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Public Deliberation and the Geographies of Wind Justice

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1. The Green Energy-Democracy Dilemma

The Obama Administration has consistently promised that green energy investments will jumpstart the economy and protect the environment. Just weeks after the President's first inaugural address, the 2009 America Recovery and Reinvestment Act provided the Department of Energy (DoE) with $167 billion for new grants and loan guarantees for clean energy projects, dwarfing its overall annual budget of $27 billion. The wind energy industry, dominated by multinational giants such as General Electric and Duke Energy, greatly benefited from these new investments. These federal policies presumed broad public support for a new green energy economy. Yet, national opinion polls often mask strong local resistance to the siting of renewable energy projects. Energy policy scholars have referred to this phenomenon as the "social gap" in energy planning (Bell *et al.*, 2005, p. 461).

The local politics of renewable energy development are hardly unique to the USA. Across the industrialized world, from the UK to New Zealand, utility and community scale renewable energy projects are increasingly struggling to get their environmental permits because of local protests. Local opponents are challenging the transparency and accountability of government and corporate decision-making, which often takes place in faraway boardrooms disconnected from the people and landscapes that will be directly affected. In the USA, an important point of contention is whether renewable energy projects, particularly on federal lands, should bypass environmental impact assessments in service of

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urgent climate change and energy security concerns. Federal and state policy-making bodies are becoming acutely aware of this green energy-democracy dilemma wherein development decisions emanate from the top, leaving local communities scrambling to understand and deliberate over costs and benefits.

This political tension should come as no surprise. To date, new energy policy has focused on innovation and investment pipelines. Remarkably, little attention has been paid to understanding the social dimensions of these major infrastructure shifts. As the clean energy revolution re-sculpts rural and urban geographies, it also redistributes the risks and benefits of industrial society. Rural communities at the forefront of new energy development are asking why they are disproportionately being asked to carry the weight of the new carbon economy while urban residents continue their conspicuous use of energy. In other words, who decides how new opportunities and vulnerabilities are shared across society in the constitution of post-carbon futures?

This essay describes the reasons why communities are opposing wind energy and offers a new research model for engaging citizens in wind energy design issues. In the following section, I show how wind energy politics are essentially about the spatialized politics of risk, vulnerability and a lack of participatory technology assessment. Reflecting on our ongoing research developing wind energy consensus conferences, the final section of the essay describes the kinds of Science, Technology and Society (STS) research that can promote more participatory energy development.

2. Public Perceptions of Wind Energy Impacts

Wind energy will play a very important role in US energy transitions. The DoE has pledged to increase the nation's production of wind energy to 20% of total electricity production by 2030. This will require increasing the installed capacity of land-based and shallow off-shore energy from a current 17 GW base to over 300 GW in the span of just two decades (DoE, 2008). Most of the land-based development is likely to occur in the Pacific, Intermountain and Plains states. With the exception of California, the residents of most of these states have had little familiarity with utility-scale wind energy.

An international social movement has emerged in response to the growing pace and scale of wind energy development. In the USA, the organization National Wind Watch serves as the information hub that links together hundreds of diverse groups opposing particular projects or raising fears about environmental protection in general (Phadke, 2011). Residents living near built and proposed installations are particularly concerned about land use and wildlife, visual and public health impacts. The groups often organize citizen campaigns aimed at gathering their own data to contest industry claims on these issues. I examine each of the issues in turn.

Large wind energy projects require vast tracts of land that often include sensitive ecological habitat. Communities across multiple ecoregions are alarmed

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about impacts to avian and bat species, including emblematic species such as California condors. In the western USA, there is also concern about the fragmentation of federally protected habitats for threatened and endangered species, such as sage grouse and the lesser prairie-chicken. These species require large habitat areas for nesting. In most cases, wind developers generate little data to enable the evaluation of habitat scale impacts; what data are collected is rarely for more than one migration season or year.

These habitat concerns are connected to local resident perceptions of visual impact. Wind turbines are often placed on prominent ridgelines and mesas to take advantage of higher wind speeds. Yet, this also means that large turbines may be visible on the horizon from as far as 13 miles away. Environmental impact statements often require wind developers to create visual simulations for proposed projects. Opposition groups routinely attack these images as inaccurate renderings of landscape change. These groups also create counter-simulations using off-the-shelf photoimaging software and Google Earth to reframe wind energy as an "industrial" intrusion on a rural community's sense of place (Phadke, 2010). Conversely, climate change activists and industry groups claim that visual pollution claims are evidence of NIMBYism. Some energy policy scholars challenge such assumptions of NIMBYism by arguing that wind opponents are often not arguing in their individual self-interest, but are evoking community-wide concerns over landscape, memory and identity (Wolsink, 2000).

The public health impacts of wind energy may prove to be the most contentious issue. Some residents and experts believe that the constant low-frequency vibration and noise emitted by large turbines disrupts the human inner ear's vestibular system. This may lead to migraines, panic attacks and other nervous system problems in a subset of local residents. This set of symptoms has been dubbed as "wind turbine syndrome". There are also concerns that animals may be similarly affected. Residents living adjacent to wind projects are uploading audio and video clips of the noise they "endure" to websites and blogs so that others may witness their plight. Wind opponents heralded the release of Dr Pierpoint's (2009) recent self-published study on the human health impacts from wind noise as solid evidence of the dangers of this "natural experiment". The American and Canadian wind industry associations responded with a counter-study that challenged Pierpoint's work as hyperbolic and misleading. Pierpoint recommends locating turbines at least 1.5 km (2,650 ft.) away from local residents. In comparison, the industry supports a 500 foot setback. Spurred by resident concerns, acousticians around the world have conducted new research, which for the most part argues for a 40 dBA or less noise standard that challenges wind industry presumptions of safety (AEI, 2009).

3. New Models for Citizen Engagement

The above examples point to how citizen campaigns are effectively drawing attention to wind energy's potential human and environmental footprints. Rather than

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dismissing their concerns, policy-makers and societies need to acknowledge that these efforts are questioning industry defined notions of acceptable evidence, risk and vulnerability, and that new dialog over wind energy decision-making is urgently required. STS scholars have long argued that energy infrastructures are socio-technical ensembles that produce unevenly distributed human risks and vulnerabilities. Citizen activism across many public health and environmental fronts has re-framed technological controversies in terms of epistemic justice concerns. Similar to the work of Cancer Alley bucket brigades or the "street science" of Brooklyn residents, citizen campaigns against wind energy point to the contingency of scientific data and technological expertise, and the hubris implied in a model of public participation that presents the technological solution as a fait accompli (Corburn, 2005; Ottinger, 2010). STS scholars have coined the term "undone science" to refer to areas of research that are left incomplete or ignored by experts but that social movements or civil society organizations identify as worthy of investigation (Frickel *et al*., 2010). The concerns raised by citizens about wind energy's potential risks falls within the realm of "undone" science.

Decades of STS scholarship on participatory technology assessment have developed robust techniques for civic engagement that promote a more deliberative approach. This literature has also called attention to the limits of orchestrated, state-sponsored "participation". Stirling (2008) has argued that "upstream" processes may produce a disciplining discourse that can "close down" rather than "open up" avenues for deliberation. In a similar vein, Jasanoff (2004, p. 94) claims that participation has the potential to degenerate into "purely instrumental" exercises over narrow technical decisions. She encourages us to think about how we can advance public participation by re-focusing on the cognitive capacities of citizens to guide science and technology toward shared visions of societal betterment.

Wind energy policy scholarship has argued that community opposition can be broadly attributed to a "democratic deficit" in project planning where local citizens remain largely removed from scientific research and technological design. Wolsink (2000) has argued that public participation in wind energy planning has been largely based on a "decide-announce-defend" model where the public is expected to either simply support or criticize a project. In contrast, our research at Macalester College aims to build a "consult-consider-modify-proceed" process (Bell *et al*., 2005, p. 468). Supported by two research grants from the National Science Foundation over the last six years, my undergraduate social science group has created new models for citizen engagement that help produce thoughtful dialog when considering whether and how to build wind farms. We have worked with communities across multiple regions to develop case studies of wind energy conflict, and to implement a landscape symposia model that convenes local citizens to carefully deliberate on the opportunities and impacts of new wind energy development.

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A landscape symposium is a forum where a representative sample of local citizens are brought together to discuss landscape values and define preservation and development priorities. As a hybrid of the consensus conference and citizen jury approach, the landscape symposium model emphasizes drawing out affective community concerns, such as scenic impacts, that conventional state-sponsored public participation mechanisms largely ignore. The overarching goal of each symposium is to create a list of agreed upon recommendations for planning officials, regarding acceptable sites, designs and mitigation techniques for wind energy development at the county or regional scale.

To date, we have sponsored three such events in counties in Minnesota, Michigan and Massachusetts. Each landscape symposium involved a group of 20–25 participants in a full day session. Using census tract data and an application process, our research team worked with local co-sponsors to recruit for occupational, age, income, gender and educational diversity. Each participant was compensated for their time with a $100 stipend.

The symposia have engaged a range of innovative deliberative exercises that are based in landscape character assessment models. Our professional facilitation team has used live-time interactive keypad polling, photographic analysis of built wind projects, computer visualizations of proposed projects and local field tours of installed and proposed wind energy projects. Through facilitated group discussion, and some brief open-ended writing exercises, participants are asked to reflect upon questions like: What are the most valued local landscapes? How are they used? Are there places that should remain protected from new energy development? Are there landscapes/sites appropriate for wind development? How can new energy developments be designed to avoid negative impacts? How might those impacts be mitigated (ecologically, culturally, economically)?

Workshop reports from each of these events are available from our research website (www.macalester.edu/windvisual). While there were many similarities in the concerns that each set of participants expressed, the most striking difference was the scale of development each group deemed acceptable for their region. According to the conventional model of wind energy development, analysts determine potential project sites and scales by examining existing transmission capacity, wind resources maps and opportunities for state and federal tax credits. Local community preferences rarely come into the picture until a project has been proposed. In contrast, the participants involved in our symposia raised important concerns about how project acceptability is deeply tied to scale, topography and existing land use cultures.

Land use culture is an umbrella term that connects concepts such as sense of place, place attachment, landscape memory and land use history. We perceived important differences in land use cultures across our case studies. Compared with Michigan and Massachusetts, our Minnesota participants were far more willing to accept large-scale projects on their landscapes. This difference cannot be explained with simple reference to population density or the presence of a

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wide open space topography. Instead, Minnesota participants more often expressed concerns about the landscape trade-offs of not choosing wind energy. For example, one symposium participant stated that "If my choice is to have wind farms located next to Buffalo State Park or to build another coal generating plant in North Dakota that's going to pollute my air, I will say build the wind towers." Another Minnesota participant stated:

> I also hold dear places that I've never seen and never will see . . . if I could have ten wind towers put on my property and it would reduce the number of troops who are sent to Iraq, I'd say put twenty on my lot, I'm willing to give up some values in exchange for other values . . ..

These participants also argued that their landscapes were already in "productive use" because of the presence of industrial agriculture and that turbines "fit in" with these land uses (Figure 1).

In contrast, Michigan participants were interested in much smaller scaled wind energy developments. Compared with the practical concerns expressed by Minnesota participants, our Michigan participants repeatedly referred to the "pristine" or "peaceful" qualities of the region which they felt would be negatively affected by wind turbines. Several participants referenced "moving up North" to "get away" from southern Michigan and Detriot. Participants spoke of favorite places in the county as "areas to retreat to and recharge us" and "places to relax, places to be alone". They expressed pride in what they saw was the "ageless", small town character of their counties. Towns and homes were referred to as "villages" and "cottages".

To contrast with the Minnesota group even further, many of our Massachusetts participants were opposed to developing any turbines at all. These participants valued places they considered undisturbed by humans, enjoying the ability to "interact with nature and natural habitat on its own terms". They expressed a desire to maintain the "simplicity" and relative "undeveloped" character of their region, and several remarked that new wind energy infrastructure would negatively transform the areas as they now know them. They also felt that wind energy was being pushed by top-down policies that jeopardized the tradition of "home rule" and the ability to say no to new developments.

Guided by these insights, we have focused on understanding how and why land use cultures differ across and within communities poised for wind development. In Minnesota, practical concerns for preventing social fracturing from unevenly shared compensation schemes seemed to rise above concerns for ecological preservation. Land use history and memory also matter greatly. This includes whether industrial scale agriculture and/or energy extraction is currently practiced. In our Massachusetts case, it has been two generations since the landscape was used for extractive industry, such as logging, and current residents refer to their landscapes as "pristine". We have also found that when local landscapes are principally consumed for recreation and relaxation, residents often want to protect what they call

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Figure 1. Symposium participants mark important landscape features on an aerial map.

"the rural character" of their communities not just in terms of how they look, but also how they sound and feel. This was clearly the case in Michigan where the tourist economy was an important local economic driver. All of these values come to matter in how residents perceive the compatibility of wind energy with current place values.

4. Conclusion

By presuming that green energy is a win-win for the global climate and national economy, policy-makers have failed to adequately gauge how important the

human dimensions and perceptions of energy change are to any major new infrastructure development. Green energy proponents presume they have the moral high ground by arguing that no one community can be exempt from "doing their bit" to protect the climate (Barry *et al*., 2008). Yet, the current supply side model of energy development places the "burdens" on particular communities in the industrialized world.

Our research is concerned with investigating the implications of taking a more precautionary approach to implementing green energy. Just detailing the importance of citizen campaigns and the micropolitics of participation is insufficient. Rather, STS scholars are well positioned to grapple with major ethical concerns that relate to climate justice and the implementation of a precautionary approach to green energy development. Citizen campaigns are drawing our attention to the unforeseen and unknowable consequences of the green energy revolution. Whether it involves consensus conferences, citizen juries or science shops, citizens can engage with the intricacies involved in energy planning decisions. Based on our research, the next step is for planning officials to implement models of public engagement that empower citizens to produce designs, mitigation techniques and conflict resolution protocols that protect landscape and livelihoods while producing responsible green energy.

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References

Acoustic Ecology Institute (AEI) (2009) *Spotlight Report Wind Farm Noise*. Available at www.acousticecology.org/spotlight_windfarmnoise2009.html (accessed 19 April 2013).

Barry, J., Ellis, G. and Robinson, C. (2008) Cool rationalities & hot air: A rhetorical approach to understanding debates about renewable energy, *Global Environmental Politics*, 8(2), pp. 67–98.

Bell, D., Gray, T. and Haggett, C. (2005) The social gap in wind farm siting decisions, *Environmental Politics*, 14(4), pp. 460–477.

Corburn, J. (2005) *Street Science: Community Knowledge and Environmental Health Justice* (Cambridge: MIT Press).

Department of Energy (2008) *20% by 2030: Increasing Wind Energy's Contribution to the U.S. Electricity Supply*. Washington, DC. Available at http://www.20percentwind.org/ (accessed 30 April 2013).

Frickel, S., Gibbon, S., Howard, J., Kempner, J., Ottinger, G. and Hess, D. (2010) Undone science: charting social movement and civil society challenges to research agenda setting, *Science Technology & Human Values*, 35(4), pp. 444–473.

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Jasanoff, S. (2004) Science and citizenship: A new synergy, *Science and Public Policy*, 31(2), pp. 90–94.

Ottinger, G. (2010) Buckets of resistance: Standards and the effectiveness of citizen science, *Science Technology & Human Values*, 35(2), pp. 244–270.

Phadke, R. (2010) Defending place in the Google earth age, *Ethics, Place & Environment*, 13(3), pp. 267–281.

Phadke, R. (2011) Resisting and reconciling big wind: Middle landscape politics in the new American West, *Antipode*, 43(3), pp. 754–776.

Pierpoint, N. (2009) *Wind Turbine Syndrome: A Report on a Natural Experiment* (Santa Fe: K-Select Books).

Stirling, A. (2008) 'Opening up' and 'closing down': Power, participation, and pluralism in the social appraisal of technology, *Science, Technology & Human Values*, 33(2), pp. 262–294.

Wolsink, M. (2000) Wind power and the NIMBY-myth: Institutional capacity and the limited significance of public support, *Renewable Energy*, 21, pp. 49–64.

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