SITING WIND ENERGY IN LINN COUNTY, IOWA

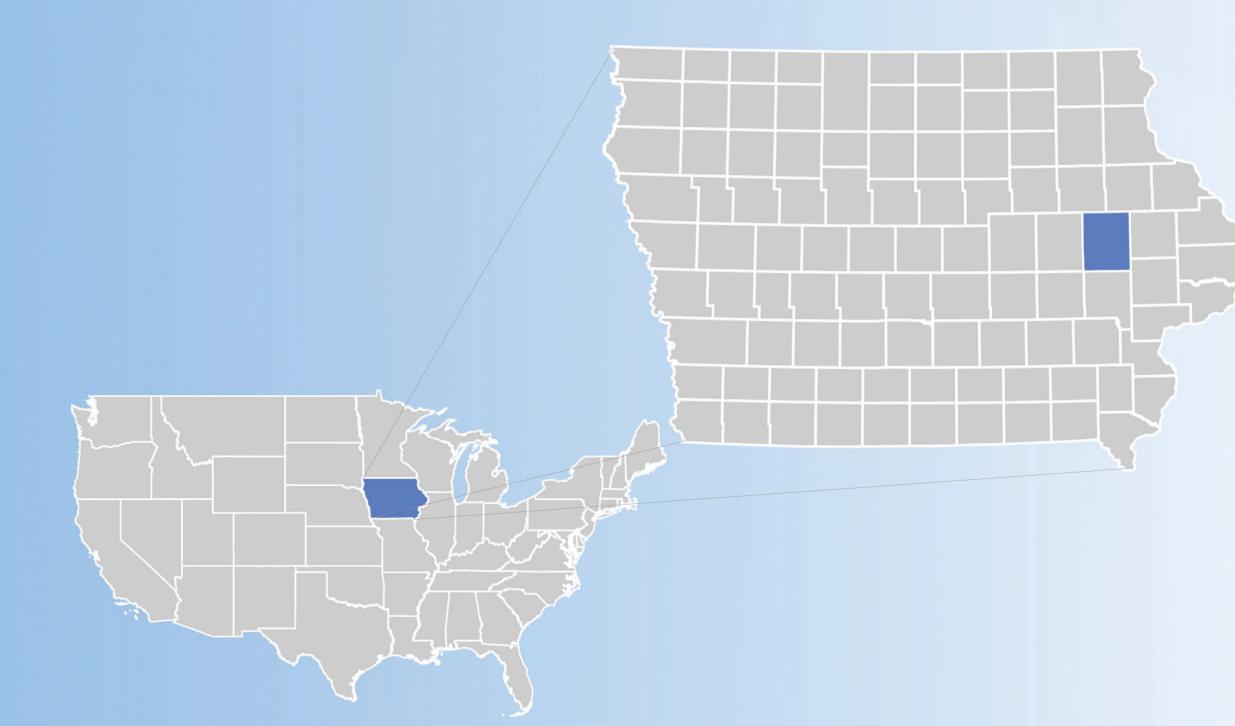
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ABSTRACT

The purpose of the Linn County Wind Farm Siting Analysis is to provide an informed siting process for the optimal placement of utility-scale wind energy development in Linn County with consideration for regulatory, suitability, and compatibility constraints. Through both the identification and spatial analysis of siting constraints, this project intends to provide Linn County decision makers with the resources to effectively evaluate conditional use permits for utility- scale wind energy projects within their jurisdiction.

STUDY AREA

Linn County contains approximately 725 square miles of land located in eastern Iowa. This county is home to Cedar Rapids, the county seat and the secondlargest city in Iowa. Key features of Linn County include the Cedar River, the Eastern Iowa Airport, and the Grant Wood's "Fall Plowing" Rural Historic Landscape District.



PLANNING CONSIDERATIONS







Electromagnetic & Mechanical Failures & Blade Throw





























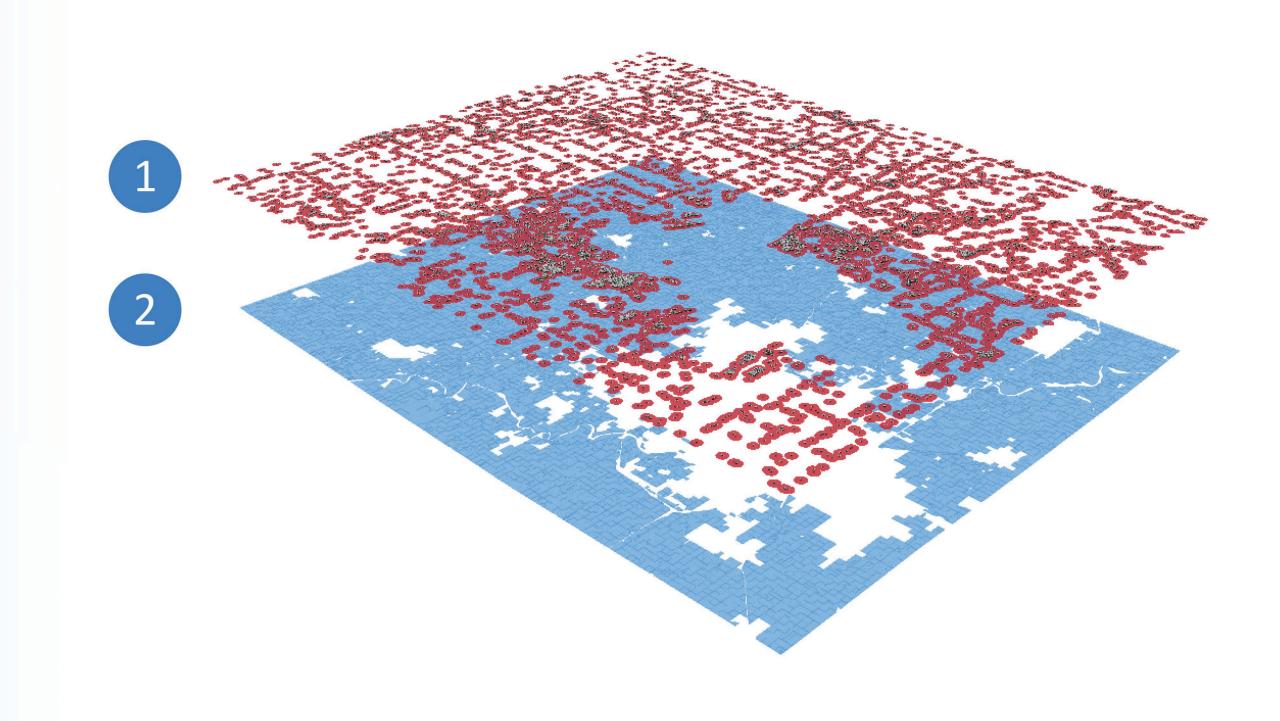


KEY POINTS

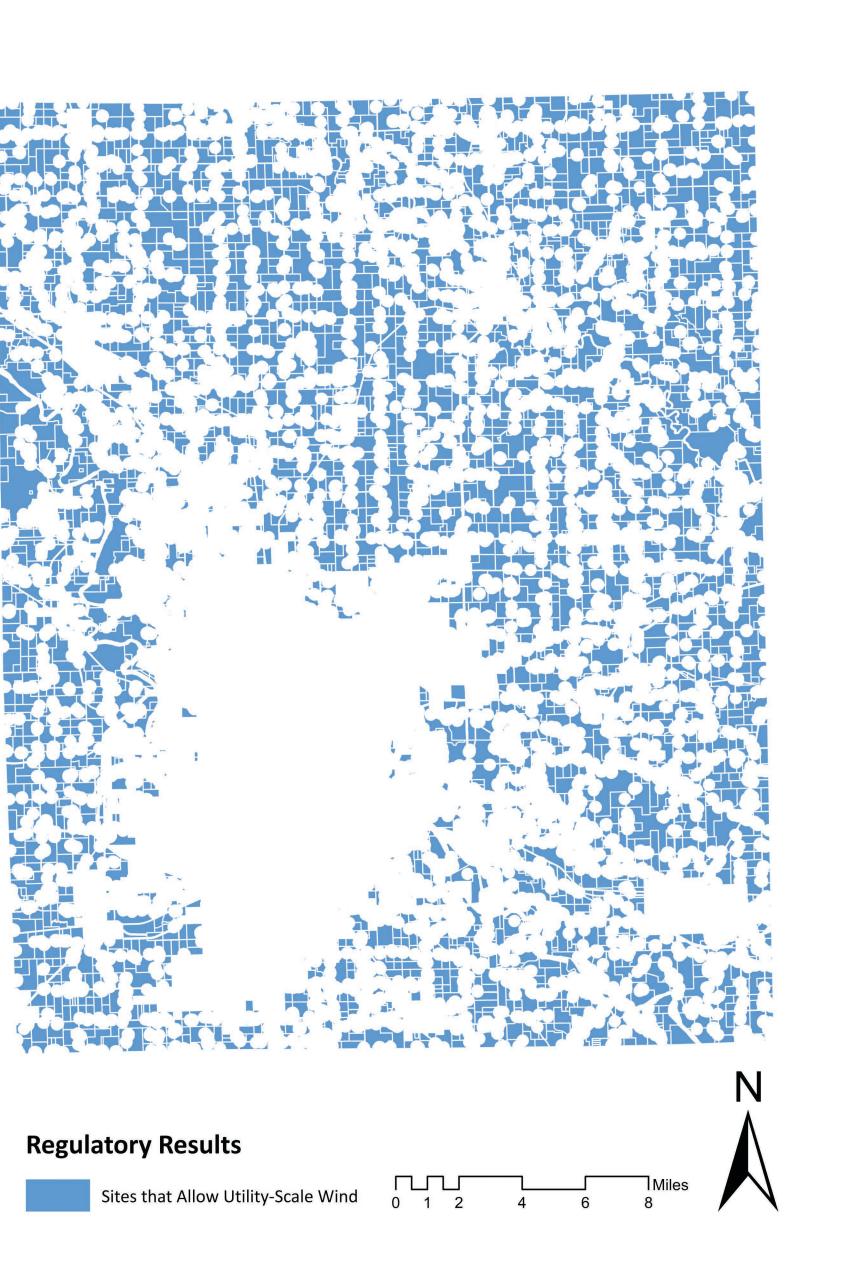
- Proactively adopt explicit language into your code pertaining to wind energy developments—Ambiguity can lead to conflicts and litigation.
- Strive for process transparency—Structuring the utility-scale wind development application process to go through board review as opposed to administrative review can further mitigate the potential for conflict.
- Be aware of general compatibility concerns and planning considerations—Are there vulnerable natural resources or historic sites in your community? Does your code require minimum buffers for wind turbines around residential areas?

REGULATORY ANALYSIS

Where can utility-scale wind developments be sited?

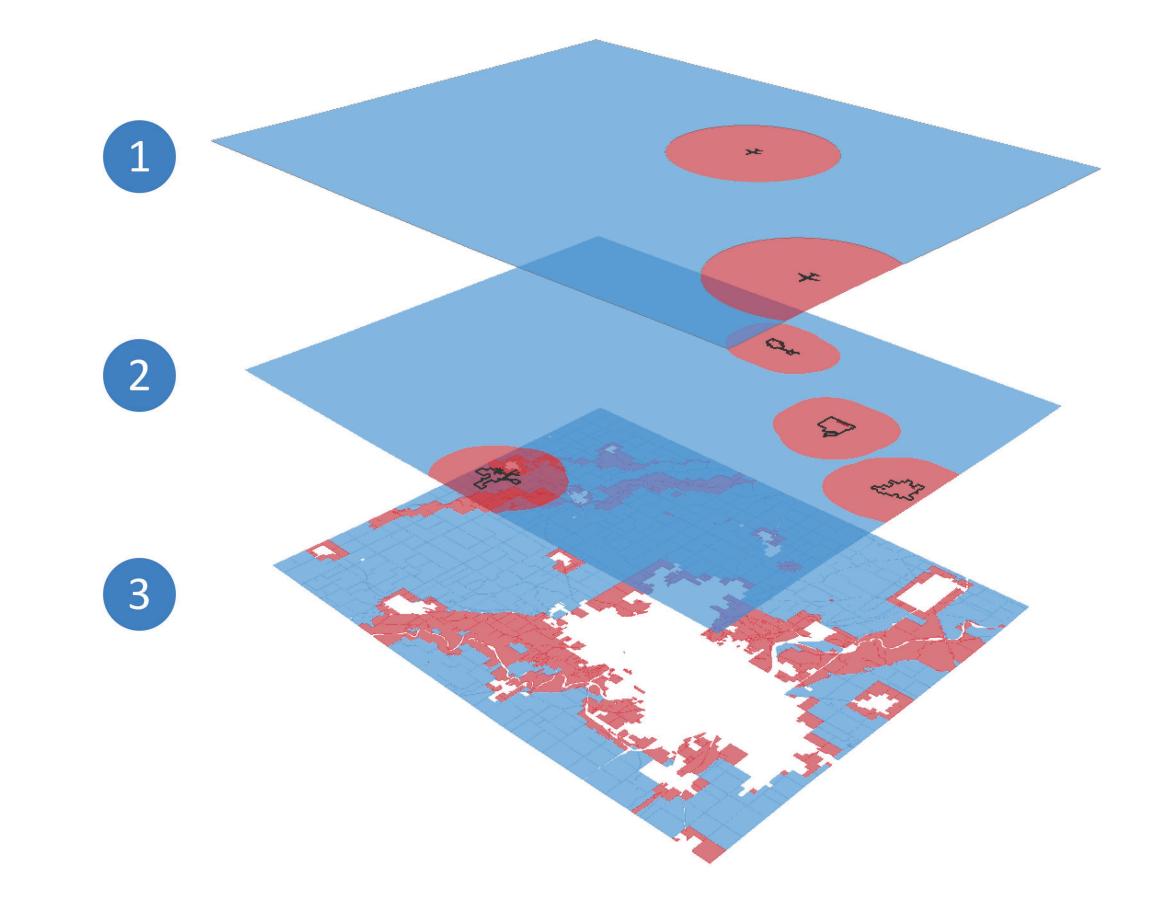


- SETBACKS: Linn County's Unified Development Code requires utility-scale wind energy developments to have a setback of at least 100 feet from neighboring properties under separate ownership and 1,000 feet from any residential structures. The mandatory residential setbacks are symbolized in red and property line buffers were applied to generate the final map below.
- **ZONING DISTRICTS:** Utility-scale wind development is only permitted by conditional use within the Agricultural (AG) or Critical Natural Resources (CNR) zoning districts. These zoning districts have been symbolized in blue.

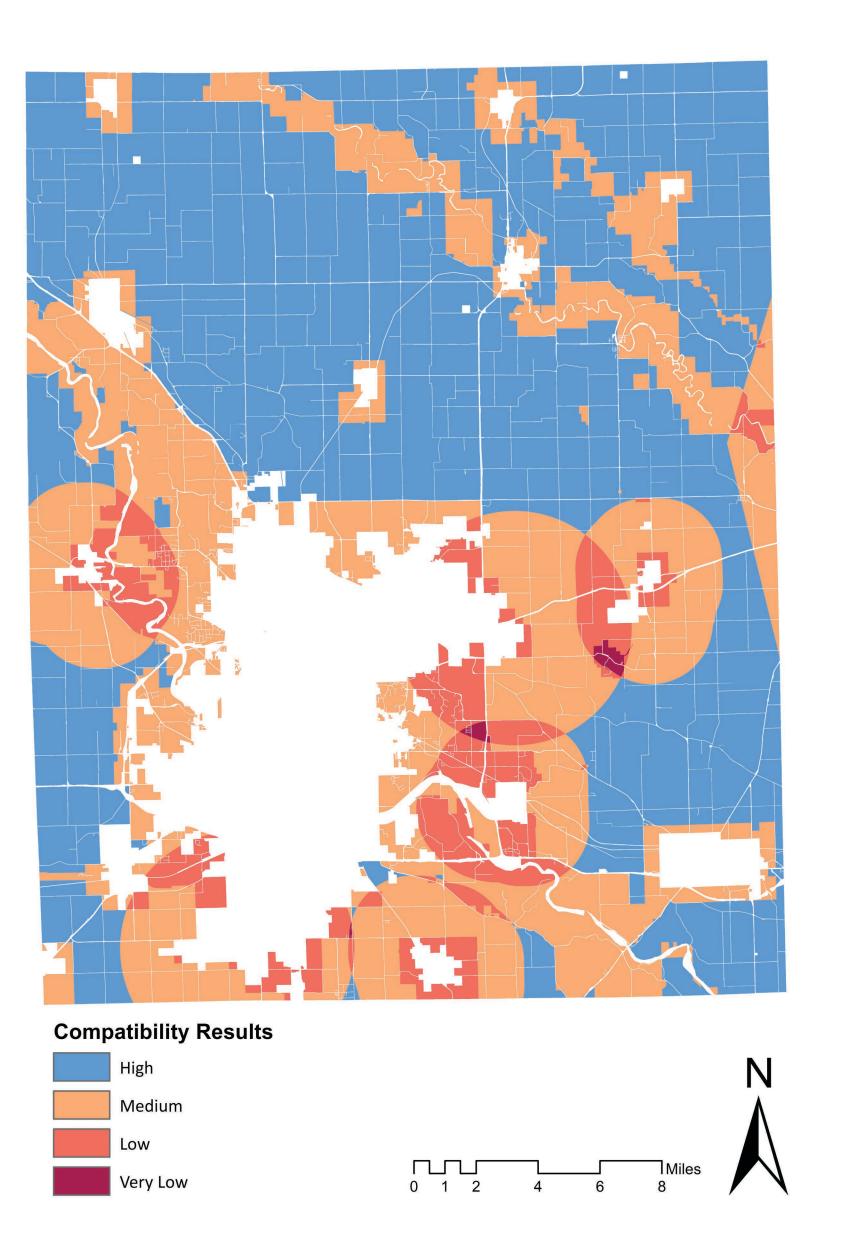


COMPATIBILITY ANALYSIS

Where should utility-scale wind developments be sited?

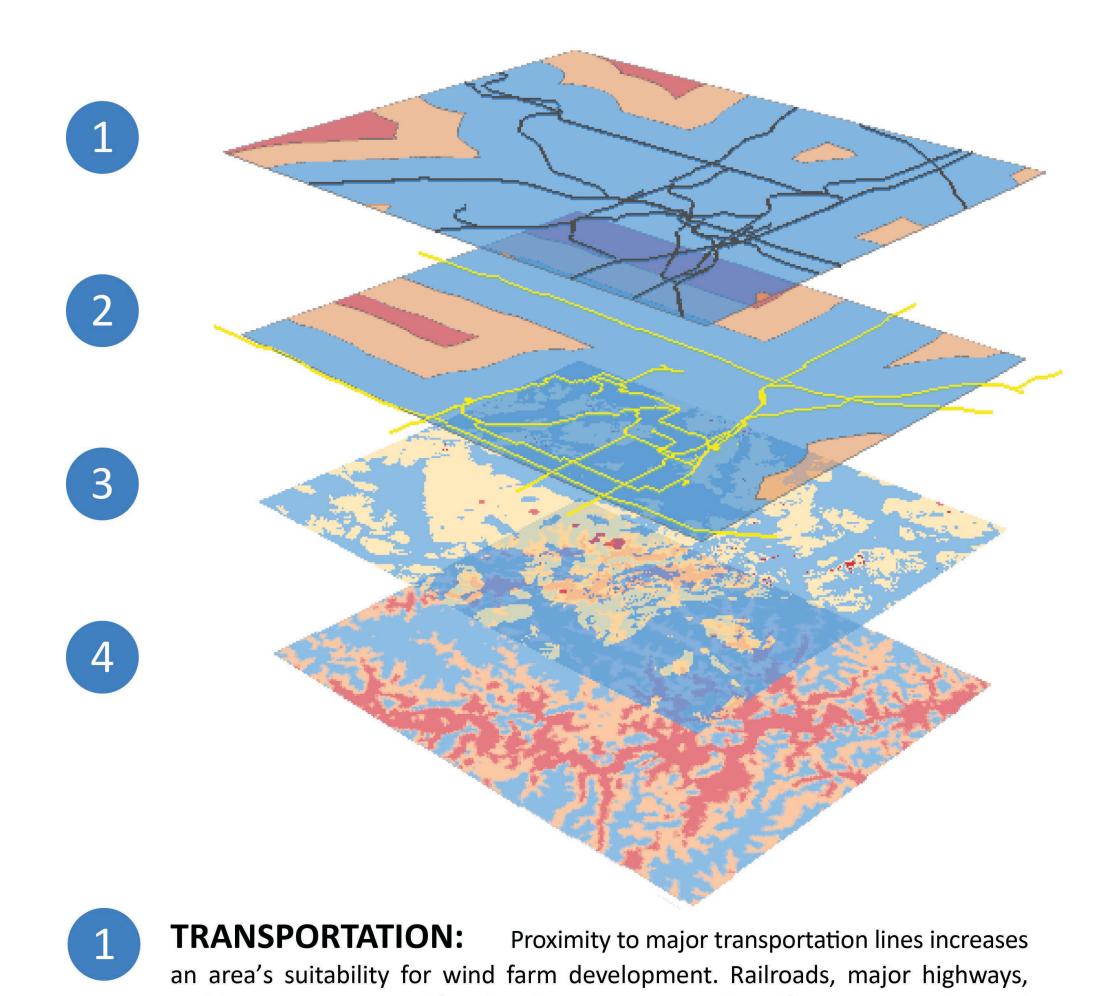


- **AIRPORTS:** The Federal Aviation Association (FAA) requires an evaluation of any construction greater than 200 feet in height. Generally, areas within 20,000 feet of public airport runways are considered incompatible with wind energy developments. These areas are indicated in red.
- FRINGE AREAS: Four municipalities in Linn County have adopted fringe area agreements with the county. Because utility-scale wind development within the two-mile extraterritorial areas around these municipalities would require review by both county and municipal staff, these areas have been deemed low compatibility.
- FUTURE LAND USE AREAS: Of Linn County's six future land use classifications, Agricultural Areas (AA) were deemed the most compatible for wind energy development as the other classifications are used to indicate critical natural resource areas or growth areas. The AA parcels are symbolized in blue and the other five classifications are symbolized in red.

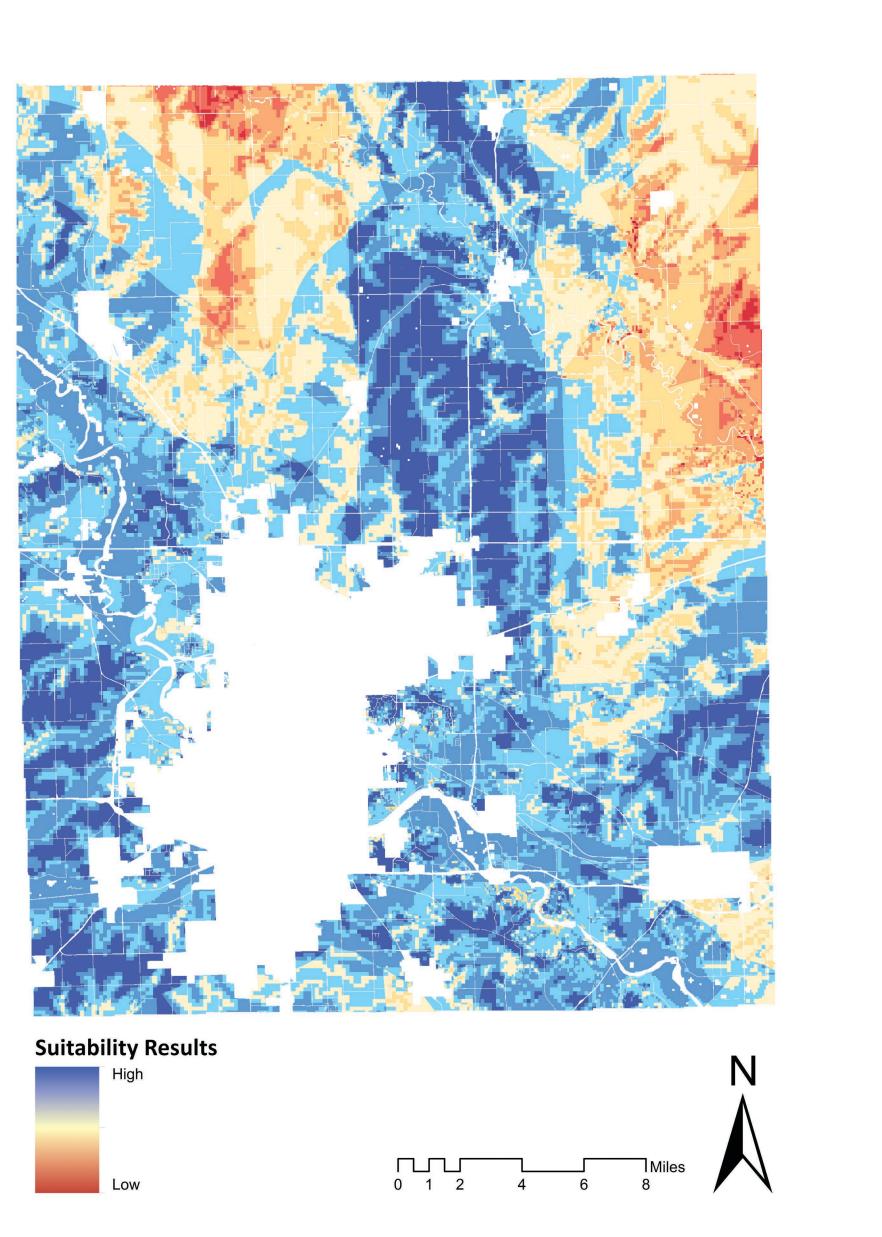


SUITABILITY ANALYSIS

Where are utility-scale wind developments <u>likely</u> to be sited?



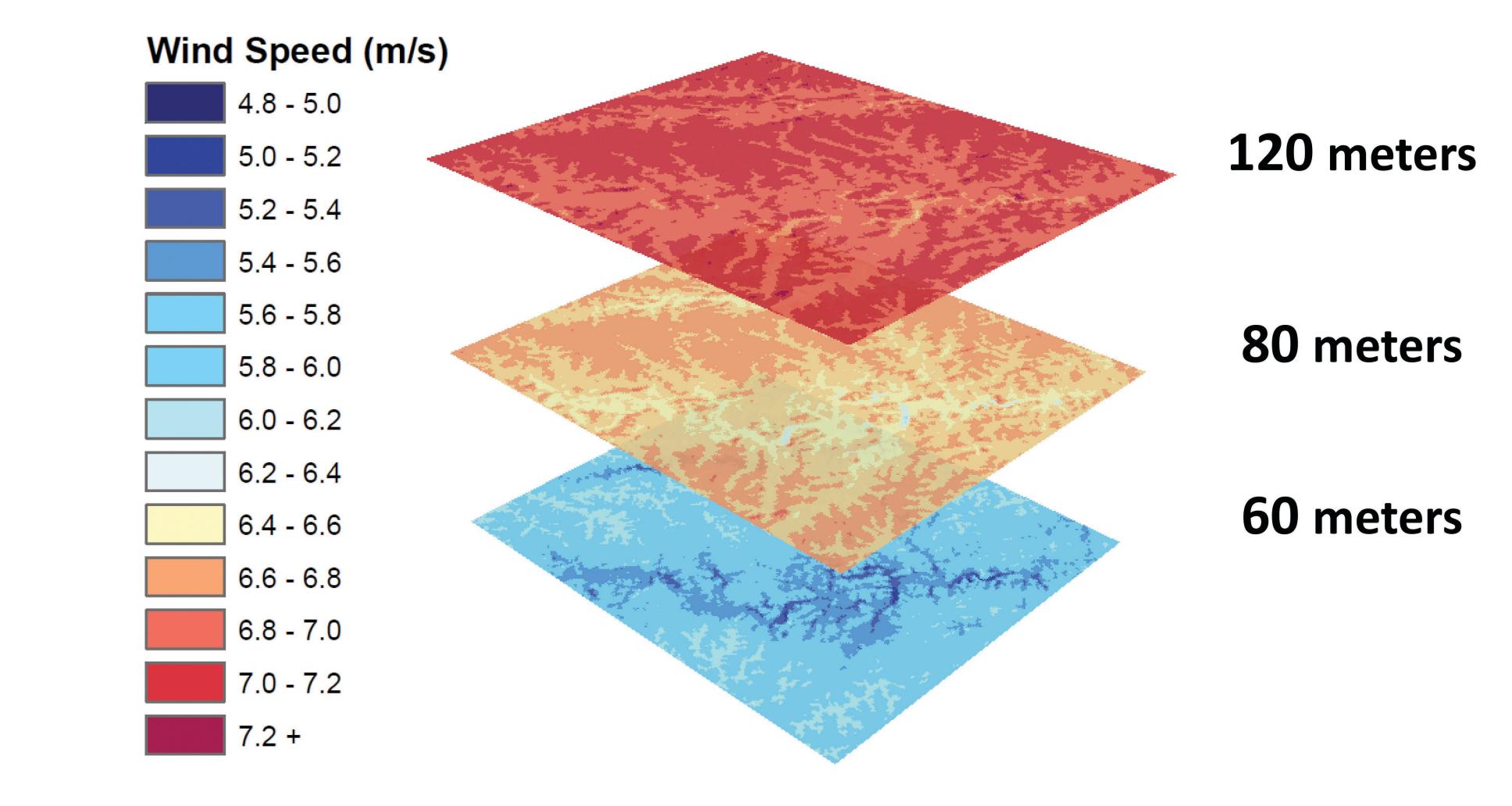
- and interstates were buffered and areas closer to these features were deemed as higher suitability areas. **ELECTRIC GRID:** Increased proximity to existing electric transmission
- lines reduces the cost of installing new lines to support wind energy developments. Wind developments are likely to be sited nearer existing transmission lines, so areas closer to these lines were deemed as having higher suitability. KARST & SLOPE: Karst formations are commonly addressed in wind
- farm siting as its presence renders an area particularly susceptible to erosion Steep slopes are similarly less ideal for turbine siting. Slopes of 7 degrees or higher and areas with karst were rated low suitability, with areas of possible karst rated with medium suitability.
- WIND RESOURCE: Greater wind speeds in an area translate to greater capacity of wind generation. The wind resource maps generated were classified into high, medium, and low wind resource areas corresponding with high, medium, and low suitability rankings.



WIND RESOURCE

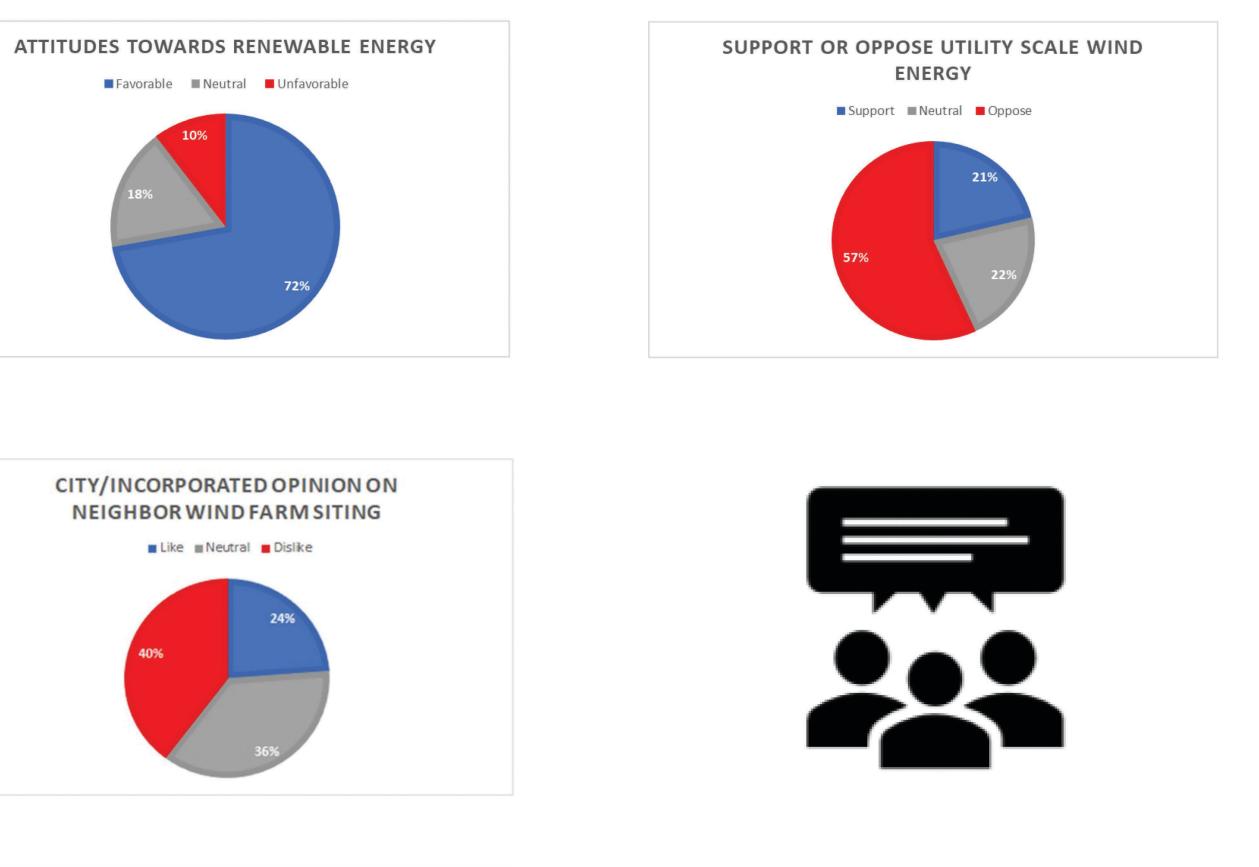
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The high-resolution wind resource maps displayed below were derived using AWS Truepower Openwind software and show the degree to which wind resource increases with height. These maps indicate there is sufficient wind resource in Linn County for utility-scale wind developments.

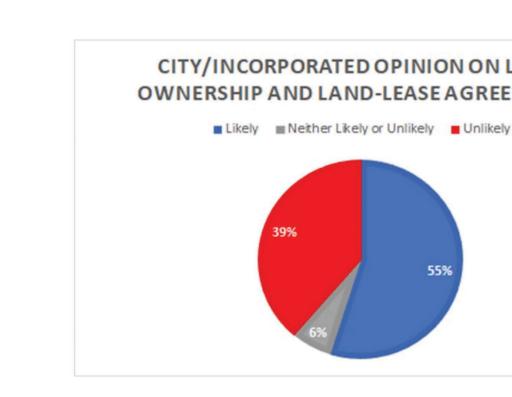


SURVEY RESULTS

An online community survey was conducted to assess the opinions and general views towards renewable energy and wind energy in Linn County. The key findings are provided below.







ACKNOWLEDGEMENTS

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