

Enough is enough, or not?

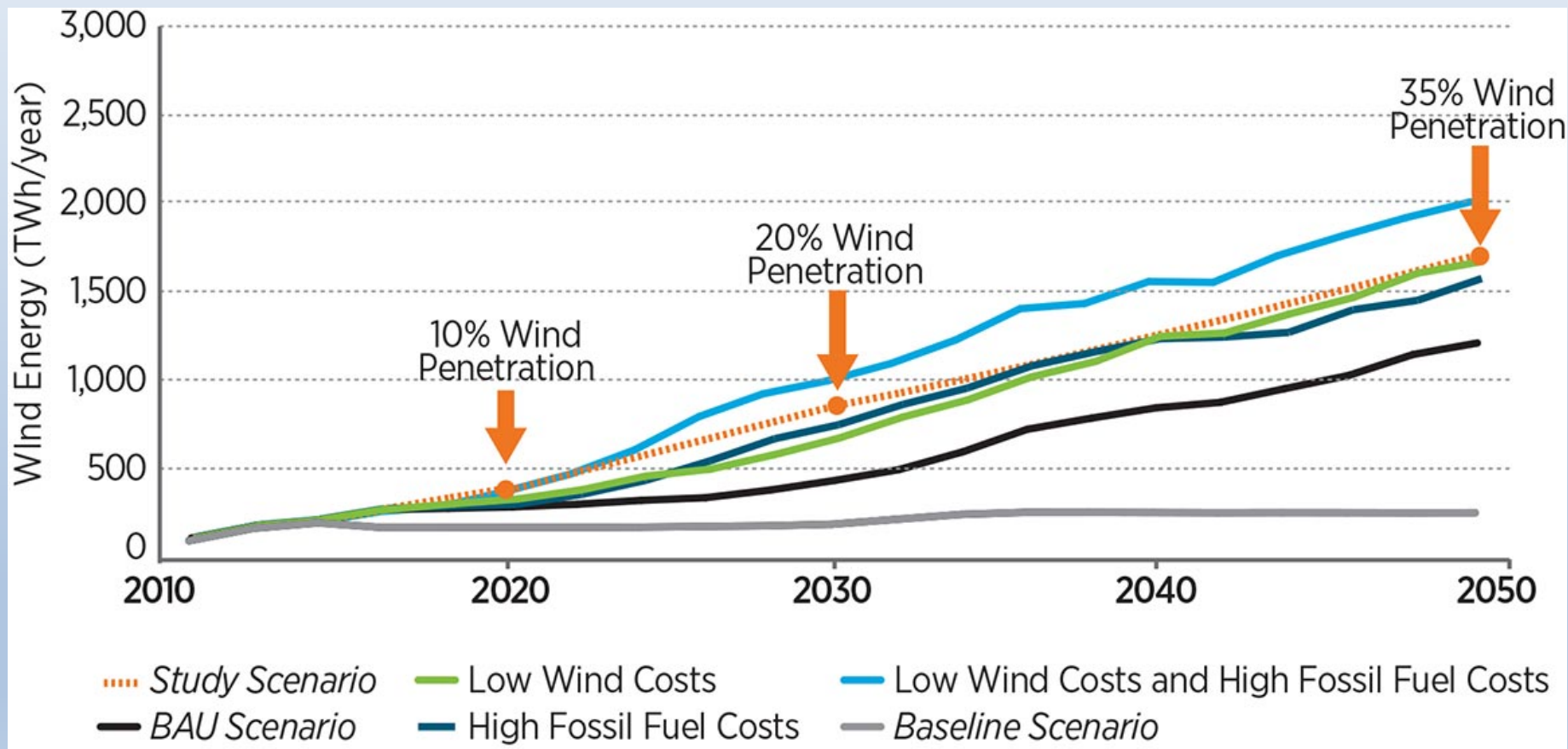
The effect of wind turbine density and proximity on attitudes toward wind energy

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Community Acceptance and Future Wind Development



Source: Department of Energy (2015). Wind Vision

Community Acceptance Research

- Proposed projects & geography
 - Conflicting evidence based on distance (Swofford and Slattery 2010; Baxter, Morzaria, and Hirsch 2013; Warren et al. 2005)
 - Conflicting evidence based on density (Krohn and Damborg 1999; Walker, Baxter, and Ouellette 2014; Warren and McFadyen 2010)
- Existing projects & familiarity
 - With familiarity comes acceptance (Jergen and Jacquet 2016; Warren et al. 2005), especially if there are positive economic impacts (Mulvaney et al 2013; Krohn and Damborg 1999)
 - Limits if net exporter (Groth and Vogt 2014), alone bearing burden (Phadke 2013)

Research Question:

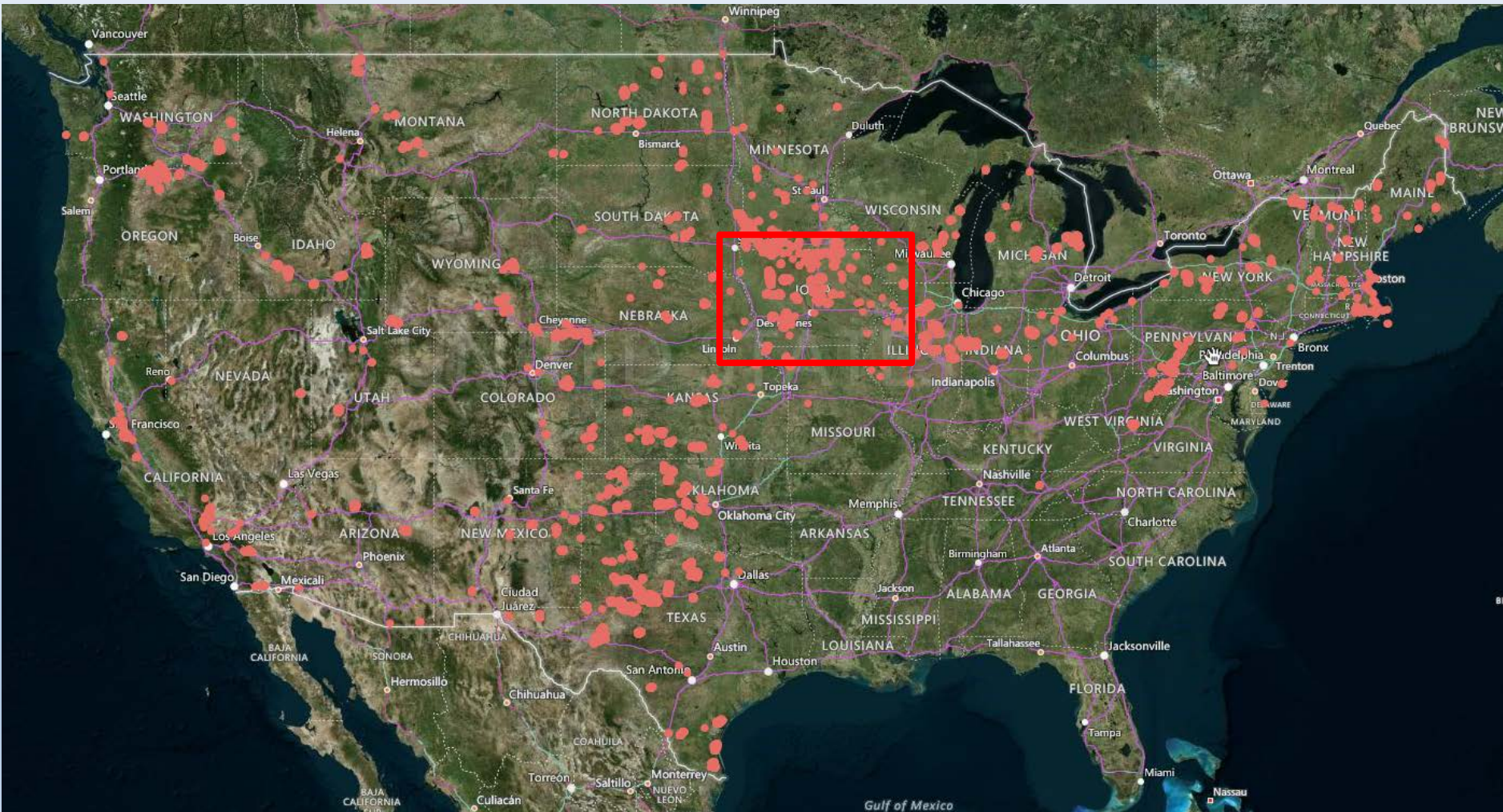
Does proximity to and density of turbines increase or decrease support for additional wind development? Why?



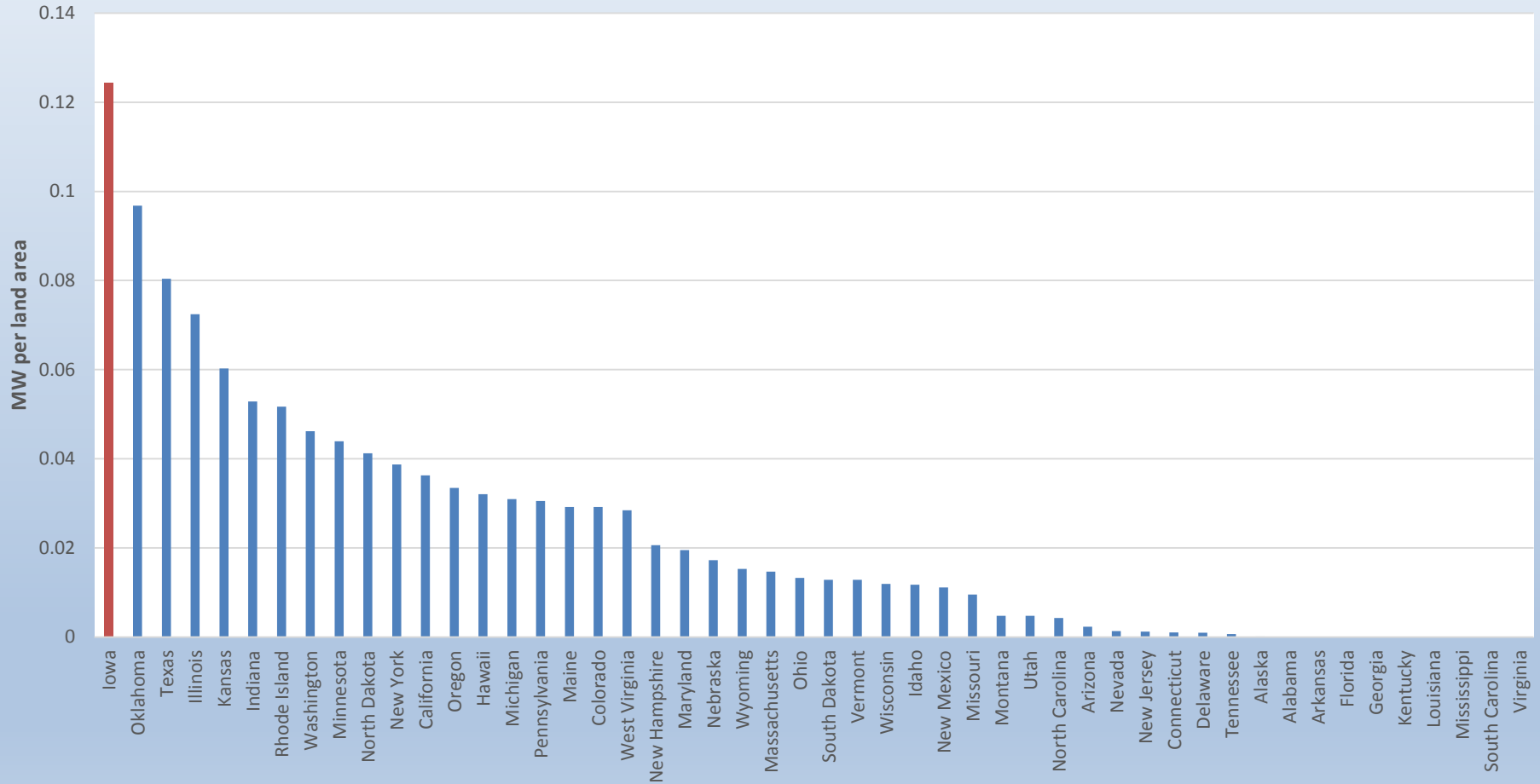
Methods

- Telephone survey of US residents
 - Random sample of known telephone numbers
 - N = 940
 - Inclusion of zip code; unweighted to use proximity variable
- Telephone survey of adult Iowa residents
 - Random digit dial
 - N = 810
 - Similar wind questions, basic demographics; plus other potential independent variables

Why Iowa?

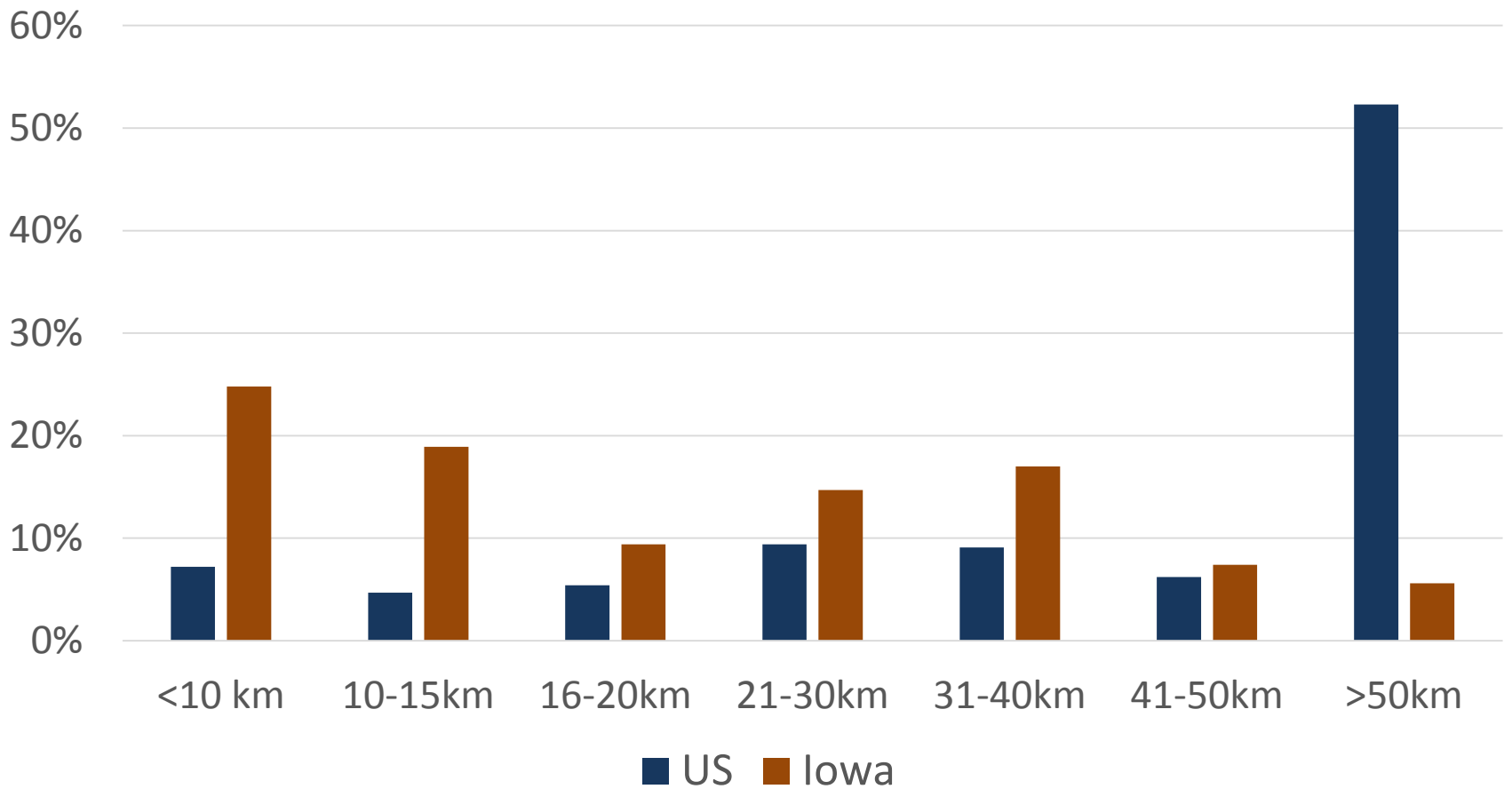


Density of turbines by state



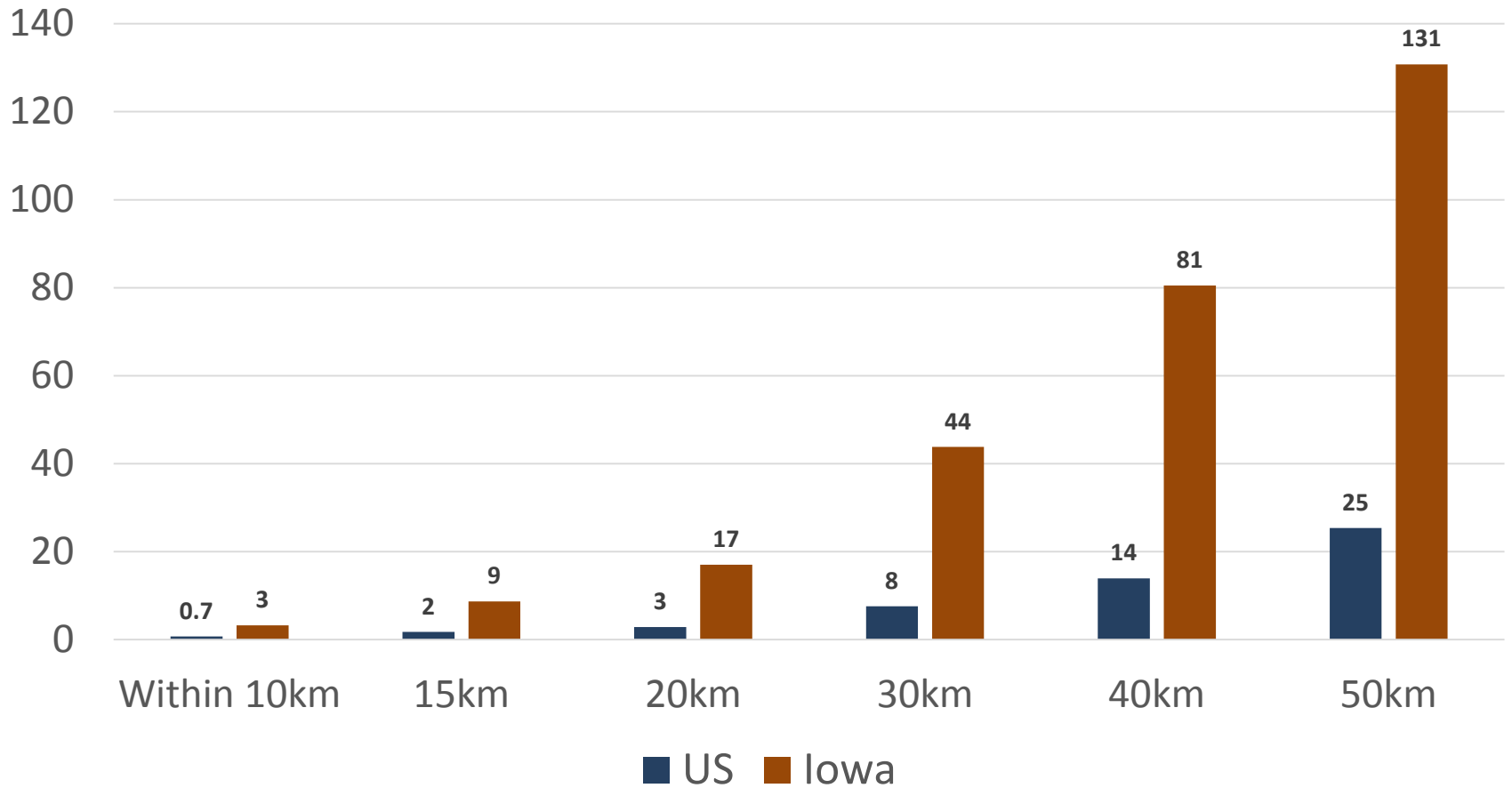
Proximity to turbines

Distance to nearest turbine



Density of turbines

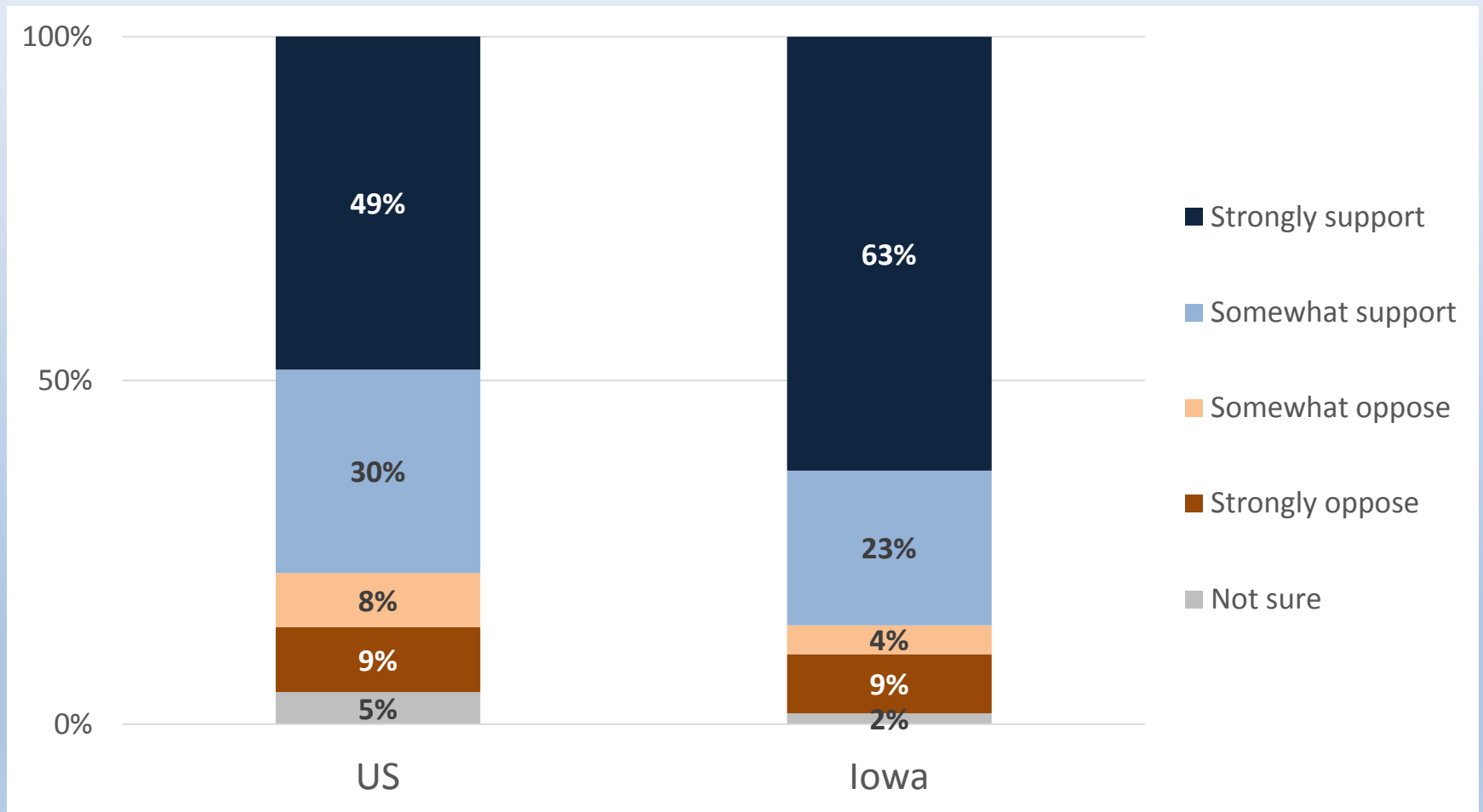
of turbines within X radius



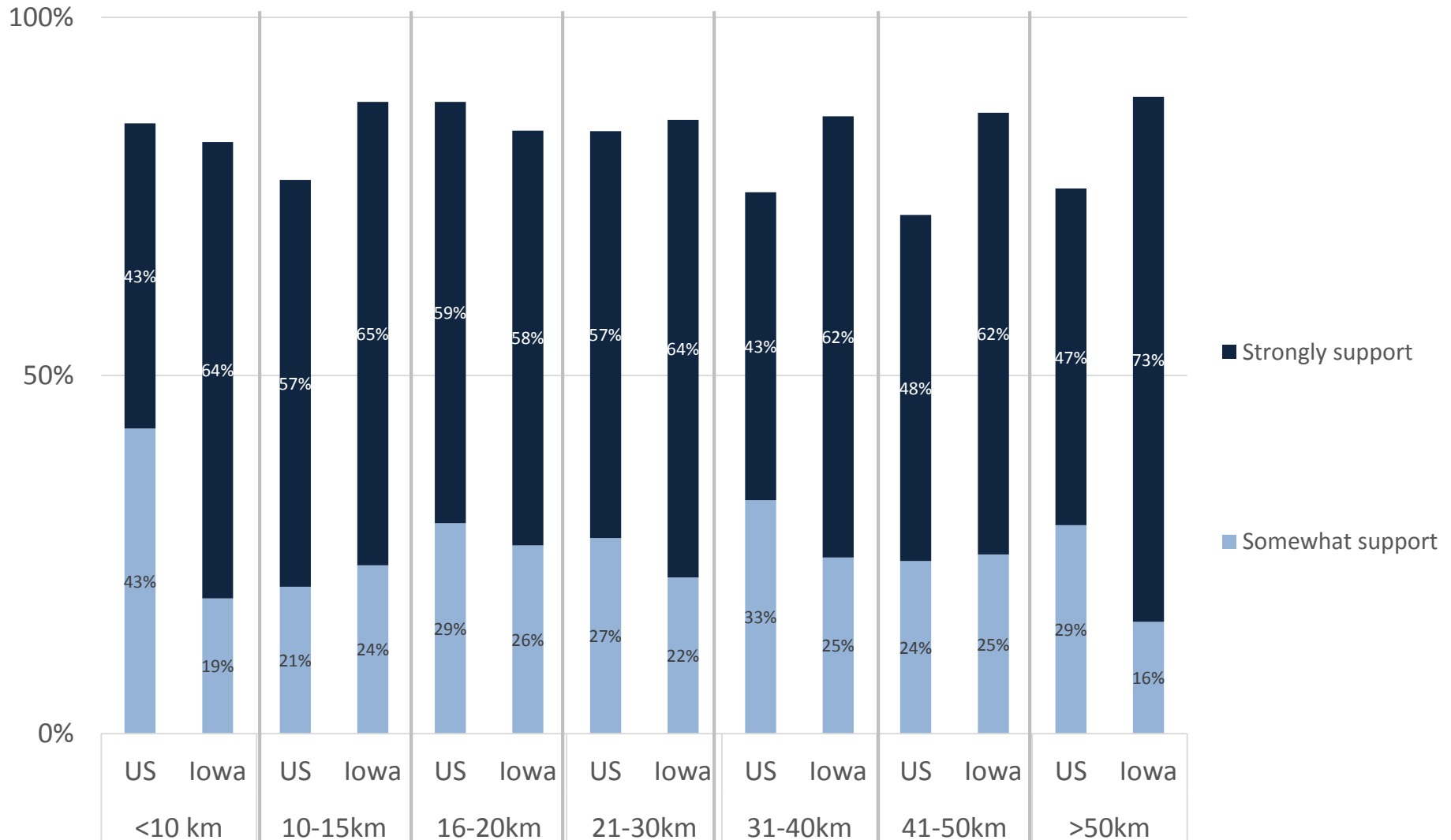
Hypotheses about support for additional wind development

- **H1:** Familiarity with turbines—as measured by distance to nearest turbine—generally increases support for additional turbines.
- **H2:** ...but only up to a certain “saturation” point (as measured by density of turbines).

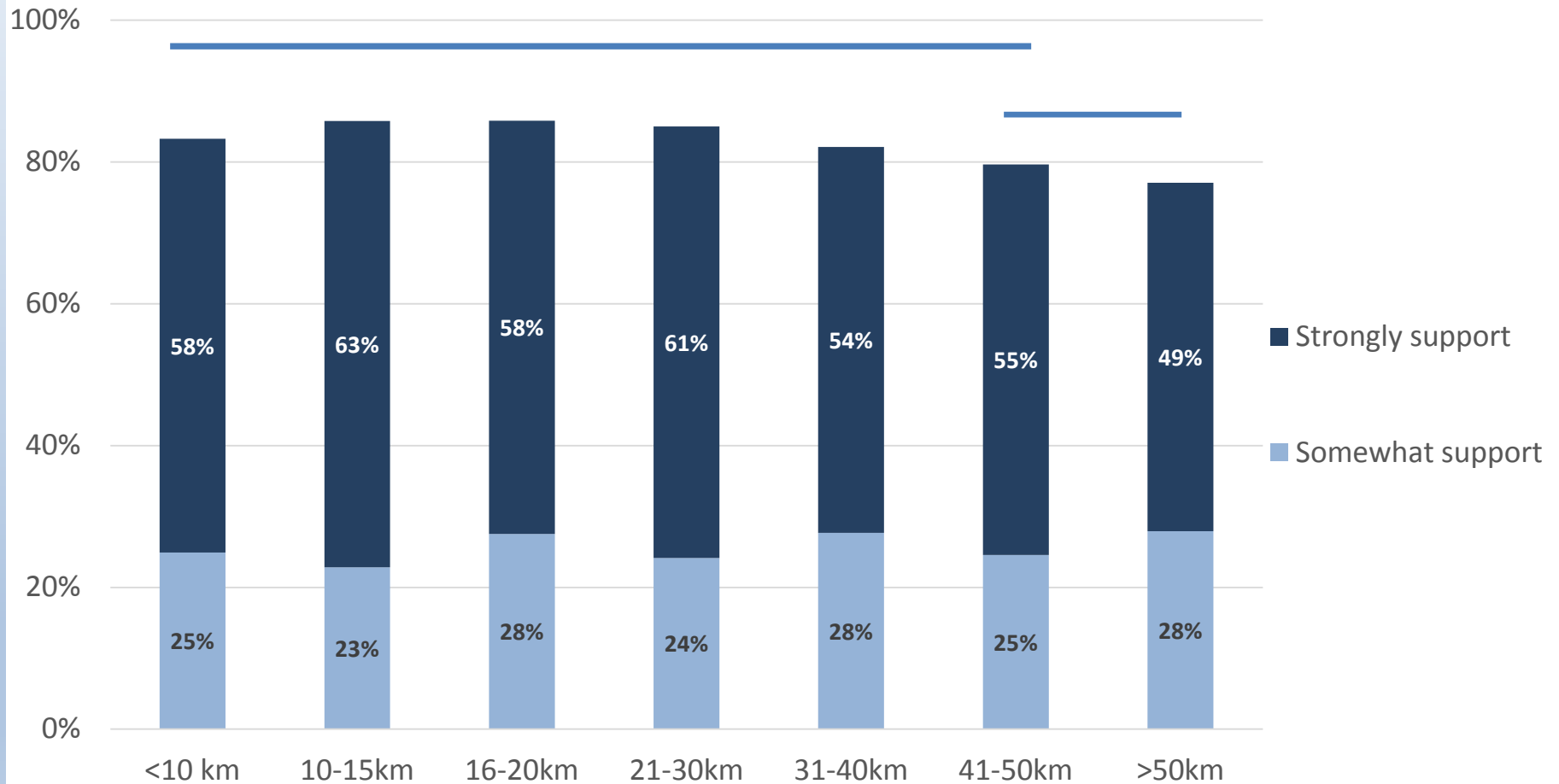
Support for Additional Wind Development in Community



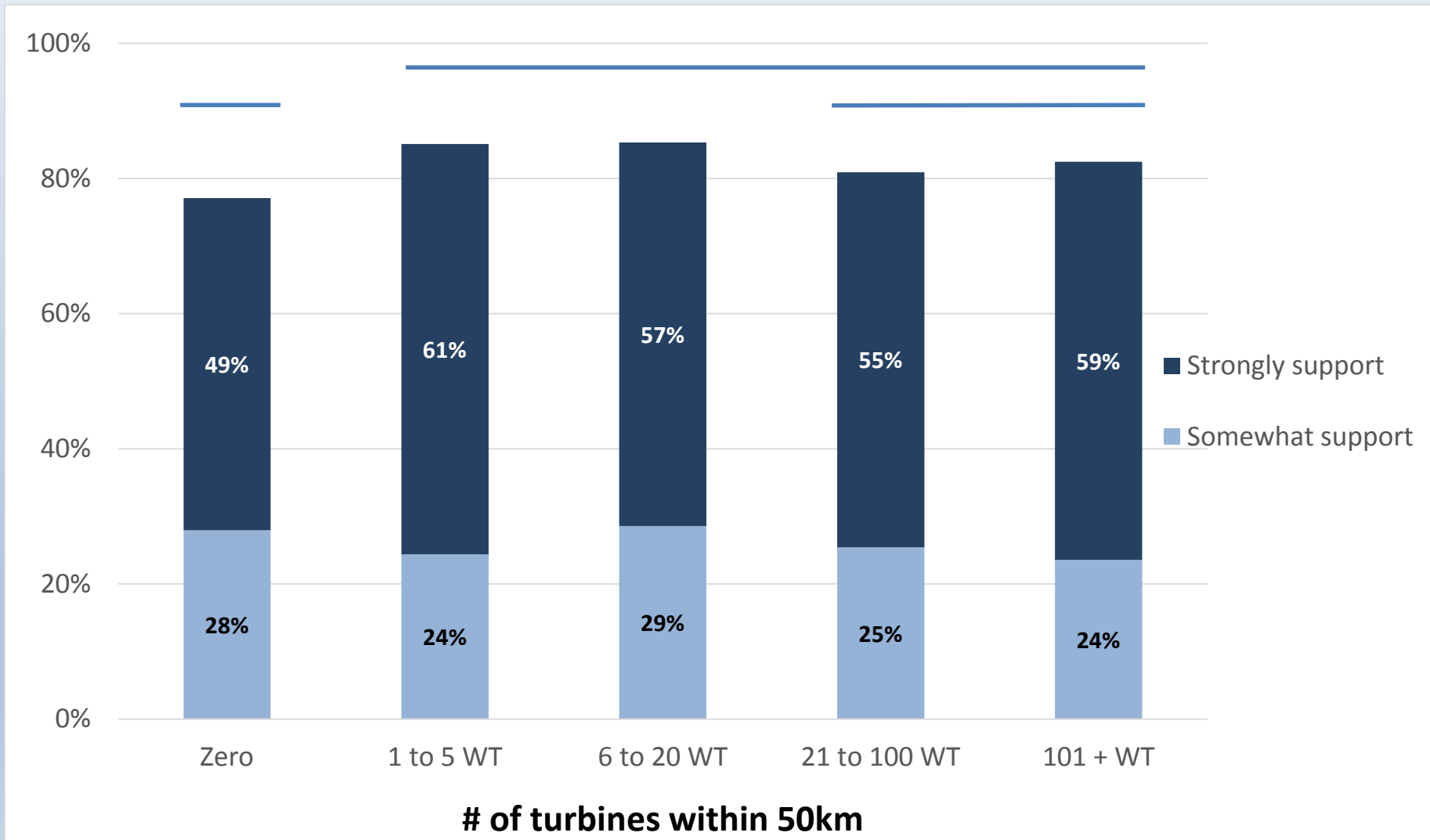
Support by proximity to nearest turbine



Support by proximity to nearest turbine



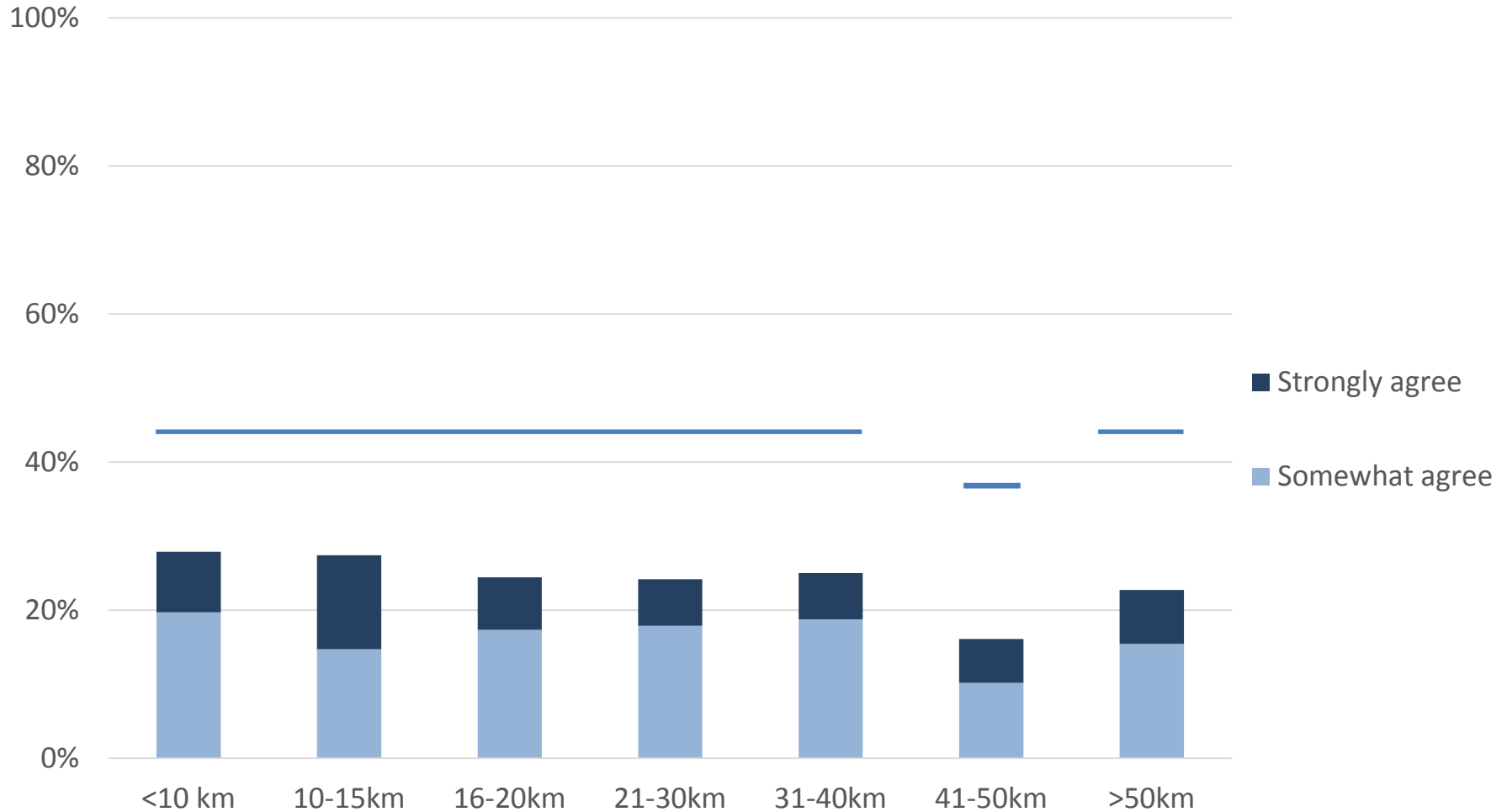
Support by density of wind development



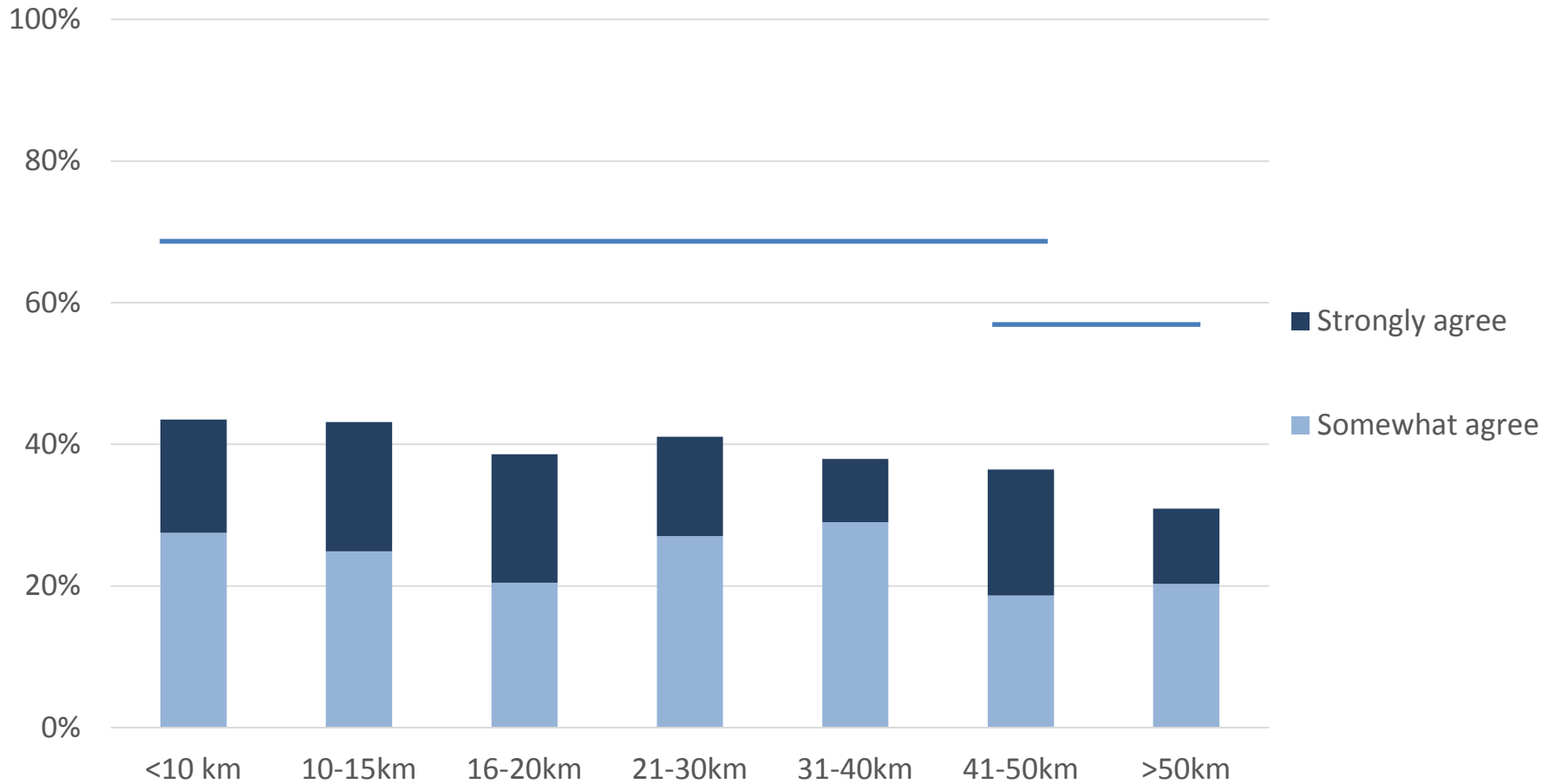
Hypothesis about why those with turbines nearby are supportive (and density doesn't matter)

- **H3:** Residents familiar with turbines generally like turbines; aren't bothered by their sound, looks.

Agreement there's noise pollution, by proximity to nearest turbine



Agree there's aesthetic problems, by proximity to nearest turbine



Key Takeaways

- Proximity to existing turbines doesn't lead to opposition for more development. Those within 50km of turbines are more likely to support additional wind.
- Density of turbines doesn't seem to matter.
- Those nearby just as—or even more—likely to see cons of wind turbines: sound, visual impacts.
- Why so?

Concluding Thoughts

- **H4:** Residents familiar with turbines value their economic benefits, which overrides any issues with sound, aesthetics.
- Multivariate analysis on Iowa data (given data comparability limitations)
- Open to thoughts on how to operationalize turbine density—what is the right radius?

Thank you!

Questions? Comments?

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Supplemental Slides

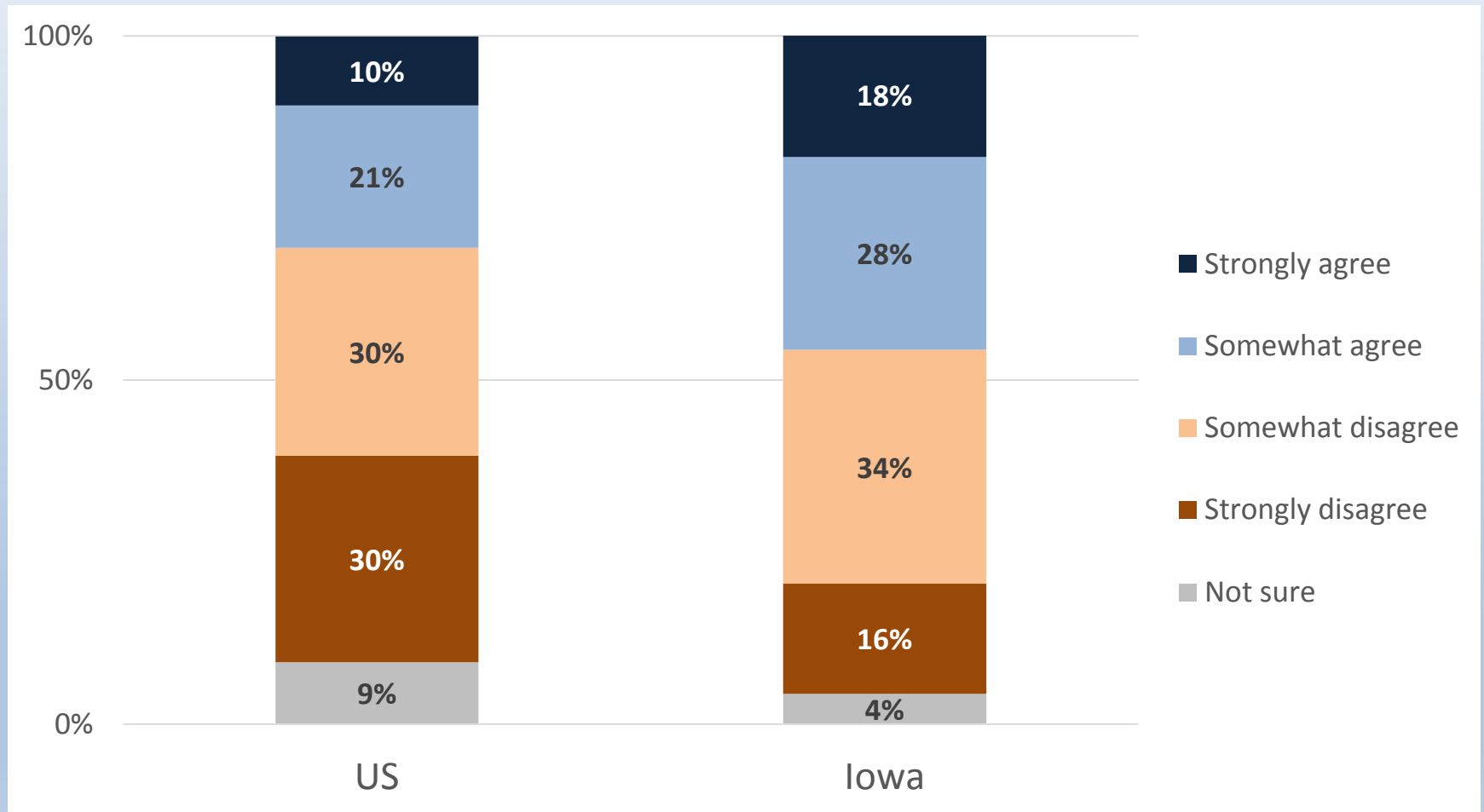
Iowa Wind Energy Study (2016)

Survey Design	
Purpose	Measure public perceptions of wind energy and transmission lines for wind energy turbines in Iowa
Frame	Dual-frame random digit dial (DR-RDD)
Eligibility	Iowans 18 yo+ at time of the interview
Field dates	March 7 – June 4, 2016
Average length	23 minutes
Language	English & Spanish
Sample size	810 (127 landline; 683 cell phone)
AAPOR RR3	24% (21% landline; 25% cellphone)
AAPOR COOP3	72% (45% landline; 81% cellphone)

National Surveys on Energy & Environment Fall 2016 (NSEE)

Survey Design	
Purpose	Measuring beliefs in climate change, carbon tax, support for state/federal policies to address climate change, attitudes toward wind turbines
Frame	Random selection of known telephone numbers
Eligibility	Residents of the US who were 18 yo+ at time of the interview
Field dates	October 13 – November 6, 2016
Language	English
Sample size	940
AAPOR RR3	11%

Agreement that Wind Turbines cause Aesthetic Problems*



*Question wording caveat

Agreement that Wind Turbines Reduce Property Values

