An exploration of the range in public perceptions of small-scale and large-scale wind power developments in Nova Scotia, Canada

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Abstract

Hostility towards wind energy developments is prevalent in Nova Scotia in recent years, and has culminated in the formation of wind-opposition groups, such as the Friends of Jeddore and the Friends of South Canoe. These two groups are against the development of industrial-scale wind energy developments near their communities. This research explores the differences in public perceptions of large- and small-scale wind-energy developments in Nova Scotia, as seen through online news articles. A conceptual content analysis was conducted of 128 articles from 12 on-line-news sources from January 2013 to January 2014. The data show that there is a discernible difference in volume and types of public commentary about large-scale and small-scale wind energy developments, with comments about small-scale developments being overall more positive than those regarding both large-scale and unspecified-scale developments. The data suggest that the public perceptions of small- and large-scale wind energy are different enough that communities who are opposed to large-scale developments may be supportive of small-scale developments. However, consideration of other factors is also necessary in the face of new developments. Specifically, consideration of levels of public engagement and ownership of new projects, and being able to answer to citizens' environmental concerns are especially important. Other emergent ideas include NIMBYism, the politicization of wind energy, and differences among real and perceived risks and benefits of wind developments and how they affect behaviour.

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Chapter 1: Introduction

Statement of the Problem

Groups of Nova Scotians, such as “Friends of Jeddore”, have reacted negatively towards the development of land-based wind farms in their communities, and in some cases have even prevented development of wind farms. Friends of Jeddore, for example, advocates against development of industrial-scale wind farms near their communities in rural Nova Scotia. Their main concerns are appropriate setbacks for turbines and increasing the level of community input in turbine development decisions (Macdonald, 2011).

In 2011, the Government of Nova Scotia changed the energy policy to include a Community Feed-In Tariff (COMFIT), which was aimed at making development of renewable energy more economically beneficial to certain groups within Nova Scotia (Nova Scotia Department of Energy, 2013). These groups include community economic development investment funds (CEDIFs), municipalities, Mi'kmaq band councils, universities, co-operatives, not-for-profit organizations, and combined heat and power biomass facilities. Groups are eligible to submit project ideas, with the possibility of developing wind-power, small-scale-in-stream tidal, run-of-the-river hydroelectricity, and combined heat and power biomass projects, while receiving energy return rates at a premium for the energy developed.

Accounts of possible benefits and risks of wind energy development, in many cases, differ between experts, certain publics and the Nova Scotia government. There also appears to be different benefits and risks associated with different scales of

development. One explanation of hostility towards wind is the “Not In My Backyard” (NIMBY) phenomenon, which is defined as individuals having positive reactions to the theoretical idea of the development of renewable energy, but not wanting it to be developed in their communities (Hermannson, 2007). However, differing perceptions of different scales of wind developments would contradict the simplicity of this theory, and suggest that a contextualized understanding of a potential wind-development host community may reduce hostility towards proposed wind developments.

Purpose of the Study

The purpose of the study is to gauge whether public perceptions of large-scale and small-scale wind power developments are sufficiently different that small-scale wind power developments could be developed in communities who might object to large-scale wind developments. The study observes whether the public associates different risks and benefits to different-sized wind developments. This Nova Scotia-based research is contextualized by the current discussion in academic literature surrounding the methodologies of evaluating public perception, specifically through conceptual content analysis of text. Emerging narratives around NIMBY, including critiques of the language used in academic literature, will create a platform on which to base an analysis of discourse around onshore wind power technology in Nova Scotia.

The Grand Tour Question and Subquestions

The first facet of the question of differing perceptions of different scales of

development lies in determining whether there are discernable differences in public perceptions in Nova Scotian discourse between sizes of wind developments. The second facet of this question is determining what the differences are, if any.

Definitions

Key definitions that delineate aspects of the research are outlined in this section. When the term “large-scale wind developments” is used, it signifies wind developments with installed capacity of upwards of 10-MW-installed capacity, and is inclusive of articles referring to “industrial-scale” developments. “Small-scale wind developments” refers to developments with installed capacity of less than 10-MW-installed capacity[1]. A “wind farm” refers to a cluster of wind turbines, and can refer to both large- and small-scale developments (Bouma, 2009). The “public” constitutes those who are involved in narratives surrounding wind power technology in Nova Scotia, as represented through online-news articles. This representation includes politicians, wind developers, experts, community members, and any other expressing an opinion in a news article. The word “community” refers to a group of individuals residing within a defined municipality. The term “perception” refers to the impression of a person or group of people, in response to stimuli, while taking into account how this person or group of people’s past experiences affect the impression (Schiff, 1970). In this study, perceptions are gleaned from text data gathered from public narratives within Nova Scotia, and for comparative purposes, from published studies of perceptions in other geographical areas.

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[1] The installed capacities noted in news articles will determine the classification of size only if the news article does not list the development as “large-scale” or “small-scale”. See Methods section for further details.

Limitations and Delimitations

Because of the timeline (September 2013 to April 2014) and method (conceptual content analysis) of the research, some delimitations were imposed on the scope of the study, such as the time frame of the articles reviewed, number of sources of data, and types of data included in research. News articles published between January 1, 2013 and January 31, 2014 were collected as sources. Reviewed literature was limited to text-based sources (e.g., secondary data and public discourse), and expert opinion found in peer-reviewed journals. Limitation of the context to Nova Scotia means that the results provided are not intended to be generalizable to other locations or social contexts. Data collected does not necessarily point to information such as levels of energy literacy, or levels of public interest. The data simply provides commentary on Nova Scotians' opinions of different scales of wind energy developments, as represented through online news sources during the period studied.

Furthermore, research included in the content analysis has been delimited to public discourses of Nova Scotia, such as newspaper articles. To try and achieve the best possible representation of the sample gathered, this research has documented the range of stated perceptions, including statements that represent more moderate public opinions, as well as the most strongly leaning voices on both sides of the discourse. A final delimitation has been to only analyse the discourse surrounding onshore wind, thus excluding off-shore wind.

Significance Of The Study

The context of the study is the viability, as related to public perception, of large-scale and small-scale wind energy development in Nova Scotia, and the potential for support or hostility towards this technology, which has been made apparent in some public discourses. An exploration of perceptions of wind-energy developments may further inform the question of acclimatization as it applies to renewable energy developments in Nova Scotia in general. Acclimatization refers to the adaptation to new situations, or environments, and is important in the consideration of changing contexts within which perceptions are formed (Merriam-Webster, n.d). For example, based on the results of the research, the question of whether or not the public has different opinions about small-scale and large-scale wind power technology could lead to better indicators or guidelines for establishing appropriately scaled wind-power developments for acceptance in particular communities.

Position of the Researcher

The author was first drawn to this research because of what seemed to be a chasm between wind energy's potential for positive community engagement and its public acceptance in Nova Scotia. The outcry from certain opposition groups, such as the Friends of Jeddore and the Friends of South Canoe, came to her attention at the same time that she first started studying COMFIT policy and wind energy capacity in Nova Scotia. She went into the research holding the opinion that wind energy was a resource which was not being tapped to its full potential, and believing that wind energy presented an opportunity for an economically, environmentally and socially beneficial

alternative to non-renewable energy, which could be established on the community scale with support from COMFIT. The researcher was curious as to whether the size of the wind developments had anything to do with public acceptance or rejection, but also wanted to know the specific risks and benefits of wind developments perceived by the public. She was also already critical of the widely-used idea of NIMBYism, and wanted to see if there were factors in hostility toward or acceptance of wind developments which supported or contradicted the idea that NIMBYism was the sole or primary cause of hostility. This critique came from having read literature, such as articles by Devine-Wright (2005) and Wolsink (2000), in which these authors question the viability of NIMBYism as a reason for hostility towards wind developments, as well as the validity of NIMBYism as a whole. The critique of existing theories around reasons for hostility towards wind is consequently considered in the conceptual content analysis.

Different approaches to identifying public perceptions of renewable energy, and wind developments specifically are outlined in the Literature Review section. Consideration of these approaches has helped shape the analysis.

Chapter 2: Literature Review

There is a body of existing literature covering public perception research, research on public perceptions of wind specifically, risk perception, the impacts of small-scale and large-scale wind, as well as grey literature on wind developments in Nova Scotia. An overview of the existing literature is outlined in the following sections.

Existing Public Perception Research

Various studies examine the roles of emotions, perceptions of risk and behaviour (e.g., Sjöberg, 2002, 2007; Estrada, Mills & Reyna, 2008; Siegrist & Visschers, 2008). Sjöberg (2007) shows that emotions play an important role in a person's risk perception of a given stimulus, suggesting that people may perceive risks before having any information on that same stimulus. However, the same study finds that negative emotions do not always correlate with elevated perception of risk, nor do positive emotions with lower perception of risk. The study also qualifies the role of emotion in perception by identifying it only as an initial reaction to stimuli, which then becomes informed through evidence in an elaborate cognitive process.

Another study shows that risk perception and behaviour are sometimes contradictory (Estrada, Mills & Reyna, 2008). Estrada, Mills and Reyna's study examines and supports fuzzy-trace theory, which purports that different types of thinking about the same situation will lead to different behaviours. Quantitative thinking, which involves thinking about trading off risks and benefits, leads to higher risk-taking behaviour. Qualitative thinking, which includes simple gist representation such as "seek

benefit" and "avoid risk", leads to lower risk-taking.

Another study finds that risk perception is significantly shaped by a person's affective evaluations, meaning evaluations that are effected by emotional stimuli, and their levels of trust in responsible agencies, such that evaluations can sometimes be irrational (Siegrist & Visschers, 2008). The study also finds that these perceptions influence risk management practices.

Another study identifies the importance of risk and benefit perception in the establishment of new policies (Sjöberg, 2002). Sjöberg holds that, especially in the case of siting unwanted developments, perceived risks are often discussed at greater length in debates than perceived benefits.

Existing Research on Public Perception of Wind

There is a good body of academic literature presenting the results of research on the perceived effects of wind turbines (e.g., Baxter et al, 2013, Aramini, 2012, Bouma, 2009, Devine-Wright, 2005, and the rest of the studies included in this section). Some of the perceived effects most often studied are those of noise and vibration on sleeping patterns of residents near turbines (Aramini, 2012) and possible economic and other social costs and benefits of wind developments (Havelka, 2013).

The studies also deal with different perception dynamics from different areas in the world. Canadian sources studying opposition to local wind developments point to the politicization of wind developments (Baxter, Hirsch, Morzaria, 2013). This politicization takes the form of information and policies regarding wind developments

coming from the realm of government. This influence produces unique effects within the public, dependent on the specific changes within different contexts. Interestingly, Baxter et al.'s (2013) study concludes that, in the Ontario communities from which samples were taken, NIMBYism did not appear to be a factor in public opposition. Their research shows that most people studied have negative reactions to not only proposed wind developments geographically near them, but that there is evidence of opposition to all new wind developments, regardless of how geographically near to or far from the proposed host communities (Baxter et. al, 2013).

Comparatively, one study which looks at effects on Netherlands communities' perceptions of pre-existing wind power developments identifies differences in perceptions of noise pollution as more acute in "built-up" areas, such as towns and villages (Bouma et. al, 2009). This study also limits the sample to citizens who were not benefiting economically from the presence of turbines, and concludes that the lack of economic benefits must be taken into account with the annoyance towards wind power developments.

There are also some studies (e.g., Baxter et al, 2013, Alberstat, 2013) of public perceptions of economic aspects and possibilities for social conflict related to wind turbine development. In these cases the "public" generally refers to members within a given geographical community who are not directly involved in the act of developing wind projects. In the Ontario study (Baxter et al, 2013), residents of sample communities felt that the economic benefits of wind development (such as increased job opportunities) did not outweigh the costs, such as loss of property value.

Existing academic literature is mainly focused on public perceptions of large-

scale wind turbines, wind farms, or industrial-scale wind developments. However, one study (i.e., Devine-Wright, 2005) considers differing perceptions of small-scale and large-scale turbines, and also the differences in favourability between small wind farms, large wind farms, and solitary wind turbines, as shown by order of preference between the three options. The study, done in Ireland, suggests that the sample group was more favourably inclined towards small groups of large turbines (5-10 turbines) rather than solitary turbines of any size, and even less favourably inclined towards large groups (up to 25) of small turbines (Devine-Wright, 2005).

Impacts of Small-Scale versus Large-Scale Developments

Some studies look specifically at the relative impact of small-scale and micro-scale wind turbines, such as Eastwick (2013) and Havelka (2013). Manwell (2002) shows that much of the research to date indicates that small turbines can actually cause more noise than large turbines because of the elevated speeds at which the blades of small turbines spin. The source goes on to indicate that perceived noise is affected by distance, wind speeds and models, and that small-scale turbines may be more audible because they can be sited closer than large turbines to human populations, combined with comparatively less focus on noise-reduction in the research and development phase than for large-scale turbines.

Other studies (e.g., Aramini, 2012; Jeffrey, 2013) focus on large-scale wind Aramini's study supports the claim that industrial-scale wind turbines cause sleep disturbance to people living less than 1.4 km away. Jeffrey's study attributes symptoms such as annoyance, stress, sleep disturbance, headache, anxiety, depression, and

cognitive dysfunction to exposure to industrial-scale wind turbines.

Another source comparing environmental effects of different sizes of turbines indicates that lowering turbine height might decrease the number of bat fatalities associated with wind turbines (Baerwald, 2007). There is also academic literature on the niche market of small-scale and micro-scale wind turbines that points to the unique economic and social opportunities of these smaller scales of wind development, such as the growing installed capacity of smaller-sized turbines and the possibility of private use and development by consumers, as compared to large-scale wind developments (Havelka, 2013).

In Nova Scotia, all of the relevant Community Feed-In Tariffs (COMFIT) literature found by the researcher pertains to small-scale wind (i.e., less than 50kW per turbine, exceeding no more than 5MW installed capacity per development)[2]. The relevant COMFIT materials pertain mostly to small-scale wind because the opportunity for the submission of large-scale wind projects to COMFIT has been closed until further notice, pending review by the Nova Scotia Department of Energy (NSDOE, 2013). NSDOE aims to increase the level of small-scale renewable energy, while increasing the level of community-owned energy projects. NSDOE identifies wind energy as being emission-free, renewable, relatively affordable, as well as being very suitable for Nova Scotia's windy climate (2013).

Impact of Wind-Power Developments on Wildlife

One key aspect of public perception of wind developments is the perceived effect

[2] This definition of scale differs from the definition provided in the Introduction chapter because not all wind developments being discussed requested COMFIT approval.

of wind turbines on wildlife, specifically on birds and bats. One source, looking at the effects of wind turbines on the flight patterns of migratory birds found that flight patterns were rarely significantly affected, apart from some of the more unwieldy birds, such as pheasants, which were less likely to be effective in swerving out of the way of turbines (Denny et al, 2008). Most migratory bird formations were able to avoid turbines while changing their overall flight patterns minimally (Higgins & Naugle, 1999). One source, studying the effects of wind developments on birds and bats, argues that bird and bat habitats are being affected negatively by wind power developments through the process of clear-cutting areas designated for turbine development (Barclay & Cryan, 2009).

Another source highlights the misunderstanding and contradictory findings of existing research specific to bat fatalities (Arnett et al., 2007). Barclay et al. (2009) found that tree-dwelling bats are most affected by the destruction of habitats, which takes place in the land-clearing aspect of turbine development. They also posit that certain species of bats are sometimes drawn to the light and movement of turbines because of accumulations of insects. When this attraction occurs, bats are more likely to be struck by turbine blades, and more likely to come close enough that the spinning blades cause pressure in the bat's lungs to drop rapidly, causing death. A study by Smallwood (2007) argues that new measurement mechanisms are needed to measure wind-turbine-related bird mortality rates, as those existing have high rates of bias, and thus may provide misleading conclusions.

Perceived and Real Health Effects

There are differing accounts of the human health effects of both large and small

wind turbines. Most of the literature concerning health effects (e.g., Pedersen & Waye, 2007, Aramini, 2012, Bouma, 2007, Eastwick, 2013, Jeffrey, 2013) pertains to sleep disruptions, nausea, headaches, and disorientation. These studies vary in their conclusions about health effects. One Canadian study (Jeffrey, 2013) suggests that improper siting of wind developments, meaning with an inadequate setback distance, can be detrimental to health and well-being, with reported effects typically related to "stress disorder–type diseases acting via indirect pathways", such as those listed in the "impacts of small-scale versus large-scale" sections. Another study indicates that physicians can expect a correlation of patients complaining of these symptoms with the development of wind energy, suggesting the impacts are real, whether or not the cause being wind developments is accurate or not (Horner et al, 2013). Homer et al conclude that there needs to be a better understanding of effects of various setbacks of wind turbines, and that a better understanding and appropriate setbacks will decrease the number of symptoms reported in rural patients. Aramini (2012) indicates that people living within 1.4 km of rural turbines reported adverse effects in sleep patterns, but that outside of the 1.4 km radius, reported negative effects were negligible. Manwell (2002) reports that as turbine technology advances, turbines of all scales are becoming quieter, which should address noise-related complaints.

In the grey literature, from Nova Scotia specifically, the Friends of Jeddore (2008) point to some of these health effects, as well as negative economic and environmental effects in their opposition toward industrial-scale wind developments. The Friends of Jeddore (2013) claim that the proposed 50MW Jeddore Peninsula development, for example, will lead to an "increased risk of hypertension, heart attacks, headache,

fatigue, transient sensations of intoxication, nausea, palpitations, sleep disorders, hearing loss, and high levels of stress." Contrastingly, there is also grey literature, such as the Scotian Windfields website (2014), which claims that the health effects of wind are negligible and misunderstood by the Canadian public. Reports from other potentially-biased, non-peer-reviewed sources such as citizen-based wind-advocacy and wind-opposition groups will be further discussed in the "Nova Scotia-Related Sources" section below.

Nova Scotia-Related Sources

Sources found pertaining specifically to Nova Scotia's wind energy are from grey literature. Government sources, such as the Nova Scotia Department of Energy's (NSDOE) website, emphasize that wind energy can be environmentally and economically beneficial to Nova Scotians, and that potential health risks and environmental damage are minimized by regulation through Environmental Assessments and development policies (Nova Scotia Department of Energy, 2013). Further, policies such as COMFIT suggest that the NS government considers wind energy as one viable direction among many for renewable energy development in Nova Scotia. The NSDOE identifies wind as a prime opportunity for local investment in energy, and as a candidate to produce renewable energy, which would help the province achieve its goal of 40% renewable energy by 2020. Provincial and municipal energy plans are also telling of the general trends regarding renewable energy, and the push towards "greener" energy, as represented by provincial renewable energy targets

and policies such as COMFIT (Nova Scotia Provincial Government, 2013).

There are also opposition groups within Nova Scotia, such as the Friends of Jeddore and the Friends of South Canoe, who cite national and international wind opposition groups, such as National Wind Watch and Industrial Wind Action, that claim that health effects of wind turbines are real, rather than merely perceived (Friends of Jeddore, 2013). Friends of Jeddore point to noise pollution from wind turbines, which they claim will present a higher risk of hypertension, heart-attack, headache, nausea, a transient sense of intoxication, and a number of other afflictions. Their sources are exclusively statements by other wind opposition groups. There are also some wind advocate groups, such as If You Build It and the Alternate Resource Energy Authority (AREA), who argue that negative health effects do not outweigh the potential positive effects of wind energy, and point to the opportunities for community-owned energy, economic and social wind energy development. As a consequence of COMFIT regulations, small-scale wind is considered a good candidate for community-owned energy across Nova Scotia, because of the fixed premium rate of energy produced and community-ownership being necessary for COMFIT approval (Alberstat, 2013). Thus, a wide range of perceptions are exhibited by these diverse groups, providing a complex and interesting context for analysis of perceptions reported in recent online news sources in Nova Scotia.

Chapter 3: Methods

Online news articles from a 13-month period in 2013-2014 were gathered and subjected to conceptual content analysis. NVivo, a qualitative data analysis tool (Chen, Gruzd, Liu, Meyers, 2012), was used to assist with the file management and coding of data. Data were coded according to a semi-flexible coding tree, which can be found in Appendix 1.

Conceptual Content Analysis

Conceptual content analysis (CCA) and qualitative data coding was conducted to analyse public perceptions of small-scale and large-scale wind power developments in Nova Scotia. CCA is a type of qualitative data analysis which searches for categories or themes within a data set, then codes text-based sources of data along those categories (Busch, De Maret, Flynn, Kellum, Le, Meyers, Saunders, White, Palmquist, 2012). CCA is advantageous because it can combine qualitative and quantitative data.

Analysing pre-existing text, as was done in this study, is advantageous in that it has less of a chance of producing the biased effect of research subjects being under scrutiny, such as is the case with surveys or interviews. However, using pre-existing data can also be disadvantageous if interpretation (including the choosing of categories to code by) is either too liberal, meaning that the interpreter might draw false conclusions based on their own experience, or too conservative, causing them to miss

important subtext. Another consideration is that text from news articles shows the journalist's interpretation of a situation, and not necessarily the direct perception of the public. Further, the journalists may have had the aim of fostering debate or conflict with their articles, and therefore may have intentionally cast certain topics into a controversial light. Exceptions to this consideration are opinion pieces that are written directly by non-journalist members of the public, such as in "Voice of the People" pieces and Letters to the Editor. It is also a static analysis, which means that the context of the data, as well as the findings, is perishable (Busch et al, 2012).

The reliability of CCA also depends on the coder's ability to code in a consistent fashion throughout the analysis. The validity of CCA depends on the correspondence between categories of coding and the conclusions that emerge from the relationships among the categories. The categories must reasonably lead to the conclusions found, and not be manipulated intentionally (Busch et al, 2012).

Online News media

Data was gathered from articles related to the perception of wind power developments within the province from online newspapers within Nova Scotia. All municipal Nova Scotian newspapers were searched. A list of municipal Nova Scotia newspapers active in 2013 was found on the Atlantic Council for International Cooperation (ACIC) website. The scope of research has been set to Nova Scotia, in the interest of approaching a body of data suitable for analysis during the time limitations and geographic focus of this research. All the listed newspapers' online article databases were searched for articles between the dates of January 1st, 2013, and

January 31st 2014 containing the phrases “wind,” “turbines,” “wind farms,” and “wind energy”. A total of 128 relevant articles were uncovered, and all were coded and included in the analysis. For a full list of articles analysed, see the References section.

Limitations include bias in data being gathered, and in coding and analysis. The bias in data being gathered lies in the fact that only the opinions of those who are active in online news media will be represented, and this may have produced an unevenly balanced demographic. Another facet of bias in the data gathered is characterized by a predicted lack of representation of those who are indifferent to the matter. The logic here is that if people are indifferent to wind developments, they are unlikely to make public statements in online news media, or to be quoted by journalists in on-line media.

Coding tools

Nvivo was used to organize data. Nvivo is a software which has been designed for qualitative data analysis (QSRI, 2012). Once news articles were uploaded into the program, they were organized into files and coded. Nvivo is advantageous because once all data are uploaded, they are together in a consistent format, which makes coding and analysis easier.

Articles were coded according to a semi-flexible coding tree. The coding is organized first by three size categories: large-scale, small-scale, and unspecified-scale, according to the size of the wind development being written about. Coding for size was done according to what the article identified the development as, by key words such as large-scale, small-scale or the listed installed capacity. If an article specifically used “small” or “large” in reference to a specific development, then the article was coded

according to that, regardless of the installed capacity of the development. If only installed capacity was noted, then the article was coded by large-scale developments (10MW or higher, or as otherwise specified by the article), or small-scale developments (less than 10MW or as otherwise specified by the article). If neither size nor installed capacity was noted in the article, then the article was coded as “unspecified scale”. Within each size category three main themes were defined: social effects, environmental effects, and economic effects. Specific topics found in articles were coded to these categories and themes. Some topics were anticipated due to existing academic literature and specified in the coding tree prior to the coding process. An example of an anticipated topic was concern for an appropriate setback. Other codes were added throughout the coding process, as topics came up in articles, such as wind developments providing a tourism opportunity.

Once online news sites were searched for relevant articles, individual articles were stored in the Nvivo program as PDF files, sorted in folders by newspaper source. Articles were then coded one at a time; sentences and paragraphs were coded within articles according the relevant size categories, themes, and topics. Accordingly, one article could contain several different coded sections of data ‘bits’. Individual sections or bits of data, as opposed to whole articles, were coded in order to facilitate identification and analysis of specific topics within the various themes and categories.

Having coded sections by size-category first allowed for comparison of prevalence of given themes and topics by size of development being discussed. This organization allowed for the emergence of distinct patterns within and between size categories.

Chapter 4: Results

Results are organized around the three coding themes indicated in the Methods section (i.e., social effects, environmental effects, and economic effects) and the three categories of wind development (i.e., large, small and unspecified scales) (Table 1). Within each theme, specific topics emerge, sometimes showing different topics for different scales of wind developments.

Searching through online newspapers revealed 21 articles discussing large-scale developments, 33 discussing small-scale developments, and 85 discussing unspecified-scale developments. The highest percentage of total positive comments across the three main themes accrued to the small-scale category, with 71.7% positive comments, followed by the unspecified-scale category with 58% positive comments, and finally the large-scale category with 48.9% positive comments. The highest percentage of positive comments within the theme of social effects was 35.2% in the small-scale category. The highest three percentages of comments were the positive social effects of small-scale wind, the positive social effects of large-scale wind at 28.5% and the positive economic effects of small-scale wind at 28.2%. The three lowest percentages of comments were the positive environmental effects of large-scale wind at 0%, the negative economic effects of small-scale wind at 4.4% and the negative economic effects of unspecified-scale wind at 5.9%. The highest percentage of negative comments were related to large-scale wind (51%), particularly negative social effects (24.4%).

The numbers and percentages of comments are summarized in Table 1. The

topics that emerged from these categories and the number of times they were mentioned are shown in Table 2. Geographical distribution of articles is represented in Figure 1. A further exploration of each theme and size category will be described in following sections.

Table 1: Number of comments by category and scale

	Large scale (n= 49)		Small scale (n= 156)		Unspecified scale (n=304)	
	Positive	Negative	Positive	Negative	Positive	Negative
Social	14 (28.5%)	12 (24.4%)	55 (35.2%)	21 (13.4%)	81 (26.6%)	51 (16.7%)
Environmental	0 (0%)	9 (18.3%)	13 (8.3%)	16 (10.2%)	28 (9.2%)	57 (18.7%)
Economic	10 (20.4%)	4 (8.1%)	44 (28.2%)	7 (4.4%)	69 (22.6%)	18 (5.9%)
Subtotal	24 (48.9%)	25 (51%)	112 (71.7%)	44 (28.2%)	178 (58.5%)	126 (41.4%)

('n' represents total number of comments)

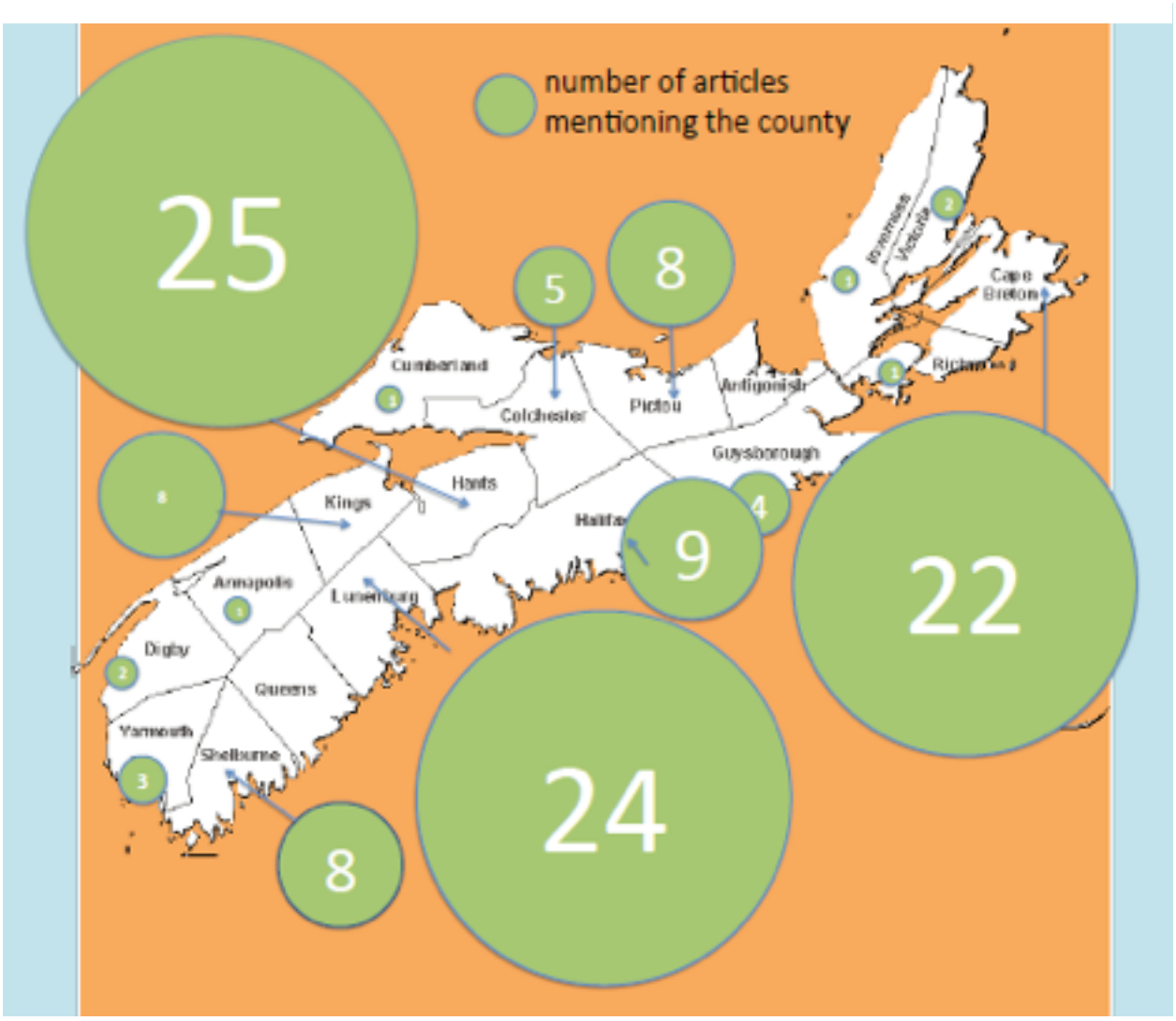
Table 2: Number of times a topic was mentioned

Number of topic references within news articles			
Effects Mentioned	**Large Scale**	**Small Scale**	**Unspecified Scale**
Social Effects			
Total Positive	**12**	**55**	**81**

Energy Security	3	5	14
Community Engagement	7	26	29
Appropriate Setback	0	7	9
Community Ownership	1	12	18
Employment Opportunities	1	5	11
Total Negative	**14**	**21**	**51**
Land Enjoyment	3	0	1
Lack of Community Involvement	3	2	15
Lack of COMFIT Understanding	0	0	1
Aesthetic Conflict	3	1	6
Total Health Effects	5	11	28
- Sound	1	4	10
- Sleep Disruption	0	0	2
- Ice Throw	0	0	1
- Shadow Flicker	0	3	8
Environmental Effects			
Total Positive	**0**	**13**	**28**
Reduction in Pollution	0	3	7
Reduction in Greenhouse Gases	0	4	7
Meeting Provincial Renewable Energy Targets	0	0	2
Environmental Assessment Approval	0	2	3
Divestment From Fossil Fuels	0	4	9
Total Negative	**9**	**16**	**57**
General Wildlife Deaths	4	0	9
Bird Deaths	1	5	13
Bat Deaths	0	5	15
Livestock Deaths	0	2	0
Impactful Extraction of Building Materials	0	0	1

Disposal of Turbines	0	0	1
Clearcutting for Development	0	1	4
Watershed Damage	4	3	14
Economic Effects			
Total Positive	**10**	**44**	**69**
COMFIT revenue	1	19	22
Affordability of Energy	5	0	6
Municipal Funding For Projects	0	13	3
Market Diversity	0	0	5
Employment Opportunities	2	4	8
Community Investment	0	0	14
Opportunity for CEDIF Investment	0	4	5
Tourism	0	0	2
Tax Benefits	0	4	4
Sufficient Energy Production	3	0	0
Total Negative	**4**	**7**	**18**
Unfair Distribution of Benefits	0	2	2
Outright Cost of Development	2	3	9
Variability of Energy	1	0	2
Loss of Private Property Value	1	1	5
Lack of Local Jobs	0	1	0

Figure 1: Geographical distribution of articles



Social Effects

The social effects of wind turbines are not always perceived with scale in mind. Data shows that social effects are often spoken about in the context of wind energy in its abstract form, meaning that it doesn't refer to any one project but wind energy in general. However, there are different volumes of commentary, as well as different topics emerging from news articles, according to size.

The most-cited positive comment related to wind turbines, across size-categories

is community engagement. This could indicate that more in-depth liaison between communities, energy producers and energy policy-makers is needed to foster understanding of the potential benefits, and to minimize the potential risks of wind developments.

Commentary on the social effects specific to large-scale wind developments is relatively sparse. One hopeful headline emerged, reading “Wind farm exceeding expectations” (Cole, 2013). This article talks about how the 31.5M wind farm in Amherst is providing power for many more homes than expected. However, other headlines are not so optimistic about large-scale wind. For example, one article, titled “Industrial wind-farm will ruin kayakers’ experience” (Cape Breton Post, 2013), posits that a large-scale wind development in Cape Breton will hinder tourism. Another article points to a family who believes that a large-scale wind farm has killed their livestock. The article quotes the citizens as saying that “those windmills not only keep her and her husband Davey up at night, the stress of living under the windmills has been killing her emus” (Riley, 2013).

Commentary on the social effects of small-scale wind developments yields evidence of private wind development initiatives. For example, a group called If You Build It, who started off as a group of Dalhousie University students, collaborated with a Nova Scotia resident and businessperson, who invested in the group so that they could build a small wind turbine to help power her Tatamagouche home (Scott, 2013). Other articles point to the possibility of small communities being able to create their own power thanks to small-scale wind turbines. One example is an article titled “Little River Harbour wind turbine to generate local power”, which indicates that the proposed “turbine will output

enough energy for 650 homes annually with 100 per cent of the energy consumed in the Yarmouth/Wedgeport region" (Allen, 2013). A similar commentary emerges from an article about a small-scale wind development in Riverton, which is described as "the first step towards Nova Scotia communities, families and businesses benefiting from projects that will produce an abundance of clean, renewable energy. This is energy that will be used in our communities, by our communities, for years to come" (New Glasgow News, 2013).

However, perceived social effects of small-scale wind are not singularly positive. Take, for example, the case of a small-scale wind development in the town of Boularderie. One article identifies that the "construction of the wind farm on privately leased farmland has created a debate about the need for renewable energy and the potential costs to the environment and health that some say can be directly linked to the proximity of homes to wind turbines" (Cape Breton Post, 2013). Health concerns were also at the center of controversy surrounding a proposed small-scale wind development in Richmond County. An article shows that residents' concerns about the health effects of even small-scale wind resulted in the mandate that "[b]oth parties [Richmond County and the wind power developer, Scotian Windfields,] will investigate Health Canada's findings as they apply to the Martinique project, and identify any necessary mitigation strategies arising out of the report" (Cape Breton Post, 2013).

In some cases, public opposition has been shown to be able to stop project development, as is the case in Millbrook. One articles shows how two turbines "had originally been proposed for the Harmony Camden area. That proposal was shelved, however, after the applicants ran into strong, vocal protest from residents in the

community" (Sullivan, 2013).

Discussions around the social effects of unspecified-scale wind developments were by far the most voluminous. Many of the articles about unspecified-scale wind developments came directly from citizens, in the form of Letters to the Editor and "Voice of the People" pieces. One letter to the editor raises concerns about health effects of developing wind power with an insufficient setback distance. The letter reads that "[m]any countries are ensuring that at least a two-kilometre distance is set between the turbine and a dwelling. This makes sense. […] No one is against green energy and its good effects. We all thought cigarettes were good, too, until negative effects became known" (Cape Breton Post, 2013). One Voice of the People piece is simply titled "Wind —Not in my back yard, thank you." The writer of the piece suggests that he would rather have a nuclear facility sited nearby, than a wind turbine (Chronicle Herald, 2013). However, not all such pieces are against wind energy. Another Voice of the People piece, titled "Embrace power of wind", questions the validity of the health concerns around wind energy. The author has been "paying close attention to media coverage of the effects of wind turbines on the health of those who live near wind farms. […] The concerns are not physiological; they are psychological and triggered by the power of suggestion" (Chronicle Herald, 2013). Other sources, such as Haligonia, have also been commenting on wind power, as shown by an article titled "A #BeaverBank Wind Farm? Why Not?" The article goes on to say "[i]t looks like a wind farm in North Beaver Bank is going to happen. How can I poke fun at our friends in the 'Bank if they get all technology-ed up?" (Haligonia, 2013). This comment shows that the author sees wind energy as a positive innovation.

News articles also show the emergence of community groups and community involvement in projects, both for and against wind energy and the associated social effects. Specific community opposition groups include the Friends of River Road, who oppose an 8MW wind farm, saying that “[t]he energy minister should withdraw his approval of a Halifax County wind farm because the project doesn’t have enough local support[…] We didn’t even know about the project until after it was approved” (Alberstat, 2013). Another article emerges about a similar group called Friends of South Canoe, who are against the development of a 102MW wind farm in South Canoe, titled “A community group has been given the green light to appeal Chester Council’s approval of a massive wind farm near New Ross” (Cape Breton Post, 2013). However, community initiatives are not only in opposition to wind developments. One example of a pro-wind community group is the Alternate Resource Energy Authority (AREA), who plan on creating a 16.1MW wind development near Ellershouse. AREA is a partnership between the towns of Berwick and Mahone Bay. On August 27, 2013, Berwick’s interim chief administrative officer Don Regan was quoted saying “[o]ur work to establish the Alternate Resource Energy Authority (AREA), the structure we are using to build a wind facility, is going well” (Kelly, 2013). AREA has even received a nod of approval from the Liberal government (Hants Journal, 2013).

News articles about the social effects of unspecified-scale wind developments show varying perceptions. For example, some articles have a hopeful outlook of the social effects, such as one, titled “New trail open by wind farm.” The article outlines not only the lack of disturbance caused by wind energy, but also the potential for its inclusion in the Nova Scotian tourism industry (Allen, 2013). The article reads that,

“while strolling the path along the scenic shoreline one hears the steady whooshing of blades that help to provide power to numerous homes annually,” and that “Roger Brooks, an expert in the fields of tourism and destination marketing, stopped at the Pubnico Point wind farm this summer. During his critique of the region to tourism industry stakeholders last month he said the wind farm deserved more attention as a destination. He saw the area as an “educational opportunity[…] I know they’re controversial […] but visitors actually like these. They see them more as an attraction than a detraction” (Allen, 2013). Another community member, however, has concerns that the Martock Ridge Community Wind Project will affect the camp and cottage land, for enjoyment, and also because of the proximity to the watershed (Thompson, 2013).

Commentary about the social benefits of the COMFIT program and the resulting developments also emerges. One article describes COMFIT as “helping communities enjoy locally generated clean and renewable electricity” (New Glasgow News, 2013). Another article’s headline reads “Mayor: wind project would make Berwick ‘masters of our own destiny’” (Kelly, 2013)

Steps are also being taken to assuage concerns about the negative social effects of unspecified-scale wind developments. One article outlines how “Colchester County residents interested in learning more about future proposed industrial wind turbines will be assisted through the formation of a citizen committee for such projects” (Sullivan, 2013). Another article shows the safeguards that are in place to protect the public, quoting Melanie Smith of Strum Consulting saying “Nova Scotia Environment requires proof that the sound generated by a turbine will not exceed 40 decibels (dba) at any residence, or gathering place that is not considered to be commercial […] Forty is

widely applied. It's certainly one of the more conservative values. […] The 40 dba is intended to be protective of human sleep disturbance" (Thompson, 2013). West Hants Council Member Shirley Pineo is quoted as showing support for wind energy, saying "I am really excited about this […] Everywhere you go you are seeing more (wind towers). They are the way of the future" (Kelly, 2013). Another Council Member, Randy Matheson is quoted as saying "I am excited, but also nervous. People can be affected by these (developments)" (Kelly, 2013).

Environmental Effects

Commentary on the environmental effects of large-scale wind developments is very limited. The only commentary dealing with environmental aspects of specifically large-scale wind developments raises concerns about damage to the watershed. One citizen rejects the development of a large-scale wind development on the grounds that he hasn't "heard anybody yet say 'I can guarantee this project is not going to affect your watershed'" (Thomspon, 2014). The proposed wind farm is on the Mills Lake Watershed Protected Area, on land owned by the Town of Windsor, and has already gotten approval from NSE (Thompson, 2013).

Commentary on the environmental effects of small-scale developments was comparatively more prevalent. One shows how a small-scale wind turbine is helping with wastewater treatment. The article reads, "The Municipality of the District of Digby has installed a wind turbine at the Smith's Cove wastewater treatment plant. The 5-kilowatt turbine will produce enough electricity to take care of approximately one third of the electricity needs of the UV building, where one stage of the sewage treatment takes

place" (Riley, 2013). Public pushback due to environmental reasons was prevalent in Hillside/Boularderie, where independent power producers claimed that "[the Hillside community] definitely pushed back quite a bit, but in the end there was nothing they had had [sic] concerns with that we didn't address through the environmental assessment process" (Cape Breton Post, 2013). Another article on the same project outlines that "[a]mong the other conditions attached to the environmental approval are that Natural Forces [a COMFIT candidate] must develop and implement a program to monitor for birds and bats, sound modelling and a shadow flicker assessment" (Cape Breton Post, 2013). Another points to the environmental assessment necessary for such developments, thus attempting to provide assurance to the public: "Overall, the results of the environmental assessment show there will be negligible effect on the environments—that's on birds, bats, health effects", the vice-president of Natural Forces, Andy MacCallum, is quoted saying (Cape Breton Post, 2013). However, a Letter to the Editor about the same project is subtitled "Wind turbines not wanted." The author of the letter cites concern for the effects on the nearby national park, and points to a petition that 298 community members signed against this development (Cape Breton Post, 2013).

Commentary on the environmental effects of unspecified-scale wind development includes how wind turbine development through COMFIT "will help the province reach its renewable electricity goal of 25 percent renewable electricity by 2015 and 40 percent by 2020" (Woolvett, 2013). Another article, entitled "The future looks green," quotes David R. Stevenson, Sun County Ltd. Consultant and scientific advisor, saying that "[i]n 2006, 80% of the electricity generated in Nova Scotia came from coal […] By 2011, that

number fell to 57%, thanks to wind power" (Heap, 2013). Mary-Frances Lynch, community relations manager for the South Canoe Wind Project, is quoted as saying that "[i]t's a great benefit for Nova Scotians, to move away from coal power and to more renewable energy sources"(Thompson, 2013).

A portion of the commentary on environmental effects of unspecified-scale wind development came directly from citizens in the form of Letters to the Editor and Voice of the people pieces. Four Letters to the Editor and four Voice of the People pieces show disagreement among citizens, with four positive articles and four negative articles. Positive commentary shows some citizens disagreeing with wind opposition groups, saying that the environmental benefits of wind turbines are critical, and outweigh the social and economic concerns prevalent in the debate. One Voice of the People piece, subtitled "Ban highways next?", comments on what the author sees as the irrational uproar about damage to bats and birds by wind turbines. The author writes, "I have noted of late that one of the arguments against wind farms is that birds may fly into the blades and be killed. I wonder how many birds are killed by vehicles on the highways on any given day in our province. […] Using the same logic as for the wind farms, I think we should ban highways and all the vehicles that travel on them" (Chronicle Herald, 2013). One Letter to the Editor says that "[m]ost wind turbine distress is psychosomatic […] and, for the record, […] yes, I would have a wind turbine in my backyard" (Cape Breton Post, 2013). Yet another Voice of the People piece reads that "[m]oving from coal and gas to wind, solar, tidal and hydro will all require new infrastructure and technology which has its own new costs. Higher costs are just going to be a reality. We need to make this transition" (Chronicle Herald, 2013). The four that were not supportive

voiced concerns about the health effects of wind turbines, as well as concerns over rising energy rates and concerns about the effects developments on Nova Scotia's aesthetic landscape.

Economic Effects

Commentary about the economic effects of large-scale wind developments shows concerns about how economic costs and benefits will affect ratepayers. In one article, "Brereton, whose company was among the losing developers, said ratepayers should be on the hook for the cost of buying electricity produced by South Canoe […]." (Alberstat, 2013). Another article states that "[…] the small projects that are 50 kilowatts get a nice piece of the pie, while the projects that are over 50 kilowatts get a not-so-nice slice" (Howe, 2013), highlighting the perceived disparity of COMFIT rates for large-scale and small-scale wind projects.

However, other articles highlight the economic advantages that large-scale projects represent. In one such article, Erskine (2014) writes that Bullfrog Power, a green energy provider, "will buy wind farm electricity that exceeds what the town needs for their own purposes", when referring to a 16.1M wind farm near Ellershouse. Another article reads, "'There seems to be a new sense of optimism about economic development in the Chester area', spurred most recently with the approval of the South Canoe Wind Farm project, said chamber president Jo-Ann Grant" (Chronicle Herald, 2014).

Commentary on the economic effects of small-scale wind development includes arguments that there are many economic gains to be had, specifically from

opportunities provided by COMFIT. Johnson (2013) quotes Paul Pynn, the vice-president of Watts Wind energy, as saying that "'The energy produced here will be consumed here […]. There will also be local tax benefits and jobs'", in Barrington, where the proposed project will be developed. Johnson also writes, "where the project is being developed under the provincial COMFIT (Community Feed-In Tariff) program, the opportunity is there for local investment." Another article by Johnson (2013) about the Barrington wind project states that "[t]he 50 kilowatt turbines being proposed […] would generate an estimated $40,000 in revenue for the Municipality. Those monies would be used to pay for the conversion of street lighting to LED lights throughout the Municipality." Yet another article about the Barrington project highlights the investment opportunity that the project represents, explaining that "[t]he project is organized as a Community Economic Development Investment Fund (CEDIF), which is Registered Retirement Savings Plan (RRSP) eligible and provides additional tax benefits to eligible Nova Scotia investors" (Shelburne County Coastguard, 2013). Another article, about the Riverton project states that "[Pictou County] said in the past it is interested in a small wind farm that will create 'comfortable returns'" (Musick, 2013). Cape Breton University's facilities manager, Donnie MacIsaac, says that CBU's turbines "are really in the middle of nowhere and you probably won't see them from the road[…] We're getting money for putting it on the grid so it's a pretty good deal[.]" (Patterson, 2013)

Discussion around the economic effects of wind energy where scale is not specified includes the economic incentives of wind energy. An example of an incentive is the Wind4All Communities initiative, which is a Community Economic Development Investment Fund (CEDIF) that gives Nova Scotians the opportunity to invest in the

Hillside/Boularderie development (Grant, 2013). Another article points out that, “regardless of any returns, CEDIFs pay up to 65 per cent of their value in provincial tax deductions (35 per cent upon purchase, 20 per cent after 5 years, 10 per cent after 10), and are eligible for any RRSP tax deductions as well” (Orzano, 2014).

However, some articles point to the view that economic benefits available through wind energy development are not distributed equitably. One notable example reads that a resident of Ellershouse “noted the amount of tax revenue expected from the project wouldn’t go directly to the community with the turbine—it would be spread out over West Hants. She predicted Ellershouse would only see a benefit of one or two per cent of the revenue generated from the project” (Alberstat, 2013). Another citizen has been quoted in the context of an article about public hostility about a proposed Cape Breton wind farm as sarcastically saying that Celtic Current, an IPP in Nova Scotia, is “in business to make money—good luck to them”.

Another indication of perceived economic risks lies in the cost of generating wind power, as opposed to other energy sources. One article states that “the proposed [hydroelectric development] Maritime Link would be more cost efficient than energy alternatives including purchasing hydroelectricity from Quebec or developing more wind power” (Amherst News, 2013).

The results show that there is indeed a difference in public perceptions between small-, large-, and unspecified-scale wind developments in the sample. Implications of these differences will be discussed in the following chapters.

Chapter 5: Discussion

Emerging topics from the analysis reveal key issues around the relative volume of commentary on different size categories, with unspecified-scale wind having the most volume of commentary, and large-scale the least. Many more comments were made around small-scale than large-scale wind, perhaps indicative of COMFIT's current focus on small-scale developments. Topics that came up may also be contextualized in reference to those that emerged from the academic literature, such as NIMBYism, politicization, trust in different institutions and authorities, and perception of risks and benefits. The results across size categories and in relation to prevalent themes in the literature will be discussed, along with cautions in interpreting the results due to methodological limitations and delimitations.

The large number of articles not specifying the size of wind developments may suggest a number of things. First, size of development might not be relevant in the public's evaluation of a project, or journalists writing the articles don't believe it to be an important factor. Second, risks and benefits of wind turbines may be perceived as being consistent, regardless of size of turbine or development. Third, some discussions of risks and benefits are being applied not to specific proposed or existing wind projects, but to wind energy in general, in its abstract form, or as a concept.

However, there is still some evidence of differing perceptions of risks and benefits across size categories: the most positive comments were in relation to small-scale, followed by unspecified-scale. Perceptions of specific positive and negative effects also varied across size categories. For example, the difference in perceptions of negative

and positive environmental effects for small-scale wind was small (10.2% negative, 8.3% positive), whereas large-scale wind showed a greater portion of negative comments (18.3%) and much smaller portion of positive comments (0%). These results suggest that the size of development is relevant for environmental effects, with greater concerns expressed around large-scale developments. Some of the key environmental concerns are bird and bat deaths, as well as potential damage to watersheds. The concern about potential watershed damage highlights how important the context of a proposed wind development is, in terms of public acceptance or hostility. Key economic concerns include loss of private property value due to nearness to wind developments and outright cost of developments.

The overall large portion of positive commentary across size-categories suggests that wind development is accepted by a substantial amount of Nova Scotia's population, as a viable energy source, at least as the commentary is represented in online news media. The large number of statements about wind power in its abstract (non-scale dependent/specific) form suggests that people who are opposed to wind, regardless of whether or not the development is geographically near them, are against wind in general, which supports the claims of Devine-Wright (2005) in the case against NIMBYism as a viable or predominant explanation for opposition.

The data gathered suggests that many people are wary of wind energy because there are uncertain factors, such as perceived and real negative health and environmental effects. One example of this is one Letter to the Editor suggesting that the uncertainty of the health effects of wind turbines is comparable to the uncertainty of the health effects of cigarettes to human health prior to adequate research (Cape

Breton Post, 2013). One of the concerns that made people hesitant to have wind developments sited near their homes was the potential health effects of wind turbines sited nearby. In the large-scale category, health concerns accounted for 10.2% of the commentary, whereas for the small-scale category, health concerns accounted for 7%. Perceptions of environmental effects as a whole were more positive with small-scale than large-scale, with 8.3% positive and 10.2% negative, whereas large-scale was 0% positive and 18.3% negative. The differences across size categories may imply that hostility towards wind developments, in this case, is not simply a case of NIMBYism, but that there are different concerns and benefits associated with different sizes of developments. Small-scale had the lowest percentage of concerns about land-enjoyment, as well as aesthetic conflict and health concerns due to proximity of wind developments. The results also show that geographical location of a turbine is only a small consideration for many people, if explicit statements are taken at face value. Concerns about appropriate setbacks are generally accompanied up by other concerns, such as health concerns and environmental concerns.

Community ownership and involvement were two of the most prevalent positive social effects that emerged. The volume of positive commentary towards community involvement suggests that the public largely favours partial ownership of developments by communities and municipal-level governments. This suggests that politicization, as defined by Baxter et al. (2013) does not always breed dissent, if the communities are kept well-informed and involved in the development. Some municipal leaders have also been vocal about supporting wind turbines and the potential benefits for the residents of the host community, as is the case with Berwick's mayor (Kelly, 2013). The politicization,

as discussed by Baxter et al., is reflected to a certain extent in the collected data. COMFIT is run by the Nova Scotia government, as are environmental assessments (EA), which are necessary for all wind developments, whether by an independent power producer, Nova Scotia Power, or as a COMFIT project. EAs also demand a certain level of community engagement in the process of approval, no matter the size of the project. The politicization of wind is also evident from the Nova Scotia Department of Energy's open backing and promotion of wind power as a viable option in Nova Scotia.

The topic of trust in institutions and experts also emerged from the data. In some cases, reports from Health Canada are what spurred citizens on to demand a more thorough examination of the health effects of wind turbines. However, there is already a body of literature examining health effects of different scales of developments, as shown in the literature review. Community consultations are also necessary in the process of environmental assessments, in which these concerns can be raised to developers. This suggests that in some cases, there is either mistrust in the government's assessment process, or in the wind developers' claims. In other cases, such as in the article titled "No More Emus in Gulliver's Cove" (Riley, 2013), detrimental effects are attributed to wind turbines with little or no evidence. In the case of this article, the argument presented is that the emus appeared to have died of stress, which the owner attributed to the nearby 30-MW wind development. This appears to be a case of perceived risk, which is not based primarily on existing research.

The difference in positivity toward small- and large-scale developments indicates that there may be a chance for positivity towards small-scale developments in communities which show hostility towards large-scale wind developments. However, it is

also necessary to note the influencing factors, such as those found in the Results section. An integral part of public acceptance is public involvement and ownership. It is necessary that the public understand the possible risks and benefits of any scale of wind energy before they are exposed to it.

Chapter 6: Conclusion

The unique perceptions of differing scales of wind developments are important in the consideration of the context in which hostility or acceptance of a given wind development occurs. The perceptions represented in this research differ enough to warrant further exploration, with the aims of drawing correlations between different scales of wind developments and different specific perceptions, such as the differing perceptions of health risks between small-scale and large-scale developments.

The analysis conducted suggests that there is indeed a difference in the perception of small-scale and large-scale wind projects, with small-scale having more positive commentary than large-scale. These data suggest that there is a possibility that communities that are hostile towards large-scale developments may be supportive to the development of small-scale developments. However, this support would also be dependent on factors other than size, most notably, high levels of community engagement and ownership, and environmental and health concerns being acknowledged and addressed adequately.

In order to produce more reliable results, similar data needs to be collected over a longer period of time, and alongside an analysis of changing energy policies and wind development progress. This kind of context would allow for a more inclusive and conclusive analysis to be conducted. Alongside collecting data over a longer period of time, including other sources for cross-reference, such as social media, council minutes, radio and television news segments, and surveys would improve the reliability of the study through contextualization.

Next steps in the research would be to assess energy literacy and public interest

in energy policy, and compare new research with contemporary discourses, such as the one identified in this research. Helping citizens understand the risks and benefits of wind energy is crucial in the consideration of new projects. Public uncertainty and misinformation appears to be a roadblock in not only wind development, but also a community's satisfaction with energy production. Understanding hostility and acceptance of wind developments on a multidimensional level is a crucial step to maximizing wind development potential, and moving in the direction of independence from non-renewable energy.

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Appendix 1: Coding Tree