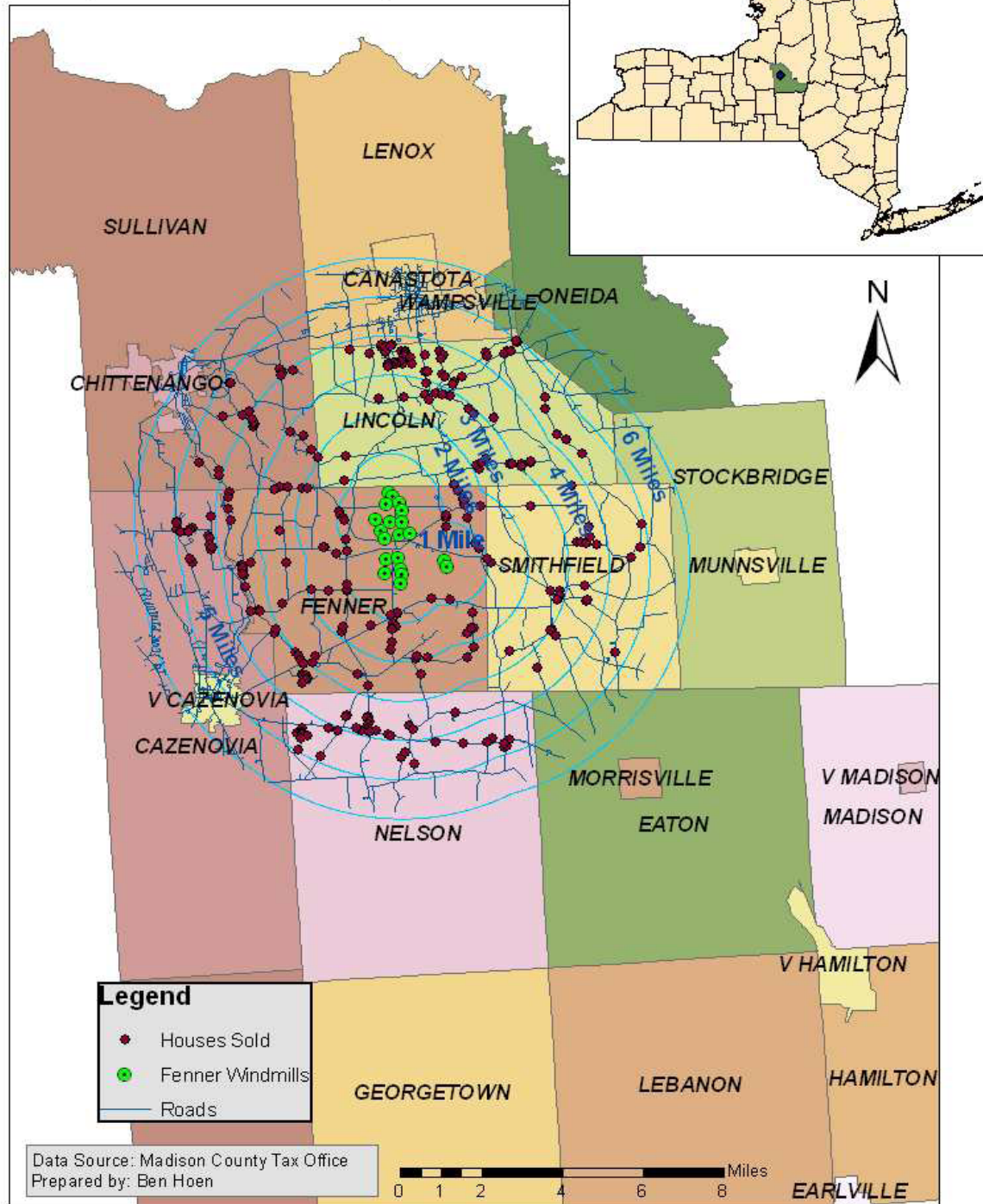
### Property Value Guarantee - Significance to Wind Farm Project Costs

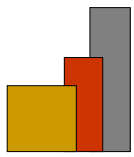
Thus, if a typical 6,000 acre wind farm project with 100 turbines at cost of \$3 million each, and has total project cost of \$300 million, the collateral damage impact to property values of \$8.8 million is equal to 2.9% of total project costs.



## Fenner Windfarm Study Area

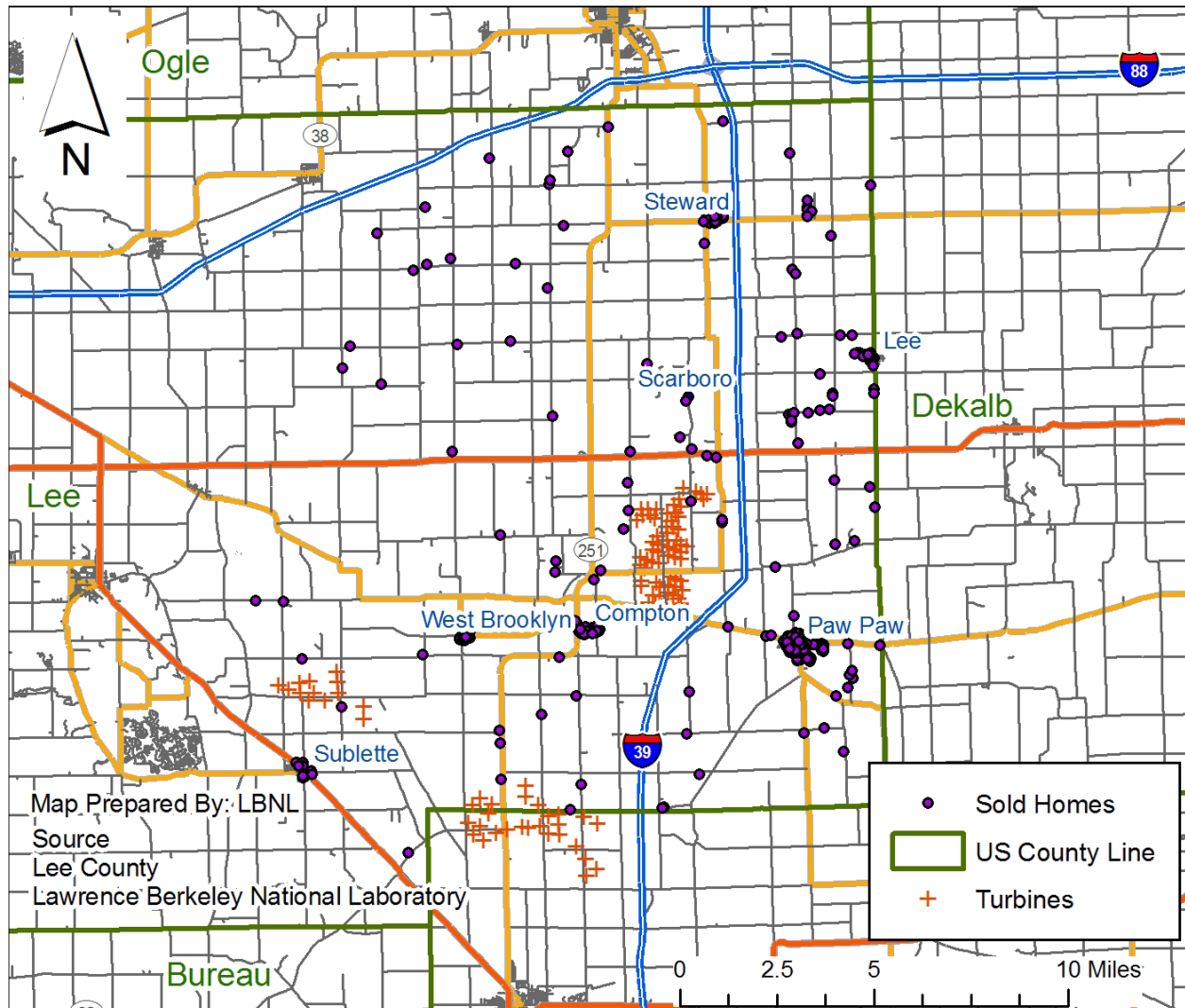
Arm's Length Residential Sales Between January 1996 - June 2005

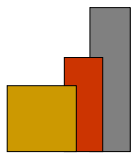




## A.5 ILLC Study Area: Lee County (Illinois)

Figure A - 6: Map of ILLC Study Area





**REVIEW CERTIFICATION**

**PROJECT DESCRIPTION:** Wind Farm Developments in general

**EFFECTIVE DATE OF REVIEW:** December 14, 2009

The undersigned, representing McCANN APPRAISAL, LLC, do hereby certify to the best of my knowledge and belief that:

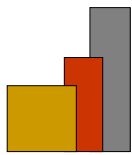
- FIRST: The statements of fact contained in this review report are true and correct.
- SECOND: The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and represents the personal, impartial and unbiased professional analyses, opinions, and conclusions of the undersigned.
- THIRD: I 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: I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- FIFTH: My engagement in this assignment was not contingent upon developing or reporting predetermined results.
- SIXTH: My 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 review report.
- SEVENTH: My analysis, opinions, and conclusions were developed, and this report has been prepared in conformity with the Uniform Standards of Professional Appraisal Practice.
- EIGHTH: The following person has made an exterior inspection of the public areas of the Mendota Hills project that is part of the basis for the opinions expressed in this report:

**Michael S. McCann has inspected the Mendota Hills wind farm,  
Twin Groves, and other wind farm projects  
on various dates beginning in 2005**

- NINTH: No one other than the undersigned provided significant real property appraisal review assistance to the persons signing this certification.

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 9/30/2011)



The following disclaimer was copied from the LBNL Report, and is considered to be relevant to the author's ratification of the data, methodology and opinions expressed in the Report.

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