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## Residents' Perceptions Toward Utility-Scale Wind Farm Development

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## Residents' Perceptions Toward Utility-Scale Wind Farm Development

### Abstract

Increased development of wind farms in the U.S. has fostered debates surrounding the siting and support for the projects. Prior research demonstrates the importance of understanding the attitudes and opinions of community members when developing projects. This article reviews a case study of an Ohio community that integrated a local survey to measure local knowledge, support, attitudes, and opinions of community residents on a proposed wind farm into the local conversation and decision-making. Ultimately the survey results informed local programming needs and an outreach and engagement strategy and provided elected officials data to guide informed decision making on the project.

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### Introduction

According to the National Renewable Energy Laboratory, the United States currently ranks second globally in cumulative wind capacity, after installing 13,091 megawatts of wind capacity in 2012, a 92% increase from the 6,810 MW installed in 2011. This addition represented the largest source of electric-generation capacity additions to the grid in 2012 (U.S. Department of Energy 2013). Facilitating increased utility-scale wind energy development, in part, are state-based renewable energy standards and goals. As of September 2014, 29 states had adopted renewable energy portfolio standards, while an additional nine states established renewable portfolio goals (U.S. Energy Information Administration 2013). Though advances have been made on many fronts, in some states this market has experienced increased volatility due to shifting state policies (e.g., siting requirements for wind turbines). In an effort to guide sound policy-making during this time period, Extension can provide an improved understanding of the perceptions that residents have towards potential utility-scale wind development.

Prior research demonstrates that utility-scale wind projects can be met with resistance by local

residents, often making decisions to site wind turbines difficult for planners and local authorities (Wolsink 2007). However, much of the research investigating the perceptions of wind farm development at the local-level has occurred in Europe and Australia, with a few notable exceptions based in the U.S. Midwest (e.g., Groth & Vogt, 2014; Mulvaney, Woodson, & Prokopy, 2013). This research finds that residents' perceptions of wind turbines are likely to vary based upon their proximity to the turbines and belief in community and personal economic, social, and environmental cost/benefits. Past Extension work has identified that public perceptions can be a major barrier towards renewable energy production (Plate, Monroe, & Oxarart, 2010). Conversations surrounding energy and the environment can be divisive in communities and are often influenced as much by values, beliefs, and the character of social interactions among stakeholders as by dollars and facts. To resolve or manage conflicts, stakeholders need to understand the social dimensions of such conflicts as well as the economic and environmental issues.

Extension has a unique position to serve at the state, regional, and national levels in understanding and connecting local stakeholder perceptions to help guide sound policy-making (Plate et al., 2010). As a source of objective and unbiased research-based educational programming, Extension can provide factual research-based information on the positive and negative community impacts of wind development. However, the continued reduction in funding presents challenges to Extension in developing new programs and conducting applied research projects. As a result of funding constraints, it is important that Extension consider multi-sector collaborations with non-profit, government, and private sectors. The research effort reported here demonstrates how Extension was able to gather data on a critical issue, by partnering with local government (i.e., county commissioners and county regional planning commission), private sector (i.e., wind energy developer), and other resources within the state land-grant institution (i.e., Ohio State University) to identify individual perceptions towards energy and environmental issues and to help inform local decision-making.

## **The Situation**

In Ohio, county commissioners are increasingly faced with the important decision of approving or denying an alternative energy zone application as the number of proposals for utility-scale renewable energy projects increases. In the case of wind energy, this decision has the potential to generate millions of dollars in local tax revenue, yet will alter the landscape of the community for decades. In Wyandot County, Ohio, elected officials were interested in gathering data to better understand how local residents would respond to a proposed wind farm development in the western portion of the county. At the state level, shifting policy dynamics have set off major debates surrounding the siting, scale, and support of large-scale wind turbines. For both state and local decision-makers across the U.S., it is important to gauge what residents in both areas of proposed wind development and adjacent to perceive to be critical energy and environmental issues (Mulvaney et al., 2013).

## **Purpose and Objectives**

In 2013 Ohio State University (OSU) Extension partnered with OSU's School of Environment and Natural Resources (SENR), local government officials, and private industry to conduct a local energy

and environmental survey of residents in Wyandot County. This location was selected, in part, due to a proposed 100-megawatt wind farm within the county. The primary objective of the survey was to assess local residents' knowledge, attitudes, and opinions on emerging and potentially contentious energy and environmental issues within the community. The proposed 100-megawatt wind farm in one of the county's townships made a countywide study especially important because it allowed for a consideration of differences between residents located in the development zone and those located elsewhere in the area. Upon initial data analysis in 2013, results were provided to the Wyandot County Commissioners and Regional Planning Commission, as well as to the private wind developer to assist in local decision-making (Campbell, McClendon, Romich, Bean, & Sharp, 2013).

## Methodology

SENR and Extension faculty and staff designed an 11-page, 45-item questionnaire and mailing correspondence. These items were submitted to the OSU Office of Responsible Research Practices in spring 2013 for review. Approval was received on May 30, 2013. Data were collected during summer 2013 using Dillman's Tailored Design Method (Dillman, 2000). Participants were contacted up to five times, including a pre-notification letter explaining the purpose of the study, the initial questionnaire mail out package, a reminder postcard, a replacement questionnaire mailing, and a second reminder postcard. A sample of 700 households was selected and stratified according to zip code status to differentiate between those residents living in the proposed wind farm development area and those who did not. The sample list was generated by the private vendor, Experian, and acquired by the research team during May 2013. Due to improper addresses, 83 surveys were removed from the list, and an additional 14 households refused to participate, which produced an effective sample of 617 households. In total, 160 completed surveys were returned producing a response rate of 26%. Response rates by zip code stratum are shown in Table 1.

**Table 1.**  
Distribution of Response by Zip Code

Zip Code	Effective Sample	Responses	Response Rates (%)
433591	116	35	30
43316	123	32	26
43323	11	4	36
43351	167	46	28
44844	16	4	25
44849	47	14	30
44882	54	11	20
45843	83	14	17
<b>Total</b>	<b>617</b>	<b>160</b>	<b>26%</b>
1 Potential development site			

Survey data was entered into Microsoft Excel and exported into the IBM SPSS Statistics package version 17, and basic descriptive statistics were analyzed using data summaries and cross-tabulations. Data reported below are based on survey questions using either forced-type (e.g., yes/no/don't know) or Likert-type scale responses (e.g., strongly agree/agree/neutral/disagree/strongly disagree), which allows for estimates of respondents' attitudes and opinions (Sproull, 1988). The purpose of these analyses are to give descriptive summaries of respondents' attitudes and opinions on wind energy development, as opposed to examining inferential statistics from the sample to the general population.

In addition, we compared demographic information and characteristics reported in survey responses to U.S. Census Bureau statistics from the 2009-2013 American Community Survey (ACS) 5-Year Data Profiles for Wyandot County and found that our survey respondents compared favorably to the general county population. The demographics of survey respondents are similar to those of the Wyandot County adult population in terms of educational attainment, employment status, and household income. There were some differences between respondents and Wyandot County's population as determined by the ACS. A larger proportion of survey respondents were male, and most respondents were married. There was also a difference in median age as compared to the county population, likely a result of the exclusion of residents younger than 18 from the survey. The most substantial difference was that a larger proportion of sample respondents reported residing in owner-occupied housing units compared to the county population.

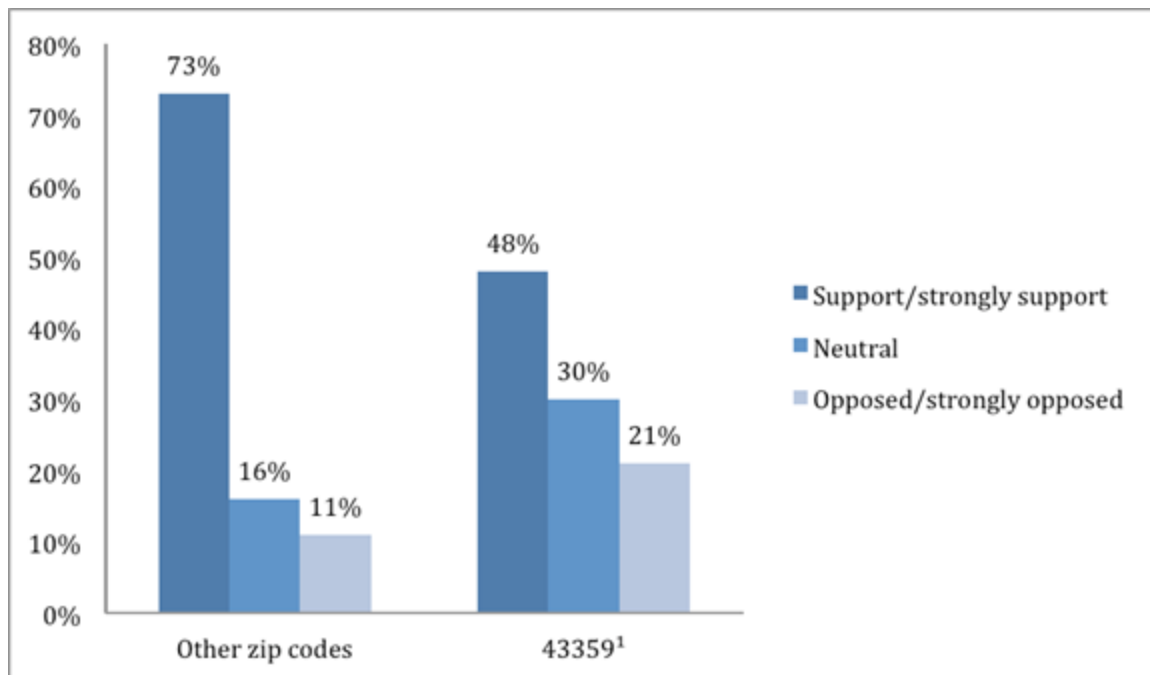
## Results

### Support for Wind Turbines in Wyandot County

To better understand who favors or opposes wind development, we explored support for wind development based on a variety of factors, including individual demographics and place of residence. We found that residents generally support wind turbines being sited in their county and that respondents were more likely to be neutral than be in opposition to turbine siting. However, we did find that support varies based upon their place of residence. Those residing in the area targeted for development were more likely to be in opposition or neutral (and not supportive) of wind turbines being placed in the county in comparison to those who live in surrounding areas (Figure 1). When asked if they would allow a wind turbine on their property if there were space for it more respondents indicated they would allow it (63%) than those who would not (31%). Residents on farms, however, were less likely to say "yes" (55%) and more likely to say "no" (42%) to this statement.

#### Figure 1.

Current Support for Having Wind Turbines in their County



<sup>1</sup> Potential development site

In a similar vein, those residing inside of the zone of development are more likely than others surveyed to live in the countryside either on a farm (43%) or not on a farm (46%), while 11% live in a small town. In addition, 83% of respondents in the proposed development area have seen a modern wind farm in operation, compared to 64% in the non-development area. These respondents were also more likely to have attended a public meeting about wind farms in their county (20%) versus 4% in those zip codes outside the development area and to have been approached to lease property as part of a wind farm (17% compared to 6%). Last, more respondents in this zip code indicated that they were opposed to government involvement in wind energy development, compared to those residing in other zip codes in the area.

## Views on Renewable Energy and Renewable Energy Standards

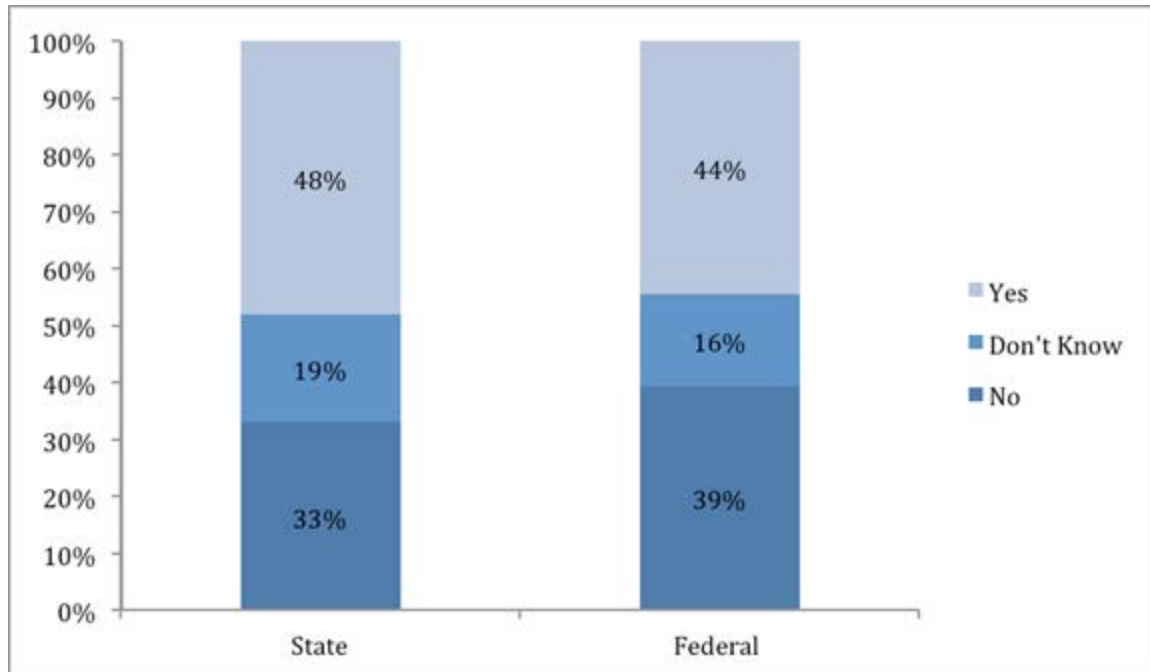
On average, respondents indicated that energy development issues are important at the local level in the Wyandot County area (respondents scored a 5.1 average between 1 (not at all important) and 7 (very important)). Respondents were asked which sources of electrical production they would prefer to be expanded in Ohio and their community. Respondents either support or strongly support the development of solar, wind, and natural gas electrical sources in Ohio and in their own communities. Solar and wind energy were more preferred to be expanded at home than outside the community, unlike the other sources of electricity listed (i.e., coal, nuclear, and natural gas). There was a high rate of neutrality around biomass energy.

We asked respondents to express their opinions about "whether government should support the development of renewable energy." Nearly half of respondents (49%) felt that the government should have some role in supporting the advancement of energy production, while slightly less than one third (31%) disagreed, nearly 19% selected "don't know." These statistics are very similar to

responses regarding state and federal government requirements that a portion of energy production comes from renewable sources. Among respondents, there is minor additional support for state than federal standards (Figure 2).

**Figure 2.**

Current Support for State and/or Federal Government Renewable Energy Standards



A much greater percentage of respondents in the proposed development area indicated sentiments against government supporting the advancement of energy production from renewable sources (40% to 29%), or whether the state government (43% to 30%) or federal government (50% to 37%) should require that a portion of energy production come from renewable sources.

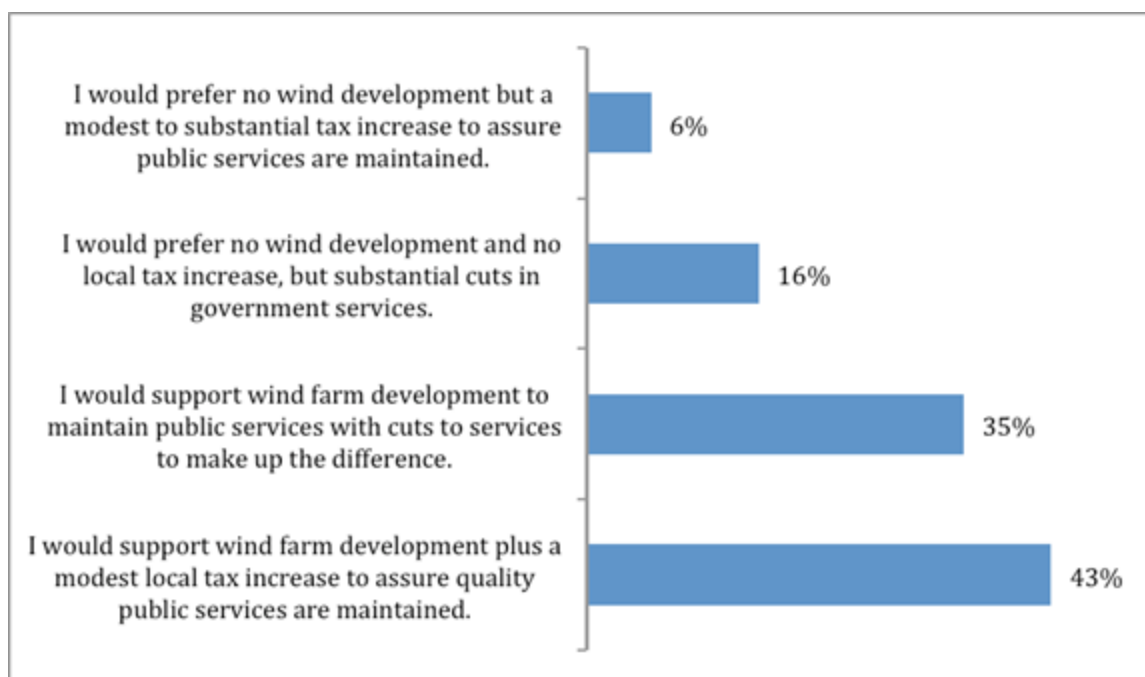
## Views on Local Taxation and Public Services

To gauge residents' views on local policy decisions, they were provided information related to wind farms and reduced local government funding as well as an example from a neighboring county that had recently experienced the construction and operation of an utility-scale wind farm.

Then survey respondents were asked to select one statement from a list of four related to wind farm development, local taxes, and public services that they felt best represented their views. Similar to data presented above, respondents generally were supportive of wind farm development, with the greatest number (43%) in support of wind and a modest tax raise to maintain quality public services, while a lesser number illustrated they would support wind farm development alongside cuts in services (35%). A much smaller percentage preferred no wind development, whether it is alongside cuts in government services (16%) or with tax increases (6%). This data is reported in Figure 3.

**Figure 3.**

Wind Farm Development, Local Taxes, and Public Service Statements



## Implications

This report provides a descriptive overview of respondents' attitudes regarding energy and environmental issues in Wyandot County, Ohio. Results indicate that there is some support (40%) for wind farm development in Wyandot County. However, 36% of respondents stated that they were unsure if the benefits outweighed the concerns for wind energy development. Furthermore, differences in support varied by geographic location (e.g., residing in development zone, on farm). Residents are divided on the role of government in supporting renewable energy development. These data suggest that there remains some uncertainty among residents surrounding the impacts of wind development in and around Wyandot County, and residents are still seeking information to formulate their opinions.

These results suggest several very important roles for Extension at the local, state, and national levels. First, there is local variation in support of utility-scale wind turbine development. By surveying residents, Extension was able to identify these differences, and it aided in site planning and development. Second, there is stronger support than opposition for government playing a role in facilitating the development of renewable energy. However, opposition is strong when it occurs. As states continue to debate policies requiring renewable energy standards for utility companies, it will be important for Extension and other researchers across the U.S. to provide policymakers with public perception data. Last, the results found here support prior work (e.g., Plate et al., 2010) that suggests that Extension needs to play a role in educating citizens on renewable energy development. As residents continue to develop their own opinions about utility-scale wind farms, it's important that they are provided with reliable scientific information.

## Acknowledgements

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