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Wind Energy and Property Values: Moving From Speculation to Understanding Pre-Review Results from a Nationwide, Multi-Site Analysis

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Introduction

With many drivers in place, such as 28 states having enacted Renewables Portfolio Standards (RPS) [1], President Obama's 2009 goal of doubling U.S. renewable capacity in three years, and the U.S. Department of Energy's goal of 20% wind by 2030 [2], the United States is poised to continue its dramatic wind capacity growth. One of the major barriers to this growth is the siting and permitting process [3]. Concerns of the community, a major stakeholder in the siting process, can be the difference between success and failure, if unaddressed [4]. One of the top concerns expressed by local communities is wind energy's potential effect on aesthetics and property values [5, 6]. Only a few reports have investigated the degree to which views of and proximity to wind facilities affect surrounding property values [7-13], however, only one has been published in a peer-reviewed journal [9], and only two relied on field visits to potentially affected homes [8, 9]. As a result, stakeholders are left without a definitive basis for answering a broad range of questions, which often turns this issue into a matter of opinions not empirical observations [14]. A clearer understanding of the facts of this issue will allow stakeholders on all sides to discuss these concerns more productively.

Objective

This study addresses community concerns on the impact of wind facilities on aesthetics and property values. Do homes in close proximity to wind facilities experience a decrease in value, while other homes further away do not? Do homes with a prominent view of wind turbines suffer a decrease in property values, while those without a view do not? Do entire communities surrounding wind facilities become stigmatized from the time the project is announced until long after it is operational? Do sales volumes closer to wind turbines differ from those further away?

To address all of these questions, the study group analyzed 7,293 home sales transactions in 10 different states and 14 counties.

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Twenty-five operational wind facilities, representing 10 distinct study areas, were selected for analysis. Each study area had at least 350 home sales transactions within 10 miles of the nearest wind turbine. spanning the period from before facility announcement to well after construction. Study areas were selected to capture a broad array of online dates, turbine sizes, topographies, house values, socioeconomic characteristics, and locations where wind energy development activity is significant.

Methods

- · Information on all arms-length sales transactions within the study areas of single family residences were collected from the counties, as well as site and structure characteristics (e.g., sqr ft., acres, bathrooms, age and condition of the home, school district).
- Distance to the nearest wind turbine was estimated using a GIS. based on the date of sale and facility configuration at the time of sale. Distance categories were: inside 0.57 miles (3,000 feet), between 0.57 and 1 mile, between 1 and 3 miles, between 3 and 5 miles and outside 5 miles
- Every home that had sold, in each study area, was visited to determine the degree to which turbines were visible and to assess the quality of the scenic vista and other potential value-influencing characteristics (e.g., if the home was situated in a cul-de-sac).
- · View (of turbine) ratings were recorded using both qualitative and quantitative techniques. Qualitative ratings were: None, Minor, Moderate, Substantial, and Extreme. Ouantitative measures included number of turbines visible and viewing angle.
- · A Scenic Vista rating system, which was used to control for the values of scenic vistas in general, was developed borrowing from landscape and land planning principals [15]. Ratings were: Poor, Below Average, Average, Above Average and Premium.
- · All data were pooled in a log-linear hedonic statistical model with the characteristics of homes in each study area each independently estimated (e.g., bathrooms, scenic vista), and with variables of interest (view of turbines, distance from nearest turbine) estimated across all sites in a pooled manner.
- · Additionally a repeat sales model and sales volume analysis were conducted

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There Is No Statistical Evidence **Of A Difference In Average Homes Prices** With "Dominating" Wind Turbines Views As Compared To Those Which Sold Over The Same Period With No View



Nor Is There For Homes Near Wind Turbines As Compared To Those **More Than Five Miles Away**



These Results Held

Even When Concentrating On Homes Which Sold Immediately Following Facility Announcement And In The First Two Years Following Construction





Results

- · In the primary analysis using a hedonic pricing model and concentrating on home sales which occurred after wind project construction, no statistical evidence was found that home prices near the wind facilities differed significantly from those outside of 5 miles; nor did the price of homes with prominent views of wind turbines differ significantly from homes without such views
- · Additional analysis found similar "no evidence" results when comparing post-facility-construction home sales prices for those homes near the turbines to pre-facility-announcement sale prices of homes at the same distance.
- · A third analysis using a repeat-sales model and appreciation rates of 492 homes which sold once pre-announcement and again postconstruction, similarly revealed no significant differences in home appreciation rates near and far from the facility or for homes with and without a view of a facility
- A sales volume analysis was also conducted comparing rates of homes sold inside of 1 mile to those outside of 5 miles in 3 distinct periods: pre-announcement, post-announcement yet preconstruction and post-announcement; sales volumes did not differ significantly among these periods.

Conclusions

Although one cannot rule out isolated cases of impacts, this analysis finds no evidence of widespread or statistically identifiable systematic reductions in value .

These results are substantiated by three different statistical models, and concur with the sales volume analysis performed separately.

Because of the margin of error inherent in the statistical analysis, there remains some property value risk to analogous communities considering wind energy facilities; based on the analysis presented here, that risk is roughly +/- 9% of home sales values, at its maximum, for homes within 3000 feet of wind facilities.

To reconcile the claims of likely effects with these results, further research is needed to fully understand the motivations of those living within a short distance and with dramatic views of turbines. The authors recommend a public acceptance survey.

Because many new wind facilities have come online in recent years, new home sales data are likely available that could support a followup study. As more data become available, it may also be useful to conduct similar studies focused on individual wind projects, rather than pooling all project site data into a single statistical model.

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