What is the significance of “community” wind energy? The influence of local project initiation, participation, and investment on local perceptions of small-scale wind energy projects in Nova Scotia

Honours Thesis

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Abbreviations

CEDIF: Community Economic Development Investment Fund

CRE: community renewable energy

COMFIT: Community Feed-in Tariff

FIT: feed-in tariff

GW: gigawatt

MW: megawatt

NIMBY: not in my backyard

PPA: power purchase agreement

RE: renewable energy

RFP: request for proposal

Definitions

Community Economic Development Investment Fund: "a pool of capital, formed through the sale of shares to persons within a defined community, created to operate or invest in local business" (Nova Scotia Economic and Rural Development and Tourism, 2012). This program was initiated by the Nova Scotia government.

Community Feed-in Tariff: a program initiated by the Nova Scotia government that provides incentives to eligible community groups, organizations, and businesses to develop renewable energy projects in the province.

Gigawatt: one billion watts (Merriam-Webster, 2013)

Kilowatt: one thousand watts (Merriam-Webster, 2013)

Megawatt: one million watts (Merriam-Webster, 2013)

Watt: unit for measuring power in the International System of Units (SI); equal to one joule per second (Merriam-Webster, 2013)

Summary

Wind energy development has the potential to play a substantial role in the transition from dependence on fossil fuels to the use of renewable energy sources, and thus to contribute to efforts to mitigate climate change. However, local opposition has at times been a barrier to wind energy development. The literature has increasingly suggested that *how* wind energy projects are developed has a significant influence on the degree to which local people support or oppose those projects. This is reflected in a growing interest in "community" wind energy among academics, policymakers, and wind energy developers. Although the term "community" has been used to label a variety of types of wind energy developments, it generally means that local people are involved in planning and/or owning the wind energy project. In Nova Scotia, the recently introduced Community Feed-in Tariff (COMFIT) Program has helped drive an increased interest in "community" wind energy. Many of the newly proposed projects under COMFIT will offer local people the opportunity to invest in the projects through Community Economic Development Investment Funds (CEDIFs). However, little prior research has examined how shareholding and other forms of local involvement influence local support for wind energy projects in Nova Scotia. Furthermore, previous studies have not examined what factors lead to a sense of "community ownership" of these projects.

The present study explored the relative influence of local project initiation, participation, and investment on local perceptions of three small-scale small scale wind energy projects in Nova Scotia: the Maryvale, Spiddle Hill, and Watt Section wind energy projects. These projects had differing levels of local involvement in terms of whether or not shareholding was available and whether or not the project was locally initiated. A mail-out questionnaire was sent to local residents surrounding the projects. A comparison of local perceptions among the three projects was conducted using analysis of variance, and predictors of local perceptions were determined using stepwise multiple linear regression.

No relationship was found between local project support and either local project initiation or local shareholding, while a statistically significant but weak relationship was found between local project support and perceived community participation in the project planning process. A sense of "community ownership" was found to be related to both local participation and local project initiation, and to a lesser degree to local investment opportunities.

These results suggest that the extent to which a developer engages with the local community and is able to involve local people in the project planning process may be a more important determinant of local perceptions than whether the project idea comes from within the community and whether the opportunity is offered for local investment in the project. Therefore, while shareholding may be a useful component of a local engagement strategy, developers and policymakers seeking to promote "community" wind energy may want to ensure that strategies are also employed to involve local people in the project planning process.

However, the results must also be considered in light of the limitations of the study, including a relatively low response rate of 10% for the survey and the case study approach of examining only three projects. Future studies could examine how the results would compare for a larger number of projects, for other forms of "community" wind energy, and for wind energy projects of different sizes. Furthermore, since a sense of "community ownership" was not found to lead to higher degree of overall community support in the case of these three projects, future research could explore other ways in which a sense of "community ownership" of wind energy projects may be valuable.

Keywords: benefits, Community Economic Development Investment Fund, Community Feed-in Tariff, community renewable energy, local ownership, project support, public acceptance, sense of community ownership, shareholding, wind power

Chapter 1: Introduction

1.1. Motivation

In recent years, an increasing number of individuals have been coming together in communities around the world to build a more sustainable future by investing their efforts and finances into local renewable energy projects. Having been created collectively by human society, overcoming today's sustainability challenges will require collective action and changes within local communities. Whether community members perceive themselves as active drivers and beneficiaries of those changes, or as passive recipients of unwanted changes forced upon them, may influence whether the transition towards sustainability is welcomed or resisted.

Community wind energy projects are one type of initiative that can enable local communities to become engaged in sustainability while at the same time providing for a portion of the community's energy needs and bringing revenue back into the community. However, placing the label "community" on a wind energy project does not necessarily guarantee involvement and positive perceptions on the part of local community members. How and to what extent local individuals are given the opportunity to participate in and benefit from the "community" project may be a stronger determinant of community perceptions than the label itself.

Using a case study analysis of three small-scale Nova Scotian wind energy projects that involve different levels and forms of local community involvement, this study examined how local project initiation, local participation, and local investment opportunities were related to local support for the project, a sense of community "ownership" of the project, and perceptions of benefits and negative impacts of the project.

1.2. Background

1.2.1. The Significance of Wind Energy

Developing wind energy has a strong potential to contribute towards meeting future energy needs and building a more sustainable society. As global energy demands continue to rise, fossil fuel supplies continue to be depleted, and climate change poses an increasing threat to global well-being, the pressing need to transition from fossil fuel energy to renewable energy has become apparent (Intergovernmental Panel on Climate Change, 2011). According to the International Energy Agency (IEA), renewable energy accounted for 13.2% of total global primary energy supply and 19.7% of global electricity generation in 2010 (International Energy Agency, 2012b). Recent years have seen a rapid increase in the deployment of renewable energy, and this trend is projected to continue into the future (International Energy Agency, 2012c; Intergovernmental Panel on Climate Change, 2011). Wind energy is one of the most technically advanced and economically viable sources of renewable energy currently available (Devine-Wright, 2005). Since 2000, when the global installed capacity was only 18 gigawatts (GW), wind power has grown rapidly to a global installed capacity of 238 GW at the end of 2011, growing at an average rate of over 25% for the past five years (International Energy Agency, 2012a). At the end of 2009, installed capacity of wind power accounted for 1.8% of worldwide electricity demand, and according to projections by the International Panel on Climate Change, that amount could increase to more than 20% by 2050 if the world makes ambitious efforts to increase wind power deployment (Intergovernmental Panel on Climate Change, 2011).

1.2.2. *Perceptions of Wind Energy*

For wind power developments to be successful, a barrier that often has to be overcome is resistance from the local community where the development is proposed. In many cases, wind farms have been quite controversial and have faced considerable opposition from people residing near proposed developments (Warren & McFadyen, 2010). Since surveys have consistently found high levels of support for wind power among the general public, the rather frequent occurrence of local opposition to proposed wind developments has often been referred to as a not-in-my-backyard (NIMBY) attitude (Devine-Wright, 2005). However, there has been limited empirical evidence supporting the validity of the NIMBY concept, and critics argue that it is too simplistic to explain the many factors that may lead people to oppose wind developments (Devine-Wright, 2005; Wolsink, 2007). While the most common stated reason for local opposition tends to be concern about the visual impact on the landscapes, other reasons for opposition include concerns regarding noise, harm to birds and wildlife, damage to the tourist industry, lowered property prices, and the perceived unreliability and high cost of wind turbines (Devine-Wright, 2005; Warren & McFadyen, 2010). Devine-Wright (2005) argues that the process by which wind farms are developed is also an important consideration, and that negative attitudes towards wind farms may stem from local people feeling a lack of control over the development process. For example, commercial developments may face resistance from communities that perceive the wind farm as an imposition from outside and an invasion by "big business", especially if the development process is viewed as not inclusive or unfair (Bolinger, 2001; Warren & McFadyen, 2010).

1.2.3. Community Wind Energy

In contrast to communities that have opposed wind energy development, an increasing number of communities are showing an interest in initiating their own wind energy projects. The growing trend of small-scale, community-based renewable energy projects and distributed power generation has been referred to as a "soft energy path", which differs considerably from the traditional "hard energy path" consisting of large-scale, centralized, commercial electricity generation (Devine-Wright, 2005). The concept of community-based power generation does not have a precise definition, and ownership of community projects has taken many different forms, including ownership by municipalities, cooperatives, development trusts, or local community organizations (Musall & Kuik, 2011). When discussing community energy projects, an important distinction has been made in the literature between "communities of interest", which consist of individuals who have a common interest but may not necessarily reside in the same geographic area, and "communities of locality", which consist of individuals who do reside in the same geographic area (Bolinger, 2001; Musall & Kuik, 2011). The two types of communities may be the same for some community-based power projects, but in other cases, the community of interest and the community of locality may be completely separate, such as when individuals from across a nation invest in a cooperative to build a wind turbine (Bolinger, 2001; Musall & Kuik, 2011).

In its various different forms, community ownership of wind energy projects has become increasingly common, particularly in some European Union states, such as Denmark, Germany, the Netherlands, and Sweden (Warren & McFadyen, 2010). For example, in Denmark, where it is suggested that community ownership of wind developments originated, approximately 80 % of wind turbines are owned by individuals or cooperatives (Bolinger, 2001). Community-based wind power generation has been considered advantageous for a number of reasons, including that it can generate local income and employment, enhance local control and participation in the project, and increase local acceptance of wind energy (Walker, 2008).

1.2.4. Feed-in Tariff Policies

The implementation of feed-in-tariff policies in a large number of jurisdictions has been influential in spurring development of renewable energy and has been particularly helpful in encouraging community-based renewable energy. A feed-in-tariff (FIT) is a policy to promote renewable energy development by offering a guaranteed price for power that is generated from renewable sources and fed into the electricity grid (Renewable Energy Policy Network for the 21st Century, 2011). The prices vary by technology and are typically set at a rate of return above the cost of generation, and they are guaranteed for a fixed long-term period, therefore providing producers with economic incentive and certainty to invest in renewable energy projects (Renewable Energy Policy Network for the 21st Century, 2011). FITs have become the most common policy used by governments to promote renewable energy, being employed by over 85 jurisdictions around the world as of 2011 (Renewable Energy Policy Network for the 21st Century, 2011). Where they have been enacted, FITs have been very successful in spurring renewable energy development, and many have argued that they are the most effective renewable energy policy (Lesser & Su, 2008). By overcoming cost barriers for small-scale renewable energy producers, feed-in tariffs have led to broader participation and more distributed generation. FITs have helped make community-based projects possible by making ownership of renewable energy projects profitable and therefore attractive for local residents and communities (Warren & McFadyen, 2010). Some FITs have specifically aimed to encourage community-based energy projects, such as the case of the Ontario FIT, which offers additional price incentives and funding opportunities for community investments (Ontario Power Authority, 2010).

1.3. Nova Scotian Context

1.3.1. Wind Energy in Nova Scotia

As in many other jurisdictions around the world, Nova Scotia is making significant efforts to increase the deployment of renewable energy. In 2010, the Nova Scotia government formulated its Renewable Electricity Plan in order to increase the amount of electricity being generated from local, renewable sources (Nova Scotia Department of Energy, 2010). At that time, close to 80% of Nova Scotia's electricity was produced using imported coal, petroleum-coke, or fuel oil. With locally produced natural gas accounting for much of the remainder, this meant that close to 90% of electricity was generated from fossil fuels. Electricity generation is the province's single greatest contributor to greenhouse gas emissions, accounting for approximately 46% of emissions (Nova Scotia Department of Environment, 2009). Therefore, reducing the use of fossil fuel generated electricity is an integral step towards meeting the province's commitment to reduce greenhouse gas emissions to 10% below 1990 levels by 2020 (Nova Scotia Legislature, 2007). In addition to reducing greenhouse gas emissions, increasing renewable energy electricity generation in Nova Scotia will stimulate economic activity, create jobs, increase energy security, protect consumers from the upward-trending prices of imported fossil fuels, and reduce air pollution from burning coal (Nova Scotia Department of Energy, 2010). The Renewable Electricity Plan committed to law Nova Scotia's target to achieve 25% renewable electricity generation by 2015, and also set a goal of 40% renewable electricity by 2020 (Nova Scotia Department of Energy, 2010). Already, the province has made considerable progress towards these goals, generating 17.4% of electricity from renewable sources in 2011 as compared to 11.3% at the end of 2009 (Nova Scotia Department of Environment, 2012).

Wind power development has been growing in Nova Scotia in recent years, and wind is expected to play a central role in enabling the province to increase its renewable electricity generation. The 2010 Renewable Electricity Plan specifies that wind will make the largest contribution towards achieving the 2015 and 2020 renewable energy targets, with support from biomass and tidal generation (Nova Scotia Department of Energy, 2010). Between 2009 and 2011, wind energy's contribution to Nova Scotia's electricity generation increased from 3% to 7%, representing a rapid increase in wind energy development (Nova Scotia Department of Energy, 2012b; Nova Scotia Power, 2012a). As of 2012, the province has over 160 wind turbines with a total generating capacity of over 300 megawatts (MW) (Nova Scotia Department of Energy, 2012b). A large portion of the wind energy development in the province to date has been through commercial wind farms, owned either by Nova Scotia Power or independent power producers that are contracted to generate electricity for Nova Scotia Power (Nova Scotia Power, 2012b). The first large scale wind farm in the province was developed by FPL Energy at Pubnico Point in 2004, and since then, several other large wind farms have entered into operation, including Nuttby Mountain, Digby Neck, Dalhousie Mountain and Glen Dhu (Nova Scotia Power, 2012b).

1.3.2. Community Economic Development Investment Funds

However, a number of small-scale, locally-based wind projects have also arisen in Nova Scotia, largely through Community Economic Development Investment Funds (CEDIFs). As defined by the Nova Scotia Government, which administers the CEDIF program, a CEDIF is "a pool of capital, formed through the sale of shares to persons within a defined community, created to operate or invest in local business" (Nova Scotia Economic and Rural Development and Tourism, 2012). The program was created in 1999 to assist entrepreneurs in overcoming the initial financial barrier of starting a business and to encourage Nova Scotians to invest in local businesses. As an incentive to invest, investments are granted a 35% provincial income tax credit and are RRSP (registered retirement savings plan) approved, and shareholders have the opportunity to contribute to decision making surrounding the investment through electing the board of directors that manages the CEDIF. The CEDIF program has assisted a number of local producers to set up wind energy developments, with ten individual local wind developers creating over 25 CEDIFs since 2001 (Nova Scotia Economic and Rural Development and Tourism, 2012). A number of these CEDIF corporations have come together to form a network called Scotian Windfields, in order to assist each other in realizing their common goal of increasing renewable energy in the province (Scotian Windfields, n.d.).

Up until 2010, the way for wind developer CEDIFs to provide power to the provincial electricity grid was to respond to Requests for Proposals (RFPs) from Nova Scotia Power and to enter into competitive bidding processes with other wind energy developers (Nova Scotia Department of Energy, 2010). Often, smaller developers are at a disadvantage in competitions with large developers, since they are not able to produce electricity as economically (Nova Scotia Department of Energy, 2010). However, recognizing the potential value of small-scale, community-based renewable energy projects, in 2008, Nova Scotia Power issued an RFP specifically for smaller projects (Nova Scotia Power, 2010). This could perhaps be viewed as a forerunner of Nova Scotia's Community Feed-in Tariff Program.

1.3.3. Community Feed-in Tariff Program

In order to further promote the development of small-scale, locally-based renewable energy projects, the Nova Scotia Department of Energy has created a Community Feed-in Tariff (COMFIT) Program. The COMFIT was introduced in the 2010 Renewable Electricity Plan and began accepting applications in September, 2011 (Nova Scotia Department of Energy, 2012a). The COMFIT provides different tariff rates, based on the cost of production, for wind, tidal, combined heat and power biomass, and run-of-the-river hydro projects. Groups eligible to apply for the COMFIT are CEDIFs, cooperatives, Mi'kmaq band councils, municipalities or their subsidiaries, not-for-profit organizations, universities, and combined heat and power (CHP) biomass facilities. Approximately 100 MW of power, equivalent to the power used by 100,000 homes, are expected to be installed through the COMFIT, while a competitive bidding process will continue to be used to procure large-scale commercial projects (Nova Scotia Department of Energy, 2012a). The decision was made not to offer a feed-in-tariff for large-scale projects, in order to avoid causing a significant increase in electricity rates. Within its first year, there has been considerable interest in the program, with over 100 applications submitted and over 45 projects approved (Nova Scotia Department of Energy, 2012a). The Department of Energy launched a review of the COMFIT in September 2012 in order to evaluate how the program has been running so far and to inform its future development (Nova Scotia Department of Energy, 2012a).

The COMFIT was designed specifically with the intent of bringing the benefits of renewable energy projects to local Nova Scotian communities. While the COMFIT will result in slightly more expensive electricity being generated by small-scale producers, the Department of Energy judged that it would be valuable to encourage small-scale, local developments, since they would strengthen energy diversity and security through an increased geographical distribution of electricity generation, stimulate rural economic activity and job creation, and enhance public understanding and acceptance of renewable energy (Nova Scotia Department of Energy, 2010). Furthermore, an emphasis on “community” projects has been stressed. One of the guiding principles of the Renewable Electricity Plan was “maximizing community involvement and social benefits”, and the COMFIT was a central mechanism to achieve this. Furthermore, the Renewable Electricity Plan stated that “the purpose of limiting access [to the COMFIT] to community-based participants is to ensure that projects are rooted in the community and investment returns remain there” (Nova Scotia Department of Energy, 2010).

While a number of requirements were put in place to help ensure that COMFIT projects are in fact “community-based”, these restrictions do not guarantee that the people funding, planning, and profiting from the project are those who reside in the geographic area directly surrounding the project site. For example, a CEDIF, cooperative, or non-profit organization that is proposing a project must have at least 25 members who reside in the municipality where the project will be built (Nova Scotia Department of Energy, 2012a). However, these groups can build anywhere in the municipality, which means that the people living directly near the project site may not be involved in the project. In the case of a CEDIF or a cooperative, people residing near the proposed project site have, at least in principle, the opportunity to invest money in the project and receive a return on that investment if the project is successful. However, they may or may not have the means to invest or wish to invest, and yet they live in the geographic community that is proposed to host the project. Furthermore, municipalities can propose projects anywhere in their own municipality or in immediately adjacent municipalities, and universities and Mi'kmaq band councils can propose projects on land that may have no geographic relation to the locations where their members reside (Nova Scotia Department of Energy, 2012a). In other words, the program does not guarantee that the community of interest and community of locality coincide with each other. These different potential dynamics of ownership and control over projects may affect the extent to which the community residing in the geographic location of the project (community of locality) expresses support for it, perceives it as beneficial for their community, and perceives it as being their community's project.

1.4. Community Wind Energy Development Models and Local Support

In the literature, numerous studies have examined the impact that a wide variety of factors have on local support for wind energy projects. Based on this research, many academics have suggested that NIMBY is an insufficient explanation for opposition to wind energy, and that the process by which a project is developed is often as important as, or even more important than, the project's physical characteristics (Devine-Wright, 2005; Wolsink, 2007). In accordance with this idea, a variety of studies have supported the idea that a community approach to wind energy development can have a positive influence on local support for projects (Musall & Kuik, 2011; Schreuer & Weismeier-Sammer, 2010; Warren & McFadyen, 2010). However, considering that the label of "community" has been placed on a wide variety of wind energy projects, with different levels of local involvement in the project development process and different amounts of benefits accruing to the local community (Walker & Devine-Wright, 2008), it cannot be generalized that all "community" wind energy projects will generate higher levels of support. There are, however, various factors that are characteristic of some "community" projects that may have a positive influence on support. Studies have found that social influences (Jones & Eiser, 2009) and trust (Walker, Devine-Wright, Hunter, High, & Evans, 2010) influence perceptions of wind energy projects, and that negative perceptions among local people are a result of the feeling that the project is being imposed on them by large, private, outsider developers (McLaren Loring, 2007), all of which suggest that local project initiation may have a positive influence on support. Studies have also suggested that local participation in the development of the project (McLaren Loring, 2007) and the perceived fairness of the project planning process (Gross, 2007) have a positive influence on support. Furthermore, studies have found that local support is affected by whether or not people perceive that the community will benefit economically from the project (Cass, Walker, & Devine-Wright, 2010) and the fairness of the distribution of benefits and costs (Jobert, Laborgne, & Mimler, 2007).

However, several knowledge gaps remain to be addressed. First, the relative importance of local project initiation, local participation, and local economic benefits in influencing local support in the context of community wind energy projects has not been examined through comparing community projects developed through different models that have some but not all of these characteristics. Second, few studies have specifically examined what factors influence whether local people have a sense of 'community ownership' over a project, as opposed to simply supporting the project, and what a "community" project should entail from the perspective of local people. Third, little research has been conducted to examine how the opportunity for local people to invest in a project influences support and perceptions of fairness, both among investors and non-investors. Finally, to the author's knowledge, no research has been conducted to examine the perceptions of local people towards "community" wind energy projects in Nova Scotia. The culture surrounding wind energy may have differing influences on perceptions in Nova Scotia than in Europe where the majority of studies to date on community wind energy have been conducted. Several conditions that are unique to Nova Scotia, such as the availability of CEDIF investment opportunities and the COMFIT program, may also influence local perceptions in Nova Scotia.

1.5. The Research Study

1.5.1. Research Questions and Objectives

The present study explored perceptions of small-scale wind energy projects in Nova Scotia among local community members, with the objective of determining what factors have an influence on perceptions. In particular, the objective of the study was to determine the relative importance of local shareholding, local initiation, and local participation on perceptions. The study sought to answer the following research questions:

> Among those who reside in the local community surrounding small-scale wind energy projects in Nova Scotia, how are a) support for the project, b) a sense that the project is "the community's project", and c) perceptions of the project's benefits and negative impacts, influenced by the following three factors:
>
> 1. Whether or not the project is locally initiated and directed
> 2. The extent of local community participation in the project planning process
> 3. The presence or absence of an opportunity for local residents to make a personal financial investment in the project

To better understand local residents' perceptions of benefits and negative impacts of the projects, secondary research objectives explored general perceptions of benefits and negative impacts and perceptions surrounding the importance of investment opportunities. The research questions were:

1. What benefits and negative impacts of the three wind energy projects being studied do local residents most commonly perceive?

2. Do local residents agree that investment opportunities should be available to local residents?
3. What are the most common reasons for local residents choosing not to invest in wind energy projects?

1.5.2. Hypotheses

Based on the outcomes of previous research studies, the following hypotheses were developed:

> The hypothesis was that in the local community surrounding small-scale wind energy projects in Nova Scotia, the following three indicators of perception of the project: a) support for the project, b) a sense that the project is "the community's project", and c) perceptions of the project's benefits and negative impacts, are influenced by three factors as follows:
>
> 1. Positively by local project initiation and direction
> 2. Somewhat positively by the local community participating in the project planning process
> 3. Very positively by the opportunity for local residents to make a personal financial investment in the project

Furthermore, it was hypothesized that the greater the number of the factors (1), (2) and (3) present, the larger the overall positive influence on the indicators (a), (b) and (c) would be. Additionally, it was hypothesized that local project initiation and local investment would be particularly important in influencing a sense that the project is "the community's project".

Since the secondary research questions were more exploratory in nature, hypotheses pertaining to these questions were not developed prior to conducting the research.

1.5.3. Overview and Scope of Study

The research questions were addressed through an examination of three small-scale wind energy projects in Nova Scotia, which represent different development models: the Maryvale project, which was developed by an *outside* private developer that *did not* offer the opportunity to invest to local residents; the Spiddle Hill project, which was developed by a CEDIF based *within* the community that *did* offer the opportunity to invest to local residents; and the Watt Section project, which was developed by a CEDIF based *outside* of the immediate geographic community and that *did* offer the opportunity to invest to local residents. These projects enabled a comparison of local perceptions based on differences between the development models. While these projects were developed before the COMFIT program came into existence, the Spiddle Hill and Watt Section projects could have been eligible had the program been in existence since they were developed through CEDIFs. A questionnaire survey was sent to a sample of the population in each of the local communities in order to collect data about perceptions of the projects and the level of involvement of the community members in the project, both through participation and investment. Statistical analysis was used to compare local perceptions of the three projects and to determine which factors were the most significant predictors of perceptions of the projects. This enabled an exploration of how local perceptions of and support for wind energy projects are related to local project initiation, local participation, and local investment, in comparison to each other and in comparison to other potentially influencing factors.

The scope of the study was defined by a number of limitations. While there are a wide variety of project development models falling under the category of "community" wind energy that could have been explored, such as projects developed by a municipality or university, the scope of the study was limited to three projects, with the "community" projects developed through the CEDIF model. Furthermore, while it would have been ideal to study the perceptions of all community members, the survey was only sent to a sample of the population, and the relatively low response rate limited the ability to generalize the results to the entire populations. Additionally, while perceptions of wind energy projects may change over time, this study examined perceptions at one specific point in time. Moreover, there is the possibility that confounding variables not addressed in the study may have an influence on local perceptions, which means that the research revealed predictors of perceptions but could not make specific claims about causality.

1.5.4. Significance of Study

Understanding the factors that influence local perceptions of wind energy projects is important for those who would like to see an increased deployment of wind energy. Considering that strong local opposition can delay or even stop wind energy projects, the perceptions of local people are an important factor in the success of wind energy projects. Since it has been increasingly suggested that the way wind energy projects are developed has an important influence on local perceptions (Devine-Wright, 2005), gaining a better understanding of which development models are most effective in gaining the support of local people is valuable. In addition to the instrumental value of gaining support, it can be argued that there is also intrinsic value in developing wind energy in a way that is welcomed by the community rather than bringing discord to the community.

This study is particularly relevant at this time due to the provincial government's ambitious renewable energy targets and the recent introduction of the COMFIT program. While the high level of interest in the COMFIT program seems to suggest that wind energy development has been well received by most communities, there have been a number of COMFIT wind energy project proposals that have faced strong opposition by local residents (CBC News, 2012; Truro Daily News, 2012). This suggests that "community" wind energy projects do not automatically lead to community support, and that the nuances of "community" development models deserve closer examination. Since the COMFIT program is still very new and few of the projects specifically developed under COMFIT were constructed and in operation at the time of this study, projects that have characteristics similar to those that would qualify were chosen for this study.

In particular, insight into local perceptions surrounding the CEDIF model is useful since this has been the most common type of COMFIT project proposed to date, and yet projects proposed by CEDIFs do not necessarily originate within the local community. It is therefore useful in the context of the COMFIT program to understand whether having the opportunity to invest in a project through a CEDIF is enough to gain the support of local people and for them to feel that the project belongs to their community.

The results of the study may be useful to both policymakers and wind energy developers. Currently, the Nova Scotia Department of Energy is conducting a review of the COMFIT program (Nova Scotia Department of Energy, 2012a). They may find the results of the study useful as they decide what requirements to include for eligible projects and as they work with communities and developers that are proposing wind energy projects. Wind energy development groups in the province, including CEDIFs, may also find the results useful as they work to develop wind energy in a way that is acceptable to local communities. Policymakers and developers in other jurisdictions may similarly find the results useful to consider.

Chapter 2: Literature Review

The objective of the literature review was to describe and analyze the state of knowledge, based on a search of academic literature, on:

1) general factors influencing local public support for wind energy projects;

2) the influence of a community-based approach to wind energy development on local support for wind energy projects;

3) how and why both the development process and the outcomes of wind energy projects can influence local perceptions of those projects.

2.1. Perceptions of Wind Energy

Traditionally, studies have attempted to explain perceptions of wind energy based on the physical characteristics of developments. In a review of the international literature, Devine-Wright (2005) found that the majority of studies on perceptions of wind energy have examined four key areas: the degree to which the public supports wind energy, the impact of physical characteristics of a development (such as wind farm size and turbine colour) on public perceptions, the connection between physical proximity to a wind development and overall perceptions of wind energy, and changes in perceptions over time among those living near to wind developments. This research has revealed a number of interesting findings, such as that concerns about visual impact and noise are the most common reported reasons for negative perceptions towards wind developments, that small developments are generally more positively perceived than large developments, and that negative perceptions of wind developments often decrease with time (Devine-Wright, 2005). As noted in several review articles, a finding that has generated significant interest has been the presence of both consistently high levels of support for wind energy among the general public alongside frequent opposition to local developments (Devine-Wright, 2005; Wolsink, 2007). These reviews have noted that the most common explanation for this trend has been the "not in my backyard" (NIMBY) attitude, which suggests that people who may be generally in favour of wind energy oppose developments close to where they live (Devine-Wright, 2005; Wolsink, 2007).

However, a growing body of literature has begun to propose explanations for perceptions of wind energy that look deeper than physical attributes of wind developments and NIMBY explanations. A significant number of academics have suggested that NIMBY is too simplistic as an explanation for negative local perceptions of wind developments (Devine-Wright, 2005; Jones & Eiser, 2009; Warren & McFadyen, 2010; Wolsink, 2007). The literature has demonstrated little empirical support for the NIMBY attitude, and in contrast, there has been some empirical research showing that those opposed to wind energy developments in their own locality are often opposed to wind energy development everywhere (Devine-Wright, 2005). For example, a study in England by Jones and Eiser (2009) found that a person's general attitude towards wind energy was a strong predictor of a person's attitude toward proposed wind projects, among both people living in towns near the projects and people living in comparable towns not near the projects. Reviews of the literature have identified a variety of other factors that can influence perceptions of a particular wind energy development, including social influences, perceived fairness, trust, and perceived benefits and costs (Devine-Wright, 2005; Huijts, Molin, & Steg, 2012; Schreuer & Weismeier-Sammer, 2010; Wolsink, 2007). As Devine-Wright (2005) notes, public perceptions can be influenced by " 'how' wind farms are developed as much as 'what' is developed" (p. 127).

Based on a review of psychological theory and empirical research on support for renewable energy, Huijts, Molin, & Steg (2012) proposed a complex framework integrating the various psychological influences on acceptance of renewable energy (RE) technologies, that is, behavior in favour of and not in opposition to RE technologies (Figure 1). Based on three behavioural motives and three relevant psychological theories, the framework suggests that acceptance of RE technologies is influenced by: perceptions of costs, benefits and risks of the technology (gain motives and planned behaviour theory); moral evaluations of the technology (normative motives and norm activation theory), and how one feels about the technology (hedonic motives and affect theories) (Huijts, Molin, & Steg, 2012). Additionally, the influences of trust, fairness, and knowledge of and experience with the technology are included in the framework (Huijts, Molin, & Steg, 2012). A multi-dimensional framework such as this appears to provide a much more enriched explanation for public acceptance of or opposition to wind energy developments than does a simple NIMBY explanation. The present study, focusing specifically on attitudes towards wind energy as opposed to acceptance behavior, will address many of the factors identified in this model as influences on attitude (fairness, trust, affect, and perceived costs and benefits) in order to strengthen the understanding of attitudes towards community wind energy.

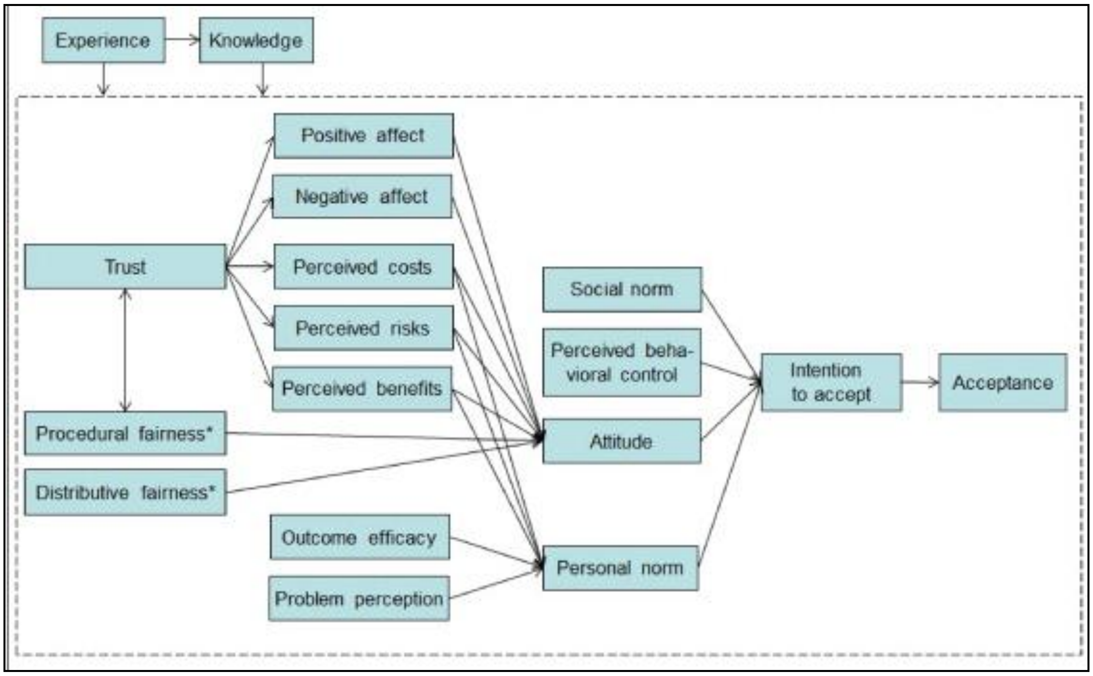

Figure 1 Model of potential psychological influences on acceptance of renewable energy, illustrating the complex nature of public perceptions. From Huijts, Molin & Steg (2012).

2.2. A Community Approach and Support for Wind Energy

Due to a growing awareness of the importance of not only the physical aspects of wind energy developments but also how the project is developed, the literature has increasingly drawn the connection between community wind energy and higher levels of local support for developments. In a review of the literature from mostly Western Europe, Schreuer & Weismeier-Sammer (2010) identified a considerable number of studies that support the idea that a community-based approach to wind energy development has a positive influence on local acceptance of projects. Similarly, a study in Quebec analyzed the influence of the development model of wind energy projects on social acceptance, through an analysis of newspaper articles and a series of interviews (Jegen & Audet, 2011). The researchers concluded that those in Quebec who oppose large-scale, private wind energy developments are generally not outright opposed to wind energy, but rather believe that wind energy should be developed on a small-scale by community cooperatives, community partnerships, or municipalities, or by private companies in a way that most of the profits remain within the local community. Based upon findings such as these, it has in turn been argued that proposed community-based projects will be more successful in actually being approved and built, that community projects will increase overall public support for renewable energy, and therefore that a community-based approach will increase the deployment of renewable energy (Bolinger, 2005; Hain, Ault, Galloway, Cruden, & McDonald, 2005; Toke, Breukers, & Wolsink, 2008). In examining the literature, a number of academics have noted that there are various potential reasons for the positive influence of community-based and/or community-owned wind on public support, including: community projects tend to be smaller in scale, local people are more likely to economically benefit from the project, the local community can be involved in the decision-making process and have more control over the project, and the community will not feel that they are being intruded on by outsiders and large developers (Barry & Chapman, 2009; Bolinger, 2001).

Both observations of international trends and a number of empirical case studies have supported the idea that community wind has a positive influence on public acceptance of wind energy. Throughout the literature, frequently cited evidence for this idea is the fact that there are high levels of community involvement in and ownership of wind energy projects in countries where wind energy has become widespread, such as Germany and Denmark, while in countries where wind energy has faced a high degree of opposition and has been much slower to develop, such as the UK, a community approach has not often been taken (Bolinger, 2005; Hinshelwood & Tawe, 2000; Toke, Breukers, & Wolsink, 2008).

A number of case studies have examined perceptions of already existing wind projects. In a questionnaire-based study in Scotland, there was a higher level of local support for a small wind energy project that the community initiated and raised funds for than for a number of larger wind projects that were initiated and owned by an outside developer in a nearby community, although the difference was a matter of the degree of support as opposed to a difference between complete support and complete opposition (Warren & McFadyen, 2010). A similar study in Germany compared perceptions of local residents towards two physically similar wind projects, which differed in the fact that one project was co-owned among a local developer, a local foundation, and a local club, with a portion of the profits specified as going towards reducing fees for kindergarten registration in the community, while the other project had little local involvement or benefit, as it was owned by individual shareholders, only two of whom were from the local community (Musall & Kuik, 2011). The study found a higher level of positive perceptions for the first project that was co-owned by the community groups than for the second project. While these studies showed higher support for projects where the ownership model included ownership or partial ownership by a community organization, they did not examine the influence of community ownership on support in terms of shareholding by individual community members. Furthermore, to the author's knowledge, no studies examining local perceptions towards "community" wind energy projects have been conducted in Nova Scotia, where a more widespread interest in wind energy development in general and "community" wind energy in particular are still fairly new, and where the culture surrounding wind energy could be very different from the European countries where the previously mentioned studies were conducted.

Despite evidence of the positive influence of "community-based" wind energy projects on public perceptions, it cannot be generalized that all "community-based" wind energy projects will be successful and will generate high levels of public support. Examples of problematic community wind projects include a wind project in the UK proposed by a local charity that was unable to gain approval by the local authority (Walker, 2008), and another wind project in the UK initiated and owned by three local farmers that led to dissatisfaction and conflict within parts of the community (Walker, Devine-Wright, Hunter, High, & Evans, 2010). As noted in Chapter 1, the label of "community" has been applied to a wide variety of wind energy projects, with different forms of ownership, direction, and community involvement. Consequently, the potential for "community" projects to have a positive influence on local support and to be more beneficial than projects that do not fall under this label can be quite different for different models of "community" projects.

This has led some to ask what community renewable energy (CRE) "should" mean (Walker & Devine-Wright, 2008). Through interviews of a variety of policy makers, administrators, activists, project participants, and local residents, Walker and Devine-Wright (2008) identified two dimensions characterizing renewable energy projects: the process dimension, which includes who develops and influences the project; and the outcome dimension, which includes who benefits economically and socially from the project (Figure 2). In answering the question of what CRE "should" mean, some interviewees placed a high value on the involvement of local people in planning CRE projects (process dimension, section A in Figure 2), while others contended that CRE projects could be set up by institutions as long as the community received benefits from the project (outcome dimension, section B in Figure 2). However, while noting that a flexible interpretation allows for a wider variety of projects (section C in Figure 2), Walker and Devine-Wright (2008) argued that there is value in striving towards the concept of an "ideal" CRE project (intersection of sections A and B in Figure 2) "which is entirely driven and carried through by a group of local people and which brings collective benefits to the local community ... both by and for local people" (p. 498). Clearly not all "community" wind projects fit this ideal model, and therefore, where the project fits along the process and outcome dimensions will lead to different impacts on public perceptions. In Nova Scotia, where some "community-based" wind energy projects have faced opposition while others have been enthusiastically welcomed, research has not yet examined which aspects of community wind energy are most significant in influencing levels of local support. Based on research in other jurisdictions, the following sections will explore more closely how various characteristics of a project's "process" and "outcome" can influence public perceptions, and how these characteristics might be facilitated through a community approach to wind energy development.

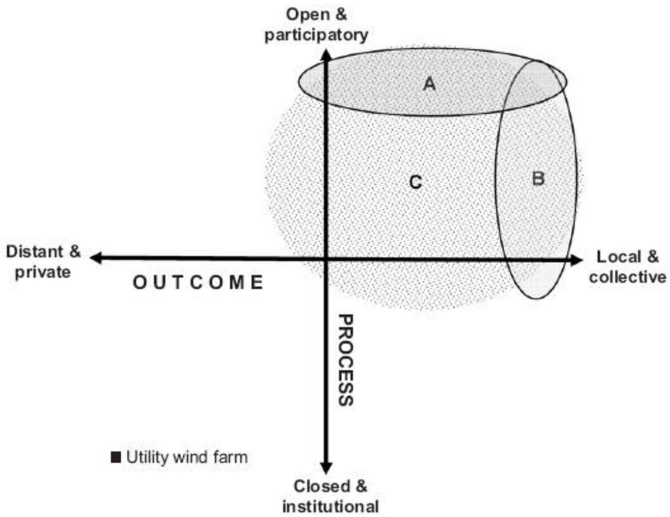

Figure 2 The process and outcome dimensions of renewable energy projects, and the potential interpretations of community renewable energy within those dimensions. Section A represents an interpretation valuing the process dimension, in that a community project should have local people involved in planning and running the project. Section B represents an interpretation valuing the outcome dimension, in that a community project should deliver benefits to local people. Section C represents a broader interpretation, in that the requirements of a community project were less specific as long as the project involved at least a degree of local involvement and/or benefits. Walker and Devine-Wright (2008) argue that the 'ideal' community project is the intersection between Section A and Section B, in that the project is driven by local people *and* local people benefit from the project. From Walker & Devine-Wright (2008).

2.3. The Process Dimension of Wind Energy Projects

2.3.1. Social Influences, Trust, and Project Leadership

Several studies have suggested the importance of social influences on perceptions of wind energy projects. A study of perceptions of wind energy in the UK found that the attitudes towards a proposed wind project held by a person's friends were the most significant predictor of that person's own perceptions of the project, suggesting the socially constructed nature of perceptions (Devine-Wright, 2003 cited in Devine-Wright, 2005). Another survey-based study in England found a significant correlation between each respondent's perceptions of the general opinion within the community regarding a wind project and that respondent's own attitudes towards the project (Jones & Eiser, 2009). Furthermore, in a study in Japan comparing people who had invested in a wind energy project to people who had inquired about the investment opportunity but had not chosen to invest, a significantly higher percentage of investors had heard about the investment opportunity from people they knew as opposed to from advertisements (Maruyama, Nishikido, & Iida, 2007). The authors suggested that personal connections to others interested in investing may have helped influence people's willingness to invest. Perhaps the role of social influences can be understood in light of the inclusion of positive and negative affect in Huijts, Molin, and Steg's (2012) model of RE technology acceptance, since social influences may help generate positive feelings toward wind energy developments.

The literature has also indicated that trust has an important influence on perceptions of wind energy projects. In their review article, Huijts, Molin, and Steg (2012) found that trust in those responsible for RE technologies was correlated with support for the technology, particularly among those who are unfamiliar with a technology; trust was therefore included as an influence on attitude in their model of RE technology acceptance. Several studies have examined the role of trust specifically in the case of wind energy projects. These studies similarly found that trust in the people or organizations developing a project was positively correlated with attitudes toward the project (Jones & Eiser, 2009; Walker, Devine-Wright, Hunter, High, & Evans, 2010).

The role of social influence and trust is reflected in the literature's discussion surrounding the impact of "who" develops wind energy projects. Studies in Western Europe have indicated that local communities have often negatively perceived projects proposed by large-scale private developers, since the developers are frequently viewed as "outsiders" and the community feels that they are being invaded upon (Jobert, Laborgne, & Mimler, 2007; McLaren Loring, 2007; Toke, 2005b). In contrast, it has been suggested that local supporters or project initiators, such as farmers setting up turbines on their land, can generate further local support much more easily than outsider developers since local people can reach out to their social networks within the community (Jobert, Laborgne, & Mimler, 2007; Toke, Breukers, & Wolsink, 2008). Hinshelwood (2000) has similarly suggested that who people hear about a project from will influence their perceptions, and therefore that community direction of a project can be important. Furthermore, several authors have suggested that outside developers can be mistrusted by local communities, especially if they do not make adequate efforts to consult the community (Jobert, Laborgne, & Mimler, 2007; Toke, Breukers, & Wolsink, 2008). Meanwhile, empirical research in the UK has found that initiation of projects within a community contributes to higher levels of trust in many cases (Walker, Devine-Wright, Hunter, High, & Evans, 2010). However, studies have not considered the extent to which local communities trust a type of developer that has become increasingly common in recent years in Nova Scotia – the CEDIF, which is a small-scale developer and local in the sense of being based within the province, but in most cases is not rooted in the local community. Research could clarify whether local communities are trusting of CEDIFs as small, Nova Scotian corporations, or if they are distrusted in the same way that large, outside developers often are.

The findings related to trust and local initiation appear to be consistent with the psychological theory of social identity. In a discussion of the literature on social identity, Hogg and Reid (2006) explain that the social identity perspective is the idea that individuals construct a part of their identity based on the groups to which they belong. As a result, people will often internalize group norms, and in doing so their beliefs, attitudes, and behaviours will shift to conform to those shared by the group (Hogg & Reid, 2006). The theory makes an important distinction between the 'in-group' with which an individual identifies, and the 'out-group' with which an individual does not identify. The theory suggests that there is a tendency of polarization, in which the group will make a decision that is more extreme than if the decision had been made by the average individual group member alone. If there is an 'out-group' involved, the 'in-group' decision will tend to be more extreme in the direction *opposite* of what the 'out-group' would want (Hogg & Reid, 2006). Therefore, assuming that most individuals feel at least some degree of belonging to the community in which they reside, social identity theory would predict that initiation of a wind energy project from within a community would have a positive influence on the perceptions of other community members, in that existing positive attitudes towards wind energy would be amplified. On the other hand, if a developer from outside the local community is perceived negatively as part of an ‘out-group’, existing negative perceptions of wind energy within the community may be over-emphasized in opposition to the outside developer.

The importance of community social identity is suggested by Warren and McFadyen’s (2010) observation of a strong sense of community ownership and pride in a wind energy project initiated from within the community, which was evident by the fact that the community had named the turbines “the Three Dancing Ladies”, with each individual turbine respectively named Faith, Hope and Charity (p. 209). In contrast, there was a sense of disconnection observed towards wind projects initiated by an outsider developer in a nearby community, with those in opposition referring to the turbines as “ ‘rape’ or ‘desecration’ of the landscape” (Warren & McFadyen, 2010, p. 209). It appears that if the wind project can be rooted in the community’s group identity and network of social trust, it will be perceived more positively by the community members.

However, it should be noted that while the importance of social networks and trust suggests that projects started within the community may have an advantage in gaining local support as compared to projects initiated by outside developers, this may not always be the case. One study of a small-scale renewable energy project in England found that while local people expressed overall support for the project, they had less interest in taking an active leadership role in realizing the project, which the researchers suggested meant that local people would have accepted direction of the project by an outside developer (Rogers, Simmons, Convery, & Weatherall, 2008). Additionally, Walker et al. (2010) found that while generally contributing to local trust, community project direction is not a guarantee of local trust, based on a project in their study in which the owners of a locally-initiated project became distrusted when they were perceived as receiving disproportionate benefits and turning the “community” wind project into a profiting business (discussed further in Section 2.4). Further research could better highlight what models of local project initiation and management are best able to generate trust and a psychological sense of “community ownership”, in terms of whether projects initiated by local cooperatives, charities, authorities, businesses, etc. can all be similarly perceived by local people as “community” projects. In particular, in Nova Scotia where CEDIFs, a form of local business, have been the most common form of "community" projects, there is little understanding of whether local people truly feel a sense of "community ownership" over the project. Additionally, research could clarify how important local initiation and management are relative to other factors that influence local support, and whether an outside developer who works closely with a community could achieve a comparable sense of "community ownership" in cases where a community may not have the drive or ability to lead a project on its own.

2.3.2. Local Participation and Procedural Fairness

The literature suggests that the ability of local people to participate in the planning and decision making surrounding a wind energy project has an important influence on local perceptions of and support for the project. In an examination of three wind project proposals in the UK, Devine-Wright et al. (2001) found that in the case where the developer made a significant effort to engage the local people in the planning process and gave them different options to choose from, there were higher levels of acceptance of the project. Similarly, another study comparing a number of wind energy projects in France and Germany found high levels of support for a project where there had been high levels of public consultation, whereas in another community, a wind turbine had been built without public consultation, which had led to negative community perceptions of the project and local resistance towards further turbines being put up (Jobert, Laborgne, & Mimler, 2007). A study examining eighteen wind energy projects from the UK and Denmark found a positive correlation between levels of participation and levels of support, but noted three outlier cases in which there were low levels of participation but still high levels of support (McLaren Loring, 2007). The researchers concluded that participation contributes to positive perceptions, but is not necessarily required to generate support in all cases (McLaren Loring, 2007). Other studies have similarly suggested a positive influence of local involvement in the planning process in generating support for wind energy projects (Breukers & Wolsink, 2007; Toke, 2005b). Furthermore, Breukers & Wolsink (2007) suggest that while it may be difficult to influence the opinions of those who are fundamentally opposed to wind power, the acceptance of those who are undecided may be gained through involvement in the planning process.

The significance of local participation can be viewed as closely connected with aspects of fairness. While local participation may help ensure that the project outcome is fair (see Section 2.4), the literature suggests that a fair consultation and planning process is valuable in and of itself. In their review of the literature, Huijts, Molin, and Steg (2012) found that procedural fairness, or having the opportunity to have one's opinion heard, has an influence on attitudes towards RE technologies. A case study of an Australian wind project found that a local community had become divided by what was perceived by many as an unfair consultation process, in particular by those who did not support the project (Gross, 2007). The researcher concluded that local people placed a high importance on procedural justice, which would mean that local people were given adequate opportunities to participate and express their opinions, were provided with the appropriate information, and were treated with respect, and that decision-making was not biased (Gross, 2007). Alluding to the importance of procedural fairness, others have suggested that participation will help give local people a better sense of control over project planning (Devine-Wright, McAlpine, & Batley-White, 2001) and will better ensure that diverse local interests are considered (Breukers & Wolsink, 2007). Similarly, Wolsink (2007) argues that top-down decision-making and unfair consultation can lead to local hostility towards a project, which could be counter-acted by fair consultation procedures that give local people a choice about development.

As mentioned previously, the literature has suggested that one of the reasons a community approach to wind energy is valuable is that it tends to enable local people to better participate in the planning of the project (Barry & Chapman, 2009; Bolinger, 2001). However, as also previously discussed, there are examples of cases in which projects initiated by local people did not satisfactorily involve the entire community in the project (Walker et al., 2010), and also cases in which outside developers were able to satisfactorily engage the local community in the project planning (McLaren Loring, 2007). Little research on community wind energy projects has specifically examined the *relative* importance of community participation in comparison to other aspects of community projects. Therefore, further research could confirm whether adequate local participation is more crucial to achieving community support than the project actually being initiated, managed, and owned by local people, and thus whether meaningful community participation is sufficient to create a sense of "community ownership" in the absence of local investment or local project initiation.

2.4. The Outcome Dimension of Wind Energy Projects

2.4.1 Benefits, Costs, and Distributive Fairness

According to the literature, the perceived benefits and costs of a wind project are an important factor influencing local support. As mentioned above, in the model proposed by Huijts, Molin, and Steg (2012) , acceptance of RE technologies is influenced by gain motives, that is, the evaluation of costs, benefits, and risks. This has been supported by evidence from several studies. In a study of 51 wind energy projects in England and Wales, the economic significance that communities placed on the project, such as whether it would create jobs or have either a positive or negative impact on tourism, was a major factor in determining whether or not local objections arose (Toke, 2005b). Another UK study involved a questionnaire survey of local people in ten communities where renewable technologies had been either proposed, approved, or rejected (Cass, Walker, & Devine-Wright, 2010). There was a strong correlation between local support for the project and the perceived balance of benefits and costs to both the individual being surveyed and to the community. In fact, the perceived benefits and costs were the strongest predictor of support, above perceptions regarding the technology sector, the fairness of the consultation process, and trust towards the developer. Interestingly, there was a very high correlation between perceived benefits and costs for the individual being surveyed and perceived benefits and costs for the community, which suggests that people perceive personal and community impacts as very similar (Cass, Walker, & Devine-Wright, 2010). A further study in the UK examining perceptions of a proposed wind project found that the perception of whether or not the project would bring economic benefits to the community was a significant predictor of attitude towards the project, having a similar influence on attitudes towards the project as did a person's overall general attitudes towards wind energy (Jones & Eiser, 2009). Moreover, a mail-out survey study in the United States examining public perceptions of large-scale wind energy developments in Iowa and Texas found that there were high levels of support for wind energy based on the perception that the developments had brought jobs and economic revival to the area, while aesthetic or environmental aspects of the developments played much less of a role in the level of support among respondents (Slattery et al., 2012). Being conducted in Europe and the United States, however, these studies do not necessarily provide insight into what economic significance Nova Scotians may place on wind energy development and in turn how this may influence their level of support for projects.

Additionally, the literature suggests that perceptions of a project are influenced not only by the perceived absolute benefits and costs, but also the perceived fairness of the distribution of benefits and costs. In their review of the literature, Huijts, Molin, and Steg (2012) found distributive fairness of costs, benefits, and risks to have an impact on attitudes towards RE technologies. Based on secondary research, Wolsink (2007) argued that local opposition to wind farms can be better explained by concerns about fairness and equity as opposed to selfish 'backyard' motives. In other words, people will be opposed to a wind farm if they feel that others are forcing them to accept an unfair degree of costs (Wolsink, 2007). Similarly, a series of case studies in the UK and Denmark found that local opposition often arises as a result of the perception among local people that an external company will be benefiting, while the local community will receive the burdens of the turbine but no benefits (McLaren Loring, 2007). The importance of distribution of external and local costs and benefits has also been suggested in a number of other studies (Agterbosch, Meertens, & Vermeulen, 2009; Ashworth, 2012). In Nova Scotia, the CEDIF development model provides an interesting case in that local residents theoretically have the opportunity to invest in a project and therefore to benefit financially, but in some cases local residents may choose not to invest or may be unable to invest. This could result in unequal distribution of benefits if the shareholders end up being mostly from outside of the community. Yet research has not specifically examined whether or not local people view this situation as fair, since they did have the opportunity to invest, and therefore it remains to be determined whether the opportunity to invest, investment itself, or neither is an important factor in generating perceptions of fairness and in turn local support.

Furthermore, the literature suggests that the distribution of costs and benefits is important not only between external local interests, but also between members within the local community. Communities have become divided and angered when landowners receive profits from developers building wind turbines on their land, while the rest of the community has to deal with the negative visual impacts (Gross, 2007; Jobert, Laborgne, & Mimler, 2007). In one case study in the UK, even a project developed from within the community by a group of local farmers caused conflict within the community after the farmers proposed to expand the number of turbines and local people became resentful that this “community” project was turning into a business operation that only the group of farmers was benefiting from (Walker, Devine-Wright, Hunter, High, & Evans, 2010). On the other hand, in several case studies where projects were built on communal land or by a local community organization, the dominant perception was that everyone in the community would benefit and positive perceptions of the projects were much higher (McLaren Loring, 2007; Walker, Devine-Wright, Hunter, High, & Evans, 2010). One area that does not appear to have been closely studied is how perceptions of distributive fairness within a community are affected by local shareholding. Further research could better illuminate how those who chose not to or are unable to buy shares in a wind project in their community, yet are aware that shareholders in their community stand to benefit from the project, perceive the fairness of the distribution of benefits.

2.4.2. Local Ownership, Shareholding, and Community Benefits

Considering the apparent connection between local support and perceptions of costs and benefits, the literature has explored the potential of local ownership or shareholding to increase project support. Several academics have argued, based on the importance observed of economic considerations and the experience of community ownership in Denmark and Germany, that offering local people the opportunity to hold shares in a project or giving the local community some form of financial stake in the project would help increase local support (Bolinger, 2001; Hain, Ault, Galloway, Cruden, & McDonald, 2005; Toke, 2005b; Warren & McFadyen, 2010). A connection between positive perceptions of wind energy and shareholding was found in a Danish study, in which shareholders expressed significantly higher levels of positivity towards wind energy in general and towards the development of more turbines in their area than non-shareholders (Andersen et al., 1997, cited in Devine-Wright, 2005). However, Devine-Wright (2005) notes that this study did not establish a causal relationship between shareholding and positive perceptions of wind energy, and therefore, that systematic empirical studies are needed that compare perceptions in situations where shareholding was and was not available. In another study based on qualitative interviews with stakeholders in several wind projects in France and Germany, the opportunity to own shares in two of a large wind farm's turbines appeared to be well received by the community (Jobert, Laborgne, & Mimler, 2007). The researchers suggested that the high levels of support for this project in comparison to another project where shares had not been offered indicates that shareholding may have a positive contribution towards project support. However, the study did not statistically evaluate the influence of shareholding on perceptions to determine the role of shareholding in relation to the potential influence of other factors.

Recognizing the potential benefits of economic incentives on local support, many wind energy developers in the UK are now starting to offer financial 'community benefits', such as providing funds for community use or offering partial community ownership (Cass, Walker, & Devine-Wright, 2010; Toke, 2005a; Walker, 2008). Studies in the UK have shown mixed results in how local people have responded to such provision of community benefits by developers. One study found that those who were in favour of a proposed wind project in their community were most likely to view the opportunity to invest in the wind project, reduced electricity rates, and a community trust fund set up by the developer as attractive benefits for the community (Jones & Eiser, 2009). The authors noted that while this shows a relationship between financial incentives and project support, it also indicates that all opponents of a project cannot necessarily be turned into supporters simply by offering financial incentives (Jones & Eiser, 2009). Similarly, secondary research on a large number of projects found that in cases where developers offered funds to communities, these financial incentives had an overall positive impact on support for those projects, but that some local people interpreted them as bribery (Toke, 2005b). In a case study in another community, half of the community agreed that a benefits package offered by the developer was 'a bribe to silence local opposition' (Cass, Walker, & Devine-Wright, 2010). Furthermore, the study found that perceptions of the benefits package as bribery were correlated with low support for the project, while perceptions of the benefits packages as being fair rather than bribes were correlated with high support for the project (Cass, Walker, & Devine-Wright, 2010). Across the entire study, which examined ten communities, the researchers found an overwhelming sense of scepticism towards the existence of 'community benefits', yet local people did feel that the community should be provided with some portion of the benefits (Cass, Walker, & Devine-Wright, 2010). Interestingly, the 'community benefits' offered by developers in these case studies included community funds, local employment, and other benefits for the entire community. The research did not examine situations in which community members were offered the opportunity to buy shares in the project, and thus receive direct, personal benefits. Since shareholding is currently being offered as a 'community benefit' by CEDIFs in Nova Scotia, research could reveal whether or not shareholding is perceived more favorably than other forms of 'community benefits'.

A psychological theory that may offer an explanation for the relationship between shareholding or other economic benefits and positive perceptions of wind energy projects is Festinger's theory of cognitive dissonance. Cognitive dissonance occurs when a person knows or believes a number of pieces of information that are inconsistent with each other (Festinger, 1962). Festinger (1962) suggests that in this situation, a person would be motivated to change his opinion, change her behaviour, distort his perception, or do something either consciously or subconsciously to resolve the dissonance. In the case of attitudes towards wind energy projects, this would suggest that if a person has a positive attitude towards wind energy in general, he would be likely to perceive a local wind energy project as beneficial, whereas if she has a negative attitude towards wind energy in general, she would be likely to perceive a local wind energy project as having negative impacts. The reverse direction of the relationship would also be likely to hold. If a person is economically benefiting from a local wind energy project, or if her next-door neighbour who she admires and respects is benefiting from the project as a shareholder, that person may shift her opinion to be more positive towards the wind energy project. Therefore, providing local shareholding or local economic benefits may have the potential to shift community opinions in favour of wind energy projects, according to the theory of cognitive dissonance.

Several other important points about community ownership and benefits have been made in the literature. Walker (2008) pointed out that different forms of community ownership have different implications in terms of distributive fairness within the community, since offering shares only benefits those who are financially able and willing to purchase shares, whereas the entire community could theoretically benefit more equally when a local organization or charity has full or partial ownership of the project. As mentioned in the previous section, further research would be needed to empirically examine whether investors and non-investors have different evaluations of the fairness of shareholding, and how this in turn influences their perceptions of wind projects. Additionally, Toke (2005a) argues that while positive impacts can result from developers offering local people the opportunity to buy shares in a wind project, the positive impacts are not necessarily as strong as when the project is initiated by the local people. Discussion in the previous section regarding the value of local project initiation seems to support this claim. However, further research on the impact of shareholding in situations where projects were initiated by local people and in situations where projects were initiated by outside developers would better clarify the relative influence of shareholding and local initiation.

2.5. Knowledge Gaps

Evidently, there has been a considerable amount of research into the influence that various factors can have on local support for wind energy projects, as well as research into the role that a community-based approach to wind energy can have in generating local support. However, it is also clear that there is no simple, clear-cut formula for generating high levels of support among all local people. Several important aspects of community renewable energy, acting through various psychological influences, have been suggested to influence local support (Table 1).

Table 1 Aspects of community renewable energy, how they are manifested, and why they may influence support.

(Incorporating ideas from Walker & Devine-Wright (2008), Huijts, Molin & Steg (2012), and other research explored in the literature review.)

Aspect of community renewable energy	How it could be manifested in the community	Psychological influence on support
	Process Dimension	
Local initiation	• Social influences • Opinions of friends • Perceptions that the rest of the community supports the project	• Positive affect/emotions • Trust • Development by someone from the community's 'in-group' as opposed to an 'out-group'
Local participation	• Meaningful local consultation • Opportunities for locals to voice opinions • Local involvement in planning the project	• Procedural fairness • Reduced negative affect if the project is not perceived as being imposed on the community
	Outcome Dimension	
Community ownership/ local economic benefits	• Opportunity to own shares • Local employment • A community benefit fund	• Distributive fairness • Positive evaluation of balance between benefits and costs

Despite the research that has been conducted on this subject, a variety of knowledge gaps remain. First, the relative importance of the different aspects of community renewable energy, identified for the purposes of this study as local initiation, local participation, and local ownership, has not been closely examined. Studies have compared community projects that more or less exhibit all three of these characteristics to projects exhibiting none of these characteristics, and have found higher support for the former (Musall & Kuik, 2011; Warren & McFadyen, 2010). Yet these studies did not isolate which of these aspects was/were most important in generating higher support, which can be done by comparing projects where all of these aspects were present to projects where only some of these aspects were present, or by statistically analyzing the factors that played the largest role in determining the level of support of individual community members. Furthermore, they did not use multivariate statistical analysis to explore potential extraneous influences on levels of support. While a number of studies (Cass, Walker, & Devine-Wright, 2010; Jones & Eiser, 2009) have identified perceptions of economic benefits as a significant, and even the most significant, predictor of support in comparison to other factors, these studies did not specifically examine projects that had been initiated by the local community. Therefore, further research would be needed to determine whether economic benefits are in fact more important predictors of support than local initiation, and in turn whether they can be seen as a substitute for local initiation and participation; as well as to determine the relative influence of local initiation and local participation, and whether meaningful local engagement can generate the same positive impact as local project initiation.

Furthermore, research has tended to focus on local support for projects rather than a psychological sense of "community ownership" of a project. It is possible that psychological ownership may have important intrinsic value in the community above and beyond simple support for the project, such as increasing a sense of community belonging or satisfaction in helping the environment. Therefore, determining what factors are most important in generating a sense among local people that the project is in fact a "community" project can be considered a second major area that could be studied further. While the label of “community” has been placed on a wide variety of renewable energy projects, and some research has asked what “community” renewable energy should mean (Walker & Devine-Wright, 2008), little research has specifically sought to understand how local people evaluate projects in their area as “community” projects or not.

A third significant knowledge gap is the role that shareholding plays in community perceptions of wind energy projects. Previous studies have examined the influence on perceptions of ownership by community organizations (Musall & Kuik, 2011; Warren & McFadyen, 2010), or provision of economic benefits by developer companies through employment or community funds (Cass, Walker, & Devine-Wright, 2010). While Andersen et al. (1997, cited in Devine-Wright, 2005) found a positive connection between shareholding and support for wind energy within a community, Devine-Wright (2005) noted that there is a need to compare cases in which shareholding was and was not available. Studies that have compared such cases have tended to qualitatively examine the potential influence of shareholding rather than statistically examining the influence of shareholding in relation to other factors (Jobert, Laborgne, & Mimler, 2007). Furthermore, research has not examined the influence of the opportunity for local community members to invest in a wind project through shareholding in comparison to actual investment. Therefore, it is unclear how the fairness of shareholding would be perceived among those who chose not to invest or are unable to invest in situations where the opportunity to invest is available, both in situations where investors are mostly within or mostly from outside of the local community. Research could better explore how the various dynamics of shareholding may influence community perceptions and in turn support for wind energy projects. Additionally, research could reveal whether other potential benefits, such as local jobs, are more valued than shareholding, and whether people would prefer a community fund that benefits the entire community over shareholding that benefits only investors.

A fourth significant knowledge gap is the lack of research into local community perceptions of wind energy projects in Nova Scotia. The majority of the studies examined in this literature review were from Western Europe, which in general has a longer tradition of wind energy development than Nova Scotia and may have a different culture surrounding wind energy. In light of the growing interest in wind energy development in Nova Scotia in recent years, and particularly in community wind energy development with the initiation of the COMFIT program, research into the perceptions of Nova Scotians surrounding wind energy development is warranted. Furthermore, the prominence of Nova Scotia's CEDIF model as a form of community wind energy development is a unique case that cannot be fully understood based on studies from other jurisdictions. While other studies have shown that projects imposed by largescale outside developers can often be negatively perceived (Jobert, Laborgne, & Mimler, 2007), it is not clear whether a project initiated by a CEDIF from outside the community yet within the province will be perceived in a similarly negative manner. Additionally, since even a CEDIF initiated within a local community is a business and not a non-profit community group, it is unclear whether local people will trust the developer and perceive the benefits as accruing to the community as a whole. Since the COMFIT program aims to promote wind energy projects that are truly "community" projects, in which the local people have a sense of involvement and ownership, research into the sense of community ownership surrounding CEDIF projects is a knowledge gap that would be useful to explore.

In summary, there are knowledge gaps in previous research relating to the relative influence of different aspects of community ownership on local support for wind energy projects, the meaning of a "community" project from the perspective of local people, the impact of different dynamics of shareholding on local perceptions of projects, and local perceptions of wind energy specifically in Nova Scotia and in relation to the CEDIF development model.

Chapter 3: Methods

The research methods consisted of an analysis of local perceptions of three small-scale wind energy projects in Nova Scotia. A mail-out survey of residents in the areas surrounding each of the three projects was used to collect data on local perceptions of and involvement in the projects. Statistical analysis was used to explore the relationship between the way wind energy projects are developed and local perceptions of those projects.

3.1. The Three Wind Energy Projects

The three wind energy projects in Nova Scotia chosen for the study were: the Maryvale wind project, the Spiddle Hill wind project, and the Watt Section wind project (Table 2; Figure 3). The Maryvale wind project is located near the small community of Maryvale (population ~200), and approximately 15 km north of Antigonish, and was developed by a Canadian and German owned corporation with its head office in Toronto, Ontario (Maryvale Wind Energy LP, 2009). The Spiddle Hill wind project is located in a largely rural area in Colchester County, approximately 15 km southeast of the town of Tatamagouche, and was developed by a CEDIF formed by entrepreneurs who reside in Colchester (Colchester-Cumberland Windfield, n.d.). The Watt Section wind project is located near the small community of Watt Section, approximately 5 km southeast of the community of Sheet Harbour, and was developed by a CEDIF based in Dartmouth. (Watts Wind Energy, 2012).

Table 2 Details of the three wind energy projects
(Colchester-Cumberland Windfield, n.d.; Horizon Legacy Group, 2010; Province of Nova Scotia, 2012; Watts Wind Energy, 2012;)

Project	Nearest Major Centre	Population of Major Centre	# of Turbines	Total Capacity	Date Commissioned
Maryvale	Antigonish	5,658	4	6 MW	Feb. 2010
Spiddle Hill	Tatamagouche	2,037	3*	0.9 MW	Jul. 2011
Watt Section	Sheet Harbour	1,562	1	1.5 MW	Mar. 2011

Note: *Spiddle Hill has one 0.8 MW turbine commissioned July 2011 and two 50 kW turbines that were added to the project in 2012.

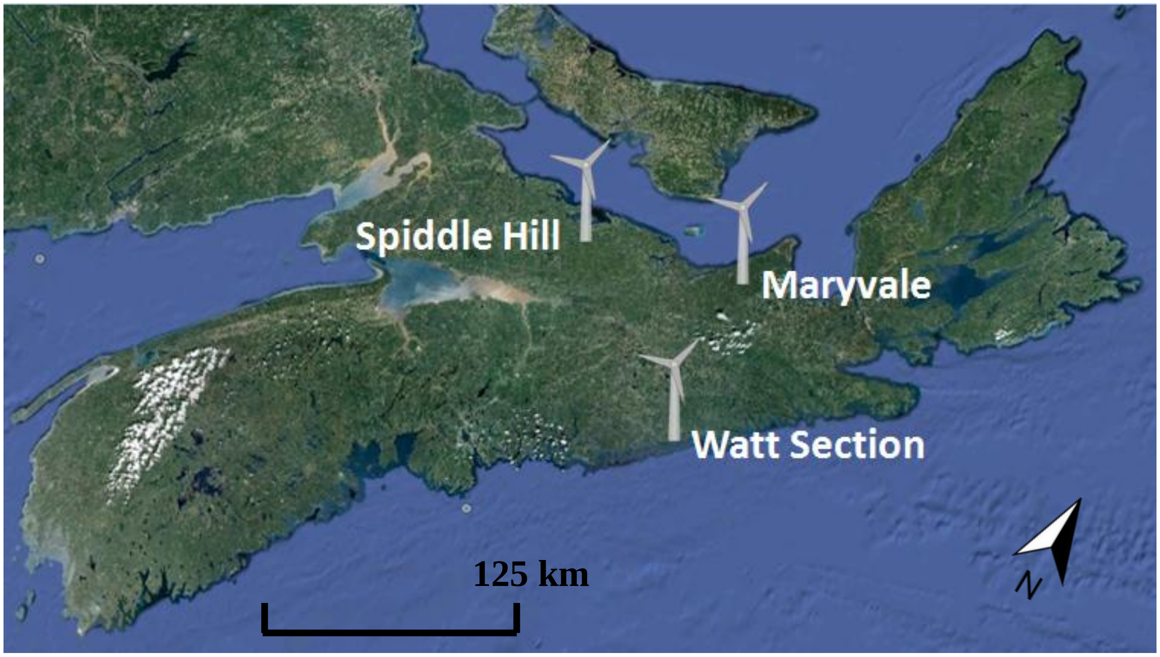

Figure 3 Location of Maryvale, Spiddle Hill, and Watt Section wind energy projects in Nova Scotia.

3.2. Experimental Design

3.2.1. Case Study Selection

The three projects were chosen as appropriate case studies for a number of reasons. First, they were the most recent small-scale wind projects to be added to Nova Scotia Power's electricity grid at the time the study commenced (Nova Scotia Power, 2012b). Other projects built during this time frame consisted of over ten turbines each. Also, prior to these three projects, the most recent small-scale project, which consisted of three turbines, was commissioned in 2007 (Nova Scotia Power, 2012b). The Maryvale project entered into a Power Purchase Agreement (PPA) with Nova Scotia Power, as a result of a 2007 Request for Proposals (RFP) for 130 MW of electricity (Maryvale Wind Energy LP, 2009). The Spiddle Hill and Watt Section projects both resulted from a 2008 RFP that Nova Scotia Power put out to encourage small, "community-based" renewable energy projects (Nova Scotia Power, 2010). The RFP resulted in PPAs with six developers for a total of 18.95 MW of electricity. Of the projects approved, the Spiddle Hill and Watt Section projects were the only projects commissioned prior to the beginning of the study in September, 2012. Note that the Fairmont wind project, located in Antigonish County approximately 10 km south east of the Maryvale project, was scheduled to be commissioned in November, 2012, during the time of the study (Wind Prospect Inc., personal email communication, October 23, 2012).

Several characteristics made the Maryvale, Spiddle Hill, and Watt Section projects suitable for this study. First, they are all relatively small in comparison to large-scale wind energy projects in the province that consist of up to 34 wind turbines and have capacities of up to 62.1 MW (Nova Scotia Power, 2012b). This is important because studies have consistently found that people tend to be more positive towards small-scale than large-scale wind projects (Barry & Chapman, 2009; Devine-Wright, 2005). Therefore, comparing a very small project to a very large project could add a confounding variable. Second, they were all commissioned in approximately the same timeframe; this is important since studies have shown that perceptions of wind projects can change over time, frequently becoming more positive after a project has been built, but in some cases becoming more negative (Devine-Wright, 2005). Therefore, comparing a very new project to a very old project could add a confounding variable. Third, the projects were developed under contrasting models (Table 33). Maryvale was developed by a company external to the local community and is owned by the developer (Maryvale Wind Energy LP, 2009). Spiddle Hill was developed by a company from within the local community and was also open for investment by local residents (Colchester-Cumberland Windfield, n.d.). Watt Section was developed by a company external to the local community but was open for investment by local residents (Watts Wind Energy, 2012). These main differences allowed a comparison of the projects based on the model of development and ownership, in order to address the research questions. In a sense, the Maryvale project can be seen as a control, representing the typical wind energy development initiated by an outsider developer and with outside ownership. The Spiddle Hill and Watt Section projects represent different forms of what might be labeled as “community” wind energy projects. While they were not developed under the COMFIT program (other than the two 50 kW turbines added afterwards to the Spiddle Hill project), they represent one of the types of projects that would be eligible for the COMFIT program had it been in place at the time. Therefore, the Maryvale project served as a basis for comparison to determine how strongly perceptions may differ when local people had the opportunity to invest in the project, or when the project was initiated locally.

Table 3 Development models of the three wind energy projects.
(Colchester-Cumberland Windfield, n.d.; Maryvale Wind Energy LP, 2009; Watts Wind Energy, 2012)

Project	Local Initiation	Opportunity for Local Shareholding
Maryvale	No	No
Spiddle Hill	Yes	Yes
Watt Section	No	Yes

The study was designed to reveal relationships based on the results obtained from the three case studies chosen. While analysis of these three projects may provide useful insight into the dynamics of local perceptions of wind energy projects based on development model, the study does not claim to be representative of all wind energy projects in general or even of wind energy projects in Nova Scotia. Each wind energy project is unique, and therefore the results from these case studies cannot automatically be generalized to all wind energy projects. However, other researchers addressing similar research questions have used case studies as a methodology in order to contribute to the general understanding of how the public tends to perceive wind energy projects depending on various characteristics of the project development process (Musall & Kuik, 2011; Warren & McFadyen, 2010).

3.2.2. Interviews with Developers

The developers of the three projects were invited by email and phone to participate in interviews in order to gain more detailed information about the project development process, such as the involvement of local residents in the project planning process, the methods of communication with the local community regarding investment opportunities, and the number of people from the local community who had invested in the project. After inviting the developers to participate in the study by email (Appendix 1) and speaking to a representative from each development company on the phone, the Spiddle Hill developer was the only one to follow through to schedule an interview. The original intention of the interviews was to gain more of a sense of the context of the development process of the wind energy projects in order to better interpret the survey results. Given that only one of the developers was interviewed, the interviews did not play a significant role in the analysis of the projects.

However, a summary of the interview with the Spiddle Hill developer will be provided here to give context for that project. The interview was conducted by phone in a semi-structured format, based on a pre-determined set of questions (Appendix 2). The interview confirmed that the idea for the project came from a resident of the local county, and that the project was being directed from within the county. Local people were informed about the project through articles in the local newspaper and posters, and advertisements were put in local and other newspapers in the province when shareholding became available. Three public meetings were held in the local community (The Falls) near to Spiddle Hill, two prior to the first stage of the project (the 0.8 MW turbine), and one prior to the second stage of the project (the two 50 kW turbines). The meetings were mostly to inform the public about the project and hear any concerns. The majority of the actual planning of the project was done by the developer company, which is directed and run by local people, but the broader local public did not play a major role in the planning of the project. The project is 100% shareholder owned by a total of 290 Nova Scotian residents. Approximately 15% of the ownership is held by the directors of the company. Approximately 63% of the shareholders are from Colchester and Cumberland Counties (the counties immediately near to the project) and approximately 38% of the shareholders are specifically from the Tatamagouche area within Colchester County. There are also a number of shareholders from the immediately local Spiddle Hill area. Local contractors were used for the project whenever possible.

3.2.3. Sampling Procedure for Survey

The target population for each of the three wind energy projects was geographically defined as the rural households within a radius of approximately 10 kilometers of the project and the households within the nearest town. For Maryvale, the nearest town is Antigonish, lying slightly outside of the 10 km radius at 15 km; for Spiddle Hill, the nearest town is Tatamagouche, also lying slightly outside of the 10 km radius at 15 km; and for Watt Section, the nearest town is Sheet Harbour, lying within the 10 km radius. For Spiddle Hill and Maryvale, the rural population was extended to a radius of 15 km in the direction of the towns. The nearest towns were included since they are often the centre of community interaction for the surrounding rural population. Consultation and planning meetings surrounding wind energy projects often take place in the nearest town, and it is likely that informal discussion about the wind energy projects also occur within the town. Local benefits from the project, such as employment, may also likely accrue to the nearest town. Therefore both the population within the nearest town and the population in the rural area immediately surrounding the project could be considered part of the local community that has an interest in the project. For the purposes of this survey, the target population were temporally defined as the households within the specified geographic population at the time of the survey (December 2012). Therefore, the survey solicited the perspectives of the local community after the projects had been in operation for approximately one and a half to three years (Maryvale – 34 months; Spiddle Hill – 17 months; Watt Section – 21 months).

A stratified random sampling procedure was used to sample both the rural households within the 10 km radius and the households within the nearest town. Stratified sampling is a procedure used when there are mutually exclusive subsamples (strata) within an overall population that may have differing characters, in order to ensure that a sufficient number of samples are obtained from each strata (Rea & Parker, 2005). Since the populations within the town are somewhat more removed from people in the rural areas closer to the wind energy projects, it was desirable to attempt to receive surveys from both sub-populations.

Canada Post's Unaddressed Admail Service was used to mail out the surveys. Therefore, Canada Post's Consumer's Choice Householder Counts were used to determine the number of households in each of the three target populations and each of the two strata within the three target populations (Canada Post, 2012). (Consumer's choice excludes households that have requested not to receive unaddressed admail, which is a fairly small number compared to the total number of households.) The letter carrier and rural routes were chosen that overlapped best with the towns and the 10 km rural radius around each of the projects. While the routes did not cover the towns and the 10 km radius perfectly (i.e. a small number of streets within the routes may lie slightly outside of the target streets), they covered the areas quite well. Using the target population sizes based on the householder counts, a power analysis was conducted to calculate the desired sample sizes (using an equation from Rea & Parker, 2005), and an expected estimated response rate of 38% was assumed to determine the number of surveys to send to attain the desired sample size (Table 4). The expected response rate was estimated based on the fact that a recent mail survey of farmers in Nova Scotia attained a response rate of 32% (Bailey, Gordon, Burton, & Yiridoe, 2008), and this study noted based on a publication by Weisberg, Krosnick, and Bowen (1996) that typical response rates for mail out surveys can range from 10 to 50 %. An option for respondents to enter a draw for a $50 gift card was also used to encourage responses. A total of 1,285 surveys were sent, and 128 useable responses were received, for a response rate of 10%.

Table 4 Number of households, desired sample size, number of surveys sent, surveys received, and response rates for the rural and town strata of the three target populations. (Canada Post, 2012)

Project		Households	Desired Sample	Surveys Sent	Useable Surveys Received	Survey Response Rate	Response as % of Households
Maryvale	Rural	729	85	224	10	4.5%	1.4%
	Town	3409	93	245	19	7.8%	0.6%
	Total	**4138**	**178**	**469**	**29**	**6.2%**	**0.7%**
Spiddle Hill	Rural	401	78	205	47	22.9%	11.7%
	Town	479	80	211	7	3.3%	1.5%
	Total	**880**	**158**	**416**	**54**	**13.0%**	**6.1%**
Watt Section	Rural	287	72	190	41	21.6%	14.3%
	Town	507	81	210	4	1.9%	0.8%
	Total	**794**	**153**	**400**	**45**	**11.3%**	**5.7%**
Total		**5812**	**489**	**1285**	**128**	**10.0%**	**2.2%**

Note: Given the difficulty in determining the precise boundary between “rural” and “town”, it is possible that some surveys designated as sent to “town” were in fact send to respondents who may not have selected “within town” as their location in relation to the wind energy project, thus making difference in ‘survey response rate’ between towns and rural areas appear larger than it actually was.

Canada Post's Unaddressed Admail service enables users to specify the routes for the delivery, and the mail items will be delivered to random households on those routes. For the purposes of this study, this was the method of randomization employed, since it was not possible to obtain a list of households on the routes or to enumerate the households. The researcher was aware that this procedure cannot be considered strict probabilistic random sampling. In order to minimize the potential impact of this sampling procedure, a clustering procedure within each of the strata was used to assign the number of surveys to each mail route according to the proportion of the stratum that they represent (Appendix 3). Furthermore, Canada Post was requested through a written note to specifically deliver a minimum of 50 surveys to the streets closest to the wind projects to help ensure that households closest to the wind projects received the survey; however, the unaddressed admail service only *requires* that the mail is delivered to houses *anywhere* on the specified route, so it is not known whether the written note was heeded and 50 surveys were in fact delivered to the streets closest to each wind project.

3.2.4. The Survey Instrument and Mail Out

As previously noted, a survey questionnaire was used to collect data on local perceptions of the projects and local involvement in the projects in terms of investment and participation. It included a number of question types. Many of the questions used a five-opinion rating scale asking respondents to specify the degree to which they agree or disagree with a statement (strongly agree, agree, neutral, disagree, strongly disagree), a commonly used form of question used to measure perceptions on surveys (Treiman, 2009). Other questions were "yes" or "no" questions, while a small number of the questions were open-ended and required coding of responses.

The survey package included an invitation to participate in the study, a copy of the survey, and a self-addressed envelope (Appendix 4; Appendix 5). An entry ballot was also included for a draw for a gift card that respondents could choose to fill out and return with the survey. Participants had the option to complete the hard copy of the survey or to complete the survey online, using a link to the survey set up through the Dalhousie Opinio Survey program. Each mailed-out survey was assigned a survey code, and participants who completed the online survey were asked to enter the survey code at the start of the survey, to prevent households from both completing the survey online and mailing it back or completing it online multiple times. The survey was sent out on December 14, 2012, and respondents were asked to have the survey post-marked in the mail or completed online by the deadline of January 21, 2013.

3.3. Methods of Statistical Analysis

Survey responses were entered for analysis into SPSS Statistics, a software program often used by social science researchers to conduct statistical analyses (Howitt & Cramer, 2011a). Prior to data analysis, all data collected on the five-option rating scale were coded into a five-point numerical scale, where strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1. This type of numerical scale is classified as an ordinal variable, in that it is not precisely known the distance that lies between the different options of the scale (Treiman, 2009). However, researchers often treat ordinal variables as continuous intervals scales and use parametric statistics to analyze the data from these types of questions (Treiman, 2009). For example, other researchers conducting similar studies on perceptions of wind energy have used parametric statistics to analyze five-point scale items (Devine-Wright & Howes, 2010) . Noting that some researchers prefer to use non-parametric statistics designed specifically for ordinal variables, Treiman (2009) argues that there are advantages to treating ordinal variables as interval scales, such as that parametric statistics are more robust and more commonly used. Howitt and Cramer (2011a) have similarly suggested that non-parametric tests should be avoided whenever possible, and that often there is little difference between the results obtained when using non-parametric as opposed to parametric tests. Therefore, the ordinal five-point scales were treated as continuous interval scales and parametric statistical analysis was applied. A number of non-parametric equivalent tests were also run on some of the data to compare to the results achieved with parametric tests. Both types of tests yielded the same results, in terms of indicating which differences among the three communities were statistically significant, thus confirming that the parametric tests are an acceptable approach.

3.3.1. Comparison of Perceptions of the Three Wind Energy Projects

In the first part of the data analysis, a number of tests were performed to compare the responses from the three wind energy projects.

Multivariate analysis of variance (MANOVA) was conducted to determine if there was a difference among the three projects for the 5-point scale items relating to perceptions of the project, namely: a) support for the project; b) a sense of "community ownership" of the project, and; c) perceptions of the benefits and negative impacts of the project. This test is used when comparing several groups in terms of a number of different variables (Howitt & Cramer, 2011a). Individual analyses of variance (ANOVAs) were then conducted for each individual 5-point scale item. When a significant difference was detected among the three projects, Scheffé's test was conducted to determine between which particular projects the differences lay. Scheffé's test is a suitable post-hoc multiple comparison test to conduct when there are different numbers of cases in the groups being compared (Howitt & Cramer, 2011a). The results from some of the ANOVAs were also checked against the non-parametric equivalent, the Kruskal-Wallis Test, and a significant difference was detected among the three projects for the same 5-point scales items. This confirms that although the data may not perfectly meet all of the assumptions of a parametric test (such as that the 5-point scale is not a continuous scale) the ANOVA test can still be used. MANOVAs were also used to compare the three projects in terms of perceptions regarding individual and community participation in the project planning process and the fairness of the planning process, as well as to compare the three communities in terms of general support for wind energy and perceptions of the general benefits and negative impacts of wind turbines.

Chi-square tests were used to compare among the three communities' perceptions of whether the idea for the project came from within the community and whether the project was being directed locally, perceptions of who owns the project, perceptions of whether or not the opportunity to invest in the project was available to community members, and the number of shareholders among respondents. These results were used to inform analysis of the rest of the data, since factors such as the opportunity to invest can only be considered as an influence on perceptions if a person is aware of that opportunity.

Together, the above analyses were used to give an indication of the importance of local investment, local project initiation, and local participation (independent variables) in influencing project support, perceptions of benefits and costs, and perceptions of a project as a "community" project (dependent variables). This was considered in the context of the information collected from the surveys about how the projects were developed.

3.3.2. Predictors of Individual Perceptions of Wind Energy Projects

While the previous statistical techniques were used to explore the factors influencing support for and perceptions of projects on a community level, they made use of averages within each of the three communities and did not account for differences in perceptions among individual community members. Other statistical techniques are needed to better analyze factors influencing perceptions on an individual level and the relative importance of those factors. In fact, several researchers have recognized the limitations of other studies on perceptions of wind energy projects that only compare average perceptions between case study projects (Devine-Wright, 2005; Wolsink, 2007). Instead, these researchers suggest the use of multivariate statistical techniques to analyze a variety of potential influences simultaneously and better determine the most important influences on local support for wind projects (Devine-Wright, 2005; Wolsink, 2007).

Multiple linear regression analysis is a statistical technique that can be used to identify influences on a dependent variable by more than one independent variable (Howitt & Cramer, 2011b). A multiple linear regression equation takes the following form:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_q X_q$$

where Y is the value of the dependent variable, a is the constant, X_q is the value of the q^{th} independent variable, and β_q is the regression coefficient (beta value) of the q^{th} predictor variable

(Howitt & Cramer, 2011b). The regression coefficients are then converted to standard coefficients for comparison and a p-value is obtained to evaluate whether or not the influence of each independent variable is significant (Treiman, 2009). A p-value is the probability of rejecting the null hypothesis when the null hypothesis is actually true; that is, the probability of saying that there a variable *is* a significant predictor when in fact it *is not*. For this study, a threshold of $p<0.05$ was used to determine significance, in that p-values less than 0.05 were considered significant, since this is a threshold commonly used by researchers.

The data collected from all three wind energy projects was combined to conduct multiple linear regression analysis. A stepwise multiple regression technique was chosen to determine the influence of different factors for two reasons. First, since a number of the variables are dummy variables, this enables each set of dummies to be analyzed in isolation. Second, multicollinearity was a potential problem between a number of the variables. Multicollinearity occurs when predictor variables are highly correlated, and the regression analysis may make one of the highly correlated predictor variables appear to be a much stronger predictor than the others (Howitt & Cramer, 2011a). Stepwise regression was used to look at the various potentially correlated variables independently, thus avoiding the problem of multicollinearity that may have occurred if all of the variables were entered simultaneously. Furthermore, the stepwise multiple regression technique was also used in another similar study (Jones & Eiser, 2009).

Stepwise multiple regressions were performed to explore predictors of the dependent variables: a) project support, b) a sense of "community ownership" of a project, and c) perceptions of benefits and negative impacts. The predictor variables were related to factors such as general support for wind energy, distance of the respondent's home from the project, investment opportunities, perceptions of whether the idea for the project came from within the community, and perceptions of local participation in the project planning process (Appendix 6). These variables consisted of single five-point scale items, factors combining several five-point scale items, and dummy variables. Dummy variables, also known as dichotomous variables, enable nominal variables to be compared in the regression equation with the five-point scale items (Treiman, 2009).

The stepwise regression method used was as follows: Step 1: enter general support for wind energy as a predictor variable. Step 2: enter distance variables (dummy variables for residents within viewing distance of the project and within 5 km of the project). Step 3: enter other predictor variables of interest.

The incremental F-test was then used to determine if there was a significant difference between the models at each step, that is, whether the predictor variables of interest had a significant influence on the dependent variables once general support for wind energy and distance from the project had been controlled for. The incremental F-test evaluates the R^2 change between two steps of the model (Williams, 2004). R^2 is the percent of the variance in the dependent variable accounted for by the predictor variables in the model, and can be thought of as a way of numerically representing the strength of the relationship between the dependent variable and the predictor values. R^2 change between two steps in the regression model represents the additional amount of variance that is accounted for when additional predictor variables are added to the model. The hypothesis being tested is as follows (Williams, 2004):

Null hypothesis (H_0): $\beta_1 = \beta_2 = 0$

Alternative hypothesis (H_A): β_1 and/or β_2 does not equal 0,

where β_1 and β_2 are the regression coefficients of the predictor variables that have been added to the model. If the incremental F-test was significant, the null hypothesis was rejected, showing that the variables added to the regression model had a significant influence on the dependent variable once the predictor variables added in the previous steps had been accounted for. The beta values were then examined to determine the significance, direction, and strength of the relationship between the dependent variable and each predictor variable in the model. The R^2 change between steps 2 and 3 of the stepwise regressions were compared for different “step 3 predictor variables” of interest in order to analyze the relative influence of the variables on the dependent variable. R^2

values of the "step 3 predictor variables" when entered into the regression model alone (without the step 1 general support variable and the step 2 distance dummy variables) were also reported for comparison, as it was possible that multicollinearity with the previous steps may have been suppressing the influence of these variables.

To illustrate this process, the following is an example of the equations, results, and analysis process of the stepwise multiple regression used for the dependent variable "sense of community ownership" and the "step 3 predictor variables" for project initiation (whether the idea for the project was perceived as coming from within or outside of the community):

Step 1: enter general support for wind energy: $Y = a + \beta_1X_1$

Step 2: enter distance dummy variables: $Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3$

Step 3: enter project initiation variables: $Y = a + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5$,

where X_1 = general support for wind energy,

X_2 = dummy variable for within viewing distance,

X_3 = within 5 km of the project but not within viewing distance,

X_4 = perception that the project idea came from within the community (internal initiation),

X_5 = perception that the project idea came from outside the community (external initiation)

For dummy variations, one category is always left out of the equation and is used as a basis for comparing the dummy variables that are entered into the equation (Treiman, 2009). For the distance variables, the comparison variable was that the respondent lived further than 5 km from the project. For the project initiation dummy variables, the comparison variable was that the respondent did not know where the project idea came from.

The results of this regression reveal that project initiation does have a significant influence on the dependent variable "sense of community ownership" once general support and distance have been controlled for, based on the fact that the R^2 change between step 2 and step 3 is significant, $p < 0.001$, with an additional 15% of the variance accounted for by these dummy variables (Table 5). It does not appear that multicollinearity was a major issue, considering that the

R^2 alone was quite close to the R^2 change between step 2 and step 3. The beta values reveal that in this model, general support for wind energy was the strongest predictor of a "sense of community ownership", β = 0.31, p < 0.001, and both initiation variables were also significant, p = 0.002 and 0.003. For dummy variables, unstandardized beta coefficients are most useful for interpretation. The unstandardized beta coefficients for the initiation dummy variables show that on the 5-point scale of a "sense of community ownership", where 5 is highest and 1 is lowest, those who believed the project idea came from within the community (internal initiation) would be predicted to score 0.67 points higher than those who did not know where the project idea came from, while those who believed the project idea came from outside the community (external initiation) would be predicted to score 0.78 points lower than those who did not know where the project idea came from, once general support and distance had been controlled for. The distance variables were not significant predictors of a "sense of community ownership" in this model.

Table 5 Stepwise regression analysis for the dependent variables "sense of community ownership". Predictor variable of interest: project initiation. Dummy variables in comparison to 'do not know'. n = 128

R^2 change:	**15.0%, p <.001**				
R^2 alone:	**20.2%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.61**	**.16**	**.31**	**3.95**	**<.001**
Distance viewing	.14	.22	.05	.63	.531
Distance 5 km	.03	.30	.01	.09	.933
Internal initiation	**.67**	**.21**	**.25**	**3.12**	**.002**
External initiation	**-.78**	**.26**	**-.25**	**-3.01**	**.003**

First step: general support and distance variables entered first. Second step: remaining independent variables. R^2 change = change in R^2 between step 1 and step 2. R^2 along = second step variables entered into the model without first step variables. B = unstandardized coefficient. SE = standard error. β = standardized beta coefficient.

Stepwise multiple regression analyses were carried out in this manner for a variety of predictor variables, and the R^2 changes were compared across the models. Together, these multiple regressions were used to provide insight into which factors may have the most influence on local perceptions of wind energy projects, thus enabling an understanding of how local project initiation, local participation, and local investment relate to levels of project support, a sense of "community ownership" of the projects, and perceptions of benefits and negative impacts of the project.

3.3.3. Perceptions of benefits, negative impacts, and investment opportunities

In order to answer the secondary research questions, perceptions of benefits, negative impacts, and investment opportunities were evaluated. The open-ended questions on personal and community benefits and negative impacts were analyzed using posterior coding. The benefits and negative impacts were ordered from most frequently to least frequently mentioned. This was used to determine the most commonly perceived ways that the wind energy projects benefit and negatively impact the local community.

The numbers of respondents to the survey agreeing that community members should be given the opportunity to invest in local wind energy projects and that a community fund should be set up were calculated. ANOVA was used to compare the response to these statements among the three communities, in order to determine if support for shareholding differed depending on whether or not it was actually available in the community. Additionally, the reasons for not shareholding or not being interested in shareholding were ranked from most frequent to least frequent, which provides an understanding of why people may choose not to invest or be unable to invest in local wind energy projects.

Chapter 4: Results

As will be outlined in this section, a fairly strong positive relationship was found between a sense of "community ownership" of a wind energy project and perceived community participation in and fairness of the project planning process. A somewhat weaker but still relatively strong relationship was found between a sense of "community ownership" and local project initiation. A weaker but still statistically significant relationship was also found between a sense of "community ownership" and local investment opportunities. However, no significant relationship was found between either project support or perceptions of benefits and negative impacts and either local project initiation and local investment opportunities. A fairly weak but statistically significant relationship was found between local participation and both project support and perceptions of benefits and negative impacts.

4.1. Survey Response

A total of 153 survey responses were received. Of these responses, 25 were removed from analysis as being incomplete. First, at least 65% of the questions on the survey needed to be answered, that is, no more than 13 of the 38 questions were unanswered, which eliminated 16 responses. Second, responses were eliminated if the respondent did not answer the question on their level of support for the project, since this was an important dependent variable that should not be imputed. This eliminated seven responses. Furthermore, two additional responses were eliminated as it appeared that the respondent rushed through the questions without thought (for example, 'strongly agree' was selected on every question).

The remaining 128 responses were used in the analysis, which constitutes a 10% overall response rate. Information about response rate by community is found in Table 4, Section 3.2.3. Spiddle Hill and Watt Section had higher response rates than Maryvale. 17% of the responses were received using the online survey, and 83% were returned by mail. Of these 128 responses, 70% had no unanswered questions, 20% had 1 to 4 unanswered questions, and 10% had 5 to 13 unanswered questions. Expectation maximization (EM) single imputation was used to create complete data sets for analysis. In terms of reducing bias and maintaining statistical power, EM imputation has been argued to be a better way of dealing with missing values than traditional approaches such as listwise deletion (deleting all cases with any missing values), pairwise deletion (using all cases but deleting missing values from the analysis), and mean substitution (replacing missing values with the mean value from the other cases in the sample) (Acock, 2005). EM imputation uses a maximum likelihood approach to impute missing values taking into consideration the relationships among all of the variables (Acock, 2005). While multiple imputation is considered an even better way to deal with missing values than EM imputation

(Acock, 2005), it was not possible to conduct all of the desired analyses in SPSS with multiple imputed data, and therefore EM imputation was chosen as the most suitable method.

There was no significant difference among the three projects in the gender of the respondents, χ^2 (2) = 0.348, p = 0.840, nor in the age of the respondents, χ^2 (2) = 5.019, p = 0.541, nor in the number of years lived in the community of the respondents, χ^2 (4) = 7.594, p = 0.108 (Table 6).

Table 6 Demographic characteristics of survey respondents

Gender		**Age**				**Number of Years Lived in Community**		
Male	**Female**	**18 - 30**	**30-50**	**50-70**	**70+**	**Fewer than 3**	**3-10**	**10 +**
52.3%	47.7%	10.2%	21.9%	52.3%	15.6%	9.4%	17.2%	73.4%

There was a significant difference among the three projects in terms of the distance from the projects of the respondents, χ^2 (8) = 42.818, $p < 0.001$. There was a significant difference between Maryvale and Spiddle Hill, χ^2 (4) = 28.530, $p < 0.001$, and between Maryvale and Watt Section, χ^2 (4) = 30.565, $p < 0.001$, but there was not a significant difference between Spiddle Hill and Watt Section, χ^2 (4) = 1.858, p = 0.762. While Spiddle Hill and Watt Section had respondents from near to the projects as well as further away and in the town, the majority of the respondents from the Maryvale project were from the town of Antigonish (Figure 4). The lack of response from households closer to the Maryvale project means that the Maryvale sample may not represent the views of those living closest to the project. This limitation of the study is discussed further is Section 5.5.

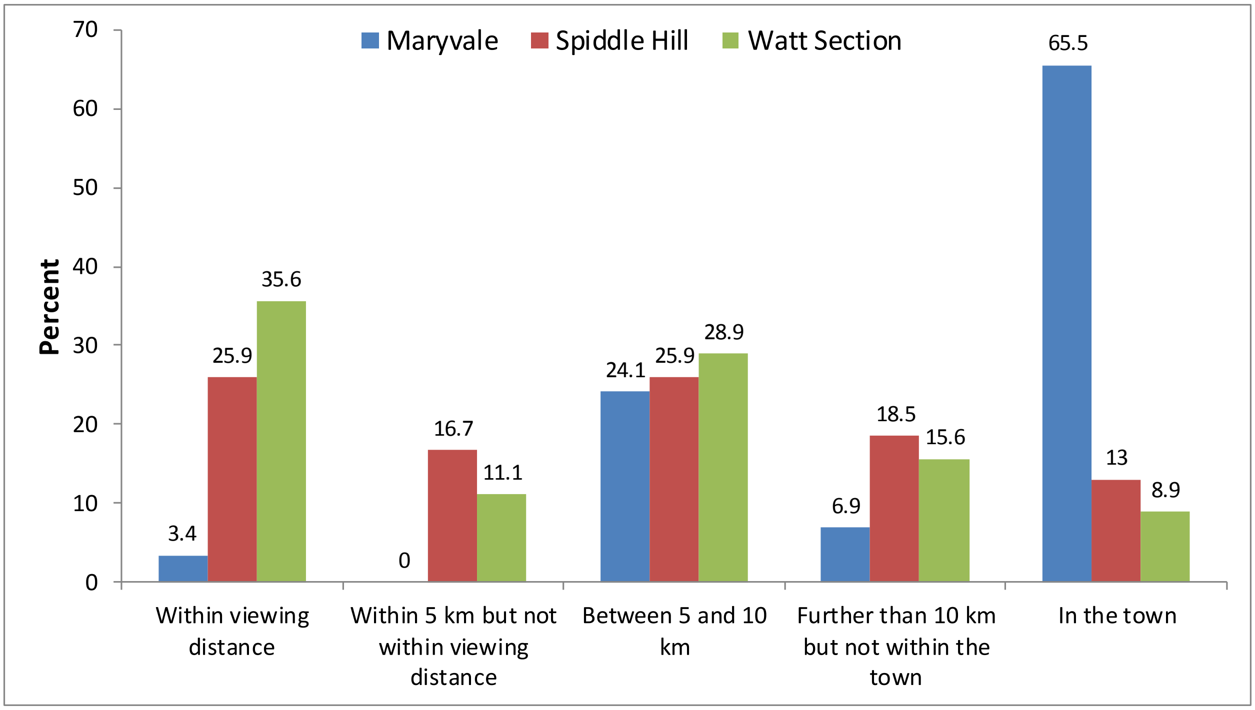

Figure 4 Distance of survey respondents from the respective wind energy projects

4.2. Comparison of Perceptions of the Three Wind Energy Projects

4.2.1. Perceptions of the Projects: Project Support, Sense of "Community Ownership"', Benefits, & Negative Impacts

When project support, the perception that the project is 'my community's' project, and perceptions of the project's benefits and negative impacts were all entered as multiple variables in a MANOVA test, with the three projects as the grouping variable, there was a significant difference in perceptions among the three projects, $F\ (20,234) = 2.73$, $p < 0.001$, partial $\eta^2 = 0.189$. Individual ANOVAs were then used to see which specific perception or perceptions were driving this difference.

ANOVA showed no significant difference among the three projects in terms of individual support for the projects, $F(2,125) = 0.49$, $p = 0.614$, partial $\eta^2 = 0.008$. The majority of respondents from all three communities were in support of the projects (Figure 5).

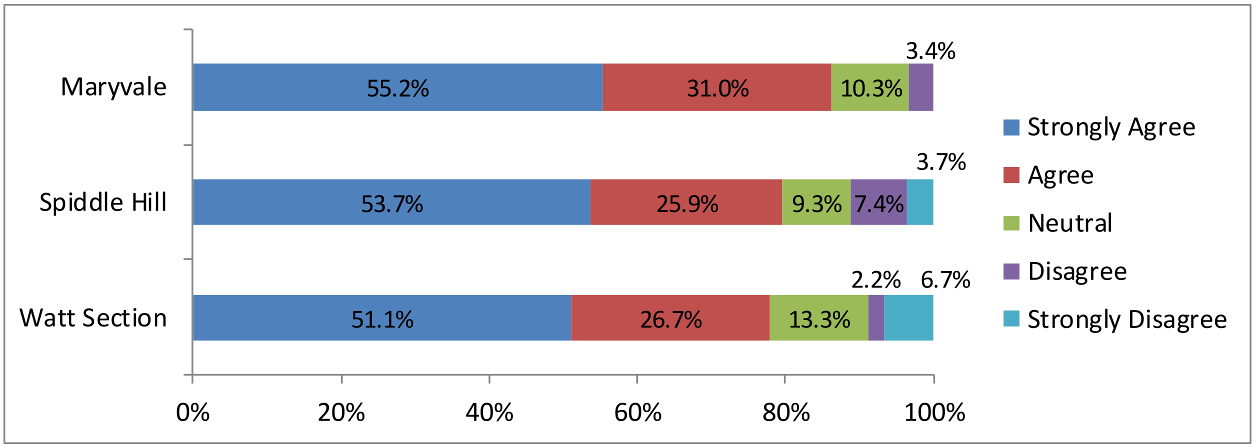

Figure 5 Level of agreement or disagree of respondents from each of the three communities with the statement "I am in support of this wind energy project."

ANOVA showed a significant difference among the three projects in terms of respondents agreeing to the statement that the project in question is 'my community's project', $F(2,125) = 8.71$, $p < 0.001$, partial $\eta^2 = 0.122$. Scheffé's test showed that Spiddle Hill respondents were more likely to agree with the statement than Watt Section respondents ($p = 0.002$), and Maryvale respondents ($p = 0.004$). No significant difference was detected between Watt Section and Maryvale respondents, $p = 0.959$ (Figure 6).

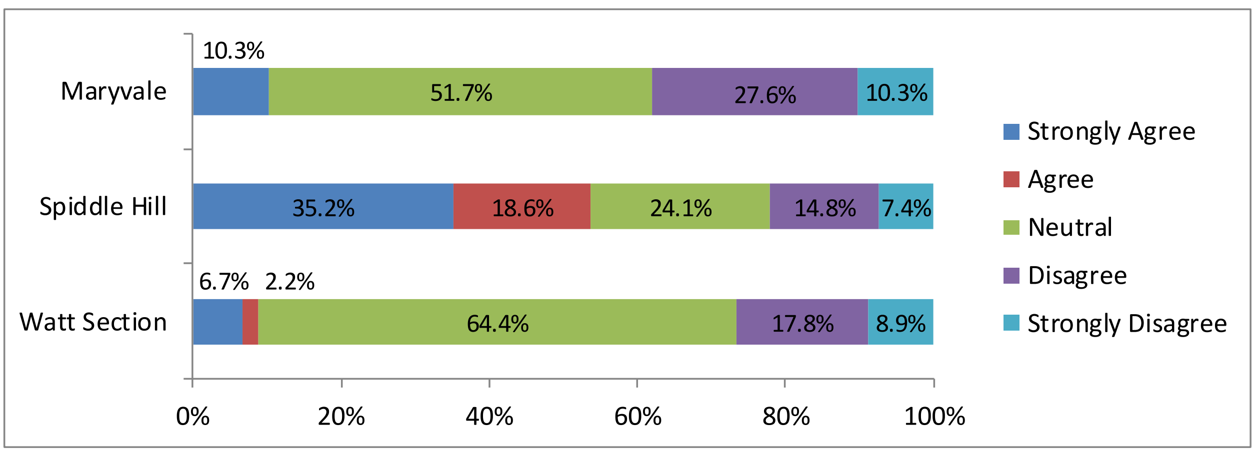

Figure 6 Level of agreement or disagree of respondents from each of the three communities to the statement "This project is my community's project."
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

There was no significant difference among the three projects detected by ANOVA in terms of agreement that the project benefits the individual and the community, and that the project negatively impacts the individual and the community (Appendix 7). While there was no significant difference among the three communities in terms of the perception that the project in question benefits outside individual investors, ANOVA did show a significant difference in the perceptions that the project benefits an outside private company, $F(2,125) = 10.27$, $p < 0.001$, partial $\eta^2 = 0.141$. Scheffé's test showed that Spiddle Hill respondents were less likely to agree that the project benefited a private company from outside their community than Watt Section respondents ($p = 0.010$) and Maryvale respondents ($p < 0.001$). No significant difference was detected between Watt Section and Maryvale respondents, $p = 0.327$ (Figure 7).

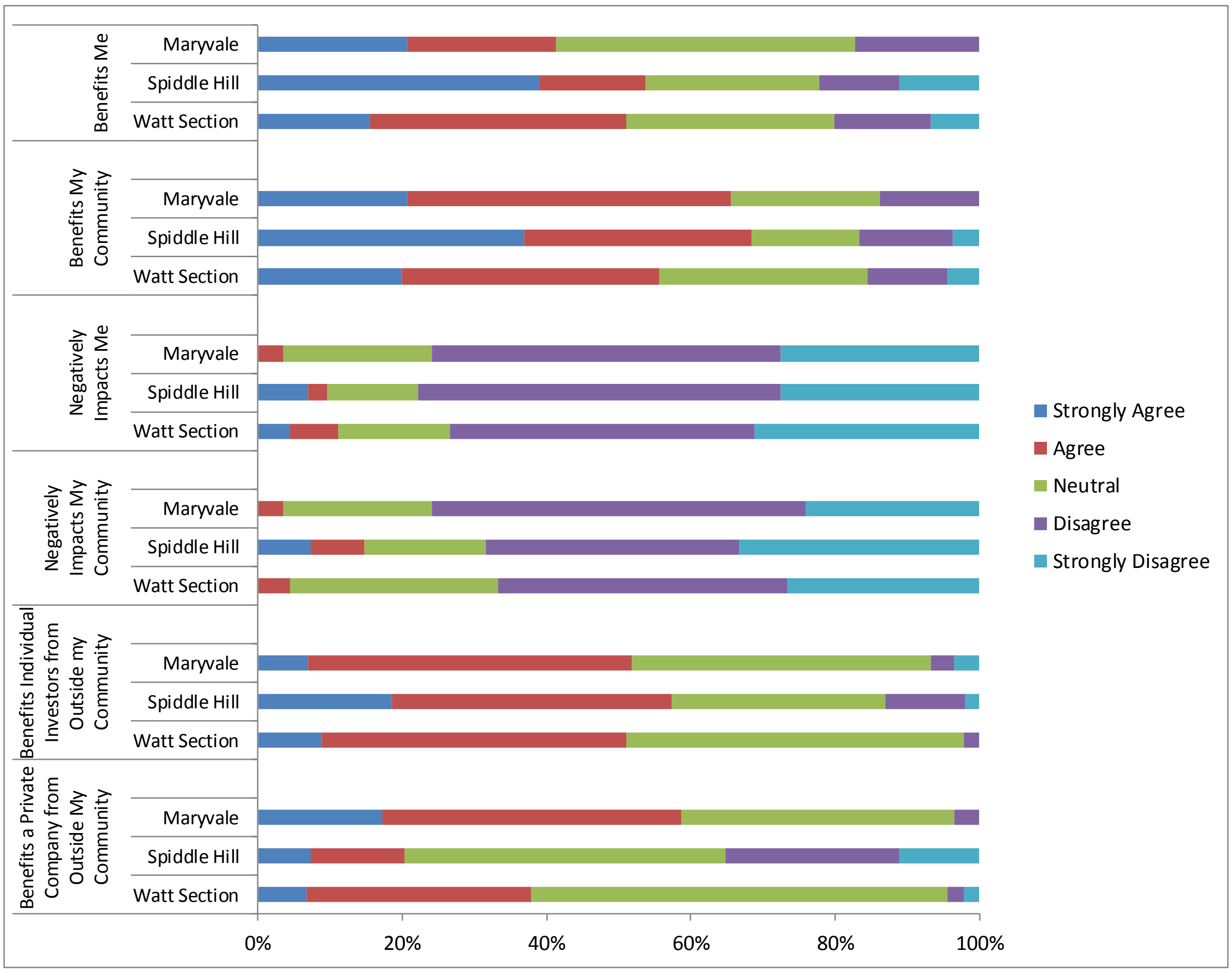

Figure 7 Level of agreement or disagree of respondents from each of the three communities to statements regarding benefits and negative impacts of the respective project.
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

ANOVA showed a statistically significant difference among the three communities with regards to the perception that the project benefits some members of the community more than others, F (2,125) = 3.67, p = 0.028, partial η^2 = 0.055. Scheffé's test found that Spiddle Hill respondents were more likely to agree with the statement than Watt Section respondents, p = 0.080, and Maryvale respondents, p = 0.082, although this difference was not statistically significant at the 0.005 level. There was no significant difference between Watt Section and Maryvale respondents, p = 0.968. Of the 30 responses to the question of who within the community would benefit more, the most frequent responses were investors (53% of responses) and landowners (20% of responses).

There was a significant difference among the three communities with regards to the perception that the project negatively impacts some members of the community more than others, F (2,125) = 5.64, p = 0.011, partial η^2 = 0.070. Scheffé's test found that Spiddle Hill respondents were significantly more likely to agree with this statement than Watt Section respondents, p = 0.048, and Maryvale respondents, p = 0.033. There was no significant difference between Maryvale and Watt Section, p = 0.907 (Figure 8). Of the 28 responses to the question of who within the community is negatively impacted more, all responses made some reference to the people living close to the turbines.

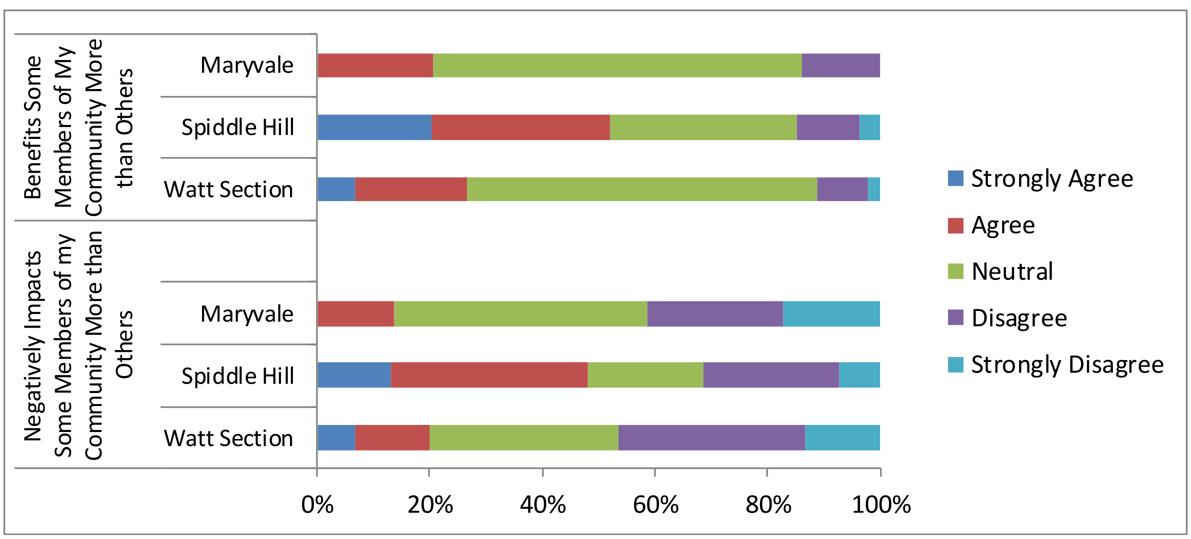

Figure 8 Level of agreement or disagree of respondents from each of the three communities to statements regarding the equality benefits and negative impacts of the respective project.
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

4.2.2. Perceptions of the Project Development Approach: Project Initiation, Investment Opportunities, and Participation

Chi-square tests showed that Spiddle Hill respondents were significantly more likely than Maryvale and Watt Section respondents to agree that the idea for the project originated within their community, that the project is being directed from within their community, and that a company and/or individual shareholders within the community have at least partial ownership of the project (Appendix 8; Figure 9). For Maryvale and Watt Section, the most common response to these questions was "don't know".

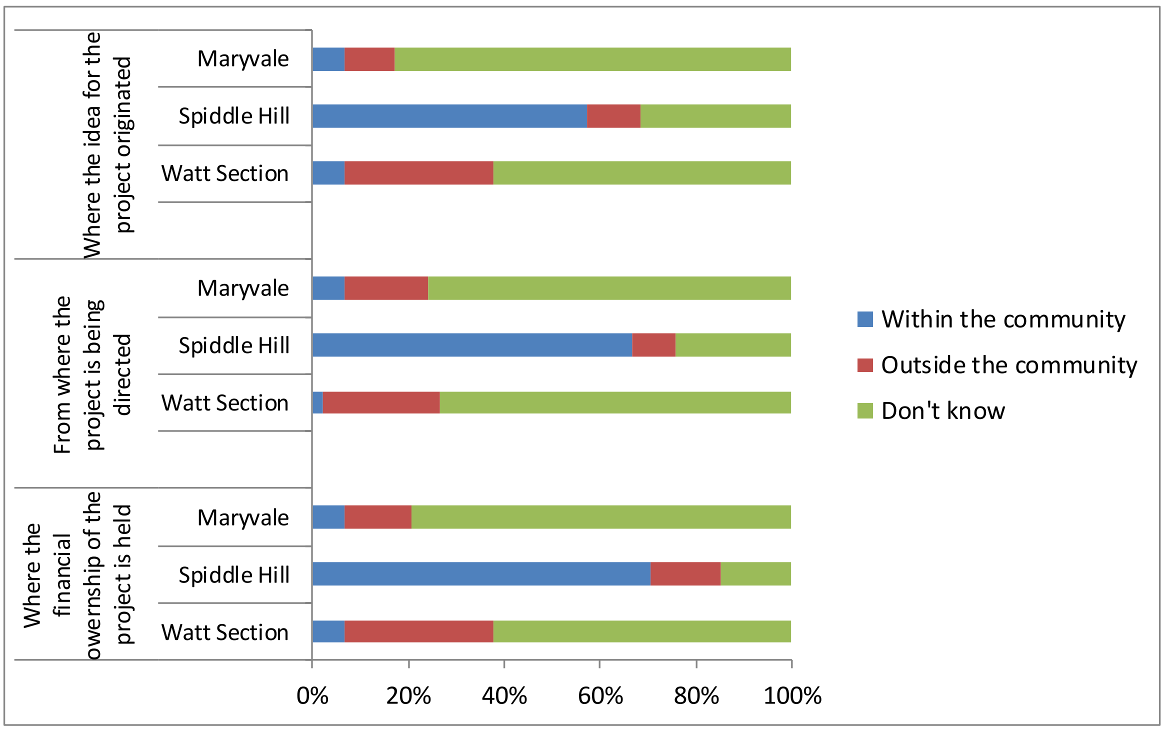

Figure 9 Perceptions of respondents from the three projects of where the project idea was initiated, from where it is being directed, and where financial ownership was held.
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45
Note: For 'where financial ownership of the project is held', the options were 'a company within my community', 'a company from outside my community', 'individual shareholders from within my community', and 'individual shareholders from outside my community'. Multiple responses were permitted. If at least one of 'a company within my company' or 'individual shareholders within my community' were selected, this was categorized as 'within my community'. If only 'a company from outside my community' or 'individual shareholders from outside my community' were selected, this was categorized as 'outside my community'.

Significantly more respondents from Spiddle Hill believed that the opportunity was available for community members to invest in the wind project than respondents from both Watt

Section and Maryvale (Appendix 8; Figure 10). Among the 54 Spiddle Hill respondents, 13 had invested in the project, while none of the respondents from Watt Section or Maryvale had invested in the respective projects.

MANOVA showed a significant difference among the three projects in terms of agreement with six statements regarding participation in the project's planning process, $F (12,242) = 2.87$, $p = 0.001$, partial $\eta^2 = 0.125$. The difference did not lie in the respondent's actual level of participation in the project, as most respondents did not participate in the project's planning

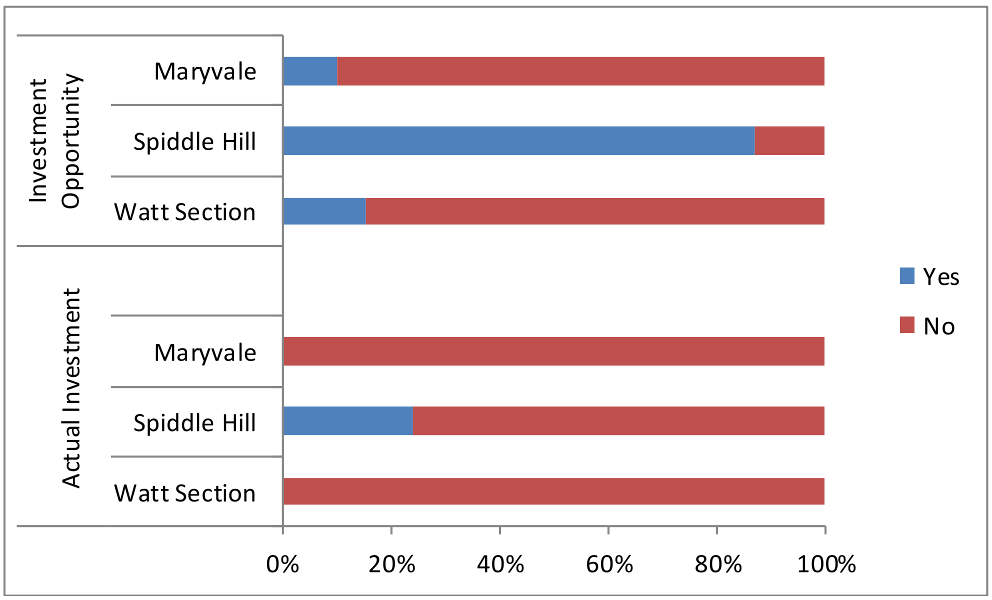

Figure 10 Belief that there was an investment opportunity, and actual investment among respondents from the three projects.
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45
Note: 'Investment opportunity' = response to the question 'Were members of your community given the opportunity to invest in the wind project'. For this question, no represents the answer 'not that I was aware of'.

process. However, Spiddle Hill respondents were more likely than Maryvale and Watt Section respondents to agree that the opportunity was *available* to participate in the project's planning process, that the community played an important role in the project's planning process, and that the project planning process was fair (Appendix 9; Figure 11).

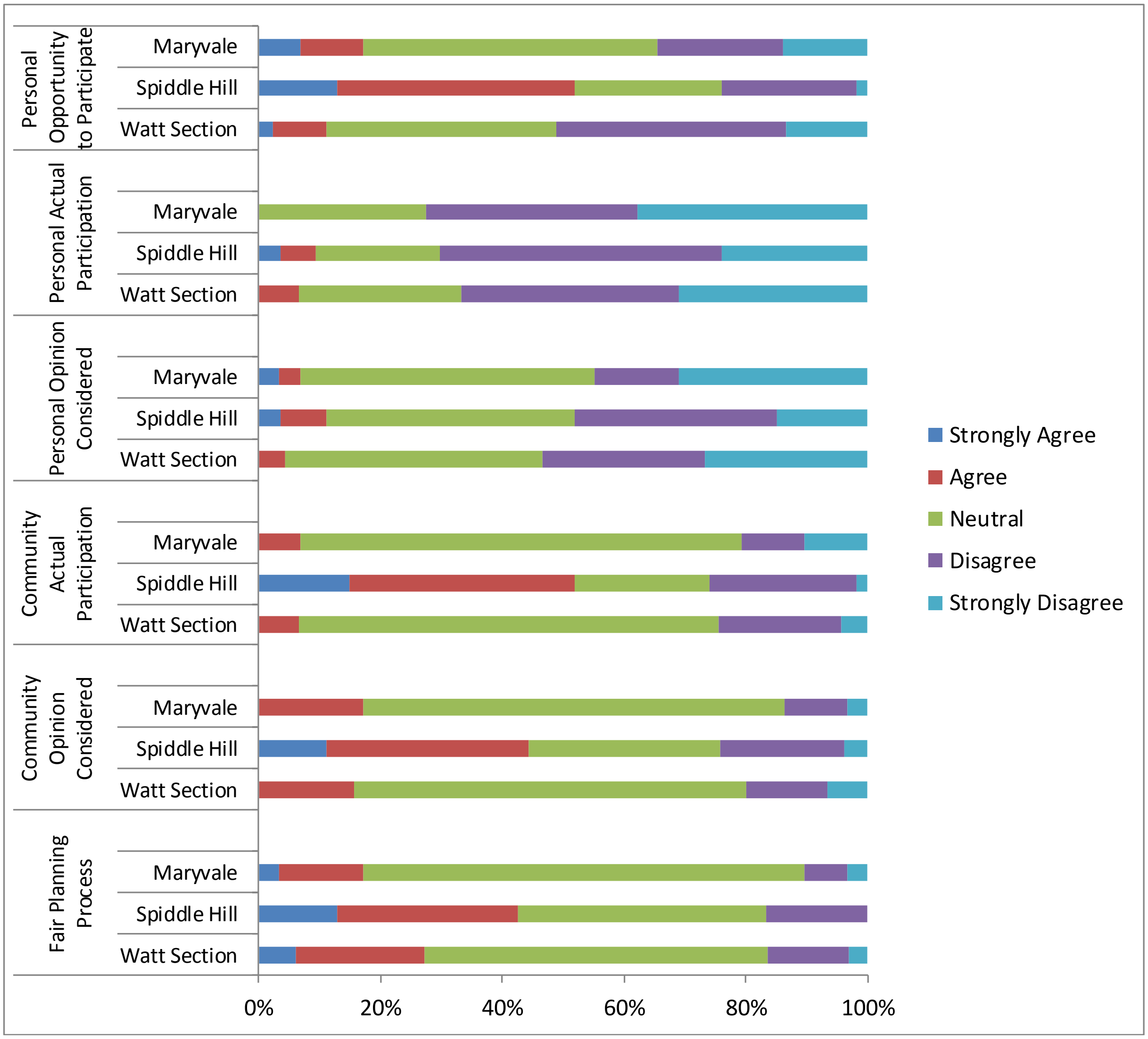

Figure 11 Level of agreement or disagree of respondents from each of the three communities to statements regarding participation in the project's planning process
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45
Note: Statements: 'personal opportunity to participate' = 'the *opportunity* was available for me to participate in the project's planning process'; 'personal actual participation' = 'I *did* participate in the project's planning process'; 'personal opinion considered' = 'my opinion about the project was taken into consideration'; 'community actual participation' = 'my community played an important role in the project's planning process'; 'community opinion considered' = 'the opinions of the community about the project were taken into consideration'; 'fair planning process' = 'the planning process of the project was fair'.

MANOVA found no significant difference among the three projects in regards to general support for wind energy and general perceptions of the benefits and negative impacts of wind turbines in general, $F (10,244) = 0.39$, $p = 0.951$, partial $\eta^2 = 0.016$. (Appendix 10).

4.2. Predictors of Individual Perceptions of Wind Energy Projects

4.4.1. Predicting Project Support

In the first step of multiple regression analysis for the dependent variable ‘project support’ (response to the statement ‘I am in support of this wind energy project’), the independent variable ‘general support for wind energy’ was entered alone and accounted for 43.4% of the variance, $F(1,126) = 96.553$, $p < 0.001$.

In the second step, dummy variables for distance from the project (within viewing distance and within 5 km) were entered, accounting for an additional 2.1% of the variance in ‘project support’, which was not statistically significant, $F(2,124) = 2.386$, $p = 0.096$. However, the dummy variable for within viewing distance was a statistically significant predictor, $p = 0.036$, with an unstandardized regression coefficient of -0.36 (Appendix 11a). This means that when predicting a respondent’s level of ‘project support’ on a 5-point scale from strongly agree (5) to strongly disagree (1), the regression model would predict a score 0.36 lower (less is agreement) for respondents living within viewing distance of the project in comparison to all other respondents.

When different variables and variable groups were entered into the regression model as a series of ‘third steps’, the most significant R^2 changes in project support were caused by the following variable or variable groups (starting with the largest): perceived benefits and negative impacts of wind energy in general, the perception that project is ‘my community’s, perceived project benefits and negative impacts, and perceived inequality of benefits and negative impacts within the community (Figure 12). The R^2 change represents the additional variance accounted for by the variable or variable group after general support for wind energy and distance from project have been accounted for. Perceived benefits and perceptions that the project is “my community’s” were associated with higher levels of project support, while perceived negative impacts and perceived unequal benefits and negative impacts within the community were associated with lower levels of project support (Appendix 11g,h,j).

Perceptions surrounding participation resulted in a smaller although statistically significant R^2 change (Figure 12), with stronger perceived participation opportunities associated with higher levels of support (Appendix 11f). Variables related to investment and local project initiation did not result in statistically significant R^2 changes.

For comparison, the variable(s) from each of these 'third steps' were also entered into the regression equation alone, i.e. without 'general support for wind energy' and the distance dummy variables (Figure 12). When entered alone, perceptions of benefits and negative impacts are even more associated with project support than is general support for wind energy.

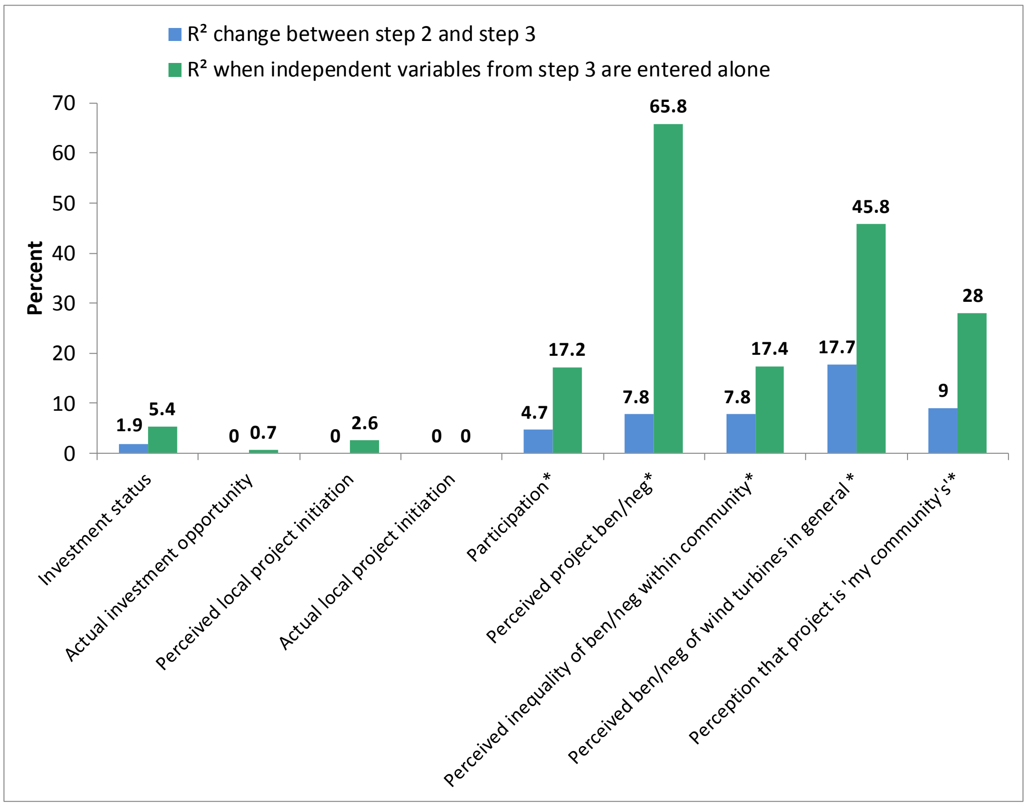

Figure 12 Stepwise multiple regression analysis for the dependent variable 'project support' (response to the statement 'I am in support of this wind energy project') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects.
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45
Notes: Method: Step 1: enter 'general support for wind energy', R^2 = 43.4%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 2.1%, p = 0.096. Step 3: enter other independent variables. Each 'step 3' is represented independently on the horizontal axis. ben/neg = benefits and negative impacts. * = statistically significant R^2 change at the 0.05 level (see Appendix 12 for p values)

4.4.2. *Predicting a Sense of "Community Ownership" of the Project*

The same step-wise multiple regression procedure was carried out for the dependent variable 'sense of "community ownership" ' (response to the statement "This wind energy project is my community's project"), with "general support for wind energy" entered first and accounting for a statistically significant 14.1% of the variance, $F(1,126) = 20.69$, $p < 0.001$. When 'distance from project' was entered next into the regression equation, the R^2 change of 0.4% was not statistically significant, $p = 0.906$, and neither of the dummy variables were significant predictors (Appendix 13a). That is, perceptions of that a project is "my community's" had no relationship with whether the respondent was within viewing distance of the project, within 5 km of the project, or further than 5 km from the project.

When other variables or variables groups where entered independently as a third step, the largest R^2 changes were caused by (starting with the largest): perceptions of project benefits and negative impacts, participation, and perceived local project initiation (Figure 13). Respondents who perceived higher levels of participation were more likely to have a sense of "community ownership" of the project (Appendix 13f). The perception that the idea for the project came from within the local community (local project initiation) was associated with a stronger sense of "community ownership" in comparison to those who did not know where the idea for the project came from, while the perception that the idea for the project came from outside of the local community (external project initiation) was associated with a weaker sense of "community ownership".

Dummy variables for investment status (whether the respondent was a shareholder, a non-shareholder, and whether the opportunity to invest was perceived as available) also resulted in a statistically significant R^2 change, although it was smaller than participation and perceived project initiation (Figure 13). In comparison to shareholders, a sense of "community ownership" was predicted to be 0.92 lower on the 5-point scale for those who did not believe the opportunity to invest was available but would have liked to invest (Appendix 13b). Interestingly, whether the project was *actually* locally initiated and whether investment opportunities were *actually* available accounted for slightly less of the variance than whether the project was *perceived* to be locally initiated and whether investment opportunities were *perceived* to be available, respectively (Figure 13).

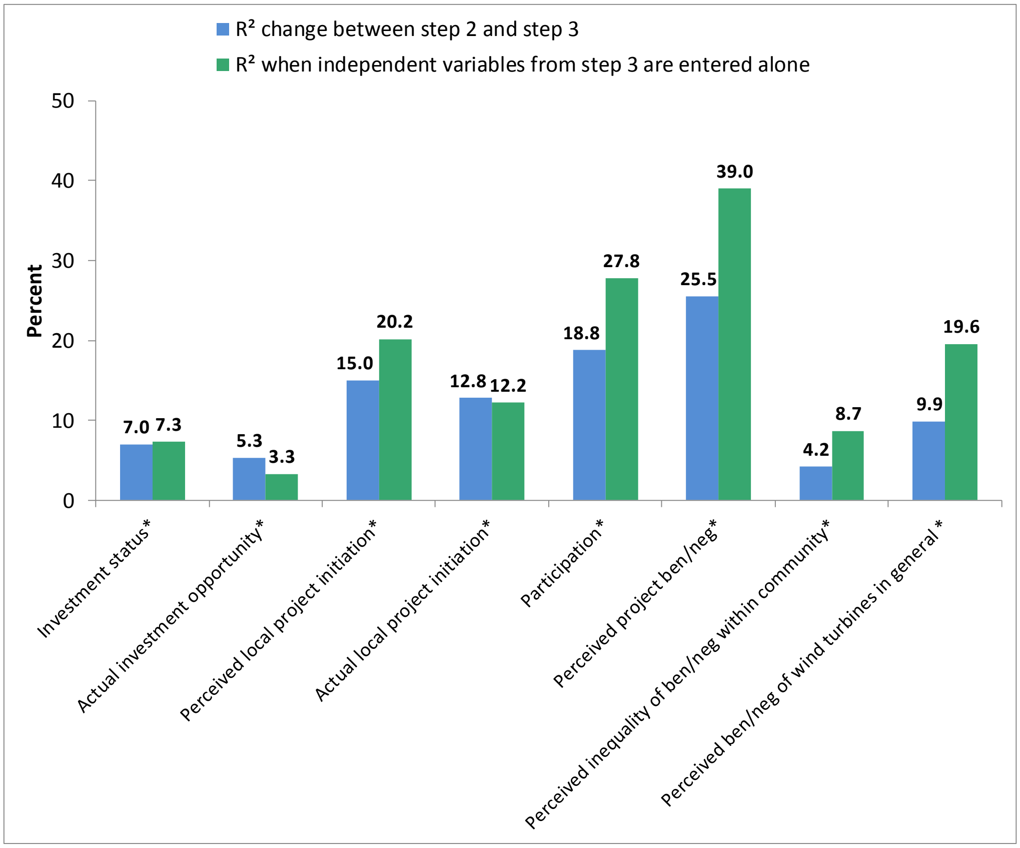

Figure 13 Stepwise multiple regression analysis for the dependent variable 'perception that project is 'my community's' (response to the statement 'This wind energy project is my community's project') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects.

Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

Notes: Method: Step 1: enter 'general support for wind energy', R^2 = 14.4%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 0.4%, p = 0.906. Step 3: enter other independent variables. Each 'step 3' is represented independently on the horizontal axis. ben/neg = benefits and negative impacts. * = statistically significant R^2 change at the 0.05 level (see Appendix 14 for p values)

4.4.3. Predicting Perceptions of Benefits and Negative Impacts

For the dependent variable "perceptions of benefits" (average of responses to the statements "this wind energy project benefits me" and "this wind energy project benefits my community"), "general support for wind energy" was entered first and accounted for 30.1% of the variance, F (1,126) = 54.158, p <0.001. The variables representing distance from the project entered as the second step did not account for a significant amount of the variance in "perceptions of benefits", R^2 change = 0.1%, p = 0.901.

In the third step, the largest R^2 changes were produced by the following variables or variable groups (starting with the largest): participation, perceived benefits and negative impacts of wind energy in general, and perceived unequal benefits and negative impacts within the community (Figure 14). Higher perceived participation and participation opportunities and a more

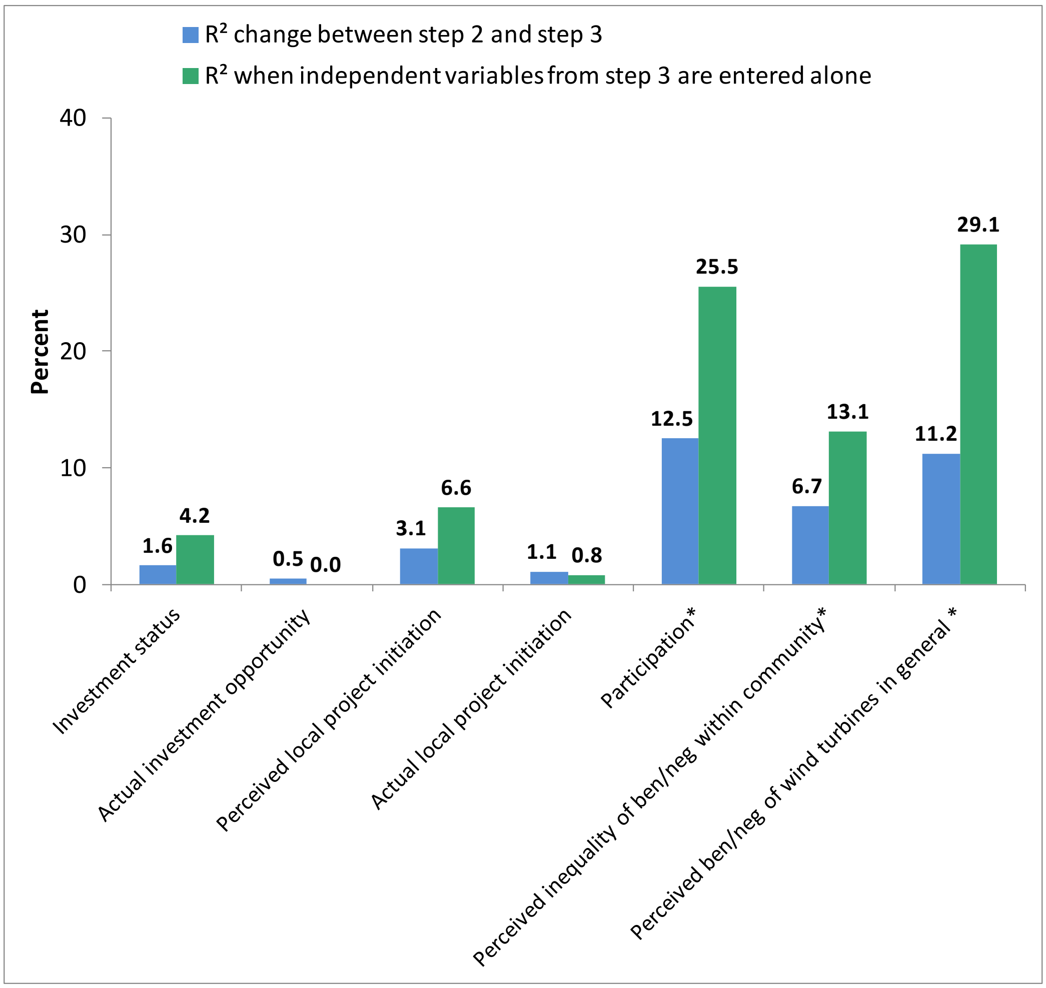

Figure 14 Stepwise multiple regression analysis for the dependent variable 'perceived project benefits' (combined responses to the statements that the wind energy project benefits: 'me' and 'my community') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects.

Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

Notes: Method: Step 1: enter 'general support for wind energy', R^2 = 30.1%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 0.1%, p = 0.901. Step 3: enter other independent variables. Each 'step 3' is represented independently on the horizontal axis. ben/neg = benefits and negative impacts. * = statistically significant R^2 change at the 0.05 level (see Appendix 16 for p values) favourable evaluation of the general benefits and negative impacts of wind energy were associated within stronger perceptions of project benefits (Appendix 15f,h). Variables surrounding investment and local project initiation did not result in statistically significant R^2 changes in perceptions of benefits.

For the dependent variables "perceptions of negative impacts", (average of responses to the statements "this wind energy project negatively impacts me" and "this wind energy project negatively impacts my community"), general support was again entered first and accounted for 20.9% of the variance, $F(1,126) = 33.23$, $p < 0.001$. The distance dummy variables entered in step two did not result in a statistically significant R^2 change, R^2 change = 1.5%, $p = 0.307$.

When additional variables or variable groups were added to the regression model in the third step, the largest R^2 changes were caused by (starting with the largest): perceived benefits and negative impacts of wind energy in general, perceived inequality of benefits and negative impacts within the community, and participation (Figure 15). A favourable evaluation of the general benefits and negative impacts of wind energy, lower perceptions of inequality within the community, and more perceived participation opportunities were associated with lower perceptions of negative impacts (Appendix 17f,g,h). Variables surrounding investment and local project initiation did not result in statistically significant R^2 changes in perceptions of negative impacts.

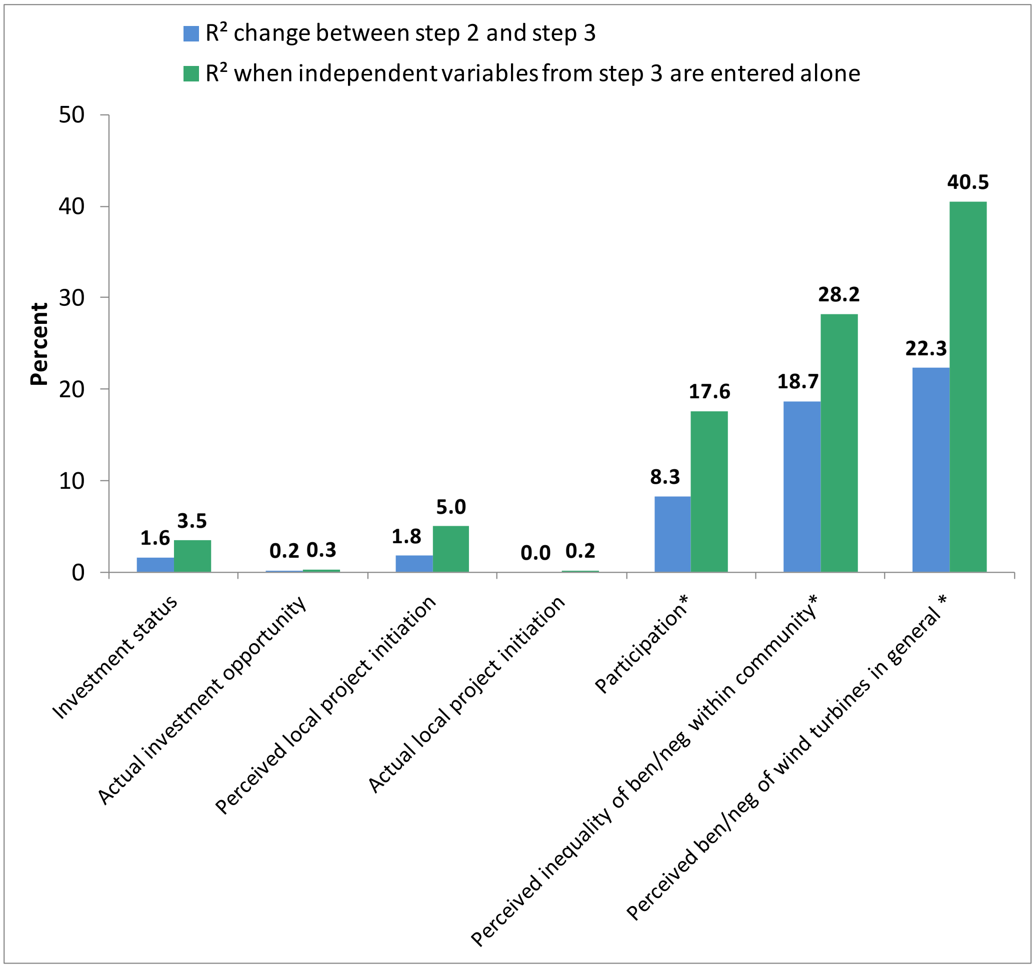

Figure 15 Stepwise multiple regression analysis for the dependent variable 'perceived project negative impacts' (combined responses to the statements that the wind energy project negatively impacts: 'me' and 'my community') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects.

Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

Notes: Method: Step 1: enter 'general support for wind energy', R^2 = 20.9%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 1.5%, p = 0.307. Step 3: enter other independent variables. Each 'step 3' is represented independently on the horizontal axis. ben/neg = benefits and negative impacts. * = statistically significant R^2 change at the 0.05 level (see Appendix 18 for p values)

4.4.4. Summary of Regression Analyses

A summary table of the regression analyses focusing on the variables of the research questions is provided in Table 7. Participation in the project's planning process had a relationship of varying strength with local project support, a local sense of "community ownership", and local perceptions of benefits and negative impacts. Local project initiation and local investment opportunities only had a relationship with a sense of "community ownership".

Table 7 Relationship between the following three predictors: local project initiation, local investment opportunities, and local participation, and the following four dependent variables: project support, a sense of "community ownership", perceptions of benefits and perceptions of negative impacts.

Predictor Variable or Variable Group		Dependent Variable			
		Project support	Sense of "community ownership"	Perceived benefits	Perceived negative impacts
	Local project initiation	0% (2.6%)	**15.0% (20.2%)**	3.1% (6.6%)	1.8% (5.0%)
	Local investment opportunities	1.9% (5.4%)	**7.0% (7.3%)**	1.6% (4.2%)	1.6% (3.5%)
	Local participation	**4.7% (17.2%)**	**18.8% (27.8%)**	**12.5% (25.5%)**	**8.3% (17.6%)**

Legend:

No relationship	Weakest relationship	Moderate relationship	Strongest relationship
0 to 3.9% R^2 change	4 to 9.9 % R^2 change	10 to 14.9% R^2 change	15% + R^2 change

Note: Relationship is displayed as the R^2 change occurring between the second and third step in a stepwise multiple regression analysis, with the following method: Step 1: enter general support for wind energy. Step 2: enter distance of residence from wind energy project. Step 3: either local project initiation *or* local investment opportunities *or* local participation. R^2 of variable or variable group when entered into the regression equation alone displayed in brackets. Statistically significant R^2 values in bold ($p<0.05$). Data used is a combination of Maryvale: n = 29; Spiddle Hill: n = 54; and Watt Section: n = 45. Values in parentheses = R^2 of the independent variables from step 3 when entered into the regressions equation alone (without step 1 and step 2 variables).

4.3. Perceptions of Benefits and Negative Impacts

When asked how the wind energy project benefits the respondent personally and the respondent's community, the environmental benefit of wind energy was overwhelmingly the most frequently mentioned benefit to both the individual and the community (Table 8). The responses related to the environmental benefits of wind energy included references to wind energy being generally better for the environment, more sustainable, non-polluting/clean, reducing greenhouse gas/carbon emissions, reducing the need for fossil fuels, and being a renewable source of energy. The second most frequently mentioned benefit was the potential for lower energy prices in the future. Other commonly mentioned benefits included revenue for shareholders, jobs, and supply of electricity. For benefits to the community, economic benefits taken together (revenue to shareholders, jobs, and other financial profits or savings to the community) are mentioned approximately two-thirds as many times (43% of respondents) as environmental benefits (61% of respondents). Note that 48% of all 128 respondents answered the question of how the project benefits them personally, while 55% of respondents answered the question of how the project benefits their community. Furthermore, it is interesting to note that in both sections on benefits, two respondents expressed that they and their community would not benefit because they were not supplied with the electricity from the project, while two respondents mentioned that their power bills have not gone down.

Table 8 Perceived benefits of the wind energy projects to individuals and their communities.

	Benefits Me	**Benefits My Community**
Better for the environment	82% (50)	61% (43)
Lower or more stable cost of electricity in the future	20% (12)	23% (16)
Revenue for shareholders	10% (6)	10% (7)
Jobs	0% (0)	10% (7)
Other financial profits or savings to the community	0% (0)	4% (3)
Supply of electricity	7% (4)	10% (7)
Positive feelings/pride/hope from helping the environment	3% (2)	6% (4)
Demonstrating that wind is possible/leadership for others	3% (2)	6% (4)
Publicity for community	0% (0)	3% (2)
Technological advancement/progress	3% (2)	1% (1)
Bringing people together	0% (0)	1% (1)
Other	3% (2)	3% (2)

Notes: Consists of coded responses to the questions “If you agree that the wind project benefits *you*, briefly state how” and “If you agree that the wind project benefits *your community*, briefly state how”). Percent of respondents who mentioned the given benefits out of all respondents who answered the question (for “benefits me”, n = 61; for “benefits my community”, n = 71), with number of times mentioned in brackets. Total values are greater than 100% since some respondents mentioned multiple benefits.

When asked how the wind energy project negatively impacts (if at all) the respondent personally, the most commonly mentioned negative impact was the visual/aesthetic impact of the turbines (Table 9). Noise and concern regarding lower property values were the next most commonly mentioned negative impacts. When asked how the wind energy project negatively impacts (if at all) the respondent’s community, the most commonly mentioned responses were noise and that the turbines were in general too close to homes, followed by the negative visual impact of the turbines. Note that 13% of all 128 respondents answered the question of how the project negatively impacts them personally, while 15% of respondents answered the question of how the project negatively impacts their community.

Table 9 Perceived negative impacts of the wind energy projects to individuals and their communities.

	Negatively Impacts Me	Negatively Impacts My Community
Negative impact on the landscape/aesthetics	50% (8)	21% (4)
Noise	38% (6)	26% (5)
Lower property values	25% (4)	16% (3)
Too close to homes in general	19% (3)	26% (5)
Physical health effects and/or infrasound	13% (2)	5% (1)
Have to pay as ratepayers	6% (1)	16% (3)
Community discord/dividing friendships	6% (1)	16% (3)
Fewer jobs than fossil fuel generation	6% (1)	5% (1)
Shadow/strobe effect	0% (0)	5% (1)
Company not listening to residents	0% (0)	11% (2)
Involvement of Emera	6% (1)	0% (0)
Upsets neighbours dogs	0% (0)	5% (1)
Drives away wildlife	0% (0)	5% (1)

Notes: Consists of coded responses to the questions "If you agree that the wind project negatively impacts *you*, briefly state how" and "If you agree that the wind project negatively impacts *your community*, briefly state how"). Percent of respondents who mentioned the given negative impacts out of all respondents who answered the question (for "negatively impacts me", n = 16; for "negatively impacts my community", n = 19), with number of times mentioned in brackets. Note: total values are greater than 100% since some respondents mentioned multiple negative impacts.

4.4. Perceptions Surrounding Investment Opportunities

Of all of the respondents, 91.4% either agreed or strongly agreed with the statement that "community members should be given the opportunity to invest in the project", while the other 8.6% were neutral to the statement. ANOVA showed that there was a significant difference among the three communities for the strength of the response to the idea that shareholding should be available, $F(2,125) = 4.70$, $p = 0.011$. Scheffé's test showed that Spiddle Hill respondents agreed more strongly that shareholding should be available than Watt Section respondents, $p = 0.016$ (there was no significant difference between Spiddle Hill and Maryvale respondents, $p = 0.936$, or between Maryvale and Watt Section respondents, $p = 0.106$).

Additionally, 68.8% of respondents either agreed or strongly agreed with the statement that "a fund should be set up so that part of the revenue from the project goes back to the entire community (ex. to renovate the library or build a playground)", while 20.3% were neutral to the statement and 10.9% either disagreed or strongly disagreed with the statement. ANOVA showed that there was a significant difference among the responses in the three communities to the idea that a community fund should be set up, $F(2,125) = 10.17$, $p < 0.001$ (Figure 16). In particular, Scheffé's test showed that Spiddle Hill respondents showed significantly less agreement that a community fund should be set up than both Watt Section respondents, $p = 0.002$, and Maryvale respondents, $p = 0.001$ (there was no significant difference between Watt Section and Maryvale respondents, $p = 0.754$).

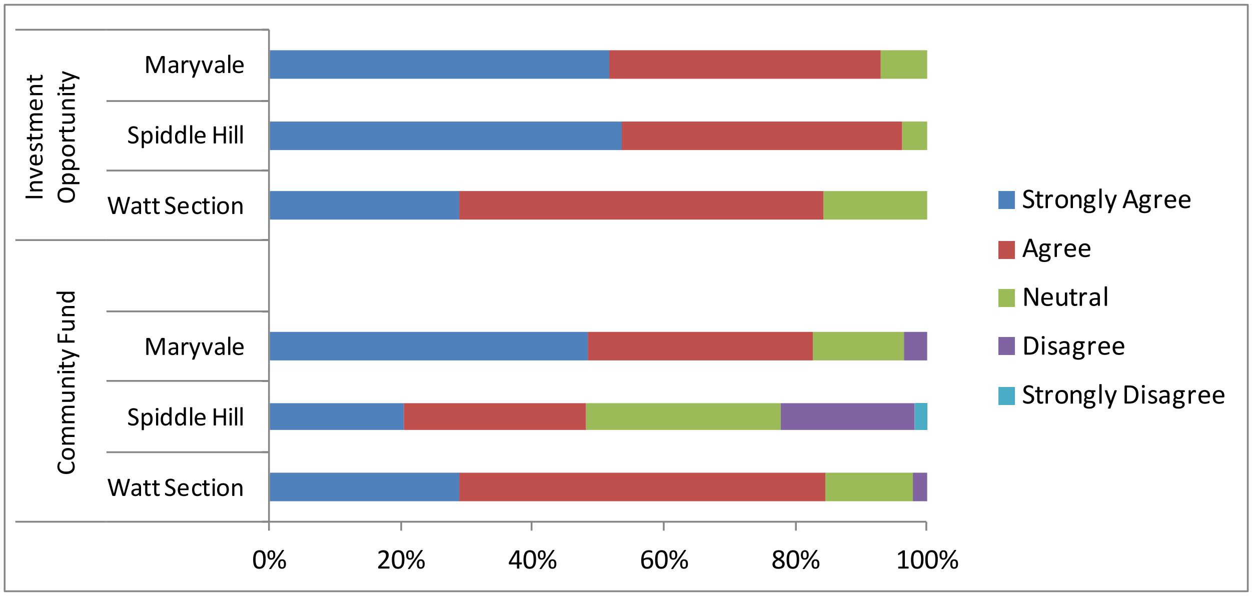

Figure 16 Level of agreement or disagree of respondents from each of the three communities to the statements "community members should be given the opportunity to invest in the project" and "a fund should be set up so that part of the revenue from the project goes back to the entire community (ex. to renovate the library or build a playground)".
Maryvale: n = 29; Spiddle Hill: n = 54; Watt Section: n = 45

Out of the total 57 respondents who believed that the opportunity to invest was available to local residents, 13 (22.8%) had invested (all of which were investments in the Spiddle Hill project). Out of the remaining respondents who did not believe that the opportunity to invest was available, 50.7% said they would have invested in the project if the opportunity had been available (assuming a minimum investment of $1,000). The most commonly selected reasons for not investing or for not investing had the opportunity been available were, starting with the most common, that the minimum investment amount was too high, lack of interest in investing in the project, and lack of funds available for investment (Table 10).

Table 10 Reasons for not investing in a local wind energy project, when the opportunity was available or if the opportunity had been available.

	Investment Opportunity Perceived as Available	Investment Opportunity Perceived as Not Available
Minimum investment amount too high	34.1% (15)	44.1% (15)
Not interested	25.0% (11)	20.6% (7)
Do not have funds available	20.5% (9)	17.6% (6)
Too risky	6.8% (3)	11.8% (4)
Other	14.7% (6)	5.8% (2)

Notes: n = 44 for number of respondents providing reasons for not investing when they believed the opportunity was available. n = 34 for number of respondents providing reasons they would not have invested had the opportunity been available, among those who did not believe the opportunity was available. Percent of times selected out of respondents answering the question, with number of times selected out of respondents answering the question in brackets.

Chapter 5: Discussion

5.1. Project Support

A clear result of the survey is that it showed a very high level of support for all three wind energy projects. No significant difference in this high level of support was found between the three projects, despite their differences in terms of whether or not they were locally initiated and whether or not local investment opportunities were available. Furthermore, whether a project was locally or externally initiated, whether or not a respondent was a shareholder, and whether or not local investment opportunities were available were all not found to be significant predictors of project support in the multiple regression analyses. Contrary to the hypotheses, this suggests that local project initiation and local investment opportunities did not have an influence on levels of project support for these three wind energy projects.

This finding appears to differ from other studies (ex. Musall & Kuik, 2011; Warren & McFadyen, 2010) and literature reviews (ex. Schreuer & Weismeier-Sammer, 2010) that have suggested that there are higher levels of support for locally initiated and/or owned wind energy projects. However, it is noteworthy that these other studies found a higher *degree* of support for locally-based projects, but did not find a complete divergence of opinions (i.e. the difference was in terms of strong support versus moderate support, rather than a difference in terms of strong support versus strong opposition). Since these studies found general local support for both local and external projects, and only somewhat higher levels of support for the locally-based projects, it is not completely surprising that no differences in levels of support were found among the three projects in the present study.

A significant although fairly weak relationship was found between local participation and local project support. Although Spiddle Hill respondents were more likely to agree that the opportunity was available for them to participate in the project planning process, that the community played an important role in the project planning process, and that the project planning process was fair, there was no difference among the three projects in terms of whether or not respondents actually *did* participate in the planning process and in the perception that personal and community opinions were taken into consideration. Therefore, the fact that project support did not differ among the three communities does not necessarily mean there is no relationship between perceptions of the project planning process and project support. Rather, the regression analysis showed a weaker but statistically significant relationship between perceptions regarding participation in and fairness of the project planning process and project support. This finding seems to agree with a study by McLaren Loring (2007) that found a moderately positive relationship between levels of participation and levels of project support, but noted that participation was not necessary to generate high levels of project support in all cases. It is also similar to the suggestion of Breukers and Wolsink (2007) that involvement in the planning process can be helpful in some instances but not others, in that it may help in gaining the support of those who are undecided about the project but may not be able to change the opinions of those who are fundamentally opposed to wind energy.

The factors that did have the strongest relationship with levels of project support included general support for wind energy as a power source and perceptions of the benefits and negative impacts of the project, which were strongly correlated with each other. General support for wind energy accounted for 43% of the variance in project support, which is similar to Jones and Eiser's (2009) study that found general attitudes to wind energy to be one of the strongest predictors of project support, accounting for approximately 40% of the variance.

Furthermore, perceptions of benefits and negative impacts of the project had the strongest correlation with project support, accounting for 65% of the variance in project support when entered into the regression model alone. This is similar to the finding of Cass, Walker, and Devine-Wright (2010) that found that perceived benefits and costs of a renewable energy project were the strongest predictors of project support, even more so than perceptions regarding the technology sector, the fairness of the consultation process, and trust towards the developer. Additionally, the present study found a degree of relationship between perceptions of inequality and project support, in that those who believed that benefits and negative impacts were distributed unequally within the community were more likely to have lower levels of support for the projects. This is in agreement with the suggestions by others that the perceived fairness of the distribution of benefits and costs has an influence on project support (ex. Agterbosch, Meertens, & Vermeulen, 2009; Wolsink, 2007).

There was a very small indication of NIMBYism, in that those within viewing distance of a project had slightly lower levels of support for the project after general support for wind energy had been controlled for. However, this relationship was very weak in comparison to other factors. This is similar to the finding of Jones & Eiser (2009) that people closest to proposed projects sites were somewhat more likely to be less supportive of those projects, but that there were many other factors that also accounted for differences in levels of project support. Thus, the present study supports previous contentions that NIMBY is too simplistic an explanation for local opposition to wind energy projects (ex. Devine-Wright, 2005; 2009; Wolsink, 2007).

While the above findings show that for these three wind energy projects, general attitudes to wind energy and perceptions of benefits and negative impacts were much more strongly related to levels of project support than local project initiation, local investment opportunities, and local participation, the results should not be interpreted as proof that "how" a wind energy project is developed has no influence on local support. For one thing, it is important to remember that all three projects were fairly small-scale (one to four turbines). The literature has suggested that small-scale projects tend to be more positively perceived than large-scale wind energy developments (ex. Devine-Wright, 2005; Jegen & Audet, 2011). Therefore, while no difference was found in levels of support for these three small-scale projects, it is possible that differences in project support would have been found if studying three large-scale projects developed with differing levels of local involvement since these projects may in general be more likely to generate local opposition.

Furthermore, the small but statistically significant relationship of local participation with project support suggests that how the developer interacts with the local community does matter to local people. While time constraints of the study meant that it was not possible to conduct interviews with local residents to gain a more in-depth understanding of the relationship between the developers and the local communities, the high levels of support for all three projects seem to suggest that all three developers did not do anything to damage relations with the communities to an extent that would have led to significant local opposition. However, had any of the developers, regardless of whether or not they were local, failed to maintain positive relations with the local communities, levels of local support may have been lower. Other studies have suggested that trust in the developer (Walker, Devine-Wright, Hunter, High, & Evans, 2010) and having the opportunity to have one's opinion heard (Huijts, Molin, & Steg, 2012) are positively correlated with levels of support. The present study seems to support the idea that other aspects of the developer's interaction with the local community may be more important than whether or not the developer is local. Therefore, perhaps the underlying reason for strong support for locally initiated and owned projects could be less about where the project idea came from or who owns the project, and more about the perception that the local community was part of the planning process and was treated with fairness and respect.

Additionally, these findings must be considered in light of the fact that only one model of "community" wind energy – the CEDIF – was examined. Although CEDIFs are relatively small companies, started from within Nova Scotia, and offer investment opportunities to Nova Scotians, they still are businesses. Therefore, although no difference in levels of project support was found between the two CEDIFs and the private developer from outside of the province, this does not mean that there would be no difference in levels of support for wind energy projects developed by private developers and those developed by other "community-based" entities, such as local charities, municipalities, or co-operatives.

Moreover, it is possible that studying a greater number of projects would have revealed trends that were not found by studying only three projects. Jones and Eiser's (2009) study found a positive correlation between community participation and perceptions of wind energy projects, yet outliers indicated that participation was neither necessary nor sufficient for high levels of support. Similarly, other studies have examined both locally-initiated projects that have faced opposition (Walker et al., 2010) and externally-initiated projects that have been supported by local communities (McLaren Loring, 2007), which also suggests that local project initiation is neither sufficient nor necessary for high levels of local support. However, this does not preclude the possibility that further studies of a larger number of projects might find an overall relationship between local initiation and project support.

5.2. Sense of "Community Ownership"

Local project initiation, local investment opportunities, and local participation all had some degree of positive relationship with a sense of "community ownership" (that is, agreement with the statement that "the wind energy project is *my* community's project"). These relationships are suggested by the fact that Spiddle Hill respondents had a stronger sense of "community ownership" of the project than Watt Section and Maryvale respondents. The Spiddle Hill project was locally initiated, had opportunities for local investment, and had higher perceptions that the opportunity was available for participation in the project's planning process. Multiple regression analysis showed that perceptions regarding community participation in and the fairness of the project planning process had the strongest relationship with a sense of "community ownership" out of these three variables, followed by local project initiation. A sense of "community ownership" also showed a relationship with investment opportunities, although this was to a considerably lesser degree than participation and local project initiation. These findings lend a degree of support to the initial hypotheses surrounding a sense of "community ownership".

Furthermore, a sense of "community ownership" showed a relationship with general support for wind energy and with perceptions of benefits for the community, as well as a negative relationship with perceptions of benefits for entities external to the community. This suggests that a degree of positivity towards the project is important for local residents to feel that the project is "theirs". The lack of relationship between a sense of "community ownership" and distance from the project indicates that this sense of ownership can extend beyond those who live right near the project to residents of nearby towns who may become directly involved in the project or may know others who are involved in the project. It seems, then, that a variety of factors can influence whether or not an individual agrees that a wind energy project is "my community's", and that a sense of "community ownership" is some function of local participation, local project initiation, and to a lesser degree local investment opportunities, as well as positive perceptions towards wind energy and perceptions that the project is beneficial to the community. This finding is in agreement with Walker and Devine-Wright's (2008) suggestion that "community" renewable energy can mean different things for different people, but that the ideal "community" renewable energy project would have a strong degree of both local involvement in the project and local benefits from the project.

The relatively weak relationship between a sense of “community ownership” and investment opportunities suggests that offering the opportunity to invest in a project is not necessarily sufficient to make local residents feel that the project is “theirs”. This can be illustrated by the case of Watt Section, where the opportunity was theoretically available for local residents to invest in the project, but most respondents were not aware of this opportunity and most were not in agreement that the project was “my community’s”. Furthermore, while awareness of investment opportunities had a slightly stronger relationship with a sense of “community ownership” than actual investment opportunities, the relationship was still quite weak in comparison to other factors such as local participation and local project initiation. This suggests that if developers or policy-makers want to promote a sense of “community ownership” of wind energy projects among local residents, it may be necessary to place a greater emphasis on including local residents in the project planning process than simply offering them the opportunity to invest in the project. Therefore, developers should not regard offering local investment opportunities as a substitute for meaningful engagement with local communities. Walker and Devine-Wright (2008) similarly suggested that there is value when local people are meaningfully involved in “community” renewable energy projects as opposed to only receiving the benefits of the projects.

In discussing a sense of “community ownership” of wind energy projects, it is reasonable to consider what the value of this sense of “community ownership” might be. While the regression analyses did find a statistically significant positive relationship between the perception that a project is “my community’s” and project support, this influence was not large enough to generate an overall higher level of support for the Spiddle Hill project (where there was the strongest sense of “community ownership”) in comparison to the other two projects. This suggests that working to create a sense of “community ownership” surrounding a project is not necessary to achieve high levels of project support in all instances and is also not a guarantee of high levels of project support. However, it is possible to surmise that there is something intrinsically valuable about community members having a sense of "ownership" over the project, and perhaps that this sense of ownership may lead individuals to be more active supporters of wind energy. For example, the substantially higher response rates to the survey in Spiddle Hill may suggest that a higher interest in wind energy has been generated in that community, and the residents may be more willing to take action to express their support for wind energy. To be clear, these suppositions regarding the value of a sense of "community ownership" are beyond the scope of this study and would have to be explored in future research. Yet if a sense of "community ownership" can be regarded as a positive feeling towards a wind energy project above and beyond simple support for the project, the current study does suggest the local participation opportunities, local project initiation, and local investment opportunities are related to at least some degree with stronger positive attitudes towards wind energy projects among local residents.

5.3. Perceptions of Benefits and Negative Impacts

There was a considerable relationship between local perceptions of benefits and negative impacts of the wind energy projects and perceived local participation in the project planning process, but no relationship between perceptions of benefits and negative impacts and either local project initiation or local investment opportunities. This was demonstrated by the fact that perceptions of benefits and negative impacts for the individual respondents and their communities did not differ among the three projects, and was confirmed by the multiple regression analyses. This is in agreement with the hypothesis that participation may influence perceptions of benefits and negative impacts, but does not support the hypothesis that local project initiation and local investment opportunities influence perceptions of benefits and negative impacts. In addition to being associated with local perceptions regarding participation, perceptions of benefits and negative impacts of a project were not surprisingly associated with perceptions of the general benefits and negative impacts of wind turbines and general support for wind energy.

Understanding local perceptions of benefits and negative impacts is important since these perceptions have been shown to be closely associated with local project support, both by the current study and previous studies (ex. Cass, Walker, & Devine-Wright, 2010; Toke, 2005b). This study found that the most commonly stated benefits of the wind energy projects were related to the environmental benefits of a clean, renewable energy source. Economic benefits, in particular the potential for lower electricity prices in the future, were mentioned frequently as well, but considerably less so than the environmental benefits. This is similar to Jones and Eiser's (2009) finding that both (a) a belief that climate change is human-caused, and (b) expectations of personal economic gain, were significant predictors of project support. However, this differs from Slattery et al.'s (2012) study that found that economic benefits such as jobs were a more important determinant of levels of local support than environmental aspects. This could perhaps be a geographical difference, considering that the study took place in the American states of Iowa and Texas, where perceptions may differ from Nova Scotia.

In terms of negative impacts, the most commonly mentioned negative impacts in this study were related to aesthetics, noise and the location of turbines in too close proximity to homes. This is in agreement with a literature review that found that negative visual impacts and noise were the most commonly reported reasons for negative attitudes towards wind energy projects (Devine-Wright, 2005).

Since the most commonly mentioned benefit of wind energy projects was not related to economic benefits and since perceptions of benefits did not differ among the three communities despite differences in whether investment opportunities were available and whether the project was perceived as having financial ownership within the community, it seems that offering financial incentives may not in all cases be necessary to convince individuals that wind energy projects are beneficial. Furthermore, since perceptions of negative impacts did not differ among the three communities, it appears that offering investment opportunities or local financial benefits did not effectively reduce negative perceptions. Therefore, in this study, financial benefits to the community did not lead to a more favourable evaluation of the project's benefits and costs, and in turn did not lead to higher project support. Jones and Eiser (2009) similarly suggested that offering financial incentives will not necessarily be an effective means of reducing local opposition to wind energy projects, since they found that opponents often did not find financial incentives attractive.

However, this is not to suggest that the opportunity to invest in wind energy projects should not be made available to local residents, since the overwhelming majority (91.4%) agreed that the opportunity to invest should be available. Furthermore, the opportunity to invest had even higher support than setting up a community fund that might offer benefits to the whole community. While other authours have noted that shareholding may raise concerns regarding fairness, since only those who are able and willing to invest will receive benefits (Walker, 2008), it appears that respondents to this survey did not negatively appraise the unequal distribution of benefits resulting from shareholding. The perception that the wind energy project "benefits some members of the community more than others" was not a significant predictor of project support or perceptions of benefits and negative impacts, and project support and perceptions of benefits and negative impacts did not differ between shareholders and non-shareholders who believed that shareholding was available. This suggests that while people may acknowledge that shareholding results in an unequal distribution of benefits, the respondents of the survey did not seem dissatisfied with this. Therefore, while other studies have found that communities have resented landowners who have profited from wind turbines on their land while the rest of the community had to deal with the negative visual impacts (Gross, 2007; Jobert, Laborgne, & Mimler, 2007), this study did not find similar resentment towards shareholders. On the other hand, the perception that the wind energy project "negatively impacts some members of the community more than others" was a significant predictor leading to lower project support, lower perceptions of benefits, and higher perceptions of negative impacts. This finding is similar to previous suggestions that opposition can arise when people feel that they are being forced to deal with unfair negative impacts (Wolsink, 2007). In summary, the present study suggests that perceptions of unequal negative impacts have a greater influence on perceptions than perceptions of unequal benefits.

5.4. Implications for Wind Energy Development

The research has a number of potential implications for wind energy developers and wind energy policy. Many of these implications may not be new insights but rather confirmation of what many wind energy developers and policymakers may already know and may already be doing well.

First, the high level of overall support among respondents from all three projects is promising in that it suggests the local communities are generally satisfied with these wind energy projects that have now been in their communities for several years. It is important to keep in mind that the response rate of the survey was fairly low, so the results cannot necessarily be generalized to the entire communities. However, it seems likely that if there was widespread strong opposition to these wind energy projects, the response rate itself might have turned out higher as a result of dissatisfied community members wanting to voice their concerns. This is not to overlook the fact that there were some concerns about the projects expressed by a very small number of respondents. Therefore, it remains important that developers continue working to adequately address local concerns that arise, even in situations where there is overall very high support for the project within the community.

Secondly, given that being within viewing distance of a project was only weakly correlated with lower project support and that many other factors were stronger predictors of project support, it may be helpful to move away from labelling local opposition as NIMBY, which carries a negative connotation. A better approach would be to ensure that local concerns are regarded as legitimate and given the appropriate space to be heard and considered.

Additionally, the fact the levels of support did not significantly differ depending on whether or not the project was locally initiated suggests that developers from outside of the immediate local community wanting to initiate a project in a particular area may not be at an immediate disadvantage in gaining local support. Since perceptions related to benefits, negative impacts, participation and community engagement were in fact significant predictors of local support, it seems that it is important for developers from both within and outside of the local community to meaningfully engage with the community, involve them in the planning process, and address their concerns regarding the benefits and negative impacts of the project. If this is done well, outside developers appear to be able to gain levels of local support that are just as high as in locally initiated projects.

In relation to offering local residents the opportunity to invest in wind energy projects, this study suggests to developers that such an opportunity is welcomed by local communities. However, it also suggests the importance of active outreach to local communities to inform them of investment opportunities, given that the Watt Section project was developed through a CEDIF yet 84% of respondents were not aware that the opportunity was available for local community members to invest in the project. Developers may also want to consider lowering the minimum investment amount, since this was identified as the most common reason for not investing in the project. Furthermore, the finding that investment and the opportunity to invest do not have a significant influence on local perceptions indicates that while developers may choose to use offering investment opportunities as a component of a public engagement strategy, it should not be considered a substitute for other ways of meaningfully engaging with local communities and listening to their concerns.

Moreover, since people perceive many benefits of local wind energy projects other than shareholding, and since perceptions of benefits did not differ according to whether or not shareholding was available, developers may want to continue strong promotion of these other benefits alongside the promotion of any investment opportunities. This is especially true since perceptions of benefits were a strong predictor of project support. The majority of people who perceived benefits of the wind energy projects seemed to connect with the more long-term, bigger-picture advantages of wind energy, that is, the benefits of a renewable, sustainable energy source and the prospects for lower and less volatile future electricity prices. There was a much smaller focus on immediate, direct economic benefits for the community such as jobs or revenue from investment. This suggests that developers would do well to help people gain a better appreciation for these long-term benefits of wind energy, in particular the potential impact in stabilizing future energy prices for those who prioritize economics. This may also point towards the importance of educating youth about renewable energy through the education system, since an understanding of the benefits of wind energy is so closely tied with support of wind energy projects.

Finally, this study offers a number of insights regarding the question of what the meaning of “community” wind energy is. First, it suggests that a sense of “community ownership” over a wind energy project is different for different people and has no one determinant that stands out as strongest. However, it does appear that a CEDIF, despite being a type of profiting business, has been accepted by many residents in at least the community of Spiddle Hill as being a “community-based” method of developing wind energy. Furthermore, while local project initiation was a fairly strong predictor of agreement that the project belonged to the community, perceptions regarding local participation were a stronger predictor. This suggests that it may be possible for developers from outside of a local community to generate a sense of “community ownership” if they adequately engage and involve the local community.

Although investment opportunities were also a predictor of a sense of “community ownership”, they were less so than local participation and local project initiation. This suggests that investment opportunities alone should not be seen as sufficient for making a wind energy project a “community” project. Therefore, for policies such as the COMFIT that are seeking to promote “community” wind energy projects, this suggests that there is value in putting an emphasis on active community participation and local engagement strategies in addition to requiring that the local community has some financial stake in the project.

Some developers and policymakers may question what the actual value of a sense of “community ownership” is. This study did not find an overall difference in levels of project support based on whether the project had a “community-based” development model, suggesting that a sense of “community ownership” was not a requirement for high levels of project support.

The regression analysis did find that a very strong sense of "community ownership" had at least some level of association with the highest levels of project support, yet causal pathways cannot be assumed. Other than this, it is beyond the scope of this study to specify the value of a sense of "community ownership". However, it is the opinion of the author that there is some intrinsic value to a community feeling that a wind energy project is "theirs", and that this sense of "community ownership" may lead to more *active* support of future wind energy development. This would imply that programs like the COMFIT that seek to promote "community" wind energy bring added value to local communities. More in-depth studies would be needed to explore and confirm these ideas.

5.5. Limitations of the Study

A number of limitations of this study must be considered when interpreting the results. The relatively low response rates and the method of sampling mean that the samples may not be representative of the views of each of the communities. The case study approach employed means that the results from these three projects cannot be generalized to all wind energy projects in Nova Scotia, and it may be particularly problematic to generalize the results to substantially larger wind energy developments. The statistical methods employed have limitations in that they are based on correlation, and therefore claims of definitive causation cannot be made considering. Furthermore, additional tests to determine the suitability of the data for the chosen statistical methods may be needed in order to confirm the results found in this study.

To elaborate, a number of limitations of the survey mean that the samples may not be representative of the populations of each of the three communities, and therefore that the results can only be definitely attributed to the respondents themselves. The first limitation is the relatively low response rate to the survey. Due to the timeline of the project, the survey was sent out in December, which is a busy time of year for many people and may have contributed to the low response rate. While reminders and additional surveys are often sent out to reduce non-response error, time and budgetary constraints did not allow this. The low response rate may have introduced a non-response error, in that the characteristics of non-respondents are not known. For example, a large proportion of respondents were from the 50 to 70 year-old age category, which means that perspectives of younger age groups were less well represented. Furthermore, a low response rate may increase the potential for self-selection bias, in that those who are most likely to respond to a survey may be those with the strongest opinions about the topic. Therefore, while the survey found fairly high levels of support for wind energy and the wind energy projects, the actual levels of support may not be as high in the entire populations. However, it is also probable that if the wind energy project was controversial in the community and had a substantial number of opponents, one might expect a much larger response to the survey. The low response rates may be an indication that the communities are relatively content with the wind energy projects and consider them to be a non-issue.

A second limitation of the survey was the use of unaddressed admail to send the survey, which may have negatively affected the randomness and representativeness of the original sample that the survey was sent to. Time and budgetary constraints meant that a household list could not be obtained through Canada Post or through enumeration. Therefore, selection of the sample was up to the discretion of the letter carriers who delivered the survey. While the letter carrier's selection of houses would not likely be inherently biased, the sample was not strictly random and could have been unrepresentative if the surveys were simply delivered to the first residences on the route.

The representativeness of the sample may be of most concern for the Maryvale sample. Maryvale had the lowest response rates of the three communities, and only one response was received from within 5 km of the project. Due to the use of unaddressed admail, it is difficult to determine why the response rate from near the turbines in Maryvale was so extraordinarily low. This could be due to a variety of reasons, including any combination of the following possibilities:

-There may be relatively few houses within 5 km of the project.

- Perhaps people close to the project simply did not respond to the survey.

- Possibly people miscalculated the distance between their house and the turbines when filling out their distance from the turbines on the survey.
- Maybe the Canada Post letter carrier delivered few if any surveys to the houses near the turbines (since the route that includes the Maryvale has a fairly large geographic extent, the surveys designated for that route could have been delivered to houses farther away).

Therefore, since the majority of the responses for the Maryvale project were from Antigonish as opposed to closer to the project, this may cause a bias when making comparisons to the other two projects that had a larger number of responses from closer to the projects.

Moreover, the case study approach used here means that the results cannot necessarily be generalized to other wind energy projects in the province. Ideally, a larger number of projects would be studied, enabling replicates of the wind project development models being studied as well as other "community" wind project development models (for example, projects developed by municipalities, cooperatives, universities, First Nations group, etc.). Since only three projects were studied, there may have been unidentified circumstances unique to these projects that would not pertain to other projects.

There are also a number of potential limitations to the statistical methods used. As previously noted, an assumption was made that the five-point scale used in many of the questions was a continuous, interval scale so that parametric statistics could be used. In reality, the distance between each point on the scale may not be exactly the same (for example, respondents might perceive a greater difference between agree and strongly agree than between agree and neutral). Therefore, it is possible that this may have affected the results to a degree.

Multiple regression analysis is a relatively complex statistical technique, with many tests required to confirm the suitability of the models. Given the authour's relatively limited prior exposure to multiple regression analysis, the more complex tests required to confirm the suitability of the models were not performed. For example, while tests were not used to evaluate the degree to which the data was normally distributed, plots of the data suggested that not all of the variables were normally distributed, which is an assumption of both ANOVA and linear regression. Since methods were not employed to correct for this, it is possible that a degree of error was introduced into the results that was not accounted for.

Also, there is a possibility that unidentified confounding variables may impact the results obtained. In terms of the comparison between the three projects, there may be another confounding variable that is influencing local perceptions of the projects. As well, the projects are not completely identical, in terms of the size of the project, the length of time the project has been in operation, the distribution of the population surrounding the project, the size of the nearby town, etc. While it is thought that the impact of these differences will be fairly negligible, they cannot be completely ruled out as potential confounding factors. Furthermore, confounding variables not identified in the multiple regression analysis could have an impact on the results and make it appear that certain factors have a greater influence on the dependent variables than they actually do, in what has been referred to as omitted variable bias (Treiman, 2009).

The nature of multiple regression is to determine correlation as opposed to causation. Therefore, the analysis can provide an indication of association and may suggest the influence of one factor on another, but it cannot definitely determine that one factor causes another. For example, general support for wind energy may lead a person to support a wind energy project in the local community, but it is also possible that positive attitudes towards a local wind energy project may lead a person to have attitudes that are positive to wind energy in general.

Finally, since many variables within the study were quite highly correlated, multicollinearity becomes a concern in the regression analyses and can make it difficult to tease out the relative contributions and relationships among a number of variables. While these do not invalidate the procedure, they do mean that conclusions must be drawn with caution.

5.6. Suggestions for Future Research

A number of avenues for future research can be suggested. Studying a larger number of projects initiated by CEDIFs may reveal trends or differences that were not made evident in this study. It may also be interesting to study larger scale "community" and "non-community" wind energy projects, since larger projects may be prone to higher levels of opposition and may see a greater influence of a "community-based" development model on levels of support. If a similar study were conducted on a larger number of CEDIFs, it may be useful to employ methods to achieve higher survey response rates, such as sending out follow-up reminders or using a phone or door-to-door survey method.

While this research specifically analyzed wind energy projects developed by businesses – CEDIFS and a larger private development company – there are other wind energy development models that were not explored. Future research could examine how forms of "community" wind energy development, such as projects developed by local authorities, local charities, local cooperatives, and local First Nations band councils, compare to CEDIFs in terms of local perceptions. This could help solidify an understanding of how local participation influences perceptions, and also whether local initiation by groups that may be considered more "community-centered" than a local business may in fact have a stronger association with local perceptions.

Additionally, it may be interesting to conduct similar research specifically in communities in Nova Scotia where projects have been proposed but local opposition was a barrier to those projects proceeding. This may provide a clearer indication of what leads to local opposition even in the case of supposed "community" projects, and highlight ways that project proponents may be able to avoid local opposition or turn local opposition into support.

Considering that a sense of "community ownership" was not shown in this study to lead to overall higher levels of community support for a project, future research could explore other potential reasons that a sense of "community ownership" for wind energy projects may be valuable and worth promoting. The author believes that a sense of "community ownership" may have instrumental value for wind energy development in that it may lead to increased active support for wind energy policies or future wind energy projects, as well as intrinsic value for the communities involved in terms of increased community cohesion and a sense of belonging. With governments seeking to promote “community” renewable energy development, it would be useful to better understand the various ways in which “community” projects may be valuable.

A final suggestion is that in future similar research, interviews or focus groups with members of the local communities could be used in addition to surveys. This could assist in gaining a more in-depth understanding of the nuances of community perceptions and the factors leading to those perceptions, in a way that cannot necessarily be captured by a survey and statistical analysis.

Chapter 6: Conclusion

This study employed a survey to examine the influence of local project initiation, local investment, and local participation on local perceptions of small scale wind energy projects in Nova Scotia. Previous literature has suggested that a community-based approach to wind energy development may lead to higher levels of local support for wind energy projects. To further explore the potential influence of a community-based approach on local perceptions of wind energy projects, this study sought to answer the following research questions:

> Among those who reside in the local community surrounding small-scale wind energy projects in Nova Scotia, how are a) support for the project, b) a sense that the project is “the community’s project”, and c) perceptions of the project’s benefits and negative impacts, influenced by the following factors:
>
> 1. Whether or not the project is locally initiated and directed
> 2. The local community participating in the project planning process
> 3. The opportunity for local residents to make a personal financial investment in the project

Three small-scale wind energy projects with varying degrees of local involvement and investment were selected for the study: the Marvyale, Spiddle Hill, and Watt Section wind energy projects.

Among survey respondents, no significant relationship was found between either local project initiation or shareholding and either project support or perceptions of benefits and negative impacts. This differs from previous research that has found somewhat higher levels of support for locally initiated and owned larger-scale wind energy projects (Warren & McFadyen, 2010; Musall & Kuik, 2011). However, similar to other studies, the regression analyses of the current study did find a relationship between support for wind energy projects and general attitudes towards wind energy (Jones & Eiser, 2010), perceptions of benefits and negative impacts (Cass, Walker, & Devine-Wright, 2010), and perceptions regarding community participation and fairness of the project planning process (Gross, 2007). Therefore, this research suggests that regardless of whether a project is initiated within the community and whether local investment opportunities are available, project support can be influenced to some degree by the developer engaging with the community in an open, participatory manner and addressing local concerns about the potential benefits and negative impacts of the project.

A fairly strong relationship was found between a sense of "community ownership" and both community participation in the project planning process and local project initiation. A somewhat weaker although still statistically significant relationship was found with local investment opportunities. These findings seem to agree with Walker and Devine-Wright's (2008) suggestion that the level of involvement of the community in the project ("process" dimension) is important for a renewable energy project to be a "community project", in addition to the importance of who benefits from the project ("outcome' dimension). While taking a "community" approach to wind energy development may not lead to an overall higher level of support for a project, as was indicated in this study, the way a project is developed may matter in terms of the intrinsic value that a community may derive from having a sense of that the project belongs to the community. Further studies could explore whether such a sense of "community ownership" may lead to more active support of future wind energy development.

The findings of this study suggest to wind energy developers, both from within and outside the local community where a project is to be sited, that engaging the local community in the project development process and adequately addressing concerns about the benefits and negative impacts of the project may help in gaining greater support in the local community. Offering investment opportunities to the local community should not necessarily be regarded as a substitute for local engagement or as sufficient for creating a sense of "community ownership" over a project.

For policymakers seeking to encourage "community" wind energy development, the results suggest that a requirement of meaningful community participation in the project planning process may be more crucial to attaining a sense of "community ownership" over a project than having community members share in financial ownership of the project through shareholding. This is not to suggest that shareholding should not be made available to community members, given that the majority of survey respondents agreed that the opportunity should be made available. However, it does indicate that the opportunity for local people to invest in a project does not necessarily equate with a psychological sense of "community ownership". Additionally, given that perceptions of benefits were strongly associated with project support and that the most commonly perceived benefits were environmental benefits and the more long-term economic benefit of more stable electricity prices, developers and educators may want to place a particular emphasis on promoting these long-term, larger-scale benefits.

The findings of this research should be considered within the context of the limitations of the study. The survey had a relatively low response rate, which means that the results may not be representative of the general populations within the three communities. The case study approach employed is limited in that the results cannot be assumed to represent other wind energy projects. Additionally, the correlation methods used can indicate relationships between the way the projects were developed and local perceptions, but they cannot establish causation between these factors.

Future research could examine a larger number of projects, including larger-scale projects and projects representing different models of "community" wind energy, in order to compare any differences in levels of support and perceptions of "community ownership". Additional insights could be gained from conducting research in communities in Nova Scotia that have been resistant to wind energy development in order to better understand the basis for that opposition. Future studies could also explore why a sense of "community ownership" of a wind energy project may be valuable even if it does not necessarily lead to higher project support, such as that it may be intrinsically valuable to the locally community and may lead to more active support of wind energy policies. The use of interviews and focus groups to complement surveys in future studies could provide a deeper understanding of local perceptions and experiences.

Contrary to previous suggestions made by other researchers, this study did not find an influence of local project initiation and local investment opportunities on levels of local support for small-scale wind energy projects in Nova Scotia. However, these factors were associated to a degree with a stronger sense of "community ownership" of wind energy projects. Furthermore, perceived community participation in and perceived fairness of the project planning process were strongly associated with a local sense of "community ownership", and to a lesser degree with stronger project support and with stronger perceptions of local project benefits. Therefore, this study suggests that compared to both whether or not the developer of the project is a local organization, and whether or not local investment opportunities are available, genuine community involvement in the project planning process may be a more important contributor to a sense of "community ownership" and to positive perceptions of wind energy projects among local residents.

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Appendices

Appendix 1: Consent Form for Interviews with Project Developers

CONSENT FORM

Public Perceptions of and Involvement in Small-Scale Wind Energy Projects in Nova Scotia

Hello!

My name is Tiffany Vass and I am a student at Dalhousie University. I would like to invite you to take part in a research study I am conducting as part of my Bachelor of Science in Environmental Science, under the supervision of Dr. Wayne Groszko and Dr. Ruth Forsdyke.

Outline of the Study

This research looks at three small-scale (1 to 4 turbines) wind energy projects in Nova Scotia. It will examine local people's participation and investment in the wind projects, and their perceptions of those projects. The objective is to better understand how local people feel regarding wind projects and the way they are developed. The research results will be made available to interested parties involved in developing wind energy in the province in the hopes that they will take the information into consideration as they strive to develop wind energy in a way that is sensitive to local interests.

Local residents surrounding the three wind energy projects are being asked to complete survey. The three projects are: the Maryvale wind project; the Spiddle Hill wind project; and the Watt Section wind project. The developers of each of these projects are also being contacted to provide background information about the projects, the way they were developed, and their ownership structures. Your company is being contacted as the developer of the Spiddle Hill wind energy project.

Your Participation

You or a representative from your organization is being asked to participate in an interview regarding the wind energy project mentioned above. The interviewee should be familiar with how the project was developed and its ownership structure. An outline of the interview questions is included at the end of this document. It is expected that the interview will take approximately 20 minutes. The interview can be conducted by phone or in person at a mutually agreed location in Halifax, at the preference of the interviewee. Preferably, the interview would take place in **mid-January**, although this is somewhat flexible. The answers will be recorded on paper and converted into electronic form in a password-protected document on the researcher's computer after the interview. The interviewee will be provided with a written copy of the response and asked to verify its accuracy.

Your participation in this research is **voluntary** and you can decline to participate. If you choose to participate, you can decline to answer any questions that you do not wish to answer. You are free to discontinue the interview at any time, and you can decide whether you want any of the information you have provided up to that point to be removed or if you will allow that information to be used. You can also decide up until the end of February 2013 if you would like to withdraw any information. After that time, it will not be possible to withdraw the information because it will already be part of the completed analysis.

Privacy and Confidentiality

Your personal information will be kept private. You will not be mentioned by name in the study results, and no direct quotations will be used. Rather, you will be referred to as a representative from the project's developer company. This means you will not be personally identified in any way in the research reports. The name of your organization will also not be mentioned in the research report. However, since the names of the projects themselves will be mentioned, it would be possible for others to determine the developer of the project. Therefore, the information you provide could be traced back to your organization. For this reason, you are asked to only provide information that you are comfortable with being made public and being traced back to your organization.

Possible Benefits, Risks and Discomforts

There are few risks associated with participating in this research. A possible risk is that your organization's practices will differ from those of the other wind projects, and this could open up your organization to criticism. It is difficult to estimate the probability of this occurring without knowing the details of the three organizations' practices. However, considering that most of the information being asked is likely already undocumented knowledge for those in the local area of the project, the risk appears minimal. Furthermore, the researcher will make every effort to mitigate this risk by stating the information and analyzing the data as fact, rather than negatively portraying or criticizing any of the developers. Differences between development practices will be discussed, but they will only be evaluated in light of the survey information obtained from local residents.

There are no direct benefits to you for participating in this research. However, the indirect benefits of your participation might include a better understanding of local perceptions of wind energy projects that could help ensure that in the future wind energy in Nova Scotia is developed in a way that is acceptable and beneficial to local people.

The Study Results

The findings from this research will be described and shared in my honours thesis, and may be provided to interested parties such as the Nova Scotia Department of Energy and other wind energy development companies in the province. A summary of the results will be available at **https://sites.google.com/site/nswindenergystudy/** by the end of May 2013 for viewing by survey participants and other interested parties. If you would be interested, I will email you a copy of my thesis and will let you know when the results are up on the website.

Questions

I would be happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact the researcher, Tiffany Vass, at (902) 488-9924 or tiffany.vass@dal.ca with any questions, comments, or concerns about the research study. Alternatively, you may contact the supervisors of the project: Dr. Wayne Groszko, at wgroszko@dal.ca or (902) 482-8817; or Dr. Ruth Forsdyke at ruth.forsdyke@dal.ca or (902) 494-6990. If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, Director, Research Ethics, Dalhousie University at ethics@dal.ca or (902) 494-1462.

Next Steps

It would be appreciated if you could let me know whether or not you or a representative from your organization is willing to participate in this study. If you are willing to participate, you (or the representative) are asked to contact me at tiffany.vass@dal.ca to set up a mutually agreed upon time and location for the interview. Please also find attached the signature page that confirms your understanding of the study and consent to participate. You will be asked to submit this form prior to or at the beginning of the interview.

Thank you so much for your time.

Sincerely,

Tiffany Vass

Tiffany Vass
Undergraduate Student
Department of Environmental Science
Dalhousie University

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Appendix 2: Questions for Interviews with Project Developers

1. Project initiation and direction:
   a. My understanding is that the idea for the project [did/did not] come from the local community. Is this true?
   b. My understanding is that the direction/management of the project [was/was not] conducted from within the local community. Is this true? Please explain if you wish.
2. Local participation:
   a. How were local people informed about the project? At what stage of the project?
   b. How many public meetings were held?
      i. At what stages of the project?
      ii. How many people attended?
      iii. Could you describe what took place at the meetings? (ex. what information was provided, how people were given the opportunity to express their opinions)
   c. Did local people play any role in the planning process? I.e. Did they make any decisions/choices about the project, help make the project happen, etc.
   d. Where the opinions of local people solicited in ways other than public meetings?
   e. How were the opinions of local people taken into consideration?
   f. Did the local people seem interested and willing to participate in the project planning process? Was it difficult to get people to come to meetings and be involved in the project?
3. Financial ownership:
   a. My understanding is that Nova Scotian residents [were/were not] given an opportunity to invest in the wind project. Is this true?
      i. If they were:
         1. How was the opportunity advertised to Nova Scotians? To residents of the local community where the project is taking place?
         2. How many Nova Scotians invested?
         3. How many investors are from the local municipality?
         4. How many investors are from the local community [will be defined for each project]?
   b. Who owns the project? I.e. what percent to investors vs. the private company vs. other
4. Other local financial benefits to the community:
   a. How many local employees were hired and for what duration?
   b. Was the land for the project bought or leased? How many private landowners benefited?
   c. Were any other financial incentives given to the local community or will revenue from the project go back to community in any other way? (ex. community development fund, to a local charity, etc.)

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Appendix 3: Number of Surveys Sent to Mail Routes and Maps of Mail Routes

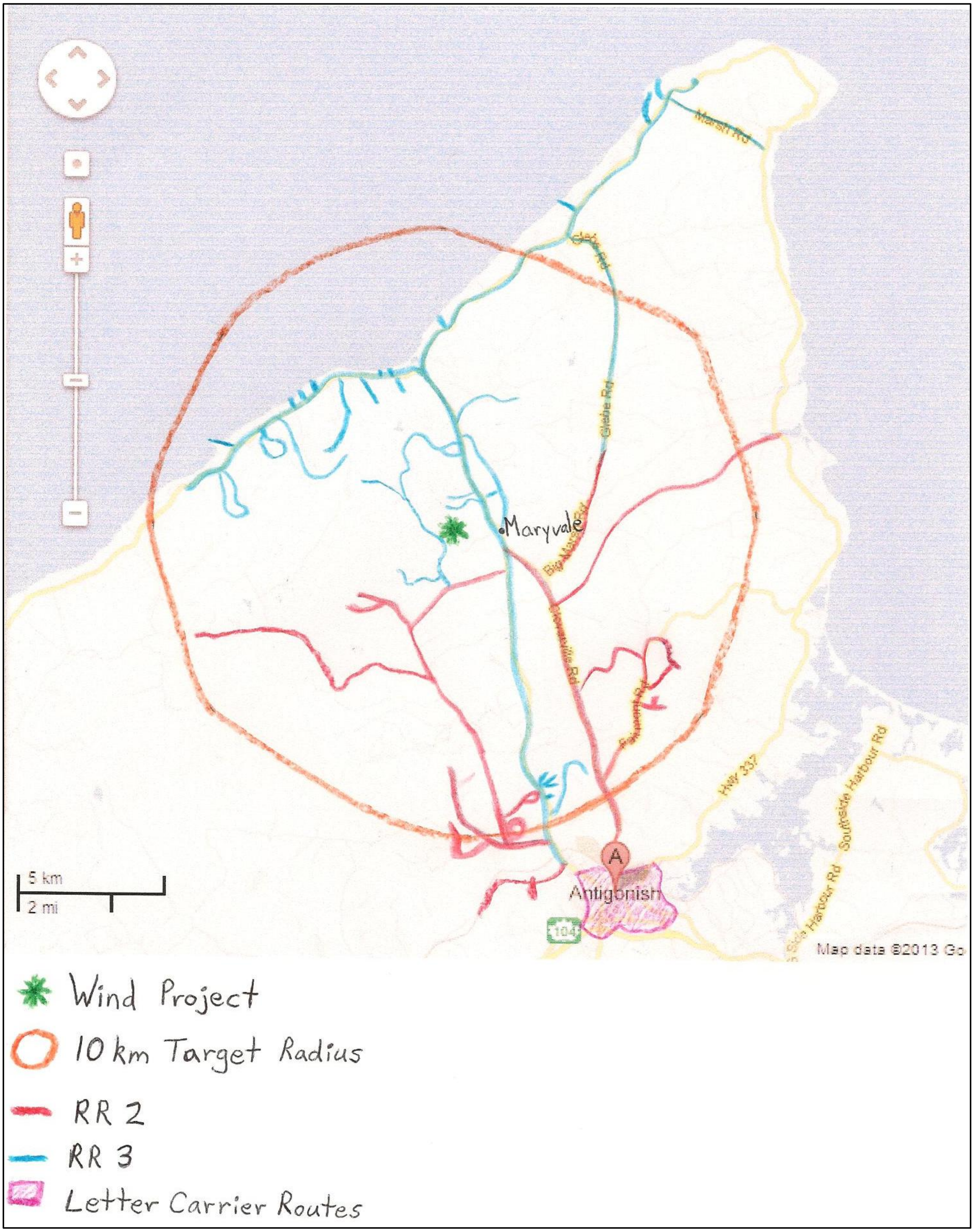
Appendix 3a: Number of Surveys Sent to Mail Routes

RR = Rural Route. LC = Letter Carrier Route. LB = Lock Box.

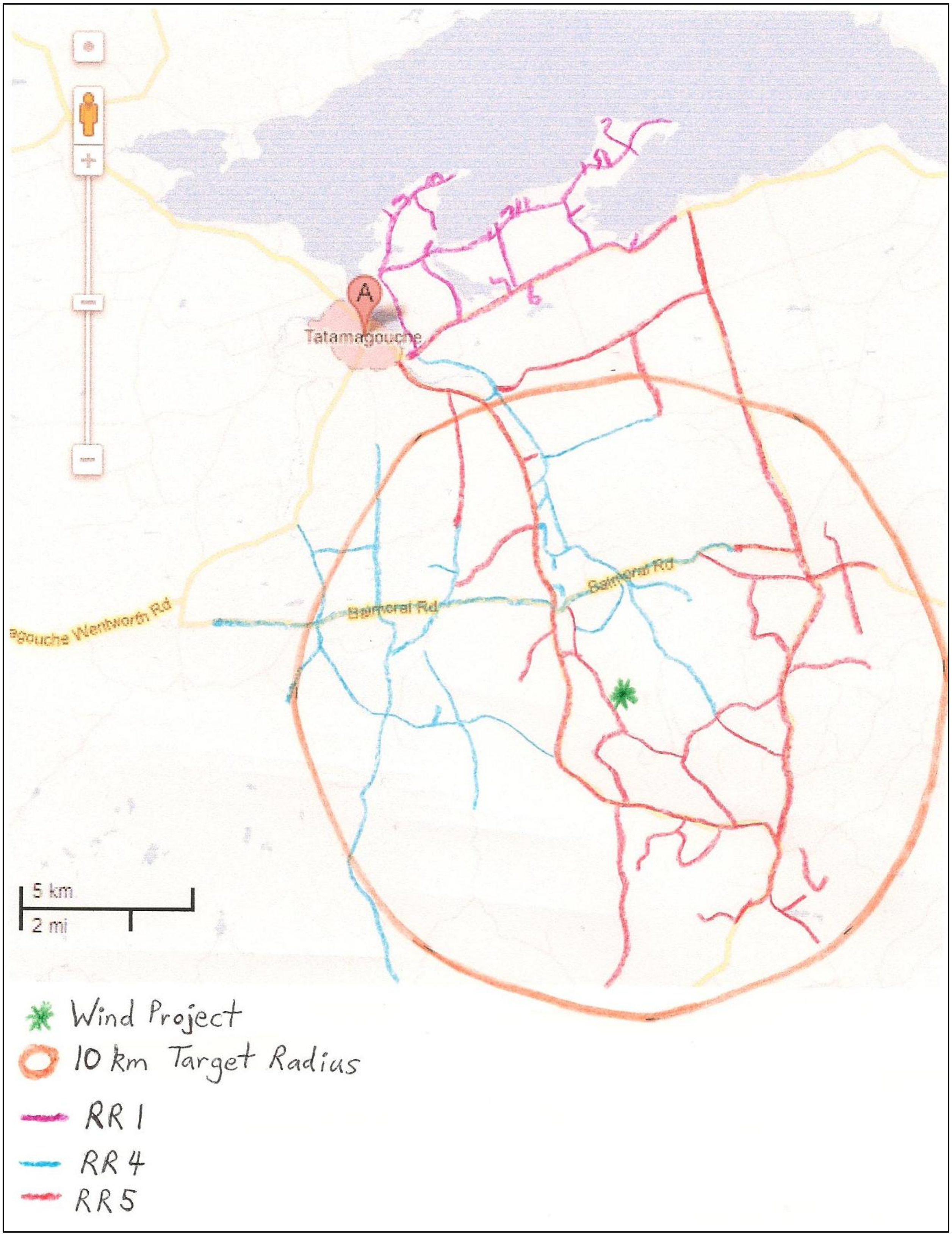
	Route Number	# Households on Route	# Surveys Sent to Route
Maryvale			
Rural	RR2	329	101
	RR3	400	123
Town	LC1	455	33
	LC2	360	26
	LC3	492	35
	LC4	96	7
	LC5	333	24
	LC6	363	26
	LC7	414	30
	LC8	381	27
	LC9	233	17
	LB1	282	20
Spiddle Hill			
Rural	RR4	137	70
	RR5	264	135
Town	RR1	179	79
	RR2 apartments	50	22
	LB1	250	110
Watt Section			
Rural	RR2 Sheet Harbour	141	93
	RR1 Port Dufferin	146	97
Town	RR1 Sheet Harbour	305	139
	LB1	157	71

Note: Maps of these routes follow in Appendices 3b-d. There are no publically available electronic maps of the rural routes that the surveys were distributed to. The maps included here represent an approximation of the coverage of the mail routes. The Maryvale and Spiddle Hill maps were created by using lists of street names that specified the mail route that covered each street. The Watt Section map was created by speaking to staff at the Sheet Harbour post office, as street lists were not available. The Lock Box routes cannot be mapped, as lock boxes are located at the post office. However, staff at the Tatamagouche post office said that the lock boxes would mostly cover the town of Tatamagouche, and staff at the Sheet Harbour post office said that the lock boxes would mostly cover the town of Sheet Harbour. Staff at the Antigonish post office said that the lock boxes would be a combination of both urban and rural households. Since the lock boxes overall mostly cover the towns, the lock boxes were specified as covering the towns.

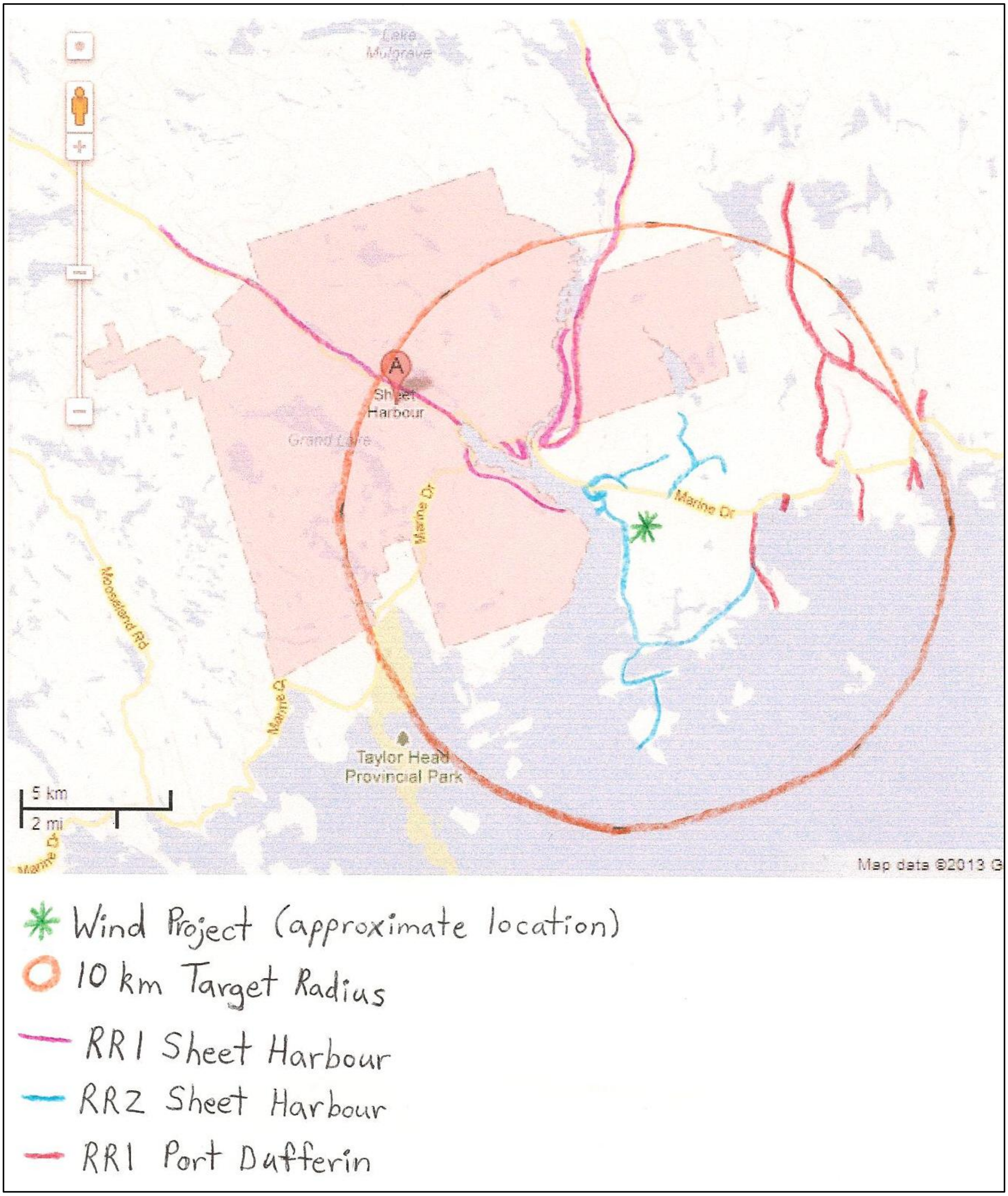
Appendix 3b: Map of Maryvale Routes



Appendix 3c: Map of Spiddle Hill Routes



Appendix 3d: Map of Watt Section Routes



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Appendix 4: Questionnaire for Survey of Local Residents

Spiddle Hill Wind Energy Project Survey *(as example)*

Please answer the following questions to the best of your ability regarding the Spiddle Hill wind energy project, which consists of 1 wind turbine and began operating in July 2011.

1. Approximately how close do you live to this wind project? (check one)
   a. Within viewing distance ______
   b. Within 5 km but not within viewing distance ______
   c. Between 5 and 10 km away ______
   d. Further than 10 km away but not in the town of Tatamagouche ______
   e. In the town of Tatamagouche ______

2. How many years have you lived in this community? (check one)
   Less than 1 ______ 1 to 3 ______ 3 to 5 ______ 5 to 10 _______ Over 10 ______

3. To what degree do you agree or disagree with the following statements (check one):

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am in support of wind energy as a power source					
I am in support of this wind project					
This wind project is a community project					
This wind project is *my* community's project					
My community supports this wind project					

4. To what degree do you agree or disagree with the following statements (check one):

This wind project benefits:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Me					
My community					
Some members of my community more than others If so, please state who benefits more: ____					
Individual investors from *outside* my community					
A private company from *outside* my community					

5. If you agree that the wind project benefits *you*, briefly state how:

6. If you agree that the wind project benefits *your community*, briefly state how:

7. To what degree do you agree or disagree with the following statements (check one):

This wind project negatively impacts:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Me					
My community					
Some members of my community more than others If so, please state who is negatively impacted more: ____					

8. If you agree that the wind project negatively impacts *you*, briefly state how:

9. If you agree that the wind project negatively impacts *your community*, briefly state how:

10. Did the idea for the wind project originate within your community? (check one)
    Yes ______ No ______ Don't know ______
11. Is the wind project being directed from within your community? (check one)
    Yes ______ No ______ Don't know ______
12. Who has financial ownership of the wind project? (check all that apply)
    The municipality ______
    A company within my community ______
    A company from outside my community ______
    Individual shareholders from within my community ______
    Individual shareholders from outside my community _______
    Don't know ______
    Other (please state): _____________________________________
13. Were members of your community given the opportunity to invest in the wind project?
    (Please note: this is for research purposes only. You are NOT being solicited to invest.)
    Yes ______ (proceed to **Box 1**) Not that I was aware of ______ (proceed to **Box 2**)

Box 1 – If you selected 'Yes' for Question 13:

A. Have you or anyone in your household invested in the project?
   Yes ______ No ______
B. If you have NOT invested, why?
   I am not interested in investing in a wind project ______
   The investment is too risky ______
   I would like to but the minimum investment amount was too high _______
   (What minimum investment amount might have led you to invest? $ _____)
   Other (please state): ________________________________
C. Has anyone you personally know from outside your household invested in the project?
   Yes ______ Not that I am aware of ______

Box 2 – If you selected 'Not that I was aware of' for Question 13:

A. Would you have invested in the project if the opportunity had been available?
   (*Assume the following hypothetical investment:* minimum investment of $1,000.
   You will receive a 35% tax credit this year and a reasonable return in a number of years.)
   Yes ______ No ______
B. If you would NOT have invested, why?
   I am not interested in investing in a wind project ______
   The investment would be too risky ______
   I would like to but a $1,000 minimum investment is too much _______
   (What minimum investment amount might lead you to invest? $ _____)
   Other (please state): ________________________________

14. To what degree do you agree or disagree with the following statements (check one):

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Community members should be given the opportunity to invest in the project					
A fund should be set up so that part of the revenue from the project goes back to the entire community (ex. to renovate the library or build a playground)					
The *opportunity was available* for me to participate in the project's planning process					
I *did* participate in the project's planning process					
My opinion about the project was taken into consideration					
My community played an important role in the project's planning process					
The opinions of the community about the project were taken into consideration					
The planning process of the project was fair					
The distribution of benefits of the project is fair (Or check here if there are none: ______)					
The distribution of negative impacts of the project is fair (Or check here if there are none: ______)					

15. To what degree do you agree or disagree with the following statements (check one):

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Wind turbines are beneficial to the environment					
Wind turbines are harmful to birds					
Wind turbines have a negative impact on the visual landscape					
Wind turbines produce an annoying level of noise					
Wind turbines negatively impact the health of people living nearby					

16. If the wind project had 4 wind turbines instead of 1, my support for the project would be (check one):
   Much higher ______ Higher _______ The same _______ Lower _______ Much lower ______

17. Could you please provide some information about yourself:
   a) Gender (check one):
      Male ______ Female ______
   b) Age (check one):
      Under 18 ______ 18 to 30 ______ 30 to 50______ 50 to 70______ 70+ ______

Thank you for participating in the survey!

Please return in the enclosed envelope

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Appendix 5: Consent Form for Survey of Local Residents

CONSENT FORM

Public Perceptions of and Involvement in Small-Scale Wind Energy Projects in Nova Scotia

Hello!

My name is Tiffany Vass and I am a student at Dalhousie University. I would like to invite you to take part in a research study I am conducting as part of my Bachelor of Science in Environmental Science, under the supervision of Dr. Wayne Groszko and Dr. Ruth Forsdyke. Your participation in the study is voluntary. If you choose to participate, you will be eligible to enter in a draw for a **$50 gift card to Sobeys/Foodland** if your survey response is postmarked or submitted by **January 21, 2013**.

Outline of the Study

This research looks at three small-scale (1 to 4 turbines) wind energy projects in Nova Scotia. It will examine local people's participation and investment in the wind projects, and their perceptions of those projects. The objective is to better understand how local people feel regarding wind projects and the way they are developed. The research results will be made available to interested parties involved in developing wind energy in the province in the hopes that they will take the information into consideration as they strive to develop wind energy in a way that is sensitive to local interests.

Local residents surrounding the three wind energy projects are being asked to participate in this research. The project that you are being asked about is the Spiddle Hill wind energy project near Tatamagouche, which currently consists of 1 turbine and started operating in July 2011. You may participate in this study if this survey was sent to your home.

Your Participation, Privacy, and Confidentiality

You are being asked to complete a questionnaire that will take approximately 10 minutes. Your participation and time are valued. You can complete the enclosed questionnaire and return it by mail in the enclosed addressed envelope (postage paid so no need to add a stamp), or you can complete the survey online at the following web address:

https://sites.google.com/site/nswindenergystudy/

Survey Code: ______

Please only complete one version of the survey. You will be asked to enter the above survey code if you complete the survey online. This is to ensure that the survey is not completed by people from outside of the study population. You are encouraged to complete the survey online, as this will facilitate analysis for the researcher. However, your response by either method is greatly appreciated.

If you complete the survey, you have the option to enter into a draw for a **$50 gift certificate to Sobeys/Foodland**. If you complete the survey online, you will have the option of providing your email address at the end of the survey. To maintain confidentiality, the survey program keeps the question regarding entry into the prize draw separate from your survey responses – your survey responses will be in no way linked to your email address. If you complete the paper copy of the survey, you have the option to write your phone number on the enclosed ballot and return with the survey. To maintain confidentiality, the researcher will separate the ballots from the surveys as soon as the envelope is opened – your survey responses will be in no way connected to your ballot entry. The deadline for the prize draw is **January 21, 2013**. The online survey must be completed or the mailed response postmarked by this date to be eligible for the draw.

Your participation in this research is **voluntary** and you can decline to participate or withdraw your participation up until you submit the survey. You can choose to skip any questions that you do not feel comfortable answering. Your answers are anonymous and confidential, and there will be no way to identify who answered which questionnaire because you will not be asked to provide your name. Therefore, you will not be identified in any way in the research results. The surveys will be kept private and will only be accessed by the researcher. Since this is an anonymous survey, once you have put it in the mail or submitted it online, you cannot withdraw your answers. **Once you submit the survey, this will be taken as an indication of your informed consent.**

Possible Benefits, Risks and Discomforts

There are very few risks associated with participating in this research. The questions of the survey may lead you to think about the wind energy project and your involvement in the project in a way that you had not previously considered, which may cause slight discomfort. However, discomfort is not likely and is not expected to be severe. There is also a very low chance that the survey could cause a small amount of discord among local residents. Efforts have been made to minimize this risk by carefully choosing the survey questions. There are no direct benefits to you for participating in this research. The indirect benefits of your contribution to the research might include a better understanding of local perceptions of wind energy projects that could help ensure that in the future wind energy in Nova Scotia is developed in a way that is acceptable and beneficial to local people.

The Study Results

The findings from this research will be described and shared in my honours thesis, and may be provided to interested parties such as the Nova Scotia Department of Energy and wind energy development companies in the province. A summary of the results will be available at **https://sites.google.com/site/nswindenergystudy/** by the end of May 2013 for viewing by interested participants and other interested parties.

Questions

I would be happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact the researcher, Tiffany Vass, at (902) 488-9924 or tiffany.vass@dal.ca with any questions, comments, or concerns about the research study. Alternatively, you may contact the supervisors of the project: Dr. Wayne Groszko, at wgroszko@dal.ca or (902) 482-8817; or Dr. Ruth Forsdyke at ruth.forsdyke@dal.ca or (902) 494-6990. If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, Director, Research Ethics, Dalhousie University at ethics@dal.ca or (902) 494-1462.

Thank you so much for your time.

Sincerely,

Tiffany Vass
Undergraduate Student
Department of Environmental Science
Dalhousie University

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Appendix 6: Explanations of the meaning and derivation of the variables and simultaneously entered variable combinations used in the multiple regression analyses

Variable	Explanation
Project support	Five-point scale from strongly agree to strongly disagree with the statement: 'I am in support of this wind energy project'
General support	Five-point scale from strongly agree to strongly disagree with the statement: 'I am in support of wind energy as a power source'
Distance from project	Dummy variables: • 'distance viewing' (lives within distance of the project) • 'distance 5 km' (lives within 5 km of the project but not within viewing distance) • in comparison 'distance more than 5 km' (lives farther than 5 km from the project)
Investment	Dummy variables: • 'available and did not' (believed that the opportunity was available for community members to invest in the project but did not invest) • 'not available and would' (believed that the opportunity was not available for community members to invest in the project but would have invested had the opportunity been available) • 'not available and would not' (believed that the opportunity was not available for community members to invest in the project and would not have invested had the opportunity been available) • in comparison to 'available and did' (has invested in the project)
Actual investment opportunity	Dummy variable: • 'actual investment available' (the opportunity to invest was in actuality available to community members, i.e. respondent was from the Spiddle Hill or Watt Section project) • in comparison to 'actual investment not available' (the opportunity to invest was in actuality not available to community members, i.e. respondent was from the Maryvale project)
Perceived project initiation	Dummy variables: • 'internal initiation' (believed the idea for the project came from within the community) • 'external initiation' (believed the idea for the project did not come from within the community) • In comparison 'do not know' (does no know where the idea for the project came from)
Actual project initiation	Dummy variable: • 'internal initiation' (the project idea actually came from within the community, i.e. the respondent is from the Spiddle Hill project) • 'external initiation' (the project idea actually came from outside the community, i.e. the respondent is from the Maryvale or Watt Section projects)
Participation	Participation factor: Factor constructed by taking the average of six statements on a five-point scale from strongly agree to strongly disagree: • The *opportunity was available* for me to participate in the project's planning process • I *did* participate in the project's planning process • My opinion about the project was taken into consideration • My community played an important role in the project's planning process • The opinions of the community about the project were taken into consideration • The planning process of the project was fair (Confirmed through factor analysis: A principle components analysis was conducted on the six variables. One factor containing all six variables was extracted, accounting for 61.1% of the variance and having an eigenvalue of 3.67.)
Personal,	Three separate composite variables entered simultaneously. The three composite variables are as

community, and external benefits and negative impacts	follows: Personal and community benefit variable: composite variable constructed by taking the average of two statements on a five-point scale from strongly agree to strongly disagree: • This wind project benefits me • This wind project benefits my community (Correlation: $r\ (126) = 0.86,\ p <0.001$) Personal and negative impact variable: composite variable constructed by taking the average of two statements on a five-point scale from strongly agree to strongly disagree: • This wind project negatively impacts me • This wind project negatively impacts my community (Correlation: $r\ (126) = 0.81,\ p < 0.001$) External benefit variable: composite variable constructed by taking the average of two statements on a five-point scale from strongly agree to strongly disagree: • This wind project benefits individual investors from outside my community • This wind project benefits a private company from outside my community (Correlation: $r\ (126) = 0.50,\ p < 0.001$)
Inequality of benefits and negative impacts within community	Two separate statements on a five-point scale from strongly agree to strongly disagree (enter simultaneously but separately): • This wind project benefits some members of my community more than others • This wind project negatively impacts some members of my community more than others
Benefits and negative impacts of wind energy	Benefits and negative impacts of wind factor: factor constructed by taking the average of six statement on a five-point scale from strongly agree to strongly disagree: • Wind turbines are beneficial to the environment • Wind turbines are harmful to birds (reverse ordering of scale) • Wind turbines have a negative impact on the visual landscape (reverse ordering of scale) • Wind turbines produce an annoying level of noise (reverse ordering of scale) • Wind turbines negatively impact the health of people living nearby (reverse ordering of scale) (Confirmed through factor analysis: A principle components analysis was conducted on the five variables. One factor containing all five variables was extracted, accounting for 55.6% of the variance and having an eigenvalue of 2.78.)
Sense of 'community ownership'	Statement on a five-point scale from strongly agree to strongly disagree: • This wind project is *my* community's project

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Appendix 7: Results of ANOVA comparing perceptions of benefits and negative impacts of the Maryvale, Spiddle Hill, and Watt Section wind energy projects among respondents from the surrounding communities

	F (2,125)	p	partial η^2
Project benefits me	.29	.748	.005
Project benefits my community	.91	.406	.014
Project negatively impacts me	.13	.878	.002
Project negatively impacts my community	.28	.758	.004
Project benefits individual investors from outside my community	.18	.838	.003
Project benefits private company from outside my community	10.27	< .001*	.141
Benefits some members of my community more than others	3.67	.028*	.055
Negatively impacts some members of my community more than others	4.72	.011*	.070

*Significant at level of 0.05

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Appendix 8: Results of Chi-square test comparing perceptions of project initiation, project direction, project ownership, and investment opportunities regarding the Maryvale, Spiddle Hill, and Watt Section wind energy projects among respondents from the surrounding communities

	All Three Projects		Maryvale vs. Spiddle Hill		Watt Section vs. Spiddle Hill		Maryvale vs. Spiddle Hill	
	χ^2 (4)	p	χ^2 (2)	p	χ^2 (2)	p	χ^2 (2)	p
Where the idea for the project came from	45.25	<.001*	22.16	<.001*	28.36	<.001*	4.37	.112
From where the project is being directed	58.62	<.001*	27.72	<.001*	43.60	<.001*	1.39	.499
Where the financial ownership of the project is held	62.54	<.001*	36.80	<.001*	42.16	<.001*	2.92	.232
Whether or not the opportunity to invest was available to community members	68.52	<.001*	46.33	<.001*	50.59	<.001*	0.41	.522

*Significant at level of 0.05

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Appendix 9: Results of ANOVA comparing perceptions regarding participation in and fairness of the planning process for the Maryvale, Spiddle Hill, and Watt Section wind energy projects among respondents from the surrounding communities

	$F_{(2,125)}$	p	partial η^2
Opportunity available for me to participation in the project's planning process	10.77	< .001*	.147
I did participate in the project's planning process	0.98	.378	.015
My opinion about the project was taken into consideration	1.05	.354	.016
My community played an important role in the project's planning process	8.13	.001*	.115
The opinions of the community were taken into consideration	2.64	.075	.041
The planning process of the project was fair	4.90	.009*	.073

*Significant at level of 0.05

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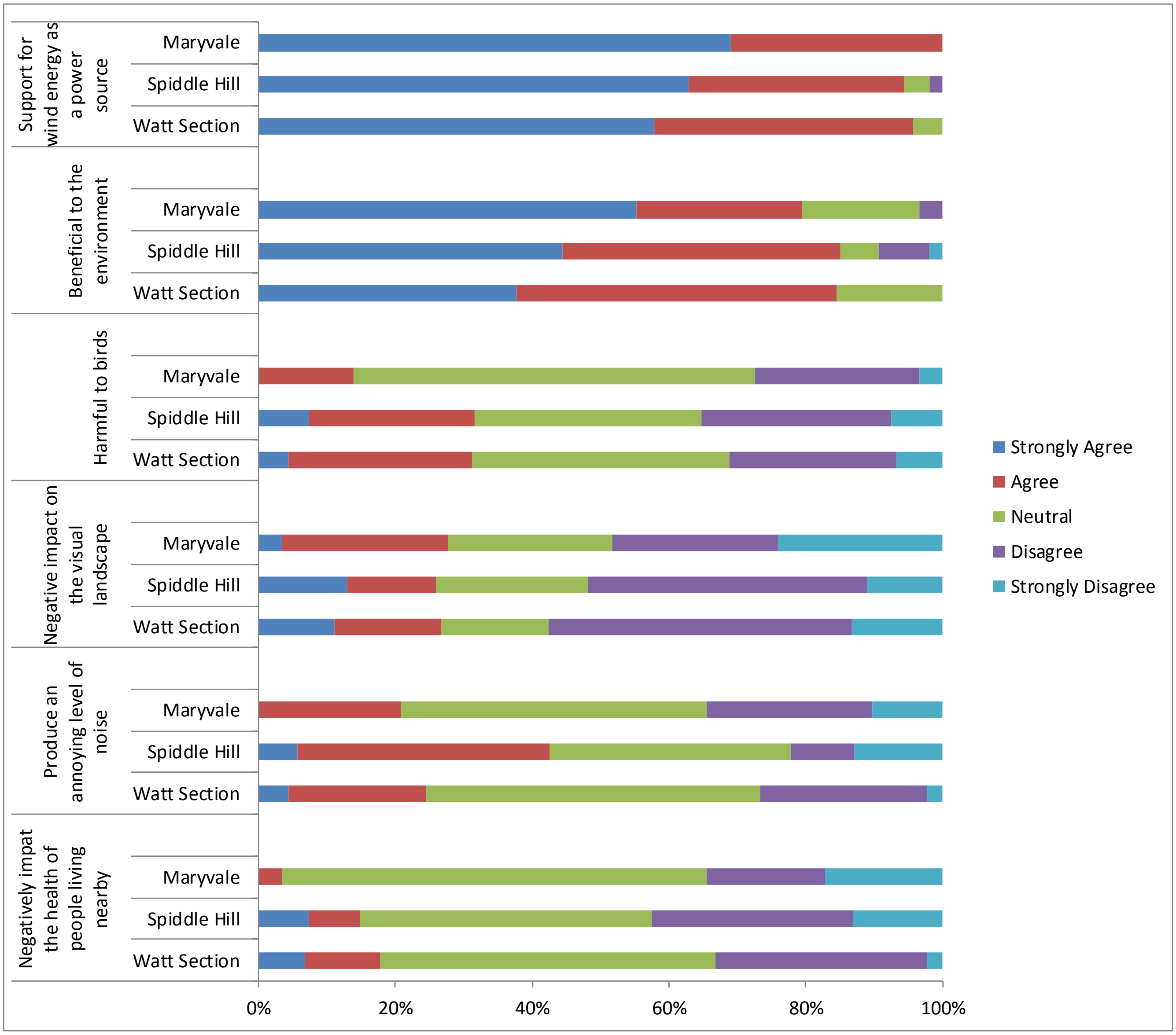
Appendix 10: Level of agreement or disagreement with statements regarding support for wind energy in general and the benefits and negative impacts of wind turbines in general among respondents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects



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Appendix 11: Stepwise multiple linear regression analyses for dependent variable ‘project support’: Beta values

Method: Step 1: enter ‘general support for wind energy’. Step 2: enter dummy variables for distance of residence from wind energy project. Step 3: enter other independent variables.
R^2 change = change in R^2 between step 2 and step 3 (Except for Appendix 11a, where R^2 change = change in R^2 between step 1 and step 2)
R^2 alone = step 3 variables entered into the model without step 1 and step 2 variables (Except for Appendix 11a, where R^2 alone = step 2 variables entered into the model without step 1 variables)
B = unstandardized beta coefficient. SE = standard error. β = standardized beta coefficient.
Explanation of variables in Appendix 6

Appendix 11a: Distance from project

R^2 change:	2.1%, p = .096				
R^2 alone:	3.0%, p = .151				
	B	**SE**	**β**	**t**	**p**
General support	**1.18**	**.12**	**.66**	**9.83**	**< .001**
Distance viewing	**-.36**	**.17**	**-.14**	**-2.12**	**.036**
Distance 5 km	.02	.23	.01	.10	.918

Appendix 11b: Investment. Dummy variables in comparison to ‘available & did’.

R^2 change:	1.9%, p = .240				
R^2 alone:	5.4%, p = .077				
	B	**SE**	**β**	**t**	**p**
General support	**1.14**	**.12**	**.64**	**9.39**	**< .001**
Distance viewing	**-.38**	**.17**	**-.15**	**-2.21**	**.029**
Distance 5 km	.02	.23	.01	.10	.924
Available & did not	.20	.25	.09	.81	.417
Not available & would	.42	.25	.18	1.7	.098
Not available & would not	.08	.26	.03	.31	.753

Appendix 11c: Actual investment opportunity.

R^2 change:	0%, p = .780				
R^2 alone:	0.7%, p = .337				
	B	**SE**	**β**	**t**	**p**
General support	**1.12**	**.12**	**.66**	**9.79**	**<.001**
Distance viewing	**-.37**	**.18**	**-.15**	**-2.09**	**.038**
Distance 5 km	.01	.24	.01	.03	.976
Actual investment available	.05	.18	.02	.28	.780

Appendix 11d: Perceived project initiation. Dummy variables in comparison to ‘do not know’.

R^2 change:	0%, p = .978				
R^2 alone:	2.6%, p = .194				
	B	**SE**	**β**	**t**	**p**
General support	**1.170**	**.12**	**.65**	**9.49**	**<.001**
Distance viewing	**-.35**	**.18**	**-.14**	**-2.00**	**.048**
Distance 5 km	.02	.24	.01	.08	.940
Internal initiation	.02	.17	.01	.13	.897
External initiation	-.03	.21	-.01	-.12	.902

Appendix 11e: Actual project initiation.

R^2 change:	0%, p = .947

R^2 alone:	0%, p = .817				
	B	**SE**	**β**	**t**	**p**
General support	**1.18**	**.12**	**.66**	**9.79**	**<.001**
Distance viewing	**-.36**	**.17**	**-.14**	**-2.11**	**.037**
Distance 5 km	.02	.24	.01	.09	.928
Internal initiation	.01	.15	.01	.07	.947

Appendix 11f: Participation.

R^2 change:	**4.7%, p = .001**				
R^2 alone:	**17.2%, p < .001**				
	B	**SE**	**β**	**t**	**p**
General support	**1.05**	**.12**	**.59**	**8.74**	**< .001**
Distance viewing	-.32	.16	-.13	-2.00	.048
Distance 5 km	.03	.22	.01	.15	.880
Participation factor	**.34**	**.10**	**.23**	**3.41**	**.001**

Appendix 11g: Personal, community, and external benefits and negative impacts.

R^2 change:	**7.8%, p <.001**				
R^2 alone:	**65.8%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.58**	**.10**	**.32**	**5.51**	**< .001**
Distance viewing	-.21	.12	-.08	-1.74	.084
Distance 5 km	.14	.17	.04	.86	.393
Personal & community benefit factor	**.20**	**.06**	**.21**	**3.17**	**.002**
Personal & community negative impact factor	**-.53**	**.07**	**-.49**	**-8.23**	**<.001**
External benefit factor	.07	.07	.05	1.04	.299

Appendix 11h: Inequality of benefits & negative impacts within community.

R^2 change:	**7.8%, p < .001**				
R^2 alone:	**17.4%, p < .001**				
	B	**SE**	**β**	**t**	**p**
General support	**1.09**	**.12**	**.61**	**9.37**	**< .001**
Distance viewing	-.31	.16	-.12	-1.94	.054
Distance 5 km	.14	.22	.04	.65	.515
Unequal benefits	.02	.08	.02	.22	.825
Unequal negative impacts	**-.28**	**.07**	**-.29**	**-4.25**	**< .001**

Appendix 11i: Benefits and negative impacts of wind energy.

R^2 change:	**17.7%, p < .001**				
R^2 alone:	**45.8%, p < .001**				
	B	**SE**	**β**	**t**	**p**
General support	**.81**	**.11**	**.45**	**7.44**	**< .001**
Distance viewing	-.22	.14	-.09	-1.60	.112
Distance 5 km	.15	.19	.05	.80	.425
Benefits & negative impacts of wind	**.68**	**.09**	**.47**	**7.70**	**< .001**

Appendix 11j: Sense of 'community ownership'.

R^2 change:	**9.0%, p < .001**

R^2 alone:	28.0%, p <.001				
	B	**SE**	**β**	**t**	**p**
General support	**.95**	**.12**	**.53**	**8.05**	**< .001**
Distance viewing	**-.35**	**.16**	**-.14**	**-2.24**	**.027**
Distance 5 km	-.04	.21	-.01	-.17	.862
'Community ownership'	**.29**	**.06**	**.32**	**4.93**	**<.001**

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Appendix 12: Stepwise multiple linear regression analyses for dependent variable 'project support': p – values

Stepwise multiple regression analysis for the dependent variable 'project support' (response to the statement 'I am in support of this wind energy project') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects. Step 1: enter 'general support for wind energy', R^2 = 43.4%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 2.1%, p = 0.096. Step 3: enter other independent variables. R^2 Change = R^2 change between step 2 and step 3. R^2 alone = R^2 when independent variables from step 3 are entered alone (without general support for wind energy and distance dummy variables) * = statistically significant R^2 change at the 0.05 level

	R^2 Change	**p**	**R^2 Alone**	**p**
Investment status	1.9%	.240	5.4%	.077
Actual investment opportunity	0%	.780	0.7%	.337
Perceived local project initiation	0%	.978	2.6%	.194
Actual local project initiation	0%	.947	0%	.817
Participation	4.7%	.001*	17.2%	<.001*
Perceived project benefits & negative impacts	7.8%	<.001*	65.8%	<.001*
Perceived inequality of benefits & negative impacts within community	7.8%	<.001*	17.4%	<.001*
Perceived benefits & negative impacts of wind turbines in general	17.7%	<.001*	45.8%	<.001*
Perception that project is 'my community's'	9.0%	<.001*	28.0%	<.001*

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Appendix 13: Stepwise multiple linear regression analyses for dependent variable 'sense of community ownership': Beta values

Method: Step 1: enter 'general support for wind energy'. Step 2: enter dummy variables for distance of residence from wind energy project. Step 3: enter other independent variables.
R^2 change = change in R^2 between step 2 and step 3 (Except for Appendix 11a, where R^2 change = change in R^2 between step 1 and step 2)
R^2 alone = step 3 variables entered into the model without step 1 and step 2 variables (Except for Appendix 11a, where R^2 alone = step 2 variables entered into the model without step 1 variables)
B = unstandardized beta coefficient. SE = standard error. β = standardized beta coefficient.
Explanation of variables in Appendix 6

Appendix 13a: Distance from project.

R^2 change:	0.4%, p = .776				
R^2 alone:	0.2%, p = .906				
	B	**SE**	**β**	**t**	**p**
General support	**.76**	**.17**	**.38**	**4.6**	**<.001**
Distance viewing	-.04	.23	-.01	-.16	.87
Distance 5 km	.21	.32	.06	.65	.52

Appendix 13b: Investment. Dummy variables in comparison to 'available & did'.

R^2 change:	**7.0%, p = .015**				
R^2 alone:	**7.3%, p = .024**				
	B	**SE**	**β**	**t**	**p**
General support	**.76**	**.17**	**.38**	**4.59**	**<.001**
Distance viewing	-.12	.23	-.04	-.51	.610
Distance 5 km	.19	.31	.05	.60	.550
Available & did not	-.31	.33	-.12	-.94	.349
Not available & would	**-.92**	**.34**	**-.35**	**-2.70**	**.008**
Not available & would not	**-.73**	**.35**	**-.27**	**-2.10**	**.037**

Appendix 13c: Actual investment opportunity.

R^2 change:	**5.3%, p = .005**				
R^2 alone:	**3.3%, p = .039**				
	B	**SE**	**β**	**t**	**p**
General support	**.79**	**.16**	**.40**	**4.89**	**<.001**
Distance viewing	-.25	.24	-.09	-1.04	.299
Distance 5 km	-.02	.32	-.01	-.07	.947
Actual investment available	**.70**	**.25**	**.25**	**2.86**	**.005**

Appendix 13d: Perceived project initiation. Dummy variables in comparison to 'do not know'.

R^2 change:	**15.0%, p <.001**				
R^2 alone:	**20.2%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.61**	**.16**	**.31**	**3.95**	**<.001**
Distance viewing	.14	.22	.05	.63	.531
Distance 5 km	.03	.30	.01	.09	.933
Internal initiation	**.67**	**.21**	**.25**	**3.12**	**.002**
External initiation	**-.78**	**.26**	**-.25**	**-3.01**	**.003**

Appendix 13e: Actual project initiation.

R^2 change:	12.8%, p <.001				
R^2 alone:	12.2%, p <.001				
	B	**SE**	**β**	**t**	**p**
General support	**.77**	**.15**	**.39**	**4.99**	**<.001**
Distance viewing	-.11	.22	-.04	-.49	.628
Distance 5 km	-.02	.30	-.01	-.08	.937
Internal initiation	**.87**	**.19**	**.36**	**4.66**	**<.001**

Appendix 13f: Participation.

R^2 change:	**18.8%, p <.001**				
R^2 alone:	**27.8%, p<.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.48**	**.15**	**.24**	**3.12**	**.002**
Distance viewing	.04	.21	.01	.17	.864
Distance 5 km	.23	.29	.06	.81	.422
Participation factor	**.74**	**.13**	**.46**	**5.88**	**<.001**

Appendix 13g: Personal, community, and external benefits and negative impacts.

R^2 change:	**25.5%, p <.001**				
R^2 alone:	**39.0%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	.20	.17	.10	1.14	.258
Distance viewing	.04	.20	.01	.19	.848
Distance 5 km	.24	.28	.06	.87	.384
Personal & community benefit factor	**.43**	**.10**	**.40**	**4.13**	**<.001**
Personal & community negative impact factor	-.16	.11	-.14	-1.52	.131
External benefit factor	**-.32**	**.11**	**-.21**	**-2.84**	**.005**

Appendix 13h: Inequality of benefits & negative impacts within community.

R^2 change:	**4.2%, p<.001**				
R^2 alone:	**8.7%, p<.003**				
	B	**SE**	**β**	**t**	**p**
General support	**.64**	**.17**	**.32**	**3.76**	**<.001**
Distance viewing	-.01	.23	-.01	-.05	.959
Distance 5 km	.31	.32	.08	.99	.323
Unequal benefits	.19	.12	.14	1.59	.114
Unequal negative impacts	**-.23**	**.10**	**-.22**	**-2.39**	**.018**

Appendix 13i: Benefits and negative impacts of wind energy.

R^2 change:	**9.9%, p<.001**				
R^2 alone:	**19.6%, p<.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.46**	**.17**	**.23**	**2.62**	**.010**
Distance viewing	.07	.22	.03	.32	.749
Distance 5 km	.32	.31	.08	1.03	.303
Benefits & negative impacts of wind	**.57**	**.14**	**.35**	**4.01**	**<.001**

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Appendix 14: Stepwise multiple linear regression analyses for dependent variable 'sense of "community ownership" ': p – values

Stepwise multiple regression analysis for the dependent variable 'perception that project is 'my community's' (response to the statement 'This wind energy project is my community's project') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects. Step 1: enter 'general support for wind energy', R^2 = 14.4%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 0.4%, p = 0.906. Step 3: enter other independent variables. R^2 Change = R^2 change between step 2 and step 3. R^2 alone = R^2 when independent variables from step 3 are entered alone (without general support for wind energy and distance dummy variables). * = statistically significant R^2 change at the 0.05 level

	R^2 Change	**p**	**R^2 Alone**	**p**
Investment status	7.0%	.015*	7.3%	.024*
Actual investment opportunity	5.3%	.005*	3.3%	.039*
Perceived local project initiation	15.0%	<.001*	20.2%	<.001*
Actual local project initiation	12.8%	<.001*	12.2%	<.001*
Participation	18.8%	<.001*	27.8%	<.001*
Perceived project benefits & negative impacts	25.5%	<.001*	39.0%	<.001*
Perceived inequality of benefits & negative impacts within community	4.2%	<.001*	8.7%	.003*
Perceived benefits & negative impacts of wind turbines in general	9.9%	<.001*	19.6%	<.001*

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Appendix 15: Stepwise multiple linear regression analyses for dependent variable 'perceived project benefits': Beta values

Method: Step 1: enter 'general support for wind energy'. Step 2: enter dummy variables for distance of residence from wind energy project. Step 3: enter other independent variables.
R^2 change = change in R^2 between step 2 and step 3 (Except for Appendix 11a, where R^2 change = change in R^2 between step 1 and step 2)
R^2 alone = step 3 variables entered into the model without step 1 and step 2 variables (Except for Appendix 11a, where R^2 alone = step 2 variables entered into the model without step 1 variables)
B = unstandardized beta coefficient. SE = standard error. β = standardized beta coefficient.
Explanation of variables in Appendix 6

Appendix 15a: Distance from project.

R^2 change:	0.1%, p = .901				
R^2 alone:	0.3%, p = .817				
	B	**SE**	**β**	**t**	**p**
General support	**1.02**	**.14**	**.55**	**7.28**	**<.001**
Distance viewing	-.07	.20	-.03	-.34	.736
Distance 5 km	.06	.27	.02	.23	.815

Appendix 15b: Investment. Dummy variables in comparison to 'available & did'.

R^2 change:	1.6%, p = .424				
R^2 alone:	4.2%, p = .150				
	B	**SE**	**β**	**t**	**p**
General support	**.99**	**.14**	**.53**	**6.90**	**<.001**
Distance viewing	-.12	.20	-.05	-.59	.554
Distance 5 km	.04	.27	.01	.15	.878
Available & did not	-.23	.29	-.10	-.80	.430
Not available & would	-.35	.30	-.14	-1.17	.245
Not available & would not	-.47	.30	-.19	-1.56	.122

Appendix 15c: Actual investment opportunity.

R^2 change:	0.5%, p = .334				
R^2 alone:	0%, p = .923				
	B	**SE**	**β**	**t**	**p**
General support	**1.03**	**.14**	**.56**	**7.33**	**<.001**
Distance viewing	-.13	.21	-.05	-.62	.536
Distance 5 km	-.01	.28	-.01	-.01	.989
Actual investment available	.21	.21	.08	.97	.334

Appendix 15d: Perceived project initiation. Dummy variables in comparison to 'do not know'.

R^2 change:	3.1%, p = .065				
R^2 alone:	**6.6%, p = .014**				
	B	**SE**	**β**	**t**	**p**
General support	**.98**	**.14**	**.53**	**6.93**	**<.001**
Distance viewing	.04	.20	.02	.19	.852
Distance 5 km	-.02	.27	-.01	-.06	.951
Internal initiation	.13	.19	.05	.68	.496
External initiation	**-.47**	**.24**	**-.16**	**-1.99**	**.049**

Appendix 15e: Actual project initiation.

R^2 change:	1.1%, p = .161				
R^2 alone:	0.8%, p = .323				
	B	**SE**	**β**	**t**	**p**
General support	**1.02**	**.14**	**.55**	**7.33**	**<.001**
Distance viewing	-.09	.20	-.03	-.43	.667
Distance 5 km	.01	.27	.01	.01	.999
Internal initiation	.24	.17	.11	1.41	.161

Appendix 15f: Participation.

R^2 change:	**12.5%, p <.001**				
R^2 alone:	**25.5%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.81**	**.13**	**.44**	**6.07**	**<.001**
Distance viewing	-.01	.18	-.01	-.06	.955
Distance 5 km	.08	.25	.02	.33	.745
Participation factor	**.57**	**.11**	**.37**	**5.19**	**<.001**

Appendix 15g: Inequality of benefits & negative impacts within community.

R^2 change:	**6.7%, p = .002**				
R^2 alone:	**13.1%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.95**	**.14**	**.51**	**6.77**	**<.001**
Distance viewing	-.02	.19	-.01	-.09	.926
Distance 5 km	.17	.26	.05	.66	.511
Unequal benefits	-.01	.10	-.01	-.09	.926
Unequal negative impacts	**-.26**	**.08**	**-.26**	**-3.31**	**.001**

Appendix 15h: Benefits and negative impacts of wind energy.

R^2 change:	**11.2%, p <.001**				
R^2 alone:	**29.1%, p <.001**				
	B	**SE**	**β**	**t**	**p**
General support	**.72**	**.14**	**.39**	**5.05**	**<.001**
Distance viewing	.04	.18	.02	.23	.818
Distance 5 km	.17	.25	.05	.68	.499
Benefits & negative impacts of wind	**.56**	**.12**	**.38**	**4.84**	**<.001**

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Appendix 16: Stepwise multiple linear regression analyses for dependent variable 'perceived project benefits ': p – values

Stepwise multiple regression analysis for the dependent variable 'perceived project benefits' (combined responses to the statements that the wind energy project benefits: 'me' and 'my community') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects. Step 1: enter 'general support for wind energy', R^2 = 30.1%, p <0.001. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 0.1%, p = 0.901. Step 3: enter other independent variables. R^2 Change = R^2 change between step 2 and step 3. R^2 alone = R^2 when independent variables from step 3 are entered alone (without general support for wind energy and distance dummy variables). * = statistically significant R^2 change at the 0.05 level

	R^2 Change	p	R^2 Alone	p
Investment status	1.6%	.424	4.2%	.150
Actual investment opportunity	0.5%	.334	0%	.923
Perceived local project initiation	3.1%	.065	6.6%	.014*
Actual local project initiation	1.1%	.161	0.8%	.323
Participation	12.5%	.001*	25.5%	.001*
Perceived inequality of benefits & negative impacts within community	6.7%	.002*	13.1%	.001*
Perceived benefits & negative impacts of wind turbines in general	11.2%	<.001*	29.1%	<.001*
Perception that project is 'my community's'	16.5%	<.001*	34.0%	<.001*

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Appendix 17: Stepwise multiple linear regression analyses for dependent variable 'perceived project negative impacts': Beta values

Method: Step 1: enter 'general support for wind energy'. Step 2: enter dummy variables for distance of residence from wind energy project. Step 3: enter other independent variables.
R^2 change = change in R^2 between step 2 and step 3 (Except for Appendix 11a, where R^2 change = change in R^2 between step 1 and step 2)
R^2 alone = step 3 variables entered into the model without step 1 and step 2 variables (Except for Appendix 11a, where R^2 alone = step 2 variables entered into the model without step 1 variables)
B = unstandardized beta coefficient. SE = standard error. β = standardized beta coefficient.
Explanation of variables in Appendix 6

Appendix 17a: Distance from project.

R^2 change:	1.5%, p = .307				
R^2 alone:	2.6%, p = .191				
	B	**SE**	**β**	**t**	**p**
General support	**-.74**	**.13**	**-.45**	**-5.62**	**<.001**
Distance viewing	.25	.19	.11	1.36	.175
Distance 5 km	.25	.26	.08	.99	.327

Appendix 17b: Investment. Dummy variables in comparison to 'available & did'.

R^2 change:	1.6%, p = .471				
R^2 alone:	3.5%, p = .220				
	B	**SE**	**β**	**t**	**p**
General support	**-.71**	**.14**	**-.43**	**-5.3**	**<.001**
Distance viewing	.28	.19	.12	1.5	.143
Distance 5 km	.25	.26	.08	.99	.325
Available & did not	-.19	.27	-.09	-.71	.481
Not available & would	-.34	.28	-.15	-1.2	.227
Not available & would not	-.04	.29	-.02	-.14	.893

Appendix 17c: Actual investment opportunity.

R^2 change:	0.2%, p = .596				
R^2 alone:	0.3%, p = .573				
	B	**SE**	**β**	**t**	**p**
General support	**-.75**	**.13**	**-.45**	**-5.63**	**<.001**
Distance viewing	.29	.20	.12	1.46	.147
Distance 5 km	.29	.27	.09	1.08	.281
Actual investment available	-.11	.20	-.05	-.53	.596

Appendix 17d: Perceived project initiation. Dummy variables in comparison to 'do not know'.

R^2 change:	1.8%, p = .238				
R^2 alone:	**5.0%, p = .040**				
	B	**SE**	**β**	**t**	**p**
General support	**-.69**	**.14**	**-.42**	**-5.14**	**<.001**
Distance viewing	.25	.19	.11	1.30	.195
Distance 5 km	.29	.26	.09	1.11	.268
Internal initiation	-.30	.19	-.14	-1.63	.106
External initiation	.01	.23	.01	.03	.977

Appendix 17e: Actual project initiation.

	B	SE	β	t	p
R^2 change:	0%, $p = .827$				
R^2 alone:	0.2%, $p = .591$				
General support	**-.74**	**.13**	**-.45**	**-5.59**	**<.001**
Distance viewing	.25	.19	.11	1.34	.182
Distance 5 km	.24	.26	.08	.93	.353
Internal initiation	.04	.16	.02	.22	.827

Appendix 17f: Participation.

	B	SE	β	t	p
R^2 change:	**8.3%, $p <.001$**				
R^2 alone:	**17.6%, $p <.001$**				
General support	**-.59**	**.13**	**-.36**	**-4.49**	**<.001**
Distance viewing	.21	.18	.09	1.20	.231
Distance 5 km	.24	.24	.08	.99	.326
Participation factor	**-.41**	**.11**	**-.30**	**-3.84**	**<.001**

Appendix 17g: Inequality of benefits & negative impacts within community.

	B	SE	β	t	p
R^2 change:	**18.7%, $p < .001$**				
R^2 alone:	**28.2%, $p < .001$**				
General support	**-.60**	**.12**	**-.36**	**-4.98**	**<.001**
Distance viewing	.18	.16	.08	1.13	.263
Distance 5 km	.07	.23	.02	.32	.751
Unequal benefits	-.08	.08	-.08	-.98	.327
Unequal negative impacts	**.41**	**.07**	**.46**	**6.07**	**<.001**

Appendix 17h: Benefits and negative impacts of wind energy.

	B	SE	β	t	p
R^2 change:	**22.3%, $p < .001$**				
R^2 alone:	**40.5%, $p < .001$**				
General support	**-.36**	**.12**	**-.22**	**-2.94**	**.004**
Distance viewing	.12	.16	.05	.73	.465
Distance 5 km	.12	.22	.04	.54	.591
Benefits & negative impacts of wind	**-.71**	**.10**	**-.53**	**-7.05**	**<.001**

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Appendix 18: Stepwise multiple linear regression analyses for dependent variable 'perceived project negative impacts': p – values

Appendix 18. Stepwise multiple regression analysis for the dependent variable 'perceived project negative impacts' (combined responses to the statements that the wind energy project negatively impacts: 'me' and 'my community') among local residents surrounding the Maryvale, Spiddle Hill, and Watt Section wind energy projects. Step 1: enter 'general support for wind energy', $R^2 = 20.9\%$, $p < 0.001$. Step 2: enter dummy variables for distance of residence from wind energy project, R^2 change = 1.5%, p = 0.307. Step 3: enter other independent variables. R^2 alone = R^2 when independent variables from step 3 are entered alone (without general support for wind energy and distance dummy variables). * = statistically significant R^2 change at the 0.05 level

	R^2 Change	**p**	**R^2 Alone**	**p**
Investment status	1.6%	.471	3.5%	.220
Actual investment opportunity	0.2%	.596	0.3%	.573
Perceived local project initiation	1.8%	.238	5.0%	.040
Actual local project initiation	0%	.827	0.2%	.591
Participation	8.3%	<.001*	17.6%	<.001*
Perceived inequality of benefits & negative impacts within community	18.7%	<.001*	28.2%	<.001*
Perceived benefits & negative impacts of wind turbines in general	22.3%	<.001*	40.5%	<.001*
Perception that project is 'my community's'	8.6%	<.001*	19.4%	<.001*

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