A Community-based Planning Model for Wind Energy Development

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PROJECT SUMMARY

This research sought new planning methods for wind energy landscapes supported by meaningful community participation. Planning processes must encourage local knowledge-sharing and acknowledge diverse world views about landscape character and suitable future development. Original research examined residents' subjective views on future energy development, their visual landscape preferences, and their perceptions of wind energy landscapes in Grey, Bruce and Huron Counties. The research has given rise to three key recommendations for provincial policy-makers and municipal leaders tasked with resolving planning problems where changes to landscapes may be considered a threat to place-identity.

Key Policy Recommendations

- *Restore local decision-making power*
- *Ensure fair distribution of benefits*
- *Support upstream, community-based planning*

BACKGROUND

Meaningful local community involvement had traditionally been a cornerstone of Ontario planning policies, but when the Green Energy Act (GEA) was implemented, local consultation for wind farm siting was removed. Currently, development approval for the construction of wind turbines is granted only at the provincial level while significant impacts to social, environmental and economic sustainability are felt at the local level.

How people form attachment to landscapes varies because of differing values and life experiences; such attachments are deeply rooted and they impact people's response to landscape change. The axiom "beauty is in the eye of the beholder" sums up a widely-held line of thinking that considers visual landscape values unpredictable and, in some measure, unknowable, particularly when it comes to wind energy development. The perceived difficulty

in predicting landscape perceptions has permitted developers to avoid deliberations on such value-laden matters during the planning process. Since the implementation of the GEA, deliberation on whether wind energy projects could be granted approval was restricted to objective concerns about environmental impact, or impacts to human health and safety. People have been vocal in expressing their values and beliefs, but discussing visual impact to landscape was pointless; residents' values could not influence decisions about development approval.

However, citizens' values strongly influence their attachment to place. Those elements that foster place-bonding, rootedness, and human connections to landscape stem in part from subjective belief structures and value orientations. Matters of the heart - sentimental attachment, sense of place, and personal histories - are deeply intertwined with environmental perception and aesthetic response. Bonds to familiar landscapes impact community identity and inspire place-protective action; threats to place-identity can adversely affect health and wellbeing of communities and individuals. The same impulses that move people to respond to acts of environmental protection may be the same impulses that move people to resist changes in familiar landscapes.

Resistance to wind energy development was characterized as NIMBYism by provincial leaders in 2009[1], and the GEA was created to hasten the approvals process as it permitted wind energy developers to avoid municipal public planning processes. They could sidetrack the 'messiness' of meaningful engagement with local communities along with the associated challenges of incorporating subjective value structures into the planning process. Over the past decade, political incentives have enabled vast and rapid construction of wind energy infrastructure in the Southwestern Ontario landscape. However, it also permitted developers to avoid dealing with issues that arise over such an abrupt change to local landscape, and the values that lie at the root of residents' place-identity.

Research Team

This research was conducted at the University of Guelph, and funded by OMAFRA, through a New Directions grant. In partnership with researchers from University of Alberta, University of New Brunswick and Dalhousie University, a concurrent SSHRC-funded project (Energy Transitions in Canada) explored parallel case studies in New Brunswick and Alberta. In all three case study regions, innovative citizen-engagement methods that enable deliberative, inclusive planning for rural landscape infrastructure were developed. Prior to community engagement exercises, cultural and community values associated with energy landscape transitions in each region were examined.

> *The results of this research show that an upstream planning model, similar to that used in Germany, could work in Ontario. More importantly, a participatory, community-based model is feasible and practical.*

[1] "Nimbyism will no longer prevail"- Dalton McGuinty as quoted in the Toronto Star, February 10, 2009. https://www.thestar.com/news/ontario/2009/02/10/mcguinty_says_he_wont_tolerate_nimbyism_in_green_energy_projects.

RESEARCH METHODS

Community involvement in planning for wind energy is highly complex because the suitability of development is hotly contested in Southwestern Ontario. Finding a solution to a particular planning problem depends on how it is characterized; wind energy planning is highly complex and has all of the key attributes of a wicked problem. Difficulty stems from divergent, contradictory, and perhaps irresolvable viewpoints about how development will impact communities. Traditional analytical and linear planning approaches, however rational, are unlikely to solve wicked problems. The way to tackle these problems is described as an "evolving art". It is argued that collaborative, inclusive approaches are most likely to succeed[2].

Figure 1. A four-step Deliberative Mapping Process. 1) Initiating conversation: sharing the results of individual mapping with table members. 2) Deliberating siting issues in a shared conversation, seated in a circle around large maps. 3) Collaborative mapping. 4) Sharing results in a plenary session

Finding a new planning process

Collaborative approaches are considered the best way forward for complex problems, and deliberation on possible solutions is essential where issues are highly contentious and polarized. Upstream approaches (or 'prior to' development plans) are also recommended. Because the rural Ontario communities that host wind development projects have limited staff and financial resources, upstream zoning for wind development was not considered a viable option[3]. Wind developers are not supportive of upstream zoning fearing it will impede progress.

[2] Lynelle Briggs. *Tackling Wicked Problems: A Public Policy Perspective.* Australian Public Services Commission. 2007. (Page 2). http://www.apsc.gov.au/publications-and-media/archive/publications-archive/tackling-wicked-problems

[3] Fast, S. and W. Mabee. Place-making and trust-building: The influence of policy on host community responses to wind farms. *Energy Policy, 81*. 2015. (Page 35)

It has been reported that some municipalities are reluctant to take on planning responsibility because of the complexity of the issues, favouring a provincial approval model. Provincial regulators have suggested that changes are necessary to the GEA, and that meaningful community involvement must become a priority, but new tools and methods will be required before local planning for renewable energy infrastructure can be restored[4].

An experimental one-day deliberative mapping workshop was designed and conducted in the region of Grey, Bruce and Huron Counties. The purpose of the workshop was to find consensus about future wind development areas, zones where wind farms are prohibited, and zones where there is uncertainty about future development. The results of this research show that an upstream planning model like that used in Germany could work in Ontario. More importantly, a participatory, community-based model is feasible even with limited resources. A single workshop does not provide conclusive evidence that this planning strategy is practical and workable, but it signals an avenue for developing new approaches for wind energy projects. It is hoped that Ontario's top-down, rationalist GEA might be replaced with a renewable energy policy that promotes inclusive, community-based decision making.

STUDIES EXPLORING LOCAL PERCEPTIONS AND VALUES

Prior to the workshop, three studies explored views on energy preferences, visual landscape preferences, landscape character values, and perceptions of wind energy aesthetics. The goal was to gain understandings about local values and understandings.

Study 1: Q-methodology Study in Ontario, New Brunswick and Alberta

First, a comparative study was used to examine diverse views on energy preferences in Ontario, New Brunswick and Alberta[5]. The 2013 study funded by SSHRC used Q-methodology, which involved having 92 participants sort a selection of 48 subjective statements about energy futures (called a Q-set) in order of agreement, from strongly agree to strongly disagree, using a pyramid-shaped chart called a Q-sort. Interviews were also conducted so that participants could further explain their viewpoints. Statistical analysis of the Q-sorts revealed five key discourses on energy issues: (1) climate change is a primary concern, (2) maintain the energy economy, (3) build on resilience of nature and local energy systems, (4) markets and corporations will lead, and (5) renewables are the path forward. The research aimed to inform those working with communities undergoing energy transitions and revealed "nuanced perspectives and opportunities to forge common round and mutual understanding" so that communities can move through debates on energy issues constructively.

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[4] Don Chiarelli. Ontario giving local governments a say. Letter to Editor, *The Owen Sound Sun Times*, June 10, 2013, Quebecor Media Inc.

[5] John Parkins. Summary of research project: *Energy discourses with Q-methodology*. Energy Transitions in Canada website: http://energytransitions.ca/energy-discourses/. For a detailed description of the research, see published paper: Parkins, J., Hempel, C., Beckley, T., Stedman, R. and Sherren, K. (2015). Identifying energy discourses in Canada with Q methodology: moving beyond the environment versus economy debates. *Environmental Sociology*, 1.

Study 2: Visual Q-methodology study in Ontario

Next, an innovative Visual Q-methodology technique was developed to elicit participants' subjective landscape preferences and to ascertain how participants value visual landscape character. This study was undertaken to better understand subjective value orientations and to determine whether patterns arise. A process similar to Study 1 was used, but the Q-set consisted of images rather than statements. Thirty-five watercolour paintings were created by reviewing and synthesizing an extensive collection of imagery that was gathered by observing landscape imagery valued by citizens in the case study area; this consisted of artwork, photography, advertising material or online reproductions of landscapes that were created, collected, displayed or shared by residents. A diverse group of 82 participants ranked the images in order of preference (most prefer to least prefer) in a Q-sort pyramid.

Figure 2. Thirty-five watercolour paintings were created to represent the values that residents express about local landscapes. Images were reproduced in a book, and in a set of cards (Q-set) used for data collection.

Figure 3. Participant performing a Q-sort. Data collection included questionnaires supplemented by interviews, which furthered understanding of the preferences expressed by participants.

Results

Factor analysis was conducted on the data using PQmethod software[6]. Four key patterns or viewpoints emerged from analysis of the results. Interpretation of these unique patterns provided a window to understand divergent ways that people see the same landscape. In Q-methodology research it is common to name the factors to represent the particular points of view that a number of participants share.

Analysis of the results, including the comments provided by participants during interviews, showed that cultural (learned) and biological (innate) processes influence perceptions of landscape. While new information may sway some landscape preferences, other environmental responses are very deeply rooted and may stem from evolutionary impulses. Understanding where preferences are rooted helps to explain why some landscape changes are resisted while others are readily adapted to. A full explanation of the research design and results of this innovative visual elicitation research can be found in the PhD dissertation completed by A. Christine Hempel in April, 2017[7].

Below are brief summaries of each viewpoint, accompanied by an image of the Q-sort that is common to those participants who share the viewpoint.

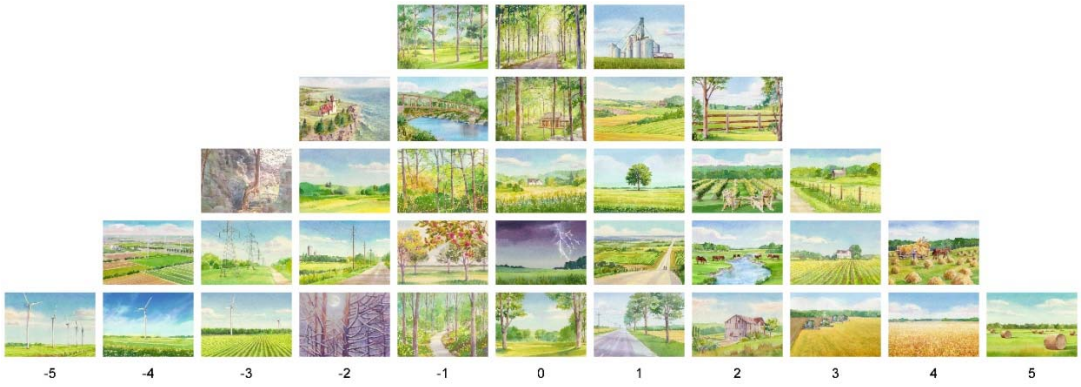
Factor 1, the Naturalist, represents the most common value orientation found among participants in the study. Most preferred are natural landscapes, where nature is perceived as dominant and powerful, and the influence of humans is least visible. The least preferred landscapes show large-scale human intervention, such as industrial agriculture, road infrastructure, and energy infrastructure.

[6] Schmolck, P. *PQmethod* (v. 2.35). GNU General Public License, 2012. Retrieved from http://schmolck.userweb.mwn.de/qmethod/downpqwin.htm

[7] A. Christine Hempel. *Planning for Change in Rural Ontario: Using Q-methodology to Explore Landscape Preference*. Chapter 4. PhD thesis, University of Guelph, April 2017. https://atrium.lib.uoguelph.ca/xmlui/handle/10214/10311

Factor 2, the Gardener, corresponds with a view of the landscape as both nature and a home for humans. Preferred landscapes reveal human effort to work with nature to shape and alter the contours of the land, but also to be shaped by nature and to adapt to its forms in a symbiotic relationship. Preferred landscape patterns are fine grained and have a balance of human and natural elements.

Factor 3, the Cultivator, prefers farming landscapes with open landscapes. Historic and modern agricultural traditions are equally embraced as they represent the bounty and harvest. Cultivators value a high level of involvement in the building and management of landscapes.



Factor 4, the Builder, appreciates landscapes that display strength and evidence of human creativity, natural forces, or a combination of both. These participants prefer constructed landscapes with evidence of progress and vitality.

Study 3: Visual Q-methodology study of wind energy aesthetics

The next stage of the project was to examine how people perceive visual landscapes as they change to accommodate wind energy infrastructure. The exploration builds on the knowledge gained in the previous two studies. Analysis of the results of this wind energy landscape perception research provided information about how people might respond to various future wind energy landscape scenarios to inform planning and design processes. The Q-set was developed by adapting 27 of the images used in Study 2 to show the same landscapes with wind turbines added.

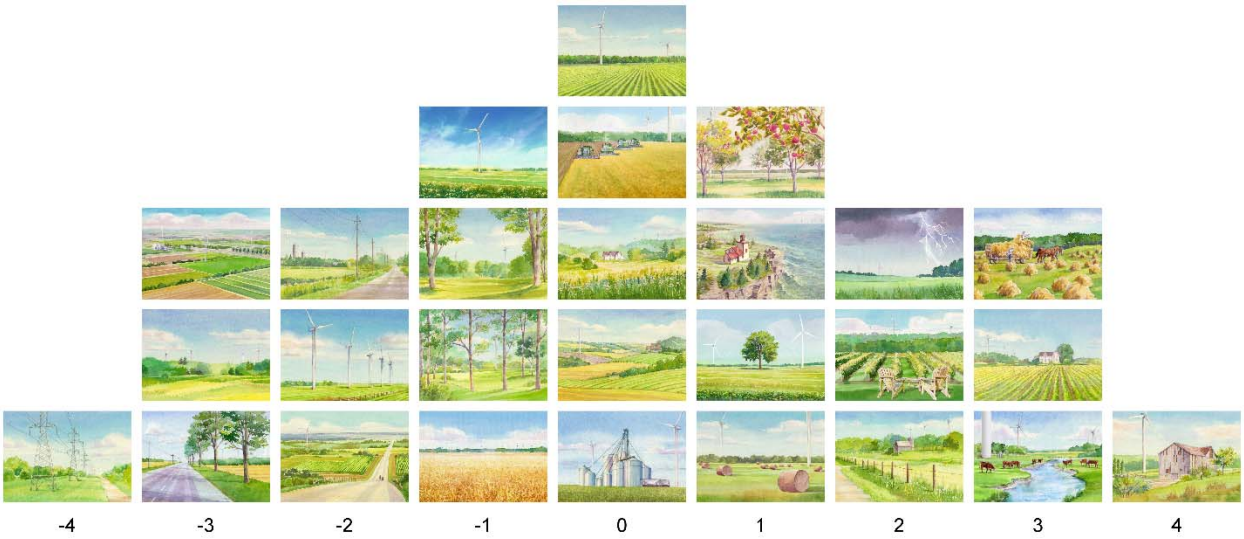
Figure 4.Watercolour paintings from the first Visual Q-methodology study (top row) were altered digitally to depict wind energy scenarios for second Visual Q-methodology study (bottom row)

Results

Factor Analysis revealed three key factors, explaining three different ways that people view wind energy landscapes. Summarized below, these patterns helped suggest planning and site design strategies that might accommodate diverse values. Factor 3, the Wind Farmer, has a very different point of view than the first two, and these differences may prove irreconcilable.

Factor 1, the Distant Observer, is distinguished by the distance between oneself and the wind turbine, and setbacks from houses, people and animals. Key considerations in planning are related to setback distance: increased setbacks will increase acceptance of wind development.

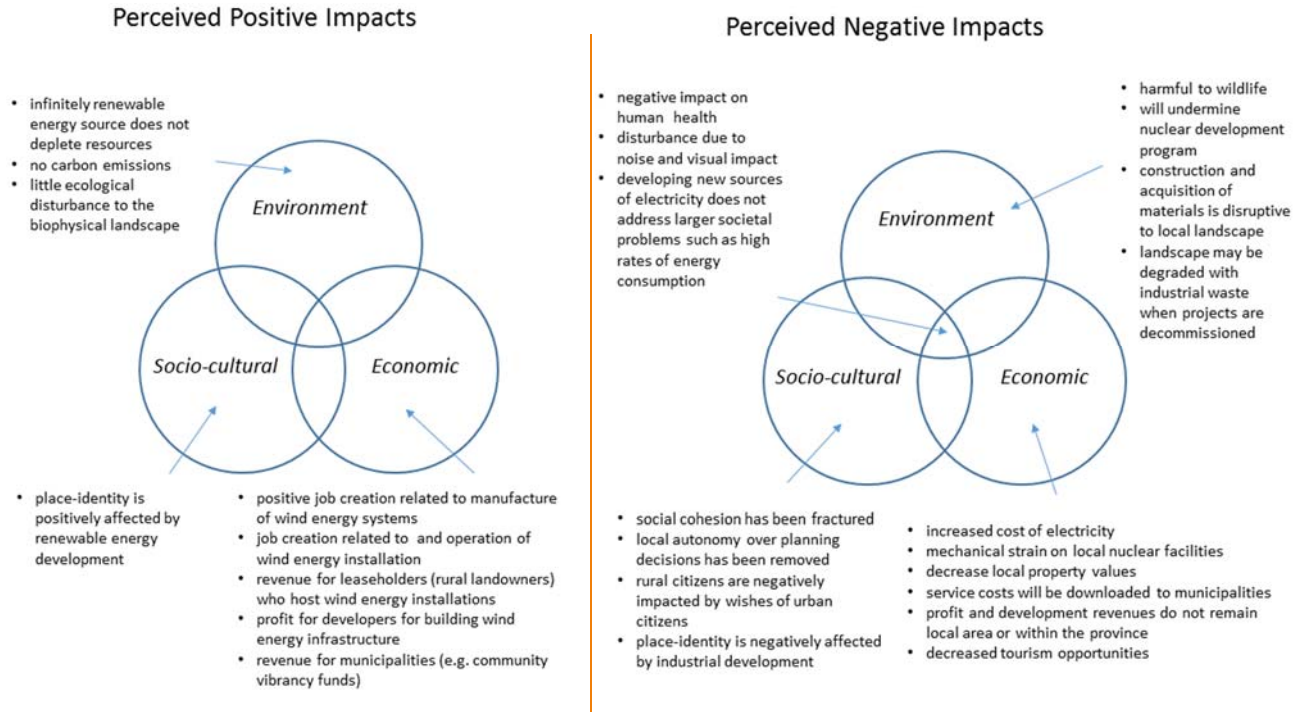
Factor 2, the Pragmatist, values landscape compatibility and what is perceived as congruent function and cultural association. Landscapes that are large in scale, dedicated to modern farming and production, and industrial in appearance are considered most suitable for wind energy; landscapes that are fine grained or associated with historic, small-scale land uses are not. Compatible uses are the key considerations for acceptance of wind development.



Factor 3, the Wind Farmer, is supportive of wind energy generally, and considers the infrastructure to be a benefit to local and/or global sustainability objectives. These turbines symbolize community resilience, modernity, and a sustainable form of harvest that improves the view of the landscape. The aesthetics of wind energy are easily accepted.

Contested perceptions of sustainability impacts

Support or resistance to wind energy development arises from varying points of view, originating in distinct sustainability goal umbrellas: environmental protection, economic development, and socio-cultural cohesion.



Environmental Impact

Participants who express support for wind energy development do so because they perceive positive environmental benefit, echoing sentiments expressed provincially, underscoring broad public support for policy shifts that enable development of renewable energy. Residents believe that the construction of renewable energy technologies will reduce consumption of fossil fuel resources and contribute to the reduction of greenhouse gas emissions. The construction of wind energy infrastructure is damaging to local landscapes, bats and migrating birds. Some have deep concerns that long-term impacts to wildlife will be more extensive than predicted. Future impacts are unknown, as landscapes have changed rapidly and long-term research has yet to be conducted.

Some participants are concerned about negative environmental impacts at the global level. Funding and policy incentives encouraging renewables may come at the expense of other low-carbon initiatives that are believed to be more effective strategies for lowering carbon emissions, such as a more effective national distribution grid, improving conservation efforts, or curbing consumption. Nuclear energy development is considered by some to be a suitable provincial response to climate change.

Social Impact

Perception of the socio-cultural impacts of wind energy development is largely dependent on residents' existing relationships with landscape and place-identity. Some residents see positive changes to community identity arising from wind energy production such as increased resilience and energy independence, or modernization of landscape function. Others perceive cultural losses due to threats to place-identity, loss of power, loss of municipal self-governance, loss of community cohesion due to conflict over development issues, loss of traditional farming as cultural legacy, and an increased perception of an urban/rural divide in the province.

Economic Impact

Economic impact of wind energy development is perceived variably in the community. Many businesses thrive when an infrastructure system is built and maintained, and positive impacts can occur on multiple levels. Profits generated by large wind energy companies who sell electricity to the grid can benefit not only shareholders of those corporations, but those who build the infrastructure, the local employees who maintain the infrastructure, the landowners who gain an income by leasing their land, and municipalities that collect tax revenue. Some residents perceive economic losses from lowered property values, new municipal responsibilities, higher electricity bills, and a strain on other electricity production facilities.

Human Health Impact

Differing beliefs about future impact of wind energy on ecosystems, economies, and social structures play a role in perceptions about potential impacts on human health. Ontario's Chief Medical Officer of Health determined that there is no direct causal link between wind turbines and illness[8]. However, wind turbines are associated with negative impacts on human health from indirect causes such as increased anxiety and sleep disturbance due to noise, visual impact, and cognitive distress[9]. Beliefs and perceptions about the impact of wind energy development generally can alter the way that aesthetics of the structures are perceived, and whether the infrastructure is considered congruent with landscape character and place-identity[10]. Distress and grief arises from perceived loss of place-identity. It is well-known that landscapes that offer restorative function to people and views of aesthetically pleasing landscapes can have positive impacts on human health[11].

Stage 4: Deliberative Planning Workshop

In the final stage of the research project, an experimental participatory mapping workshop was conducted. In this one-day event, held in December 2015, 27 participants (planners and

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[8] Dr. Arlene King, Chief Medical Officer of Health. The Potential Health Impact of Wind Turbines, Queen's Printer for Ontario, 2010. Retrieved from https://www.health.gov.on.ca/en/public/publications/.../wind_turbine.pdf

[9] Dr. Hazel Lynn and Dr. Ian Arra. Presentation of research findings to Grey Bruce Health Unit, Feb. 19, 2013. Retrieved from http://ontario-wind-resistance.org/wp-content/uploads/2013/02/literature-review-2013-association-between-wind-turbine-noise-and-human-distress.pdf

[10] A detailed description of the research design and results of this research can be found in Chapter 5-6 of the PhD dissertation cited above, A. Christine Hempel 2017.

[11] Cooper Marcus, C. and Barnes, M. (1999). *Healing Gardens: Therapeutic Benefits and Design Recommendations.* New York: John Wiley & Sons.

government employees, elected officials, wind development representatives, researchers and lay citizens) collaborated on identifying most- and least-preferred zones for future wind energy development in a large region including Grey and Bruce Counties, and part of Huron County. This study concludes that finding common ground is possible when seeking specific planning outcomes, while sharing knowledge, deliberating alternatives, and accommodating diverse landscape preferences.

Workshop design

A new model for a one-day workshop was designed to include features of seven planning models: Design Charrette[12], Deliberative Study Group[13], Nelessen's Rural Design Workshop[14], Community-based Landscape Character Assessment[15], Sacred Structure Mapping[16], Ecological Method[17] and Circle Processes[18].

Participants

The participants were selected to represent a diverse range of experience and knowledge related to landscape aesthetics, wind energy, policy or community collaboration, including:

- elected government representatives and government employees (planners/ technicians)
- researchers (including scholars, and graduate and undergraduate students)
- members of citizen advocacy coalitions or conservation groups
- other professionals or lay citizens with relevant knowledge

This workshop was designed with sensitivity to the constraints of rural planning departments, including slim budgets. A participatory approach is more inclusive and encourages the practical necessity of meaningful involvement of residents in rural communities. Assembling a capable planning team with a wide range of expertise requires the support and knowledge offered by citizens to bolster the capacity of limited planning staff and consultants. The agenda is provided below.

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[12] Lennertz, B. and Lutzenhiser, A. (2006). The Charrette Handbook: The Essential Guide for Accelerated, Collaborative Community Planning. Chicago: American Planning Association.
[13] Forester, J. (2006). Planning and Mediation, Participation and Posturing: What's a Deliberative Practitioner to Do. Lecture submitted to the Oxford Handbook of Public Policy, Moran, M. Goodin, R. and Rein, (Eds). Retrieved from https://instruct1.cit.cornell.edu/courses/practicestories/documents/samples_planning/ParticipationAndPosturing.pdf
[14] Nelessen's workshops are described in Arendt, R., Brabec, E., Dodson, H., C Reid, C. and Yaro, R. (1994). Rural by Design. Chicago: Planners Press, American Planning Association.
[15] James, P. and Gittens, J. (2007). Local Landscape Character Assessment: An Evaluation of Community-led Schemes in Cheshire. Landscape Research, 32 (4), 423-442.
[16] Hester, R. (2006). Design for Ecological Democracy. Cambridge, Mass.: MIT Press.
[17] McHarg, I. (1967). An Ecological Method for Landscape Architecture. Landscape Architecture 57 (2) 105-107.
[18] Ball, J., Caldwell, W., Pranis, K. (2009). Doing democracy with circles: engaging communities in public planning. St. Paul Minnesota: Living Justice Press

Agenda for Workshop, Bayshore Community Centre, Owen Sound. December 7, 2015

10 am – 10:30 am: Introductions over coffee

- Host: provide background on the project and the goals of the workshop, and general introduction about the mix of attendees
- Facilitator: Individual introductions. Who are we? Where are we from? What is our relationship to the research project, or landscape, or relevant issues?

10:30 - First presentation: Visual Landscape Character

- First phase of VQ research project –diverse values of visual landscape character
- Second phase of VQ research project – investigation wind energy/landscape compatibility

10-minute break

11:20 - Second Presentation: German Planning Model

- Overview of visiting scholar's research interests
- Explanation of the German Planning model
- Pros and cons – can this model be applied in our region?

11:50: Explanation of Collaborative Mapping Exercise

- Can people's diverse values of landscape character contribute to wind energy planning?
- Overview of Mapping Constraints – explanation of factors relevant to siting wind projects
- Explanation of individual packages – maps provided to individuals for consideration.

12:30 – 1:15 – Lunch break, and open conversation

1:15 – 1:45 – Individual consideration: review of maps, independent work

2:00-3:00 – Study Groups and collaborative mapping

- 6-8 participants per table (4 tables total – assigned seating)
- One set of large maps per table and one large drawing sheet
- Deliberation – looking for areas of consensus on congruent/incongruent wind energy siting in spatial planning context. If no consensus is possible, what issues arise?

10 minute break

3:00-3:45 – Plenary Session

- Presentation of findings from each table
- Issues that arose, considerations, new knowledge, mapping?
- Was it possible to achieve consensus at table?
- Is there potential for overall alignment in spatial planning?
- Recommendations?

3:45 – 4:00 – wrap up and end-of-workshop evaluation

Constraint Mapping preparation

Variations of the Ecological Method, also described as constraint mapping, is currently employed in the private and public sector for wind energy planning and is used in most upstream planning models in Europe. In preparation for analytical mapping, relevant landscape features required investigation and mapping. A University of Guelph graduate student identified a set of landscape constraints using GIS. Additional maps were created to provide information about landscape features relevant to the study. The information provided to participants was reproduced as a large set of maps for each table (36" X 48") and a small set of 9 maps (11" X 17") for individual participants. The maps described: 1) Wind resources; 2) Areas of Natural and Scientific Interest (ANSIs); 3) Energy Infrastructure; 4) Municipalities identified as 'willing hosts'; 5) Landscape Character; 6) Landscape Ecology; 7) Elevation; 8) Greenways; and 9) Location of Existing and Proposed Wind Energy Projects

Figure 5. An oversized map showing aerial photo of the entire region was created that showed locations of existing and approved wind energy projects using ball-tipped pins.

Workshop format

Presentations

The first presentation was a PowerPoint delivered by Christine Hempel outlining the purpose, methodology, and results of the two Visual Q-methodology studies. This was presented so that each participant could consider the diverse perspectives held by area residents about visual landscape preferences. Participants would be able to reflect on their own points of view as well as the values of others during the mapping process. Most attendees had either been part of the Q-methodology studies, or had attended previous presentations summarizing the results.

The second presentation was delivered by a guest scholar, Andrea Bues, PhD candidate, Freie Universität, Berlin, who had reviewed the planning policy and decision-making process for wind energy projects in the Brandenburg region of Germany. The upstream planning process, based on constraint mapping, was outlined for participants. The overall objective of the planning process in Germany is that planning regions must designate 2% of the land area that would be suitable zones for future wind energy infrastructure. In the example of Brandenburg, there are 5 planning regions that are roughly the same geographic size as the counties in our case study

area. Each of these regions must prepare a regional plan containing wind designation areas. Their goal of designating 2% of the region's land area for wind development was adopted as a planning outcome for the workshop.

The third presentation outlined the objectives of the mapping activities in the afternoon. Each of the large printed maps was described, as well as the rudimentary objectives of mapping using site information layers.

Individual mapping

After a lunch break, participants considered their own ideas about zoning alternatives.

Figure 6. Individual mapping: some people worked at shared tables; others found space to work alone

Collaborative mapping

The collaborative mapping was a dynamic, creative process aimed at knowledge-sharing while building consensus. First, participants and researchers were seated at 4 roundtables in groups of 6 or 7 people. They shared their own maps and discussed relevant issues with their group. Next, a set of large constraint maps were laid in the middle of the table, the team was tasked with creating a zoning map. The objective was to use coloured markers to identify 3 sones: 2% of land area for new wind projects (green); restricted zones (red); and areas that *might* be suitable but where there is uncertainty or disagreement (orange).

Figure 7. Participant explaining collaborative map produced at his table

Plenary Session

At the end of the collaborative mapping session, representatives from each table summarized the key discussion items arising at each table and shared information about the plans created by the group.

Analysis of maps

After reviewing the maps created by individual and groups, and after reviewing workshop evaluations and comments, the sketch below was created by Christine Hempel. It is intended to synthesize the ideas documented at the workshop. The participants did not collaborate on or evaluate the synthesized map, as it was created after the workshop.

It is important to note that this sketch is an interpretation of the results achieved during the single-day event, rather than a plan for future wind farm locations.

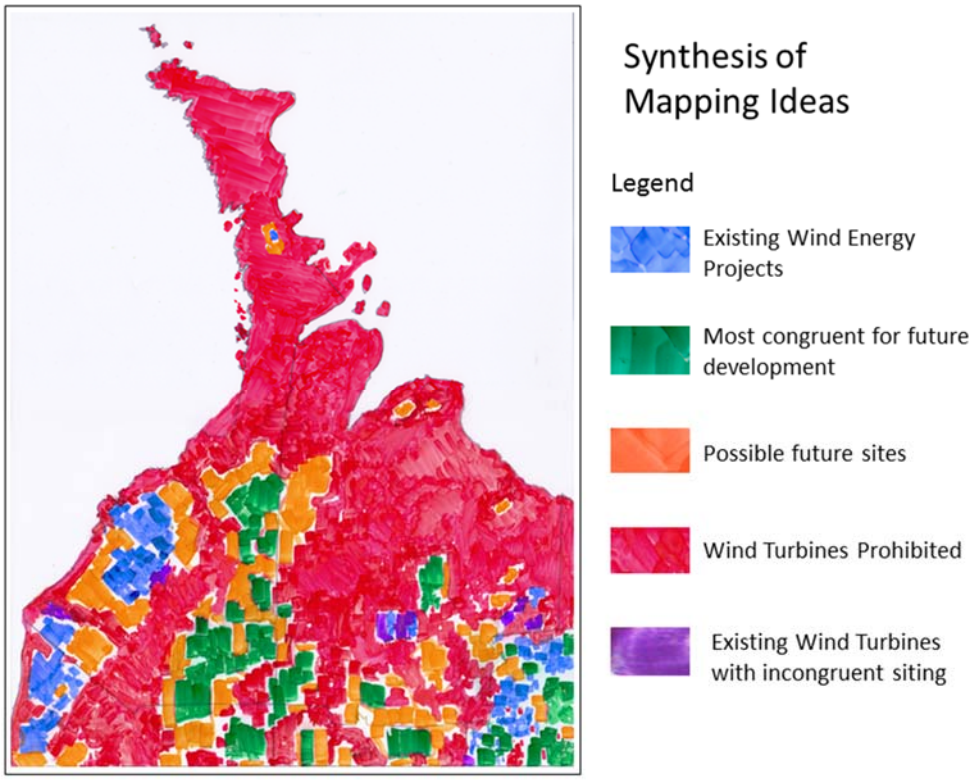

Figure 8. The areas noted in green indicate zones where there was a high level of agreement that wind energy development might occur, the red zones indicate areas where the participants agreed that wind energy should be restricted, and the orange areas denote areas of uncertainty or lack of consensus. Drawn by C. Hempel.

DISCUSSION OF SIGNIFICANT FINDINGS

Future benefits to the global atmosphere from wind energy are difficult to perceive, while negative environmental impacts are perceived locally. Wind turbines represent economic regeneration by some; for others, they are detrimental to people's livelihoods. What creates a positive future-oriented identity for one community appears as a threat to the cohesive social fabric or cultural traditions of another. Resistance is not NIMBYism, a term that implies that people who resist development lack knowledge, are irrational, or act from selfish motives[19].

[19] Burningham, K., Barnett, J. & Thrush, D. (2006). The limitations of the NIMBY concept for understanding public engagement with renewable energy technologies: a literature review. University of Manchester: Oxford Road

At local community meetings, representatives of wind energy companies have claimed that residents' resistance to development was due to lack of information and knowledge. This attitude displays little appreciation for many types of local knowledge that many residents possess. Most local concerns about negative impacts to sustainability, such as impacts to wildlife, concerns about lack of distribution of economic benefit, or criticisms of unfair decision-making structures, have been substantiated in the academic literature.

Prior to the enactment of the GEA, scholars denied that NIMBYism explains resistance to wind energy development: "this (NIMBY) viewpoint is completely unrealistic in its simplicity".[20] Instead, opposition was attributed to place-protective action[21]. The results of this research suggest that both resistance to and support for wind energy development stem not from selfish, ignorant or irrational motives, but from place-protective action rooted in sustainability concerns. The centralized wind-energy planning regime that was implemented in Ontario after the GEA provides a clear example of how local democracy efforts and place-protective action were undermined. The policy suggests a lack of understanding of the complexity of the issues; deep concerns for social, economic and environmental sustainability are expressed by those supporting wind development, those resisting it, and the residents who are conflicted.

Future directions

For fruitful outcomes from collaborative planning efforts, an important first step is to listen closely for the 'shades of grey' in what appears to be a black and white or polarized discourse[22]. The participatory planning workshop provided an ideal venue to share diverse views on the future impacts of development, local wisdom, and varying life experiences as well as learning about the physical constraints related to infrastructure planning. Participants shared this information when collaborating at tables and worked together on planning solution.

The analysis of the 4 group maps and the individual maps suggests that the collaborative process may lead to consensus, and achieve specific planning outcomes. However, it is beyond the scope of this one-day workshop to determine whether consensus was reached on future wind energy development or restriction zones. During the one-day workshop, recurrent themes were identified, consensus was reached about 'red' areas that should be restricted, and enough 'green' zones were identified for future wind development to satisfy the 2% land mass required in the German planning model. The areas denoted as 'orange' point to where there is disagreement about future development. These areas can be considered places where future research and exploration is required prior to decision making. Furthermore, the single workshop did not have enough full participation of all relevant stakeholder groups to make conclusions.

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[20] Wolsink, M. (2006). Invalid theory impedes our understanding: A critique on the persistence of the language of NIMBY. *Transactions Institute of British Geographers,* 31 (1), 85-91.

[21] Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology, 19* (6), 426-441.

[22] Hillier, J. (1995). The Unwritten Law of Planning Theory: Common Sense. *Journal of Planning Education and Research,* 14 (4).

POLICY RECOMMENDATIONS FOR WIND ENERGY DEVELOPMENT

This research has given rise to three key recommendations for provincial policy makers and municipal leaders who are tasked with infrastructure planning in the context of complex problems, and where changes to landscapes may be considered a threat to place-identity.

1. Restore local decision-making power

Municipal councils must have the power to make decisions about where energy infrastructure will be built in their region. Meaningful community consultation will be impossible to achieve if local communities are not able to exert significant influence in the development approvals process. Because local planning authority was removed by the GEA, resistance to wind energy development has become conflated with protest over the stripping of local power. As a result, even those communities that were previously supportive of the construction of wind energy projects have requested a moratorium until local authority is restored. It is at the community level that deliberation on key sustainability questions must occur. Upper-tier governments are responsible for creating policies that comply with global sustainability objectives, such as the transition to low-carbon futures. But physical landscapes and cultural values differ from region to region: *how* sustainability targets are specifically identified and achieved must be at a regional level.

If a wind development program is considered a suitable future goal for the residents of Grey, Bruce and Huron Counties, the acceptance of wind turbines in those landscapes will be not be achieved without the support and consent of the local community. Those landscapes that were identified during the planning workshop as most congruent for wind farms were mostly open, large-scale agricultural landscapes. However, most farmers report a high level of involvement with the land; place-attachment to landscapes of harvest is interwoven with local livelihoods, a strong sense of social cohesion and community-based decision making.

2. Ensure fair distribution of benefits

Whether participants supported wind energy development or not, the unfair distribution of financial benefits in Ontario's economic development model must be resolved. People's response to landscape is intricately connected to what that landscape affords. For farmers, the beneficial impact to their livelihood arising from the landscape harvest contributes strongly to place-attachment. The perception that wind energy infrastructure creates negative economic impacts - to self, to other community members, or to provincial ratepayers – creates resistance. Financial benefits must be more fairly distributed to benefit developers, landowners, immediate neighbours, the local community, and the citizens of Ontario.

3. Support community-based upstream planning

Once local authority over planning decisions is restored, adequate support and resources must be provided to support planning efforts and enable meaningful community consultation. Where

municipalities are supportive of the construction of wind energy infrastructure generally, the topic remains contentious and there are divisions within communities. Planners and elected officials must be equipped with funding, resources and tools to effectively plan for future development using collaborative, upstream processes. Alternative models -such as the German process of creating wind energy development zones - might be used as a starting point, but adequate information must be prepared and made available at the community level to make informed decisions and to support effective knowledge-sharing and deliberation.

For effective upstream planning, support and resources could include the following:

Conduct values research

Identifying the most prevalent subjective values and belief systems in a region are key to understanding how community members imagine the future of their landscapes. These values must be considered and shared in planning processes. To facilitate upstream planning on a particular issue, prior research about community value orientations should be conducted so that planners and community leaders understand the key differences and similarities amongst community members. Interestingly, the Q-sorts provided by planners who participated in these visual Q-methodology studies often shared attributes with all other factors, indicating that planners may be especially well-equipped to understand and articulate multiple community viewpoints. The Q-methodology studies described in this research offer effective methods that provide both quantitative and qualitative information, but other values-based research might be suitable depending on the planning problem that is to be addressed and the available resources.

Provide maps of cultural and physical landscape character

To be of practical use, landscape preference research must be translated into a mappable form that can be used by planners and decision makers. Cultural and biophysical landscape character should be created; such maps are not tied to a particular planning issue but they can be used as guidelines for a number of future landscape planning and resource development applications such as forestry, roads, pipelines, pits and quarries. Landscape character maps would point to compatible physical landscape types for infrastructure development, compatible land uses, and compatible cultural associations. The development of character maps involving local citizens provides a structure for the inclusion of local wisdom, histories, and in-depth knowledge that communities hold about their landscapes. During the workshop, the lack of availability of landscape character maps was identified as a key concern for participants and planners; regional landscape character maps should be available to planners, developers, and citizens prior to site planning for new developments.

Provide maps of natural heritage systems

The absence of adequate natural heritage systems maps is a problem in Grey, Bruce and Huron Counties and prevents residents from having confidence that environmental impact from a landscape change can be fully understood. Currently, wind farm developers conduct their own environmental assessments while community members do

not have access to publicly- available, trusted information about regional natural systems such as migration routes or sensitive wildlife habitat. Such landscapes are of key planning concern and must be made available prior to planning landscape change.

Provide adequate technical information

Single-day workshops such as the one developed for this research require extensive pre-planning. Most of the mapping constraints commonly used by wind energy developers (such as wind resource availability or location of transmission lines) were prepared in advance. This information should be enhanced with technical expertise specific to the planning application. For this research, there was no available database of existing or proposed wind energy projects; the maps showing all wind energy projects proposed, approved, and operational in the region had to be created for this study. This information must be available to the public.

NEXT STEPS: FUTURE RESEARCH

Support scientific research about impacts to human health

Lack of substantive research about the impact of wind energy installations on human health emerged as a key concern for residents and elected representatives. More scientific research must be undertaken to explore the factors that cause distress so that health effects, whether caused directly or indirectly by wind turbines, can be better understood and mitigated.

Support scientific research about impacts to wildlife

Participants voiced concerns about the threat that wind turbines pose to the health of animals (livestock and wildlife). Some scientific literature echoes local concerns, and suggests that renewable energy projects pose significant risk to ecological systems[23] . Scientists have agreed that more focused scientific research is required to evaluate impacts of wind energy infrastructure on wildlife than has currently been conducted in North America, and construction of new development should be halted in sensitive migration zones in the region until potential risks can be thoroughly quantified[24]. The shores of Lake Huron provide substantial wind resource, but were identified by participants as sensitive migration corridors.

[23] Dai, K., Bergot, A., Liang, C., Xiang, W, and Huang, Z. (2015). Environmental issues associated with wind energy – A review. *Renewable Energy* 75, pp. 911-921

[24] Piorkowski, M., Farnsworth, A., Fry, M., Rohrbaugh, R., Fitzpatrick, J., Rosenberg, K. (2012). Research priorities for wind energy and migratory wildlife. *Journal of Wildlife Management,* 76, (3) 451-456.

Support new community-based research on salient issues

During the workshop, areas of land were identified by some as suitable development zones but not supported by others, and knowledge gaps that prevented further agreement were identified by participants. These areas are noted in orange in the figure below. More research and input from the community is required before decisions can be made in areas of contention.

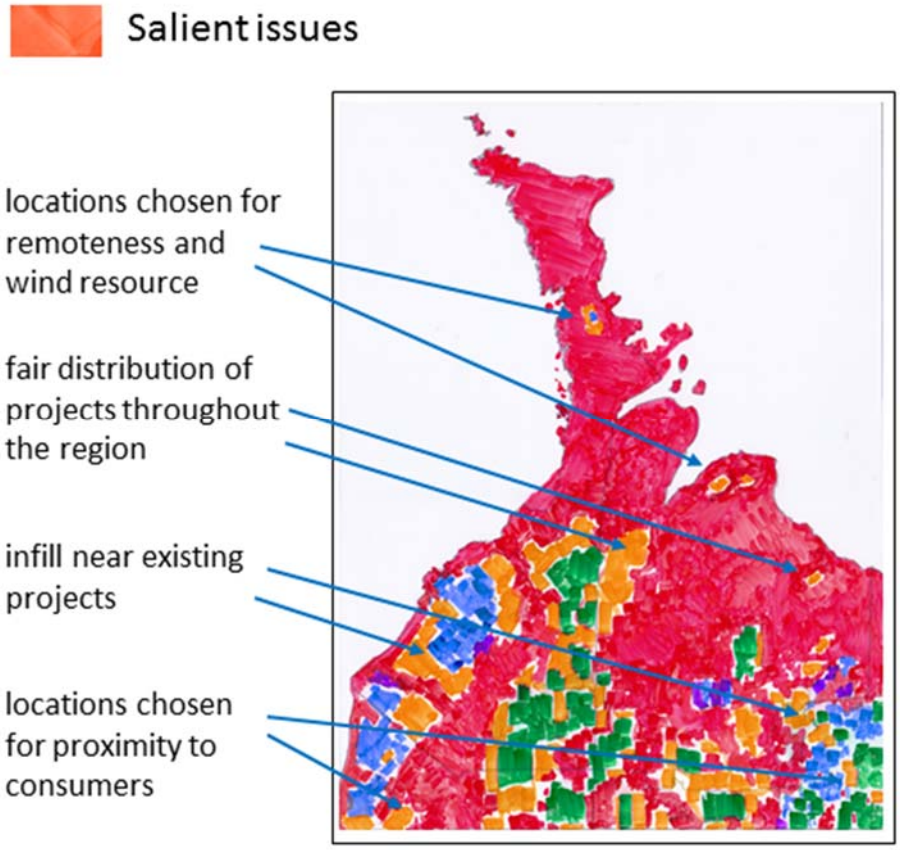

Figure 9. Salient issues that gave rise to contention or uncertainty at the workshop indicate areas for further exploration. Questions include: Should wind energy projects be built in remote regions (far from people) or closer to consumers? Should existing wind development areas be intensified (infill approach) or should wind energy be more evenly distributed throughout the region?

CONCLUSIONS

A key strength of the workshop design was that it provided participants with social learning and knowledge-sharing opportunities aided by the presentation of the results of the visual landscape values research. Participants were equipped to discuss landscape preferences and values in a mapping context where highly subjective issues are typically considered too subjective and varied to incorporate into practical mapping applications.

The workshop process demonstrated that in a facilitated process, a group of residents, elected representatives, planners, lay citizens, developers, and stakeholders representing diverse groups can come together to share knowledge, discuss salient issues on a complex planning problem and find agreement on future wind energy development and restriction zones. Those planning issues that are not reconciled, or where disagreement and uncertainty arose, highlight key areas requiring further investigation and research.

The GEA is a rationalist policy that strips planning power from local government. Wind energy planning is particularly complex and ill-suited to such a hierarchical solution. Although the planning process is bound to remain complex, inclusive strategies that foster deliberation, knowledge-sharing and consensus-building are feasible and more likely to succeed than a top-down approach.