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Wind energy policy, development, and justice in Ontario and Nova Scotia, Canada: A comparison of technocratic and community-based siting processes

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Abstract and Keywords

This thesis primarily examines wind energy policy and development through the lens of local acceptance and environmental justice in Ontario and Nova Scotia, Canada. It has been argued that encouraging more participatory planning alongside introducing financial benefits, can powerfully shape local responses. With little in the Canadian context to substantiate this claim, this dissertation attempts to fill a gap in the literature. The thesis also investigates a methodological question within the social scientific, mixed method literature. Using a small subset of this literature associated with wind energy development, research was undertaken to examine potential relationships between research design and method dominance. Results from Study 1- which looked at distributive justice and wind energy development highlight stark differences between Ontario and Nova Scotia in terms of perceptions of local benefits. Qualitative and quantitative findings point to the strength of traditional benefit sharing initiatives but also more novel forms of benefit structures. Study 2 examined local residents' experiences of planning processes and found much stronger levels of procedural justice in Nova Scotia. It also suggested that local opposition to wind turbines in Ontario was intertwined with procedural injustice including few opportunities to participate. There were low levels of 'the ability to affect change'- an idea that was common to both provinces. The findings from the methodological investigation (Study 3) suggest there is little evidence in the domain that qualitative methods are being heavily marginalized, yet there is some indication that research design may influence method priority. Some of the key theoretical contributions relate to the advancement of the resident-centered viewpoint, and the application of Arnstein's ladder of citizen participation. Methodologically, the multi-jurisdiction approach is unique and likely will help to inform Canadian wind energy policy. In study 3, novel methods were used to look at the concept of method priority- an idea that should inspire future researchers to question the ways the concept has been measured in the past. Practical contributions, including public

engagement through the media, as well the publication of a ‘Toolkit’ and the hosting of a stakeholder workshop rounded out the research.

Keywords: wind energy; social responses; mixed methods; energy policy; community-based development

Co-Authorship Statement

This dissertation was written in the Integrated-Article format and thus is made up of a collection of papers that have either been accepted for publication or are currently under peer review. The thesis is book-ended by Introduction and Methods Chapters to begin and a Discussion and Conclusion Chapter to close. The manuscripts are as follows:

Chapter 3: Walker, C., & Baxter, J. (2017). "It's easy to throw rocks at a corporation": wind energy development and distributive justice in Canada. *Journal of Environmental Policy & Planning*, 1-15.

Chapter 4: *Walker, C., & Baxter, J. (2017). Procedural justice in Canadian wind energy development: A comparison of community-based and technocratic siting processes. Energy Research & Social Science, 29, 160-169.**

Chapter 5: Walker, C., Baxter, J. (Under review). Sequence and method dominance in mixed-method research: An empirical investigation using the social dynamics of wind energy literature. *Qualitative Research*.

All of the above papers are co-authored with my supervisor, though as the first author I conducted the research, which involved research problem identification, academic literature review, analysis and writing.

*Based on some comments following thesis defense, some minor changes were made relative to the published article in Energy Research & Social Science.

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Chapter 1: INTRODUCTION

1.1: Introduction

This dissertation examines wind energy policy, local development processes and outcomes in Ontario and Nova Scotia, Canada (Chapters 3 and 4). It also investigates the practices of publishing mixed methods research in the social scientific wind energy literature through a structured and critical literature review (Chapter 5). This chapter provides background information needed to understand the basis for the dissertation. To begin, I review the case for renewable energy deployment-including wind turbines. Next, I outline the organization of the thesis and study objectives, followed by a literature review on the social dynamics of wind energy. The reader is then introduced to the idea of mixed methods in practice- which is the topic of Study 3 (Chapter 5) of this thesis. Finally, the Research Context in which this dissertation is set is given- with special regard to policy programs and community profiles in Ontario and Nova Scotia.

1.1.1: Background

As governments around the world continue with attempts to mitigate anthropogenic climate change, increase energy sovereignty, and reduce regional air pollution, many are looking to electricity generated from renewable (naturally replenished) sources. When broken down by sector, electricity contributes the most (25%) in terms of global greenhouse emissions (IPCC, 2014) and thus presents the case of 'low hanging fruit'- where large advancements toward low-carbon sources could substantially mitigate climate change.

Thanks to national and state-led policy initiatives, development of renewable energy has taken a strong hold across many developed countries. Projections from the US Energy Information Administration (2017) indicate that renewable energy sources, including wind and solar, will be the fastest growing source of new electricity generation, with average annual increases of 2.9% from 2012 through 2040 (EIA, 2017). Behind only hydroelectric power, onshore wind energy is the second largest source of renewable electricity in the world, providing 2.5% of the total demand (IEA, 2017).

Since Canada is a resource-based economy and energy-producing nation, particularly in terms of oil and gas developments, emissions from its electricity sources play a relatively small role, contributing 11% of total national emissions (EC, 2016). This low rate is also due to the country's reliance on low-carbon hydroelectric and nuclear power. Despite Canada's relatively low contribution from its electricity sector, federal and provincial governments are continuing to introduce policy related to renewable energy and/or emission reduction targets. Some of these are tied to Canada's signing of the 2015 United Nations Paris Agreement - which set a goal of limiting global temperature rise to 'well below' 2 degrees and pursuing efforts to keep this to 1.5 degrees Celsius (Schleussner et al., 2016). Though electricity generation is largely an issue of provincial governments, in late 2016 Federal Environment Minister Catherine McKenna announced a plan to phase out coal-fired electricity by 2030 (Harris, 2016). Meanwhile, in 2017 Ontario and Alberta joined British Columbia and Quebec as provinces that have recently introduced either a cap and trade system or a carbon tax (Marowits, 2016). Mostly due to provincial-level policy, wind energy has seen large increases over the past decade and with 12,000 megawatts (MW) of installed capacity, now represents 6% of

Canada's electricity demand (CANWEA, 2017a). Ontario is Canada's undisputed leader in wind development with approximately 40% of the nation's capacity while Nova Scotia's 600 MW of wind energy represents almost 10% of the province's electricity (CANWEA, 2015).

In light of the importance placed on wind energy for addressing climate change and other environmental problems, this research looks at the ways in which it is currently being developed in Ontario and Nova Scotia, Canada. Especially in the former, there has been a growing level of opposition and resistance to wind energy development, as evidenced by among other things, 90 townships and counties passing resolutions declaring themselves unwilling hosts for wind development (OWR, 2017). Though wind energy is much newer to the energy landscape in Nova Scotia, early evidence has shown that local support for wind is much higher and that this may be associated with policy levers meant to encourage more community-based development (Vass, 2013). This suggests a need to examine how policy may interact with local impacts- including levels of support and perceived economic benefits- within the context of wind energy development in Canada.

This dissertation also represents the continuation of my past studies conducted at Western University during my M.A. degree (Walker, 2012). Through this work, I published four times on topics including the complexity behind support and opposition to wind projects, and psychosocial health issues related to wind energy development in Ontario (Mason et al., 2016; Walker et al., 2015; Walker et al., 2014a; Walker et al., 2014b). This dissertation builds on that work – going further through an

interprovincial, comparative case study approach to investigating wind energy development and local responses.

From this dissertation two journal articles have been published (Chapters 3 and 4) and one is under review (Chapter 5). There are also two other outputs from this the research: i) a toolkit (COAREP, 2017) and ii) a workshop, which brought together various stakeholders from the research in December 2016. The toolkit was designed as a practical guide for future potential host communities who are unfamiliar with wind turbine policy and siting processes. The communities studied may not necessarily benefit directly from the toolkit as lease agreements were already signed and turbines were in operation by the time toolkit was completed. Yet, through community visits and our research team's website (www.COAREP.uwo.ca), they were the first to hear about and give feedback on the toolkit. It was also made clear to those that participated that we were asking them to share their experiences so that other rural communities might benefit from what they have learned. The focus of the toolkit was the empirical results from the dissertation but I made these findings accessible through documents that were posted online, were written in relatively simple terms and emphasized the concerns and preferences of the participants who made up this research. Part of the dissertation was funded by a grant from the Metcalf Foundation (Toronto, Ontario) which began in January 2014.

1.2 Organization of the Thesis

This dissertation consists of six chapters, including this Introduction which discusses the theoretical background and literature that helped to shape this research.

In the following chapter (Chapter 2) methodological practices are outlined in detail. In the core "studies"/manuscript chapters (Chapters 3-5) the reader is shown the empirical work. Though written and presented separately outside of this dissertation, within it, they represent a coherent body of work that contributes to scholarship in areas of geography, environmental policy, facility siting, environmental justice, and mixed methodology.

The first manuscript (Chapter 3) started to take shape during the writing of the literature review and evolved during the interview stage of data collection. During conversations with residents, it became clear that whether a person was supportive or opposed to their local development, they expressed a greater need for equitable financial benefits. Thus, this manuscript explores the role and importance of distributive justice in understanding public responses to wind energy. The fact that very few researchers have focused on distributive justice away from its 'procedural partner' (see below) suggested a greater need for this type of paper.

The second of three manuscript chapters (Chapter 4) focuses on procedural justice and its role in shaping local responses to wind energy development. Again, it was inspired by a combination of the literature review and preliminary results that suggested issues of procedural justice were affecting levels of local support and opposition to wind energy in both provinces. The analysis in Chapter 4 also compares the relative importance of each of the environmental justice variables through a regression analysis.

The final manuscript (Chapter 5) presents a unique methodological investigation of research design (method sequence) and method dominance. More specifically, it sought to increase our understanding of how the sequence in which quantitative and qualitative techniques in mixed methods research are deployed, may affect the dominance of particular methods and the kinds of knowledge that is prioritized. The literature on social dynamics of wind energy is rife with a wide variety of ways in which research methods are mixed. Based on that literature and my own experiences with mixed methods research, I developed a working hypothesis that qualitative methods are most often playing secondary or complementary roles in social research and this tendency may be shaped by the order in which methods are completed. I tested this hypothesis through both qualitative (in-depth reading) and quantitative (word counts) measures designed to determine method priority or dominance across a set of papers (n=27). Very little methodological literature has attempted to examine this idea. Thus this study addresses a general gap in the social science methods literature.

The final chapter (Chapter 6) is devoted to the dissertation's Discussion and Conclusion. It also provided the space to reflect on the theoretical, methodological and practical contributions of the doctoral research as well as provide 'big picture' ideas surrounding the need for future research in this ever-changing sub-field of geographic study.

1.3 Study objectives

The dissertation research addresses three main objectives:

1. To examine and compare the relative influence and nuances of financial compensation, economic benefits and overall distributive justice in shaping local responses to wind energy in Ontario and Nova Scotia (Study 1, Chapter 3).
2. To investigate perceptions of procedural justice and local support for wind energy in Ontario and Nova Scotia with special attention to ideas of local approval processes, and the relative contribution of other variables including those associated with distributive justice (Study 2, Chapter 4).
3. To explore how different strategies for mixed methods research affect knowledge production outcomes, by critically testing the relationship between research design (method sequence) and method dominance (priority) in the mixed methods, wind energy literature (Study 3, Chapter 5).

These objectives evolved from an earlier set of research goals articulated in my dissertation proposal. The following are the original research objectives from that document:

1. To study the role of policy implementation on how turbines are received in turbine communities.

2. To investigate ideas of fairness, equity and local conflict and how each is perceived by residents living near turbines in Ontario and Nova Scotia compared to those of turbine developers and siting agents.

3. To critically interpret how turbines and the siting process affected community conflict, and resident well-being in the two provinces.

4. To attempt to answer the question 'how do residents who have had turbines approved in their local community view the system for distributing benefits (particularly economic ones)?'

5. To outline the key predictors of intra-community conflict in communities living with turbines.

Evolving objectives is common in grounded theory research (Corbin & Strauss, 1990) as new information is gathered and the study context changes. While the original objectives focused on alternatives to current siting practices, the field-based manuscripts narrow this even further to focus on two concepts (procedural and distributive justice) that would help make valuable contributions to both academic literature and public policy as they have not been covered in as much detail as other issues (e.g. NIMBY, health risk perception).

1.4 Literature Review: Social dynamics of wind energy

Especially in the face of overall public support for wind energy, it is interesting to ask why some proposals face opposition and others do not. This simple question was first popularized by Bell et al. (2005). Their research attempted to explain the 'gap' between high support through opinion polling and low levels of project development. More than a decade later, researchers have published much in this space- an area of social science now tentatively labelled the social dynamics of wind energy literature (Walker & Baxter, 2017b). The introduction of this label is meant to encompass the wide

range of social scientific inquiry within this area and includes research from the more disciplinary fields of geography, planning, sociology, public policy, risk perception and psychology.

The following pages review the most popular concepts used to explain support and opposition for wind energy development, especially from a geographic lens. These include the NIMBY explanation, aesthetic concerns, noise and acoustic problems, and broadly defined environmental injustices. More focused than exhaustive, this review centers on some of the major debates and controversies surrounding wind energy development today and the academic study thereof. Together, these ideas provide the theoretical and conceptual foundation for this dissertation.

1.4.1 The NIMBY explanation

The pejorative Not in My Backyard (NIMBY) theory of opposition to wind turbines has controlled much of the academic and lay/policy discourse over the past few decades. The NIMBY explanation is based on the idea that people are in favour of wind energy but object to development when it is proposed in their community (Wolsink, 2000). Historically, the NIMBY attitude was used to describe why some potentially dangerous facilities (e.g. hazardous waste, power plants) face local resistance. Over the past few decades, some academics have employed it to explain why developers have faced opposition to wind turbine siting (Bosley & Bosley, 1988).

Though still popular in public discourse, the NIMBY or 'self-interest' theory has been highly criticized for being overly simplistic. The theory's initial dominance in the

literature was in part due to this simplicity and ability to correlate setback distance with opposition (Eltham et al, 2008; Kelle, 2005). In the context of Ontario, Canada, the theory of NIMBY has played an especially important role in the development of environmental law and policy. For example, in explaining the motivation behind the now controversial Green Energy Act in 2009, Ontario Premier Dalton McGuinty claimed the policy would only be responsive to "real concerns" and that "NIMBYism [would] no longer prevail" (Ferguson & Ferenc, 2009).

Despite its early popularity, researchers from around the world have been highlighting the problems with NIMBY for almost a decade. These researchers most often cite the idea as an inadequate way to explain the complexity of anti-wind attitudes, and argue that competing ideas such as place attachment (Devine-Wright & Howes, 2010), siting processes (Barry et al., 2008), or other local, place-based variables (Baxter et al, 2013; Walker et al., 2015; Walker et al, 2012) have more explanatory power (see also Aitken, 2010; Cass & Walker, 2009; Pedersen et al, 2007). Through this research, the theory has also been shown to be misleading and unhelpful in terms of moving the conversation surrounding wind energy development forward (Burningham, 2000; Wolsink, 2006). That is, groups who still advocate the position that opponents are 'NIMBYs' are promoting divisive rhetoric and in doing so, causing a trivialization of real concerns (Eltham et al, 2008; Pedersen et al, 2007). Furthermore, investigations into the nuances of public support and opposition have revealed that there are cases where a reverse NIMBY attitude – PIMBY (Please in My Backyard) – is actually occurring (Jepson et al., 2012; Warren et al, 2005). The welcoming attitude of PIMBY seems to be

particularly likely when communities embrace the local economic benefits of wind development.

Despite the refutation of the NIMBY hypothesis by many academics, the theory is still alive and well in the public domain. It can be seen in newspaper articles about wind turbines around the world and is littered across discussion and comment boards in Ontario and abroad. Through this type of rhetoric, those opposed to wind turbines have become very aware of the way they are characterized (Barry et al., 2008; Walker et al, 2012). Perhaps understandably, they have responded by questioning the motivations of those in support of wind energy projects. Common themes presented by those opposed to wind projects include that proponents are supportive only because they are getting paid or that they have no concern for the well-being of their neighbours (Walker et al, 2012). This type of rhetoric created by those supportive and opposed to wind energy has resulted in a rather divisive way to approach the debate. Ironically, in an attempt to quell the concerns of the people of Ontario, Dalton McGuinty and the Liberal party in Ontario may have fuelled a whole new debate; one which centres on potential health effects and local problems associated with green energy policy. That is, in an effort to delegitimize NIMBY concerns, the GEA was written with two acceptable causes for legal appeal: threats to human health or the environment (McRobert et al., 2016). Some have stated that we should not be surprised when Ontario has since seen a large influx in human health concerns since 2009 and that opponents are simply are using the tools allowed to them (Songsore & Buzzelli, 2014; McRobert et al., 2016). This idea that law impacts behaviour in this way has been called the socio-legal theory of 'naming, blaming

and claiming' (Felstiner et al., 1981) and has been noted across a variety of studies in the social sciences (e.g. Orsini, 2002; Sarat, 2000; Wiethoff, 2003). This idea is not applied to any great extent within the dissertation here, though it is important for the reader to be able to better understand the context of Ontario.

1.4.2 Noise, Acoustics and Health

The empirical research on noise from wind turbines is mixed, including major debates surrounding whether or not sound levels can predict self-reported annoyance and whether not annoyance is a 'true' health effect (Rubin et al., 2014; Michaud et al., 2016; Walker et al., 2015). Unlike visual annoyances, problems arising from wind turbine noise are much more complex. That is partly because the issue is intertwined with more serious claims of negative health effects (see Pierpont, 2009) now prominent in Ontario. Those health debates lay somewhat outside of the context of this dissertation (see Jalai et al., 2016; Michaud et al., 2016; Songsore & Buzzelli, 2016), yet it is helpful to outline how sound or noise from turbines can shape public response.

Early research from Pedersen et al (2007) found that wind turbine noise was unique in a sense as it was perceived as more annoying than other sources of sound at similar levels (Pedersen et al, 2007). Subsequent research has suggested this is likely because of two factors. The first is that turbine noise fluctuates through its 'swish and thump' cycle (Bowdler, 2008). Called amplitude modulation, Moorhouse et al. (2007) found that sound is perceived as more annoying when the level is not held constant. As

well, perceived control over the noise can often lead to greater tolerance. In a laboratory study when Maris et al. (2007) allowed some people to choose the characteristics of a sound they were going to hear, they were much more accepting of a noise at the same or higher levels than a control group who were not allowed to do so. Overall perception of wind development can also help explain whether or not an individual hears a 'sound' or 'noise'- the latter with a more negative connotation. Groups like Ontario Wind Resistance of Ontario clearly characterise the acoustics of noise (OWR, 2017) yet some research has shown residents can enjoy the sound, believing that rural areas are a good setting for development 'you can hear' (Pedersen et al, 2007).

The conflation of noise with other issues is shown in work looking at wind turbines and setback distances in Ontario. Hill and Knott (2010) found that because setback distances are perceived as arbitrary, they are often combined with issues of property value loss and loss of municipal control, and this can lead to public confusion. The authors suggest that if noise was instead given as the regulated feature for the setback distances, the average resident may have more readily accepted the policy. It is also clear that like visual problems, the issue of noise may well be intertwined with the social context of local communities. Pedersen et al. (2010) show that even when controlling for ability to hear a wind turbine, annoyance is lower (on average) in the presence of economic benefits. This finding agrees with similar research from the facility siting literature. Baxter and Lee (2004) found that economic prosperity of a development can downplay concerns local residents might otherwise have. In their

study of a hazardous waste facility in Swan Hills, Alberta, perceived financial benefits played a significant role in overall community acceptance.

1.4.3 Visual issues

Several studies have identified visual problems associated with wind turbines as a major factor in opposition (Bruekers & Wolsink, 2007; Gipe, 1995a; Jones & Eiser, 2010; Wolsink, 2007). These issues are more prevalent in European studies, and thus policy recommendations from these countries often center on ways to minimize the visual and/or acoustical issues associated with development (Jobert et al, 2007; Pasqualetti, 2001; Thayer and Freeman, 1987).

Research has shown that complaints about visual annoyances are highly dependent upon local landscape conditions (Jobert et al., 2007; Pedersen et al, 2007) and are also affected by discontent with the decision making process (Bruekers and Wolsink, 2007). Support for wind turbines is low mainly when they are visible to local residents. In their study asking 'how big is a backyard?', Jones and Eiser (2010) concluded that turbines are more strongly supported by local communities when their appearance is hidden. Proximity therefore may not be as important as visibility, especially in mountainous or rolling landscapes where turbines can 'hide'. In their study looking at the planning and siting processes of wind energy development across Germany, the Netherlands and England, Bruekers and Wolsink (2007) found that when policies failed to take into account local interests, strong opposition to wind was fuelled by arguments about visual aesthetics.

There may also be cultural associations with the land that allow visual concerns to enter the debate. Deemed 'cultural rationality' by Barry et al. (2008), research found that intrusion of turbines onto the countryside of the United Kingdom was used as evidence against development. In contrast to the technical or scientific evidence they were bombarded with that promoted wind energy, residents claimed a local understanding of turbines (i.e. on the basis of heritage and pastoral identity) was the more appropriate way of thinking. In the case of Ontario, the visual problems with wind energy development appear to be playing less of a role than in Europe (see Devine-Wright, 2005; Kaldellis, 2005; Wustenhagen et al., 2007). In a poll, Ipsos (2010) found that only 16% of Ontarians thought turbines were eyesores or not pleasing to the eye. However, that poll was conducted just after the passing of the Green Energy Act (GEA) into law and before most turbine siting processes started in Ontario- suggesting that 16% value may be even lower in 2017. The GEA effectively excluded visual annoyances as an 'acceptable' argument against turbines though so savvy residents may be directing their attention away from this specific complaint towards others that are considered legitimate – including health.

While most research concerning aesthetics has suggested mostly negative or neutral connotations among the public, Jepson et al., (2012) find that the visual effects of wind energy development has been seen to be a positive in the eyes of some. Research from conservative west Texas revealed that many residents felt like walking around the countryside where turbines were visible was like 'going to a garden' (Jepson, et al, 2012).

They argue this interpretation was caused by the positive economic impact that wind turbines have brought to the area coupled with the history of 'ugly' oil rigs in the region. This idea that perceptions of aesthetics can be shaped by economic benefits fits with more recent research from Ontario which found a rural community to be more accepting of wind turbines because of financial benefits and the gap in the economy created with the loss of local tobacco production (Walker et al., 2012).

1.4.4 Environmental Justice

This dissertation research is embedded within long-standing ideas of environmental justice and the literature related to equity and fairness through policy and facility siting. Though what counts as 'just' is likely to vary from place to place (MacIntyre & MacIntyre, 1988; Sen, 1990), issues relating to justice are becoming more popular in the discussion surrounding wind energy support and opposition. Within the wind energy literature, the idea of environmental justice can be split into two distinct categories: a) procedural justice or fairness during planning stages and b) distributive justice or fair organization of the costs and benefits of wind turbine development. As these concepts of justice are two of the most important in shaping public responses to wind energy development, I examine them in detail (Chapter 3 and 4). There are also other aspects of environmental justice that lay just outside of this dissertation, including issues of recognition and the capability of people to flourish in society (Schlosberg, 2007). Recognition relates to the processes that degrade and devalue some people in comparison to others (Fraser, 1997; Honneth, 2001). The capability approach to studying environmental justice implies we should evaluate the justice of arrangements

in terms of how they affected the ultimate wellbeing and functioning of people's lives (Scholsberg & Carruthers, 2010). It has been said to simultaneously address a number of environmental justice issues including inequality, disrespect, and participatory rights and that this may be well served in analyzing indigenous environmental justice concerns (Scholsberg & Carruthers, 2010).

American philosopher John Rawls provides general principles of justice that help define the ones used in this thesis. He asserted that justice must not be defined by the will of the majority. That is to say, the 'greater good' of the many should not take precedence over the loss of freedom of the few (Rawls, 1971). This is in contrast to the majority of moral philosophers who believe people should collectively and reasonably choose utilitarian criteria as a way to guide institutional arrangements (Chapman, 1975). Rawls' understanding of justice fits well within the context of this thesis and indeed, in the case of wind energy development as a whole, because the cases 'for' and 'against' wind are generally seen to be on the global (many persons) and local (few) scales respectively (Warren et al., 2005). Shain (2011) argues that Ontario wind energy policy is causing an uneven distribution of burdens whereby government initiatives are causing harm to a few (rural health effects) for the environmental and health benefits of green energy to many. This may be particularly problematic for the most disadvantaged rural people who do not have the means to sell or move from what Shain (2011, p. 348) calls the "careless introduction of wind energy generators" (see also Faden and Shebaya, 2010). In using procedural and distributive justice to guide the research, we can better focus on rural areas playing host to development.

Outside of Ontario, there is a general trend in wind power planning to place the 'common' global or regional good (pollution reduction, climate change mitigation) above more 'localized' concerns such as wildlife protection and landscape impacts (Breukers & Wolsink, 2007). This has been the preferred choice for developers and policy makers because of well-established science that states a reduction of greenhouse gas emissions should be a priority, and that wind turbines are one of the best ways to accomplish this (Szarka, 2004). Yet that same science is generally agnostic about negative impacts on locals. This has led to political justification of the streamlining of facility siting (Ferguson-Martin & Hill, 2011) and retreating to discredited decide-announce-defend planning policies (Haggett, 2011).

While it has been well established that climate change is threatening the health of both people and the environment (i.e. IPCC, 2014; McMichael, 2013; Patz et al., 2005), green technologies such as wind energy should not necessarily be developed if it means sacrificing the health and well-being of rural communities playing host to development. Additionally, one must recognize that particularly in the Canadian context, despite the fact that a large majority of turbines are being built in rural areas (CANWEA, 2017c), public opinion surveys (IPSOS, 2010; Mainstreet Research, 2016; TSC, 2008) solicit opinions from urban dwellers as well, people who may have little experience living with wind turbines. The results of these reports are therefore not representative of the most affected groups, and can privilege the urban majority in support of wind energy. In an effort to more fully commit to a righteous definition of justice, Rawls (1971) optimistically noted society's "natural socialability" will lead to a stronger commitment to what is right by moving beyond self-interested outcomes toward a kind of natural

sense of equality (p. 584). Yet in some ways, this dissertation uses a definition of justice that is more fundamental and practical than those used by Rawls. That is, in asking local residents what they think of current systems (i.e. status quo of developing wind energy) I escape any prescribed definition or understanding of justice and instead place trust in participants to better frame perceived (in)justice related to turbines.

1.4.4.1 Procedural Justice

Procedural justice relates to perceptions of fairness during a variety of decision-making processes and has most commonly been studied through research in social psychology (e.g. Brockner et al., 2001; Lind & Tyler, 1988) and geography (Hay, 1995; Towers, 2000). The concept of procedural justice was first introduced by Thibault (et al., 1973; & Walker, 1975) who suggested that people involved in disputes care just as much about how decisions are made as they do about the eventual outcomes. Subsequent research has provided evidence for this procedural justice hypothesis (see Folger & Cropanzano, 1998; Tyler & Blader, 2000).

The hazardous facility siting literature includes a number of references to procedural justice and the value of a just planning and procurement process. Within this set of research, it has been shown that communities that are engaged in the siting process are more likely to win broad-based consent (Baxter, 2006; Cutter, 1996; Kasperson, 2005). Though wind turbines are only seen as 'hazardous' to some (i.e. through health problems), these concepts seem appropriate for explaining support for them as well. Indeed, Gipe (1995) found that involving local actors in the planning

process helped a project ‘succeed’, or obtain high levels of support in the local area. On its most basic level, he proposed this was so because high levels of procedural justice allowed for positive debate and the chance to resolve conflicts before they escalate. This idea shares characteristics with the Habermasian concept of collaborative planning; a framework of planning that opposes the so-called rational ideas of land use, instead preferring to think of how collective interests emerge and are legitimized through the use of reason (Haggett, 2011; Fast, 2013).

In research looking at the most common procedures used during renewable energy decision-making, Haggett (2011) breaks things down into three categories of increasing capacity for avoiding injustice. The first she labels 'information provision'; an idea commonly associated with the decide-announce-defend model. Its value is in its ability to streamline the process of development and is used to a certain degree in Ontario (Ferguson-Martin & Hill, 2011) and the state of Texas (Bohn & Lant, 2009). This type of approach, which is contrary to much of the environmental assessment literature, is unfortunately becoming more common in renewable energy policy circles (Barry & Ellis, 2011). What was inappropriate for waste facility and other noxious facility siting efforts, now seems to be used in the context of wind energy. For example, a policy change that removed a local community's ability to object to development has left many rural residents in Ontario without recourse and feeling slighted (Walker et al, 2014a). Next in this continuum of energy decision making is consultation- a process by which there is a genuine dialogue between a developer and local citizens. What this does not necessarily entail however is the degree to which concerns, complaints and

suggestions are actually applied by the developer. Lastly, the process of deliberation has been noted by Haggett (2011) to be the most involved in terms of steps taken to ensure high levels of procedural justice. The idea of deliberation is based not just on a dialogue but a greater degree of participation- including substantial, two-way consultation and/or community ownership- within the actual decision-making process. This is what Arnstein (1969) would call a partnership and represents the highest rung on her 'ladder of citizen partnership'. Citizen participation is a concept from the planning literature first introduced by Shelly Arnstein, and is related to procedural justice. In her first influential work, Arnstein (1969) illustrated the concept through a 'ladder' whereby the bottom rungs represented non-participation, the middle rungs were deemed tokenism, and the upper levels were said to be where citizens actually controlled planning processes. In part, the analysis of this dissertation research was framed under Arnstein's concept whereby higher degrees of procedural justice (i.e. higher rungs on the ladder) were said to be associated with higher levels of citizen participation (see Chapter 4). Questions were also asked within the interviews and surveys related to these ideas.

Coinciding with the refusal of the so-called NIMBY hypothesis researchers in the social dynamics of wind energy literature have pointed to other, more nuanced explanations for public approval or opposition to development. Many of these studies have pointed to environmental [in]justice frameworks which studied distributive and procedural justice together (Baxter et al., 2013; Gross, 2007; Haggett, 2011; Hall et al., 2013; Vass, 2013; Walker et al., 2014a; Walter & Gutscher, 2010; Zoellner et al., 2008). Within these articles, procedural justice was studied under Cole and Foster's (2001)

definition of the ability of individuals and communities to participate in wind energy planning. For just processes to have occurred, they must be accessible, decision makers must recognize the contributions of citizens, and input should have some bearing on the final decisions being made (Schlosberg, 2007).

1.4.4.2 Distributive Justice

Distributive Justice is a concept of environmental justice that has been studied in a variety of research contexts including Management (Folger & Konovsky 1989; McFarlin & Sweeney, 1992) Geography (D'Costa, 2011; Mooney & McGuire, 1987) and Sociology (McVeigh et al., 2014). Through these many sets of literatures, the concept of distributive justice has come to embody several different ideas. However, one definition that captures most of these is "the distribution of conditions and goods which affect individual well-being" (Deutsch, 1975; p. 137). What is the 'best' possible distribution of wealth is difficult if not impossible to determine fairly if one knows in advance where one sits compared to others (i.e. privilege). Nonetheless, I attempt to work through this impasse by using the Thomas Theorem from the school of humanism, which trusts and in fact emphasizes the human experience and perceptions thereof (Hoffman, 1967). That is, while the subjective idea of fairness of outcome is central to the thesis, I also use a perceptual, equality-based interpretation of fairness to guide the research questions- and indeed the interview guide and the survey (see Rawls, 2001).

Contemporary research in the social dynamics of wind energy literature has come to understand the term distributive justice as the equitable distribution or fairness of

outcomes following development (Agterbosch et al., 2009; Gross, 2007). In wind energy development, an important segment of these outcomes are financial benefits. How or if these benefits are introduced to members of host communities, has been said to greatly influence local support for a project (Bolinger & Wiser 2004; Toke et al., 2008; Walker et al., 2014a). In places where the distribution of benefits is perceived as 'just' by local residents, there are higher levels of support for local development (Gipe, 1995; Maruyama et al., 2007; Jepson et al, 2012). It is believed that equitable benefit schemes lead to local support by making benefits tangible to all, thus eliminating the gap between so-called winners and losers (Gross, 2007; Swofford and Slatterly, 2010). Most research to date has not adequately addressed the possibility that individuals in the same community may have different interpretations regarding what 'fairness' means and whether or not those more affected by development perceive benefits different than those who are not. In this way, the fairness of benefits is likely to be contested and may be determined along many social or cultural lines or according to differentiated principles or norms of local citizens (Gross, 2007). Questions of whether or not 'fairness' means that benefits should be commensurate with an evaluation of local impacts (i.e. equity basis) or through other even more subjectively equal ways have been debated (see Deutsch, 1975). Under community ownership models, these kinds of questions are in theory more likely to be answered through deliberative and inclusive conversations. Deciding what is 'fair compensation' is therefore also a question of policy and development structure seemingly far removed from local outcomes.

Though there is a relative paucity of research on wind turbines and their impacts in the Canadian context, a recent study by Baxter et al. (2013) points to the importance

of local equitable distribution of financial benefits. It was the first peer-reviewed publication involving empirical data from local residents actually living near wind turbines in the province. The most startling finding was that only 25% of residents in the control community (a rural location with no existing or proposed turbines) supported turbines and they scored highest on all measures of concern compared to a community with existing turbines. Further, while 53% in the turbine community felt that, "economic benefits are not distributed fairly…" 62% felt this way in the control community. This suggests that those living with turbines may experience a greater sense of fairness in terms of benefits compared with those who can only perceive the concept of distributive injustice.

Just as there are different kinds and degrees of involvement during the planning stages, there are also variations of community benefit models (CBM) used in local areas. In a toolkit developed for policy making the UK, it was shown that three basic schemes exist that use a CBM in some capacity (CSE, 2009). The first, which delivers the least amount of benefits to the community, is local contracting. This would include employment or economic activity through the construction and/or operational phases. The second is community funding, which necessitates regular payments or direct support for community projects and/or local interests. This is somewhat typical of energy projects in Canada where taxes and community infrastructure projects – parks, hockey arenas, and/or community centers – are given back to the community rather than to individuals. Lastly, community ownership is the system that incorporates the highest degree of financial benefit for local communities (Bolinger, 2001; McLaren

Loring, 2007). This can be done through investment, profit sharing, or outright ownership of a wind farm. When these types of investment options are made available to the public, it is important to note that not every person within a 'wind turbine community' will have the financial ability to take part. When ownership is required for ability to take part in decision-making processes, this may in fact exacerbate the equity of local outcomes.

Across the literature more broadly, It is well demonstrated in the literature that those developments that incorporate a greater degree of community ownership are more likely to gain local approval (Maruyama et al, 2007; Toke, 2002; Warren & McFadyen, 2010). In fact, the lower success rates of wind energy in the UK compared to continental Europe has been claimed to be as a result of a lack of community ownership in the former (Bruekers and Wolsink, 2007; Toke et al., 2008; Toke, 2002; Warren & McFadyen, 2010). A growing group of research claims these same ideas can be applied to the struggle to develop successful wind energy in Canada (Fast et al., 2016; Ferguson-Martin & Hill, 2011; Walker & Baxter, 2017a) and the US (Brannstrom et al., 2011; Pasqualetti, 2001).

The hazardous waste siting literature has also studied issues of distributive justice. Inequity of benefit packages has been shown to exacerbate risk concerns in local communities facing development (Kasperson, 2005). Other findings show a more direct relationship between risks and benefits. Renn (1992) agrees with much of the literature that states for people living near development, some degree of risk is acceptable given benefits that can be accrued to them. Meanwhile, Krimsky (1992) is more precise-

stating that overall acceptability of risk is roughly proportional to one third of the benefits (i.e. low risk perception when value of benefit is approximately 3x higher). Particularly if one uses an encompassing definition of risk that can adapt to the characteristics of wind turbines, we can see how community benefits may play an important role in decreasing the amount of opposition seen at the local level of wind energy development.

When introducing financial benefits, payments made to residents and/or communities can be perceived as bribes- money given to offset or quiet serious concerns (Baxter et al., 2013; Cass et al., 2010). Community benefits 'too early' in the process can create the perception that planning decisions are being influenced by the payment or setting up a system where liability rights are 'for sale' (Cass et al., 2010). Giving payments after construction may also lead to similar problems including the perception that non-leaseholders are given "buy-off(s)" (Miner, 2012).

Within the social dynamics of wind energy literature, it has been most common for distributive justice to be studied alongside its procedural justice counterpart (Baxter et al., 2013; Gross, 2007; Haggett, 2011; Hall et al., 2013; Vass, 2013; Walker et al., 2014a; Walter & Gutscher, 2010; Zoellner et al., 2008). Though the two are often related, fairness during and after wind energy is built represent distinct concepts (Cutter, 1995; Lake, 1996). Thus, this focus on distributive justice within a single article (Chapter 3) is in itself a major strength of the present dissertation.

1.5 Mixed methods research in practice

Even with some degree of experience analyzing and publishing mixed method research, this dissertation was my first attempt at conducting both qualitative and quantitative data collection and analysis from the beginning of a project. Because of this, a substantial amount of time was set aside during the early stages of the dissertation toward *how* mixed methods should be accomplished in the context of this thesis. Based on different classification schemes and discipline-specific conventions, there is said to be more than 40 mixed methods research designs (Ivankova et al., 2006; Clark & Ivankova, 2015).

To understand how mixing methods is accomplished in the social scientific study of wind energy, in late 2013 I searched for academic journal articles which used both qualitative and quantitative methods. While only eight papers were initially found, they showed two important trends. The first was that qualitative methods (i.e. interviews) were usually playing secondary or complementary roles. The second was that qualitative methods were usually completed first and when this was the case, they were most often used only to inform or help design the quantitative method(s). In other words, those studies that used qualitative methods first tended to prioritize quantitative methods. In reviewing methodological literature, I was surprised to see relatively little on this potential relationship between research design (method timing) and method priority. Instead, method sequence (Morse, 1991) and method priority (Creswell & Clark, 2011) were usually discussed as ideas independent of each other (Walker & Baxter, 2017b). The few articles that do address both issues in the same article tend to imply that

priority is a result of a researcher's preferences and/or limit method sequence to being either sequential or simultaneous (McManamny et al., 2015; Leech and Onweubuzie, 2009). For example, these papers do not distinguish between a study that used qualitative methods before a survey versus the other way around. In recognition of this void in the methodological literature, my dissertation research includes an expanded review of the mixed methods social dynamics of wind energy literature, which was made up of 27 articles published between 2005 and 2015. Full details regarding how this analysis was completed can be found within the Methods (Chapter 2) as well as Article three (Chapter 5).

1.6 Research Problem and Context

The research problem addressed by the empirical research (Chapters 3 and 4) is the obstacles to achieving environmental justice, and related ideas of local opposition to wind energy development in Canada. Though turbines are considered to be part of a viable low-carbon energy future, in recent years there has developed a strong debate in Canada regarding the local impacts of wind energy development. This debate seems particularly intense compared to the same debates in Europe, where turbines have been prevalent for decades. Some scholars have explained this is because of the system of wind turbine development common in continental Europe and elsewhere- one in which most projects are developed and/or owned by the local community and higher levels of procedural and distributive justice typically result (Toke, 2002; Maryuama et al., 2007). In this type of system all residents living in close proximity to a wind turbine earn a financial incentive (tax credit, direct payments) or have the opportunity to invest and

perhaps more importantly, are more heavily involved in the siting consultation process (CSE, 2009; Devlin, 2005; Toke, 2005). Thus, this research investigates whether shortcomings in procedural and distributional justice are the source of intense local opposition to wind energy in Canada.

Though much more detail is given in the manuscripts that follow (see Chapters 3 and 4) some context is given below with relation to wind energy development in Ontario and Nova Scotia, Canada. Given the relative lack of empirically based, comparative research – especially focused in the North American context – I conducted a case comparison study of wind turbine communities and their policy frameworks in Ontario and Nova Scotia. This was largely driven by criticisms of Ontario's approach to green energy development by both academics (see Fast et al, 2016; McRobert et al., 2016; Stokes, 2013) and those living closest to developments in the province (e.g. through media pieces; Eisen, 2017; Miner, 2016). Criticisms of Ontario's policy have largely centred around two things: the Green Energy Act (GEA; 2009) and the Feed-In Tariff program.

In essence, what the GEA did was streamline the renewable energy approval process by removing elements of municipal sovereignty with regard to energy development (see McRobert et al., 2016)- something a select group of scholars in the US and other places have been calling for (Osofsky & Wiseman, 2014; Salkin & Ostrow, 2009). The policy did this by: i) eliminating a local municipality's ability to veto any project in their jurisdiction, and ii) limiting what were considered 'viable' complaints against wind turbine development to those that either show serious effects to human

health or the environment (McRobert et al., 2016). Technically speaking, municipalities cannot stop turbines from coming to their community and developers need only limited community information sessions to satisfy the conditions of environmental assessment. This runs contrary to a well-developed literature highlighting the value of participatory siting. In eliminating local voices and control in wind energy development decisions, some- including us (Walker & Baxter, 2017b) have suggested that environmental injustices (i.e. procedural injustices) are taking place and this is fuelling opposition to wind energy. Concerning the second characteristic which limited complaints, it may not be surprising that an increasing number of complaints in recent years have been centred on human health and/or the environment. Indeed, research in Ontario has shown that human health is now playing a very important role in the debate (Baxter et al., 2013; Walker at el., 2015) and that this rise has been significant since the policy's introduction in 2009 (Songsore & Buzzelli, 2014).

Also in 2009, the Ontario government introduced its Feed-In Tariff (FIT) program which, alongside the GEA and the province's long-term energy plan, aimed to "facilitate the increased development of renewable generating facilities of varying technologies…" (IESO, 2017). It did so through increasing the price given to electricity generated through renewable energy. Though the prices given for each technology decreased over time, large onshore wind began at 13.5 cents for every kilowatt hour of electricity produced (cents/kWh) while small scale solar began at 80.2 cents/kWh. As of 2014, large scale wind energy was eliminated from the FIT program and instead those interested in developing wind energy projects could do so through a competitive pricing

program called the Large Renewable Procurement (LRP). Under this program, wind energy production reached prices as low as 6.45 cents/kWh (Zawadzki, 2016).

In combination, the GEA and FIT program spurred wind energy project construction almost exclusively through corporate developers (McRobert et al., 2016). There has been very little introduced- in term of policy levers- that promotes community based wind energy in Ontario. Such community-based initiatives have been shown to increase distributive justice outcomes (Warren & McFadyen, 2010). There exists inherent inequity in the province whereby there is an 'all-or-nothing' arrangement with the local residents living closest to the turbines. Under FIT and now the LRP, wind turbines are almost exclusively placed on private rural land whereby leases are paid to "hosting" landowners (+$8K/turbine/year) while neighbours often receive nothing- yet the negative externalities (i.e. sound, visual disturbances) are shared.

Standing in contrast to the approach taken in Ontario, in 2010 Nova Scotia implemented a new community-based, green energy policy initiative: the Community Feed-in-Tariff (COMFIT) program. Designed with many of the same directives of Ontario's FIT program, COMFIT places greater emphasis on multi-tiered planning and community-based wind development (Nova Scotia Department of Energy, 2010). This program was inspired by successful experiences from Europe; where in the countries of the Netherlands, Germany, and Denmark local ownership ranges from 50% to 88% and levels of local support are high (Eltham et al., 2008; Toke et al., 2008; Toke, 2005).

In theory, it was believed that the way in which wind energy was developed through Nova Scotia's COMFIT program *should* lead to higher levels of both procedural and distributive justice. This was thought to be true because development in the province includes not only more thorough community involvement in decision-making (procedural justice), but through local ownership, the majority of profits from the development are more likely stay in the local community (distributive justice). The latter benefit is seen through the requirement that all turbines must be majority owned (i.e. >50%) by community groups or local residents- largely through investment opportunities.

Part of Nova Scotia's 2010 Renewable Energy Plan, the COMFIT program aimed to move the province "away from carbon-based electricity toward sources that are greener and closer to home" (Nova Scotia, 2013; p. 1). In terms of greenhouse gas emissions, it may be argued that Nova Scotia was in much greater need of wind energy development. While Ontario now receives approximately 9% of its electricity from fossil fuel sources (almost entirely natural gas; IESO, 2016), Nova Scotia generated 76% from these sources in 2013 (NS DOE, 2050). Projects under the COMFIT policy are relatively small (less than 6 MW; with most being 2-4 MW) compared to those in Ontario, which can reach up to approximately 200 MW. As community-based wind development is new to Canada, the difference is likely in part because it is much easier for community groups and individuals to take ownership in smaller projects. Groups that are eligible for participation are municipalities, co-operatives, universities, Community Economic Development Investment Funds (CEDIFs) and non-profit groups (Nova Scotia, 2013). Preliminary evidence indicates that COMFIT has been a success- as the province's

renewable energy targets of 25% and 40% by the years 2015 and 2020 appear to be well within reach. Currently, renewables including wind make up 18% of the province's total energy generation (Ruskin, 2014).

Given the policy contexts of both provinces, the overall hypothesis of this research (Chapters 3 and 4) was that the way in which wind energy is being developed in Nova Scotia may present greater opportunities for both procedural and distributive justice and therefore would likely lead to greater levels of local approval and support. That is, the policy process itself can contribute to the perceived negative impacts of turbines and the seemingly low level of support for turbines in rural communities. While Ontario has experienced problems with the GEA related to environmental justice, equity issues appear less prevalent in Nova Scotia (Ferguson-Martin & Hill, 2011).

In choosing each wind development in Ontario and Nova Scotia, I was guided by the need to examine communities who had recently been through planning and siting processes, represented distinct communities in terms of socio-economics, and who had received various levels of media attention. These were three up-front criteria, but the grounded theory design also was flexible enough to allow for some changes as the research went on.

The community profiles below identify two key issues: size and general socioeconomic characteristics of each community, and initial community response to wind energy development (i.e. through media reports). There were some problems encountered in trying to outline each community in a similar way including a lack of

community-level population or census data and a lack of media reporting surrounding development. This was particularly the case in Nova Scotia where communities were much smaller and not much was published surrounding issues of conflict or opposition toward wind projects. More information about these communities can be found within Table 3.1: Research site contexts.

1.6.1 Ontario: Community profiles

Located just northwest of Strathroy and just south of Grimsby, Ontario respectively, Adelaide-Metcalfe (Adelaide Wind Power Project) and Wainfleet (Wainfleet Wind Energy Project) were chosen as the first two Ontario-based communities. These places fit our initial criteria as having recently gone through siting processes and the projects themselves also represented some diversity in terms of size. Reasons for inclusion were also partially pragmatic, as the two developments included 23 turbines with hundreds of surrounding homes around which to conduct interviews and surveys. The Adelaide-Metcalfe (developed by Suncor) development was unique in that it was built in close proximity to another project, NextEra's Adelaide Wind Energy Centre. Turbines for this project were located just south of Suncor's development. This presented a unique challenge not seen in any other community in that participants may have thought I was interested in studying another nearby development. Yet care was taken during both the interview and survey stages to make sure participants were: i) within 2km of a Suncor turbine and ii) that they lived in closer proximity to a Suncor turbine.

In the summer of 2014, a third site located in Oxford County was added to our Ontario sample. Though it was not initially targeted as a potential research site, Norwich (Gunn's Hill Wind Farm) was added because it presented a rare case of community-based wind energy in the Ontario context. This was thought to be a good opportunity to compare an Ontario-based small scale, community wind energy project with similar

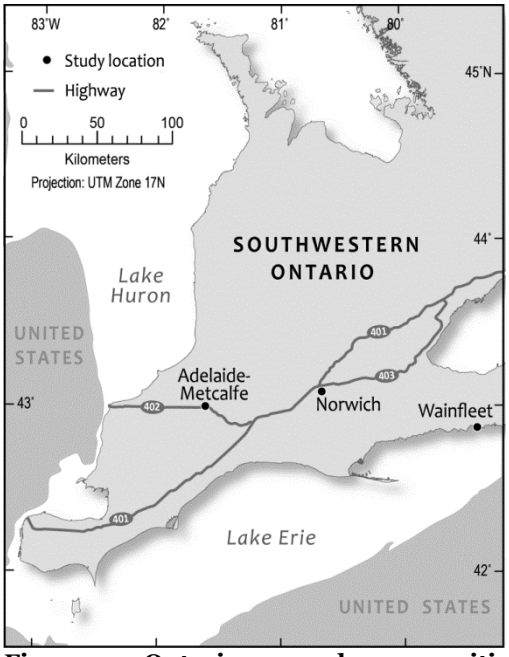

Figure 1.1 - Ontario research communities

efforts of Nova Scotia. The Gunn's Hill project was also unique in that no turbines were yet constructed during either the interview or survey portion of the research. In terms of comparisons to other sites, this was not ideal, yet because the focus of this work is on wind energy policy and related siting processes- and less on 'daily life' impacts- I considered this not to be a significant issue. Lastly, in light of the fact that turbines were not yet constructed in Oxford County, I anticipated somewhat higher levels of opposition to the local project there. That is because research has shown that local concerns often lessen after turbines are operational (Baxter et al., 2013; Walker, 1995; Wolsink, 2007).

Adelaide-Metcalfe, ON (Adelaide Wind Power Project)

This research first began in Adelaide-Metcalfe. Part of the reason I chose to investigate this community is because we (Dr. Baxter and I) were immersed in the process for the two years prior to the construction in Spring 2014. This involved attending public consultation meetings, giving a presentation of our past research relevant to wind energy to the Strathroy Rotary Club and keeping up to date with media reports that covered public protests. Of special note was the well-publicized taping of township council meetings by a local anti-wind advocate. On several of these occasions, meetings were suspended and police were called to end the taping. Combined with the many newspaper reports that followed this story, the Adelaide-Metcalfe project represented a community where media attention and personal familiarity was high.

In terms of Census demographic data, the Township of Adelaide-Metcalfe was the smallest community studied in Ontario (population of ~3000 people), had 192 homes within 2 km of a wind turbine, and with nearly 25% of its working population in agriculture, forestry, fishing and hunting, was the most agricultural in comparison to other communities studied in Ontario (Stats Canada, 2013a). The community's median income of $28,644 was less than the provincial average of $30,526- yet fell between the incomes found in other Ontario sites (Stats Canada, 2013a; Stats Canada, 2013h). The area is also home to a very active anti-wind citizen coalition, the Middlesex-Lambton Wind Action Group (MLWAG). The group's stated goal is to "…educate residents of Middlesex and (nearby) Lambton Counties on the aggressive tactics of wind developers & on the detriments that are known to be caused by wind turbines" (MLWAG, 2017).

Because of the close association between the groups, three qualitative interviews took place with residents in Lambton county, home to separate but related wind energy projects.

Wainfleet, ON (Wainfleet Wind Energy Project)

Likely because the community was located further away from London, Ontario, less was initially known about the second study site in Wainfleet. It fit our ideal criteria as a wind project that had recently gone through siting and planning processes and turbines were operational at the start of research. It was also a much smaller project than the one in Adelaide-Metcalfe, with just five turbines - though because Wainfleet had the highest concentration of homes, it had the highest number of residences within 2 km of wind turbine (n=287). Wainfleet was also a community of somewhat higher socioeconomic status compared to others in rural Ontario. It is located in the Niagara Region- an area known for wineries and higher levels of tourism- and had a median income of $29,211 in 2011 (Stats Canada, 2013i). Many homes in which we dropped off letters of information (see Chapter 2) were located near Lake Erie and appeared to be cottages or summer homes. Wainfleet is also twice as large as Adelaide-Metcalfe with 6,300 residents (Stats Canada, 2013i). With only 8% of these people working in agriculture, forestry, fishing and hunting, the area is much less dependent on farming relative to other communities studied in Ontario (Stats Canada, 2013i).

The Wainfleet Wind Energy Project (WEEP) is a small project by Ontario standards- yet somewhat average in comparison with those from Nova Scotia. In part, I

chose Wainfleet to enable a better comparison with Nova Scotia. Like the development in Adelaide-Metcalfe, the WEEP has also proven to be a source of controversy in the community. The community neighbours the riding (Niagara West – Glanbrook) of former provincial Conservative leader Tim Hudak who had repeatedly called for a moratorium on turbine development (Dakin, 2014). The Township of Wainfleet is also known for its municipally funded legal battle against its wind energy development. In late 2013, township council voted to give a local Skydiving business $40,000 to help with its legal challenge against the proponents of the WEEP. Wainfleet Mayor April Jeffs defended the controversial decision admitting that she knew "the optics would not be good…but felt it was the right thing to do" (Edwards, 2013).

Norwich, ON (Gunn's Hill Wind Farm)

The third of three Ontario sites in this research is located in the Township of Norwich (Oxford County). With a total population of 10,670 (Stats Canada, 2013f), it was the largest community studied- yet a similar number of homes (n=227) were within 2km of a [future] wind turbine compared with sites in Ontario. Norwich is located just south of the city of Woodstock and the 401 highway upon which it sits. Median income was the lowest out of all Ontario sites at $26,923 and the labour force was much more diverse than other communities- approximately 34% of citizens worked within manufacturing or agriculture, forestry, mining and hunting (Stats Canada, 2013f).

The Gunn's Hill Wind Farm began construction in 2015 and by the fall of 2016, it was operational. It consists of ten turbines (18 MW total) installed on private agricultural lands. The project was added as a final Ontario-based site when I learned of Gunn's Hill community-based approach- a rarity in Ontario. The project was developed under Ontario's updated Feed In Tariff program whereby 'price adders' (ranging from 0.5-1.5 cents/kWh) were introduced to encourage Aboriginal or Community participation and ownership in the project. The developer, ProWind Canada, chose to designate the project as a community participation project, thus allowing for up to 49% public (non-developer) ownership in the project. Public investments (either shares or bonds) were made through a newly formed Oxford Community Energy Co-operative. Approximately $9 million was raised and this secured the 49% equity ownership structure (Oxford CEC, 2016). Approximately one-third of the 140 investors in the project were from Oxford County (Miner, 2015). Prowind has also allocated $25,000/year for 20 years to be put toward a community fund, which is administered by "an open and local committee comprised of local citizens" who determine where and to whom funding goes. Initial consultation suggested funding will go toward a local park and/or the community centre in Oxford Centre (Stantec, 2013; pg. 5.31).

Like the experiences seen elsewhere in Ontario, there was clear and vocal opposition to the Gunn's Hill development. A local concerned citizens group, the East Oxford Community Alliance (EOCA) was formed during the planning stages and through the Environmental Review Tribunal, appealed the final approval of the wind project by the Ministry of Environment on concerns over human health and the

environment. The tribunal took place in July of 2015 and after the appeal was dismissed in October, the project moved forward in the fall. A representative of the EOCA group stated she wasn't surprised the outcome, saying "The public never [had] the opportunity to 'win' in the appeal process" because of the high standard for proving human health problems (Miner, 2015).

1.6.2 Nova Scotia: Community profiles

In late July 2014, research began in Nova Scotia, Canada. In order to enable a better comparison with Ontario, wind turbine communities were purposefully chosen if they were built within the last 12 months[1] and followed the same initial criteria for inclusion of the study mentioned above. Nevertheless, because of a much smaller number of projects in Nova Scotia, some adaptation of the criteria was necessary. Notably, one project (Watt Section) had been operational for just over four years. Wind developments in Nova Scotia were also generally much smaller than those based in Ontario, and therefore I was required to investigate more communities. This was because smaller wind farms (i.e. less turbines) and lower population densities meant fewer people with 2km of a turbine (i.e. there was an average of 91 homes within 2 km). Smaller projects were encouraged by the province's Community Feed-In Tariff program whereby municipalities, CEDIFs, Universities, non-profits and first nations groups could apply to be majority owners in wind projects. Though the focus in Nova Scotia was on projects related to the COMFIT program, other forms of community-based development were also investigated in order to gain a clearer picture about the range of

[1] In Ontario, an exception was the community surrounding the Gunn's Hill project, which was included for other reasons (see pages 37-38).

practices used in the province. While most used some form of community-based development, there was also one 'traditional' or Ontario-like developer-led project in New Russell (South Canoe Wind Farm; see below).

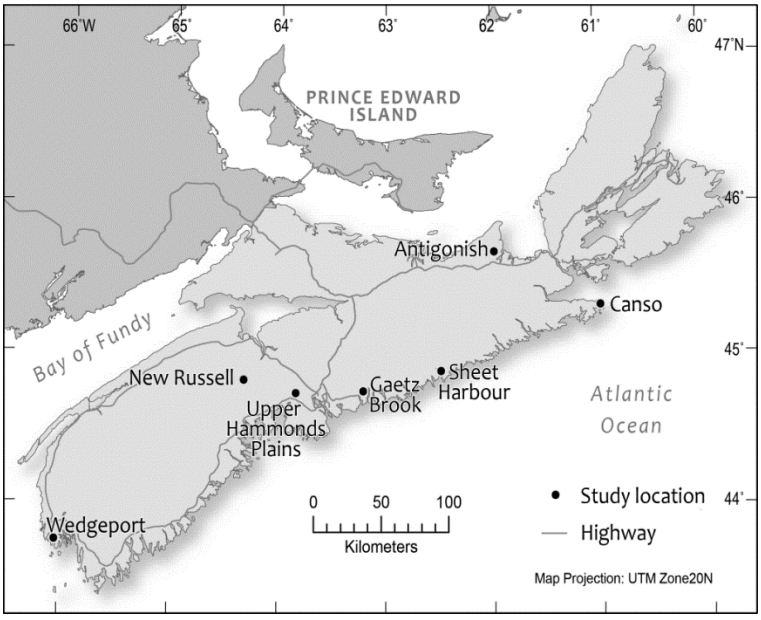

Figure 1.2 - Nova Scotia research communities

Canso, NS (Sable Wind)

Research in Nova Scotia began in Canso, a small community on the Eastern shore of mainland Nova Scotia. For all of its 111-year history, it was a self-governed town until 2012 when it was amalgamated with the Municipality of the District of Guysborough (CBC, 2012). It has a history of being a fishing port and more recently has been home to mining and natural gas extraction (MODG, 2015). As of 2010, median household income was $21,421 and the unemployment rate was more than 15.3% (Stats Canada, 2013e). The median income was much lower than the provincial average of $27,570 (Stats Canada, 2013g). Of those employed, the major industry (18.4%) is agriculture,

forestry, fishing and hunting. This is much higher than the typical community studied in Nova Scotia.

The Sable Wind Energy Project is a six-turbine project totalling 13.8 MW in capacity. It is located just southeast of the town limits of Canso and there were 187 homes within 2 km of a wind turbine. This was twice as many as the provincial average. The project is a partnership between the Municipality of the District of Guysborough and Nova Scotia Power. Although the project is majority (51%) owned by local government, it does not qualify under COMFIT because of its large size. COMFIT projects must be connected at the distribution level, typically meaning they will be less than 6 MW in size. This meant that they did not receive preferential pricing – an "adder" of a few cents extra per KWh. At nearly 14 megawatts of capacity, Sable Wind qualified under the more traditional program, the Nova Scotia Renewable Electricity Administrator's Request for Proposals (RFP). Guysborough was the first municipality in Nova Scotia to build and own a major wind project and in October 2015 was awarded the Group Leadership Award at 31ST Annual CANWEA Conference and Exhibition (NAWP, 2015). Through a media search and spending some time in the community, there seems to be no strong public opposition to the project. Most media articles covered planning and construction updates rather than community concerns as one might expect coming from Ontario newspapers.

Gaetz Brook, NS (Gaetz Brook Community Wind Farm)

The Gaetz Brook Community Wind Farm was built in the Fall of 2014 by Natural Forces who also owns 42% of the project. The project was built under the COMFIT program and is majority (58%) owned by a CEDIF, Wind4All Communities. It consists of a single 2.3 MW turbine located 1.5 kilometers from Gaetz Brook (Natural Forces, 2015). Just one turbine was chosen because the closest substation to the community could only support an additional 2.3 MW of electricity (Natural Forces, 2015). Despite having just a single turbine, there were 206 homes within 2 km of it- the most of any in the Nova Scotia sample. Gaetz Brook and the surrounding communities of Porter's Lake, Musquodoboit Harbour and Chezzetcook have an overall population of 10,000 people and is located in the Halifax Regional Municipality (HRM; Natural Forces, 2013). Because it is located within the HRM, any census data given would reflect the entire municipality which is made up of more than 417,000 people (Halifax, 2017) – much of them residing in urban or peri-urban settings. It is for this reason that no census data is given for the Gaetz Brook project as well as others in the HRM (Sheet's Harbour and Pockwock). Media coverage of the wind power project in Gaetz Brook was minimal and when articles did appear, like Sable Wind, they gave planning and/or construction updates to their readers.

New Russell, NS (South Canoe Wind Farm)

The largest of all wind projects studied in both provinces was the South Canoe Wind Farm. The 34 turbine (102 MW) project is located in the Municipality of Chester,

between the rural communities of New Russell and Vaughn (25 km southwest of Windsor, NS). Chester has a population of approximately 10,400 and a diverse labour force relative to other communities with 42% involved in manufacturing, health care/social assistance, retail or construction (Stats Canada, 2013d). The median income in 2011 was comparable to the provincial average at $26,526 (Stats Canada, 2013d). The area surrounding the wind project is very rural and there were only 25 homes found to be within 2 km of a wind turbine.

In order to create "an avenue of exchange between the community and the project team" (South Canoe, 2012) a Community Liaison Committee was created for the South Canoe project. It has met since the winter of 2012 and includes local residents, councillors, and members of the Chester Chamber of Commerce. The project is owned by two Nova Scotia-based businesses, Oxford Frozen Foods (78 MW) and Minas Basin Pulp and Power (24 MW). Both companies are headquartered outside of the immediate community where turbines were built. Though the project was not a COMFIT development, there were several community-level initiatives including sponsorship funding for local projects and events, engagement with local schools (South Canoe, 2012). Unlike many of the other projects in Nova Scotia, there was some degree of opposition to the 34 turbine project. Notably, in June 2015 the CBC wrote a story about concerns over perceived property value devaluations in the area (Paquette, 2015). Though in comparison to the media stories seen in Ontario, there was still an apparent lack of media coverage overall.

Antigonish, NS (Fairmont Wind)

Located just north of the town of Antigonish, Nova Scotia the Fairmont Wind Farm is made up of two 2.3 MW turbines and was built and owned by Natural Forces (65% ownership). The project preceded the COMFIT program, yet public investment in the project was enabled through the CEDIF structure created by Wind4All. Fairmont Wind was chosen because the community recently went through siting processes and because of its unique public minority ownership structure of 35%. Investigating the local impacts and perceptions of such a development was thought to complement the study and perhaps show ways in which Ontario and other jurisdictions could proceed under community-based, minority ownership models. In a 2012 media article, the proponents behind the Fairmont project showed that investors in the 11 million dollar project needed to contribute at least $5000 and that up to 49% of the project was available for public ownership (Cosgrove, 2012). This minimum investment is very high compared to the $1000 minimum seen in Norwich, Ontario (Forman, 2017) and other projects in Nova Scotia. Notably, a project near Wedgeport, Nova Scotia once offered investment shares as low as $1.30 (Cosgrove, 2014).

The turbines that make up the Fairmont project are located just southwest of Cape Breton Island, in a rural area of the province Stats Canada labels Antigonish, Subdivision A. There are 51 homes within a 2 km radius of a turbine. In 2011, the population was 8,253 and median income was slightly below the provincial average at $26,157 (Stats Canada, 2013b). The small community of Fairmont is located just north of the town of Antigonish, which has a population of approximately 5,600 residents

(Vass, 2013) and is home to St. Francis Xavier University. Likely because of this proximity, more than 16% of its residents work in Educational services (Stats Canada, 2013b). Again, like most developments in Nova Scotia, media pieces concerning the project were rare and covered mostly updates and timelines concerning the project.

Sheet's Harbour, NS (Watt Section)

In order to have a balance of study sites in Nova Scotia (i.e. somewhat mixed policies), Watt Section was chosen because it is a community-based project that preceded the COMFIT program. There were 51 residences within 2 km of the turbine. Created through a partnership between two Nova Scotian firms, Seaforth Engineering and Eon WindElectric the development was completed in March of 2011, making it is the oldest project in my study. The wind project is comprised of a single 1.5 MW turbine and is located in Watt Section, a rural community located on the Southeastern shore of mainland Nova Scotia. The community is located approximately 130 km east of Halifax and only 5 km from Sheet Harbour- a small community with approximately 800 residents (Sheet Harbour, 2017). Despite its distance from the urban centre of Halifax, it is also a part of the Regional Municipality of Halifax. Besides a few articles discussing the opportunity to invest and providing the community with updates, there was little conversation about the project in the media.

Though Watt Section was not officially a COMFIT project, it shares the same 51% majority community ownership requirement of COMFIT projects that followed. That is,

the CEDIF structure that was developed outside of the local area (Dartmouth, NS) was offered to local residents, and thus appears it *could* have been eligible for the COMFIT (Vass, 2013).

Wedgeport, NS (Little River Wind Power Project)

First awarded a contract to build in 2012, Scotian WindFields was responsible for the Little River Wind Power Project- located in the small community of Wedgeport, NS. The town is part of the larger Municipality of Argyle, which is part of Yarmouth County located on the southwest tip of Nova Scotia. Argyle is home to 8,175 people with 21% of its workforce in agriculture, forestry, fishing or hunting (Stats Canada, 2013c). Like many other communities studied in Nova Scotia, its median income of $26,126 is just less than the provincial average (Stats Canada, 2013c). The Little River project has 62 homes within 2 km and was in service just months before interviews began (March 2015). The single turbine development was approved under the COMFIT program in 2012 and used a non-COMFIT, community-based structure in order to enable provincial investors to own part of the 51% public ownership available.

There was little media attention surrounding the Wedgeport development. This may partially be because a much larger wind project (tentatively named the Wedgeport Wind Farm) was under much more scrutiny by the public. The project was targeted to generate 45-50 MW of electricity using as many as 25 turbines. As reported by Yarmouth County Vanguard, many local residents objected and “voiced their concerns, many of them heatedly” during a July 2012 meeting (Allen, 2012). The next month, the developer (Anaia Global) was not awarded a tender for contract.

Upper Hammonds Plains, NS (Chebucto Pockwock Community Wind)

The final wind energy project studied in Nova Scotia was the Chebucto Pockwock Community Wind Project (known simply as Pockwock). It is located in just outside of Halifax in the village of Upper Hammonds Plains. No reliable census data could be obtained because it is a small community within the larger HRM. The five-turbine project was created through the COMFIT program and Chebucto Wind Field Inc. was the primary proponent while Community Wind Farms Inc. and juwi Wind Canada were responsible for contracting and leading the technical aspects of development (Pockwock, 2015). There were 58 residences found within 2 km of a turbine. The development is on the property of the Halifax Regional Water Authority, 25 km northwest of Nova Scotia's largest city Halifax. There is very limited news coverage of the Pockwock development aside from a couple of articles within Halifax's Chronicle Herald updating provincial approvals and planning processes (see Alberstat, 2013).

1.7 Summary

This Introduction chapter has provided theoretical, conceptual and case study background information needed to understand this dissertation. It also introduced the content and organization of the work that follows in the integrated article format.

The chapter began with a discussion on the need for renewable energy before outlining the organization of the thesis, which is comprised of six chapters: an Introduction, Methods, three manuscripts (either accepted or under review), followed

by a Discussion / Conclusion chapter. Next, the objectives of the study and how they evolved over the process of the research was presented. Using a grounded theory approach, these objectives changed as findings were collected and as new research sites (communities) were added. A detailed Literature Review centered around the emerging social dynamics of wind energy, with an emphasis on theories of environmental justice. The literature is beginning to recognize the value in the application of environmental justice theory to wind energy research. The research presented here adopts a somewhat novel approach by examining procedural justice and distributive justice in two separate papers. Related studies to these elements of justice (Chapters 3 and 4) represent the cornerstone of this dissertation.

Based on literature reported here and initial media reporting in each province, I expected higher levels of local support for wind energy in Nova Scotia where community-based initiatives are much more common. This hypothesis was shaped by the procedural and distributive justice literature presented above. I anticipated greater perceived justice by residents in Nova Scotia, where people are in theory often able to invest in their local wind energy projects. The idea of community-based ownership also implies more control over siting and planning procedures.

Literature on mixed methods in practice was also introduced in this chapter. Given the history of qualitative methods in mixed methods research, I expect there to be a subjugation of this kind of inquiry and that the priority given to each method may be influenced by research design (i.e. method order). The chapter closed by explaining the research problem and context, including a description of provincial-level policies and brief community profiles of all 10 research sites in Ontario and Nova Scotia. Inclusion

criteria were discussed for the communities studied; acknowledging that these were somewhat flexible as new opportunities presented themselves to increase knowledge about the way wind energy was being developed in the two provinces.

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Chapter 2: METHODS

2.1: Introduction

This chapter provides a detailed look at the methodological decisions and details regarding the dissertation research. Because I have used the integrated article format, many important particulars have been drastically reduced in the article chapters (Chapters 3, 4 and 5). These include the theoretical basis for the methods I selected and detailed participant recruitment practices. Particularly with reference to Chapters 3 and 4, strict word counts, alongside an apparent preference for results and discussion by editors and reviewers often meant methods sections were forced to be very concise.

This chapter traces the methodological origins of the dissertation research by first fully introducing Study 3 (Chapter 5) and the motivations behind the mixed method literature review. Describing this final study first is intentional as it helps the reader to contextualize mixed methods that were applied throughout the thesis (Chapters 3 and 4). Though covered in detail in Chapter 5, additional information on sampling, analytic procedures, and steps used to guard against threats to rigour are expanded upon here. Next, the chapter turns its focus to Studies 1 and 2- by first exploring the assumptions and theories behind mixed methods design. It then expands upon the mixed method study design- or how the empirical research was planned, designed, and implemented. Finally, qualitative and quantitative forms of rigour relevant to this research are discussed.

2.2: Study 3 – A Critical review of the Mixed Methods literature

The final article of this thesis (Chapter 5) presents a structured literature review meant to investigate uses of mixed methods in what we call the social dynamics of wind energy literature. More specifically, it looks at the relationship between method timing (research design) and method dominance. Explaining the motivations and decisions that guided that paper also serves to introduce important methodological questions that shaped the research project as a whole.

Research looking at methodological practices is important partially because the number of research teams studying wind energy development and social responses using mixed methods is to be on the rise. Indeed, the increasing acceptance of mixed methods approaches as the 'third wave' of research design is shown within Chapter 5 where I analyze 27 papers that were found within what I call the 'social dynamics of wind energy literature'. The analysis that makes up that Chapter is itself mixed – using qualitative and quantitative methods to investigate research design and method dominance.

2.2.1: Literature reviews of methodological practices

While traditional literature reviews are completed in order to provide background information or otherwise generally scope out a study (Armitage & Keeble-Allen, 2008), the structured approach taken here is in and of itself a study – particularly a study of methodological practices in a specific area of enquiry. It includes definitive objectives – including hypothesis testing on the relationship between research design

and method dominance. Structured literature reviews are also known to locate all known relevant literature, and include strict inclusion and exclusion criteria (Petticrew & Roberts, 2006; Petticrew, 2001). Also known as systematic reviews, structured literature reviews are critical- and have also been known to enhance methodological rigour and highlight opportunities for future research in a sub-field (Briner & Denyer, 2012). The initial findings from this study of the literature helped to shape the way qualitative and quantitative methods were used in the field studies.

Though investigations of research design (method timing) and method dominance (priority) have rarely been done within the methodological literature, there were some examples of similar structured literature reviews on which article three was based. Especially in health studies and management, Mixed Studies Reviews (MSRs) are becoming increasingly popular and are defined as:

> *"a form of literature review which reviews qualitative and quantitative studies, and/or mixed methods studies for the for the broad purpose of breadth and depth of understanding and corroboration of knowledge"*
> *(Pluye et al., 2009; p. 530).*

Within MSRs, the primary source of data analysis comes directly from the text of each publication analyzed (Pluye et al., 2009) with the aim of assessing the quality of research. Here, though I do not qualify the final article as a MSR, it does share some characteristics with it- including the fact that publication text is the primary source of analysis (see 2.2.3 below). Despite the use of MSRs across various areas of social

scientific inquiry, they have not been employed in geographic and/or energy research to any extent.

Perhaps the most relevant study to the one I present in Chapter 5 is a 'comprehensive search' by Mayoh and Onwuegbuzie (2014). It is the only review that systematically investigates the effect of method order on method dominance. However, it does so alongside other methodological questions and the authors targeted mixed methods research in phenomenological research, which studies qualitatively driven questions regarding human experience and perception (Moustakas, 1994). Their finding of a lack of quantitatively driven research in this area is therefore not surprising. They suggest a need for a review that does not tend to restrict studies based on methodological leanings.

While I characterize Chapter 5 to be a structured and critical literature review with some shared characteristics with Mixed Studies Reviews, during the peer-review process, one person had a different interpretation. They insisted that looking at the way qualitative and quantitative methods are practiced in a specific literature encompassed the definition of a prevalence study. Researchers who conduct these studies are said to "examine the frequency of MMR [mixed methods research] use in specific disciplines and determine the prevalence rates of mixed methods studies as a percentage of all studies" (Molina-Azorin & Fetters, 2016; p. 123). These studies have been employed across a range of social scientific disciplines including education, sociology, and management (Alise & Teddlie, 2010; Molina-Azorin & Lopez-Gamero, 2014; van der Roest et al., 2015). Here, although the targeted search for articles was within a specific

field of study, I was *only* interested in looking at mixed methods studies. I also believe that my study goes beyond the somewhat nature of a prevalence study. However in part to appease the reviewers, I conceded that the investigation may be deemed a quasi-prevalence study. This decision was made in part because I believed issues of semantics would not impact the contribution of my work in any significant way.

2.2.2: Sampling strategy for the mixed methods review

In an attempt to capture the entire mixed methods, social dynamics of wind energy literature, I used a free text strategy to search within multiple online databases. Using a free text search, the researcher is in charge of thinking up all possible terms and combination of terms that may be used to search for articles of relevance (Arnedt, 2007; Sandieson et al., 2010). As outlined within article one, these included searches within two journal databases: Google Scholar and Web of Science. Authors from across academic disciplines have cautioned that reliance on a single database will often lead to the exclusion of some relevant articles (Brettle & Long, 2001; Hood & Wilson, 2001). Both of these free text searches took place in November 2015. The search terms "wind energy" OR "wind turbines" AND "mixed method" OR "mixed methodology" OR "qualitative quantitative" OR "q method" were used within both databases in order to capture articles that may be more easily found within each. All terms were chosen because of my understanding and experience with the wind energy literature and more specifically, the terms that would likely be prominent within mixed methods studies. Though because the search terms were limited, there is a chance that I missed some relevant articles that used mixed methods but did not explicitly state so. Also in part due

to my experience within the sub-field, I chose a 10-year period of 2005-October 2015 as my sample frame. Most research within this sub-field was published during this time. Using both journal databases and the search terms above, more than 700 articles were initially found. The sample was reduced to 27 articles using a filtering process of four selection criteria: i) a peer-reviewed article ii) within social sciences iii) relevant to wind energy and iv) employed mixed methods.

2.2.3: Analytic framework

In part because this type of research looking at method order and dominance had rarely been attempted before, there was no the type of standard or accepted analysis to be performed which could be easily emulated. That being said, I did borrow some more commonly accepted forms of qualitative and quantitative analyses from similar studies.

Method sequence was characterized using the classification system of Hollstein (2014) by which research design is mostly defined by method order or sequence. Using the system as a guide, I created a four-fold sequence characterization whereby: i) qualitative methods are followed by quantitative methods (sequential exploratory design) ii) quantitative methods are followed by qualitative methods (sequential explanatory design) iii) qualitative and quantitative methods occur separately but at the same time (parallel design) or iv) qualitative and quantitative methods are immersed within or may alternative with each other (fully integrated design). In cases where method order was unclear from the way the paper was written, I contacted the authors for verification and was able to confirm how the methods were mixed in all cases.

I conducted the second and more complex form of analysis to determine method dominance within each mixed method publication found. In order to accomplish this, three analytic strategies were used. First, a qualitative interpretive reading was used in order to analyze how authors represented quantitative and qualitative data throughout each publication. Interpretive readings may also be labelled a form of discourse analysis which is a cornerstone of the qualitative approach (Morgan, 1993). Interpretive readings are commonly used in ethnographic research and in areas of social science where the goal is represent textual narratives of either research participants or the texts' authors themselves (Barker et al., 2009; Czarniawska, 2004; Thomas, 1993). In the case of the dissertation, the interpretive process involved reading each paper in its entirety to assess: the purpose of each method, degree of detail (methodological, theoretical) concerning each, as well as the apparent quality and rigor of each strand. Though I found no paper which concurrently used the above three criteria to investigate method dominance or priority, some have been used in recent studies of literatures in health care in particular (Creswell et al., 2004; McManamny et al., 2015)

Secondly, I performed a quantitative content analysis of each publication's results section. Although one may suspect that qualitative analyses may require more space (higher word count) due to the 'richness' of the data (Creswell, 2013) we expected that in comparison to one another, these content analyses would provide an objective means of measuring method dominance. Therefore, the results section of each publication were analyzed using a word count to determine how much each paper devoted to qualitative and quantitative findings (as a percentage of the total). Under the assumption that

quantifying tables, figures and illustrations would be more difficult, only words apart from these were counted. That is to say, we ignored the thinking behind 'a picture is worth a thousand words' by not assigning each figure a word count. This was thought to provide a more subjective form of analysis across the sample. Word counting as a form of content analysis has long been used by researchers interested in seeing trends within textual data (Holsti, 1969; Kasssarjian, 1977; Onwuegbuzie et al., 2009). Yet I could find no study that used word counting in an attempt to measure method priority within a set of literature as I do here. Some have been critical of word counting, including those suggesting the possible use other units of measurement (e.g. pictures, figures or number of paragraphs) complicates the previously perceived subjective form of measurement (see Guthrie et al., 2004).

Finally, using the sample sizes provided within each publication, quantitative to qualitative ratios were calculated for each. For example, if 'Paper A' by Smith et al. had a quantitative sample of 300 surveys and a qualitative sample of 15 interviews, the sample ratio would be 20:1. Though it is well-known that sample sizes are typically much larger in quantitative data sets (Carey, 1993; Sale et al., 2002) there has been some suggestion that there is more or less a 'correct' range of sample sizes required for qualitative and quantitative analyses respectively and that the latter are usually required to be much higher (Collins et al., 2007). In calculating a ratio for each publication found, I attempt to (however indirectly) measure the amount of resources expended on each method within a study's overall research design- a point that has been suggested elsewhere (Onwuegbuzie & Collins, 2007). In particular, given the labour involved in interviewing,

a ratio that approaches 1:1 suggests very large effort and resources invested in the qualitative compared to the quantitative. The comparison of these ratios was again a novel form of measuring dominance through mixed methods research and was not found within any existing literature.

2.2.4: Rigour in the methodological analysis

There was one important strategy within the structured literature review to guard against threats to rigour. During the qualitative portions of analyses, when I was having a difficult time ascertaining subjective method priority (i.e. through interpretive reading) my supervisor would act as a second set of eyes and would review each paper. This type of triangulation exercise is said to increase inter-coder reliability (Armstrong et al., 1997; Jonson & Jehn, 2009). In four papers that were given to Dr. Baxter in which I saw no method priority, he agreed that there was no clear method priority in three-while in one, he suggested that based on the criteria I used, it was the qualitative research that was slightly more dominant. After a secondary review myself, I agreed that the fourth paper was indeed slightly favouring qualitative research.

2.3: Studies 1 and 2 – Distributive and Procedural Justice

2.3.1: Theories and Methodologies

Studies 1 and 2 (Chapters 3 and 4) were partially guided by the inductive nature of grounded theory but also focused on established research from the social dynamics of

wind energy, risk analysis, environmental justice, facility siting, and general environmental policy literatures. The empirical research consisted of: 1) face-to-face in-depth interviews with proponents, government representatives, and particularly residents living near wind turbines in Ontario and Nova Scotia and 2) surveys with residents and developers within the two provinces.

Following the inductive nature of grounded theory (Corbin & Strauss, 1990; Strauss and Corbin, 1994), interviews addressed a range of issues brought about by the nearby wind turbine installations including economic, environmental and aesthetic concerns of citizens. However, the study and the questions guiding the interviews implicitly focussed on 'locality' or local impacts. It was within this flexible research context that ideas related to the established environmental justice literature emerged from the data. More specifically the concepts of distributive justice and procedural justice quickly appeared to be especially relevant. A short introduction to each literature can be found within the preceding chapter- with more detail found within each article.

2.3.2: Mixed Methods Design for the procedural and distributive justice manuscripts

The decision to employ mixed-methods in this study (Chapters 3 and 4) was the result of both pragmatic and theoretical considerations. First, there has been increasing acceptance of research that combines both qualitative and quantitative approaches in Geography (Crooks, 2007; Luginaah, 2009; Walker et al., 2015) and social science as a whole (Creswell et al., 2003; Hanson et al., 2005; Bryman, 2006; O'Cathain et al., 2007;

Tolman and Szalacha, 2004). Patton (1990) argues that social science research should not be either "pro-numbers" or "anti-numbers" but rather "pro-meaning" (p. 479). That is to say, researchers should not covet one methodology over the other but should aim to use the one- or a combination of both- that best addresses the research problem.

Creswell and Garrett (2008) argue that the potential to use either or both methods provides an expanded 'toolkit' for researchers interested in addressing complex social problems. When well-thought-out and implemented, multi-methods research can enhance a research plan by "[interrogating] both the generalizable and the particular" (Warshawsky, 2014; p. 165). In this way, mixed methods work and the diverse types of data sets it produces are beneficial if the goal is to answer research questions that require both depth and breadth. Practicing authors have also argued that using both approaches is helpful when studying particularly complex issues (Creswell, 2009; Johnson and Onwuegbuzie, 2004) such as wind energy and localized impacts of development.

Pragmatically, there were also some advantages that were experienced as a result of the use of mixed-methods. With particular reference to Nova Scotia, much was unknown about the political and social context behind rural wind energy development. Using a sequential exploratory approach (i.e. qualitative data collection first; see Hollstein, 2014) I was able to better inform the survey instruments that followed beyond what would have been possible if it were a purely quantitative study. That is not to say that the qualitative portion was *only* used to inform the survey. The findings from the

interviews in and of themselves serve a valuable role in this research. Yet without interviewing before the survey was developed, the questionnaires would have been lacking the certain insight and questions developed through in-depth conversations with residents and developers. Conducting interviews first did not lead to a similar type of limitation within the qualitative phase of data collection because of the open-ended, semi-structured nature of the interviews. That is, though questions were prepared for each interview, the conversational nature allowed for the exploration of a variety of concepts related to participants' experiences and opinions surrounding wind energy development. Employing other forms of mixed methods designs- including a parallel mixed-methods approach (i.e. in which both methods are employed at the same time) would have also prevented qualitative research from shaping the survey portion of the research.

Lastly, the inclusion of both methods facilitated the ability to answer a much greater number of research questions. For example, this study was interested in two interrelated questions: i) what are the experiences of the planning and siting processes for local residents? and ii) What are the most important factors in determining the level of local support of planning and siting processes? While some may argue both of these questions could be answered by a single methodology, the former of these questions seems to be much better approached by qualitative means and the latter, through a quantitative approach. In this way, mixed methods allowed the opportunity to follow Patton's (1990) guiding principle of appropriateness, meaning that the questions being examined (and not more subjective preferences) should determine the methodology

employed. This idea has been explored in more detail by Elliot (1999) in her *The Professional Geographer* paper entitled, "And the Question Shall Determine the Method". Elliot argues that in particular reference to the research agenda of health geography, the intersection of 'the biological' with social and environmental variables means socials scientists need to draw on alternative epistemologies and methods.

Despite the apparent advantages to using mixed methods, there are also potential drawbacks- some of which are explored in Chapter 5. Perhaps most critically, the use of mixed methods *often* privileges one method over another (Bryman, 2007; Niglas, 2004) and therefore researchers should question whether or not their mixed-methods research truly uses both approaches or is including them for some other reason. This issue is explored in more detail within the final manuscript. There have also been recent criticisms of mixed methods research because of the relative lack of methodological detail and/or evidence of rigour through data collection and analysis (Wisdom et al., 2012). In a similar way, researchers may cite the usage of mixed-methods as a form of rigour in and of itself- failing to provide any substantiated explanation why this may be the case outside of providing triangulation (Baxter and Eyles, 1997).

2.3.3: Study Design for the mixed methods fieldwork

The research related to Chapters 3 and 4 was carried out in three phases – data collection, data analysis, and journal article/toolkit creation and dissemination - involving multiple case studies (communities) who have turbines built or in the case of Gunn's Hill, Ontario were under construction. In Ontario, we purposively chose three

sites developed under the Green Energy Act and Feed-In Tariff programs (i.e. built 2010 or later). In Nova Scotia, we studied in seven communities home to a variety of developments- Community Feed-In Tariff (COMFIT) projects, non-COMFIT community developed projects (i.e. through Community Economic Development Investment Funds), and a larger, more 'traditional' private development associated with Nova Scotia's request for proposals. More information on these 10 communities is found in section 1.6, of the previous chapter.

The main study was comprised of two key research methods – in-depth qualitative interviews and a follow-up quantitative survey mostly with the two key stakeholder groups most directly associated with wind energy development: residents living within 2 km of actual/proposed turbines, and wind energy developers. Others including municipal councillors and policy experts were also interviewed. The 2 km distance is one advocated by concerned citizen groups and some academics as a reasonable distance to protect against the negative impacts of turbines (see Pierpont, 2009; Shepherd et al., 2011). In addition, it is the setback distance used in our previous quantitative data sets (Walker et al., 2015; Walker et al., 2014) so ease of comparison across cases was an additional motivation. The strict 2 km setback was used for the resident-based survey portion of the research only. For qualitative interviews, the research began with this setback but after snowball sampling we also spoke with residents and policy experts living outside of this distance. Snowball sampling (Noy, 2008) involves asking former participants to ask others they know (e.g. neighbours, friends) if they would like to help with the study. Per ethics guidelines, these potential

participants were encouraged (by existing participants) to contact the interviewer to set up a time to have an interview.

A variety of methods were employed to create a list of home addresses of residents living within a 2km radius of a wind turbine in all communities. In Ontario, when maps and or GIS analysis tools were made available (either through the municipality or the developer) we created buffer zones around each wind turbine and gathered addresses within this area. We were fortunate in the case of the Wainfleet development where there was the "Niagara Navigator" software, which was provided by the Region of Niagara (Niagara Region, 2017). In other cases, we often needed to 'ground-truth' addresses through driving through these rural areas and taking notes on which homes were within two km of a turbine. This was particularly the case in Nova Scotia where GIS analysis tools were rarely provided by the municipality or developers. Despite the nature of 'ground-truthing' being time consuming, it has the side-effect of increasing our confidence that for the survey, only those homes within 2km of a turbine in both provinces were delivered a survey (see Chapter 3).

2.3.4: Qualitative research – in-depth interviews

The in-depth interviews allowed stakeholders to express all their views on wind energy in general, but the interviewer guided the conversation to focus on themes related to local planning and development processes (see Appendix B for interview guide). Interviews were chosen over focus groups because the anonymity of a interview

allowed more candid opinions than are likely in group discussions (Barbour and Schostak, 2005). Further, group discussions can be prone to such tactics as intimidation – a strong possibility with this politically charged issue. As suggested by my previous work I made clear to participants that speaking about issues surrounding community conflict was welcomed (Walker et al., 2014). I also probed how stakeholders felt about the current benefit structures and asked each to propose alternatives they feel might lead to more equitable outcomes in the community. I then opened the conversation to alternative models posed both in the literature and by other stakeholders; ones that the interviewee may not yet have mentioned. The conversations also involved focussed discussion of planning and siting processes as well as alternative or desired changes residents in particular would like to have seen. My goal was to expose and explore such issues in the interviews with all stakeholder groups in both provinces in parallel- yet the interviews were cumulative to add new ideas about benefits, planning and conflict avoidance as I moved deeper into the project. This building of ideas from one interviewee to the next is a hallmark of grounded theory analysis in the social sciences (Pandit, 1996).

The interview portion of the research began in mid-June 2014 (11 months prior to the survey) with letters of information sent out to homes within Adelaide-Metcalfe and Wainfleet, ON. We first randomly selected and sent letters of information to 80 homes that were within 2km of a turbine in mid-June 2014. The response to these drop-offs was initially slow- with only 2 responses within the first 14 days – possibly due to the time of year when agricultural operations intensify and vacationing becomes more

popular. In order to encourage more participation, an advertisement was placed in local newspapers that surround both wind farms and multiple rounds of randomly selected drop-offs (totaling 260) were completed in late June and early July 2014. The latter of these efforts brought the total number of letters dropped off to 192 (77 in Adelaide-Metcalfe, 115 in Wainfleet). One month after the 192 letters were distributed, I received sudden interest and soon interviewed a total of 15 local residents. Some of this increase may be attributed to those who took weeks or even months to indicate their interest in being interviewed. Including some snowball sampling the total number of residents interviewed in Adelaide-Metcalfe (n=9) Wainfleet (n=6) made me certain that I reached thematic saturation (O'Reilly and Parker, 2012) whereby each new interview was adding very little to what ideas and feelings I was capturing. In these original two Ontario communities, I also interviewed municipal council members (n=3) and developers (n=3). These groups were interviewed because they were thought to be intimately connected with day-to-day life in the community and were influential in shaping the way wind energy is built in rural areas. They were purposefully contacted directly through public contact information such as emails or phone numbers.

During the summer of 2014, the Gunn's Hill Wind Farm, located in Oxford County, ON was granted approval to be developed by the Ontario government. Somewhat similar to the conventions of Nova Scotia, it was built under a co-operative model whereby 49% of ownership was made available to the public (more information in Research Context above). Because it presented a rare case of Ontario-based community development, it was added as a third case study site in late 2014. Though

turbines would not be constructed until more than a year later, this was balanced against the benefits of investigating a unique case of community-based wind energy project in the province. After a list of all homes within 2km of a proposed turbine was created, I randomly selected 90 (40% of total sample) homes in Oxford County and dropped off a letter of information. These were dropped off in early October 2014 and by January 2015, 8 interviews were completed with residents (n=4), the developer (n=2) and those involved in the organization behind the community project (n=2). Therefore, with the addition of the Gunn's Hill, case the Ontario qualitative sample was made up of 29 interviews. Most (n=19) were with residents while I also spoke with developers (n= 5) and policy experts (n= 2) and municipal councillors (n=3) (See summary table 2.1 below).

Using the lessons learned in Ontario, I decided to drop off letters at the homes of 40% (n=126) of all homes across four initial Nova Scotia-based sites (Antingonish, Canso, New Russell and Watt Section) – more than originally planned. The focus on these four was due to their different levels of community involvement and experiences with the COMFIT program. A total of seven interviews were then completed with residents in these communities in the summer of 2014. In order to increase the number of interviews, I also used snowball sampling in Nova Scotia and this led to two more interviews with residents. Because I was mostly hearing only positive or pro-wind narratives in the interview process in the four communities, I decided to access the Nova Scotia Department of Environment's Environmental Assessment library in Halifax to find contact information of those writing in to share their opinion about proposed

projects. The large majority of these filings were negative or demonstrated concern regarding local wind energy development. In this respect, I sent out 12 of letters to residents and other stakeholders across 3 new communities in the province. An additional four interviews were completed with these people- two with residents living near a soon-to-be built development in Greenfield, Nova Scotia but were also familiar with developments elsewhere and broader policy development. Thus 14 interviews were completed with residents in Nova Scotia.

Like the preceding work in Ontario, I was also interested in speaking with municipal politicians and developers of wind energy projects in Nova Scotia. Weeks after contacting eight municipal councillors working in 'wind energy communities' in the province, six interviews took place. Participation rates were similarly high after contacting developers. In the two months after contacting Nova Scotia-based firms, three face-to-face interviews were conducted.

Interviews in Nova Scotia thus took place with 14 residents across 4 communities[2]. Additionally, eleven interviews took place with developers (n=3), policy experts (n=3) and local members of council (n=5) in Nova Scotia for a total of 25 interviews. Most of these took place in person though because I was in Ontario when some participants contacted me, one was done through email communication and another was done over the phone.

[2] Though the community of Greenfield was considered as a fifth qualitative community, it was not included in the study because these interviews mainly concerned 'big question' ideas of Nova Scotia policy and I did not send the quantitative components (surveys) there.

2.3.5: Qualitative interview analysis

After all 54 interviews were completed and audio recorded, they were transcribed verbatim using a trusted transcriptionist and placed into NVIVO 10 qualitative software. Coding, the process of identifying themes in qualitative data was used (Hay, 2000). In an attempt to explore every significant issue discussed during each interview, line-by-line coding was employed. This type coding is said to keep the researcher 'close to the data' (Wainwright, 1994). Following the first round of coding, analytic coding was performed whereby I investigated "deeper into the processes and context of phrases or actions" (Hay, 2000; pg. 283).

After these two rounds of qualitative analysis, I selected quotations for inclusion in the two articles (Chapters 3 and 4) that make up part of this dissertation as well as other papers that may follow. The process of selecting quotations has been characterised as a "balance between scientific reporting and artistic license" (Sandelowski, 1994, p. 479). Though there were no strict criteria to decide whether a quote would be used, it is important (though possibly rare) for researchers to discuss why particular voices are heard and others are silenced through this selection process (Baxter and Eyles, 1997). I also acknowledge that there is no single interpretation of qualitative research that is 'right' or most important, yet choices must be made that are defensible. Thus I used two major guidelines which helped us to select and limit the size and number of quotations. First, I chose representative quotations – ones that characterized the major themes I chose to elaborate on within the thesis- which best illustrated the opinions and

experiences of those participants I spoke with (Graneheim and Lundman, 2004). Though I employed quantitative methods to increase our understanding of breadth (Kelle, 2005) it was thought presenting qualitative quotes that were deemed to be important to the largest majority would also help us best understand experiences of turbine development in these communities. Second, quotes were chosen for inclusion if they represented some strong connection to existing literature or in some cases, introduced a novel way of thinking of environmental justice and wind energy development. Some of these novel contributions contrasted with the representative quotes, though it was important to include themes from a range of people including those who challenged emerging and popular themes. Also known as negative case analysis, this process adds transparency, trustworthiness and credibility in qualitative research (Cote and Turgeon, 2005; Register and Scharer, 2010). An example of the presentation of a negative case is found in the qualitative findings of Chapter 3- where a developer "Roger" challenges the notion that COMFIT was a success in terms of both public support and related issues surrounding environmental justice elements.

2.3.6: Quantitative survey research

Surveys were used to allow for a quantitative comparison and testing of the ideas of procedural and distributive justice and development practices of wind energy. That is to further test themes interpreted in the interviews and to increase generalizability. The survey portion was purposively designed after preliminary analysis of all interviews was complete. That is, a *sequential exploratory* mixed-method approach was used whereby

qualitative work is performed first and this helps to inform the quantitative portion to follow (Creswell et al., 2003; see also Chapter 4). This approach was carefully chosen after a thorough review of past uses of mixed methods in what I call the "social dynamics of wind energy" literature. Chapter 5 is devoted to this review.

Using the methods detailed above, which gave us a list of all homes within 2km of a turbine in all communities, surveys were first sent out to the three Ontario and four Nova Scotia-based communities in May 2015. In Ontario we ended up with a final sample frame of 913 addresses. From May to August, surveys were sent out to all of these homes. Of these original 913, 207 surveys 'bounced back'. The reasoning varied but most indicated that the address did not exist or the resident had moved. The vast majority of these (n=195) came back from Wainfleet- a town along the north shore of Lake Erie. This was likely because many residents seem to have their cottage or second home there and so there is no mailbox for which to deliver mail. Only the remaining 12 came back to us from the Adelaide-Metcalfe area where most notes left on the envelopes indicated that people had moved. Indeed, after investigating in person, many of these homes appeared to have been abandoned for a long time. When excluding any 'bounce-back', surveys were sent and delivered to a total of 706 houses in Ontario. Wainfleet received the most surveys (n=287), while 192 and 227 surveys were sent to Adelaide-Metcalfe and Gunn's Hill respectively. After almost a full six months of waiting for all responses to be returned, we received 127 completed surveys from all Ontario-based communities. After disregarding all the surveys that bounced back, the response rate was 18%. Response rates by community in Ontario ranged from 16.3% in Gunn's Hill to

20.8% in Adelaide- Metcalfe. Wainfleet had a response rate of 17.8% (see summary Table 3.2 below)

Because surveys to communities in Nova Scotia were sent out after I left the province (i.e. after qualitative fieldwork was completed), finding homes within the chosen Nova Scotian wind turbine communities was more difficult. In order to collect addresses within 2 km of a turbine in Nova Scotia we relied mostly on municipal GIS staff (when available), GIS analysis (after given coordinates from developers) and a Nova Scotia real estate web service offered by ViewPoint Realty. Their simple GIS software tools allowed for the identification of properties both for sale and not for sale within 2km of a turbine in these communities. This information was cross-referenced with tools available through Google Earth and when available, local politicians (i.e. through calls to their GIS technicians) to create a final list of homes. Initially, surveys were sent out to only those homes within the original four communities where most interviews took place (n=455). These communities (and the number of surveys sent out in each) were: Antingonish (54), Canso (275), New Russell (61) and Watt Section (65). After four months of waiting on responses, I only received 46 returned surveys. Like the experience in Ontario, many (n=141) of these surveys 'bounced back'. Thus the actual number of surveys delivered in the four original Nova Scotia communities was 314. Because of the need to increase the survey sample, and because all homes in the original four communities had been sent a survey already, it was decided that more communities should make up the quantitative sample for Nova Scotia. This was necessary because the number of homes-and thus potential participants- surrounding wind energy projects in

most Nova Scotia-based communities was relatively small. Therefore, there were some communities with resident responses which made up the quantitative sample but did not make up the qualitative sample. The three more communities were chosen: Gaetz Brook (n=269 surveys sent), Upper Hammonds Plains (n=68), and Wedgeport (n=92), where surveys were sent out in summer 2015. Like the result in other communities, there was a fair amount of bounce-back of letters sent out to Gaetz Brook (n=63), Upper Hammonds Plains (n=10), and Wedgeport (n=30). The list of surveys sent out (minus any that bounced back) for all communities in both provinces can be found within the 'Homes within 2 km of a wind turbine' column of Table 3.1 in the following chapter.

When excluding those surveys sent out that bounced-back, 640 surveys were delivered to homes in Nova Scotia in the summer of 2015. There were significant differences by community in terms of survey delivery. The highest percentage of surveys bounced back from South Canoe (59%; n=36) while Canso (32% of sample; n=88), Gaetz Brook (23%; n=62), Watt Section (22%; n=14), and Fairmont (5%; n=3) had higher success rates. Throughout the summer and fall of 2015, 113 surveys were completed and returned from Nova Scotia for a response rate of 17.7% in the province. Not surprisingly, those communities with the most homes found within 2km of a turbine had more surveys returned. The majority of surveys were completed by residents of Gaetz Brook (38) and Canso (29) while the other five; Wedgeport (14), Fairmont (12), South Canoe (8), and Watt Section (7) and Pockwock (5) contributed to 41% of the total.

Table 2.1 – Research Sample Summary

Method	Research Participants	Participants in each province*
In-depth Interviews	Residents near actual/proposed turbines	19 (ON) 14 (NS)
	Wind developers	5 (ON) 3 (NS)
	Municipal councillors and staff	3 (ON) 5 (NS)
	Policy experts	2 (ON) 3 (NS)
	Total	**54**
Survey	Residents near actual/proposed turbines	127 (ON) 113 (NS)
	Wind developers	6 (ON) 6 (NS)
	Total	**252**

*Because the sample frames within each community was the same, it is possible (and even likely) that some interview participants also were also part of the quantitative sample.

2.3.7: Survey analysis

One month after all surveys (n=252; n=240 residents) were returned (by mail or completed online), the responses recorded within them were entered into SPSS 24 quantitative software. After the data was cleaned (see below) and in the case of Study 2 (Chapter 4), weighting was applied, simple descriptive analyses including frequencies and crosstabs were performed in order to examine possible trends in the data by community, province and/or policy program. These initial and more advanced statistical tests were guided by the findings from the qualitative work as a way to triangulate findings – a technique used by others studying within the social dynamics of wind energy (Devine-Wright and Howes, 2010; Lombard and Ferreira, 2014; Walker et al., 2014). Next, bivariate correlations were performed in an attempt to see possible relationships between a variety of dependent variables (e.g. local support, approval of

economic benefits) and range of independent variables found within the survey[3]. T-tests were also used across all papers that used the data collected in order to compare two groups of respondents. This was a particularly helpful test in looking at how responses differed by province. Finally, more advanced multi-variate linear regression analyses were performed. These were done in order to investigate the *relative* importance of a group of selected variables on the dependent variable. Variables were chosen for inclusion in this regression model if they: i) were of special importance to the literature to date and or ii) were shown to be significant in either the qualitative results or preliminary quantitative analyses (i.e. correlations, t-tests).

2.3.8: Other quantitative survey notes

In order to quantitatively understand the experiences of development from the perspective of industry, 18 surveys were also sent out to firms responsible for the developments we studied across Ontario and Nova Scotia. Unfortunately, even with a response rate of 67%, this only left 12 completed surveys- not nearly enough to conduct any sort of reputable quantitative analysis. Though the responses (data) were entered into SPSS, no statistical tests or analyses were run and the surveys themselves did not inform any part of this thesis.

After the 240 surveys were returned, some responses in particular were in need of cleaning (see Osborne & Overbay, 2008). The most intensive re-categorizing came

[3] The full survey can be found within the Appendix C.

through responses that were entered as interval data but contained an 'unsure or do not know' category. For example, when asked where the construction and operation staff from their wind project were from, 56% of residents answered they did not know. Because categories for this question were purposively ordered from: local communities, the province, Canada, and outside of Canada (i.e. most local to most distant across four categories)- inputting a fifth category of 'unsure' would have skewed the ordered analysis. The need for another data editing process became evident after seeing results across two questions meant to examine political viewpoints. Likely because revealing political leanings can be difficult for some to do- even within an anonymous survey- many respondents did not indicate who they voted for in the previous provincial election (n=99) or their general political affiliation (n=116). Fortunately, there was a smaller number of residents (n= 80) who did not answer either question within the survey. Thus, a new variable called "political view" was created. When participants left one of the previous questions blank or refused to answer, we assigned their political view as whatever was revealed in the other question (e.g. If a person indicated they voted Liberal in the last election but refused to indicate their political affiliation, they were assigned Liberal). In some (n=19) cases where answers to the questions were not consistent, or the participant indicated 'other' in both questions, no political view was created. Therefore using this method, a total of 124 were assigned a political view. Still, given the overall lack of response from these questions, future research should instead look to determine political leaning through more indirect questions (see Everett, 2013).

2.4: Rigour

In the quantitative realm, rigour is usually focused on the ideals of external validity and reliability (Drost, 2011) while in qualitative work rigour is involves different, but related terminology including credibility (internal validity), transferability (external validity) and confirmability (reliability) (Baxter and Eyles, 1997; Koch, 2006). Not surprisingly, the 'rules' or guidelines governing rigour in mixed-methods research are even less established. The limited amount of literature on the subject points to the suggestion that mixed methods research should at the very least include sufficient methodological detail as would be expected in a stand-alone qualitative or quantitative paper (Wisdom et al., 2012). More information on this idea- especially with reference to rigor in qualitative and mixed-methods research can be found in Chapter 4.

2.4.1: Qualitative rigour

Threats against rigour were guarded against in the qualitative portion of the research in at least four ways. First, I took great care to ensure that themes presented and discussed within each interview would not be misinterpreted in the coding that would follow. This was done through what I call 'in-situ member checking'- whereby I would consistently ask each participant for clarification or elaboration during the interview when a particular idea was unclear. In contrast, traditional member checking occurs after preliminary analysis is complete (Creswell and Miller, 2000; Sandelowksi, 1993). If during interviews if I found myself thinking, "I wonder what she meant by that?", I would continue the conversation within such an issue until clarification was given. Thus the 'in-situ coding' or member checking provided the answer in almost all

cases. In cases where I could not answer this question, the ideas were usually less relevant to the existing and/or emerging research questions. Ideally this qualitative rigour strategy would have been accompanied by a more traditional form of member checking where a researcher brings preliminary results or interpretations back to the participants to essentially ask, "did we get this right?" (see Creswell and Miller, 2000). Unfortunately, due to the time consuming nature of mixed-methods research, timelines were relatively tight and because research needed to continue, I decided that traditional member checking would not be feasible. Additionally, my past experiences with the process (Walker et al., 2014) indicated that it may not necessarily add very much insight into the already analyzed qualitative work. I did however provide some feedback to participants somewhat after the fact- both through the online publication of the toolkit which summarized much of the findings from the dissertation as well as making publications publicly available for one month after acceptance (i.e. through our research website).

The second strategy employed in the qualitative portion to guard against threats to rigour was to have each interview transcribed verbatim and to use only verbatim quotations in all results sections. This is likely one of the most popular ways in which qualitative researchers can increase the transparency of their research findings and has been noted to be commonly used in social geography research in particular (Baxter and Eyles, 1997; English et al., 2008). In using only verbatim quotes, we increased authenticity or what Kline (2008) calls 'presentational rigour', making the results and

research conclusions more trustworthy from the perspective of the reader (Poland, 1995).

Third, during the qualitative phase of the research I used both random and purposeful sampling in order to hear a wide variety of voices. This helps with the transferability of the findings (Baxter and Eyles, 1997). For example, in Nova Scotia in particular, most residents that were sent a letter of invitation (i.e. living within 2 km of a turbine) were supportive of the wind energy development in their community. Yet during many of these conversations, they would mention that there was a small group of people who opposed development. Therefore, in order to speak with these important community members and hear varied perspectives, interviews were set up with them through snowball sampling (see Noy, 2008). Interviews were also purposively sought with 'policy experts' and politicians in both provinces who (often) did not live near any of the wind energy developments studied (more detail given below). Though this type of sampling minimized the odds of accurately characterizing the overall feelings within each local community, it was more important for the qualitative research to emphasize depth and a variety of opinions and perspectives- which are less likely to happen within smaller sample sizes to begin with.

Fourth, although the list of questions asked during the interviews evolved somewhat, each was based on a standardized interview guide (see Appendix B). This list of questions changed based on new insights and knowledge particularly during the initial stages of interviewing residents living close to wind energy development. That is, the interview guide was designed with an eye toward the 'delicate balance' between

theoretical flexibility and relative consistency. Using a standardized or semi-structured interview guide is said to allow for stronger comparisons between interviewees (Baxter and Eyles, 1997; see also Eyles et al., 1993)- an important idea of our research taking place across two provinces. Unlike a survey, the wording of each question should not be entirely consistent because the interviewer must often use a participant's unique vocabulary and understanding of the issues to ask different and/or supplementary questions – a key advantage of the researcher "as instrument" (Britten, 1995).

2.4.2: Quantitative rigour

For the survey portion of the research, I also established rigour through multiple field and analytic strategies. Perhaps most importantly I used a randomized or total sampling strategy within every community. I sent out surveys to all known homes within 2 km of a turbine in all 10 turbine communities – as complete a sample frame as is possible. That this spatially-based sample frame was perhaps too complete even is evidenced from the fact of the several returns from cottages without mail service. Not only does this strategy lead to results that can be generalized, it was a necessary one, particularly in Nova Scotia where the number of homes within 2 km was often less than 50. Though in Ontario there were upwards of 300 homes in some cases, the need to have a large enough overall sample for quantitative analysis meant that we dropped off or sent surveys to all known addresses.

Despite the efforts made to make sure surveys were sent out to every eligible household within 2km of a turbine it is entirely possible that I did not capture the true

representation of the population(s). This is because of the fact that like participation in interviews, returning the surveys was voluntary and thus some degree of self-selection was present. Self-selection bias is a common problem in qualitative and quantitative research in the social sciences (see Costigan and Cox, Hudson et. Al., 2004; Whitehead, 1991) and occurs when the types of participants who respond to questionnaires or surveys do not represent or distort the characteristics of the overall population (Heckman, 2010). As is explained in more detail below, across the entire sample, only 19.7% of those receiving a survey completed and returned it. There is some evidence from the social dynamics of wind energy literature that those who come forward to share their feelings related to wind energy- at least in the context of planning and siting processes- are generally those opposed to development (Bell et al., 2005; Toke, 2002; Wolsink, 2000). Wolsink (2000) notes that "people generally do not come forward with positive responses…" (p. 58). Thus though this is difficult to measure, it is possible that our survey over-represents the actual percentage of those against their local wind energy development. However, there is no reason to believe that this possible distortion is any more prevalent across provinces or communities. That said, there have been pockets of resistance in Ontario, where residences have been discouraged from completing surveys by concerned citizens groups. This would bias the sample in the opposite direction, towards favourable opinions of turbines. We have no specific indication that this was happening in our Ontario study sites – that is, no emails to us or posts on concerned citizen blogs or websites recommending locals not to participate in our study. There are negative things said about both myself and Dr. Baxter though, mostly across comment boards of websites such as: Ontario Wind Resistance, Wind Concerns Ontario and more

traditional media outlets such as the London Free Press. We do not know how widely read these comments are, being buried where they are on these websites.

A second way in which quantitative rigour was guarded was through a purposeful survey design. Care was taken to make sure that questions reflect the lived experiences of wind energy development in both provinces. Hoinville and Jowell (1978) argue that understanding the targeted population is paramount to designing an effective survey instrument and that the best way to do this is through qualitative work which can identify important attitudes and issues. In doing so, well-designed surveys decrease the likelihood that questions force respondents' views into false or irrelevant structures. This was aided by the fact that interviews were completed and coded prior to the surveys being sent out to participants. Survey questions were also shaped by personal conversations with my supervisor (Dr. Jamie Baxter), other practicing academics in the field and through intensive reading of the academic literature. Together, these steps help to ensure that the survey was a good measure of the constructs relevant to the research project (see Fowler, 1995).

Third, quantitative rigour was enhanced by allowing multiple options for participants multiple options to respond to the call for surveys. In addition to the traditional mail-back option- for which we included a self-addressed stamped envelope- participants were also given a unique four digit code and access to complete the survey online. Most early research looking at the introduction of web-based survey has indicated that the quality and usefulness of data collected is high and/or similar to that

of traditional methods (Cockburn and Wilson, 1996; Huang, 2006; Kaplowitz et al., 2004; Stanton, 1998). Though we received only 11 online responses[4](compared with 229 mail-back) from residents, it was believed that in creating two options for potential participants to respond, we would encourage more participation due to different preferences of those looking to participate (Dillman et al., 2009). Those responding using the online option tended to be significantly younger and were more likely to have a university degree.

2.5: Conclusion

This chapter provided an expanded description of the theoretical and practical considerations behind the mixed-method approach used for this dissertation - given the choice of the integrated manuscript option. Even with manuscript reviewer comments that asked for more methodological detail in one submitted journal article in particular, there was limited amount of space in each findings chapter (article) to write thoroughly on methods. One way around this was for each to focus on a different aspect of methodology, then cite the other (i.e. "for more information, see companion piece, Walker and Baxter, 2017"). Even with these kinds of strategies, there was not nearly enough room for the type of discussion given here.

As is shown throughout the preceding pages, I went to great lengths with regard to data collection and analysis to ensure the methodological rigour of this dissertation.

[4] In order to make sure respondents were not submitting two or more surveys, we gave each survey a unique code which could either be used online to access the survey or 'used' by mail by sending the survey to us. Through this, we found no cases where a person tried to send the survey two or more times.

First of all the choice of using grounded theory (Pandit, 1996) was very beneficial in helping to guide the evolving set of research questions. One such research question that evolved organically through a reading of the literature was the one concerning research design and method dominance in mixed methods research. This led to the first article in this thesis (presented as Chapter 5 here). The dynamic nature of grounded theory also allowed for flexibility during interviews with developers across both provinces where I had very limited experience in the understandings of industry. For example, discussion of novel compensation measures (i.e. electricity rebates) meant I was able to present these types of ideas in further interviews and the survey work. Having a more rigid set of (qualitative and quantitative) research questions would have prevented this type of evolution.

While difficult to coordinate at times, the mixed method approach used in this dissertation research served an important role- mainly that it allowed for "[interrogation of] both the generalizable and the particular" (Warshawsky, 2014; p. 165). I followed the ideas of both Patton (1990) and Elliott (1999) who suggest answers to social scientific inquiry should not favour one method over the other but rather, 'the question shall determine the method'. In the case of Studies 2 and 3, qualitative work was used to increase our understanding of the in-depth, daily life experiences of wind energy development, while survey analysis was employed to see larger trends and test ideas of generalizability related to distributive and procedural justice.

Apart from being important on its own, my analysis of mixed methods research conducted by others helped to shape the way in which I wanted my own mixed methods

research to proceed. After a careful consideration of all possible designs, the sequential exploratory approach was chosen for Studies 2 and 3 (Hollstein, 2014). This allowed for the interviews to precede the survey by months, and in turn for the qualitative results to inform the quantitative instrument. This was particularly beneficial in Nova Scotia where I knew must less about residents' experiences with wind energy development.

While much went as originally planned, this dissertation also encountered a few problems and limitations. The first was the number of surveys that 'bounced-back' from some communities. This meant that in most cases, a much smaller number of potential responses were to be expected- especially Wainfleet, ON where almost 200 surveys were returned without completion. A second problem encountered was the need for two different sampling frames from the qualitative to the quantitative portions of the research. Relatively small populations living within 2 km of a turbine in our four original Nova Scotia-based communities, alongside the need for larger number of quantitative responses, meant that more communities would need to be sampled in Nova Scotia. Ultimately three more communities were chosen for the quantitative portion of the research. That these sample frames do not align is not ideal but should be acceptable given the comparisons by province (see chapters 3 and 4) and not necessarily community.

Lastly, the steps made toward rigour- both in qualitative and quantitative terms- helped make this research more transparent, trustworthy and reliable. In the context of limited word counts in academic journals, this chapter allowed the space to provide in-depth descriptions of the ways in which rigour was used in this dissertation. In

providing these descriptions, we help the reader to understand the steps taken to ensure all forms of inquiry were methodologically sound and that much was done to ensure findings are valid.

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Chapter 3: "IT'S EASY TO THROW ROCKS AT A CORPORATION": WIND ENERGY DEVELOPMENT AND DISTRIBUTIVE JUSTICE IN CANADA[5]

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[5] This chapter is also published in the Journal of Environmental Planning and Policy. As the lead author, I received permission to include this journal article within the current thesis. See Appendix E.

3.1 Introduction and literature review

Despite the need for wind energy as an alternative source of electricity, some jurisdictions – including Ontario, Canada – have faced intense pushback from local communities. According to growing literature, this resistance is partially because of policy which restricts local powers (Baxter, Morzaria, & Hirsch, 2013; Hill & Knott, 2010; Songsore & Buzzelli, 2015; Stokes, 2013; C. Walker, Baxter, & Ouellette, 2014). The Green Energy Act of Ontario is one such policy. Developed in 2009, it has severely limited the amount of community involvement during the planning stages – essentially removing local voices and input (Fast et al., 2016; McRobert, Tennent-Riddell, & Walker, 2016). This relationship between policy and local support suggests that issues of procedural justice dominate (see also Hall, Ashworth, & Devine-Wright, 2013; Ottinger, Hargrave, & Hopson, 2014; Zoellner, Schweizer-Ries, & Wemheuer, 2008). Less has been said – particularly in the Canadian context – about distributive justice (Gross, 2007; B. J. Walker, Wiersma, & Bailey, 2014) or 'the equitable distribution of outcomes' (Kuehn, 2000, p. 10684) – something that can theoretically be neglected even when procedural matters are made more just.

The concept of distributive justice relates to how (mostly financial) benefits are introduced and shared within communities (Rawls, 1971). In the context of wind energy, benefits can take many forms including group-oriented tax revenues for municipalities, and community funds to more individualized lease payments to landowners 'hosting' turbines. More substantial initiatives involve partial or outright ownership of a project

by local citizens or community groups who share in the profits (Cowell, Bristow, & Munday, 2011), ensuring that more benefits stay within those communities (Munday, Bristow, & Cowell, 2011). When benefits are not created, identified, or accepted by individuals in local host communities, feelings of opposition are more likely to manifest (Bronfman, Jiménez, Arévalo, & Cifuentes, 2012; Cohen, Reichl, & Schmidthaler, 2014). Furthermore, rapid growth and support for wind energy have been attributed to the deliberate localization of financial benefits (Bolinger, 2004; Toke, Breukers, & Wolsink, 2008). Denmark and Germany have encouraged community-owned development whereby local residents can share in the profits of the project (Jobert, Laborgne, & Mimler, 2007; Musall & Kuik, 2011; Walker & Devine-Wright, 2008). In development models that focus on 'outsider' investors or developers, though community-based tax and collective community projects (e.g. new recreation centres, parks) are often part of mitigation plans, direct financial benefits for local residents are rare (Brannstrom, Jepson, & Persons, 2011). Recent research in North America (Baxter et al., 2013; Mulvaney, Woodson, & Prokopy, 2013; Slattery, Johnson, Swofford, & Pasqualetti, 2012; C. Walker et al., 2014; Walker, Baxter, Mason, Luginaah, & Ouellette, 2014) is consistent with European research (Gipe, 1995; Mackenzie, 2010; Walker & Devine-Wright, 2008; C. Walker et al., 2014), which suggests that the 'right' type and degree of economic benefits lead to more support for wind energy.

The term 'community-based' as it applies to wind energy development has multiple meanings – indeed, it has been co-opted to mean more than the sharing of profits locally (Bristow, Cowell, & Munday, 2012). There is concern that industry-led

initiatives have used the term to their advantage when, for example, community tax benefits are involved (Walker & Devine-Wright, 2008). Our definition of 'community-based' is fairly narrow; it concerns majority ownership or investment from those individuals living close to wind turbines. In this sense, cooperative or other models that involve some 'locals' investing in turbines may not be 'community-based' by our definition if the majority of investors live nowhere near the turbines. 'Community' in this context refers to spatial locality (e.g. those living close by; Walker & Devine-Wright, 2008). For example, our quantitative and most of our qualitative sample frames are made up of those residents living within 2 km of a wind turbine (i.e. a locality).

In efforts to site and build wind turbines that are supported locally, developers are employing more equitable benefit schemes which minimize the gap between so-called winners (lease-holders) and losers (people living close to turbines without compensation) (Gross, 2007; C. Walker et al., 2014). In Exmouth, UK participants were more likely to support a hypothetical development when benefits were communicated in a way that ensured a 'good deal' to communities (B. J. Walker et al., 2014). They suggest that avoidance of speaking about the implementation of 'individual benefits … may be the most viable way to increase support' (p. 46). Other research has similarly suggested that local acceptance increases, as smaller benefits are seen across the community rather than larger ones given to individuals within it (Cass, Walker, & Devine-Wright, 2010; Ter Mors, Terwel, & Daamen, 2012; Wolsink, 2007). Attitudes to financial and other benefits are also likely bound up with residents' feelings of trust in the wind energy developer – such that being fairly dealt with in the siting process can develop

trust and positive attitudes towards any benefits (Hinshewelwood, 2001; Walker, Devine-Wright, Hunter, High, & Evans, 2010). Aitken (2010) also suggests that perceptions of unfair economic benefit packages are inextricably linked to feelings of mistrust towards developers. Under community-owned project scenarios, trust is more likely to be fostered under cooperative approaches (Aitken, 2010; Barry, Ellis, & Robinson, 2008; Toke, 2005).

Though some research has looked at ideas of distributive justice and wind energy development generally, unpacking distributive aspects of financial benefits in local communities has been limited. For example, the nuances of what expectations are and what people think of what they have been given in relation to others has rarely been studied. Among the limited set of early papers that do provide nuance, Maruyama, Nishikido, and Iida (2007) suggest that in Japan, investment as profit sharing has the potential to attract local residents and create the effects of a social movement. More often, researchers have asked if benefits were generally acceptable (Baxter et al., 2013; C. Walker et al., 2014; B. J. Walker et al., 2014) or if residents approved of specific benefits such as jobs or tax revenues created (Brannstrom et al., 2011; Slattery et al., 2012).

There is also a group of papers that caution of the problems associated with a focus on compensation alone. Cowell et al. (2011) warn that '[couching] the rationale for community benefits in instrumental terms' or as a tool for compensation of (social) impacts is troublesome (p. 539). They suggest that efforts to increase distributive justice without attention to other important factors including planning processes (i.e.

procedural justice) may significantly hinder efforts to build projects that are supported. In addition, Ter Mors et al. (2012), in the broader realm of facility siting, have criticized the 'compensation' literature for focusing almost exclusively on financial benefits as a means for garnering local support. In this way, we aim to unpack distributive justice as necessary but not sufficient condition of public acceptance.

Even when well intended, payments intended to offset negative externalities from developments like turbines may actually increase public opposition. For example, financial benefits have been criticized by some local residents as bribes or 'blood money' (Kleinsteuber, 2016). That is, compensation raises suspicions about mitigation efforts, whereby residents worry that developers see payments as a substitute for maximizing safety (Gregory, Kunreuther, Easterling, & Richards, 1991). This 'bribe-effect' has been seen in the wind energy (Baxter et al., 2013; Cass et al., 2010) as well as facility-siting literatures (Claro, 2007; Ferreira & Gallagher, 2010; Frey, Ober-holzer-Gee, & Eichenberger, 1996; Ter Mors et al., 2012). Related to hazardous waste siting, inequity of benefit packages has been shown to exacerbate risk concerns in local communities (Kasperson & Kasperson, 2005). In a more general sense, however, psychometric studies show a direct relationship between risks and benefits whereby feelings of risk decline as the perception of benefits increase – suggesting that some risks are relatively acceptable in the face of compensatory benefits (Finucane, Alhakami, Slovic, & Johnson, 2000; Krimsky & Golding, 1992; Renn, 1992; Starr, 1969).

The remainder of this paper compares stakeholders' views of and experiences with financial benefits in Ontario and Nova Scotia – two Canadian provinces with very

different approaches to community benefit strategies. Given the established, mostly European literature that suggests that distributive justice is an important tool for increasing public approval of development, we examine these ideas in jurisdictions where wind turbines are relatively new to the energy landscape. In Nova Scotia – where policy has encouraged some level of community ownership – we expect the perceptions of distributive justice to be stronger than in Ontario where developer-led initiatives without any level of community ownership (profit-sharing) are typical. One existing study has looked at the impacts of economic benefits in Nova Scotia and found that there was a positive relationship between the perception of benefits and concern about negative impacts; however like Cowell et al. (2011), they recommended that offering local investment should not be a substitute for local engagement (Vass, 2013). Research from Ontario finds that the perception of an uneven distribution of benefits predicts opposition to local wind development. In areas where residents saw compensation as fair and deserved, there was a significant and strong correlation with turbine support (Baxter et al., 2013; C. Walker et al., 2014).

The emphasis here is on variance in policy contexts (Mills, Van de Bunt, & De Bruijn, 2006) – one with community profit-sharing required by the policy (Nova Scotia) and one that does not (Ontario). In this way, our study extends the handful of mixed methods studies on how benefits are perceived in the context of wind energy (e.g. B. J. Walker et al., 2014) by asking residents and other stakeholders about their preferred 'way forward' in terms of benefit packages in Canada.

3.2 Policy contexts of Ontario and Nova Scotia

Below, the reader is given some background information regarding wind energy policy measures as well as some simple descriptions of the communities studied in Ontario and Nova Scotia. It is critical to underscore context in comparative research as 'what is possible in one context, may not be elsewhere' (Walker et al., 2010). Based on our survey sample, Ontario participants were more likely than Nova Scotia sample residents to identify as Conservative (71.6% vs. 25.1%), were slightly less educated (64.6% vs. 70.2% College diploma or higher), and were more wealthy (64.9% vs. 56% with median family income of $55,000 or more). Based on visual observations of the housing stock, homes in Ontario were generally larger and more recently built than those in Nova Scotia. Further descriptions of all communities can be found in Table 1.

3.3.1 Ontario

Due in large part to the Green Energy Act and Feed-In Tariff (FIT) programme, recent development in Ontario has been almost entirely developer-led, and not very community-oriented in terms of profit sharing (Fast & Mabee, 2015). The FIT programme historically offered favourable prices (e.g. 11.5 cents/kWh) for electricity generated through renewable technologies (IESO, 2015). Throughout this time, there were also Aboriginal and Community-based 'price adders'[1] ranging from 0.5 to 1.5 cents/kWh. Recent history in Ontario has shown that these adders have had only very limited impact in drawing in community investment or municipally owned projects (IESO, 2016). Most new projects continue to deliver the large majority of profits to

developers and any individualized benefits go to a relatively small number large-parcel land holders who lease their land to developers for the turbines (Fast & Mabee, 2015).

The three Ontario research sites are set in different, largely agricultural, areas of southern Ontario. They were chosen because they all recently went through siting processes under the Green Energy Act and FIT programmes and thus were developer-led. Adelaide-Metcalfe and Norwich are both set in Southwestern Ontario, near the communities of Strathroy and Woodstock, respectively. Wainfleet, Ontario is located in Southern Ontario near the city of St. Catharines and is less agricultural in nature (for full descriptions of each community, see Table 3.1).

Table 3.1: . Research site contexts.

	Community	Project name	Number of turbines (MW)	Population size (est.)[a]	Homes within 2 km of a wind turbine	Type of project/ownership structure
Ontario	Adelaide-Metcalfe	Adelaide Wind Power Project	18(40 MW)	3000	192	Developer-led
	Wainfleet	Wainfleet wind energy project	5(9 MW)	6400 (Township)	287	Developer-led
	Norwich	Gunn's Hill Wind Farm	10(18 MW)	10,721 (Township)	227	49% public ownership
Nova Scotia	Canso	Sable Wind Farm	6(14 MW)	800	187	Municipally owned (51%)
	County of Antigonish	Fairmont Wind Farm	2(4.6 MW)	4500 (North of Antigonish)	51	Majority developer-led; Minority (35%) community-owned (CEDIF)
	Sheet Harbour	Watt Section	1(1.5 MW)	800	51	COMFIT; Majority (51%) community-owned
	New Russell	South Canoe	34(103 MW)	10,600 (Municipality of Chester)	25	Developer-led
	Gaetz Brook[b]	Gaetz Brook Wind Farm	1(2.3 MW)	2020 (Head of Chezzetcook)	206	COMFIT; Majority (58%) community-owned
	Upper Hammonds Plains[b]	Chebucto-Pockwock Community Wind	5(10 MW)	1850	58	COMFIT; Majority (51%) community-owned
	Wedgeport[b]	Little River Harbour	1(1.99 MW)	8300 (District of Argyle)	62	COMFIT; Majority (>50%) community-owned

[a]Population estimates were obtained (when possible) from Stats Canada census data. When these data were not available, estimates were obtained from information obtained through county or municipal offices.
[b]These communities were part of the quantitative sample frame only.

3.3.2 Nova Scotia

In Nova Scotia, there have been far more concerted legislative efforts to support community-owned wind energy development and thus keep economic benefits in the province. Since 1999, the province has promoted community-based development through their Community Economic Development Investment Fund (CEDIF) programme – which was created to help Nova Scotians start or invest in local businesses (Vass, 2013). Under this programme, any resident of the province can invest in a wind project – for as little as $1.30 per share in some cases – and there must be at least 25 investors from the local municipality (Allen, 2014; Vass, 2013). Investments are granted a 35% provincial income tax credit and shareholders gain some decision-making ability through the election of a board of governors (Vass, 2013).

Major renewable energy policy development in Nova Scotia began in 2009, when under pressures to reduce emissions and stabilize electricity prices, participatory processes helped to create new policy (see Adams, Wheeler, & Woolston, 2011). One year later, the government of Nova Scotia formally announced its Renewable Electricity Plan (REP) – which set a target of 25% renewable electricity by 2015 – a goal that has been exceeded (Nova Scotia, 2015). An important part of the REP was the Community Feed-In Tariff (COMFIT) programme that shared some attributes with Ontario's FIT policy, with the major difference being that corporations were excluded – only CEDIFs and other community groups could hold majority ownership (Vass, 2013). As of October 2016, COMFIT wind energy projects included ownership from CEDIFs, municipalities, not-for-profit groups, universities, and First Nations groups (Nova Scotia, 2016c). In

comparison to the more technocratic, developer-led model of Ontario, it appears that the COMFIT and Nova Scotia's other community-based wind initiatives have more promise for realizing more equitable economic benefits at the local level.

In Nova Scotia, we selected six small developments that either fell under the province's COMFIT policy (n = 4) or other forms of community ownership (n = 2). Only one project was entirely developer-led and relatively large in size (New Russell). In comparison to Ontario-based communities, those in Nova Scotia were generally much smaller and though mostly set in rural areas, were less agricultural (see also Table 3.1).

3.3 Methodology

We used mixed methods – combining the analysis of interviews and surveys – to investigate the nuances of financial benefits and distributive justice comparatively. The research was carried out in two phases – first 54 in-depth interviews were conducted with residents (n = 31), municipal leaders (n = 10), developers (n = 7), and policy experts (n = 6) associated and/or living with rural wind energy developments in Ontario and Nova Scotia. Participants volunteered after they received a letter of information (LOI) outlining the research and their potential participation in it. This LOI was sent to approximately 40% (n = 407) of randomly selected homes within 2 km of a turbine in 3 Ontario and 4 Nova Scotia-based communities. A total of 31 interviews with residents took place for a participation rate of 7.6% (6.7% in Ontario; 9.6% in Nova Scotia). A more targeted approach was taken to arrange interviews with developers, municipal leaders, and policy experts across both provinces. Using publicly available information,

these people were purposively contacted to represent a range of turbine development companies including ones who had worked in our case communities. The topics covered in the interviews included: views of turbine siting, community conflicts, and benefits and fairness. All interviews were transcribed verbatim and were analysed using an inductive grounded theory approach involving line-by-line coding (Ryan & Bernard, 2003) with the help of NVivo software.

We used the preliminary interpretations of the interviews to create a quantitative survey that was delivered to all homes within 2 km of a wind turbine (n = 1346) across the same 7 communities from the interview phase, plus 3 more communities in Nova Scotia. These latter communities were added to increase the sample size to support adequate statistical analysis (Tacq, 2011). Thus, Gaetz Brook, Upper Hammonds Plains, and Wedgeport were added to make a total of 10 communities surveyed (see Table 3.1). Like the interviews, a LOI was included and participation was voluntary. The questionnaire comprised questions concerning attitudes towards wind energy development, facility siting and developer engagement, economic benefits and fairness, and range of socio-demographic control variables such as age, income, gender, and political affiliation.[2] Respondents indicated their response to most questions on a 5-point Likert scale from strongly agree (1) to strongly disagree (5).

For the quantitative portion of the research, we received a total 240 completed resident surveys (n = 127 in Ontario; n = 113 in Nova Scotia) for a response rate of 17.8%. The overall analytical strategy was to explore the predictors of both support for turbines and perceived adequacy of benefits, first by producing cross-tabs, simple

correlations, and t-tests with all potential predictor variables against these dependent variables (DVs). The second phase involved regression modelling using only those predictors which were significant in the bivariate analyses, and/or within the literature more broadly. The first regression was a one-stage model with local sup-port as the DV and five distributive justice variables as the independent variables (IVs). The second regression used four blocks of variables to model the 'perceived adequacy of economic benefits' as the DV.

3.5. Findings

In the following pages, mixed-methods results are presented according to key themes that emerged in the conversational interviews. There is a purposeful examination of differences between: (i) provinces and (ii) policy programmes.

3.5.1 The importance of sharing benefits locally

In conversations with those familiar with the policy programmes of both Ontario and Nova Scotia, it was clear that the latter was seen as a 'better way' to develop wind energy. Survey results also show that local support (26.9% vs. 79.8%) and approval of the way turbines were planned and built (21.1% vs. 66.1%) were approximately three times higher in Nova Scotia. When asked about what he believed was the most important factor behind the successes in the province, 'Peter' who works for a developer who specializes in COMFIT projects immediately cites economic returns:

> 'Peter' (NS): I think the biggest thing is if you can allow people to take on some ownership in the project and provide them with financial returns- it gets a lot more support.

Using the survey data, we ran bivariate correlations between five measures of perceived financial benefits[3] (IVs) and local support (DV) and found strong relationships in the expected direction (i.e. more/equitable benefits correlating positively with more support; not shown).

In a conversation with a policy expert in Nova Scotia, 'Kathryn' hypothesized that the COMFIT projects in Nova Scotia work well because when they form the majority ownership group, local owners are much more difficult to despise than outsider owners:

> 'Kathryn' (NS): There doesn't seem to be the opposition [in Nova Scotia] and maybe … it's just hard for someone to stand up and say, 'I don't want my community to benefit.' (Laughing) Whereas [in other places] … well it's easy to throw rocks at a corporation because they have a terrible reputation and a lot of it is earned.

From the survey, when asked about community-based development, the majority of the resident respondents thought favourably of the idea. Just over 56% of the overall sample agreed 'Wind energy development is best when it is owned by local communities', while only 5.6% disagreed. Approval of community-based development was slighter higher in communities that went through COMFIT or had some degree of community-based initiatives. That these differences are not statistically significantly different by policy or province suggests broad based appeal for the idea of community-based majority ownership programmes.

Despite some preliminary indications, there were exceptions to the idea that community-led development leads to the perception of better outcomes. Though the literature and interview data suggested that having a chance for public investment would correlate with higher levels of support, it did not in Norwich, ON where the proponent offered and received 49% public ownership in their project. Across Ontario, community-based development is rare and so investigating the impact of such a development gives us a unique chance to see how public investment opportunities can work in the province. The survey revealed that there was less support for Gunn's Hill (21.2%) compared to the Ontario average (26.9%) – despite residents there showing higher praise for all measures of perceived economic benefits than the Ontario average (Table 2).

Further to the idea that policy may influence views somewhat, one third of all Nova Scotia residents agreed with the statement, 'The local wind energy development in my community has brought with it adequate economic benefits' – more than twice as much as the Ontario average (Table 3.2). Table 3.2 also makes clear that a majority in both provinces feel that more payments should be given to the local community (ON – 65.9%, NS – 71.4%) – suggesting that benefits are falling short – even for those Nova Scotia residents living near community-based projects.

Table 3.2: Perception of benefits in Gunn's Hill, Ontario, and Nova Scotia.

Per cent who agree:	Gunn's Hill (%)	Ontario[a] (%)	Nova Scotia (%)
The local wind energy development in my community has brought with it adequate economic benefits	18.8	15.5	33.0
The positive impacts of the existing wind power project are distributed fairly within the local community	6.1*[b]	4.4	17.7
All residents have been adequately compensated for the negative impacts of the existing wind power project	5.9	5.5	8.0
More financial benefits should be given to the local community	55.9*	70.3	75.2
I was aware of opportunities to invest or own part of my local project	45.5*	9.2	17.3[c]

[a]Excludes Gunn's Hill.
[b]*Significantly different from Ontario average (p = .05).
[c]Even though 17.3% were aware of investment opportunities, Nova Scotia respondents still had the highest percentage reporting they felt that economic benefits were adequate.

3.5.2. Differing views of financial benefits

In Ontario, many residents we spoke with were unfamiliar with the idea that turbines could bring with them more substantial financial benefits than currently exist. The few we interviewed who were familiar generally had negative views of such benefits, full stop – like Lauren who says that any benefits without addressing health issues 'feels toxic':

> 'Lauren' (ON): I've never felt comfortable with [spreading financial benefits]. … So if my husband was suffering from the migraines from that noise it would be like his boss coming up to him and saying, 'well we'll give you another 100 bucks a week to continue to suffer.' You know? 'But won't that soften it?' No … it becomes blood money. It feels toxic.

Even a supporter of wind energy in Ontario acknowledged that introducing community benefits draws a fine line between providing a 'genuine' offset and being 'bought off':

> 'Sandy' (ON): You know the one thought [I have] is 'Well that's just the wind mafia buying you off.' The other thought is 'Yes we genuinely want you to benefit because you're going to be looking at the thing.' So which one is the right answer on that? I'm not exactly sure.

The need to introduce more community benefits to allow residents to 'escape' was also a theme in interviews. Among survey respondents, 75% of residents agreed that a fund should be established to pay fair market value for those unable to tolerate turbines, while 73% believed that more benefits should be given to those close to turbines. There were no significant differences by province or policy in this strong desire for greater local benefits. This is in spite of statistically significant provincial differences across 'negative impact categories' in communities with wind turbines – including health effects and property values (see Table 3.3).

Table 3.3 Perceived negative impacts of wind energy development by province.

	Province	Percentage agreeing	t-test of means sig. (p-value)
I have experienced negative health effects due to the wind turbines.	ON	15.8	.00*
	NS	5.5	
The value of my property and/or dwelling has decreased due to the wind turbines.	ON	46.2	.00*
	NS	15.6	
I find the natural landscape in my community less appealing due to the wind turbines.	ON	63.6	.00*
	NS	27.5	
I enjoy spending time outdoors less due to the wind turbines.	ON	31.7	.00*
	NS	12.8	
I invite guests over to my home less frequently because of the wind turbines.	ON	17.5	.00*
	NS	3.7	

*Statistically significant difference between mean response ($p < .05$).

Particularly by developers we spoke with, financial compensation was often linked to feelings of jealousy. From their perspective, financial compensation is needed in order to address the situation where landowners holding turbine leases tend to be the only beneficiaries – as is the case across the large majority of projects in Ontario. To contrast, the approach taken in Nova Scotia was one that often 'spread [benefits] … to a bunch of other landowners'.

> 'Brian' (NS): In trying to address anti-wind sentiments … number one is jealousy and that's generally related to financial contributions so we're always trying to find a way to socialize that cost, not just to pay one land owner but to spread it to a bunch of other landowners so it's more equal spread, you know?

Such characterizations of jealousy can understandably breed resentment though. For example, 'Macy' – an opponent of wind turbines in Ontario – says that jealousy did not figure into her case, since she had a lease offer, but still refused:

> 'Macy' (ON): A lot of people were saying 'oh you don't want them just because you couldn't get them over there.' Well we [had] the opportunity to sign up … We chose not to. So it's not that we're those people that just don't want them because everyone else has them and we're jealous.

We were interested in further exploring the relationship between perceived benefits and local support for wind energy (Table 3.4). A simple one-stage regression model was run with the question 'I support the existing wind power project in my community' as the DV against five dimensions of distributive justice (IVs) to unpack the relative contributions of each towards residents' approval of their local project. The variables directly related to equity, community benefits and a fund being created to help those 'escape' were all statistically significant – underscoring the importance of broad and fair financial benefits for turbine support.

Table 3.4: Regression analysis (local support as DV; R^2 = .414).

	Standardized coefficients (beta)
The positive impacts of the existing wind power project are distributed fairly within the local community	.337**
All residents have been adequately compensated for the negative impacts of the existing wind power project	.225**
More financial benefits should be given to the local community for having turbines	.169**
More financial benefits should be given to residents living close to turbines	–.001
A fund should be established to pay fair market value to households who must move because they cannot tolerate the negative impacts of turbines	–.250**

Note: Dependent variable: I support the existing wind power project in my community. *Significant at the p = .05 level.
**Significant at the p = .01 level.

3.5.3. Criticisms of 'local' profit-sharing and compensation

Though there was strong support for community-based wind energy in Nova Scotia in particular, some we spoke with pointed out flaws in the COMFIT programme. The most popular argument against the initiative was that not all projects were actually owned by local communities. This idea was discovered during an early interview with 'Shannon' who was unaware of the opportunity to invest in her local project:

> 'Shannon' (NS): I wonder who the investors are around that [turbine] … Who are they and what's their investment? I know they've got a financial investment but what are the risks to other people and what investment do they have? Do they live here?

Indeed, 'Shannon's' concerns regarding the conditions of investment under the CEDIF programme are warranted. Under the CEDIF option, there needs to be only 25 local investors, and the rest can be from anywhere in the province. 'Kathryn', a policy expert, describes how CEDIF investors are generally from outside the local project.

> 'Kathryn' (NS): Let's be frank … you could have 25 bankers in Sydney and that could theoretically be your community involvement for wind turbine development, you know, in South Harbor, which is nowhere near Sydney!

While investment opportunities were made popular in Nova Scotia, policy has limited these options in Ontario. Alternately then, if the focus going forward is on local compensation rather than local investment, 'Graeme', a developer from Ontario, is concerned that the cost would be too high to move towards '[paying] everyone' not just the lease-holders – thus creating a threat to the cost-competitive nature of wind energy:

> 'Graeme' (ON): One of criticisms of wind energy is that the rate being paid is too high so that's why they've introduced the competitive process [in Ontario] so that the cost of energy is as low as possible. You can't have it both ways, you know, you can't say 'we want this energy from wind to be cost competitive' and then also say 'but you have to pay everybody in the community.' Those are opposing forces.

Likewise, 'Roger', a small-scale developer (NS), notes that COMFIT has also led to more 'red tape' – 'piling on high levels of complexity and complication in business dealings that … [cause] extra expense'.

3.5.4. Suggestions about community benefits moving forward

A common thread in conversations about financial benefits was the idea that in one form or another, more local residents should be paid. This finding is not entirely surprising given that most residents feel that the current system is unfair. 'Angelo' who is part of the team who developed Ontario's Gunn's Hill project – and the opportunity for local investment starting at $1000 dollars – explains that community-based development is something people 'want to be a part of':

> 'Angelo' (ON): We want to give anybody in the community the opportunity to invest. It is very expensive to have an investor that just invests 1000 dollars because you are carrying that administrative burden for 20 years but I said … almost anybody can then say, 'Yeah I will be part' or 'I want to be part of that.'

While most people we spoke with had positive opinions of financial benefits, there was less consensus regarding just what form of benefits should be introduced. Some, including Brian, suggested that employing local contractors and labour is good start towards localizing benefits.

> ‘Brian’ (NS): Hiring local contractors is like the best thing you can do. They know the community … if it’s a civil contractor they know the soils, they know where the rock is they know where the gravel is. They know the neighbours … you know the neighbours recognize their trucks … They’re great community champions.

Beyond local contracting, interviews brought forth ideas about localizing financial benefits by lowering residents’ electricity bills. ‘Graeme’, who has experience in building turbines in Europe where this type of initiative has been implemented, thinks that this may help avoid accusations of bribery.

> ‘Graeme’ (ON): I was kind of pushing toward … to hydro bill contribution because then it’s not perceived as a bribe you know it’s like a direct, ‘We’re building a wind project to generate electricity and we’ll contribute to your hydro bill from this project’, you know? So it can’t be perceived as some sort of buy-off or anything it’s a benefit and it’s a tangible benefit linked to wind

More surprisingly, ‘Joanne’, who was staunchly opposed to wind turbines in her community of Wainfleet, Ontario admitted that introducing benefits through reduced hydro rates, though it may not lead to acceptance, could take the ‘sting out of all the nastiness’:

> ‘Joanne’ (ON): I think it might be a little bit more widely accepted, the fact that well, okay I’m going to slam a turbine or five of them into a community if we could all have lower hydro rates, yes, that might take some of the sting out of all of the nastiness that goes along with these darn things.

Overall, our survey showed that more than 75% of our respondents (77% in Nova Scotia) support the idea of a programme that would lower electricity bills in households living close to turbines. Of those indicating opposition to their local project, 83.1% would like to see reduced electricity bills. The fact that those against wind energy in their

community were significantly more likely to desire a reduction in the cost of electricity underscores the potential power of this idea.

3.5.5. Final regression: predictors of adequacy of financial benefits

To better understand what predicts local residents' approval of benefit packages, we ran regression models using the question 'The local wind energy development in my community has brought with it adequate economic benefits' (Table 3.5) as the DV. The general hypothesis is that both the total amount of benefits and the degree to which they are shared (i.e. equity) will be among the most powerful and significant predictors of perceived adequacy. Variables were entered in four blocks, two of which represented groups of variables suggested by the literature and preliminary analyses, and two acted as controls (i.e. demographic and provincial variables).

Somewhat surprisingly, the fair distribution of benefits grossly dominates the regression models with a standardized regression coefficient varying between 0.90 and 0.74 ($p < .05$), which seems to drown out the 'more financial benefits' measures. The only other variable that was significant was household income ($B = -0.254$), suggesting that those with higher income are more likely to perceive adequate benefits. The relative statistical power of the equity variable indicates that quantity is not as important as the distribution of economic benefits.

Table 3.5: Four-stage regression analysis[a] (adequacy of benefits[b] as DV).

	Model 1	Model 2	Model 3	Model 4
General opinion of benefits				
More financial benefits should be given to community	−.017	−.017	.096	.132
More financial benefits should be given to residents	.129	.064	.041	.388
Positive impacts are distributed fairly	.909**	.824**	.756**	.827*
The project pays sufficient taxes	.38	.045	.050	.118
Construction and operation staff were local	.079	.064	.158	.261
Model 1: r^2 = .852				
Negative impacts of turbines				
Experienced negative health effects		.006	−.064	−.243
Property or dwelling has lost value		−.061	−.144	.532
Landscape is less appealing		.061	.141	−.213
Turbine noise is annoying		−.179	−.234	−.085
There are threats to wildlife		−.002	.055	.048
Turbines have created community conflict		.099	.051	−.031
Model 2: r^2 = .871				
Provincial and policy context variables				
Ontario (Nova Scotia)			.297	.278
Public ownership (%)			−.148	−.326
COMFIT (no)			.014	−.220
Electricity production is one of the most important issues in my province			.078	.133
Fossil fuels pose a climate change threat			.078	−.268
Fossil fuels pose a threat our economy			.058	.308
Trust in wind developer to make fair decisions			−.59	.172
Model 3: r^2 = .909				
Demographic variables				
Male (female)				−.252
Age				−.229
Political view				.080
Years in community				.059
Education				.133
Annual family income				−.254*
Turbine on property (no)				.376
Model 4: r^2 = .973				

[a]The first two blocks of variables were chosen because of suggestions in the literature and/or were strongly correlated (.235–0.743; p = .000) with the DV. The final two blocks were added as controls.

[b]'The local wind energy development in my community has brought with it adequate economic benefits'. Distribution of benefits and 'adequate economic benefits' were tested for multi collinearity and showed that they are not related in that way (Pearson correlation of.654).

*Standardized regression coefficients were statistically significant at the p = .05 level.

**Standardized regression coefficients were statistically significant at the p = .01 level.

3.6. Discussion

This comparative case study of policy programmes in Canada highlights stark differences in various aspects of perceived economic benefits and support for local wind energy development. This work adds to the growing literature that suggests that resistance to wind energy in Canada is at least partially due to the policy levers used in areas going through energy transitions (Baxter et al., 2013; Fast et al., 2016; McRobert

et al., 2016; Song-sore & Buzzelli, 2015; Stokes et al., 2013; C. Walker et al., 2014). It also shares some common elements with established literature from Europe that shows that appropriate local benefits are associated with higher levels of local support (Bronfman et al., 2012; Cohen et al., 2014; Toke et al., 2008).

While it is perhaps not surprising that we find strong support for community benefits generally (Slattery et al., 2012; Walker, Baxter, Mason, et al., 2014), one of the main contributions here is the focus on the nuanced relationship between amount and fairness of distribution (i.e. more localization of profits). Our final regression model predicting the adequacy of economic benefits is dominated by the fairness measure, while the amount variables were not significant. Though this may create the impression that policy and financial benefit measures should focus on the distribution of payments and other benefits, the finding is set in the context of a sample where a majority feel that the amount of financial benefits they are receiving is not enough either. The take-away message may be that fairness predicts differences between overall perceptions of local benefits, while amount is so universally a concern it does not. Indeed, as some have recently suggested, the existence of benefits in and of themselves is not a sufficient precursor for local support (Jepson et al., 2012; Maruyama et al., 2007; Stokes, 2013; Walker & Devine-Wright, 2008; B. J. Walker et al., 2014). Thus, while fair distribution may go a long way to satisfying concerns about economic benefits, the overall amount no doubt matters as well.

This study also sheds light on how people talk and think about the ways that fairer distribution might be achieved, namely through investment opportunities, compensation, and rebates on electricity bills. Though a majority of the survey sample was in favour of community ownership, both those supportive and opposed to wind energy were sometimes against financial benefits, often for different reasons. Among those with pro-wind attitudes, there were those who felt directly paying non-lease holding locals is not entirely necessary, though this must be tempered with the findings of Baxter et al. (2013) and C. Walker et al. (2014) that show financial that benefits in Ontario are significant predictors of support. Thus, benefits in the context of daily life are more complicated than the simplistic dichotomy of 'in favour' versus 'in opposition'. Among those against their local project, there were claims that benefits were bribes or blood money in order to quell real and immediate concerns (e.g. health, property values). However, just as recent studies in Ontario have shown that safety is expressed an important concern (Songsore & Buzzelli, 2015; C. Walker et al., 2014; Walker, Baxter, & Ouellette, 2015), our work here suggests that residents opposed to turbines also feel that lack of local financial benefits is a problem. Thus, financial benefits should not be used as a replacement for minimizing facility risks. Indeed, ensuring that things like health, noise, and property value loss mitigation are addressed is important regardless of financial benefits distribution.

There is a danger that the findings here may be read to support the idea that financial benefits should not go to local residents because compensation may be perceived as bribery. To be clear, the starting-point of this study, supported by the

findings here, is that the status quo in places that pay lease-holders only is largely perceived to be a broken facility-siting model (Baxter et al., 2013). Our findings show that financial benefits strongly predict that dissatisfaction. Thus, current methods of providing direct payment only to turbine lease-holders and 'community funds' to cover the remainder of the community will likely not fix problems in Ontario.

In terms of policy comparisons, our findings about COMFIT – a programme designed to promote local, community-based profit-sharing – may have implications for policy communication. Surprisingly, when responses to the statement 'wind energy development is best when owned by local communities' were compared, residents living near COMFIT projects (61.8%) were slightly more likely to agree than those living near non-COMFIT projects (55%). This may be explained by the curious, and perhaps scandalous, fact that a relatively small percentage of people (18.9%) were aware of the opportunities to invest in Nova Scotia. This suggests a gap between theory and practice in terms of having communities invest in their local renewable energy project. This deserves further unpacking to understand both awareness of investment opportunities and how people react to such opportunities once faced with them. The 'community-based' projects we studied were not grass-roots developments; rather, they were often projects brought to the communities by outside interests – one possible explanation for the apparent lack of uptake of investment from locals.

The inter-provincial comparisons of community-based project deployment reinforced the well-known phenomenon that stage of development is a strong predictor of resident concern (Edelstein, 2004). That is, the one community-based investment

project in Ontario that was approved but not operational at the time of the research had relatively low levels of local support. It is well understood in the facility-siting literature that levels of concern are highest at this stage, just prior to becoming operational (Baxter et al., 2013; Wolsink, 2007). Survey results corroborated the finding that Gunn's Hill had higher levels of perceived economic benefits across all questions asked within the survey – though support was significantly lower than the Ontario average. Another possible explanation for results seen in Gunn's Hill may be that the 49% (local) public investment did not give locals the controlling share, unlike COMFIT projects in Nova Scotia which requires a majority stake (51% or more) to be awarded. Numerically, this 2% difference is small; but in practice, control over a project may be most important to local residents (Varghese, Krogman, Beckley, & Nadeau, 2006). Exploring the role local control plays in support for community-based development of wind is fodder for future work.

While much of our findings support the idea that the community-based development leads to better outcomes – at least in terms of local support – residents had two key criticisms of such 'local' profit-sharing models. First, some who were intimately familiar with the details of the CEDIF option – which makes up the large majority of COMFIT projects (Nova Scotia, 2016c) – claimed that investors do not need to be local or live in the community at all. Indeed, based on information produced by the government of Nova Scotia (2016a), CEDIFs must only have 6 directors and 25 investors from the 'defined community'. Outside of that, it seems that investors can reside anywhere in the province. Second, the perception of too much 'red tape' associated with COMFIT was tied to concerns about higher than necessary electricity rates. Indeed, the

rates given for large wind energy production (13.1 cents/kWh; Nova Scotia, 2016b) were much higher than the price awarded under Ontario's recent and first competitive bidding programme (as low as 6.45 cents/kWh; IESO, 2016).

In contrasting the nuances of support across provinces, we concede that it is operationally challenging to isolate the impact of distributive justice from procedural justice. Perhaps because of this, most existing research in Canada does not distinguish the two (Baxter et al., 2013; Denis & Parker, 2009; Vass, 2013; C. Walker et al., 2014). We focus on distributive justice here in order to add depth to our understanding of financial benefits and wind energy in Canada. Nevertheless, to echo the advice of Cowell et al. (2011), we suggest that due attention must also be paid to procedural justice. Our findings must be tempered with Ter Mors et al.'s (2012) criticism that the 'compensation literature' assumes too tight an inverse connection between local support and community benefits – the type of relationship supported in the risk literature as well (Finucane et al., 2000; Starr, 1969). There is much more going on, and continued efforts to disentangle the impact of benefits from other procedural issues related to siting remain worthwhile conceptually. Yet, for practitioners, the distinction may seem less relevant on the surface if procedural matters (e.g. offering of electricity bill rebates) are also distributive remedies. However, without knowing what residents value, uncritically following any single solution is bound to be fraught with difficulties.

3.7. Conclusion

Moving forward, it is important to note that especially during the planning stages of wind development, conversation in the community may include debate regarding the type of community benefit model that will be introduced. As has been implemented in Scotland,[4] Canada might benefit from the creation of a registry whereby residents, developers, and local councillors can view the range of community benefits that have been used across the country. This may force developers to more critically think about their benefit schemes, while more generally such a registry provides residents a much-needed informational resource.

It is ironic and potentially worrisome that the policy programmes of both Ontario and Nova Scotia seem to be moving away from community-based development. For example, Ontario's new competitive procurement process has eliminated attractive FIT pricing for all developments including ones that could ostensibly be community-based and grass-roots with high percentage local ownership. Under these current conditions, substantial community ownership is more financially risky than in the past and therefore unlikely to take place at all. This may increase levels of opposition and ultimately threaten the long-term success of the industry. Though proponents are now stressing the merits of competitive pricing, it may also create less room for financial benefits in local communities. Meanwhile, the cancellation of Nova Scotia's successful COMFIT programme may mean that like Ontario, cost-cognoscente objectives leave less room for any local economic benefits – equitably distributed or otherwise.

3.8 Notes

1. These 'price adders' increased the price given for renewable energy produced by up to 1.5 cents/kWh depending on equity level.
2. A copy of the full survey is available to readers upon request.
3. These survey questions were: the local wind energy development in my community has brought with it adequate economic benefits; the positive benefits were distributed fairly; all residents have been adequately compensated for the negative impacts of the existing wind power project; more financial benefits should be given to the local community for having tur-bines; and more financial benefits should be given to residents living close to turbines.
4. The Government of Scotland initiated a website (http://www.localenergyscotland.org/view-the-register/) called the Com-munity Renewables Register which outlines among other things, the benefit structure (i.e. community buy-in, fixed payments) and where funds were spent.

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Chapter 4: PROCEDURAL JUSTICE IN CANADIAN WIND ENERGY DEVELOPMENT: A COMPARISON OF COMMUNITY-BASED AND TECHNOCRATIC SITING PROCESSES

4.1 Introduction

Governments are turning to renewable electricity production to address climate change, reduce pollution and increase domestic energy production. Though many have hailed the Ontario government for leading Canada in wind energy capacity, this has often come at the cost of considerable turmoil in rural communities (Walker et al., 2015; Walker et al., 2014b). Though there is a growing literature on the value of participatory siting processes for increasing acceptance of turbine developments, there has been much less unpacking of how residents and other stakeholders view the siting *process* as opposed to the *turbines*.

In the context of Ontario, Canada pressures to stop wind energy production in the province have increased significantly since the implementation of the controversial Green Energy Act (GEA) and Feed-In Tariff (FIT) program - which together took away local decision-making ability and led almost exclusively to technocratic, corporate-led development (Fast et al., 2016; Songsore & Buzzelli, 2016; McRobert et al., 2016). Opposition to these policies has been expressed in many ways including through the provincial Conservative party's call for a moratorium on all wind development (CBC, 2011) and 90 Ontario townships and counties passing resolutions declaring themselves 'non-willing hosts' for turbine development (OWR, 2016). Meanwhile, such a list of unwilling communities can not be found in Nova Scotia, where through its Community

Feed-In Tariff (COMFIT) program, the province has implemented a more bottom-up, locally-based renewable energy program. Recent research has suggested this approach has led to relatively high levels of support (Adams et al., 2011; Walker and Baxter, 2017; Vass, 2013).

4.2 Background Literature

Technocratic, top-down development which removes real power for locals to veto development usually leads to relatively fast build-out of wind energy capacity by limiting the opportunities for opposition (Bohn and Lant, 2009; McRobert et al., 2016; Ottinger, 2014). However, development done in this way has been said to increase claims of injustice that may have political traction and thus threaten the long term growth of the industry (Ottinger et al., 2014; Richards et. al., 2012). This has prompted considerable interest in an alternative approach, community-based wind development, as a model for addressing both procedural and distributive fairness (Warren & McFadyen, 2010). Despite its theoretical advantages, some research has suggested the 'romanticized' narrative of community energy (Simcock, 2016; Walker et al., 2010) may be hiding some practical or 'on the ground' shortcomings including the degree to which communities will benefit in terms of a process and/or outcomes (Bristow et al., 2012; Walker & Devine-Wright, 2010). For example, Walker and Baxter (2017) identify serious concerns about distributive justice in terms of the sharing of local financial benefits to the most negatively impacted residents near turbines. Perhaps because this 'questioning' of community energy is still new, there has been little empirical work to date that has focused on procedural justice. Looking at wind energy in the UK, Simock (2016) provides a rare exception- though his qualitative study of stakeholders heavily engaged

within planning processes. We build upon this work by combining multiple methods to study procedural justice across a wider range of stakeholders involved with or living near wind turbines in Canada.

In light of the increasing resistance to wind turbines in Ontario and elsewhere, social scientists have been studying the multitude of factors that shape local response to development. This emerging 'social dynamics of wind energy literature' (Citation withheld for peer review) includes a variety of explanations including noise and aesthetic concerns (Pasqualitti, 2001) as well as personal attitudes and experiences with wind turbines (Krohn and Damborg, 1999; Walker, 1995). Others have subtly and not-so-subtly suggested that selfish, Not In My Backyard (NIMBY) attitudes of locals are the most important factor (Krohn and Damborg, 1999). Most published research tends to refute this characterization (e.g. Devine-Wright, 2005; Wolsink, 2007; Wolsink, 2000) often pointing instead to a lack of fairness or equity in the development process as the being at the root of localized resistance (Aitken, 2010; Ottinger et al., 2014; Wolsink, 2007). Through many of these studies, procedural and distributional equity have been merged in the efforts to better understand a wider range of community perspectives and experiences (Baxter et al., 2013; Gross, 2007; Haggett, 2011; Hall et al., 2013; Vass, 2013; Walker et al., 2014b; Walter & Gutscher, 2010; Zoellner et al., 2008).

Yet ideas of fairness during siting processes and fairness of turbine cost and benefits distribution after they are built represent two distinct concepts (Cutter, 1995; Lake, 1996). Much of the focus on distributive justice in this context has been on the distribution of turbines and their negative impacts, but also on the distribution of

benefits (Walker and Baxter, 2017). Procedural justice on the other hand tends to focus on the participation of locals in wind energy planning and the conditions of that participation. For these processes to be considered just, meetings must be accessible (Cole and Foster, 2001), decision-makers must recognize the legitimate contributions of local citizens, and public input should have some bearing on final decisions (Schlosberg, 2007). Some have already argued that meaningful access to decision-making is not met in turbine siting in Ontario and elsewhere (Aitken et al., 2008; Gross et al., 2007; Jami & Walsh, 2014; Ottinger et al., 2014).

Some have argued that fairness of process may be equally or more important than fairness in the distribution of benefits from turbines (Cowell et al., 2011; Walker and Baxter, 2017). The broader international literature focusses mainly on procedural justice as the most pertinent of the justice variables in shaping public response to wind energy (Ottinger et al., 2014; Firestone et al., 2012; Gross, 2007). For example, in the Canadian context, Jami and Walsh's (2014) recent review suggests a model containing six variables as major factors for success in wind energy project deployment. Of the six, at least three (addressing concerns, transparency, and involvement of stakeholders) relate to procedural justice while only one (financial compensation) concerns distributive justice.

Even though many are now writing about procedural justice and citizen participation and wind energy, authors have rarely explored procedural and distributive matters as separate effects (Firestone et al., 2012; Simcock, 2016 are two notable exceptions). There remains both practical value (e.g., very different policy implications)

and conceptual value (e.g., unpacking "fairness") in exploring the distinct explanatory power of the siting process, by understanding of the nuances of procedural justice in wind energy development.

Our theoretical understandings of procedural justice can be linked in part to the literature on citizen participation in planning. Arnstein (1969) described the now well-known eight-rung 'ladder' of citizen participation whereby the degree of involvement ranges from non-participation (e.g. manipulation, therapy) to the highest levels of citizen power (e.g. partnerships, citizen control) – the latter being more in line with the ideal of community-based wind development in the literature (Walker & Devine-Wright, 2008). There are numerous accounts of the negative impacts of token displays of public participation where local voices are encouraged, but have little real influence over the planning outcomes (e.g., merely consulting or simply providing information), processes that simply inform locals of a planning decision that is already fair accompli (Dennis, 1972; Lane, 2005; Pateman, 1970). Despite the popularity of the ladder of citizen participation in terms of theoretical writings, Painter (1992) has argued that those looking to assess participation should also look to outcomes (i.e. how things changed because of participation) rather than only analyzing power structures prior to these processes. Further, we are concerned that the ideal of levels of participation has little meaning for those on the ground who experience felt injustice. There is also very little observational work within the social dynamics of wind energy literature that present findings with relation to the ladder of citizen participation. Papers that do cite Arnstein's idea most often do not seem to do so as part of the larger orienting theoretical framework of the paper and we likewise do not (see Christidis & Law, 2012; Devine-

Wright, 2005; Hindmarsh & Matthews, 2008; Rogers et al., 2008; Wright, 2012). Instead we draw on Arnstein's focus on the concept of 'citizen power' to align with and unpack the allied concept of procedural justice as comprised of four key elements: information sharing, opportunities to participate, the ability to affect outcomes and dealing with the developer more generally. Arnstein's ideas of non-participation and citizen control and providing information, are only two of four procedural justice dimensions that emerged from our interview analysis. We further compare these key dimensions of Arnstein against another core element of fairness/justice against five measures of distributive justice. This allows us to link these literatures and at the same time take on Painter's (1992) suggestion that distributive issues dominate.

We compare experiences of development by province largely because the policy and planning processes were very different. Though both policies are very top-down, there was a much more community-based approach taken in Nova Scotia which was a reboot of a problematic technocratic approach in that province. Thus we expected much higher scores on both procedural and distributive justice measure as well as overall support in Nova Scotia. That is, the working hypothesis is that a perceived lack of procedural justice is playing a role in the amplification of the intense local opposition to wind turbines in Ontario and to a lesser degree, Nova Scotia. Below we provide a very brief overview of the wind energy policy context of Ontario and Nova Scotia, Canada. More extensive reviews are available elsewhere (see Adams et al., 2011; Fast et al., 2016; McRobert et al., 2016; Walker and Baxter, 2017).

4.3 Study Context

This section outlines the differences in wind turbine siting policy in Ontario and Nova Scotia since this is the main analytical comparator.

4.3.1 Ontario's FIT program

The main mechanism by which wind turbines have been built in Ontario has been under the Green Energy Act (GEA; see McRobert et al., 2016) and the Feed-In-Tariff (FIT) program (Fast and Mabee, 2015; Hill and Knott, 2010). First introduced in 2009, the GEA streamlined approval processes and removed local planning authority related to energy development- including wind and solar energy projects. Various studies have pointed to this policy change as the main driver behind public opposition towards wind in Ontario (Fast et al., 2016; Hill & Knott, 2010; McRobert et al., 2016; Songsore & Buzzelli, 2016).

The most salient feature of the FIT system for the purposes of this study is that policy is set up in a way that has failed to encourage widespread use of community-based models- where local profit sharing and involvement in decision-making is more prevalent.[6] This contrasts the experiences of other countries such as Germany. While FIT programs are ideally meant to increase community ownership, Ontario's pricing structure (Stokes, 2013; Yatchew and Baziliauskas, 2011) and movement toward promoting engagement over ownership (McRobert et al., 2016; Mulvihill et al., 2013;

[6] The lone exceptions include a single turbine located near Exhibition Place in Toronto which was developed in part by Canada's first community wind power co-operative, WindShare (http://www.windshare.ca/)

Walker and Baxter, 2017) has resulted in a system more geared toward developers rather than communities. What the Ontario FIT program did offer was set prices over several years for electricity generated through renewable technologies including large wind turbines (e.g. 11.5 cents/kWh). The main, and largely unsuccessful, mechanism for encouraging community-based wind projects was through the introduction of small 'price-adders' based on the level of local ownership (Mabee et al., 2012; OPA, 2010; Yatchew and Baziliauskas, 2011).

The failure of FIT to encourage community-based development combined with the streamlined approvals process under the GEA encouraged developer-led wind projects in Ontario effectively subverting several elements of procedural justice (McRobert et al., 2016). All Ontario-based wind projects investigated through this study were built under the GEA / FIT program and were majority owned by a commercial developer.

4.3.2 Nova Scotia's COMFIT program

While Ontario's main policy program has led to a lack of community-owned wind projects, the most relevant feature of recent policy in the Nova Scotia system is the *requirement* that developments must be owned by the public. Years after relatively small advances in development across Nova Scotia, wind energy was re-envisioned under the Renewable Electricity Plan (REP) of 2010. A major component of the province's REP was the Community Feed-in Tariff (COMFIT) program, which like the FIT program of Ontario set attractive and guaranteed prices for renewable energy production. However unlike Ontario's main policy tool, COMFIT stressed energy

production that was owned (51% or more) by municipalities, citizens within municipalities, or local community groups as a requirement[6]. These transformative policies were informed by stakeholder engagement processes which allowed for the sharing of public views related to renewable energy development (Adams et al., 2011).

While putting profits in the hands of locals speaks to distributive justice, with 51% ownership also comes power over decision-making power which also speaks to Arnstein's ideas about citizen participation and control. For this reason, we expected that community ownership would translate into high levels of community participation in facility siting as well – e.g., for residents to understand the nature of potentially investing in the project. The idea that greater participation in the process comprised a key difference from Ontario is also informed by government reports which highlighted COMFIT's promise to "[empower] people at the local level" (Nova Scotia, 2013) and by the requirement of proponents to prove public engagement and support (Nova Scotia, 2011). Prior to the implementation of COMFIT, some wind projects were also developed through Community Economic Development Investment Funds (CEDIFs) which like COMFIT, required at least 51% public ownership (Lipp et al., 2012; Morin, 2014; Soots, 2007).

Thus, we studied three key project ownership structures in Nova Scotia in order to better understand all development in the province. Most of the wind projects studied (5/7) were sited under the COMFIT program or were majority owned by a municipality, one was built under CEDIF (35% public ownership), while one other was built under the Ontario-like, developer-led model.

4.4 Methodology

We used a mixed methods, comparative case study design (Dion, 2003; Yin, 2011) to study perceptions of procedural justice in Ontario and Nova Scotia. We combined in-depth, qualitative interviews (n=54) with quantitative surveys (n=252). Interviews took place with municipal leaders (n=10), developers (n=7), policy experts (n=6) and mostly residents (n=31) across 7 wind turbine communities in Ontario (n=3) and Nova Scotia (n=4). Communities were chosen using a combination of criteria including those related to policy frameworks, and a lack of existing or ongoing research.

The communities of Adelaide-Metcalfe and Norwich, Ontario are located in agricultural, southwestern Ontario near the larger urban centres of Strathroy and Woodstock respectively. Wainfleet, Ontario is located in the Region of Niagara- just off the northeastern shore of Lake Erie. The communities of Canso, Antigonish, Sheet Harbour and New Russell made up the qualitative sample in Nova Scotia and though also rural in nature, were less agricultural compared with sites in Ontario. They are located in a variety of locations across the relatively small province of Nova Scotia.

While the focus of the interviews was lived experiences of siting processes with residents, other groups were sought to increase our understanding of procedural justice from multiple stakeholder perspectives (see Lincoln, 1995). Residents volunteered after receiving a Letter of Information (LOI) by mail. This letter was sent to approximately 40% of those living within 2km of a wind turbine in both provinces (n=407). The 2km

radius was chosen because we were interested in seeing what the planning process was like for the community of people most affected by and intimately aware of local wind energy development. The use of the setback also enables consistency with recent studies in Canada (e.g. Baxter et al., 2013; Walker et al., 2015). Some residents were also interviewed following snowball sampling- whereby an existing participant would forward the researcher's name to another member of the community often living just outside of the 2km setback. Other stakeholders were contacted directly using publicly available information such as email addresses. The qualitative sample was mostly made up of middle-aged to elderly people and approximately half (29/54) were male. Interviews were audio recorded, transcribed verbatim, while inductive grounded-theory coding was managed using NVivo qualitative data management software. Analysis of the interviews was completed through line-by-line, thematic analysis with a focus on those ideas related to procedural justice (Guest et al., 2011; Ryan and Bernard, 2003).

Based largely on preliminary analysis of the interviews, a quantitative survey was developed with items relating to a variety of turbine issues including perceived procedural and distributive justice, general attitudes toward wind energy, and sociodemographic characteristics[7]. Some of these variables were used as controls based on their capacity to predict facility acceptability in in a range of risk perception and facility siting studies (Finucane et al 2000). Most questions were on a five point, Likert-scale from 1 (Strongly agree) to 5 (Strongly disagree). The LOI accompanied each survey, sent out to all households within 2km of a turbine in the same seven communities studied during qualitative research, plus three more communities in Nova

[7] A full copy of the survey is available to readers upon request.

Scotia to boost sample size (see Maps- Figures 1.1 and 1.2). As there were relatively few people living in each community, (i.e. average number of homes was 135), there was no need to random sample. Gaetz Brook and Upper Hammonds Plains are located in the Halifax Regional Municipality while Wedgeport is in southwestern Nova Scotia near the town of Yarmouth. To bolster participation, each participant was offered entry into a draw for one of four $100 gift cards to a [national] store of their choosing. In total, 1346 surveys were sent to all homes within 2km of a turbine across the 10 communities. 240 resident surveys were returned and completed (n=127 in Ontario; n=113 in Nova Scotia) for an overall response rate of 17.8% (18% in Ontario, 17.7% in Nova Scotia). Though response rates such as this are fairly typical in Canada for such research, there remains potential for a nonresponse bias. Many of the cases in Ontario in particular involved protests from local residents which may suggest that those most concerned about the negative impacts of turbines are most likely to respond. However, this must be tempered by a general distrust of all research, particularly among the most vocal, which suggests a tendency for non-response from that group. We suggest these patterns likely balance each other and agree with recent research in other wind energy contexts suggesting that non-response bias is likely limited (Blanes-Vidal & Schwartz, 2016; Larson & Krannich, 2016). Though there is a possibility that those who are generally content with local turbines are disproportionately represented among non-responders, we have no reason to believe that such non-response bias should be any more pronounced between provinces, which is the main unit of comparison in this study.

Respondents in the three Ontario communities were less educated (64.6% college education or higher v. 70.2% in Nova Scotia), earned slightly higher family incomes (80.9% earning $40, 000 vs. 74.4% in Nova Scotia) and were more likely to own their place of residence (97.6% vs. 85.75% in Nova Scotia). As echoed by Christidis et al., (2014), who also studied perceptions of wind energy in rural Ontario, it is difficult to draw inferences about generalizability by comparing sample demographics with population characteristics. This is because the definition of a 'wind turbine community' is typically much smaller than census areas that are available for comparison. However, to ensure that our sample was *more* representative of larger rural populations, we 'weighted' our survey data (see Lee & Forthofer, 2005) to align with the gender distribution of the larger census tracts of both provinces. Across Ontario and Nova Scotia, females were slightly underrepresented and so we weighted the data set accordingly. All quantitative findings thus represent statistical analyses run under a more representative sample.

Surveys were analyzed using SPSS, first using simple frequency and bivariate analyses such as t-tests of means, and correlations. This was followed by a more advanced, five-stage multivariate regression analysis with an index, as the dependent variable. This index was created through the combination of two questions: "Overall, I approve of the way the wind energy development was planned and built in my community" and "I support the existing wind power project in my community" and was meant to capture residents' overall approval of wind energy development processes. Throughout the analyses, we purposively grouped quantitative variables in order to

investigate procedural justice in the context of Arnstein's ladder of citizen participation. As is shown in Tables 2 and 3, we use *Information* and *Opportunity* to represent the middle rungs of the ladder- also known as tokenism. The *Ability to affect outcomes* variables are related to the highest levels of the ladder- attempting to measure how much citizen power local residents experienced. We also use a group of variables called *Dealing with the developer* which is entrenched within our concepts of procedural justice and has been said to influence public support for wind energy development (Jobert et al., 2007). The independent variables chosen for inclusion in the regression model were done so based on their significance throughout bivariate analyses and/or were said to be associated with local support and or approval of siting in the literature.

4.5 Results

The following findings juxtapose interview quotations with survey analysis focused on the evolution of and experiences with procedural justice elements related to provincial policy. Qualitative findings provide the reader with an in-depth understanding of the major themes, while survey work tests these ideas across larger samples. The main analytical comparison is between Ontario and Nova Scotia- provinces that had very different planning processes.

4.5.1 COMFIT: "Sounds better than what's going on here!"

Most of the residents we spoke with in Ontario were unaware of Nova Scotia's COMFIT program. Thus, the interviewer would describe to these residents how ideas of community-based ownership typically plays out in other jurisdictions. There were

generally positive reactions, whether one was supportive or opposed to wind energy in Ontario. For example, "James" a resident and "Michael" a resident and politician of Adelaide-Metcalfe, talk about what they like about the community-based model (e.g. better communication, more positive conversations), in an area where large corporations have been responsible for wind energy development:

> **"James" (ON, supportive):** That [community-based development] sounds better than what's going on here! It's kind of every man for himself you know what I mean? So if it was a more community-oriented thing that would be great…
>
> **"Michael" (ON, neutral):** There should be more open communication with the municipality….That would have kept people better informed and it would have been a more positive conversation. So coming up in the future, if there's the opportunity for a, like a cooperative type program …I think the municipality could be a partner in it.

Survey responses also show higher degrees of approval of community-based wind development. Table 1 shows the percentage who reported agreement and the average response (Likert-scale; 1=strongly agree, 5=strongly disagree) concerning questions related to community-based development and local decision-making (Table 1). Using t-tests of means, there are statistically significant differences between the two provinces for three of four questions. Residents experiencing the more community-based siting process of Nova Scotia were more likely to agree that: "local residents should be able to invest and share in the profits of local turbines" and "local government should have greater decision making power in turbine facility siting". Respondents from Nova Scotia were also statistically less likely to support ideas around local government and/or public referendums having more influence on decision making processes.

Table 4.1: Residents ideas about community development		Percentage (%) agreed	Mean	Mean difference[1]
Wind energy development is best when it is owned by local communities	ON	49.9	2.43	.20
	NS	62.6	2.23	
Local residents should be able to invest in and share in the profits of local turbines	ON	69.9	2.09	.50**
	NS	91.0	1.59	
Local government should have greater decision-making power	ON	69.1	2.15	-.53**
	NS	46.9	2.68	
I would like to see the wind energy decisions decided through a public referendum or vote	ON	77.3	1.84	-.35*
	NS	69.3	2.19	

[1]*Differences are significant at the *p=0.05; **p=0.01 levels.*

4.5.2 Meaningful participation opportunities in the siting process

Residents of Ontario and Nova Scotia also differed in terms of how they spoke about their specific experiences of planning processes such as open houses and general information sharing. These stories ranged widely even within the same community. For example, some across both provinces believed that open houses went well and that their voices were listened to, while others perceived them to be a "waste of time". Generally, those falling into the latter category opposed their local project. Indeed survey data reveals that 68.8% of those who agreed that they "had ample opportunity to voice their concerns" supported their local project (17.2% were opposed). But it is how residents talk about these experiences that best illustrate how much better things were for residents in Nova Scotia. "Dan" a politician in Chester, NS recalls that during one of their planning sessions all but one person –someone vacationing in Australia- was able to ask questions.

> **"Dan" (NS, supportive):** Well there was one case where we had someone that had live video feed from somebody in Australia that kept breaking up and we grew impatient with that and we said "you just got to quit because we can't make any sense of it… you're hearing one word and not the next." But I mean everybody was given their chance.

In Ontario, most of the residents we spoke with had negative things to say about planning processes. Many did not even recall receiving invitations to public meetings. Of those that did attend meetings, one of the most common criticisms was that plans regarding development were already set. “David” remembers little opportunity for real discussion.

> **“David” (ON, opposed):** Nobody could say anything- it was coming regardless and they were going to put up so many towers… we wasted our time thinking we can do something about it and is that ever frustrating because we weren’t listened to or heard.

In Ontario, experiences of these open houses and meetings described by some developers we spoke with reveals frustration on their end as well. When “Ian” faced those opposed to development at an open house, he reported that he was constantly yelled at. When asked what he could have done differently to make the meeting less volatile, he describes the situation from the point of view of trying to “convince” rather than engage in dialogue:

> **“Ian” (ON, supportive):** I wouldn’t say there was anything [I could have done] …if you’ve got a group of people that are minds set up there was no convincing those people. No convincing. Jesus Christ could have come down himself! They probably would have crucified him!

Further, survey data supports the idea that residents of Nova Scotia approved of their more participatory community-based process (see Table 2). In a similar way that Firestone et al. (2012) measure overall satisfaction with development processes, the statement “Overall, I approve of the way the wind energy development was planned and built in my community” was meant to capture the overall view of the siting process.

Agreement with this statement was almost three times higher in Nova Scotia (22.1% in Ontario; 65.4% in Nova Scotia). The remainder of the table is comprised of blocks of more specific variables related to justice and siting including: information, opportunity, dealing with the developer, and ability to affect the outcome. . There are significant differences in the expected direction between provinces for most (9 of the 14) procedural justice variables tested (i.e. more justice in Nova Scotia). Exceptions include all three variables related to "Opportunity" and the question "Overall, participation in the siting process lead to meaningful changes in the siting outcome"- where both responses from both provinces are very low (14.1% in Ontario; 10.4% in Nova Scotia).

Despite the apparent higher degrees of perceived procedural justice in Nova Scotia across most questions, there seems to be a general lack of satisfaction with a wide array of dimensions of procedural justice in both provinces. Besides the "overall approval" measure, values for *both* provinces are consistently below 50%. In terms of the "ability to affect outcome" variables, there are particularly low scores, where for example only 6.7% (Ontario) and 10.3% (Nova Scotia) reported they felt they had any "control" over whether the turbines were built.

Table 4.2: Procedural justice variables by province

	Province	% Agree	% diff.[1]	Mean	Mean diff.
General approval					
Overall, I approve of the way the wind energy development was planned and built in my community	ON NS	22.1 65.4	-43.3	3.90 2.44	1.46**
Information					
I was provided with enough information on the existing wind power project before it was approved.	ON NS	32.2 47.1	-14.9	3.50 2.99	.51*
The information provided by the developer on the existing wind power project has been trustworthy	ON NS	26.6 32.4	-5.8	3.51 2.93	.58**
The plans relating to the wind turbines were always transparent to local residents.	ON NS	33.8 40.8	-7	3.30 3.00	.30
Opportunity					
I felt encouraged to take part in the planning process for the local wind energy development.	ON NS	28.9 30.4	-1.5	3.43 3.31	.12
Local residents were made adequately aware of the opportunity to participate in the planning process for the local wind project(s).	ON NS	41.0 44.0	-3	3.13 2.96	.17
I had ample opportunity to voice concerns about the existing wind power project before it was approved.	ON NS	45.6 43.2	2.4	3.02 2.89	.13
Dealing with the developer					
The wind energy developers in my area were always truthful in its dealings with the community about the project.	ON NS	25.4 38.6	-13.2	3.39 2.79	.60**
The wind energy developer in my area used bullying tactics.	ON NS	30.5 8.2	22.3	3.05 3.74	-.69**
The wind energy developer seemed to go the "extra mile" in listening to and engaging with the local community.	ON NS	23.1 35.9	-12.8	3.47 2.92	.55**
Ability to affect outcome					
Overall, participation in the siting process lead to meaningful changes in the siting outcome.	ON NS	14.1 10.4	3.7	3.46 3.25	.21
Local residents' concerns about the wind power project were adequately dealt with before it was approved.	ON NS	17.8 34.4	-16.6	3.80 2.97	.83**
Turbines were set back further away from homes in some cases when concerns arose.	ON NS	15.0 35.7	-20.7	3.42 2.79	.63**
I felt in control in terms of whether or not the turbine(s) were going to be built in my community.	ON NS	6.7 10.3	-3.6	4.31 3.88	.43**

[1]Differences represent the difference between percentage agreed with the statement in Nova Scotia, subtracted by the percentage agreed in Ontario. A negative value represents a case where there was more agreement in Nova Scotia.

4.5.3 Lack of real power

We explored the idea of control initially in the interviews where residents in Nova Scotia had strong opinions about this lack of power (control over the decision). Thus the COMFIT program was not a panacea in relation to meaningful community participation.

> **"Janice" (NS, opposed):** Where in the process did we have a say? We didn't. Though they allowed us to come to meetings and they allowed us to speak but when it came right down to it didn't change anything. It held no weight.

Also in contrast to the mostly positive experiences in Nova Scotia, an interview with "Nancy" indicates that a lack of decision-making ability shaped her feelings towards a local project. She felt the companies responsible for the turbines employed a "steamroller attitude".

> **"Nancy" (NS, opposed):** [Company name] has come in kind of like with that steamroller attitude like "let's just get the job done. We know what we need to do." …It's got nothing to do about community, it's going nothing to do…it's about how do we do it…make sure we do it legally.

This idea of a lack of control in Nova Scotia is somewhat surprising given how community-based development is often generally touted in the literature. During an interview with a small-scale developer in Nova Scotia ("Roger"), we are given a hint as to why this may be the case. He suggested that local residents were generally unaware of investment opportunities, and when larger community groups do purchase equity, they are making relatively small gains.

> **"Roger" (NS, supportive):** These [COMFIT] projects are not really community projects in the sense of being owned broadly by the community… I mean they can write the script for a press release that says how great community projects are, but are [these communities] going to be happy a decade from now from how much money they've got?

Though there were others like “Ann”- a resident in Nova Scotia- who was not only aware of opportunities to invest but did so- for only “ten dollars a share”.

> **Interviewer:** Do you feel like there was the opportunity for anyone in the community to invest?
>
> **Ann (NS, supportive):** Yeah! I mean anyone that wanted to. For… like ten dollars a share… I don’t know what I bought, ten shares or something like that for 100 dollars.

“Ann’s” experience was unique though, as survey data shows that whether or not the wind project was built under a community-ownership model or not, most residents in Nova Scotia were unaware of opportunities to invest. In fact even in Ontario where in most cases there was no opportunity to invest[8], a higher percentage of people (20.7%) reported they were aware of this investment possibility (most near Gunn’s Hill), compared to those who were aware in Nova Scotia (16.7%). Based on the percentages of our samples near facilities with the opportunity to invest the maximums are: Ontario (24.4%; 31/127 residents) and Nova Scotia (65.5%; 74/113 residents).

4.5.4 Tangible benefits of community-based approach

One of the main advantages of the qualitative portion of this research was to add depth to how residents experience elements of procedural justice in their daily lives. In conversations with residents and developers in Nova Scotia in particular, were stories of sometimes small, but tangible benefits when community-based approaches were used.

[8] The exception was the project in Norwich which compromised 29.2% of the Ontario sample. There, the developer offered and received 49% equity from the public. Excluding Norwich, the percentage of the Ontario sample that was “aware” of opportunities to invest was 11.1%.

"Caroline" from Nova Scotia illustrates this theme through the story of an elderly couple who believed their clothesline was too close to the edge of development.

> **"Caroline" (NS):** [So] the guys that were working there dug a deeper hole and put up a nice sturdy pole for them and talked with them and said "Okay is this good? Is it okay if we move it this way just slightly?" And you know, from what they had [before] they upgraded. I mean I don't think a clothesline pole would be too important to a lot of big companies but because it's a community project, because the community is involved you can have those kind of discussions.

This idea of developers and their contractors empathizing with the everyday problems locals face – issues as seemly simple as taking a few minutes to help out with a clothesline – suggests that simple social connections help build trust. The latter is a well-known correlate of meaningful public participation and facility siting. We did not hear about such connections being made in our Ontario interviews which is only suggestive at this point that it had something to do with community-based development. But what is clearer is that such experiences are associated with better procedural experiences. From the developer's side in the COMFIT context, "Brian" points to the nature of his approach to business as the reason why they are able to be more respectful of communities during planning and siting stages.

> **"Brian" (NS):** We're a smaller company, we're private, we're not publicly traded, we have a younger team who's quite passionate about renewables, we all get into this because it's so important to us, you know? And I think that tends to allow us to be a little bit slower and respectful of communities.

Thus, social connectedness and a slow and respectful approach to communities may be key ingredients in a positive experience of procedural fairness regardless of the top down policy framework in which such approaches to people are enacted (technocratic, or community-based).

4.5.5 The relative importance of Procedural Justice: Regression analysis

In order to better understand procedural justice in the context of local approval of the overall wind energy development process, a five-stage linear regression model was run with the composite variable of local approval and support the dependent variable. Independent variables include four procedural justice indexes by summing all items listed in the four categorical subsets of Table 4.2. The Cronbach (x) reliability scores of these new index variables are appropriate according to the cut-points of 0.70[9] identified by Bland and Altman (1997): Information (.879), Opportunity (.829), Dealing with developer (.853), and Ability to affect change (.794). The regression analysis also included four distributive justice variables which measure perceived economic benefits. Lastly three sets of control variables (attitudes toward wind energy, geographic context, and demographic variables) were added to the model due to the effect some variables have shown in related research (i.e. health perception, property value loss). Some variables were also included because of ideas we had heard from participants (i.e. that proximity and/or number of turbines seen may influence support for siting processes). In the final model, only the 'Ability to affect the outcome' indexed variable is significant (p=0.023) among the group of four procedural justice indexes. The regression analysis also suggests perceptions of wind energy as an environmentally friendly technology, and the perceived importance of the issue of electricity production are positively associated with the dependent variable. Residents living in Ontario and those closest to wind turbines were more likely to disapprove of development processes.

[9] Values of Cronbach's alpha greater than 0.70 in a survey are said to a good indication that items are measuring the same underlying construct and thus summing these responses is appropriate.

Table 4.3: Five-stage regression analysis (n=240)
(Indexed 'Approval of local wind energy development' as Dependent variable[1])[2]

	Model 1 (r^2=.698; SE=1.044)	Model 2 (r^2=.717; SE=1.469)	Model 3 (r^2=.784; SE=1.920)	Model 4 (r^2=.887; SE= 2.577)	Model 5 (r^2=.891; SE=2.879)
Procedural Justice (Indexes)[3]					
Index – Information	.318	.372*	.175	.105	.111
Index – Opportunity	-.169	-.208	-.128	.067	.054
Index – Dealing with developer	.246	.135	-.009	-.065	-.028
Index – Ability to affect outcomes	.463**	.427**	.366*	.319**	.330*
Distributive Justice					
Distribution of positive impacts		.217	.242	.105	.093
All residents have been adequately compensated for negative impacts		-.025	-.069	-.108	-.153
More financial benefits should be given to the community		.063	.019	.018	-.004
More financial benefits should be given to residents close to turbines		.028	.036	-.048	-.023
Attitudes toward wind energy[3]					
Wind energy is environmentally friendly			.297**	.323**	.343**
Wind turbines are an unacceptable threat to human health			-.173	-.152	-.124
Wind power projects lower property values			-.029	-.076	-.086
Provincial context					
Ontario				-.266*	-.244*
Importance of electricity issues in my province				.147*	.166**
Community ownership (%)				-.053	-.102
Distance to closest turbine[4]				-.191**	-.202**
Number of turbines seen from home				-.043	-.080
Size of project (number of turbines)				-.126	-.114
Demographic variables					
Age					.050
Political view					-.065
Education					.014
Annual family income					-.033

[1] The Dependent variable was an indexed variable combining "Overall I approve of the way wind energy development was planned and built in my community" and "I support the local wind energy project in my community" (Kronbach alpha= 0.915. Both questions were asked as Likert-scale responses from strongly agree (1) to strongly disagree (5)).[2]Most independent variables were calculated through the survey using a Likert scale (1= strongly agree; 5=strongly disagree). Exceptions include dummy variables (Province and Gender), scale data (community ownership %, project size) and other interval data (distance to turbine, number of turbines seen, age, political view, education and income). [3]The first two blocks of Indexed variables were chosen because of suggestions in the literature that justice is an important predictor of turbine development approval (0.378 to 0.786; p=0.00). [3]The final three blocks were added as controls. Values given are standardized regression coefficients and are statistically significant at the p=0.05 (*) and p=0.01 (**) levels. [4]Those living closest were most disapproving of development (based on our DV). Because the DV was 'reverse-coded' (when combined, 2=most approving; 10=least approving) and the distance variable (IV) was coded from closest to furthest away, the distance finding is negative but consistent with our initial hypothesis that those further away from development may perceive less injustice.

4.6 Discussion

Through the lens of provincial wind energy policy, this paper presents empirical findings which highlight the importance of facility siting procedural justice in Ontario and Nova Scotia, Canada. In doing so, it adds to a small but growing literature that focuses specifically on planning and siting processes leading to wind turbine development (Ottinger et al., 2014; Firestone et al., 2012; Jami & Walsh, 2014). Consistent with recent research, the results suggest that a lack of procedural justice elements – particularly the ability to affect facility outcomes - are important drivers of local views of wind energy siting processes and facility support. The focus on procedural justice here builds on recent literature exploring the multitude of factors (e.g., health risk perception, aesthetic concerns) responsible for shaping public support for wind turbines in Canada (Baxter et al., 2013; Fast et al., 2016; Walker et al., 2015) and beyond (Aitken, 2010; Gross, 2007; Warren & McFadyen, 2010)

Aligning with what some of the literature says about community-based development, there did seem to be an overall greater satisfaction with both the overall process and procedural justice elements in Nova Scotia. Especially when looking at general siting approval, information sharing and dealing with the developer, Nova Scotia residents were relatively more pleased with how wind energy was planned in their community. Part of this success may be attributed to the collaborative and participatory way in which policy was initially formed in Nova Scotia (Adams et al., 2011)- a kind of 'upstream' procedural justice that fed down tangible benefits to local communities.

These particular elements of justice have long been recognized as playing important roles across various literatures related to development and public approval (Baxter, 2006; Cole and Foster, 2001; Gipe, 1995). With reference to Arnstein's (1969) ideas about citizen participation, the results here suggest more people from Nova Scotia in our study overall had a more positive attitudes towards participation and their potential impacts on decisions (Dennis, 1972; Pateman, 1970).

Though Nova Scotia residents perceive there to be more procedural justice this may be only in a relative sense when compared with Ontario. That is, Nova Scotian residents scored their local facility siting below 50% (majority) agreement across most of our procedural justice measures. Additionally, the opinions expressed through interviews by those opposed to local wind energy development in the province echo many of the more common criticisms found in Ontario (Jami & Walsh, 2014). Indeed one of the few procedural justice variables measured in the survey that scored low and did not differ significantly by province was related to whether participation lead to meaningful changes. This suggests that residents of Nova Scotia were happier with the outcome of wind energy development even if they still felt somewhat powerless to change it. The importance of this idea throughout our study should not be entirely surprising as the potential to affect the outcome is a pillar of procedural justice (Schlosberg, 2007) and is touted as the 'central variable' behind any estimation of citizen participation (Amy, 1987; Bedford, 2002). Given that so few our within 2km locals seemed to invest in the project, or even be aware of the possibility to invest

suggests that top-down investment opportunities do not necessarily translate into real empowerment for the most directly affected residents.

The somewhat unexpected discontent with specific elements of procedural justice in Nova Scotia despite community ownership structures under COMFIT and CEDIFs may be due largely to specific aspects of implementation – including apparent "local" investment from investors several kilometers away from the developments. Of those respondents who were given the opportunity to invest in Nova Scotia, only 19.7% were even aware of such opportunities. In this context, we should continue to question the 'romanticization' of the term community-based (see Bristow et al., 2012; Simcock, 2016; Walker et al., 2010; Walker & Devine-Wright, 2008) - while future research that looks into who is actually investing in these projects is essential. These were not grass-roots initiatives in the sense of small towns banding together to tell their governments they want favourable conditions to erect turbines, rather they are relatively larger municipalities and institutions responding to top-down policy and financial incentives. Policy documents shed some light on this issue. For example, under CEDIF regulations, a project's board of directors must include six people living in the local area- meaning anywhere in the municipality not necessarily in the zone where negative impacts of turbines are felt (Nova Scotia, 2016). Additionally, there is a requirement that a project has at least 25 investors from the same 'local area'. The problem may lie in the fact that municipalities in Nova Scotia can be very large –up to 5400 km^2 in size (Historica Canada, 2016). This highlights a key disconnect between the way the policy defines community – i.e. in a very broad way – and the way we have sampled in the "high

impact zone" of 2km. Neither is entirely adequate, but our sampling was intentional to underscore that procedural and (spatial) distributive justice must be connected. Thus, how researchers, policy-makers, and developers define "community" needs to be scrutinized to understand whether the promise of "community-based development" is being realized; at least under what contingencies.

The disconnect between who lives with and who is making decisions behind wind energy development is something others have claimed to be at the root of discontent with the siting process in Ontario and elsewhere (Walker et al, 2015). Even when developers offer the majority (51%) of shares of a project to the 'local community', our findings suggest it is still 'outsiders' who are the ones actually investing in and controlling these projects. Even more concerning is the general lack of awareness we saw from those who were theoretically given opportunities to invest in their local project. Diffusing investment over vast geographic areas may actually perpetuate injustices when those living closest to turbines continue to experience the negative externalities while reaping few of the benefits (Cole and Foster, 2001). The pragmatics of finding sufficient numbers of investors may warrant a rethinking of the term "community" whereby it may be more appropriate to call the program a Regional or Municipal-based program.

Though top-down, technocratic approaches have been commonly used to create high levels of deployment of wind and other renewable energy technologies (Bohn &

Lant, 2009; Wolsink, 2010; Walker, et al., 2015) – the long-term costs to communities and the industry are still somewhat uncertain. In a time of much needed action on climate change, the expedited advancement of low-carbon technologies by traditional developers is regarded as positive in many ways. However, development that lacks procedural justice is not only unfair to local communities, but associated resistance movements that have developed in their wake may threaten the long-term sustainability of the wind industry if they trickle up into regional (e.g., provincial) politics where the policies originate (Richards et. al., 2012).

While procedural justice elements are important correlates of local responses to wind energy siting, we stress that these ideas only tell part of the story. To echo the warnings of recent research on distributive justice (Cowell et al., 2011; Walker and Baxter, 2017) we must be careful not to ascribe too much of a causal relationship between any of variables relating to turbines and siting. Our work is suggestive, along with others, that procedural justice issues are at least as pertinent as distributive justice issues (Firestone et al., 2012; Gross, 2007; Jami and Walsh, 2014; Ottinger et al., 2014) yet the final regression model shows that other contextual variables are significant as well and that considerable variance is still left "unexplained". This is why we encourage ongoing interview work to tease out the contingencies of experiences of wind energy siting.

Related to the regression analysis, the composite dependent variable was a measure of overall satisfaction with the siting process *and* support for the local turbine development. This contrasts with other studies that have used local support alone as the dependent variable; a seemingly subtle, but we suspect, important distinction (see Walker and Baxter, 2017). Perceptions of wind energy as environmentally friendly, the importance of electricity, province of residence, and distance from the closest turbine (i.e. those closest were least supportive) indicate that some context-specific explanations for differences in support are also playing important roles. There was also evidence presented that showed that 'social connectedness' and 'respectful development' in Nova Scotia may have led to better experiences for those living close to wind turbines. These types of ideas, alongside policy and associated planning and development processes, should be noted by researchers going forward.

It is somewhat surprising that the size the developments does not seem to play a significant role in the sense that most (6/7) developments in Nova Scotia were comprised of six turbines or less. Meanwhile, the average development in Ontario contained 11 turbines. Within the regression, we attempted to control for this through the *number of turbines seen from home, and size of the project* variables (neither statistically significant in the regression) - though this may not have accurately captured residents' perceptions of this potentially important idea. At least one study suggests that clustering may be important (Walker et al., 2014a); height and juxtaposition in the landscape may also play roles (Firestone et al., 2015). In part because turbine capacity was relatively consistent between provinces, the size of the turbines was relatively

homogenous. However as turbines get larger, it may become necessary to account for this. Future research should keep these kinds of place-based variables in mind especially when looking to compare responses across jurisdictions.

4.7 Conclusions and Policy Implications

Despite the benefits of technologies like wind energy, for low-carbon technology to meet the definition of *sustainable* and prosper in the long term, development must respect local communities where projects are built, particularly the most directly impacted residents in those communities. Indeed, a lack of local support can be indicative of environmental injustices that can also create social barriers that slow or stop the progress of renewable energy. If governments are to 'stem the tide' of unwilling hosts, they must better understand the multitude of factors that correlate with support and opposition. In this study, one specific aspect of procedural justice was found to be a key: the ability for residents to affect outcomes. It is unclear whether Nova Scotia's top-down investment models made residents in the 2km impact zone feel more empowered or if the reboot of the policy to be community-oriented merely fostered a positive predisposition to siting. Given that there is less than majority agreement that residents positively experienced the siting process suggests it may be a combination of the two.

At the outset of this study, we argued for a more nuanced understanding of procedural justice – and thus measured the concept using a range of measures and

which were distilled into four different indexes. Though all siting processes in our study, even those that were ostensibly community-based, score low on most of our measures it is control over decision-making that separates those supportive and unsupportive of the local turbine siting processes. This suggests that while greater control over decision-making is paramount, issues related to information sharing, opportunities to participate, and the resident-developer relationship are also important, particularly when the ability to change or prevent a turbine development is low.

Our study also provides some evidence that well (re)designed state-run policy programs may positively orient residents towards specific events like open houses and more general, procedural experiences of wind energy development. While our results clearly suggest room for improvement in both provinces, local approval of wind energy development was much higher under the less technocratic, bottom-up approaches (including COMFIT) of Nova Scotia. At least some of this differentiation is likely to do with the province's community-based initiatives, which seemed to lead to better experiences of procedural justice. Yet for the most part, these positive experiences still fell short in terms of the ability to affect change. As Arnstein (1969) writes, "There is a critical difference between going through an empty ritual of participation and having the real power needed to affect the outcomes of the process" (p. 216). Hosting open houses, Q & A sessions, or public consultation sessions are a good start, yet as participants in our study made clear, the absence of any real ability to affect the outcome is what people are really concerned with. When people take the time to share their opinions but nothing is done about them, there is an understandable degree of frustration in the

process. At the very least the parameters and goals of public engagement need to be clear – what aspects of the project are alterable through such interactions.

True community ownership- where locals *actually* own their project- may be the answer for jurisdictions hoping to *increase* local acceptance, however if handing over full decision-making power to local communities is too much for states to bear, authorities should focus on allowing councils and residents at least some degree of control to shape the characteristics of their local development. While the ability to say "no" is clearly what some we spoke with wanted, allowing all stakeholders the opportunity to come together with traditional developers and decide where or how (not if) turbines are built may be all that states are willing to yield. Policy makers need to recognize though that this is a relatively weak approach to community engagement and may have limited positive impacts. Nova Scotia got something right, but at the end of the day there were still limitations and room for improvement in terms of procedural justice. Going forward, whether through actual community-ownership or other initiatives, policy should also be written in a way that incentivizes residents and councils to say "yes" in a similar way that small communities often look to attract new business by adjusting land use zoning requirements. In some cases, this may require developers to act more like facilitators – allowing rural communities to control and benefit from an advancement of a low-carbon energy future.

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Chapter 5: METHOD SEQUENCE AND DOMINANCE IN MIXED METHOD RESEARCH: AN EMPIRICAL INVESTIGATION USING THE SOCIAL DYNAMICS OF WIND ENERGY LITERATURE

5.1 Introduction

The rapid growth of mixed method research has reinvigorated discussions surrounding why (and how) mixing quantitative and qualitative approaches should be done (Small, 2011). Debates were started in the mid-19th century and focused on the tensions between stand-alone qualitative and quantitative approaches (see Becker & Geer, 1957; Trow, 1957). Today, contemporary discussions surround a variety of issues including the qualitative/quantitative dichotomy (Glassner & Moreno, 2013), difficulties in publishing mixed methods research (Mertens, 2011), and issues around method integration (Mason, 2006; Mertens, 2014). There is also some discussion surrounding the idea that qualitative methods are typically marginalized in mixed methods research (Bryman, 2007; Greene et al., 1989; Niglas, 2004). More recently Hesse-Biber (2010b) has highlighted the longstanding issue of qualitative research serving mostly secondary roles- an idea she calls the "methodological orthodoxy" (p. 455).

Despite its increased popularity, the empirical use of mixed methods remains diffuse and the sharing of experiences remains limited. There is much literature on the "how to's" of mixing methods yet a limited amount of research looking at the underpinnings of such practices (Hesse-Biber, 2010a: p. 417). We address two interrelated issues here: method sequence and method dominance. Sequence relates to

questions of method order, the most basic being whether the methods are implemented simultaneously or sequentially (Morgan, 2013). Like Hollstein (2014), this study differentiates papers by the order by which each method is used. Dominance, often referred to as priority, relates to emphasis or which method is more central to the paper (Creswell & Plano Clark, 2011). Though these topics have been covered in isolation, less attention has been paid to the potential interactions between them. This paper explores the question of whether the 'order matters' in terms of research design and method dominance. Given the history of qualitative methods in mixed methods research, we suspected there may be subjugation of qualitative methods in particular (Bryman, 2007; Hesse-Biber, 2010a). This working hypothesis was also partially inspired by personal experiences within mixed methods publication- wherein we felt pressures to emphasize quantitative findings. These questions are posed through an empirical analysis of mixed methods papers in the social dynamics of wind energy literature.

5.2 The Social Dynamics of Wind Energy Development Literature

In part due to the rise of public opposition to wind turbines in rural communities, what we call the 'social dynamics of wind energy literature' has grown immensely over the past decade. In some cases, stakeholder opposition has slowed the development of these renewable energy projects. This has caused problems for developed countries who wish to reach their renewable energy and/or climate change targets (Batel & Devine-Wright, 2015). As in many domains of social scientific inquiry, early studies mainly used quantitative-based methods and found some evidence of the not-in-my-backyard (NIMBY) explanation (Krohn & Damborg, 1999). However, in a more recent summary

article, Devine-Wright (2005) suggested that such explanations are simplistic and future work should require a broader set of methodological approaches. In response to such calls for more qualitative and mixed methods, we have seen a recent surge in multi-strategy work in the social dynamics of wind energy literature (e.g. Zoellner et al. 2008). This shift has been relatively sudden with little critical examination of mixed methods implementation in particular.

5.3 Topics in mixed method research

Within the social sciences, examination of mixed method research has been both theoretical and empirical. Through an examination of how mixed methods are theorized and practiced, Bryman (2006: p. 98) suggests five major questions to be aware of when designing and reading mixed methods research.

1) *Are the qualitative and quantitative data collected simultaneously or sequentially?*
2) *Which has the priority?*
3) *What is the function of the integration?*
4) *At what stage(s) in the research process does multi-strategy research occur?*
5) *Is there more than one data strand?*

This paper concentrates on the first two typologies, but to this we add consideration of how the two are interrelated- an idea that has received relatively little attention in the literature. We also challenge the limitations of Bryman's first question which does not distinguish between studies that employ qualitative methods at the beginning, end, or immersed within the research process (see also Denzin, 2010).

5.3.1 Questions of method sequence

Though some researchers have since examined more complex issues surrounding timing in mixed methods research through systematic reviews (Cameron, 2009; Palinkas et al., 2011) or methodological thought pieces (Guest, 2013; Leech & Onwuegbuzie, 2009) their papers do not seem to be concerned with how decisions regarding method sequence may influence interpretative readings of their work.

As outlined across the whole of social science, there are up to forty mixed methods designs (Ivankova et al., 2006; Plano Clark & Ivankova, 2015). This variety is in part due to the number of different classification schemes (Hanson et al., 2005). Using criteria suggested by Hollstein (2014) we use the 'five families of [mixed method] design' classification system to frame this research, largely because Hollstein explicitly categorizes research design based on method sequence alone. The study excludes what Hollstein calls an embedded or nested mixed method design because it classifies method dominance and not method design per se. We therefore focus on four designs as described below.

5.3.2 Sequential designs

As the name indicates, the most defining feature of sequential designs is the use of quantitative and qualitative methods one after the other. Most often the conclusions based upon the first strand will help to determine the research questions, data collection and analysis in the second (Teddlie & Tashakkori, 2006). Following the example of

Creswell et al., 2003), we distinguish between two main designs: "sequential exploratory" (qual→ quan) and "sequential explanatory" (quan→qual) designs.

Sequential exploratory

In some but not all cases of qualitative followed by quantitative methods, the qualitative will act only as a 'pre-study' to the quantitative research (Glaser & Holton, 2007). This may be used when the important issues need to be identified (Hollstein, 2014) or to test the validity of qualitative findings on a wider population (Hesse-Biber, 2010b). In this case the qualitative will often act to inform the quantitative to which there is often a presumed higher priority.

Sequential explanatory

The rationale for the mixed method explanatory design is often that the quantitative "…analysis provide a general understanding… [while the] qualitative data and their analysis refine and explain those statistical results" (Ivankova et al, 2006: p. 5). Some may use survey-based methods as a 'prestudy' for later research to be examined more thoroughly, or to explore contradictory results (Hesse-Biber, 2010b) through qualitative methods. Initial quantitative results may also be used to more purposefully select participants for the qualitative strand to follow (Gelo et al., 2008).

5.3.3. Non-sequential designs

Parallel design

By contrast to the designs described above, the parallel design usually deploys both methods simultaneously. Component or sub-research questions are framed from the start as opposed to sequential designs where the results of one will influence the other (Tashakkori and Creswell, 2007). Each stage of data collection and analysis need not be completed at the same time; however the results of one should not affect the design of the other.

Fully integrated design

Teddlie and Tashakkori (2006: p. 23) suggest that the fully integrated design is "the Full Monty" of mixed methods research design. Most often used in inductive forms of inquiry, the approach combines quantitative and qualitative methods interactively along all stages of the research process. In some cases, this will mean qualitative and quantitative methods will alternate (see Greene & Geisken, 2013) depending on the evolution of the research.

5.4. Questions of method dominance

The second dimension guiding this study is method dominance, or which method an author gives more consideration to during the research process (Greene, 2008). Others have preferred to think of this idea in terms of qualitative versus quantitative

driven research (Hesse-Biber, Rodriguez & Frost, 2015; Hesse-Biber et al., 2010b; Mason, 2006). Dominance is somewhat synonymous with the term priority, though we decide to use the former to emphasize the importance of methodological usage. When studied, the underscoring of one method over the other has been thought to be a conscious choice of the researcher or is the result of pragmatic variables such as the expertise of the researchers, publication timelines or the audience for the study (Bryman, 2007). Here we argue that method design (i.e. sequence) may also be playing a role.

There is some support for the idea that qualitative methods do get subjugated in mixed methods research. Reviews of different literatures in the social sciences (Plano Clark et al., 2008; Creswell et al., 2004; McManamny et al., 2015; O'Cathain et al., 2007) have found that qualitative methods and/or findings are usually not given priority. According to Hesse-Biber (2010b), the recent neglect of qualitative approaches often results because authors simply "[sprinkle] in some vignettes to provide narrative examples of the [quantitative] conclusions" (p. 457). Some have even defined mixed methods as research that contains one complete method alongside "one or more… supplementary components" (Morse, 2010; Morse & Niehaus, 2009: p. 9). Seifert et al. (2010) offer a rare example of a study that gives both methods equal priority. The authors claim they were able to do so by: i) articulating an integrative purpose ii) creating equally important research questions and iii) having two separate research teams. The last of these efforts therefore avoided the challenge of insufficient expertise in one method (Creswell & Plano Clark, 2011).

5.5 The interactive effects of timing and dominance

The small but growing literature which does address both timing and dominance (see Ivankova et al., 2006; McManamny et al., 2015; Plano-Clark et al., 2008; Žydžiumaite, 2007) generally analyzes the two variables separately and makes the implication that method dominance is 'a choice' that researchers make separate from other methodological considerations. Others including Leech and Onweuegbuzie (2009) have only depicted mixed method research as either being done sequentially or simultaneously, and do not consider how method sequence may influence how research is conducted or received. Palinkas et al. (2011) move past this in describing research that uses qualitative methods to inform quantitative surveys for example, but their discussion does not go far beyond that. Instead, they justify their findings- which highlight the prevalence of sequential exploratory approaches in health care research- by stating the "focus is…consistent with [calls] by funding agencies " (p. 48). Even within more methodologically targeted journals, research has largely ignored the possible interactive effects of method sequence and method dominance (e.g. Hall & Howard, 2008).

Mayoh and Onweubzuie (2013) may present the best piece of recent literature that describes the relationship between research design and method dominance in phenomenological research. In part, they argue that a study's priority is indicated by the timing of method. However, they challenge the conventional manner in exploratory design where mixed methodology uses qualitative methods first (Morgan, 2013) to allow

the presumably more important quantitative methods to follow. They suggest that the lack of quantitatively driven mixed methods studies in phenomenological research is because of time consuming nature of qualitative inquiry. Yet, by limiting their analysis to *phemenological studies*, which are generally interested in human perception and experiences (Moustakas, 1994), the authors may be limiting themselves to a set of literature which is inherently focused on subjective, qualitatively driven inquiry. The analysis found in this paper attempts to limit these types of filters by including all literature within one broadly defined domain; regardless of inherent methodological preferences. Thus we move past the discussion surrounding *how to* combine methods (Creswell & Plano Clark, 2011; Hesse-Biber, 2010a) to see how mixed methods are actually playing out.

5.6 Methodology

In order to examine the mixed methods, social dynamics of wind energy development literature we conducted two database searches – one in Google Scholar, and the other Web of Science using the Boolean search terms: ("wind energy" OR "wind turbines") AND ("mixed method" OR "mixed methodology" OR "qualitative quantitative" OR "q method"). In Google Scholar this produced 734 journal articles and books published between 2005 and October 2015. The sample dwindled to 15 after selection criteria were applied. An article was included in the final sample if it: i) was published in a peer-reviewed academic journal ii) was relevant to wind energy iii) was within social sciences iii) employed both qualitative and quantitative methods. Google

scholar has been criticized for gaps in coverage (Giustini and Boulous, 2013; Jacsó, 2005) so the journal database Web of Science was also used. With vetting, this search produced 12 new articles. Using this data set (n=27), the following three questions frame this research:

1) *What is the sequence of qualitative and quantitative methods in each work?*
2) *Which method, if any, dominates the paper as a whole?*
3) *How does method dominance potentially relate to method sequence?*

For question 1, the characterization of method sequence was based upon Hollstein's (2014) classification. We independently read through each paper to determine the research method order. In four instances, the method sequence was unclear so we contacted the author(s) and were able to confirm order in all of these cases.

To address question 2 regarding dominance, we developed three analytical strategies. The first was an interpretive reading of how the authors represented the quantitative and qualitative data throughout each paper. The first author read through each paper in its entirety to qualitatively assess which method was prioritized more prevalently. This subjective assessment looked at how the author(s) spoke about each method including the reasoning behind the use of each method, the amount of detail given about each method (i.e. data collection, analysis), and the apparent quality and rigor of each strand. In six cases of doubt, the second author also read each paper (to increase inter-coder reliability[1]). Next, a quantitative assessment of the amount of text devoted to each method in the results section (using word counts) was performed.

Though qualitative research is generally 'richer' (Creswell, 2013)- requiring more space (i.e. higher word counts)- this step was introduced in order to inject some degree of objective analysis of each paper. Lastly, quantitative: qualitative sample size ratios were calculated for each paper. Especially in comparison to one another, the sample ratios may suggest the amount of resources expended on each method in the overall research design (Onwuegbuzie & Collins, 2007). That is, though one would expect higher quantitative samples in most papers, *relatively* low ratios of surveys to interviews may indicate higher levels of qualitative priority. Together, these approaches to deconstructing design and practice together give a reasonable sense of method dominance– perhaps even beyond the conscious intent of the authors themselves.

To answer our third question, we compared both of the preceding questions to see if there is any apparent relationship between method sequence and dominance. That is, after answering each of questions 1 and 2 with regard to each paper, we looked at potential interactions between them.

5.7 Results

The findings are organized according to the three research questions and can be found in table 5.1 (below). The third question in particular is built upon the work of the previous two and culminates in the ultimate question of this research: what is the relationship between method sequence and method dominance?

*Table 5.1 - Mixed methods articles** (2005-2015) and measures of method dominance*

METHOD	AUTHOR (YEAR)	STATED PURPOSE OF QUALITATIVE	% OF RESULTS WITH QUAL.	SAMPLE RATIO (QUAN: QUAL)*	DOMINANT METHOD
SEQUENTIAL EXPLORATORY	Walker et al. (2015)	"allowed concepts to be developed inductively"	54.6	6:1 (152:26)	QUAL
	Fast et al. (2015)	"[allows for] contingent meaning and interpretative flexibility"	32.8	N/A (N/A:35)	NEITHER
	Brownlee et al. (2015)	"to develop a measurement instrument"	0[2]	28:1(483: 17)	QUAN
	Fast et al. (2015)	"[to understand] residents' impressions of how turbines fit or do not fit into landscapes"	41.2	13:1 (483: 35+)	QUAL
	D'Souza and Yiridoe (2014)	"provide insight and understanding…and [help to develop] a survey"	28.1	38:1 (226:6)	QUAN
	Walker et al. (2014a)	"important insight" and "to inform and design the survey"	36.5	6:1 (152:26)	QUAN
	Walker et al. (2014b)	"triangulation of concepts…[and an] alternative… to purely positivistic approaches"	33.1	6:1 (152:26)	NEITHER
	Devine-Wright and Howes (2010)	"[triangulation and]…to create items in questionnaire"	25.1	14:1 (457:33)	QUAN
	Zoellner et al. (2008)	"to understand the wide range of social parameters…"	53.2	N/A(349:N/A)	QUAL
	Ellis et al. (2007)	"[to allow for the] study of attitudes"	17.4	5:1 (54:11)	QUAN
SEQUENTIAL EXPLANATORY	Janhunen et al. (2014)	"allowed a deeper understanding of the underlying factors"	37.2	8:1 (112:14)	NEITHER
	Lombard and Ferreira (2014)	"Triangulation"	0	N/A (98:N/A)	QUAN
	Schaefer et al. (2012)	"[to] identify perceived barriers and attitudes toward a [Feed In Tarriff]"	67.6	13:1 (366:29)	NEITHER
	Frantál and Kunc (2011)	"to investigate…socio-cultural contexts…and also the actual residents' point of view"	26.1	2:1 (156:73)	QUAN
	Warren and McFadyen (2010)	"to explore the perceptions…concerning the impacts of onshore windfarms"	46.7	21:1 (105:5)	QUAN
	Holburn et al. (2010)	None given	42.9	N/A (29:N/A)	QUAN
	Maruyama et al. (2007)	"[to uncover] the interests of the various actors involved in community wind projects"	0	N/A (745:N/A)	QUAN
	Varho and Tapio (2005)	"to describe the results through the arguments given by the interviewees"	41	1:1 (14:14)	NEITHER
FULLY INTEGRATED	Greene and Geisken (2013)	"to present a more complete picture"	49.8	8:1 (108+:12)	QUAN
	Jepson et al. 2012	"to explore the content and meaning of common views"	85.2	1:1 (21:11)	QUAL
	Brannstrom et. al. (2011)	"Create a concourse of statements [and]…elicit rationale (postsort)"**	31.3	1:1 (21:11)	QUAN
	Wolsink and Breukers (2010)	"allows for…comparison of human subjectivity"	60.8	1:1 (56:56)	QUAL
	Fisher and Brown (2009)	"enables the researcher… [to study perceptions]"	50.1	1:1 (20:23)	QUAL
	Haggett and Toke (2006)	"to consider how protest manifests…[and] explore some of the issues raised"	50.8	N/A (51:N/A)	NEITHER
PARALLEL	Mulvaney et al. (2013a)	"focused on assessing the benefits and costs…historical data…general concerns…and community involvement"	56.9	N/A (N/A:11)	NEITHER
	Mulvaney et al. (2013b)	"a deeper understanding of the historical timeline and community acceptance of the wind farm"	25.0	N/A (N/A:N/A)	QUAN
	Maillé and St-Charles (2012)	"deepen the understanding"	48.4	1:1 (93:93)	QUAL

* N/A refers to any sample (number) that was not stated in the paper. For example, some papers gave vague descriptions of the number of interviews they completed. If either a qualitative **or** quantitative sample was not given, a sample ratio was unable to be calculated.
** A full list of papers is available by contacting the authors

5.7.1 Question 1 – method timing/sequence

Using the four-fold characterization of research designs (Hollstein, 2014) we find a relative balance of method sequence across the sample used in this study (see Table 5.1). Based on what some have suggested (Bryman, 2007) it was not entirely surprising that the most commonly used design (n=10) was the sequential exploratory design. Authors in this field began to use the approach in 2007 and there has been a recent surge (n=7) from 2014-2015. The sequential explanatory approach was the second most common design (n=8). The final two- fully integrated and parallel research designs were used to publish six and three papers respectively.

5.7.2 Question 2 – method dominance

This research used subjective and objective measures to determine the overall method dominance in each paper. Through these, there appears to be an overall theme of the subjugation of qualitative design and findings in the papers. This can be gleaned from the relative lack of articles that prioritize qualitative methods. Of the 27 papers analyzed, nearly half (13) were dominated by quantitative methods, while only 7 gave more priority to qualitative methods. There were varying degrees of dominance or method priority throughout the sample. For example, some papers (Brownlee et al., 2015; Lombard & Ferreira, 2014; Maruyama et al., 2007) presented no qualitative data in their results sections. Conversely, all papers that emphasized qualitative findings did so with moderation- with only one paper (Jepson et al., 2012) found to have more than 70% qualitative data.

5.7.3 Question 3 – relationship between sequence and dominance

While differences in method dominance seen across the entire sample were important, we were also interested to see if this was related to method sequence. Overall, the sequential explanatory and fully integrated designs in particular showed the most instances of quantitative and qualitative prioritization, respectively.

Sequential Exploratory

As shown in table 5.1, papers that used the exploratory approach showed a slight preference for quantitative methods. That is, the studies were dominated by the quantitative reporting in five papers, there were three papers that emphasized qualitative methods and the remaining two were balanced. Across the sub-sample (n=10) all authors explain that the qualitative methods were used to 'set up' or help design survey methods. Interviews were said to create measurement instruments (Brownlee et al., 2015; Devine-Wright & Howes, 2010) or to better inform "the more rigorous (quantitative) investigation" (D'Souza & Yiridoe, 2014, p. 264). Another reason for using mixed methodologies was to help overcome the complexity of the issues at hand. Zoellner et al. (2008) cite their inclusion of qualitative interviews in particular as being vital because of "…wide range of social parameters that determine renewable energy processes in communities" (p. 4137).

The results sections of the exploratory papers are particularly indicative of method dominance. As shown in Table 1 there is no consistent pattern, but if there is

any bias, it is towards the quantitative findings. The amount of space devoted to each method varies widely but equates to an average of 32.2% qualitative, suggesting a fairly strong preference for quantitative text- though this value is highly influenced by the study by Brownlee et al. (2015) who devote none of their results section to qualitative findings.

In looking at sample sizes used for each method we see similarities across the sequential exploratory research design. In most cases the quantitative sample is much larger than the qualitative sample. Of the papers in which data is available, the ratio of quantitative to qualitative ranges from 38 to 1 (D'Souza & Yiridoe, 2014) to approximately 5 to 1 (Ellis et al., 2007). Together with all of the subjective and objective measures used, we find there is a slight preference for quantitative (i.e. survey) findings amongst sequential exploratory papers.

Sequential Explanatory

Sequential explanatory articles' stated purpose for using qualitative methods avoided any mention of using one to inform or design the other. Instead, there was an indication that the qualitative methods were included to expand and delve deeper into research questions. That is, qualitative methods were used to allow for richer understandings (Janhunen et al., 2014) or explore "residents' [actual] points of views" (Frantál and Kunc, 2011: p. 507). In these cases, interviews were used to further investigate findings that arose within the initial survey.

The findings sections within this sub-set of literature reveals that the authors who used an explanatory approach devoted less space towards the qualitative findings (32.7%). There was only one article which contained a majority of qualitative findings in its results section (Schaefer et al., 2012). This trend is somewhat surprising considering how the qualitative methods were described above. The quantitative to qualitative sample ratios within the set of explanatory articles were also similar to those found in the sequential exploratory papers- though there were two with comparable ratios of 1:1 (Varho and Tapio, 2005) and 2:1 (Frantál and Kunc, 2011). All told, it is clear that sequential explanatory papers found in this study tend to prioritize the quantitative methods.

Fully integrated

In all but one case of papers that used the fully integrated design, authors' stated purposes for including qualitative methods centered on theoretical development or expansion. For example, Green and Geisken (2013) used interviews to "present a more complete picture" of the research questions (p. 4). The only exception to this rule was from a Q-Method paper in which Brannstrom et al. (2011) used interview data to "create concourse of statements" to be used in a quantitative, sorting exercise.

In looking through the results sections of all integrated papers found, we calculate that qualitative findings make up a slight majority of the text (54.7%). This turned out to be the highest value found among all research designs studied. There is also a fair degree of consistency; four of the six articles contained between 49% and 61%

qualitative findings. Interestingly, the two 'outliers' came from the same research project (mostly quantitative - Brannstrom et al., 2011; mostly qualitative - Jepson et al. 2012).

The sample ratios found within fully integrated papers also reveal more dominance given to qualitative methods. These ratios are approximately the same in three studies and in one case (Fisher & Brown, 2009) the qualitative sample is actually larger. Another unique feature found in this sub-set is the use of three or more separate methods of data collection. In the paper by Green and Geisken (2013), economic modeling began the data collection, followed by in-depth interviews and finally surveys were sent to randomly chosen residents. Two more papers (Jepson et al., 2012; Brannstrom et al., 2011) also employed three stages of data collection.

In all, the papers that employed fully integrated designs showed some tendencies to prioritize the qualitative data and findings. The exceptions were from Brannstrom et al., (2011) and Green and Geiksen (2013) - who emphasized the quantitative- and Haggett and Toke (2006) who presented each method equally.

Parallel

There were only three papers that used a mixed method parallel design. In two of these papers, the stated purpose for using qualitative methods was to deepen the understanding (Mulvaney et al., 2013b; Maillé & St-Charles, 2012).

Studies that used parallel designs had wide variations in terms of how much space was devoted to qualitative findings. The average of 43.4% is indicative of the fact that qualitative results served a somewhat complimentary role, however this value was influenced heavily by one paper in particular (Mulvaney et al., 2013b) whose quantitative findings encompassed 75% of the results section. Only a single paper (Maillé & St-Charles, 2012) within this sub-set contained full details regarding sample sizes.

Overall there is no clear pattern or tendency for authors to prioritize one method or the other within parallel mixed methods designs. Our analysis concludes one paper emphasized the qualitative, another quantitative and the third balanced the two. It is perhaps because we found only three articles why there is difficulty in seeing any pervasive trends that exist.

5.8 Discussion

This study has shown that within the social dynamics of wind energy literature, there a relative balance in terms of research designs. Though most (18/27) of the papers found were sequential, we also found nine that used integrated or parallel research designs. This variety suggests that researchers are considering the many ways in which to employ both qualitative and quantitative methods. In doing so, academics highlighted here seem to be moving away from Morse's (1991) two-fold classification system which characterizes all mixed methods research as being conducted either simultaneously or sequentially.

One of the main messages from this study is that mixing methods in theory does not necessarily lead to a paper that presents a balanced mix of findings. Of the 27 papers in our sample, we detected a lack of a dominant method in only 7. Though mixed methods do not *necessarily* imply balance (see Morse, 2010), and there may be good reason for emphasizing one type of data, it is nevertheless useful to interrogate *how* dominant quantitative methods are being used in practice.

Somewhat in line with recent concerns that qualitative methods are only playing complementary roles (Hesse-Biber, 2010b; Morgan, 2013), only 26% of the sample analyzed here gave priority to these methods. There were an equal number of publications in which there was a 'methodological balance'. Therefore there was a two to one ratio in terms of quantitative-dominate to qualitative-dominate papers. Though this is significant, our original reading of the literature - and perhaps our knowledge of the history of the social sciences - made us very sensitive of threats to qualitative methods. That is we expected a larger difference in quantitative-dominate to qualitative-dominate papers. In this sense we might say that the priority given to qualitative methods exceeded our (lowered) expectations. A reason for this may be that those inclined toward conducting mixed methods in the wind energy literature, are coming from somewhat stronger understandings of the value of qualitative research. In any case, the current relative balance in terms of method dominance currently within the social dynamics of wind energy literature suggests, qualitative methods are not being *heavily* dominated as we had originally suspected.

Regarding the interaction of method sequence and dominance in our sample, there are two fairly strong trends: i) completing quantitative methods first typically resulted in more priority given to quantitative methods and ii) research that uses the fully integrated approach tends to emphasize the qualitative portion. In looking at the effect method sequence may have on revealed dominance in a specific domain, this paper adds to a very limited number of studies that have looked the relationship. Traditionally, researchers have treated the two factors as independent (Hall & Howard, 2008) and thus may have ignored the possible interactive effects of sequence and dominance. Mayoh and Onweubzuie (2013) present the best and most recent investigation into this relationship though it is done within a domain that is inherently qualitative in nature. In contrast, this review is open to all mixed methods research in the broadly defined realm of the social dynamics of wind energy literature.

Despite our focus on method sequence here, we do not mean to suggest that there are no other factors important in shaping priority. Indeed Bryman (2007) makes clear that researchers may: i) intend to emphasize one over the other or ii) be 'forced' to prioritize a single method because of the many "predispositions and preferences" of researchers and funding agencies (p. 20). Bryman and others have called these types of pressures *barriers* toward the integration of qualitative and quantitative research. Based on the present findings, we suggest that research design should also be considered as a potential barrier. That is, though less overt than other barriers, some research designs may be more apt to allow for a balanced use and presentation of mixed methods. Future research should further investigate the relationship between sequence and dominance proposed here.

Three papers identified that they used qualitative methods, but present only quantitative findings. These papers might have been omitted from analysis, but we included them to highlight that identifying mixed methods research can itself be challenging. Phrases like, "based on interviews" or "insights from interviews" are perhaps meant to signal companion work published elsewhere rather than in the current paper. Similarly, publication pressures may be forcing authors to cut qualitative findings from their work. Less optimistically, these authors may be using qualitative methods simply to help their work stand out as a form of mixed methods inquiry. Whatever the case may be, the absence of significant qualitative work within them underscores the need to be explicit about intent when describing research design.

Ironically, though the fully integrated approach tended to allow a relative methodological balance, the authors fail to highlight how they achieved that balance in any direct way. It may simply be that authors who gravitate to this design tend to be more balanced or there may be specific (unmentioned) aspects of the design and execution of the work that play an important role. Regardless, going forward it will be useful to explore such questions for those interested in achieving a more balanced approach to mixed methods.

Especially within studies that gave more priority to quantitative methods, there was often an implication that qualitative work holds secondary status regarding rigor or robustness (Hesse-Biber, 2010b). A few authors stressed how the interviews were completed in order to create measurement instruments (Brownlee et al., 2015; Devine-

Wright & Howes, 2010) or to set up the survey (D'Souza & Yiridoe, 2014). While this approach does follow the basic tenets of exploratory research as outlined in this paper it also diminishes the value of qualitative research, while suggesting a lack of understanding of the term rigour itself. As Baxter and Eyles (1999; 1997) explain, the term rigour has historically been associated with quantitative methods- though through a different set of evaluation criteria, it should be applied in the qualitative realm as well (see also Creswell, 2013).

Though we cover an entire literature, it might be argued this is a relatively small sample size (n=27) to draw any conclusions beyond the social dynamics of wind energy literature. We whole heartedly agree, and suggest instead that we have provided a foundation for future work that might explore ideas about sequence, dominance and design in larger and more diverse data sets. We also anticipate some criticism regarding the subjective nature of the interpretative reading- a step that was used to qualitatively assess dominance. In order to help balance these potential concerns- and employ mixed methods ourselves- we also introduce more objective measures including a word count. Together, the combination of subjective and objective ways of measuring dominance is a unique contribution and when applied to other literatures, may increase our understanding of important methodological questions.

5.9 Conclusion

This paper has provided a set of procedures for determining if and perhaps how qualitative methods are subjugated in mixed methods design. While there was some

indication that a sequential methods are more likely to result in papers that have quantitative methods dominate, this paper does not present enough evidence to claim correlation. Nevertheless, it may be the case that the sequence of methods may bias the ways in which each method is done or ultimately presented to the reader. In our sample, papers that used a sequential explanatory design in particular were much more apt to allow quantitative data to dominate.

Drawing on the ideas of Elliot (1999), the quest for 'answers' to social scientific problems should not privilege one method or another but instead, researchers should let the question determine the method. Indeed, despite the potential benefits of combining methods, researchers should not blindly employ them. Just as academics must be trained in qualitative or quantitative methods, they should also be required to have a strong knowledge base surrounding mixed methodologies. The decision to use mixed methods therefore should involve just as much if not more thought than a traditional research project. A few papers within this literature seemed to blindly incorporate either qualitative or quantitative research into an otherwise stand-alone research project. Like the work of Wisdom et al. (2012), methodological details were too often lacking from this review. Future researchers using mixed methods from across disciplines should aim to incorporate sufficient detail regarding these matters.

Going forward with research in the social dynamics of wind energy literature, academics should be familiar with the benefits of mixed methods. With special relation to wind energy debates, qualitative and mixed methods have much to contribute. For example, interviews may help in addressing the pitfalls associated with opinion polling,

where the view of the majority is emphasized (Aitken, 2010). The combination of statistical analyses and more in-depth forms of research therefore may present a clearer and encompassing view of the subject at hand.

Through an examination of a set of literature in detail, this paper has also reminded the reader of the true value in conducting mixed methods research. As the use of mixed methods approaches becomes more and more common, it is important for academics to use mixed methods only when the research problem or question calls for it. As Fielding (2012) writes, "Rather than mixing because there is something intrinsic or distinctive about quantitative data or qualitative data, we mix so as to integrate the two fundamental ways of thinking about social phenomena" (p. 125-126).

Despite all of the criticisms and complexities of mixed methods research presented here, there is still the potential for increases in our understanding of social scientific problems when using qualitative and quantitative methods together. Especially when employed with a greater consideration for both approaches, researchers may be able to more fully and appropriately investigate social phenomena.

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Chapter 6: DISCUSSION AND CONCLUSION

In this final chapter, I summarize the most important findings and discuss the major contributions- theoretical, methodological, and practical- with regard to both wind energy development and social responses in Canada (Chapters 3 and 4) and the structured, critical literature review of mixed methods research (Chapter 5). I close the chapter with a brief look at the dissertation's limitations, before suggesting some areas and questions for future research.

6.1 Introduction

The primary aim of this dissertation was to examine the relationship between policy levers and local responses to wind energy development in Ontario and Nova Scotia, Canada (Chapters 3 and 4). Though there is still a relative paucity of such research in Canada compared to the more established European literature, emerging Canadian work suggests that provincial level policy and related development patterns can shape how communities respond to wind turbines (see Baxter et al., 2013; Fast et al., 2016; McRobert et al., 2016; Richards et al., 2012; Walker et al., 2015). While much of this research suggests high levels of opposition to wind energy in Ontario, less is known about other provinces- including Nova Scotia who has recently built wind energy through cooperative, community-based approaches (Adams et al., 2011). Based on some early evidence from Vass (2013) and a collection of media stories, I hypothesized that I would see higher levels of support, though the exact mechanism was still unclear as there is a lack of empirical work in this area.

I employed a grounded theory approach within the primary study (Chapters 3 and 4). This flexible design allowed me to adapt to the research settings, including most notably the research objectives. About 25% of the way through the interviewing it became clear that elements of procedural justice (Thibault & Walker, 1975) and distributive justice (Gross, 2007) may have particular relevance to explaining public support for wind energy in Ontario and Nova Scotia. The decision to focus on these was also in part because despite their theoretical suitability, the two concepts have not been applied to any great extent within the existing literature. Procedural and distributive fairness are part of larger theoretical frameworks built under the umbrella of environmental justice and have been used across many sub-disciplines in the social sciences including Geography (Brockner et al., 2001; Hay, 1995; Towers, 2000; Tyler & Blader, 2000; Cutter 1995). Literature related to hazardous facility siting was particularly helpful in shaping the type of research questions I ultimately asked. Within Chapter 4, procedural justice was tightly woven within Arnstein's (1969) ladder of citizen participation. I use the ladder to illustrate different levels of procedural justice through development processes in Ontario and Nova Scotia.

The dynamic, grounded theory approach also allowed not only for initial research questions to morph somewhat, but also for a new methodologically-focused one to enter the dissertation entirely (Chapter 5). Through a reading of the social dynamics of wind energy literature, it was quickly apparent that: i) there had been a recent surge in mixed methods studies and that ii) the large majority of these papers emphasized or prioritized quantitative methods and findings. What was less obvious were the reasons why

researchers tended to perform research and/or write in this way. Past research has often suggested that method priority or dominance (as I refer to it) was either a conscious decision of the author or is the result of pragmatic variables such as expertise of the researchers, publication timelines, or the audience for the study (Bryman, 2007). I tested another idea- that method dominance was in part being shaped by the order in which qualitative and quantitative methods were being used in research projects. Thus, Chapter 5 challenges the traditional ways in which method order (sequence) and method dominance are most often thought of as independent of each other.

In light of the context described above, the research objectives for this dissertation were:

1. To examine and compare the nuances of financial compensation, economic benefits and overall distributive justice among wind energy development processes in Ontario and Nova Scotia (Chapter 3).
2. To investigate elements of procedural justice in Nova Scotia and Ontario with special attention to ideas of local support, local approval processes, and the relative contribution of other variables including those associated with distributive justice (Chapter 4).
3. To explore and critically test the relationship between research design (through method sequence) and method dominance (priority) in a set of mixed method, wind energy literature (Chapter 5).

These three objectives guide the three manuscripts written for the dissertation and have either been accepted for publication (Chapters 3 and 4) or are under review (Chapter 5).

6.2 Summary of findings

6.2.1 Chapter 3: Distributive Justice and turbine communities

Chapter 3 investigates financial benefits and issues of distributive justice in Ontario and Nova Scotia (Walker & Baxter, 2017a). There are three key findings of this work: significant differences in support by province, associations between distributive justice and support, and deeper understandings of community ownership and benefits sharing in Canada.

Just over 26% of residents surveyed in Ontario supported their local project, while this figure was nearly three times higher in Nova Scotia (79.8%). The percentage of those respondents indicating their health and property values had been affected by the wind turbine projects near their homes was also three times higher in Ontario. Thus these findings confirmed our initial hypothesis- based on recent studies (Adams, 2011; Baxter et al., 2013; Vass, 2013)- that opposition to wind energy in Nova Scotia was likely to be lower than what has been seen in Ontario.

Chapter 4 and much of this thesis looks to increase our understanding of why we see significant gaps in terms of local support for wind among the two provinces studied. Through early interviews with residents, developers and other stakeholders in Ontario and Nova Scotia, it was quickly apparent that financial compensation was playing some role. Those in industry were often candid in admitting that tangible benefits can shape individual's opinions toward wind energy, while residents too would speak of their

desires to benefit more than the status quo is providing. This was particularly the case in Ontario where most I spoke with were not even aware of concepts of community-ownership or public investment opportunities related to wind energy. Statistically, there was also a significant difference between Ontario and Nova Scotia across a question that was designed to encompass several ideas of financial benefits. 16.9% of the Ontario sample agreed that local development had brought with it "adequate economic benefits" while this value was 33% in Nova Scotia, signaling that a better system for financial benefits in the maritime province may partially explain differences in level of support.

The regression modelling supports the importance of financial benefits in predicting turbine support. In the first model, a simple one-stage regression model was run with local support as the dependent variable and five dimensions of distributive justice as the independent variables. Those variables related to equity, community-based benefits and funding to help people 'escape' were statistically significant. A series of four models using adequacy of financial benefits as the dependent variable provides more nuance. Among the 25 independent variables (including demographic and geographic controls) included in the final model, only the fair distribution of financial benefits and annual income were significant (i.e. those in lower income brackets more likely to say benefits were not adequate).While the total amount of benefits was strongly correlated with both local support and adequacy of benefits, the relative power of it was negated when fairness of distribution was introduced. Thus residents were more concerned with the way in which benefits are spread out fairly throughout their community than with the total amount given or earned as a result of recent

development.

The interviews allowed me to more deeply explore some commonly held ideas relating to community-based wind energy development and benefit structures, particularly related to: investment opportunities, and the novel ways of introducing benefits. The first of these ideas related to who is actually investing in the 'community-owned' projects of Nova Scotia. Initially through interviews and later through survey analysis, the residents living near wind turbines were often not the ones investing and most had no idea who exactly who in their community had. Interviews with policy experts and a later reading of policy documents confirmed that the CEDIF program (the option most often used in Community Feed-In Tariff projects) only required investors to reside in the local municipality. The second finding challenged the way financial benefits are usually introduced in both provinces. During an interview with a developer, I learned that some European wind energy projects are introducing electricity rebates for those living close to wind turbines. When this idea was introduced through both interviews and surveys, residents were overwhelmingly supportive of it.

6.2.2 Chapter 4: Procedural Justice and turbine communities

Sharing some characteristics with Chapter 3 (manuscript 1), Chapter 4 (manuscript 2) focused on procedural justice and associated ideas relating to planning processes (Walker and Baxter, 2017b). Like its distributive counterpart, research looking at procedural justice has been done mostly in the European context (e.g. Hall et

al., 2013; Ottinger et al., 2014; Toke, 2002; Zoellner et al., 2008) though there is some emerging research from Canada as well (Baxter et al., 2013; McRobert et al., 2016; Walker et al., 2015). Yet most of these studies mention procedural justice as an implication or the issue is secondary to some other overarching theme like community conflict (Walker et al., 2015), political or legal frameworks (McRobert et al., 2016; Stokes, 2013) or broader conceptualizations of local support (Baxter et al., 2013; Hall et al., 2013). Very few have framed their work from the outset as concerning procedural justice. One exception comes from Firestone et al., (2012), who deliberately examine procedural justice but they do so in a somewhat limited way through just three survey questions while also suggesting that qualitative research may help us better understand issues related to process and outcome.

The major findings from this paper center on differentiated experiences of the siting processes for those living in Ontario versus Nova Scotia. The interviews revealed that in the latter, general planning procedures were said to have gone much better in Nova Scotia where people I spoke with would express their support for the way wind was ultimately built. In Ontario, especially among those unhappy with the pattern of top-down, technocratic development in province, people voiced their desire for policies that keep people better informed and lead to "more positive conversation[s]". Some developers I spoke with were also clear about their desire for community-based development and/or frustration with processes associated with the status quo in Ontario.

Perhaps the most pertinent finding of this paper was the significance that ideas related to 'ability to affect the outcome' variables had throughout qualitative and quantitative findings. Even during interviews with the most ardent supporters of local wind energy development, residents would make it clear that they resented the inability to control many aspects of the project- even during inclusive, and highly engaged processes common in Nova Scotia. This second manuscript also included a five-stage regression analysis with indexed development process approval as the dependent variable. Independent variables included elements of procedural justice, distributive justice, attitudes toward wind energy, as well as provincial context and demographic variables. In the final model, 5 of 21 variables were significant: the ability to affect the outcome, wind energy as environmentally friendly, importance of electricity in my province, province of residence, and distance to the closest turbine. Combined with qualitative and other quantitative findings, the significance of the ability to affect the outcome variable suggests that local control may be the most important aspect of procedural justice across both provinces. Meanwhile, the other four variables serve to remind us of the complex relationship between social responses to wind energy development.

Lastly, though general experiences of development were better for residents in Nova Scotia, when asked specific survey questions about planning and siting processes, the gap between provinces decreased significantly. That is, across most measures of procedural justice tested, a minority of Nova Scotians approved (e.g. only 41% agreed that plans were transparent; 34% agreed in Ontario). In the case of one variable looking

at whether or not participation led to changes in the project, there was actually less agreement in Nova Scotia (though not statistically significant).

6.2.3 Chapter 5: The structured and critical review of the mixed method, social dynamics of wind energy literature

The investigation of the potential relationship between method sequence and method priority was I far as I could tell, the first of its kind. Past research has treated the two variables as independent or has only 'scratched the surface' in terms of their interaction.

The findings from Chapter 5 somewhat confirm the idea that qualitative methods were playing complementary roles in mixed methods research. Within the sample of published articles (n=27), a plurality (48%) emphasized quantitative findings. In contrast, only 26% prioritized qualitative findings. It is somewhat surprising that quantitative methods did not dominate even more given the findings in other similar studies where quantitative findings dominate in 60-80% of the cases (Bryman, 2007; Hesse-Biber, 2010; Niglas, 2004). Despite the relative balance, quantitative findings tended to dominate to a much higher degree than qualitative findings when they were assessed as dominant. There were three papers in the sample that had no space devoted to qualitative findings despite claiming to use qualitative methods. There was also asymmetry in terms of the method description. For example, there were five publications that gave great detail including sample sizes related to the survey-based

research, but no such detail for the qualitative portion. The interpretative reading exercise used to look at method priority often described qualitative methods such as interviews as being used to "set up a measurement instrument" or "create items in [the] questionnaire". Thus, there were still signs that qualitative research is generally considered superfluous or of secondary importance to some researchers.

In looking at the relationship between research design and method dominance, a plurality of papers that began with qualitative methods (i.e. sequential exploratory) emphasized the quantitative (50%). Meanwhile, a majority of the sample (62.5%) which used a sequential explanatory design also prioritized the quantitative. Only when using the fully integrated approach did researchers tend to allow qualitative methods (50% of sample) to dominate relative to survey-based methods (33% of sample). The article closes with a discussion of broader questions of mixed methods research design and implementation.

6.3 Contributions of the study

6.3.1 Theoretical Contributions

Due to the lack of empirical academic work in Canada in the area of wind energy policy and local communities, the cases are relatively novel, but so too are some of the conceptual insights. This work builds on theory developed in such studies developed largely in the EU, where there has been a concerted effort to look at the relationship

between wind energy policy and levels of local support (e.g. Toke, 2005; Warren and McFadyen, 2010). It also builds on growing empirical work Canada that suggests community engagement and benefit schemes are a vital way to develop wind turbines that are accepted or supported by local communities (e.g. Baxter et al., 2013; Deagan et al., 2013; Fast et al., 2016; Hill & Knott, 2010; Walker et al., 2015).

6.3.1.1 Advancing the resident-centered viewpoint

A portion of published research in what I call the social dynamics of wind energy literature purports to explain public acceptance of wind energy development yet does so without speaking with or surveying people living closest to turbines. These literature and policy reviews are valuable, and indeed have set the course for the theoretical basis of wind energy research (see Pasqualetti, 2001; Wolsink, 2000). More recently, geographers have studied wind energy development empirically through case studies, yet in many instances, interviews or surveys still exclude local residents. Research from Jobert et al. (2007) aimed to understand how "policy frameworks influence local acceptance" (p. 2751) by speaking with scientists, wind energy representatives, members of industry, politicians and developers. Increasing our understanding of the views of multiple stakeholder groups does provide a useful 'piece of the puzzle'- yet in not studying rural residents closest to development, I believe our understanding will be limited. In the Canadian context, researchers sometimes study policy documents, and/or speak to those living outside of rural communities where turbines are being built (Richards et al., 2012; McRobert et al., 2016; Stokes, 2013; Watson et al., 2012). These types of studies are no doubt important in terms of understanding policy development or the views of different stakeholders outside of the local community. However, they

must not be used as a replacement or proxy for research that does enter rural communities playing host to development and learning about daily-life experiences.

In entering communities playing host to wind energy, this research showed that differentiated policy programs can influence ideas of environmental justice for those living closest to development. It also suggests more generally that planning processes are more just, and there are less negative impacts to 'daily life' when provinces use more community-based initiatives to build new energy projects.

6.3.1.2 The relationship between research design and method priority

Chapter 5 deals with long-standing methodological questions in the social sciences and applies them to the social dynamics of wind energy literature. Traditionally, method order and method priority have been treated as two separate and unrelated ideas (Ivankova et al., 2006; McManamny et al., 2015; Plano-Clark et al., 2008; Žydžiumaite, 2007). While I do not refute that method priority can be a conscious decision or is shaped by things like journal preferences (Bryman, 2007), evidence presented in Chapter 5 suggests that method order may be shaping method dominance or priority- perhaps independent of a researcher's intentions. In terms of concept and theory development, this is important - especially for those researchers aiming to conduct and present mixed methodologies within the same research project. For example, conceptual insights may be missed if too much emphasis is placed on survey findings; while too much emphasis on the qualitative may miss opportunities to explore the generalizability/transferability of concepts. That is, focussing too much on either

method may limit our understanding of complex social phenomena. More generally, insight from this work may also help to fight the recent trend which has seen qualitative methods playing increasingly minor roles in mixed methods research (Creswell et al., 2004; Hesse-Biber, 2010; McManamny et al., 2015; O'Cathain et al., 2007; Plano-Clark et al., 2008).

6.3.1.3 The application of Arnstein's ladder

I use the Arnstein's theory of Citizen Participation in part to frame Chapter 4, which looked at how elements of procedural justice are differentiated between Ontario and Nova Scotia. Other studies that do use Arnstein's ladder to shape the research (e.g. Jami & Walsh, 2014) do so through textual policy analyses and not residents' experiences of planning processes as I do in Chapter 4. I associate the lower levels of the ladder with experiences in Ontario and the middle to high levels (i.e. what Arnstein calls partnerships) with Nova Scotia. That is, I advance the theoretical application of Arnstein's ladder to some policy-relevant ideas in Canada. This also helps to contextualize these types of ideas for the reader while also connecting the research to well-established theory in the planning literature (see Barry & Ellis, 2011; Haggett, 2011).

Arnstein's (1969) ladder has occasionally been cited in research looking at wind energy planning processes. Indeed, mostly European research has cited the ladder of citizen participation in some recent publications (Hindmarsh & Matthews, 2008; Rogers et al., 2008; Wright, 2012)- yet does not seem to inform the research to the

degree it did here. In chapter 4, Arnstein's concept of citizen power is especially relevant to the findings whereby the ability to affect change was seen as the most critical procedural justice variable in terms of shaping local approval. It is stressed that residents' disappointment regarding planning processes were largely concerned with a lack of decision-making power.

6.3.1.4 A better understanding of financial benefits and community-based development

Within Chapter 3 (manuscript 1) I provide the first known in-depth study into the relationship between the amount of financial benefits and the fair distribution of those benefits. I conclude that both are important in shaping local responses to wind energy, however from the perspective of local residents, fairness dominates when applied in relative sense (i.e. through regression analyses) - at least in these cases. Existing research in this area looks at community benefits without the nuance I do here and often makes the implication that the introduction of benefits in any capacity can powerfully increase local support (Aitken et al., 2010; Cass et al., 2010; Cowell et al., 2011). Further, qualitative interviews allow for a more in-depth investigation of *why* fairness is more important than amount. Perhaps residents' are more concerned with the overall welfare of their own community rather than a select few people- including themselves- who may benefit substantially from development.

Throughout Chapters 3 and 4, I also provide one of the first criticisms of the community-development model, at least the way it has been operationalized in Nova Scotia and Ontario. The wind energy literature has historically painted community based initiatives with an idyllic brush; often telling stories of small communities getting together as a collective to bring green energy into their village or town (see Maruyama et al., 2010). In Nova Scotia, the unawareness of local investment opportunities, combined with a general unawareness of how turbines were planned and built in their community indicates that most local residents were not intimately connected with development processes as the literature may have suggested. While there were some apparent benefits from more community-based initiatives, people directly and indirectly responsible for the project development should also understand the ways in which these programs are similar to more technocratic, developer-led models.

6.3.1.5 Local control is paramount

Though Nova Scotia had high degrees of procedural justice in terms of transparency and information sharing, residents still indicated their resentment in terms of control over their local development. Again, this is a unique contribution to the Canadian literature on wind energy development. Past studies have shown that planning processes are important yet fall short of explaining what specific aspects are most crucial (Baxter et al., 2013; Walker et al., 2015; Jami and Walsh, 2014). Chapter 4 (manuscript 2) showed that local control in paramount through both qualitative and quantitative findings. The inclusion of Gunn's Hill in Ontario- a wind project that received 49% public investment yet showed very low levels of procedural justice - may underscore the importance of local control as was more commonly seen in Nova Scotia.

These findings provide reasonable cause to go 'back to the drawing board.' That is, maybe 49% is 'not enough' in terms of local control and the extra 2% (i.e. 51%, majority ownership) may go a long way toward a more just planning process. This is not surprising if one links the idea of procedural justice to Arnstein's (1969) ladder of procedural justice whereby the highest rung represents the most inclusive form of citizen participation and control.

6.3.1.5 The 'success' of wind energy development

Chapters 3 and 4 also wrestled with ideas related to the 'success' of wind energy development. What exactly counts as successful renewable energy development no doubt depends on each stakeholder's unique perspective. Most contemporary research has used local support as a proxy for success (Gross, 2007; Jobert et al., 2007; Toke, 2005; Walker et al., 2015; Warren & McFadyen, 2005) while others attribute success at least partially to whether or not proposed projects get built (see Holburn et al., 2010; Lewis & Wiser, 2007; Loring, 2007). Yet to address issues of long-term sustainability of the industry, these two ideas must be merged going forward.

This research is focused on local support and perceptions of justice yet also cites the work of those with broader views of the wind energy industry including Richards et al. (2012)- which helps to contextualize this dissertation. Thus, we suggest two things from this work. First, that support and fairness may be intertwined through policy processes; and secondly, that the long-term growth of the industry depends on the short and medium-term public response in areas playing host to wind projects. I conclude that academics whose continued study of wind energy is focused on short-term

successes (i.e. whether projects get built or not), may be better served with the engagement of rudimentary definitions of sustainability which include ideas related to environmental and social well-being. Results presented here suggest that the lack of control, and concerns about fairness means 'success' may be fragile and not guaranteed to continue in the coming years.

6.3.2 Methodological Contributions

6.3.2.1 The multi-jurisdiction approach

The dissertation research in Chapters 3 and 4 differs from the established research from Europe and Canada in that it compared results of differing policies to develop wind energy between major jurisdictions – i.e. provinces. This allowed for an investigation into which policies were more effective in the eyes of local residents and other stakeholder groups. Most research looking at the nuances of wind energy development in the Canadian context in particular has done so at the intra-provincial scale (Baxter et al., 2013; Christidis et al., Fast et al., 2016; Richards et al., 2012; Walker et al., 2015). Notable exceptions include work by Ferguson-Martin and Hill (2011) and Watson et al., (2012) who study variation in deployment outcomes, and planning processes, respectively. Thus in comparing multiple provinces with different approaches to wind energy policy, this research aimed to better inform policy makers and provide future researchers a 'roadmap' for how inter-provincial research can be accomplished. Through this purposeful examination *across* provinces, the ways wind energy *can* be sited and developed in Canada should also be more palatable to those interested. That is, it is important to note how different policy programs- all under the Dominion of

Canada- may be developed in and implemented in ways that powerfully affect perceptions of environmental justice.

6.3.2.2 Introducing new ways of looking at method priority

In Chapter 5, I introduced a somewhat novel method by which future researchers can investigate the relationship between method sequence and method priority. Though some of these techniques used in this research to measure priority have been applied in other contexts, combining them here is in itself an important contribution. That is, when each method is used in isolation, findings may tell only part of the story. Indeed, it may also be appropriate to study the mixed method literature using a set of qualitative and quantitative forms of analysis. One particular method I used to detect method priority that was not found in any related literature to date, was the comparison of sample sizes contained within each study. This may be especially helpful under the assumption that these sample ratios may tell us something about how much time and resources are being spent on each method (Onwuegbuzie & Collins, 2007). This method could be applied to any literature within or outside of Geography to study how mixed methods are being designed and implemented in each area of research. The results may be telling of the methodological trends, including the potential for the subjugation of either qualitative or quantitative methods within such disciplines.

6.3.3 Practical Contributions

Beginning with the early stages of research design, I established the goal of writing this dissertation with practical, policy-relevant contributions in mind. This was in part driven by the fact that wind energy policy and development was popular in public discourse throughout Ontario, and to some extent Nova Scotia. It was also encouraged by my funding source, the Metcalf Foundation- who wanted the dissertation research to include some tangible product to be used under their Green Prosperity Challenge program.

6.3.3.1 The stakeholder workshop

Following the submission of all three manuscripts, I held a stakeholder workshop to discuss the major findings of the main research (Chapters 3 and 4). This also served as the release of the more accessible Toolkit for Turbines I produced- which summarized findings and gave some practical policy suggestions in terms of the future of wind energy development. The workshop was held on December 8th 2016 and involved research participants, other academics in the field, members of provincial government, and representatives from the wind energy industry. Discussion centered around the dissertation research though conversations often 'spun-off' into other areas of wind and/or environmental policy.

The workshop was organized mainly to facilitate the sharing of important information and to help in the wind energy siting process going forward. One practical goal of the workshop was to encourage stakeholders to more thoroughly interact on the

issue of benefit sharing. Since there is stigma attached to even talking about money and benefits, I highlight that such discussions have to happen early, and likely often throughout the process, but are not a replacement for mitigation of negative impacts. Important insights were shared between the residents, academics, and policy makers in attendance for the workshop and these ideas helped to shape the final writing and presentation of this dissertation.

6.3.3.2 Online publication of the Toolkit

Dovetailing with the workshop is a second tangible contribution of this research: the Toolkit for Turbines (see http://coarep.uwo.ca/mobilize.php) which alongside the interactive website, allowed various stakeholder groups to easily access the findings from this research. It also may have allowed residents across both provinces to assess their own concerns and preferences regarding turbines and engage in a dialogue with other stakeholders to understand their concerns and preferences. A major aim of the toolkit was to provide information and establish principles for fairer and less divisive turbine facility siting outcomes. There are similar documents available to residents in Canada like the Ontario Sustainable Energy Association's (2005) *Ontario Landowner's Guide to Wind Energy*; yet these do not go the extra step to facilitate important dialogue – i.e., to suggest how communities and developers might come together on a more level playing field to collectively negotiate fairer agreements. I closed the document with eight principles for better wind energy policy and siting, explained in more detail in the toolkit itself:

- Principle 1: There is no 'magic bullet' for local support for turbines.
- Principle 2: Community-based development does not necessarily prevent local discontent
- Principle 3: Majority support may be accompanied by majority discontent on a number of siting measures.
- Principle 4: Specifics matter – e.g., distribution of community benefits, not just the overall amount
- Principle 5: Residents desire third-party "unbiased" information and knowledge translation
- Principle 6: Residents favour mandatory local vote negotiations.
- Principle 7: Support for a range of financial benefits mechanisms including opportunities for locals to invest and profit directly
- Principle 8: Financial benefits are not a replacement for proper mitigation

6.3.3.3 Media release and engagement with news organizations

While waiting for my supervisor and second reader to review my completed thesis, and with one manuscript published in the *Journal of Environmental Policy and Planning*, I wrote a media release outlining the distributive justice publication and the associated toolkit (above). With the help of Dr. Baxter, along with Deb Van Brenk and Rob Rombouts of Media Relations at Western, I produced a media release, which was sent out by Western University Communications on March 2nd 2017 (see Appendix F). Over the next week, I received and fulfilled requests for interviews with several news

organizations including the Canadian Broadcast Corporation (CBC), and the London Free Press. The media release was also published across several local newspapers across the country including the Toronto Star, and the Globe and Mail with details available on the coarep.uwo.ca/mobilize.php website.

6.4 Study Limitations

While on the whole I was pleased with the progress and outcome of the dissertation research, there are at least three shortcomings of this dissertation work worth detailing since they have some bearing on how the findings might be interpreted: self-selection bias, inconsistent quantitative sample frames and loss of richness throughout qualitative data collection, and analysis.

The single most important threat to the survey findings I expect to hear from policy professionals and statisticians is self-selection bias. This means that the people who volunteered to participate in my study are not necessarily representative of the population as a whole. Indeed, on the surface, this is a serious threat to the representativeness of my sample (Collier & Mahoney, 1996; Winship & Mare, 1992). Yet, I argue that consistency of participant recruitment, and incentive strategies should have not have produced biases that would significantly differ between communities or provinces. That is, the bias should be consistent across sites, so would not be likely to explain the inter-provincial differences that were found here.

Within the major study of the dissertation (Chapters 3 and 4) another limitation was the inconsistent quantitative sample frame between Ontario and Nova Scotia.

There were a total of three communities that were sent surveys in Ontario, yet because of the fact that fewer people generally lived within 2 km of a turbine in Nova Scotia, I was somewhat forced to send these out to seven communities in the province. This helped provide comparable numbers of surveys in each province. This limitation may have biased my findings through inconsistent sample frames, yet this was balanced against the need to stick with 2km setback which ensured that residents had roughly comparable exposures in terms of distance to the nearest turbine.

Lastly, the findings from this research are limited in a sense of the loss of richness from the immense sum of qualitative data compared with the relative lack of quotes that are presented throughout the dissertation. A total of 54 interviews were conducted with all stakeholders and the average interview time was just over 1 hour and 10 minutes long. After transcription, and analysis, only 26 quotes are within the central manuscripts (Chapters 3 and 4). This type of practice of condensing large amounts of data is common in qualitative research (Miles, 1979). The problem was undoubtedly made worse through the mixed method approach this dissertation undertook, whereby qualitative findings were balanced alongside the need to present survey findings. Thus indeed there is a loss, yet it is one I accept in light of the benefits of presenting mixed methods.

6.5 Directions for Future Research

There is still much to learn with regard to both social responses to wind energy development and the nuances of method dominance in mixed methods research. This

dissertation aimed to move the conversation forward in terms of both of these ideas and yet in doing so, clearly identifies some areas where future research is warranted. Thus this dissertation closes with a brief discussion of three such areas organized by manuscript.

6.5.1 Chapter 3: Distributive Justice

The fact that many people living closest to wind energy developments where public investment was offered did not recall having been made aware of any such opportunity is very concerning since it undermines the intention of local profit sharing in the first place. This may be as simple as distributing a survey in these rural communities to see who exactly is taking part. If as I suspect, it is the case that the majority of investors are located outside of the local community, developers and policy makers must begin to ask themselves if they are using community-based development in the truest sense of the term. Additionally, if indeed local investment is lacking, a study of the potential barriers to local investment may be a fruitful avenue of research for either qualitative or quantitative researchers studying wind energy development in rural areas.

Researchers in this field should continue seeking out success stories – in terms of fairness and benefit sharing, but also dig deeper in terms of what is going on within rural areas playing host to community-based development. Despite some strong indications that development was more equitable in Nova Scotia, there were still plenty

of people in the province that were not satisfied. Concerning a recent 100% community-owned wind energy development in M'Chigeeng, Ontario one could ask if people there are more satisfied in a situation where their community receives the entirety of the profits or do new problems arise? (e.g., Where and when does money get spent? Who is likely to benefit most?). If we are going to encourage the movement toward a higher percentage of profit staying in local communities, we need to know what it does to communities after turbines start spinning, and cheques 'come in the mail'.

6.5.2 Chapter 4: Procedural Justice

In the second manuscript which looked at planning processes and local support/approval, there were differences between provinces that were not explained sufficiently. Though the feeling of local control is shown to be a powerful idea throughout qualitative and quantitative analyses, other significant variables remind us that social scientific research is undoubtedly complex. There was scant material to explain the finding in the final regression model that showed statistical significance among two provincial level variables meant to act as control variables: the importance of electricity and the perception of wind energy as being environmentally friendly. It is possible that concepts like political viewpoints and unique sets of values between provinces is responsible for some of the difference yet this research did not focus on them in any significant way. Thus future research examining differentiated responses would be well-served to understand this type of socio-cultural context.

6.5.3 Chapter 5: The structured and critical review of the mixed method, social dynamics of wind energy literature

The findings from the final manuscript suggest a possible relationship between research design and method dominance yet because the study was the first of its kind, much more research is needed. More specifically, there is a need for an investigation of method order and dominance through a much larger data set. This will allow for the type of quantitative analyses needed to help study the correlation between the two variables.

Additionally, future research in this area may benefit from looking at different ways to measure method dominance including the inclusion of tables and figures in a word count. Similarly, because I conducted a word count through only the results section, others could experiment by looking through the entire paper or different sections within it to determine which method dominated.

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Appendices

Appendix A: Ethics Approval

Western Research

Research Ethics

Western University Non-Medical Research Ethics Board
NMREB Amendment Approval Notice

Principal Investigator: Dr. Jamie Baxter
Department & Institution: Social Science\Geography,Western University

NMREB File Number: 105153
Study Title: Toolkits for wind turbine facility siting
Sponsor:

NMREB Revision Approval Date: July 13, 2015
NMREB Expiry Date: April 11, 2016

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Other	Confidentiality agreement for transcriptionist	2015/05/21
Other	Email to Developers	2015/05/21
Revised Western University Protocol		2015/06/26
Instruments	Survey - Developers	2015/06/29
Instruments	Survey - Residential + Municipal	2015/06/29

The Western University Non-Medical Science Research Ethics Board (NMREB) has reviewed and approved the amendment to the above named study, as of the NMREB Amendment Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

This is an official document. Please retain the original in your files.

Appendix B: Interview Guide

Interview Guide Version (14/03/2014 12:04:45 PM)

Toolkits for wind turbine facility siting in rural Ontario and Nova Scotia: Negotiating benefits and minimizing conflict

Preamble

This interview guide is meant to be general so that it can be used for conversations with members of a *wide variety of stakeholder groups*. Borrowing from standpoint theory, we want to understand how various stakeholders view the same issues. Borrowing from grounded theory, the topics may evolve as the number of interviews grows and concepts develop. Nevertheless, in terms of ethics and risk, the topics will be similar in nature to the ones listed here. The interviewing strategy is to start with very open-ended questions on each topic to learn if the participant guides the conversation into areas of interest to the project. If they do not, the interviewer will "manually" narrow the focus.

Topics

1. **Views on Turbines**

- How do people in [community] view turbines?
- How do you view them personally?
- Describe how well they fit into [community].

2. **Views on Turbine Siting**

- Please tell me about the siting process that led the turbines to be put in [community].
- Probe:
    - Main positive aspects of siting.
    - Main negative aspects of siting.

3. **Community and other Conflict**

- What role has conflict played?
- What about social conflict between neighbours in the community?
- Probe
    - What is the source of this particular from of conflict?

- Thoughts on mental health impacts of such conflict?

- How does that compare in terms of impact with conflict between residents and
- Probe
    - Government
    - Siting “agents”

4. Benefits and Fairness

- How would you describe the benefits from turbines in [community]?
- Probe
    - Larger scales
- What about economic benefits.
- Please tell me your thoughts about groups that *do* and do *not* benefit financially from turbines?
- If [community] could have a “do-over” [turn back the clock] in terms of allocating economic benefits what would you like to see happen?
- Who should get what and how?
- Probe
    - Landowners who lease their land for turbines
    - Immediate neighours of these landowners
    - Residents within 2km of any turbine.
- Who do you feel should be responsible for making that happen?
- How do feel about host communities being encouraged to act collectively as a community (or groups within the community) rather than as individuals?
- Probe
    - E.g., landowners who could lease land for turbines working with wider groups in the community
- What resources are lacking in benefits decision-making?
- Probe

- E.g., Community leaders
- Legal advice
- Information about other sites being considered
- Information about what the neighbours receive
- Information about what the neighbours think about turbines

5. Turbine Policy

- What else needs to be done to improve turbine policy in the province?
- What can others learn from what has happened here?

Appendix C: Resident Survey

Hello,

My name is Chad Walker, and I am a graduate researcher in Geography at Western University working under the supervision of Dr. Jamie Baxter. I am carrying out a study on the planning and siting processes of wind turbines in rural communities. I would greatly appreciate it if an adult member of your household (18 years or older) would complete the enclosed questionnaire and return it to the university by mail. A postage-paid envelope is included for your convenience. As an alternative**, the adult member of your household can also complete the survey online through Western's survey platform, Qualtrics.** See more details below under Online Option. The survey should take approximately **10 minutes** to complete and is anonymous.

Thank you for your time.

Chad Walker

UNIQUE CODE TO ACCESS ONLINE SURVEY: «Unique_code»

Title: Toolkits for Turbine Communities – The planning and siting processes for wind turbines
Affiliation: Department of Geography, Faculty of Social Science, University of Western Ontario

Introduction/Purpose
This questionnaire is part of a Western University research project[10] which investigates the planning process and local impacts of wind energy development in Ontario and Nova Scotia. If you choose to participate in this survey, you will be asked your opinions and your experience with the wind turbines in your community. This survey questionnaire takes about **10 minutes** to complete.

Risks/Benefits
There are no known risks to your participation in this study.This study may benefit your community and other communities facing proposed wind development. It may also help developers and government policy-makers by providing information on how to better design siting, mitigation and monitoring processes associated with wind turbine and other large-scale community developments.

Voluntary Participation
Participation in this study is voluntary.

Online Option
For your convenience, we have also created an online version of the survey available at through Western's Qualtrics system. As with the paper questionnaire, the data we receive online will be used only for aggregate analysis and anonymity is one of our highest priorities. If you would rather complete the survey online, please go to the website listed at the top of the previous page and type in the verification code when asked. You will we still be entered into the gift card draw if you choose the online option.

Free Draw Entry – 4 chances for $100 Gift Card
As a thank-you for your participation you can request to be entered into a free draw. <u>You can enter the draw regardless of whether you complete the questionnaire by mail or online.</u> Winners will receive their choice of a $100 gift card for Tim Horton's, Winners Superstore, or Canadian Tire. We will draw four of these for the entire study – approximately 2000 people have been asked to participate. Of these, we expect 430 surveys to be returned.

What happens with the data?
The data are entered into a confidential database for anonymous statistical analysis. The analysis aggregates the data, so no identifying information will appear in any publication from the results.
We have included an identification code on each survey which tells us which turbine development is closest to you, but we do not link this ID to your name – if you choose to enter the free participant draw - in the analysis or findings.

Contact
If you have any questions about the study, you may contact me, Chad Walker, [contact information removed] OR the project principle investigator, Jamie Baxter [contact information removed]. *More information about the research project and our related studies can be found at our website, Communities Around Renewable Energy Projects - COAREP.uwo.ca.*

If you have questions about your rights as a research participant you may also contact the Office of Research Ethics, The University of Western Ontario [contact information removed].

1. **Instructions**

Each of the sections below will ask for your personal opinion on the wind turbines in your community and wind energy in general. Unless asked otherwise, please check only ONE box per question (row) to indicate how much you agree with each statement. If you don't have a specific opinion, please check the middle box ("neither agree nor disagree") rather than leaving the question blank.

Thank you very much for your participation!

Section A:
For each of the following questions, please indicate how much you agree with the statement. Check ONE in each row.

Part 1: General Energy Issues

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1.	Electricity production is one of the most important issues my province faces.	☐	☐	☐	☐	☐
2.	Nuclear power generation poses a serious **environmental health** threat.	☐	☐	☐	☐	☐
3.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose a serious **environmental** threat.	☐	☐	☐	☐	☐
4.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose a serious **climate change** threat.	☐	☐	☐	☐	☐
5.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose **threats to our economy**.	☐	☐	☐	☐	☐
6.	Wind energy will help deal with the problem of climate change	☐	☐	☐	☐	☐

Part 2: Support for Wind Energy

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
7.	I support the existing wind power project in **my community**.	☐	☐	☐	☐	☐

8.	I would support building more turbines in my community.	☐	☐	☐	☐	☐
9.	I support using more **wind power** to meet Canada's energy needs.	☐	☐	☐	☐	☐

Part 2b: General Views on Wind Energy and Turbines

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
10.	Wind energy is an environmentally friendly technology.	☐	☐	☐	☐	☐
11.	In the big picture, wind energy makes sense economically.	☐	☐	☐	☐	☐
12.	Wind turbines are an unacceptable threat to human health	☐	☐	☐	☐	☐
13.	Wind turbines are an unacceptable threat to wildlife, including birds and bats.	☐	☐	☐	☐	☐
14.	Wind power projects lower local property values.	☐	☐	☐	☐	☐
15.	Wind turbines are visually unappealing.	☐	☐	☐	☐	☐
16.	Wind turbine noise is unacceptably annoying.	☐	☐	☐	☐	☐
17.	Those **opposed** to wind energy are being unreasonable.	☐	☐	☐	☐	☐
18.	Those **supportive** of wind energy are being unreasonable.	☐	☐	☐	☐	☐

Part 3: Community Engagement in Turbine Siting

*Some questions below only apply to those who lived in the community before the turbine siting process began. Check **ONE.***

		YES	***NO***
19.	I lived in this community before the local wind turbine(s) were built.	☐	☐

IF YOU RESPONDED "NO", PLEASE SKIP DOWN TO QUESTION 57.

*For each of the following questions, please indicate how much you agree with the statement. Check **ONE only.***

		AGREE				**DISAGREE**
	Please complete questions 23-56 if you lived in the community before the wind turbines were built.	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
	Part 3.1: Voicing Concerns					
20.	Overall, I approve of the way the wind energy development was planned and built in my community	☐	☐	☐	☐	☐
21.	I was provided with **enough information** on the existing wind power project before it was approved.	☐	☐	☐	☐	☐
22.	The **information** provided by the developer on the existing wind power project has always been **trustworthy**.	☐	☐	☐	☐	☐
23.	I had ample opportunity to **voice concerns** about the existing wind power project before it was approved.	☐	☐	☐	☐	☐
24.	Local residents' **concerns** about the existing wind power project were **adequately dealt with** before it was approved.	☐	☐	☐	☐	☐
25.	I felt encouraged to take part in the planning process for the local wind energy development.	☐	☐	☐	☐	☐
26.	I feel as though our local council fairly represented the community's views with regards to the wind energy development.	☐	☐	☐	☐	☐
27.	I highly valued the efforts of our municipality councillors and staff in the wind turbine siting process.	☐	☐	☐	☐	☐
28.	Turbines were set back further away from homes in some cases	☐	☐	☐	☐	☐

	when concerns arose.					
	Part 3.2: Timing and Transparency	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
29.	Local residents were **made** adequately **aware** of the opportunity to participate in the planning process for the local wind project(s).	☐	☐	☐	☐	☐
30.	The plans relating to the wind turbines were always **transparent** to local residents.	☐	☐	☐	☐	☐
31.	I wish there were more opportunities for face-to-face meetings with my local council and other residents **prior to** lease agreements being signed.	☐	☐	☐	☐	☐
32.	The wind energy developers in my area were always truthful and respectful with the community about the project.	☐	☐	☐	☐	☐
33.	There was a general **lack of respect for the wind energy developer** from the local community.	☐	☐	☐	☐	☐
34.	The wind energy developer in my area used bullying tactics.	☐	☐	☐	☐	☐
35.	Overall, participation in the siting process lead to **meaningful changes** in the siting outcome.	☐	☐	☐	☐	☐
36.	The wind energy **developer** seemed to go the "**extra mile**" in listening to and engaging with the local community.	☐	☐	☐	☐	☐
	Part 3.3: Decision-making and Expertise	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
37.	I felt in control in terms of whether or not the turbine(s) were going to be built in my community.	☐	☐	☐	☐	☐
38.	Local government should have greater decision-making power in turbine facility siting.	☐	☐	☐	☐	☐
39.	I approve of the way my **local** government has handled the	☐	☐	☐	☐	☐

	community wind power project issue.					
40.	The provincial government should determine if or where turbines are placed in my province.	☐	☐	☐	☐	☐
41.	My **provincial** government is qualified to determine where turbines should be built.	☐	☐	☐	☐	☐
42.	I wish there were more independent, third party experts involved in the meetings and open houses.	☐	☐	☐	☐	☐
43.	I would like a system where the community decides which experts to invite to public meetings.	☐	☐	☐	☐	☐
44.	I would like to see the decision about whether or not a community hosts a wind energy development decided through a public referendum/vote.	☐	☐	☐	☐	☐
45.	Community Liaison or Community Advisory Committees are beneficial in the process of wind energy development.	☐	☐	☐	☐	☐

Part 3.4: Community Ownership

		AGREE				**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
46.	Wind energy development is best when it is owned by local communities	☐	☐	☐	☐	☐
47.	Local residents should be able to invest in and share in the profits from local turbines	☐	☐	☐	☐	☐
48.	I was aware of opportunities to invest or own part of my local project.	☐	☐	☐	☐	☐
49.	The idea of investing in local turbines is offensive to me.	☐	☐	☐	☐	☐

Part 3.5: Leases

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
50.	Landowners should have the right to lease their land to any kind of legal development they choose.	☐	☐	☐	☐	☐
51.	Land leases for turbines on private land should ***not*** be signed before the community is provided details about the project.	☐	☐	☐	☐	☐
52.	Legal professionals should be made available to local residents prior to signing of lease agreements.	☐	☐	☐	☐	☐
53.	Landowners tend to sign turbine leases without adequate knowledge of lease details.	☐	☐	☐	☐	☐

Part 5: Information

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
54.	There is a lack of independent, unbiased information about the true impacts of wind energy developments.	☐	☐	☐	☐	☐
55.	I am unsure about the 'right' or relevant questions to ask about wind turbines.	☐	☐	☐	☐	☐
56.	Information about the true impacts of wind energy	☐	☐	☐	☐	☐

	development needs to be put into plainer language.					
57.	Local government lacks the knowledge and resources needed to make good decisions about wind energy.	☐	☐	☐	☐	☐
58.	Developers need to be better educated about the true impacts of wind energy.	☐	☐	☐	☐	☐
59.	Local residents who **SUPPORT** wind development need to be better educated about the disadvantages of wind energy.	☐	☐	☐	☐	☐
60.	Local residents who **OPPOSE** wind development need to be better educated about the advantages of wind energy.	☐	☐	☐	☐	☐
61.	There is disagreement amongst political parties in my province on the issue of wind energy development.	☐	☐	☐	☐	☐

Part 5: Benefits and Fairness

		AGREE				**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
62.	The local wind energy development has brought with it adequate economic benefits to my community.	☐	☐	☐	☐	☐
63.	The **positive impacts** of the existing wind power project are distributed **fairly** within the local community.	☐	☐	☐	☐	☐
64.	Overall, the existing wind power project has had more **positive impacts** than **negative impacts.**	☐	☐	☐	☐	☐

65.	All residents have been **adequately compensated** for the negative impacts of the existing wind power project.	☐	☐	☐	☐	☐
66.	More financial benefits should be given to the local community for having turbines.	☐	☐	☐	☐	☐
67.	More financial benefits should be given to residents living close to turbines.	☐	☐	☐	☐	☐
68.	A fund should be established to pay fair market value to households who must move because they cannot tolerate the negative impacts of turbines.	☐	☐	☐	☐	☐
69.	Residents living close to wind turbines should receive discounts on their electricity.	☐	☐	☐	☐	☐
70.	The local wind energy project pays sufficient taxes to the municipality	☐	☐	☐	☐	☐
71.	It is fair that financial payments are only given to the landowner who has a turbine(s) on their land.	☐	☐	☐	☐	☐
72.	The developer of the local wind development is from	The local area ☐	The province ☐	In Canada ☐	Outside of Canada ☐	Do not know ☐
73.	I would most prefer that the wind developer was from. (check one only)	The local area ☐	The province ☐	In Canada ☐	Outside of Canada ☐	Do not know ☐

Part 6: Stakeholder Concern/Trust

For each group listed below, please respond to this statement:

		AGREE			DISAGREE	
74.	**"This stakeholder has done an excellent job listening to individual concerns regarding the wind development in my community"**	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1)	Local government	☐	☐	☐	☐	☐
2)	Provincial government	☐	☐	☐	☐	☐
3)	Wind developer	☐	☐	☐	☐	☐
4)	Local wind turbine **opposition** groups	☐	☐	☐	☐	☐
5)	Local wind turbine **support** groups	☐	☐	☐	☐	☐
6)	Neighbours and friends	☐	☐	☐	☐	☐
7)	Family	☐	☐	☐	☐	☐

		AGREE			DISAGREE	
75.	**"I trust this group to make fair decisions that may affect my community regarding wind energy development"**	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1)	Local government	☐	☐	☐	☐	☐
2)	Provincial government	☐	☐	☐	☐	☐
3)	Wind developer	☐	☐	☐	☐	☐
4)	Local wind turbine **opposition** groups	☐	☐	☐	☐	☐

5)	Local wind turbine **support** groups	☐	☐	☐	☐	☐
6)	Neighbours and/or colleagues	☐	☐	☐	☐	☐
7)	Friends and/or family	☐	☐	☐	☐	☐

Part 7. Actions Related to Community Wind Turbines

				AGREE		**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
76.	*I have been an active **opponent** of wind energy in my community.*	☐	☐	☐	☐	☐
77.	*I have been actively in **favour** of wind energy in my community.*	☐	☐	☐	☐	☐

		Frequently	*A few times*	*Once*	*Never*
78.	*I have physically protested **against** wind turbines in my community (e.g., picket, spoke publicly at a meeting, spoke to the media).*	☐	☐	☐	☐
79.	*I have written to government or the media **against** wind turbines in my community.*	☐	☐	☐	☐
80..	*I have signed a petition **against** wind turbines in my community.*	☐	☐	☐	☐
81.	*I have written **online** comments **against** wind turbines in my community.*	☐	☐	☐	☐
82.	*I have physically demonstrated **in favour of** wind turbines in my community (e.g., picket, spoke publicly at a meeting, spoke to the media).*	☐	☐	☐	☐
83.	*I have written to government or the media in **favour** of wind turbines in my community.*	☐	☐	☐	☐

84.	*I have signed a petition in **favour** of wind turbines in my community.*	☐	☐	☐	☐
85.	*I have written ONLINE comments in **favour** of wind turbines in my community.*	☐	☐	☐	☐

Section B.

*For each of the following questions, please indicate how much you agree with the following statements. Check **ONE.***

Part 8: Personal Impacts

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
86.	I have experienced negative health effects due to the wind turbines.	☐	☐	☐	☐	☐
87.	The value of my property and/or dwelling has decreased due to the wind turbines.	☐	☐	☐	☐	☐
88.	I find the natural landscape in my community less appealing due to the wind turbines.	☐	☐	☐	☐	☐
89.	I enjoy spending time outdoors **less** due to the wind turbines.	☐	☐	☐	☐	☐
90.	I have thought about moving to be further from the wind turbines.	☐	☐	☐	☐	☐
91.	I invite guests over to my home **less** frequently because of the wind turbines.	☐	☐	☐	☐	☐
92.	The existing wind power project has created **unacceptable** levels of community conflict.	☐	☐	☐	☐	☐

Section C: Demographics

*Choose the best answer for each of the following questions. Check **ONE.***

93.	Gender	☐ M	☐ F	☐ Prefer not to say

94.	Age	☐ 18-25	☐ 26-34	☐ 35-49	☐ 50-65	☐ 66+	☐ Prefer not to say
95.	Household size (# of people)	☐ 1	☐ 2-3	☐ 4-5	☐ 6+	☐ Prefer not to say	
96.	In the last provincial election I voted (or would have voted) for the _____ party.	□ NDP	□ Liberal	□ Progressive Conservative	□ Other_____	□ Prefer not to say	
97.	My political affiliation most closely aligns with the _____ Party of my province.	□ NDP	□ Liberal	□ Progressive Conservative	□ Other_____	□ Prefer not to say	
98.	Number of years living in community	_____ (Please write)					
99.	Highest level of education attained.	☐ No certificate, diploma or degree ☐ High school ☐ College ☐ University degree ☐ Graduate degree ☐ Prefer not to say					
100.	Annual family income, after-tax (Canadian dollars)	☐ Under $25,000	☐ $25,000-39,999	☐ $40,000-54,999	☐ $55,000-69,999	☐ $70,000-109,999	☐ $110,000 or more ☐ Prefer not to say
101.	Housing situation	☐ Short-term Rental	☐ Long-term Rental	☐ Home owned	☐ Prefer not to say		
102.	Is a wind turbine located on your property?	☐ Yes	☐ No	☐ Don't know/Prefer not to say			
103.	If you answered YES, do you have serious regrets about signing the lease to have a turbine(s) on your land?	☐ Yes	☐ No	☐ Don't know/Prefer not to say			
104.	Are you currently, or were you ever, employed by the	☐ Yes	☐ No	☐ Don't know/Prefer not to say			

	wind power project in your community?	
105.	Has a member of your family received financial compensation (e.g., lease payments, employment) from an existing wind power project?	☐ Yes ☐ No ☐ Don't know/Prefer not to say

106.	Please enter me in a free prize draw for 1 of 4 gift cards.	□ Yes **Gift Card if am picked in the draw (choose 1):** Superstore ☐ Canadian Tire ☐ Tim Hortons ☐ Winners ☐
107.	Approximate distance to closet turbine	□ <550m □ 550m-1km □ 1-2km □ 2-5km □ 5km+ □ Unknown/prefer not to say
108.	Numbers of turbines seen from my home.	□ 0 □ 1 □ 2 □ 3 Other _____ Unknown/prefer not to say □
109.	Is the address to which this survey was delivered your year-round home?	□ Yes □ No □ Prefer not to say
110.	I have or will shortly have turbines on my property.	□ Yes □ No □ Prefer not to say
111.	I am an elected municipal official.	□ Yes □ No □ Prefer not to say

SECTION C – Anything to Add?

112. In the space below, please elaborate your thoughts on any of the responses above or the topic of wind energy in general:

Appendix D: Developer Survey

Jamie Baxter, PhD, Associate Professor
Department of Geography

Hello,

My name is Chad Walker, and I am a graduate researcher in Geography at Western University working under the supervision of Dr. Jamie Baxter. I am carrying out a study on the planning and siting processes of wind turbines in rural communities. I would greatly appreciate it if **up to four adult members of your company (18 years or older) that were most involved with the_____wind project(s) would complete the enclosed questionnaires** and return it to the university by mail. As an alternative**, you and your co-workers can also complete the survey online through Western's survey platform, Qualtrics.** See more details below under **Online Optio**n. In order to make sure answers based on your true opinions, I ask that you complete the questionnaires independently from any other co-workers. A postage-paid envelope is included for your convenience- feel free to send all surveys back in the same envelope. The survey should take approximately **10 minutes** to complete and is anonymous.

Thank you for your time.

Chad Walker

UNIQUE CODE TO ACCESS ONLINE SURVEY: «Unique_code»
(Survey Website: http://tinyurl.com/ToolkitsSurvey)

Title: Toolkits for Turbines – Planning and siting of wind turbines
Affiliation: Department of Geography, Faculty of Social Science, University of Western Ontario

Introduction/Purpose
This questionnaire is part of a Western University graduate research project which investigates the planning process and local impacts of wind energy development in Ontario and Nova Scotia. If you choose to participate in this survey, you will be asked your opinions and your experience with the wind turbines your company planned/built. This survey questionnaire takes about **10 minutes** to complete.

Risks/Benefits
There are no known risks to your participation in this study.This study may benefit your community and other communities facing proposed wind development. It may also help developers and government policy-makers by providing information on how to better design siting, mitigation and monitoring processes associated with wind turbine and other large-scale community developments.

Voluntary Participation
Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time. You may refuse to participate by not sending back this questionnaire in the pre-stamped envelope. Our contact information is below.

Online Option
For your convenience, I have also created an online version of the survey available at through Western's Qualtrics system. As with the paper questionnaire, the data we receive online will be used only for aggregate analysis and anonymity is one of our highest priorities. If you (and your coworkers) would rather complete the survey online, please go to the website listed at the top of the previous page and type in the verification code(s) when asked. You will we still be entered into the gift card draw if you choose the online option.

Free Draw Entry – 4 chances for $100 Gift Card

As a thank-you for your participation you can request to be entered into a free draw. <u>You can enter the draw regardless of whether you complete the questionnaire by mail or online.</u> Winners will receive their choice of a $100 gift card for Tim Horton's, Winners,

Superstore, or Canadian Tire. We will draw four of these for the entire study – approximately 2000 people have been asked to participate. Of these, we expect 430 surveys to be returned.

What happens with the data?
The data are entered into a confidential database for anonymous statistical analysis. The analysis aggregates the data, so no identifying information will appear in any publication from the results.

Contact
If you have any questions about the study, you may contact me, Chad Walker [contact information removed] OR the project principle investigator, Jamie Baxter [contact information removed]. *More information about the research project and our related studies can be found at our website, Communities Around Renewable Energy Projects - COAREP.uwo.ca.*

If you have questions about your rights as a research participant you may also contact the Office of Research Ethics, The University of Western Ontario [contact information removed].

Instructions
Thank you for choosing to participate in this survey. Each of the sections below will ask for your personal opinion on wind turbines, wind energy and facility siting. Unless told otherwise, please check only ONE box per question (row) to indicate how much you agree with each statement. If you don't have a specific opinion, please check the middle box ("neither agree nor disagree") rather than leaving the question blank.

NOTE: We are surveying both developers and local residents. Throughout the questionnaire we ask your personal views so that they may be compared to those of residents living near turbines.

<u>Section A:</u>
For each of the following questions, please indicate how much you agree with the statement. Check ONE in each row.

<u>Part 1: General Energy Issues</u>

		AGREE				**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1.	Electricity production is one of the most important issues my province faces.	☐	☐	☐	☐	☐
2.	Nuclear power generation poses a serious **environmental health** threat.	☐	☐	☐	☐	☐
3.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose a serious **environmental** threat.	☐	☐	☐	☐	☐
4.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose a serious **climate change** threat.	☐	☐	☐	☐	☐
5.	Fossil fuels (e.g. coal, gas) used for electricity generation in my province pose **threats to our economy**.	☐	☐	☐	☐	☐
6.	Wind energy will help deal with the problem of climate change	☐	☐	☐	☐	☐

<u>Part 2: General Views on Wind Energy and Turbines</u>

		AGREE				**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
10.	Wind energy is an environmentally friendly technology.	☐	☐	☐	☐	☐
11.	In the big picture, wind energy makes sense economically.	☐	☐	☐	☐	☐

12.	Wind turbines are an unacceptable threat to human health	☐	☐	☐	☐	☐
13.	Wind turbines are an unacceptable threat to wildlife, including birds and bats.	☐	☐	☐	☐	☐
14.	Wind power projects lower local property values.	☐	☐	☐	☐	☐
15.	Wind turbines are visually unappealing.	☐	☐	☐	☐	☐
16.	Wind turbine noise is unacceptably annoying.	☐	☐	☐	☐	☐
17.	Those **opposed** to wind energy are being unreasonable.	☐	☐	☐	☐	☐
18.	Those **supportive** of wind energy are being unreasonable.	☐	☐	☐	☐	☐

Part 3: Community Engagement in Turbine Siting

*For each of the following questions, please indicate how much you agree with the statement. Check **ONE only.***

		AGREE				**DISAGREE**
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
	Part 3.1: Voicing Concerns					
20.	Overall, I approve of the way the wind energy development was planned and built in my community	☐	☐	☐	☐	☐
24.	Local residents' **concerns** about the existing wind power project were **adequately dealt with** before it was approved.	☐	☐	☐	☐	☐
28.	Turbines were set back further away from homes in some cases when concerns arose.	☐	☐	☐	☐	☐

	Part 3.2: Timing and Transparency					
29.	Local residents were made adequately aware of the opportunity to participate in the planning process for the local wind project(s).	☐	☐	☐	☐	☐
30.	The plans relating to the wind turbines were always **transparent** to local residents.	☐	☐	☐	☐	☐
35.	Overall, participation in the siting process lead to meaningful changes in the siting outcome.	☐	☐	☐	☐	☐
	Part 3.3: Decision-making and Expertise					
37.	I felt in control in terms of whether or not the turbine(s) were going to be built in my community.	☐	☐	☐	☐	☐
38.	Local government should have greater decision-making power in turbine facility siting.	☐	☐	☐	☐	☐
40.	The provincial government should determine if or where turbines are placed in my province.	☐	☐	☐	☐	☐
41.	My provincial government is qualified to determine where turbines should be built.	☐	☐	☐	☐	☐
42.	I wish there were more independent, third party experts involved in the meetings and open houses.	☐	☐	☐	☐	☐
43.	I would like a system where the community decides which experts to invite to public meetings.	☐	☐	☐	☐	☐
44.	I would like to see the decision about whether or not a community hosts a wind energy development decided through a public referendum/vote.	☐	☐	☐	☐	☐
45.	Community Liaison or Community Advisory Committees are beneficial in the process of wind energy development.	☐	☐	☐	☐	☐

Part 3.4: Community Ownership

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
46.	Wind energy development is best when it is owned by local communities	☐	☐	☐	☐	☐
47.	Local residents should be able to invest in and share in the profits from local turbines	☐	☐	☐	☐	☐

Part 3.5: Leases

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
50.	Landowners should have the right to lease their land to any kind of legal development they choose.	☐	☐	☐	☐	☐
51.	Land leases for turbines on private land should ***not*** be signed before the community is provided (other) details about the project.	☐	☐	☐	☐	☐
52.	Legal professionals should be made available to local residents prior to signing of lease agreements	☐	☐	☐	☐	☐
53.	Landowners tend to sign turbine leases without adequate knowledge of lease details.	☐	☐	☐	☐	☐

Part 5: Information

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
54.	There is a lack of independent, unbiased information about the true impacts of wind energy developments.	☐	☐	☐	☐	☐
56.	Information about the true impacts of wind energy development needs to be put into plainer language.	☐	☐	☐	☐	☐
57.	Local government lacks the knowledge and resources needed to make good decisions about wind energy.	☐	☐	☐	☐	☐
58.	Developers need to be better educated about the true impacts of wind energy.	☐	☐	☐	☐	☐
59.	Local residents who **SUPPORT** wind development need to be better educated about the disadvantages of wind energy.	☐	☐	☐	☐	☐
60.	Local residents who **OPPOSE** wind development need to be better educated about the advantages of wind energy.	☐	☐	☐	☐	☐
61.	There is disagreement amongst political parties in my province on the issue of wind energy development.	☐	☐	☐	☐	☐

Part 5: Benefits and Fairness

		AGREE				DISAGREE
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
62.	The local wind energy development has brought with it adequate economic benefits to my community.	☐	☐	☐	☐	☐
63.	The **positive impacts** of the existing wind power project are distributed **fairly** within the local community.	☐	☐	☐	☐	☐
64.	Overall, the existing wind power project has had more **positive impacts** than **negative impacts.**	☐	☐	☐	☐	☐
65.	All residents have been **adequately compensated** for the negative impacts of the existing wind power project.	☐	☐	☐	☐	☐
66.	More financial benefits should be given to the local community for having turbines.	☐	☐	☐	☐	☐
67.	More financial benefits should be given to residents living close to turbines.	☐	☐	☐	☐	☐
68.	A fund should be established to pay fair market value to households who must move because they cannot tolerate the negative impacts of turbines.	☐	☐	☐	☐	☐
69.	Residents living close to wind turbines should receive discounts on their electricity.	☐	☐	☐	☐	☐
70.	The local wind energy project pays sufficient taxes to the municipality	☐	☐	☐	☐	☐
71.	It is fair that financial payments are only given to the landowner who has a turbine(s) on their land.	☐	☐	☐	☐	☐

72.	The wind energy branch of our company located in.	The local area ☐	The province ☐	In Canada ☐	Outside of Canada ☐	Do not know ☐

Part 6: Stakeholder Concern/Trust

For each group listed below, please respond to this statement:

		AGREE				DISAGREE
74.	**"This stakeholder has done an excellent job listening to individual concerns regarding the wind development in my community"**	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1)	Local government	☐	☐	☐	☐	☐
2)	Provincial government	☐	☐	☐	☐	☐
3)	Wind developer	☐	☐	☐	☐	☐
4)	Local wind turbine **opposition** groups	☐	☐	☐	☐	☐
5)	Local wind turbine **support** groups	☐	☐	☐	☐	☐
6)	Neighbours and friends	☐	☐	☐	☐	☐
71)	Family	☐	☐	☐	☐	☐

Section B.

*For each of the following questions, please indicate how much you agree with the following statements. Check **ONE.***

Part 7. Questions (specifically) for developers

		AGREE			DISAGREE	
		Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
113.	I found it beneficial to get to know the local community before development.	☐	☐	☐	☐	☐
114.	I found it beneficial to meet with many local residents on a one-on-one basis.	☐	☐	☐	☐	☐
115.	It is important for our company to let local residents have a greater say in the entire process of wind development.	☐	☐	☐	☐	☐
116.	Spreading financial benefits amongst all residents living closest to turbines increases **support** for wind energy development.	☐	☐	☐	☐	☐
117.	Spreading financial benefits amongst residents closest to turbines increases overall **fairness**.	☐	☐	☐	☐	☐
118.	It is important for turbines to be placed outside of where they can be seen by local residents.	☐	☐	☐	☐	☐
119.	It is important for turbines to be placed at least 1 km away from the closet home.	☐	☐	☐	☐	☐
120.	Our company found it beneficial to spend more time in the community than was initially anticipated.	☐	☐	☐	☐	☐
121.	Our company found it beneficial to spend more money in the community	☐	☐	☐	☐	☐

	than was initially anticipated.					
122.	Construction and operation staff for the local wind project were mostly from_____	The local area ☐	The province ☐	In Canada ☐	Outside of Canada ☐	Do not know ☐
123.	Construction and operation staff for any wind project should be mostly from _____	The local area ☐	The province ☐	In Canada ☐	Outside of Canada ☐	Do not know ☐

Section D. Demographics

*Choose the best answer for each of the following questions. Check **ONE.***

93.	Gender	☐ Male	☐ Female	☐ Prefer not to say		
94.	Age	☐ 18-25	☐ 26-34	☐ 35-49	☐ 50-65	☐ 66+ ☐ Prefer not to say
124.	The wind energy branch of our company has approximately _____ employees.	☐ 1-24	☐ 25-49	☐ 50-99	☐ 100-499	☐ 500+

97.	My political affiliation most closely aligns with the _____ Party of my province.	□ NDP	□ Liberal	□ Progressive Conservative	□ Other_____	□ Prefer not to say
106.	Please enter me in a free prize	□ Yes **Gift Card if I am picked in the draw (choose 1):** Superstore □ Canadian Tire □ Tim Hortons □ Winners □				

	draw for 1 of 4 gift cards. (you can only be entered if you fill out the address above)	

SECTION C – Anything to Add?

112. In the space below, please elaborate your thoughts on any of the responses above or the topic of wind energy in general:

Appendix E: Permission to use published article in thesis

Email correspondence:

27th March 2017

Dear Chad Walker

Thank you for your correspondence requesting permission to reproduce the following article published in our journal in your printed thesis and to be posted in your university's repository.

"It's easy to throw rocks at a corporation": wind energy development and distributive justice in Canada, published online 1st January 2017.

We will be pleased to grant permission on the sole condition that you acknowledge the original source of publication and insert a reference to the article on the Journals website: http://www.tandfonline.com

This is the authors accepted manuscript of an article published as the version of record in Journal of Environmental Policy & Planning, 2017

http://www.tandfonline.com/doi/full/10.1080/1523908X.2016.1267614

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Thank you for your interest in our Journal.

Yours sincerely

Karin Beesley

Permissions Administrator

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Appendix F: Press release for Manuscript 1

Wind energy plans should generate more equitable benefits to neighbours, says Western U study

The more a community is involved in wind energy planning – including getting direct benefits from nearby turbines – the more likely it is that a development will have local support, says newly published research from Western University.

The study by Chad Walker and Jamie Baxter of the Department of Geography examines communities living with wind turbines in Southwestern Ontario and Nova Scotia. Their paper, *"It's easy to throw rocks at a corporation: Wind energy development and distributive justice in Canada,"* is published in the *Journal of Environmental Policy and Planning* (http://tandfonline.com/doi/full/10.1080/1523908X.2016.1267614

In interviews and surveys, residents criticized the top-down, corporate-led pattern of development in Ontario – in stark contrast to the more positive reflections about similar projects in Nova Scotia, where there are more profit-sharing, community-based initiatives.

"The general lack of financial benefits and opportunities to invest in local wind projects in Ontario may be added to the long list of things responsible for intense pushback to development in the province over the past decade", says Walker. "In Nova Scotia, support for local wind projects was three times higher and perceptions of health effects were three times lower."

Those living closest to wind turbines in both provinces believe that the amount of local benefits is too low, but they have even stronger feelings about the fair local distribution of those benefits. Government efforts to site new projects should focus on local fairness, said Walker and Baxter, who suggested the provinces consider novel compensation measures. For example, 75% of all survey respondents (and 83% of those opposed to their local project) supported the idea of electricity rebates for turbines' nearby neighbours. In Ontario in particular, reducing hydro bills in wind-rich, rural areas may make wind energy a bit more palatable. Ontario is home to more than 6,000 turbines, the vast majority of them owned by corporations outside the communities where they are located.

The study also sheds light on community-based ownership – a development strategy meant to keep benefits and control in the hands of locals. "Past research has painted community-based development with an idyllic brush, but those living near wind turbines often were not aware of opportunities to invest in their projects" says Walker. Although Nova Scotia's approach has been relatively successful in generating local support, most residents still had concerns, including fears that the majority of "local" investors may live hundreds of kilometers away and be far removed from the realities of rural wind development.

Walker and Baxter's research is also outlined in a "Toolkit for Turbines" document, which contains recommendations for policy changes and was shaped by discussion during a workshop held in December, 2016. Walker and Baxter focus attention on more equitable and sustainable planning processes – but they emphasize that "financial benefits are not a replacement for proper mitigation" of issues such as noise and sleep. http://coarep.uwo.ca.

Along with researchers from Dalhousie University in Halifax and Queen's University Belfast

(UK), Baxter has recently received federal funding to continue studying community-based renewable energy development and new ways to improve siting processes.

MEDIA CONTACT: Deb Van Brenk, Media Relations Officer, Western University

ABOUT WESTERN

Western University delivers an academic experience second to none. Since 1878, The Western Experience has combined academic excellence with life-long opportunities for intellectual, social and cultural growth in order to better serve our communities. Our research excellence expands knowledge and drives discovery with real-world application. Western attracts individuals with a broad worldview, seeking to study, influence and lead in the international community.

Curriculum Vitae

CHAD WALKER, PhD

PROFESSIONAL POSITIONS

2016 – Present	Lecturer, Department of Geography, Western University.
2010 – Present	Teaching Assistant, Western University.
2013-2014	Consultant – Toronto Renewable Energy Cooperative
2013	Research Associate – Health Canada

EDUCATION

2017 **PhD, Geography (Environment & Sustainability), Western University**

Dissertation Title: *Wind energy development processes and community-level impacts in Ontario and Nova Scotia, Canada (*Supervisor: Dr. Jamie Baxter)

2012 **M.A., Geography (Environment & Sustainability), Western University**

Dissertation Title: *Winds of Change: Explaining Support for Wind Energy Developments in Ontario, Canada (*Supervisor: Dr. Jamie Baxter)

2010 **Bachelor of Arts, Bowling Green State University (OH)**

Program: Environmental Policy and Analysis
Thesis Title: Undergraduate Students' Knowledge and Opinions of Climate Change (*Supervisor: Dr. Shannon Orr)*

RESEARCH AND TEACHING INTERESTS

Renewable Energy Policy	Environmental Hazards	Qualitative Methods
Environment and Health	Climate Policy	Quantitative Methods
Mixed Methods	Research methods	

TEACHING AND RESEARCH EXPERIENCE

Lecturer, Western University

- Environmental Hazards and Human Health (GEOG 3432).
  - *Winter 2016 & Winter 2017 (50 Students)*
- Environment, Economy and Society (GEOG 2153)
  - *Summer 2016 (29 Students)*

Research Assistant, Western University

- Department of Geography. 2010 – 2016.

Teaching Assistant (2010 – Present)

- Environment, Economy and Society (x2), Western University.
- Geography of Canada (x2), Western University.
- Ontario and the Great Lakes (x2), Western University.
- Geography of International Business, Western University.
- Environmental Hazards and Human Health, Western University.

PUBLICATIONS (Google Scholar profile)

BOOK CHAPTERS

Walker, C. (Accepted) Promoting qualitative research in the public sphere: Lessons learned from online criticisms". The Craft of Qualitative Research. *Canadian Scholar's Press.*

Mason, S., **Walker, C.,** Baxter, J. and Luginaah, I. (2016) "Ethics and activism in environment and health research" Practicing Qualitative Methods in Health Geography. Routledge.

PEER-REVIEWED JOURNAL PUBLICATIONS

Walker, C., & Baxter, J. (2017). Procedural justice in Canadian wind energy development: A comparison of community-based and technocratic siting processes. *Energy Research & Social Science*, 29, 160-169.

Walker, C. & Baxter, J. (2017) "It's easy to throw rocks at a corporation": wind energy development and distributive justice in Canada. *Journal of Environmental Policy and Planning, 1-15.*

McRobert, D., Tennent-Riddel, J. & **Walker, C.** (2016) Ontario's Green Economy and Green Energy Act: Why a Well-Intentioned Law is Mired in Controversy and Opposed by Rural Communities. *Renewable Energy Law and Policy Review.*

Walker, C., Baxter, J., Mason, S., Luginaah, I & Ouellette, D. (2015) Wind energy development and perceived real estate values in Ontario, Canada. *AIMS Energy*.

Walker, C., Baxter, J., & Ouellette, D. (2015) Adding Insult to Injury: The Development of Psychosocial Stress in Ontario Wind Turbine Communities. *Social Science & Medicine.*

Walker, C., Baxter, J. and Ouellette, D. (2014) Beyond rhetoric to understanding asymmetrical Impacts of wind turbine conflict in two Ontario, Canada communities, *Environment and Planning A.*

PAPERS UNDER REVIEW

Walker, C., Mason, S., & Bednar, D. (Under review) "Get it in your own city! Get it in your backyard!" Development, urban bias and inequalities in rural Ontario, Canada. *Journal of Rural And Community Development.*

Walker, C., Baxter, J. (Under review). Sequence and method dominance in mixed-method research: An empirical investigation using the social dynamics of wind energy literature. *Qualitative Research.*

Mkandawire, P., Kangmennaang, J., **Walker, C.,** Antabe, R., Mason, S., Atuoye, K., Luginaah, L. (Under review). Pregnancy intention and gestational age at first antenatal care visit in Lesotho. *Maternal and Child Health Journal.*

OTHER PUBLICATIONS

Walker, C. (Accepted). Wind energy development and local involvement. Municipal World Magazine.

Walker, C and Baxter, J. (2017) “Toolkit for Turbines: Wind Energy Development in Ontario and Nova Scotia, Canada”. A policy analysis report funded by the George Metcalf Foundation.

Walker, C. “Towards Greater Acceptance of Wind Energy: A Review of Community Benefit Models” a 20 page policy analysis report requested and funded by the Toronto Renewable Energy Cooperative (TREC) and the Canadian Wind Energy Association (CANWEA).

PRESENTATIONS (SELECTED)

Walker, C. (2017) "It's easy to throw rocks at a corporation": wind energy development and distributive justice in Canada, Association of American Geographers Annual Meeting, Boston, MA, USA.

Walker, C. (2016) "By the time neighbours find out, it's a sure thing!" - Wind Energy and Procedural Justice in Canada. Association of American Geographers Annual Meeting, San Francisco, CA, USA.

Walker, C. (2015) “The Conservatives actually brought forward green energy!”, Association of American Geographers Annual Meeting, Chicago, IL, USA.

Walker, C., & Baxter, J. (2015). Health as a driving force: Theories describing Ontario’s wind turbine resistance movement. Ontario Network for Sustainable Energy Policy Workshop. Picton, ON.

Walker, C. (2015) Controlling the Future of Green Energy, 3-Minute Thesis Competition, Western University, London, ON. (finalist)

Walker, C. and Baxter, J. (2014) Beyond rhetoric to understanding asymmetrical impacts of wind turbine conflict in Ontario, Canada communities, Qualitative Analysis Conference, London, Ontario, Canada.

Walker, C., Mason, S., and Bednar, D. (2014) Idyllic landscapes and invisible conflict in rural Ontario and Manitoba. Canadian Association of Geographers Annual Meeting.

Walker, C. and Baxter, J. (2014) Insult and Injury: Origins of psychosocial stress in Ontario wind turbine communities, Association of American Geographers Annual Meeting, Tampa, Florida, USA.

Walker, C., Shrubsole, D. (2013) Collaborative Environment & Sustainability program Information Session, Department of Geography, Western University, London, ON (invited)

Walker, C., Baxter, J and Ouellette, D. (2013) "Winds of Change": Explaining Support for Wind Energy Developments in Ontario, Canada, Environmental Studies Association of Canada Annual Meeting, University of Victoria, Victoria, BC.

Walker, C., Baxter, J and Ouellette, D. (2013) Jeanne X. Kasperson Award Specialty Group- "Winds of Change": Explaining Support for Wind Energy Developments in Ontario, Canada, Association of American Geographers Annual Meeting, Los Angeles, California, USA.

Walker, C. and Baxter, J.(2012) What smell? Socio-political Factors and Ontario's wind energy development, Canadian Association of Geographers Meeting, Waterloo, ON

Walker, C. (2012) Workshop Series – Effective Presentations, Teaching Support Centre, Western University, London, ON. (invited).

Walker, C. (2012) Your own pigs don't smell: Wind energy and public opinion, 3-Minute Thesis Competition, Western University, London, ON. (finalist)

MEDIA AND INTERVIEWS

CBC Radio, Morning Drive: Study shows wind farms can gain public support. March 8 2017.

London Free Press. Turbine turmoil avoidable, study says. March 6 2017.

CBC News. Local planning, sharing benefits key to wind-farm buy-in, study finds. March 5 2017.

CBC Radio: Afternoon Drive with Bob Steele (Audio interview). March 2 2017.

Canadian Press (via Metroland Media). Local involvement key to wind-farm buy-in: study. March 5 2017.

106.9 The X, Article. "Wind farms raising health concerns" September 24th, 2014.

The Aylmer News. "Port Burwell Wind Turbine Study". July 10, 2014.

The Londoner, Article. "Language require changing for meaningful turbine talk" May 26, 2014.

Western University – Media Relations. "Western University wind turbine study cuts through rhetoric". May 21, 2014.

London Free Press. "Western University researchers calling on governments and wind farm developers to avoid feeding war of words". May 21, 2014

AM980 News. "Western University Study Looks To Cut Down On Wind Turbine Rhetoric". May 21, 2014.

HONORS, AWARDS and GRANTS (Selected)

2015-2017	Social Science and Humanities Research Council of Canada – Doctoral Scholarship ($40,000)
2014-2016	Ontario Graduate Scholarship ($30,000)
2014, 2015	Finalist, Three Minute Thesis Competition ($500)
2014	Graduate Student Award of Excellence ($1,500)
2013	Jeanne X. Kasperson Award for research in Risk Analysis ($400 USD)

ACADEMIC ASSOCIATIONS

American Association of Geographers
Canadian Association of Geographers
Environmental Studies Association of Canada