



How island and community wind projects can stimulate sustainable economic development through energy independence: Isle au Haut, Maine, USA.

Gilbert L. Michaud

School of Community Economic Development
Southern New Hampshire University
December 2012

Submitted in Partial Fulfillment of Requirements for the Master of Science
in Community Economic Development

Approved by the Community Economic Development Program:

A handwritten signature in black ink, appearing to read "E. Jacobs", written over a horizontal line.

Eric L. Jacobs, Ph.D.
Date: 09 December 2012

SNHU School of Community
Economic Development

A School of Southern New Hampshire University

Table of Contents

Acknowledgments.....	4
Abstract.....	5
I. Community Context	6
<i>a. Community Profile</i>	6
<i>b. Community Needs Assessment</i>	18
<i>c. Target Community</i>	20
II. Problem Analysis	21
<i>a. Problem Statement</i>	22
<i>b. Stakeholders</i>	23
<i>c. Project Goals in Community Economic Development Terms</i>	28
III. Review of Literature	36
IV. Project Design/Logic Model.....	41
V. Methodology and Implementation Plan	44
<i>a. Project Participants/Beneficiaries</i>	44
<i>b. Community Role</i>	45
<i>c. Host Organization/Group</i>	46
<i>d. Project Staffing/Team</i>	46
<i>e. Project Implementation</i>	49
<i>f. Budget</i>	57
VI. Monitoring and Communication.....	60
VII. Evaluation Plan.....	66
VIII. Sustainability.....	71
IX. Results.....	73
X. Conclusions & Recommendations	76
<i>a. Prospects of Attaining Intermediate and Long-Term Outcomes</i>	77
<i>b. Further Considerations</i>	77
XI. Appendices	80
<i>a. Bibliography</i>	80
<i>b. Community Questionnaire</i>	87
<i>c. Gantt Chart</i>	89
<i>d. Organizational Chart</i>	90
<i>e. Sample Membership Certificate</i>	91
<i>f. Project Monitoring Matrix</i>	92
<i>g. Project Evaluation Matrix</i>	95

Tables and Figures

Figure 1: Coastal Maine/Isle au Haut Location	6
Figure 2: Map of Isle au Haut, Maine, USA.....	6
Figure 3: Maine Island Electric Rates, 2008.....	9
Figure 4: U.S. Department of Energy/NREL wind resource map	13
Figure 5: U.S. Department of Energy/NREL currently installed wind power.....	14
Table 1: Community Needs Assessment Matrix	19
Table 2: Problem Analysis Matrix.....	21
Table 3: Project Stakeholder Matrix	24
Table 4: Strengths, Weaknesses, Opportunities, and Threats Analysis	27
Table 5: Problem Analysis Recapitulation	41
Table 6: Logic Model.....	42
Table 7: Prospective Board of Directors.....	46
Table 8: Budget Proposal.....	58

Acknowledgments

The experience of writing this master's degree thesis did not come without challenge, but much wisdom and intellect was gained. Surely the process would not be complete without thanking those who helped along the way. First and foremost, my family and loved ones for their guidance, motivation, and words of encouragement, I am forever indebted to you. To Charles Farrington at Fox Islands Electric Cooperative and Travis Bullard at Eolian Renewable Energy Company who so kindly agreed to interviews concerning their work and how it might relate to the development of a project plan for the Isle au Haut Electric Cooperative. To the plethora of teachers, instructors, and councilors at various educational institutions, your insight and support will forever be appreciated. Lastly, to the faculty and staff here at Southern New Hampshire University - particularly Dr. Eric Jacobs for advising this project - and my fellow students and colleagues in the School of Community Economic Development, this submission would not have been possible without your support and culture of learning you have created.

Abstract

Resting in Maine's Penobscot Bay, the island community of Isle au Haut is one of only fifteen remaining year round island communities along the state's seacoast. Unfortunately, the community's electric rates are upwards of six times state and national averages, in a time where Isle au Haut is experiencing employment troubles, general poverty, and a senescent population. This study considers a locally-owned renewable energy project in the effort to engage community members on the planning and evolution of wind development. Specifically in the form of a cooperative arrangement, the Isle au Haut Energy Cooperative project proposal aims to diagnose the feasibility of pursuing wind power development on the island to provide an alternate solution to the area's current expensive and unreliable power sources, and combat some of the town's largest societal concerns for the future. By striving to be a leader in the rural green economy, the proposal's focus is to stimulate community involvement and community change to preserve the island's way of life while enhancing economic opportunities and the social well-being of the area. Via the market based community economic development approach, the democratic governance structure of the cooperative promotes collective action in the attempt to increase energy security and provide financial benefits to the geographically challenged municipality of Isle au Haut, Maine, USA.

I. Community Context

a. Community Profile

Population and Geography

Isle au Haut is both a municipality and its own separate island in Knox County, off the coast of Mid-coast Maine in the Penobscot Bay. The island's south and western shores are home to a portion of Acadia National Park and as of the 2010 U.S. Census the population was merely 73 persons with a population density of 6.2 persons per square mile (U.S. Census Bureau, 2010).

The island is only publicly accessible by mail boat from the nearby mainland town of Stonington, Maine. Isle au Haut is 12.7 total square miles, and again as of the 2010 Census, there were 172 housing units on the island; only of which 42 were full-time occupied (the remaining 130 units were seasonal) (U.S. Census

Bureau, 2010). Moreover, at an elevation

of 540 feet, Isle au Haut's highest point is Mount Champlain, located roughly in the island's center. Most of the town's terrain consists of hills and valleys covered largely by

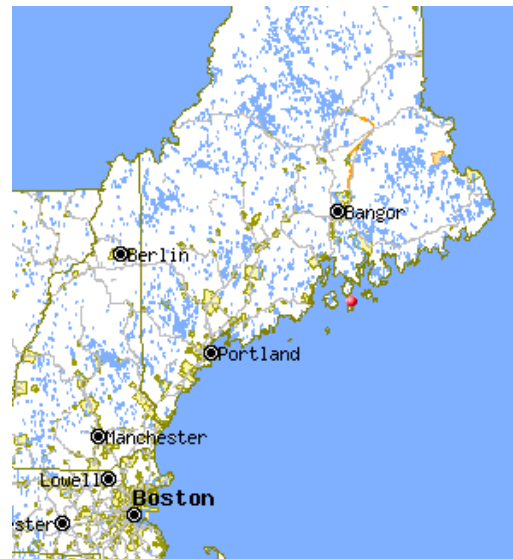


Figure 1 (Mainevacation.com, 2012)



Figure 2 (Statemaster.com, 2012)

coniferous trees, and the coastline largely granite rocks with a few rough and rocky beaches. A small freshwater lake, Long Pond, lies on the island's east side and is used mostly for recreational activities.

Income and Demographics

The ethnic structure of Isle au Haut in 2010 was 91.8% white, 2.7% both American Indian and Asian respectively, and 1.4% African American (U.S. Census Bureau, 2006-2010). Of the 42 households on the island, 8 (19%) were husband-wife families (2 of which had their own children under 18 years), and 25 (59.5%) were non-family households (U.S. Census Bureau, 2006-2010). Isle au Haut's median income for a household was \$33,750, and the median income for a family was \$41,250 (U.S. Census Bureau, 2010). It is noted that the island has to work to sustain a lively year round community and is openly and particularly interested in the immigration of year round residents who are families with children, small business owners or those who can work remotely, as well as commercial and profitable lobster-men and fishermen. Most of the islands activities and services are collaborative in nature, and living here requires a good amount of self-sufficiency, creativity, and practicality. It is undoubtedly a unique place to reside.

Increased Cost of Living

With its remarkably small population (though, in the summer, this significantly expands due to seasonal homes and tourists), and because of geographic ineptitude, Isle au Haut is currently experiencing an increase in the cost of living. Because of the fact that Isle au Haut is an island, an appreciably higher percentage of residents have to use public

transportation means to commute to work via the local boat service to the mainland. This is both costly and time consuming to locals. 2010 U.S. Census data indicated that 9.5% of Isle au Haut's labor force uses public transportation to get to work (the boat), and according to the Isle au Haut Boat Services web resource a round trip for an adult is \$37 (Isle au Haut Boat Services, 2012). Maine as a whole sees only 0.6% of its labor force using public transportation to commute to work daily (U.S. Census Bureau, 2010).

Another one of the most noteworthy contributors to the cost of living predicament is the community's electricity and energy costs. The average delivery rate of Isle au Haut's electric costs of 37.02 cents per kilowatt hour (kWh) as of 2010 were the third highest in the state, and significantly higher than Central Maine Power's average delivery rate of 4.19 cents per kWh, Bangor Hydro-Electric Company's 6.63 cents per kWh, and Maine Public Service Company's 6.31 cents per kWh – the state of Maine's three largest utilities that account for 777,998 of Maine's 809,239 utility customers (Maine Public Utilities Commission, 2010). Isle au Haut's electricity and energy needs are currently served solely by the entity named the Isle au Haut Electric Power Company (Isle au Haut Community Development Corporation, 2012). According to the Maine Public Utilities Commission delivery rate and electricity statistics, the Isle au Haut Electric Power Company had 134 customers, sold 241 MW hours annually, and brought in \$89,000 for annual revenue (Maine Public Utilities Commission, 2010). The average delivery rate of delivery ranks only behind the Matinicus Plantation Electric Company at 65.02 cents per kWh, and the Monhegan Plantation Power District at 74.51 cents per kWh (Maine Public Utilities Commission, 2010). The following graphic was published by the Swan's Island

Electric Cooperative and its island wind power study and shows this discrepancy in Maine islands' electricity rates (Swan's Island Electric Cooperative, 2008).

2008 ISLAND ELECTRIC RATES

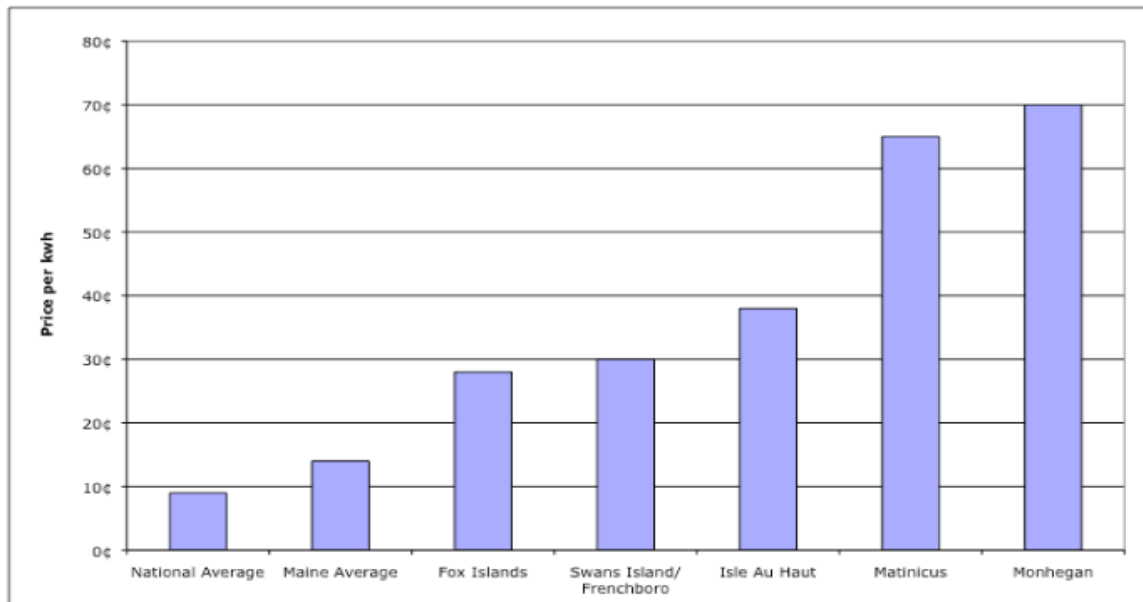


Figure 3 (Swan's Island Electric Cooperative, 2008)

The aforementioned Isle au Haut Electric Power Company was incorporated in 1969. Prior to this, homes on Isle au Haut were run via diesel generators that were privately owned. But, the service itself was made possible via the construction of a submarine cable from the island to the mainland town of Stonington, Maine in 1983 (Isle au Haut Community Development Corporation, 2012). Today, the Bangor-Hydro Electric Company sells electricity to Isle au Haut. Specifically because the service is purchased from the mainland and shipping and supply costs need be integrated into the bill, the rates are considerably higher than that on the mainland (Neal, 2007). And while the electricity itself is reasonably consistent, the Isle au Haut Electric Company remains very informal being simply located in the manager's house on the island - a local woman named Tina Tully. The business also has a board of directors that help supervise its operations. The

town of Isle au Haut itself has a similar decision making organization; the town is overseen by a group of selectmen – in addition to its planning board, board of appeals, school board, and lighthouse committee (Isle au Haut Community Development Corporation, 2012).

Poverty, Employment Difficulties, Aging Population

In concurrence with the preceding, the community of Isle au Haut has a relatively low income and aging population. The U.S. Census Bureau's American Community Survey (ACS) statistics show Isle au Haut having 10.8% of households and 13.8% of families living on less than \$10,000 of income per year (U.S. Census Bureau, 2006-2010). This is contrasted by the Maine state totals of 7.1% of households and 3.9% of families living on less than \$10,000 of income per year (U.S. Census Bureau, 2010). Correspondingly, Isle au Haut's median household income as of 2010 was estimated at \$33,750 and median family income was \$41,250. Statewide statistics comparatively show a median household income of \$45,815 and median family income of \$58,197 (U.S. Census Bureau, 2010). Furthermore, Isle au Haut as of 2010 had a median age of 49.5 years old with only 9.6% of its population under 16 years of age (U.S. Census Bureau, 2010). In comparison, the Maine state figures show a median age of 42.7 years old with exactly 18% of its population under 16 years of age (U.S. Census Bureau, 2010). In revealing these figures, it has become evident that there are fundamental financial and demographic discrepancies within Isle au Haut. Even the Isle au Haut Community Development Corporation (IAHCDC) itself has explicitly called for new families to move to the island with children to attend their school. In a recent Bangor Daily News article, Gerardine Wurzburg, the Chairperson of Isle au Haut CDC noted the lack of

children enrolled in the local school, and lack of residents to participate in small community life (Steeves, 2011).

Moreover, poverty and employment difficulties exist here for the island community. U.S. Census Bureau ACS statistics indicate that the town of Isle au Haut sees 13.8% of all families and 9.4% of all people's income in the past twelve months below the poverty level (U.S. Census Bureau, 2006-2010). In contrast, similar statewide statistics show 8.4% of families and 12.6% of all people with incomes in the past twelve months below the poverty level (U.S. Census Bureau, 2006-2010). In addition, Isle au Haut has drastically contrastive employment opportunities than the state of Maine as a whole. Because the island only has small businesses and services to meet the community needs, the occupational breakdowns prove influential to observe. Isle au Haut has 0% of its labor force in a full-time management, business, science, and/or arts occupation, while the Maine data shows 34.2% of its population within this same category (U.S. Census Bureau, 2010). Similarly, 38.1% and 45.2% of Isle au Haut's labor force works in service and natural resource/construction/maintenance occupations respectively, while Maine's data shows percentage of 17.5% 11.6% respectively for these categories (U.S. Census Bureau, 2010).

Similar Challenges in the Region

Isle au Haut is certainly not the first island community in Maine's Penobscot Bay to face challenges of this variety. In fact, there is a moderately short history of other communities acting on or at the very least discussing alternative energy developments to combat island plight. In 2009, construction was completed on the Fox Islands Wind Project, an alternative energy wind project on nearby Vinalhaven and North Haven

islands that is commonly recognized as the east coast's largest community wind project and New England's largest coastal wind facility (Fox Island's Wind Project, 2011).

Similarly, informative studies conducted as early as 2006 on nearby Swan's Island, which is governed by Swan's Island Electric Cooperative, began to investigate into wind power and the economic benefits of locking in a price for its elevated electricity rates. And though alternative energy and electricity rate reducing projects have been completed and/or discussed in the aforementioned regions, nothing of relevance has been conversed for the island of Isle au Haut. In a 2007 Comprehensive Plan Survey of the local residents, however, inhabitants voted 85% in favor of exploring alternative energy development for the town, second only behind the removal of old cars, vehicles, and construction debris. Stated by the plan, "It shall be the policy of Isle au Haut to investigate methods of becoming more energy independent" (Town of Isle au Haut Comprehensive Plan, 2011).

Why Wind?

Wind energy would be the resource of choice in terms of an economic development project largely due to its ample prevalence in the community. The U.S. Department of Energy and the National Renewable Energy Laboratory recently developed a wind resource map for the state of Maine that is useful for identifying wind development opportunities. On this diagram, the town of Isle au Haut's north shore has a wind power density at 50 meters (measured in W/m^2) of 600-800 – classified by the department as an outstanding resource potential (6 on a scale of 1-7) (U.S. Department of Energy, 2011).

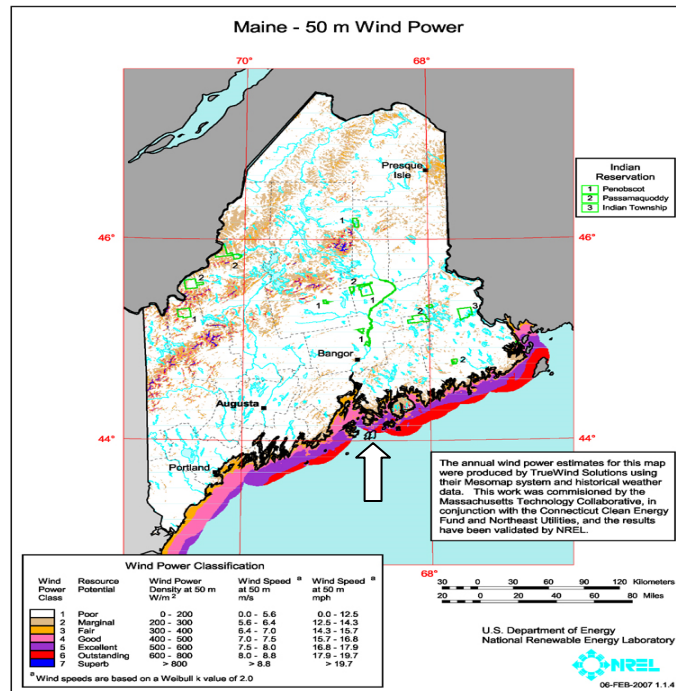


Figure 4 (U.S. Department of Energy, 2011)

In addition to the prevalence in the community, wind is a viable alternative for the township because of its critical input as a power source without being a discrete source of pollution. While Isle au Haut is not a large industrialized economy relying on a sizable non-human power supply, the overall reduction of fossil fuel burning still helps prevent harmful residuals finding their way back into the local environment. On a global scale, the world is already experiencing continued fossil fuel emission growth that is in turn leading to negative meteorological alterations. Expressly, according to Natural Resource Economics, an Introduction, “the total consumption of energy of all forms in the United States was about three times greater in 2000 than it was in 1950” (Field, 2008). So then, in an era in which increasing energy consumption coupled with expanded production of fossil fuel emissions causes concern for global warming outcomes and consequences, wind energy development provides a means to increased energy demands while

preserving critical resources and without causing pollution. In addition, it has been noted “the potential for wind energy is immense, and experts suggest wind power can supply up to 20% of U.S. and world electricity. Nevertheless, the United States currently produces less than 3% of our electricity from wind” (Windustry, 2012). Another map developed by the U.S. Department of Energy and the National Renewable Energy Laboratory confirms this declaration and shows the United States' currently installed wind power capacity in megawatts (MW), and the graphic works to tell the story of how the east coast of the U.S. and Maine specifically offer much opportunity for wind energy development in contrast to other parts of the country when considering its previously noted prevalence (U.S. Department of Energy, 2012).

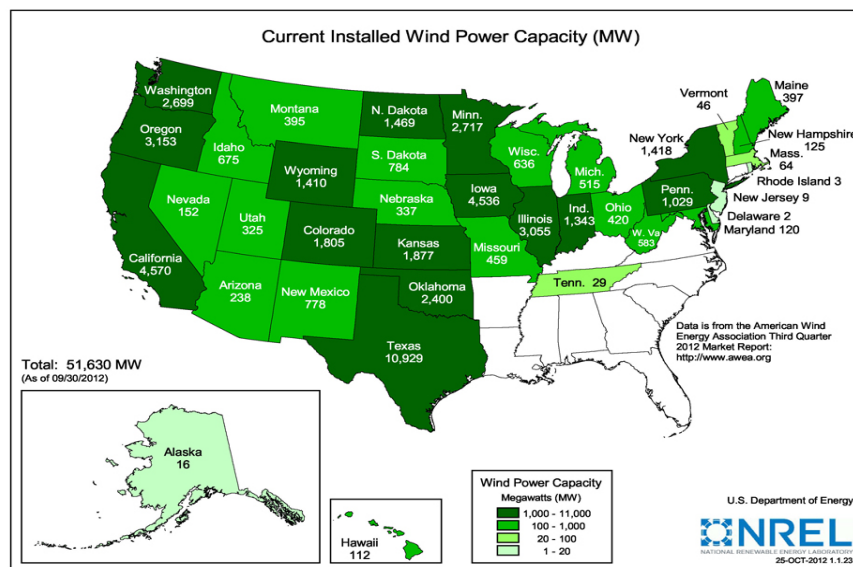


Figure 5 (U.S. Department of Energy, 2012)

According to the Isle au Haut Community Development Corporation, French voyager Samuel Champlain was credited with naming the island Isle au Haut – which

translates to High Island – because of the simple fact that it is physically the tallest island in Maine's Penobscot Bay (Isle au Haut Community Development Corporation, 2012). This information, coupled with the north shore's wind density measurements, provide reason to believe that a community wind project can be a flourishing development here. Because of the fact that it is commonly noted that wind is the least costly renewable energy source to develop, and wind development for Isle au Haut could be situated without harmful aesthetic and environmental impacts, project benefits could be kept in the community to offset rising electricity costs. Wind energy development for Isle au Haut could result in a revitalization of the local economy while stabilizing electric prices, promoting cost-effective energy production, and relying on fewer subsidies than other forms of energy. Socially, a sense of security and independence is created as well, via less reliance on the electric services of Bangor Hydro Electric Company as formerly illustrated. The use of wind power results in energy diversity and less dependence on unpredictable fossil fuel sources from the mainland, which are historically susceptible to price undulations. Local electric-power generation and ownership means that moneys are invested back into the community. Environmentally, pollution free wind energy also promotes clean water and air due to its lack of emissions.

The question of wind turbine size and magnitude is a central consideration for a project on Isle au Haut, but the diminutive population present makes this procedure much simpler. It has been illustrated “an average U.S. household uses about 10,000 kilowatt-hours (kWh) of electricity each year. One megawatt of wind energy can generate between 2.4 million and 3 million kWh annually. Therefore, a megawatt of wind generates about as much electricity as 240 to 300 households use” (Allegany Wind Project, 2012). So

because there are 172 housing units on the island - only of which 42 were full-time occupied – it seems viable to operate the power of one tower and one set of fan blades amounting to 0.5 MW of wind energy. While the recent trend in wind development has been toward larger and taller turbines amounting to more generation in megawatts, the tininess of Isle au Haut’s population deem large developments unnecessary. A 0.5 MW turbine would reduce sizing concerns with only an average tower height of 165 feet and rotor blade diameter of 130 feet (Gareth Hatch, 2012). And because of diseconomies of scale, increasing megawatt output beyond this threshold would prove inefficient when just producing energy for the town specifically. There exist a plethora of companies from which a wind turbine of this size could be purchased, which typically consist of a foundation, tower, nacelle (holding many primary components and control system), and a rotor. The turbine itself works by transforming wind's kinetic energy sources into electric ones. Nonetheless, a storage system of some variety would also have to be integrated due to the understandable reality that the wind does not blow all of the time. Excess power generation could be sold back to the mainland via the existing underwater infrastructure system, and at the same time power could still be purchased from the mainland in the event or times of wind deficiencies.

In the shadow of peak oil, energy self-sufficiency for Isle au Haut via wind evolution can be a sufficient way to meet demand while reducing mainland dependence. But all is not considered satisfactory in terms of wind energy; concerns of aesthetics, noise, shadow flicker, and biological impact have been voiced by many. Yet, in a close knit community such as Isle au Haut, and in the Penobscot Bay region where other islands are pursuing wind power development, the advantages seem to far outweigh the

disadvantages when the issue is the loss of the year-round community. Wind may be a variable resource, but it is predictable for the most part via analysis and resource studies. Furthermore, recent and improved design has substantially reduced turbine audible sound, so much so that the sound of the blowing wind is often louder than the turbines.

The logistics of a wind energy project to provide electric rate relief seemingly would be best served by the creation of a cooperative organization, one that both generates and distributes its own power sources. This type of organization is owned and controlled by the residents who use the electricity resources, and these members work to operate the co-op for their common benefit. The objective of electricity rate reduction might not be attainable if one was acting alone, hence the collaborative nature of the arrangement. Most energy cooperatives in the United States are rural or regional entities that distribute power to local member-owners that is purchased through larger, generation businesses or facilities. But, in Isle au Haut's attempt to reduce energy import dependency ratios, the increased supply of local wind energy generation allows for the development of a multifaceted cooperative that meets community needs. Sizing the project to meet these needs can provide a sustainable and affordable energy future for the isle, while providing jobs and generating revenues without causing pollution or depletion of natural resources.

Site Selection

In addition to high energy costs, there exist an abundance of other reasons behind the site selection of Isle au Haut for a wind energy project. For example, the regulatory complexity of local state and federal entities certainly play a role in development potential, as well as demand forecasts. In addition, the consideration of a project for Isle

au Haut is dependent on shipyard labor and infrastructure for the turbine system's development and servicing. Specific site selection is targeted for the island's north shore for these accessibility opportunities, but minimal conflict with island and sea space use needs to be considered as part of the public acceptance process. Fishing grounds, shipping lanes, and protected marine and land areas will be considered as part of the evaluation and engineering efforts. The site opportunity regarding the existing transmission cable to the island that is already connected to a grid substation makes the isle's north shore even more desirable a location, because of cost and schedule minimization.

b. Community Needs Assessment

One of the most beneficial ways to accentuate the magnitude of the development of the Isle au Haut Energy Cooperative is via the evolution of a community needs assessment. The function of this evaluation was to organize personal narratives and existing literature in the effort of better understanding why this project could be valuable and useful for the island residents. The needs assessment also addresses gaps amid present-day conditions for Isle au Haut, its causes and effects, and a subsequent desired method of intervention. Information was gathered from citizens and organizations around Maine and Isle au Haut itself to determine the attitudes and opinions regarding the importance and urgency of the energy issue. The matrix itself is valuable as a clarification tool as part of the planning process, and the resulting development of an applicable solution for implementation. By gathering and analyzing this data and creating this report, it has become obvious that high energy costs and dependency on fossil fuels has adverse effects on Maine's rural and island communities.

Table 1 - Community Needs Assessment Matrix

Personal Experience and Research					
<i>Source</i>	<i>Data Gathering Method</i>	<i>Nature of Problem</i>	<i>Causes</i>	<i>Effects</i>	<i>Intervention</i>
Self	Interview	High Energy costs on Isle au Haut, ME	Geographic difficulties of transporting energy via submarine cable to island	Increased cost of living, increased poverty/age demographics, decrease in population	Conduct a community economic development project
Secondary Sources					
<i>Source</i>	<i>Document</i>	<i>Nature and Extent of Problem</i>	<i>Causes</i>	<i>Effects</i>	<i>Intervention</i>
Town of Isle au Haut, Maine	Town of Isle au Haut Comprehensive Plan	High energy costs, 85% of respondents were in favor of alternative energy development	Disadvantageous location	Dependence on mainland resources, lack of employment opportunities	"It shall be the policy of Isle au Haut to investigate methods of becoming more energy independent" (Isle au Haut Comprehensive Plan, 2007)
Natural Resources Council of Maine, Mainewatch Institute, Maine Center for Economic Policy	Energy for Maine's future: A Call for Leadership	Maine has become increasingly dependent on unsustainable energy sources that are "warming the earth, damaging the environment, threatening public health, and posing long-term risks to our security and quality of life" (Natural Resources Council of Maine, Mainewatch Institute, Maine Center for Economic Policy, 2002)	Energy costs, risks, and dependencies are not one of local government's highest policy priorities. Leadership and direction is lacking in Maine.	Maine lags behind neighboring states in the integration of renewable energy sources, missing important opportunities to save money, increase in air pollution, and decrease in public health.	Maine needs leaders to step forward on the state and community level to promote the generation of clean renewable power.
Ocean Energy Task Force	Final Report and Recommendations	Maine's island communities have slowly begun to disappear, today	Urbanization, high costs of living, interstate	Maine's island and coastal communities have a difficult time sustaining:	Maine has significant offshore wind power energy resources; we need to address regional energy needs

	to Governor Baldacci	only 15 year-round communities remain off the coast of Maine. 90% dependency on fossil fuels.	commerce replaced waterborne commerce. 2008 economic catastrophe – crude oil at \$147 per barrel.	heating their homes, lighting their schools, etc.	and energy independence.
Community Perceptions					
<i>Source</i>	<i>Data Gathering Method</i>	<i>Nature of Problem</i>	<i>Causes</i>	<i>Effects</i>	<i>Intervention</i>
Gerardine Wurzburg – Chairperson of Isle au haut CDC	Document Review	High energy costs, cost of living, and home rental fees	Lack of resources and lack of housing to attract year-round residents to Isle au Haut	Lack of children enrolled in local school, lack of residents to participate in small community life	Education, affordable housing projects, increase in working remotely, resource allocation

c. Target Community

Due to the fact that Isle au Haut is such a sparsely populated and isolated island community, there have been limited and inadequate project proposals or ideas in the effort to alleviate some of the island's largest problems. However, there indeed have been other undertakings aimed to thwart some of Isle au Haut's difficulties of poverty and high cost of living. One of the most prominent and well documented of these is the presence of the Isle au Haut Community Development Corporation, and the non-profit organization's rental home construction and micro-loan program. Here, the Community Development Corporation, or CDC, leverages capital from the Maine State Housing Authority's MaineHousing Program in order to develop and provide affordable and net-zero energy consumption homes. In regard to the latter, the CDC offers a micro-loan program to help assist local small business owners by providing working capital up to \$25,000 (Isle au Haut Community Development Corporation, 2012). This can be used for equipment, marketing, maintenance, etc. in order to help the islanders thrive in their respective

industry. Though these programs operated by the Isle au Haut CDC are relevant and applicable in nature, they do little to relieve the island's overall high cost of island living issue. Through energy bill reduction, the development of the Isle au Haut Energy Cooperative would work to relieve some of the fundamental aforementioned difficulties - while at the same time creating employment opportunities and incentive for persons to relocate to the isle.

II. Problem Analysis

The assembly of a problem analysis is designed to create a logical flow of the social issue on Isle au Haut, and outline some of the contributing factors and consequences. Outlining cause and effect relationships relieve complication issues and create an analytical connection between energy costs and larger and longer scale community concerns. The use of local data helps to identify the exact scale of the problem and its effects, and allow for suitable interventions.

Table 2 - Problem Analysis Matrix

EFFECTS	<p>-Lower income population: Isle au Haut's median household income was \$33,750 and median family income was \$41,250. Statewide statistics show a median household income of \$45,815 and median family income of \$58,197 (U.S. Census Bureau, 2010).</p> <p>-Higher poverty levels: Isle au Haut sees 13.8% of all families and 9.4% of all people income in the past 12 months below the poverty level. In contrast, similar statewide statistics show 8.4% of families and 12.6% of all people with incomes in the past 12 months below the poverty level (U.S. Census Bureau, 2010).</p> <p>-Aging population: Isle au Haut as of 2010 had a median age of 49.5 years old with only 9.6% of its population under 16 years of age. In contrast, the Maine state figures show a median age of 42.7 years old with 18% of its population under 16 years of age (U.S. Census Bureau, 2010).</p>
----------------	--

	<p>-Employment Difficulties: Because the island only has small businesses and services to meet the community needs, Isle au Haut has 0% of its labor force in a management, business, science, and/or arts occupation, while the Maine data shows 34.2% of its population within this category. Similarly, 38.1% and 45.2% of Isle au Haut's labor force works in service and natural resource/construction/maintenance occupations respectively, while Maine's data shows percentage of 17.5% 11.6% respectively for these categories (U.S. Census Bureau, 2010).</p>
PROBLEM STATEMENT	<p>The 73 persons living on the remote island town of Isle au Haut, ME pay the third highest electricity rates in the state at an average rate of 37.02 cents/kWh, subsequently, Isle au Haut sees 13.8% of all families in the past 12 months below the poverty level (opposed to 8.4% for ME) and an aging population (median age of 49.5 years old as opposed to statewide median age of 42.7) (U.S. Census Bureau, 2010).</p>
CAUSES	<p>-Isle au Haut's high electricity and energy costs: The average delivery rate of Isle au Haut's electric costs of 37.02 cents per kWh as of 2010 were the third highest in the state, and significantly higher than Central Maine Power's average delivery rate of 4.19 cents per kWh, Bangor Hydro-Electric Company's 6.63 cents per kWh, and Maine Public Service Company's 6.31 cents per kWh – Maine's three largest utilities that account for 777,998 of Maine's 809,239 utility customers (Maine Public Utilities Commission, 2010).</p> <p>-High cost of living: Because of the fact that Isle au Haut is on an island, a higher percentage of people have to use public transportation means to commute to work (the local boat service). This is both costly and time consuming to locals. Census data indicates that 9.5% of Isle au Haut's labor force uses public transportation to get to work (the boat), and via the Isle au Haut Boat Services website a round trip for an adult is \$37. Maine as a whole, on the other hand, sees only 0.6% of its labor force using public transportation to commute to work daily (U.S. Census Bureau, 2010).</p>

a. Problem statement

In sum, this endeavor has been centered on the island community of Isle au Haut, ME and function of community members in collaborating on the development of an energy cooperative and local alternative energy project not only to reduce their carbon footprint, but also create a more sustainable future and economic foundation. As noted, the 73 persons living on the remote island town of Isle au Haut, ME pay the third highest

electricity rates in the state of Maine while encountering a financially destitute and aging population. In the attempt to help fight these community issues, the development of the Isle au Haut Energy Cooperative and the subsequent construction of wind turbines to work to offset the energy costs for the island, a community and resource oriented approach exists. Essentially, by directly incorporating community members and giving them the opportunity to be involved in all aspects of the project – be it organization, planning, financing, development, management, follow-up - the formation of a strong community organization that in turn supplies both long-term sustainability, community engagement, and economic development – not to mention lower cost of living for island residents (and potential immigrants) could be witnessed.

b. Stakeholders

The detailed identification of the Isle au Haut Energy Cooperative project's stakeholders is a crucial step in the development of the project in the sense that it is imperative to identify the principal persons, groups, and firms that will play a role in the project's success. In addition to the project management team and the citizens of Isle au Haut as a whole, a variety of vendors, financiers, and other groups are needed to complete a project of this magnitude. Therefore, the cooperation with the existing Isle au Haut Electric Power Company as well as investments and assistance from local business and organizations is vital. Potential project stakeholders are identified here along with their level of impact in the project development and implementation:

Table 3 - Project Stakeholder Matrix

Stakeholder	Stakeholder Interest in the Project	Assessment of Impact <i>A: Extremely Important</i> <i>B: Fairly Important</i> <i>C: Not As Important</i>	Potential Strategies for Obtaining Support of Reducing Obstacles
Citizens of Isle au Haut, Maine	Organization, planning, financing, development, management, follow-up, benefit from project.	A	Educate, arrange, and coordinate on the importance of alternative energy development and its benefits.
Isle au Haut Electric Power Company	Investment, key partner in infrastructure development	A	Promotion and coordination of community involvement and societal betterment.
Isle au Haut Community Development Corporation	Leadership, advocacy and community collaboration	A	Market benefits of project and organize community members' involvement
UMass Renewable Energy Research Laboratory	Investment, evaluation and analysis of project	A	Show strength of wind resources in the area and party benefit
Rural Utilities Service	Funding source: grants/loans	A	Return on Investment, Community and Regional economic prosperity
Island Institute	Project assistance, Cooperative organization, financial and economic analysis	B	Outline benefit of organizational member
Maine Public Utilities Commission	Cooperative organization through state entity	B	Precise and careful project planning and paperwork
USDA Rural	Cooperative start-up	B	Precise and careful project planning

Development	and planning		and paperwork
Cooperative Maine	Organization and structural assistance	B	Explanation of key resource allocation and beneficial cooperative structure
Unity College	Project evaluation	B	Explanation of key resource allocation and beneficial cooperative structure
Black Dinah Chocolatiers	Possible Investment	C	Private Investment
Natural Resources Council of Maine	Promotion and state and regional advocacy	C	Show strength of wind resources in the area and party benefit
Coastal Enterprises Inc.	Investment, grants, loans	C	Explanation of key resource allocation and beneficial cooperative structure
Bangor Hydro- Electric Company	Reduction of key customer's sales	C	Explanation of project advancement
Fox Islands Electric Cooperative	Possible assistance/partner	C	Doing a similar type project, local island betterment
Swan's Island Electric Cooperative	Possible assistance/partner	C	Doing a similar type study, local island betterment
Cianbro Corporation	Possible Contractor services	B	Monetary benefit
Town of Isle au Haut	Arrangement of town meetings and venues	B	Project involvement and benefit
Tina Tully, General Manager of Isle au Haut Electric Power Company	Town civic leader, potential board member of new energy cooperative	A	Promotion and coordination of community involvement and societal betterment.
Judi Burke,	Current Town	A	Promotion and coordination of

Brenda Clark, Pat Cole, Betsy Doermann, Kathie Fiveash, Rudi Graf, Kate Hotchkiss, Robert Lingley, Belvia MacDonald (Chair), Greg Runge and Carl Wilson	Comprehensive Planning Committee, civic leaders and/or sub group, potential board members or helpful in development of new energy cooperative		community involvement and societal betterment.
Alexander Harris	Island Institute Island Fellow, focus on Isle au Haut governance and economic development, key co-op organizational player	C	Explanation of key resource allocation and beneficial cooperative structure
Gerardine Wurzburg	Chairperson of the Isle au Haut CDC, potential board member of new energy cooperative	B	Explanation of key resource allocation and beneficial cooperative structure
Paula Greatestorex	Current town schoolteacher, potential member or organizational help/educational effort of project.	C	Promotion and coordination of community involvement and societal betterment.

In addition to the stakeholder matrix, a SWOT analysis offers a method of strategic planning in analyzing and recognizing both the interior and exterior dynamics that are encouraging and adverse in achieving the targets of the Isle au Haut Energy

Cooperative project. Aligned with previous specifications and project objectives, this matrix helps evaluate strengths, weaknesses, opportunities, and threats to find competitive advantages within attainable strategies for the target population of Isle au Haut's residents. Overall, the investigation shows how the potential of wind development, coupled with key financing opportunities and partnerships can help sustain Isle au Haut. But, the factors of time, community criticism, and ever-changing capitalization circumstances need to also be considered.

Table 4 - Strengths, Weaknesses, Opportunities, and Threats Analysis

<p style="text-align: center;">STRENGTHS</p> <ul style="list-style-type: none"> - Wind resources of Isle au Haut have great potential and prominent capabilities to utilize a renewable energy resource - Terrific wind resources, potential for financial assets/loans/grant moneys, tight-knit community present - Nearby Fox Islands Wind project can be a source/project to learn from, as well as similar studies that have been done - Lower electricity costs for the island, potential for reselling excess energy back onto mainland grid for financial returns - Energy innovation, Isle au Haut can be one of the country's leaders in green energy development in the U.S. moving toward our uncertain energy future - Distinct attitude needed, knowledge that alternative energy development is the wave of the future and the time to act is now, community energy independence, trying to keep families on the island and save school, etc. 	<p style="text-align: center;">WEAKNESSES</p> <ul style="list-style-type: none"> - Wind energy has received a bad reputation at times for a number of reasons. Reach is really only the one community because of the island aspect involved - One of the largest challenges here is gaining start-up funding and financial support for the project - This is a time sensitive issue - Will be a sustainable source, but will require certain levels of upkeep - Aesthetic changes could create a distraction for boaters, hikers, campers, etc. - Wind is not 100% predictable - rather it is largely measured by averages - Need to elect board members and have key management in place to ensure project completion and cooperative success
<p style="text-align: center;">OPPORTUNITIES</p> <ul style="list-style-type: none"> - Increasing incentives and funding opportunities for 	<p style="text-align: center;">THREATS</p> <ul style="list-style-type: none"> - Possible community, regional, and political

<p>alternative energy development via federal and state entities</p> <ul style="list-style-type: none"> - Integral to nationwide shift to green economy - New, lighter, wind turbine technologies currently exist - innovative and renewable solutions to help sustain Isle au Haut - Many European countries and other nations are current leaders in alternative energy development; Isle au Haut can be an influential example in island wind projects in the U.S. - Other Maine islands with similar complications can learn from Isle au Haut's potential success in this project - UMASS Renewable Energy Laboratory, Unity College, USDA are key research partners/opportunities - Additional strategic alliances include Rural Utilities Service, Island institute, Coastal Enterprises Inc., Fox Islands Electric Cooperative 	<p>backlash</p> <ul style="list-style-type: none"> - It has been argued by some reports that wind turbines negatively affect quality of life - Always a chance that new technologies will subsequently emerge after project completion - Need to have the right individuals/companies/organizations on board because there are only so many resources in the local area - Need to make sure that Isle au Haut's population will either remain intact or increase - loss of school and transition to summer-only community will make project virtually worthless - Federal government and Rural Utilities Service is where most of capital where come from and this is ever changing
--	--

c. Project Goals in Community Economic Development (CED) Terms

Cardinal to the development of the Isle au Haut Electric Cooperative is the examination of its contribution to the science of community economic development (CED). Though CED is undoubtedly interdisciplinary in nature, it does encompass key characteristics that help shape the definition of the science. First and foremost, CED is a community oriented process that works to provide enhanced local social conditions and economic opportunities. The combination of social and economic development within a community is meant to bring about a higher sense of well-being in the community both a culturally and communal manner. More often then not these actions are targeted toward a group or groups of people who are disadvantaged in some capacity (The Canadian CED Network, 2012). Essentially, community economic development is a progressive

approach at improvement that is largely interdisciplinary in nature, but combines numerous schools of economic, sociological, and psychological thoughts to accomplish the goals of community organization, community building, and increased social capital and well-being. Therefore, while one of the central reasons for developing the Isle au Haut Energy Cooperative is due to economically marginalized income, impressions are that the project is not solely economic in nature, though requiring specific economic interventions. Economic knowledge and skills are certainly needed in the development of an energy cooperative for Isle au Haut. One of the key aspects in the formation of said cooperative is increased energy security, especially in a sustainable way moving into the uncertain future of rural America. In fact, via successful projects such as this, Isle au Haut Maine, as well as rural America in general, can effectively work to become the leader in the growth and development in what has been labeled the green economy. Essentially, though, the development of this project is in fact economic in nature because it works to incorporate the four A's of the E in CED. The raising of awareness is present via the education and understanding of key island income and resource problems, and how lower cost of living can encourage other forms of critical economic expansion. Next, advocacy is represented through the active support for social justice, communal project backing and support. The allocation of resources is seen in the wind energy potential and the opportunity that this resource presents for Isle au Haut, and labor and capital resources are integral to success as well. Lastly, association is comprehended because of the fact that the specific creation of the cooperative organization is the key to this project's potential success; community organization and management.

Community and development are also present in this undertaking's effort to meet the electricity and energy needs of the community and keep resources local by constructing energy and power development via wind turbines to work to offset the energy costs for the island. Because Isle au Haut is perceived as a community that cares about its residents, school, and small businesses – and because living here requires self-sufficiency and resourcefulness (community), it appears to well fit for a project of this variety. Moreover, while the Isle au Haut Community Development Corporation is already situated in the community, it would be more well-suited to develop an original and separate cooperative organization in the effort of wind power development in the area. In an energy cooperative of this sort the community members are the owners, so without the approval and financing of these member-owners, this project will have not even been proposed and followed through with. In this sense, the community would see the direct benefits: a lower cost per kWh on their electric bills. Finally, this should have other results integral to community development, such as attracting more year-round residents, seeing the island school continue its functions, and overall reducing the cost of living here (development).

Approach in CED

The community focused approach to CED is largely appropriate to the Isle au Haut Energy Cooperative project because of the community's shared view on its key issues and expression of need for collective action. While Isle au Haut does see various income levels among residents, what is noteworthy is the area's high level of social organization. The community focused approach consequently combines both the social and economic interests of Isle au Haut, and via strategic planning and partnerships the

common goal of reduced electricity gives way to the cooperative structure in which the community members are the owners of the business. Bonding social capital is also present here because of the incorporation of island residents in a homogenous manner, or within the same social group, to promote a common support and sense of community to deal with the issues identified in the problem statement. Consensus organizing could also be utilized as a development technique here, as a low-key strategy that works to accommodate and tie the self interests of Isle au Haut together in order to realize the value of and attempting to achieve the common goal of energy and electricity cost reduction.

In the community economic development concept of power analysis, the possibility for success in a project such as this comes via the community organizations and members who would work to develop and finance the project. In this way, by mobilizing Isle au Haut's internal resources, the community can see a practical way of collective benefit. Conceptually, the CED market-based approach would be utilized in this circumstance, in which the isle's social space is treated much like a market. By doing this, imperfections within this 'market' are attempted to be corrected in order to stimulate development. By promoting participation in the cooperative project, the theory works to provide a systematic way of promoting economic activity through community actions. The community actions of collaborating on a shared ownership alternative energy project, therefore, fundamentally work to suit the needs and requirements for sustainability as well as development. Because of the fact that a project such as this would not move forward without collaborative actions, its concepts are rooted in collective identity and benefit rather than traditional outside forms of development work.

Severity and Urgency

Because of its rural nature, Isle au Haut's depleting population has led to complications as limited economies of scale are present for energy resources, making it difficult to reside in the area because of the higher cost to gain these essentials. With such key issues in the focus of the public's eye such as global warming and peak oil, now more than ever it seems pertinent to enact sustainable environmental policies, not only from a reduction of current oil use and pollution standpoint, but also moving forward with renewable energy sources to offset oil demand. This is best said via the report on the strategy on the sustainable use of natural resources from the EU legislative commission (2005):

“To reverse unsustainable trends, contain environmental degradation and maintain the essential benefits of natural resources, environmental policy needs to do more than just regulate pollution (controlling pollutant emissions and waste). This strategy, thanks to its resource life cycle based approach and the pooling of reliable information, should help to improve the eco-efficiency of resource use and smooth the way to more sustainable modes of production and consumption.”

It has become obvious that few can argue the increasing importance of the ever-dwindling natural resource pool in the world today.

In conjunction with these energy resource concerns, another chief concern for the future of community economic development is land use planning. Isle au Haut needs to realize how the organization and planning of land and vacant lands can provide benefit, especially when using them wisely for their most useful purposes without environmental degradation. The planning of land use of the community is essential to sustainability. In

the current nationwide trends of urban sprawl, increased air pollution, the overcrowding of traffic and travel times, and energy inefficiency, it is effortless to understand the depleted sense of a local feel of a community. Therefore, in order to provoke economic and sustainable community development, Isle au Haut's improved management in response to land use must be implemented, by safeguarding natural resource pools while ensuring a cohesive neighborhood and community feel.

One of the most influential considerations to this project, however, is the capability keep local control in the proud community and state of Maine as a whole, and to eradicate profit-driven multimillion dollar corporations from taking direct advantage of the area's resources while residents get little to nothing in return. In fact, currently this is something that has already taken place in Maine, with six currently operating, four proposed, one under construction, and one approved wind power projects - and all except for one are owned and operated by large corporations such as TransCanada Corporation, First Wind, Patriot Renewables LLC, and Independence Wind LLC. Only one significant wind power project in Maine was done via the community based model, this is Fox Islands Wind Project, via the Fox Islands Electric Cooperative, a small rural cooperative also in the Penobscot Bay region. Fox Islands Electric Cooperative is a generation and distribution co-op that essentially provides electricity and power to Vinalhaven and North Haven Islands, two small islands off of Mid-Coast Maine, which is within proximity of Isle au Haut circumstantially (Wikimedia Foundation, Inc., 2012).

Economic Impact

Community wind projects have extensively been touted both in literature and operation as having an impact on jobs and economic development, mutually during the

construction and operation phases. Also, because the cooperative model focuses on the highest levels of local ownership, increased levels of community support offer higher returns on investment. The economic impact of this particular community wind project can be seen through many different avenues, but most prominently via the utilization of local/regional labor and materials during development and operations, as well as through the reliance on local banks and businesses for financing and loans. The community based model also allows higher levels of economic impact to be seen by the community and to fight the perception that outsiders are the specific and primary beneficiaries of the project.

Particularly, direct benefits for the construction of the Isle au Haut wind power project can be had by the construction company and its subcontractors, project developers, turbine erection units, road constructors, crane operators, upkeep workers, engineering firms, and attorneys. More indirect beneficiaries comprise of construction material vendors, project accountants and feasibility study personnel, financiers, and manufacturers of both the turbine and related equipment. Because of the fact that Isle au Haut is an island, many of these persons and groups will need to come from the mainland, but it is the objective to keep these benefit recipients within the state of Maine as a whole so that the local region experiences the greatest benefit. While the benefit magnitude is largely a function of project size, the economic development impact of the cooperative and wind project for the isle should not be underestimated. In fact, a recent study indicated “New retrospective analysis of operating community wind projects finds that total employment impacts from completed community wind projects are estimated to be on the order of four to six 1-year jobs per-MW during construction and 0.3 to 0.6

long-term jobs per-MW during operations” (Lantz & Tegen, 2009). This may not seem exceptionally momentous in the proposal for a 0.5 MW wind project for Isle au Haut, Maine, but the additional creation of the cooperative organization itself offers a considerable boost to these employment impact projections.

How the economic impact relates to the project's intended outcomes further considers how much electricity is needed for island residents while insulating residents from future increases in electricity price. Considering the volatility of electric prices as of late, the lowering of kWh rates is a meaningful benefit for Isle au Haut. According to the Fox Islands Wind Project's background, “a detailed economic analysis suggested that the project could lower electric-power rates by 2-4 cents per kilowatt-hour for the initial 10 years and twice that amount during the second decade” (Fox Islands Wind Project, 2011). Similar studies conducted by the Swan's Island Wind Power Project proposal projected that electricity costs could be reduced by 8-10 cents per kWh, resulting in a user savings of anywhere from \$30-\$43 per month over the lifespan of the project (Swan's Island Electric Cooperative, 2008). A similar type of model and result would be anticipated for the Isle au Haut project; the use of federal grants and the signing of a purchase power agreement would project savings for the isle to be in the range of 6-10 cents per kWh based on the indicated MW size of the wind development and its cost to develop and construct. It would be estimated, therefore, that this savings would be seen in the range of \$25-\$30 per month to the consumer over the next twenty years following erection and assembly.

Attention also must be brought to the factor of time. The Isle au Haut Energy Cooperative and wind power project will require several years to fully experience its

potential and return to the community and, therefore, examining the social service activity throughout the time-frame is also an impact of significance. The socio-economic value created in acting on this proposal is largely inevitable in its success. But, numerous other financial and economic impacts are seen in the long-term, making the electric price stability more difficult to comprehend in the initial phases. It is this very long-range investment in the community, however, that should generate employment opportunities and local ownership to revitalize the economic activity of Isle au Haut.

III. Literature Review

Electricity and energy cooperatives have, in fact, existed in the United States for many decades. Most of these organizations, however, formed as a result of President Roosevelt's Executive Order No. 7037 that was signed on May 11, 1935 that worked to create the Rural Electrification Administration (National Rural Electric Cooperative Association, 2005-2012). Upon the subsequent passing of the Rural Electrification Act, federal financial lending programs and support became more prevalent, and rural electric organizations began emerging throughout the country. One of the key distinguishing characteristics of cooperative organizations themselves is the seven common principles that they typically adhere to. The organizational governing entity of all of the United States' electric cooperatives, the National Rural Electric Cooperative Association (or NRECA) identifies these said principles as: voluntary and open membership, democratic member control, members' economic participation, autonomy and independence, education, training, and information, cooperation among cooperatives, and concern for community (National Rural Electric Cooperative Association, 2005-2012). Consequently,

as Pina states (2005), “The members of the cooperative have sole power over the organization and will also take part in forming bylaws. However, decisions will be taken collectively...Each member will be allowed the opportunity to take part of the board of directors once a year in order to uphold equal opportunity among the members” (p.21-22). Cooperative structures are unique. Community residents serve as the organizational members, and the co-op itself is typically overseen by a board of directors. Continues Pina (2005), “The board of directors will be responsible for organizing the members by establishing ground rules that will uphold the bylaws created by the members. Also, the board of directors will keep track of meetings and participant events or workshops. Moreover, the board of directors will also maintain log and information sheets of the overall day-to-day operations” (p. 22).

What is significant about the cooperative model is its distinct structure and connection among the organization’s members. A doctoral dissertation by David Passe of Iowa State University titled *The Development of a Cooperative Model to Analyze the Effects of Differential Member Treatment* discusses the membership composition of cooperative structures, and the awareness needed to work toward the interest of its members. Though all organizational scenarios are circumstantial, it is still necessary for cooperative management to understand how to treat its members and their interests in the decision-making and policy development process (Passe, 1986). A cooperative based wind energy project in Isle au Haut, Maine, for example, would rely heavily on local human capital, in turn providing much stronger community involvement in the creation of energy and economic prosperity. Passe’s piece is influential in working to understand

how cooperative principles and treatment of organizational members is essential in involving community members in all aspects of development and implementation.

Though there might be many different possible ways to structurally organize this type of alternative energy development, there are various sources that explain why cooperative organizations can be the most advantageous business arrangement, especially when management personnel have experience working with the community and other industry ventures. In a piece titled *Cooperative Strategy and New Venture Performance: The Role of Business Strategy and Management Experience*, an examination was conducted of the use of cooperative arrangements, and the elements of management, strategies, and performance. State McGee, Dowling, and Megginson (1995), “the effects of cooperative behavior may be driven by the experience and capabilities possessed by the management team” (p. 566). The formation the proposed Isle au Haut Energy Cooperative would follow the cooperative principles of a distinct purpose, control, ownership, and allocation of benefits – and it has become obvious that while there are intricacies of such an organization, management experience does play a vital role in cooperative success.

At any rate, the other key component of this undertaking specifically is not only to lower the cost of living on Isle au Haut and stimulate economic development, but also to do so in a sustainable manner. Renewable sources have been at the forefront of future energy developments and discussions, especially in uncovering how current electric generation and energy use is accountable for harmful emissions. In fact, because of the lack of relevant federal guidance in U.S. energy policy implementation, local renewable

energy development had been deemed as vital in the attempt to offset global warming and presents the greatest hope for enduring sustainability. Heiman and Solomon state (2004):

Given the major social and environmental impacts of conventional fossil fuels and nuclear power, the need for electricity from renewable energy has never been more compelling. This is especially the case with the growing international concern about global climate change, since nuclear power and renewable energy sources are the only long-term energy options. However, serious security and waste disposal problems beset nuclear power. As a result, only renewable energy sources, coupled with energy efficiency and conservation, can greatly lower greenhouse gases, such as CO₂, in a sustainable manner (p. 94).

Wind energy, as Pasqualetti states (2000), is “now the fastest growing renewable energy resource in the world” (p. 381). Furthermore, Milborrow (2011) found “it can be installed quickly in areas where electricity is urgently needed. In many instances it may be a cost effective solution if fossil fuel sources are not readily available, or are expensive” (p. 539). So then, in an effort to meet the electricity and energy needs of Isle au Haut specifically, and keep resources local, it would be viable to develop an energy co-op via wind turbine development to work to offset the energy costs for the island. In fact, as Pude states (2009) “Coastal New England, particularly its islands, is one area that holds particular promise for wind power development due to a strong wind resource and the important social implications that can result from reduced energy costs” (Abstract).

In a report issued by the Maine Center for Economic Policy, the Natural Resources Council of Maine, and the Mainewatch Institute: *Energy for Maine’s future: A Call for Leadership*, it was illustrated that the state of Maine has become increasingly

dependent on unsustainable energy sources that are “warming the earth, damaging the environment, threatening public health, and posing long-term risks to our security and quality of life” (p. 1). As a result, Maine needs leaders to step forward on the state and community level to promote the generation of clean renewable power, and the Isle au Haut Energy Cooperative would to this issue has one of the leaders in the state of alternative energy development.

On the whole, with the 73 residents on the remote island town of Isle au Haut, Maine paying the third highest electricity rates in the state it has become obvious that this small island community and its high cost of living help account for higher poverty rates, flight of the youth, and an aging population. Consequently, according to Granger, island nations and communities are:

...vulnerable because of the character of their socioeconomic environment, their insularity, and dispersion, and their isolation and size. Economically, diseconomies of scale, increasing indebtedness, persistently high unemployment, falling commodity prices, rising import costs, shrinking markets for their monoculture exports, the vagaries of geopolitics, increasing population and growing poverty mitigate against real development, frustrate the expectations of the populace, and threaten social discord (p. 71).

With some of the highest electricity rates in the state of Maine, and more than plentiful wind resource potential, the establishment of the Isle au Haut Energy Cooperative would fit the needs of a community economic development project. With a social landscape that is collaborative in nature, this formulation is not only realistic and relevant; it is an absolute necessity for the future of Isle au Haut and its economic and

social well-being. The plethoras of texts, scholarly articles, reports, etc., as well as the recent local development of similar alternative energy projects together form a strong basis of research obtainable that is undoubtedly influential in developing this respective project.

IV. Project Design/Logic Model

The Isle au Haut Energy Cooperative Project will aim to be implemented with the long-term objective of lowering poverty rates, encouraging inflow of immigrants to the island as permanent residents, and lowering costs of living to amount to higher quality of life for residents. In the intermediate, expected results include increased community collaboration, and enhanced socially responsible behaviors to better the community as a whole. The formulation of a logic model offers a tool to depict the relationships between outputs, activities, and indicators in order to analyze the potential of successful implementation. Because of the proposal nature of this project, the logic model includes assumptions concerning program actions and the prospective way it will work. A recap of the problem analysis is present, and logic model works to show the different outcomes desired and the levels of participation to practice the concepts and work to change the social conditions of the municipality. The resources that will be required to achieve the coveted outcomes are also outlined at this juncture.

Table 5 - Problem Analysis Recapitulation

Effect	Comparatively high poverty rates, an aging population, and a significant lack of school aged children – Isle au Haut is on the verge losing its year-round population if these trends continue
---------------	--

Problem Statement	The 73 persons living on the remote island town of Isle au Haut, ME pay the third highest electricity rates in the state at an average rate of 37.02 cents/kWh (Maine Public Utilities Commission, 2010), subsequently, Isle au Haut sees 13.8% of all families in the past 12 months below the poverty level (opposed to 8.4% for ME) and an aging population (median age of 49.5 years old as opposed to statewide median age of 42.7) (U.S. Census Bureau, 2010).		
Causes	High energy and electricity costs	General high cost of goods and supplies	Lack of immigrant influx to the island

Table 6 - Logic Model

Long-term Outcome	Lower poverty rates, promote an influx of immigrants to island as permanent residents (and school-aged children), and lower costs of living to amount to higher quality of life for residents.		
Intermediate Outcome	Increased collaboration and socially responsible behaviors to better the community as a whole		
Short-term Outcomes	Identification of cooperative board members and key project stakeholders	Increase community knowledge that renewable energy can consequently help other community needs	Development of skills in which community members are acting in a collective interest in order to sustain island life and flourish moving toward the future
Outputs	<ul style="list-style-type: none"> -Clearly identify 5-6 board members for cooperative organization -Memorandum of Understanding (MOU) with town comprehensive planning committee -Work to obtain grant funding for official wind resource study 	<ul style="list-style-type: none"> -75% of Isle au Haut sees the communal benefit of project -2-3 town conventions/seminars with educational opportunities to residents. 	<ul style="list-style-type: none"> -Raise awareness to at least 50 residents of environmental sustainability, community involvement, and ways on the personal level to

	-Lay out budget proposal		save money and be more socially responsible.
Activities	<ul style="list-style-type: none"> -Survey town members on interest in such a project -Identify potential stakeholder team, and conduct brief interviews with persons -Develop relationships with those who will be influential in the project: UMASS Renewable Energy Laboratory, Unity College, USDA, Rural Utilities Service, Island institute, Coastal Enterprises Inc., Fox Islands Electric Cooperative. 	<ul style="list-style-type: none"> -Organize workshops and town symposiums that lay out positive effects that wind energy can have on the community. -Provide information and work to answer questions about development of wind energy -Communicate to town the evaluation and analysis results of the project. 	<ul style="list-style-type: none"> -Survey community residents on current state of the town and outlook toward the future. -Host a community event depicting the benefits of renewable energy and environmental sustainability - with activities for children -Present the benefits of community collaboration and environmental sustainability to Isle au Haut Comprehensive Planning Committee and Town Board.
Data Gathering Techniques	<ul style="list-style-type: none"> -Questionnaire -Focus group discussions -Key informant interviews 	<ul style="list-style-type: none"> -Quantitative, self-administered survey of residents -Secondary gathering of qualitative data -Literature Review 	<ul style="list-style-type: none"> -Narrative account of the history of the problem -Qualitative, self-administered survey of residents -Non-participant

			observation
Data Sources	Personal data gathering as a result of interviews, discussion, questionnaire	-Town of Isle au Haut Comprehensive Plan Survey in 2007 has identified that 85% of residents are in favor of exploring alternative energy development (Town of Isle au Haut Maine, 2007). -Create frequency/percentage distribution tables from results of quantitative survey	-Personal observation of community members and respective actions -Survey results -Bivariate descriptive statistics

The increased education and knowledge that the formation of wind energy and the cooperative development can provide community benefit is in all likelihood the step of alpha importance in this regard, especially in initial phases of implementation. This will largely be done via community meetings, workshops, and working with outside sources of relevance such as the Island Institute non-profit in nearby Rockland, ME. Utilizing Isle au Haut's land, labor, and capital resources hopes to provide the community with enhanced economic activity. Furthermore, the project is anticipated to have other results integral to community development, such as attracting more year-round residents, seeing the island school continue its functions, and overall reducing the cost of living on this island. As step one in the process, it will be vital to coordinate, organize, and show the community members what positive benefits a project like this can certainly have.

V. Methodology and Implementation Plan

a. Project Participants/Beneficiaries

It is not laborious to identify the participants in this program because of the restraints of Isle au Haut, Maine being an island community. Furthermore, the confined

population figures and geographic area mean that the island has to work to sustain a flourishing year-round community, and as noted is particularly interested in the immigration of year round residents who are families with offspring, small business owners or those who can work remotely, as well as commercial and profitable lobstermen and fishermen. Because of the fact that most of the island's activities are collaborative in character, it is the perceived hope that community members will be interested in moving forward with the project once they learn the benefits of action. As step one in this educative process it might be most advantageous to reach out to the persons that have been targeted as potential stakeholders in the project. Again because Isle au Haut is so small population-wise, getting the attention of operative community leaders whom have the most influence offers the best attempt at gaining entry. While there have been scenarios of resistance to wind turbines in other locations for aesthetic concerns, once again, the town's comprehensive survey notes how townsfolk were generally in favor of exploring alternative energy solutions for the island. Collective activity will ensue via the formulation of the cooperative structure itself, in this sense a democratic process of community members seeing the direct benefit the project. There are not any exact skills that the community itself is particularly lacking, but failure to coordinate and act on this project could mean the community losing its school, store, and dozens of year-round residents because of the increasingly high costs of energy and living. So then, there appears to be a direct incentive to act and a solid community response to the proposal is expected.

b. Community Role

The specific development of the stakeholder team that will serve as the cooperative's board of directors was critical to identify as project successes will certainly rest with its leadership group. Tina Tully is a town leader who already has experience managing and supervising an electricity organization, and other potential board members include local leaders of various backgrounds and capacities as revealed.

Table 7 - Prospective Board of Directors

Team Member Name	Affiliation and/or Relationship to Planned Project
Tina Tully	General Manager of Isle au Haut Electric Power Company, Town civic leader, potential board member of new energy cooperative
Belvia MacDonald	Chair of Town Planning Committee, potential board member or helpful in development of new energy cooperative
Alexander Harris	Island Institute Island Fellow, focus on Isle au Haut governance and economic development, key co-op organizational player
Gerardine Wurzburg	Chairperson of the Isle au Haut CDC, potential board member of new energy cooperative
Paula Greateorex	Current town schoolteacher, potential member or organizational help/educational effort of project.

c. Host Organization/Group

A key facet of the progress of this project is the formation or organization of the cooperative entity itself, and this serves as the host organization for the purposes of this proposal. This is beneficial by incorporating a system of democratic control and by directly incorporating community members and giving them the opportunity to be involved in all aspects of the project as members of the co-op. The Isle au Haut Energy Cooperative organization would essentially be responsible for supplying energy and electricity to the community, and operating the wind turbines to accomplish the feat of lower energy expenses in the long-term. Additional elements of cooperative establishment, structure, and logistics are discussed in the project implementation section.

d. Project Staffing/Team

It is true that other organizations of significance will be required to assist in the formation of this energy cooperative, in fact, the Isle au Haut Community Development Corporation and the Island Institute non-profit organizations could be a resource of both financing and economic analysis benefit. As previously indicated, however, the indubitable key here is the formation of the cooperative structure itself for the island. The first step in the development of a cooperative is to identify a leadership group that will begin discussions with other potential members or users. The board of directors will be responsible for the performance of the cooperative as well as providing adequate financing, setting goals and policies, and the evaluation of the general manager and key staff. On a day-to-day basis, the Isle au Haut Energy Cooperative will need to physically staff a general manager, linesmen/crewmen, an accounting and engineering manager, and a customer service/assistant individual. Arguably the most prominent and prestigious position here is the general manager, and his/her role is to manage the rest of the staff and daily business activities, coordinating activities in compliance with cooperative goals, developing an annual operating budget, and reporting all of these things to the board of directors. The remainders of the cooperative membership are Isle au Haut's residents themselves, and in this sense it will be vital to communicate, educate, and involve the members into the cooperative as it will be integral to success. When the members are well-informed of the cooperative happenings, as well as its purpose, objectives, finances, and benefits, they are more likely to invest their time and resources into the cooperative's prosperity. Essentially, in the Isle au Haut Energy Cooperative proposal, members' participation and interaction with the cooperative's operations will increase a feeling of involvement, ownership, and responsibility for achievement. The following outlines more

details in terms of the potential project team and a project organizational chart is available in the appendix section as appendix d.

Project Supervisor: Gilbert Michaud – Coordinator and organizer of the Isle au Haut Energy Cooperative Project, directing and administering project goals and day-to-day operations of development

Project Management Group:

Tina Tully - General Manager of Isle au Haut Electric Power Company, town civic leader, board member of new energy cooperative

Alexander Harris - Island Institute Island Fellow, focus on Isle au Haut governance and economic development, key co-op organizational player

Gerardine Wurzburg - Chairperson of the Isle au Haut CDC, board member of new energy cooperative

Paula Greateorex - Current town schoolteacher, potential member or organizational help/educational effort of project.

Investors:

Coastal Enterprises Inc. - Investment, grants, loans

Black Dinah Chocolatiers – Private Investment

Rural Utilities Service - Funding source: grants/loans

Isle au Haut Electric Power Company - Investment, key partner in infrastructure development

Cooperative Establishment:

Town of Isle au Haut - Arrangement of town meetings and venues

Isle au Haut Community Development Corporation - Leadership, advocacy and community collaboration

Island Institute - Project assistance, Cooperative organization, financial and economic analysis

Maine Public Utilities Commission - Cooperative organization through state entity

USDA Rural Development - Cooperative start-up and planning

Cooperative Maine - Organization and structural assistance

Wind Turbine Analysis/Construction:

UMass Renewable Energy Research Laboratory - Evaluation and analysis of project

Unity College - Project evaluation

Cianbro Corp. – Contractor Services

Customer Community: Isle au Haut, ME

e. Project Implementation

The creation of a time-line offers more precise insight into the steps of implementation for this presentation for action, the first step being to survey the residents of Isle au Haut, Maine. The purpose of this investigation is to help develop an understanding of current thoughts and conventions on community issues, activities, and interest in the formulation of an energy cooperative. Overall, an initial survey will serve as an efficient way to extract information from Isle au Haut's residents to help gather information for decision-making regarding specific project steps. The information gathered will help shape the subsequent community education process of this proposal. The survey will be relatively inexpensive to administer and a sample of such is available via appendix b.

Following the survey, one of the most valuable steps of kicking off the Isle au Haut Energy Cooperative project will be via town symposiums that project organizers will conduct for the community that work to outline the benefits of community collaboration and renewable energy to alleviate some of the island's largest concerns for the future. Outlining these issues and solutions for development will be absolutely

integral to on-boarding the community in moving forward with the project and initiative.

The first town workshop/symposium hosted will be intended to provide the island community of Isle au Haut with in depth information concerning the development of a new energy cooperative and how renewable energy can be integrated to offset high costs of living, all while being environmentally conscious and protecting natural resources.

Attendees will glean how this project and the process as a whole can enhance island quality of life and add to community sustainability. A potential agenda and budget for this symposium follows:

*Isle au Haut Renewable Energy Symposium
Enhancing Quality of Life by Reducing High Cost of Living
Isle au Haut Town Hall
Tentative Agenda – Month, Day, 2013 (should be a Saturday)*

8:15 AM – Gathering, Coffee and Snacks, Introduction from Project Organizers

8:45AM – Introduction to Key Community Issues – Cooney Fellow, Island Institute, Alexander Harris

9:30AM – Effects of Renewable Energy and Cooperative Principles – Gilbert Michaud

10:30 AM – Break

10:45AM – Town Board of Directors Sharing Vision for the Future

11:15AM – Outline Project Plans to Attendees/Residents

12:00 PM – Lunch Break

1:00 PM – Identification of Resources for more information, Open Floor to Questions

2:00PM – Closing address by Project Organizers, Next steps for the Program

2:45PM – Adjourned

Symposium Budget

Renting of Town Hall: \$200

Coffee, Snacks, etc: \$75

Presentation Materials: \$100

Brochures: \$100

Lunch: \$500

Total: \$975

This initial kickoff session for the implementation of the Isle au Energy Cooperative Project will be the first test at gaining entry and on-boarding the community with the project's goals. The draft of this agenda outlines potential activities for the symposium, and residents' email addresses will be gathered in order to keep them updated on project happenings. Incentive to attend the meeting will be based on food, as well as a general interest in communal well-being. An informational email will be sent out after the meeting and contact email and phone number will be provided for those with additional questions. Brochures will be made for the meeting and will be handed out to attendees for more information and as a reference. In terms of the time-line, after this symposium is conducted, an additional survey will be administered to gauge the level of support for the project. Furthermore, cost and feasibility analyses will be conducted, along with the development of a business plan. Additional information and survey results will then be presented to the community. A general meeting of potential cooperative members will ensue as will a vote on whether to proceed. If the vote passes, legal papers must be prepared and the formal steps of incorporation can take place.

After these aforementioned steps, and with the understanding that the cooperative fills a local economic need, the formal configuration of the cooperative board of directors and cooperative itself will occur. As formerly stated, this type of commercial organization is owned and controlled by the people who use its services, and a board of directors represents the member/community interests. Interviews will take place through initial project organizers with the persons outlined in the community role section as a potential board of directors. These Isle au Haut residents will then vote on vital organizational issues and be accountable for implementing the plan of business. This

leadership group will have many responsibilities in starting the cooperative and seeing the project through, and hence a leader familiar with cooperatives is largely preferred. Assistance will be sought from the Maine office of USDA Rural Development, the University of Maine's Cooperative Extension, the National Cooperative Bank, and similar energy cooperatives in the Penobscot Bay region to help with these organization stages. Both a legal and financial counsel will also be needed to legally prepare organization papers and to assist in cooperative financing respectively.

Subsequently, a general meeting should be called to invite potential members to discuss operating practices, financial requirements, and member user commitment. This meeting should be announced via the Island Institute's Working Waterfront newsletter, the Bangor Daily News, by mail, and word of mouth. Expected members will be allowed an abundance of time to express their views and concerns, and the formation of a steering committee can offer further and future insight to the group discussion via certain studies. Considerations will include land, facilities, equipment, and labor needed as well as operating efficiencies in terms of energy volume.

The Isle au Haut Energy Cooperative's capitalization is the next concentration, as a source of financial capital is needed to both start and operate the organization. While cooperatives can be capially structured as stock or non-stock (The University of Maine Cooperative Extension, 2009), the latter seems most relevant for Isle au Haut and, therefore, membership certificates are seemingly the route to take. In this method, membership fees are paid by the island residents and this establishes voting rights to all members within the co-op. A sample membership certificate can be found in appendix e. The quantity of fiscal assets collected by these membership certificates is estimated in the

project budget, and further member investments will be determined by studies concerning cost of facilities, member projections, and volume of business. Beyond member certificates and investments, much of the other funding will come via debt capital - the long-term borrowing of money to reach the financial start-up goals. Federal tax credits for renewable energy projects should also be taken advantage of in terms of financing the wind development aspect of the co-op, in the form of corporate investment. A grant from the Rural Utilities Service will also be solicited for the wind development aspect of the project.

Legal papers in accordance to state and federal laws will need to be acted upon in the cooperative formation (such as membership applications and membership certificates), as well as the organizational bylaws and articles of incorporation. The articles of incorporation give the co-op legal standing and work to signify the principals and characteristics of the business. These articles are expected to include the cooperative name (Isle au Haut Energy Cooperative), its area of business (Isle au Haut, Maine), and cooperative purposes (energy supply). The consequent development of organizational bylaws would help to formally declare how the organization will conduct business. This could include the co-op's membership rights, voting methods, how the board of directors are appointed or removed, terms of office, marketing procedures, fiscal year dates, organizational compensation, and the process itself for revising these bylaws.

The next task for the board of directors as part of this process is to hire the cooperative's general manager (GM). Following this, the acquisition of relevant facilities such as office space and machinery/equipment will take place, with the help of the newly employed GM and through local suppliers and project stakeholders. After these steps, the

Isle au Haut Energy Cooperative can initiate operation, initially acting in the same manner as the previous entity of the Isle au Haut Electric Power Company by purchasing its energy resources from the mainland, and shipped via the underwater cable to the isle. Because of the longevity needed to write and submit grants, conduct a wind feasibility study, an economic analysis, and an environmental study, the newly formed cooperative can expect to purchase power from the Bangor Hydro Electric Company and operate in this manner for a range of eighteen to twenty-four months. This does not mean project operations are at a standstill, however, as one of the key goals of the new general manager and board of directors is to apply for grants for a more formal wind feasibility study with the help of Unity College and the UMass Renewable Energy Research Laboratory. A specific site on the island's north shore for wind power development would likely be identified as a result of this study.

In conjunction with the wind resource analysis and site selection, an engineering and logistical study would also need to be conducted to help determine the technical practicability of transporting and constructing a wind turbine on Isle au Haut. Access roads and equipment lay down areas may need to be constructed. In addition, a technical study of the existing submarine cable would be beneficial to ensure that excess power generated from the turbine could be sold to the mainland, and when the wind is not blowing, power could still be purchased from the mainland. Also of relevance would be if the current infrastructure could accommodate for a 0.5 MW wind turbine, and if any grid work or grounding system work would need to be completed. Throughout this process, the Isle au Haut Energy Cooperative's employees and directors would work with the Island Institute non-profit organization to study the financeability of the wind project and

economic projections. The sustainability of such a project would be a cardinal factor, and it is widely noted that a wind turbine's lifespan is approximately twenty years (Rowan University Clean Energy Team, 2006). This team would work to ensure high levels of community support, and to secure a time-line for construction and implementation in accordance to incentives and policies regarding financing. Over the long period of the wind resource analysis, the energy cooperative's management team would need to continue to track the status of said incentives on the state and federal levels, learn more about similar developments, and reach out to lenders, investors, and potential project stakeholders concerning support and progress.

Neighboring these studies and steps, environmental, sound, and visual impact studies would be conducted before construction bids and a vote to proceed. A range of sound scenarios would need to be considered, and projected to be in compliance with state of Maine standards. A shadow flicker analysis would follow and predict the shadows cast on nearby objects when the turbine blades spin in front of the sun – with the anticipation that no homes or public spaces would experience this effect. An avian study would further help distinguish the types and number of birds near the proposed site, with the expectation that there would be no threat to any species. Lastly, views and visual impact studies would further justify the proposed site for development. After these studies have been conducted, analyzed, and communicated to the municipality of Isle au Haut as well as key project stakeholders, construction bids would take place to finalize the financial aspect of the wind development, and a vote would ensue to the cooperative members based on all of this information. Assuming that the vote passes, legal, environmental, local, state, and federal permitting would materialize, and months of site

construction would follow. Testing and commercial operation would expect begin in the year of 2017, and further studies and analyses would be conducted to evaluate turbine impact on the stability of electric rates in the years to follow.

The following works to outline the specific steps that could be taken in the development of the cooperative and wind power project, contingent upon what the association's membership decides along the way. While the time-line does presume a certain direction in the co-op's development and actions, it is still beneficial to summarize the aforementioned on a specific course. Should these outlined steps be disqualified by the co-op's members and management, it will be at the discretion of the Isle au Haut Energy Cooperative Project organizer team to determine and shape future developments in configuration with the project's original anticipated outcomes. Appendix c contains a graphical representation of the steps in the form of a Gantt Chart, which works to further put the necessary steps into visual context.

1. Survey community residents on current state of the town, outlook toward the future, and interest in wind energy development: February 2013 – March 2013
2. Organize workshops and town symposiums that lay out positive effects that wind energy can have on the community: February 2013 – March 2013
3. Present the benefits of community collaboration, environmental sustainability, and renewable energy development to Isle au Haut Comprehensive Planning Committee and Town Board: April 2013
4. Identify potential stakeholder team - conduct brief interviews with persons: May 2013
5. Formal configuration of cooperative board of directors: May 2013- June 2013
6. Capitalizing the cooperative – stock and member investment: June 2013 – August 2013
7. Formulate formal budget and project capital needs: August 2013 – September 2013
8. Legal considerations: formal paperwork, bylaws, articles of incorporation: September 2013 – October 2013

9. Membership drive: October 2013
10. Selection of General Manager: November 2013
11. Acquire relevant facilities and land: December 2013 – January 2014
12. Write and submit grants for official wind feasibility study: January 2014
13. Conduction of study and data gathering/analysis: January 2014 – January 2016
14. Partner with Island Institute to conduct an economic impact analysis of project: January 2016
15. Contract engineering and environmental study: February 2016 – April 2016
16. Construction bids: April 2016
17. Present detailed outline of project to Isle au Haut residents and cooperative members: May 2016
18. Formal vote to proceed with project: May 2016
19. Legal, environmental, local, state, and federal permits: June 2016
20. Solidify insurance: June 2016
21. Site construction: June 2016 – November 2016
22. Groundbreaking ceremony: April 2017
23. Commercial operation: October 2017 -
24. Creation of website: October 2017
25. Project evaluation, analysis: April 2017 and October 2017

f. Budget

The total required amount of \$839,050.00 for the year of construction of the Isle au Haut Electric Cooperative Wind Project serves as a reasonable, cost-effective and adequate to meet the needs of the 73 community residents and participants. By encouraging financial commitment from the community, and securing grant, loan, and investment moneys, it is uncomplicated to comprehend how this project can come into fiscal fruition.

Table 8 - Isle au Haut Energy Cooperative: Budget Proposal

Expenses

Staff (Yearly):

General Manager's Salary \$41,000

Benefit Package \$12,300

Finance/Operations/Engineering Manager's
Salary \$35,500

Benefit Package \$10,650

Professional Linesman's Salary \$31,000

Benefit Package \$9,300

Administrative Assistant/Customer Service

Representative's Salary \$25,000

Benefit Package \$7,500

Travel and Expenses \$4,000

SubTotal \$176,250

Office Expenses (Yearly):

Office Rent: \$11,400

Telephone & Internet Service \$1,200

Printing/Copying/Paper \$1,000

Postage \$700

Office Supplies \$1,000

Online services/technology/fees \$1,000

Board of Directors' Expense: \$2,200

Professional Services: \$4,000

Marketing Expenses: \$1,000

Miscellaneous: \$1,000

SubTotal \$23,500

Start-Up Costs (One-Time):

Land Acquisition: \$41,000

5 Computers/1 Printer/Scanner/Fax \$7,100

Survey Administration: \$250

Website: \$1,000

Workshops and Town Symposiums: \$1,950

Income

Carry over revenues from Isle au Haut Electric Power

Company: \$95,000

Membership Certificates: \$18,000

Member Investment: \$10,000

Membership Drive: \$15,000

Donations: \$9,000

Corporate Contributions: \$32,000

User Fees: \$12,000

Rural Utilities Service Grant: \$78,000

Island Institute Investment: \$30,000

Private and Foundational Loans: \$100,000

National Cooperative Bank Loan: \$130,000

Corporate Investment in Exchange for Tax Credits:
\$310,050

Sub Total: \$839,050

Sub Total: \$51,300

Project Costs (One-Time):

Wind Analysis and Feasibility Study: \$62,000

Permitting and Legal Fees: \$14,000

Turbines and Equipment (1 towers, 1 generator, 1 blade): \$155,000

Shipping Costs: \$31,000

Groundbreaking Ceremony: \$5,000

Construction, Roads, and Foundation: \$180,000

Turbine Erection and Assembly: \$52,000

Electrical and Wiring: \$38,000

Support Structures and SCADA System: \$51,000

Sub Total: \$588,000

Total \$839,050

Total \$839,050

The budget proposal blueprint works to summarize the total expenses and income required to not only start up the organization, but also the wind project costs and the yearly operational expenses (staff and office). The above outlines the explicit staff needed and their respective salary and benefits packages, as well as office rent, supplies, marketing expenses, etc. Seen next are the start-up costs for the cooperative itself in the form of gaining land for the wind power project, as well as items and supplies for the office itself. The last of the expenses section outlines a budget for the steps of the wind project such as an analysis and feasibility study, equipment, construction and assembly, and other fees of relevance. Note that the yearly budget for the Isle au Haut Energy Cooperative would not be the projected figure of \$839,050, but more in the range of \$250,000 to account for necessary staff and annual office expenses. The remainder of the operating expenditures is due to project and organizational start-up costs. On the income side, conversely, carry over revenues from the previous entity known as the Isle au Haut

Electric Power Company will be available in the transition to the cooperative. The previous company would cease to exist as a result of the new cooperative structure, and since many of the same persons will be involved in the new venture, financial capital will also carry over to help offset new project costs. Cooperative membership certificates would be sold as discussed, and a membership drive would be conducted to raise additional funds. Grants and loans would be required from the National Cooperative Bank, the U.S. Department of Agriculture's Rural Utilities Service, local/regional banks, individuals, and foundations of relevance. Lastly, in order to take advantage of a tax investment, a commitment from a local corporation should be sought out in exchange for federal tax credits offered by firms investing in wind and renewable energy projects of the sort. This is fairly common in alternative energy developments of this nature.

VI. Monitoring and Communication

Community economic development (CED) projects can unquestionably become disorganized and subsequently difficult to manage without a monitoring system in place to track its progress in line with the intended outcomes. Monitoring for both timeliness, as well as project goals, helps keep the project's tasks organized and on schedule with the target completion date. Simultaneously, approaching and communicating this progress to the project's funders, stakeholders, and the community of Isle au Haut as a whole is an essential management strategy because it allows the steps of implementation to be adaptive yet still timely in nature. As many nonprofit organizations and groups are struggling to survive in terms of finances, it is unfortunate to note that communication with project members and citizens as a whole is seemingly becoming less and less of

priority, which can in turn be disastrous. Therefore, salient strategic planning to communicate with the three groups mentioned is vital. For funders of the wind energy project on Isle au Haut, follow up is imperative in the effort to show a project's success and possibly receive funding once again down the road. This is most relevant to bank loans and the Rural Utilities Service grant. A stakeholder communication plan is also beneficial to keep everyone on the same page toward the intended project ambitions – both directly to them as well as through media outlets. Finally, the community of Isle au Haut itself will be essential because of the fact that they are the ones who will be directly impacted by the project and will appreciate the updates along the way. Overall, as a project manager and organizer, effective communication will keep the key relationships together to help make this project triumphant.

As part of the Isle au Haut Energy Cooperative project's monitoring efforts, focus will be situated on striving to report consistent data gathered as well as developing variables that measure what they were intended to measure. This will especially be a vital stride in defining the existing behavior and troubles of the community, and further having fine relationships and perception with the community and through media measures. Another central challenge to the data gathering/collection opportunities topic concerns the likely costs associated with the efforts. While the investment into these types of studies will have substantial payoffs to the project, financing the data collection is still a noteworthy concern. Implementing a cost effective way to obtain and organize/analyze the data will allow organizers to realize the veracity of the project, and in turn will optimistically result in substantial cost savings for the community down the road as well. It is inevitable that challenges do exist both on the financing and analyzing levels of data

measurement and collection for the project. But, as accurate data collection is essential to the integrity of the research, the project's management and organization team will attempt to use the most appropriate methods for data collection and construct surveys and other techniques in the best way as to reduce the likelihood of error. In this way, it is the ambition to be able to answer the appropriate questions accurately, and have the most detailed and relevant information for decision-making. A monitoring schedule is a necessary component to keep the project administrator on track as the Isle au Haut Energy Cooperative Project progresses toward its intended aims and objectives, and this is available in the appendices section as appendix f.

The comprehensive key in setting measurement forms and project goals along the way is to use the data to make informed decisions regarding whether the project or process is on target, and to recognize opportunities for improvement should that be necessary. Therefore, it is both beneficial to outline not only performance and quality indicators for the short-term outcomes of interest, but also self measures for success such as no errors and timely reports published and acting in a professional manner. Self measures for achievement, in addition to quality indicators about the actions or results of activities and outputs toward the thesis project goal, allow the project administration team to remain objective.

Communication Plan

Funders: One of the operatives to gaining grant or project funding will be to understand what the goals of the funders money's are for and only seek assistance from those who most heavily align with the project goals - communicating with this small network of funders will prove more manageable. Because the Isle au Haut project is a

new development and funders and grant administrators have not yet been worked with, it will be tremendously important to have a vision of the organization and its goals for the project and to communicate that with them. Knowing the organizational and wind power project strengths, weaknesses, and unique qualities will be pivotal in helping funders understand the initiative and to make a compelling case for funding. A few steps before reaching out to funders will be the latter coupled with what level of funding might be needed. With this in mind, connecting with funders will be crucial in securing grant money, as will consistent communication (via phone, email) during the project steps. Follow up will be vital as well, and knowing each funder and what they need to hear will help the administration team understand how and what timing should be used. The best means to this effort will be done by personal meetings, telephone conference calls, emails, detailed reports, and newsletters - depending on the timing, situation, and specific funder. Overall, working to minimize monetary risk through a funder communication plan can alleviate concerns of an inefficient and underfinanced business.

Stakeholders: Once project actions begin to take shape, communicating with the previously identified stakeholders in an effective way will help make or break the project. What will be extremely valuable in this regard is knowing the specific stakeholder and their level of involvement to understand the best method of communication. For example, constant communication to the general contractor and those assisting in feasibility studies will be important, yet periodic contact with community members and lower level stakeholders such as other local energy cooperatives would be acceptable as well. Furthermore, understanding their respective needs and interests is key in understanding the who, what, when, why, and how to communicate. Specifically, some stakeholders

will be in touch on a daily basis in terms of collaborative work, but for the other, less involved ones, it will be pivotal to also to correspond via personal meetings, telephone conference calls, emails, detailed reports, and newsletters. Many struggling projects lack effective stakeholder communication, and audience awareness and timely communicative efforts will keep productivity and happiness at a high for the project on Isle au Haut.

Stakeholder communication is also noteworthy in the cooperative's efforts to conduct professional and organized meetings as well as creating relations with other cooperatives. As maximum involvement by prospective board members is important, so is the use of committees within the board for the ongoing management of the organization. Establishing a quorum for membership and board meetings will work to recognize a minimum proportion of organizational members needed to carry out authorized business. Setting this quorum too high, however, creates risk in not gathering enough members to convene on subjects of importance. Furthermore, following and communicating sound practices concerning financial reports and budgets, and involving membership in a comprehensible manner can work to avoid organizational losses. Full fiscal reports should be issued to members annually, with quarterly accounts for board of director use. A yearly autonomous audit, coupled with short and long term strategic planning can determine how the cooperative is attuned to its mission statement in juxtaposition with Isle au Haut's economic and social changes. Similarly, the linking of this newly established cooperative to other co-ops of relevance provide a communication route involving best practices, and for associated services such as for equipment, marketing relations, and educational programs.

Community: The community communication plan is more complicated because of the fact that community members are not in touch in any timely manner, and it is possible that some may even be against the project as a whole. Nevertheless, with only 73 residents, town meetings and symposiums on Isle au Haut will be a key communicative tool for community outreach, as is a potential project and organizational website. In this respect, considering content, mood, and design will be imperative. Keeping positive emotions flowing from the project management team all the way through the community citizen will help effectively and clearly deliver the message of choice. A few ideas of concentration might include flyers/brochures, (e)newsletters, press releases/conferences, news stories in local papers such as the Bangor Daily News, and even television coverage. With the last few (in dealing with the media) always having a positive and informative approach will be crucial in community outreach and communication. Word of mouth is also essential here, and following the above steps will optimistically generate a positive response around the community and wind project. The board of directors and management team's policy on communication and education help create a community culture more willing to patronize the Isle au Haut Energy Cooperative.

Overall, understanding how to communicate with project members, be it funders, stakeholders, or community members is obviously necessary, but it is also a consideration to understand what type of financial resources might be available in this project to complete the activities. Largely dependent on funding and budgets, it may not be viable to create posters and flyers. Regardless, creating a viable plan of action in terms of communicating the project is so crucial, and even self-evaluation of this plan can be of

significance. Adequate communication and access to organizational information along the way can assuage prospective situations of cooperative lethargy or even distrust.

VII. Evaluation Plan

It has become evident that evaluation measures have become increasingly influential with intense competition for funding coupled with widespread increases in skepticism, globalization, and technology. The plan of evaluation for the Isle au Haut Energy Cooperative project is consequently designed to assess the actions and societal impact the cooperative and wind project has had on the community. Evaluation measures will be both summative and formative, and will be based off of initial program objectives. And, while much of the project development thus far has been primarily assessed from an independent perspective and focused on summative measures, participatory evaluation of formative components offer the best means to practical civic participation and sustainability. This method also encourages project improvement and development opportunities, increased empowerment, and a more encompassing perspective for the cooperative project. Though this method may compromise on standardized measures necessary for comparison purposes, it will involve project, organizational, and community members in terms of how, what, and when to evaluate, as well as with which to implement future recommendations. Stakeholders such as the Isle au Haut Community Development Corporation, UMass Renewable Energy Research Laboratory, Unity College, and the Island Institute will help position the evaluation process to a more flexible and higher quality analysis focused on participation rather than obtaining an outside evaluation report.

More specifically, in reverting to the objectives to be measured, one sees in the short term the identification of cooperative board members and key project stakeholders and the increased community knowledge that renewable energy can consequently help other community needs. It is fundamental here to clearly identify five to six board members for the cooperative organization as well as seek out a memorandum of understanding (MOU) with the town comprehensive planning committee. Potential board candidates will be identified via a questionnaire, focus group discussions, and key informant interviews, and evaluating success will take place a few months into the 2013 calendar year, after town workshops and symposiums have been conducted. Additionally, a compilation of all potential local and regional vendors, contractors, analysts, legal entities, etc would need to be compiled and evaluated to determine whether or not there will be capacity issues.

In reference to another expected short term outcome, the organization would work to define the increasing of community knowledge that renewable energy can accordingly aid in other community needs as a function of awareness, not necessarily of size. The town of Isle au Haut Comprehensive Plan Survey had previously identified that 85% of community residents are in favor of exploring alternative energy development (Town of Isle au Haut Maine, 2007), and due to the age of this study it will be critical to re-establish a benchmark in which at least 75% of residents are in favor of alternative energy development for communal benefit. Much of the evaluation plan here will revolve around quantitative, self-administered survey of residents and secondary gathering of data, and community needs of relevance revert to the long term outcomes concerning poverty rates, lack of immigrants, and high costs of living. In order to adequately and

cost effectively execute this objective, the administrative organization's series of workshops and town symposiums that lay out positive effects that wind energy can have on the community will be a cost-effective means to educating the townspeople.

Evaluation procedures would be expected to take place early in 2013.

The last short term outcome revolves around the development of skills in which community members are acting in a collective interest in order to sustain island life and flourish moving toward the future; a benchmark has been set to raising awareness to at least fifty residents of environmental sustainability, community involvement, and ways on the personal level to save money and be more socially responsible. Data in this respect will be gathered from personal observation of community members and respective actions, qualitative, self-administered survey of residents, and non-participant observation. Further evaluation measures will consider community workshop attendance records as well as volunteer involvement percentages. As part of the evaluation process, if unenthusiastic results come out of the surveys, these skills and numbers may have to be reevaluated, but, for the purposes of this evaluation plan, these will be the variables at play. This outcome will be an ongoing process at the initial phases of project implementation, but in terms of assessment can be expected to be determined early in the 2013 calendar year.

Long term success will be measured by the lowering of poverty rates, an incursion of immigrants to the island as permanent residents (and school-aged children), and lesser costs of living to amount to higher quality of life for residents. Indicators in this regard include, therefore, statistically noticeable lower poverty rates, increases in island population (especially children), and lower costs of living and amenities. All of these

signs can be measured via U.S. Census reports, and non-participant observation also could offer insight to pertinent changes. In terms of the evaluation schedule, observation will be ongoing starting from the development of the cooperative organization and construction of wind turbines, and U.S. Census data will be examined and analyzed in the years of 2020 and 2030.

Building a culture of sustainability and embracing energy development for community advantages and opportunities is a reasonable short term output that is appropriate in the evaluation process to see how the subsequent steps of this project would fall into place. The anticipated result here is community development effects such as attracting more year-round residents, seeing the island school continue its functions, and overall reducing the cost of living on this island. Therefore, as an appropriate accomplishment it will be vital to coordinate. The evaluation of all the relevant indicators in turn provides a method to determine program effectiveness, in conjunction with understanding if the target island populations were reached and if the mission was cost effective.

Furthermore, when analyzing what will make this project successful, this discussion centers around the twofold value created for the community itself. Economic value is hoped to be created in this effort via using the community's established resources and inputs to create a service (electric) that will reduce cost of living for residents. While complex econometric measurements could be incorporated to better help comprehend the effect, a straightforward electricity cost-benefit analysis would also be suitable. In this sense, it is possible to assign numeric and monetary values to the community's investment as well as work to understand its return on this investment, specifically in

terms of lower electric rates. However, because of the longevity involved with seeing this return, the prospective cost-benefit analysis would have to be retrospective, with follow ups every six months after the wind power is operating. Cost-benefit ratios might not be considerable during the first few evaluation endeavors, but would be projected to be increasingly greater over time.

Social value created is also a means to evaluative success here, as the project works to provide a process by which the lives of island residents are vastly improved not only via economic measures, but also as a result of the collaborative activities. As indicated, one of the fundamentals of the Isle au Haut Energy Cooperative project is to on-board residents and community stakeholders and allow them to work together toward a collective benefit, and the social inclusion and accessibility of the program's procedures will also formulate a sense of togetherness and social identity. This social value is not easily measured, but it is challenging to argue the community organization working to bring forth social value. So then, while the community's cost savings as a result of the activity will be the largest factor of achievement here, the social value, while difficult to quantify, will hopefully provide a strong platform for the community to flourish moving toward the future.

In total, achievement will be had in the evaluation process via striving toward target goals for cooperative board members, working to continuously increase awareness, and hosting prosperous and well attended community events. As collaboration is so integral to the project's accomplishment, the same holds true for the evaluation operations as participatory evaluation encourages involvement of project, organizational, and community members in terms of how, what, and when to evaluate, as well as with which

to implement future recommendations. Just as importantly, it is vital to keep in mind that the scientific properties of reliability, validity, and sensitiveness all come into play in the evaluation of the proposal's intended outcomes. The goal of evaluation is to indicate the program's impact on the residents of Isle au Haut, Maine, and the continuous and participatory nature of this process will keep funders/stakeholders involved, ensure quality, and allow for improvement recommendations to be made. A monitoring and evaluation matrix is available in the appendices (appendix g), and works to outline the aforesaid outcomes and indicators in terms of the data gathering and time-frame that will be utilized.

VIII: Sustainability

The endurance of the Isle au Haut Energy Cooperative project proposal is a vital consideration, especially so as the plan moves from its initial actions and outcomes to those of the intermediate and long-range. As the nature of the program focuses on sustainable development in terms of meeting current and future energy needs for the community, successes will be truly realized in the community's continued vision of energy independence, and effort to keep and attract families to the island. A continuous and adequate flow of natural, administrative, and financial resources will further sustain the output needed to improve social conditions as the project moves further from its implementation phase. In fact, it is this very interdependence of economic, social, and political systems on one another that threaten sustainable development here, but the administering of long range planning techniques can work to alleviate concerns of project resilience. Financially, while securing funding will be an initial focus, maintaining a proper revenue stream of the cooperative to maintain viable living costs for this lower-

income community will be a key circumstance. Politically, having a visionary cooperative general manager and administration team (and their balanced relationship with town council members and town leaders) will also be integral in sustained success, as well as accounting for potential leadership changes. Socially, the continued desire of the community to utilize their local wind resources and understand what impacts this can have on the sustainability of island life as the community moves toward the future after development and implementation. Because the cooperative model maintains simplicity and ease, and a socially diverse and increasing stream of financing exists, so will increased possibilities for durability. Continued awareness of these considerations throughout implementation phases will attempt to help prevent the cooperative organization on the island from financially and organizationally ceasing to exist.

The intimidating task of launching a community initiative that is truly sustainable is bettered by the development of the sustainability plan. For the Isle au Haut Energy Cooperative plan, the sustainability framework rests in the cooperative model that remains flexible and financially diverse and prosperous. This is accomplished by keeping all members involved and knowledgeable, having capable financing during the initial stages, and following the parliamentary procedures. The rationale here is that competence in member-owner commitment, leadership, and overall management minimizes the risk of inadequate business practices. This, in turn, aligns with the overall vision of stimulating community involvement to reduce electricity costs to island inhabitants.

All of these sustainable elements have the opportunity to affect the Isle au Haut Energy Cooperative plan, and specific key impacts include energy security, cost of living reduction, and a growing population. A lack of funding would cripple the programmatic

process and the impact on island occupants. Local political support is necessary to stimulate decision making and prevent tensions with development. Essentially, community acceptance, understanding, and engagement are required for program survival.

The action plan, therefore, requires the diversification of the funding portfolio by way of a membership drive, user fees, and corporate investment in exchange for tax credits. Establishing relationships with the Rural Utilities Service, the National Cooperative Bank, and the Island Institute will further help move along financing capabilities. Secondly, commitment and dedication of staff and stakeholders helps the organization stay focused to its clearly identified mission. In conjunction, the use of experienced advisers and consultants can prevent many wasted motions and expenses on the part of the community. The assistance of the Fox Islands Electric and Swan's Island Electric Cooperatives will help outline regulations, environmental issues, and trends of relevance in maintaining sustainable and technical knowledge. Lastly, marketing and public awareness efforts on the part of the project itself help to stimulate interest to investors, non-profit organizations, and government entities. This will also work to secure social participation and effective support from stakeholders such as attorneys, financiers, and the community of Isle au Haut as a whole. Checking the progress and staying true to the plan of action for sustainability will further allow necessary adjustments to be made and drive the program's success and viability over time.

IX: Results

The results component aims to bring forth the consequences of the aforementioned actions and events, particularly in regard to the identified short-term outcomes. Due to the preliminary nature of this thesis, however, this project as a proposal for action has not yielded many concrete results. There is benefit, however, in utilizing this chapter to reflect on processes of short-term change, as well as proposing how to address successes and failures impartially.

Short-term Outcome 1: Increase community knowledge that renewable energy can consequently help other community needs

As formerly commented, the town of Isle au Haut Comprehensive Plan Survey in 2007 had identified that 85% of community residents are in favor of exploring alternative energy development (Town of Isle au Haut Maine, 2007). Because of the age of this study it will again be significant to reinstate a standard in which at least 75% of residents are in favor of alternative energy development for common benefit. Currently, planned workshop activities have not been completed due to the lack of community entry and funding to host educational symposiums. In preliminary outreach activities to persons and agencies of relevance, however, much support and encouragement was had, and it is these exact partnerships that will ultimately assist in meeting this first short-term outcome. Self-administered surveys of residents will help make the determination of whether quantitative attainment was had, and potential lessons to be considered revolve around the use of a well thought out marketing plan that will raise public awareness and involvement for the community of Isle au Haut.

Short-term Outcome 2: Identification of cooperative board members and key project stakeholders

While the project's key stakeholders have already been identified, they have not been contacted to this point due to timing issues. These include, but are not limited to local and regional vendors, contractors, subcontractors, consultants, attorneys, universities, local businesses, and townspeople of interest. Key project stakeholders will continue to be contacted as part of the ongoing process toward long-term change in the community and will be part of the ongoing awareness and marketing effort. One potential pitfall is the fact that most of the stakeholders aside from the townspeople themselves are located on the mainland; therefore, geography may compromise capabilities. Nonetheless, board member candidates for the cooperative itself will be realized via devising key partnerships between the administrative organization and community leaders, and is vital in achieving the long-term objective for Isle au Haut. This mainly has not been completed due to the orderly process of the short-term outcomes. It is the hope that proper communication among these various parties, however, will prevent false assumptions of collaboration and move expectations forward.

Short-term Outcome 3: Development of skills in which community members are acting in a collective interest in order to sustain island life and flourish moving toward the future

This short-term outcome is purposely more vague in nature and coincides largely with the other noted results. Numerically, a goal of raising awareness to at least fifty residents concerning sustainability and renewable energy is set. Again, hindering the achievement of this outcome is favorable community support in the logic model's identified activities. This has not been accomplished thus far, but the education and paradigm shift nature of the outcome supply feasibility in reaching intermediate and long-term goals. A lesson to be considered in terms of this outcome is the importance of sharing responsibilities among project administrators and volunteers as part of the

educational process. Because of the long-term goal to improve the well-being of Isle au Haut, it is the expectation that providing residents with the information, tools, and techniques concerning wind energy development will further advance social change and increase opportunities for success in moving toward the intermediate outcomes.

X: Conclusions & Recommendations

Returning to the initial intentions and anticipated short-term outcomes, the Isle au Haut Energy Cooperative project sought after community involvement and change in terms of energy to provide other benefits to the community. In examining the outcomes of community education, skill development, and board of director identification, this study has revealed and delineated reason as to why increased community collaboration and overall enhanced quality of life can be witnessed.

Additionally, as formerly indicated, one of the most momentous gains from pursuing the Isle au Haut Energy Cooperative Project considers the social value brought forth to the community. Though intricate to quantify, the ability of social capital to influence island activities looking toward the future should not be discredited. The social cohesion created by the inhabitants' connections along the way generates economic and social benefits that can be relished by the community. Prioritizing high quality networks among Isle au Haut residents can ensure a positive attitude toward energy independence in the forthcoming motions of the society. In fact, it is the precise transparency of the cooperative organization itself that promotes greater levels of participation as well as superior democratic use. Overall, via the social connections and strategic alliances created, the town of Isle au Haut can gain access to increased levels of social capital that

in turn allow the project to be sustainable beyond the phases of implementation in providing communal benefit.

a. Prospects of Attaining Intermediate and Long-Term Outcomes

The outreach conducted so far, and the forthcoming accomplishment of the short-term results has helped prepare the way for the Isle au Haut Energy Cooperative project to meet its intermediate and long-term outcomes. Positive stakeholder response to the project, anticipated high workshop attendance records, and volunteer involvement work to increase awareness of the island's energy crisis, promote environmental sustainability, and community participation. Once the benchmark is met in which 75% of inhabitants are in favor of alternative energy development, the cooperative venture seemingly cannot exist without community collaboration. It is this specific co-action between residents and the town's comprehensive planning committee that will help form the organization's leadership and advisory team and further implement the plan of business. So long as societal engagement continues throughout the process, Isle au Haut should be on pace to incorporate a behavior set focused on social responsibility, participation, and contribution. In turn, via the aforementioned steps and ensuing reasoning, there is prospect and expectation that the cost of living expenses decrease and the town sees lower poverty rates, in-migration, and a sustained and advanced quality of life. Nevertheless, as the project continues to move toward its intermediate and long-range outcomes, continued mobilization, project marketing, and access to funding opportunities should help continued achievement.

b. Personal Thoughts

Though this proposal attempts to discretely outline how Isle au Haut can develop an energy cooperative focused on the transmission and distribution of renewable sources to offset current high costs of electricity, there is much consultant and advisor assistance needed to further implant the proposition into the community. Furthermore, it is questionable to recognize the author as the project supervisor for reasons of geography, acquaintance, and overall involvement with the everyday life of the island. But despite the potential lack of fit, the project was not approached in a tentative nature nor was isolation felt. It is simply mentionable that employment confinements and organizational workability compromised the project's practicality and evolution within the time-frame of this writing. Again, the problem analysis, project design, and implementation plan all work to form a powerful precis for community alteration and increased well-being.

It is clearly discernible that the function of the community economic development professional is significant in aiding and improving the well-being of marginalized persons and groups throughout the world today. By approaching economic and social issues in a holistic and participatory manner, disadvantaged populations can continue to gain access to the knowledge and skills that can have an impact on community change and increased opportunities in overcoming crises. As under-served regions and municipalities continue to face issues of poverty, unemployment, environmental change, and cultural degradation, it is necessary for the practitioner to understand the complexities of this interdependent and ever-changing science. In the case of the Isle au Haut Energy Cooperative Project, it is the particular interdependent quality of such issues that accumulate into a seemingly destructive future of one of Maine's last year-round island communities. By utilizing and controlling the isle's plentiful wind resources,

however, the effective addressing of this individual difficulty should help promote a widespread understanding and strengthening of the local economy. In any respective community for that matter, it is essential to consider the financial, political, and social circumstances that exist.

XI: Appendices

Appendix a - Bibliography

References

- Allegany Wind Project. (2012). *Frequently asked questions*. Retrieved 10 November 2012 from <http://www.alleganywindfarm.com/faq.htm>
- Cooperative Maine. (2012). *About*. Retrieved 10 September 2012 from <http://cooperativemaine.wordpress.com/about/>
- Co-op Power. (2012). *Bring co-op power to your community*. Retrieved 12 November 2012 from <http://www.cooppower.coop/index.php/bring-co-op-power-to-your-community>
- EU Legislative commission. (2005, December 16). *Strategy on the sustainable use of natural resources*. Retrieved 04 November 2012 from http://europa.eu/legislation_summaries/environment/sustainable_development/128167_en.htm
- Field, Barry C. (2008). *Natural resource economics: An introduction*. (2nd ed., p. 194). Long Grove: Waveland Press.
- Fox Islands Wind Project. (2011). *Project background*. Retrieved 21 February 2012 from: <http://www.foxislandswind.com/background.html>
- Gareth Hatch. (2012). *Why are wind turbines getting bigger?* Retrieved 12 November 2012 from <http://www.terramagnetica.com/2009/08/01/why-are-wind-turbines-getting-bigger/>
- Granger, Orman E. (1997). Caribbean Island States: Perils and Prospects in a Changing Global Environment. *Journal of Coastal Research*. 24, 71-93.

- Grassroots Innovations. (2011, May 12). *CISE work with the brighton energy coop: The labyrinth of legal entities and organizational structures*. Retrieved 22 July 2012 from <http://grassrootsinnovations.blogspot.com/2011/05/cise-work-with-brighton-energy-coop.html>
- Heiman, Michael K. & Solomon, Barry D. (March 2004). Power to the People: Electric Utility Restructuring and the Commitment to Renewable Energy. *Annals of the Association of American Geographers*, 94, 1, 94-116.
- Island Institute. (2012). *Energy initiatives*. Retrieved 05 May 2012 from <http://www.islandinstitute.org/energyinitiatives.php>
- Island Institute. (2012). *Grant making*. Retrieved 03 June 2012 from: http://www.islandinstitute.org/grant_making.php
- Island Institute. (2012). *Maine ocean renewable energy*. Retrieved 13 August 2012 from <http://www.islandinstitute.org/oceanrenewableenergy>
- Island Institute & Working Waterfront. (2012). *The working waterfront*. Retrieved 06 November 2012 from <http://www.workingwaterfront.com/>
- Isle au Haut Boat Services. (2012). *Rates*. Retrieved 01 November 2012 from <http://www.isleauhaut.com/winterschedulerates.html>
- Isle au Haut Community Development Corporation. (2012). *Electric power company*. Retrieved 03 March 2012 from <http://isleauhaut.org/island-walk/electric-power-company/>
- Isle au Haut Community Development Corporation. (2012). *Island Facts*. Retrieved 02 November 2012 from: <http://isleauhaut.org/welcome/island-facts/>

- Lantz, E., & Tegen, S. (2009, May). *Economic development impacts of community wind projects: A review and empirical evaluation*. Windpower 2009, Chicago, IL.
Retrieved 09 October 2012 from
<https://docs.google.com/viewer?a=v&q=cache:WBkwecCe82MJ:www.nrel.gov/docs/fy09osti/45555.pdf>
- Mainevacation.com. (Producer). (2012). *Isle au Haut map*. [Web Graphic]. Retrieved 21 February 2012 from <http://www.mainevacation.com/regions/Isle-au-Haut-Maine.html>
- Maine Public Utilities Commission. (2010). *Delivery rates*. Retrieved 29 January 2012 from: http://www.maine.gov/mpuc/electricity/delivery_rates.shtml
- McGee, Jeffrey E., Dowling, Michael J., & Megginson, William L. (Oct. 1995).
Cooperative Strategy and New Venture Performance: The Role of Business
Strategy and Management Experience. *Strategic Management Journal*, 16, No. 7,
565-580.
- Milborrow, D.J. (June 2011). Wind energy: a technology that is still evolving.
*Proceedings of the institution of mechanical engineers, part a: Journal of power
and energy*, 225, 4, 539-547.
- NCB Financial Group. (2012). *National cooperative bank*. Retrieved 04 November 2012
from <http://www.ncb.coop/>
- National Rural Electric Cooperative Association. (2005-2012). *History of electric co-ops*.
Retrieved 06 March 2012 from:
<http://www.nreca.coop/members/History/Pages/default.aspx>

- National Rural Electric Cooperative Association. (2005-2012). *Seven cooperative principles*. Retrieved 06 March 2012 from:
<http://www.nreca.coop/members/SevenCoopPrinciples/Pages/default.aspx>
- Natural Resources Council of Maine, Mainewatch Institute, Maine Center for Economic Policy. (2002). *Energy for Maine's Future: A Call for Leadership*. Augusta, ME. Didisheim, Pete.
- Neal, B. (2007, September 1). *Keeping the lights on island co-ops pay more for electricity*. Retrieved 12 May 2012 from
<http://www.workingwaterfront.com/articles/Keeping-the-lights-onIsland-co-ops-pay-more-for-electricity/11845/>
- Pasqualetti, Martin J. (July 2000). Morality, Space, and the Power of Wind-Energy Landscapes. *Geographical Review*, 90, No. 3, 381-394.
- Passe, David. (1986). *The development of a cooperative model to analyze the effects of differential member treatment*. (Doctoral Dissertation). Retrieved 12 March 2012 from ProQuest Digital Dissertations. (8627143)
- Pina, I. (2005). *Point neighborhood child care cooperative*. Retrieved 19 March 2012 from: <http://academicarchive.snhu.edu/handle/10474/415>
- Pude, Suzanne. (2009). *Overcoming funding obstacles to island wind power projects in New England: The case of Monhegan, Maine*. (Abstract). Retrieved 22 January 2012 From ProQuest Digital Dissertations. (1468261)
- Rowan University Clean Energy Team. (2006). *Wind energy*. Retrieved 26 November 2012 from <http://www.rowan.edu/colleges/engineering/clinics/cleanenergy/rowan>

university clean energy program/Energy Efficiency Audits/Energy Technology
Case Studies/files/Wind Power.pdf

Statemaster.com. (Producer). (2012). *Acadia national park - Isle au Haut*. [Web
Graphic]. Retrieved 21 February 2012 from
<http://maps.statemaster.com/state/ME/1>

Steeves, Heather. (2011, December 17). *Island: Please come live here - and make sure to
bring the kids*. Retrieved 13 March 2012 from:
[http://bangordailynews.com/2011/12/17/news/midcoast/island-please-come-live-
here-and-make-sure-to-bring-the-kids/?ref=mostReadBox](http://bangordailynews.com/2011/12/17/news/midcoast/island-please-come-live-here-and-make-sure-to-bring-the-kids/?ref=mostReadBox)

Swan's Island Electric Cooperative. (2008). *Why wind power?* Retrieved 22 January
2012 from: <http://www.swansisland.org/windpower/home.htm>

Swan's Island Electric Cooperative. (Producer). (2008). *2008 island electric rates*. [Web
Graphic]. Retrieved 01 November 2012 from
<http://www.swansisland.org/windpower/>

The Canadian CED Network. (2012). *What is ced?* Retrieved 24 November 2012 from
http://ccednet-rcdec.ca/en/what_is_ced

The Cianbro Companies. (2012). *Construction services*. Retrieved 11 July 2012 from
<http://www.cianbro.com/AboutUs/ConstructionServices.aspx>

The University of Maine. (2012). *Cooperative extension*. Retrieved 02 November 2012
from <http://extension.umaine.edu/>

The University of Maine Cooperative Extension. (2009, March 25). *Organizational
structure options: cooperatives and corporations*. Retrieved 25 November 2012

from <http://www.extension.org/pages/19640/organizational-structure-options:-cooperatives-and-corporations>

Town of Isle au Haut. (2011). *Town of Isle au Haut comprehensive plan*. Retrieved 15 February 2012 from:

<http://webcache.googleusercontent.com/search?q=cache:vjlPEBg1ZP0J:www.maine.gov/spo/landuse/compplans/plans/isleauhaut/compplan.pdf+isle+au+haut+comprehensive+plan&cd=1&hl=en&ct=clnk&gl=us&client=firefox-a>

Town of Isle au Haut Maine. (2007). *Survey presentation*. Retrieved 15 February 2012 from: <http://www.townofisleauhaut.com/survey/>

United States Department of Agriculture. (2012). *RUS electric program*. Retrieved 18 May 2012 from http://www.rurdev.usda.gov/UEP_Homepage.html

Unity College. (Unknown). *Community wind assessment program at Unity College*. Retrieved 24 February 2012 from:

<http://www.unity.edu/facultypages/womersley/windweb.htm>

University of Massachusetts Amherst. (2012). *Partner with the wind energy center*. Retrieved 04 August 2012 from

<http://www.umass.edu/windenergy/partner.php?pid=0>

U.S. Census Bureau. (2010). *Profile of general population and housing characteristics: 2010 demographic profile data*. Retrieved 05 February 2012 from:

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_DP_DPDP1&prodType=table

U.S. Census Bureau. (2006-2010). *Selected economic characteristics: 2006-2010*

American community survey 5-year estimates. Retrieved 05 February 2012 from:

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_5YR_DP03&prodType=table

U.S. Census Bureau. (2010) *Selected economic characteristics: 2010 American community survey 1-year estimates*. Retrieved 05 February 2012 from:

http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_1YR_DP03&prodType=table

USDA.gov. (2012, October 29). *Maine*. Retrieved 01 November 2012 from

http://www.rurdev.usda.gov/ME_Home.html

U.S. Department of Energy. (Producer). (2012). *Currently installed wind power capacity (mw)*. [Web Graphic]. Retrieved from

http://www.windpoweringamerica.gov/wind_installed_capacity.asp

U.S. Department of Energy. (Producer). (2011). *Maine 50-meter wind resource map*.

[Web Graphic]. Retrieved 03 February 2012 from:

http://www.windpoweringamerica.gov/maps_template.asp?stateab=me

Wikimedia Foundation, Inc. (2012, October 2012). *Wind power in Maine*. Retrieved 01

November 2012 from http://en.wikipedia.org/wiki/Wind_power_in_Maine

Windustry. (2012). *Why wind energy?* Retrieved 11 November 2012 from

<http://www.windustry.org/wind-basics/why-wind-energy>

Appendix b – Sample Community Questionnaire

Please complete the subsequent questions by following the given directions.

1. How many months a year do you live on Isle au Haut (circle one and only one answer please)?

- A) 0-3
- B) 3-6
- C) 6-9
- D) 9+

1. What type(s) of community activities do you participate in (circle all that apply)?

- A) Volunteer/Service Related Activities
- B) Sports and Recreation
- C) The Arts
- D) Multicultural Activities
- E) Church/Religious Organizations
- F) Military
- G) Fund-raising
- H) Other (please specify: _____)
- I) Refuse to Answer Question

2. To what extent do you have an interest in joining some sort of community organization (circle one and only one answer please)?

- A) Strong Interest
- B) Interest
- C) Neither Interest nor Disinterest
- D) Disinterest
- E) Strong Disinterest
- F) Do not know
- G) Refuse to Answer Question

3. Please rank the following community problems according to the importance that you think they should be financed and/or acted upon (note- rank 1 = most important, rank 7 = least important, please rank each item).

Community Problem	Rank
Poverty	
Hunger	
Fear of Crime/Personal Safety	
Deteriorating Infrastructure	
Lack of Employment Opportunities	

High Cost of Living	
Aging Population	

4. Which of the following best describes your age (circle one and only one answer please)?

- K) 18-24 years old
- L) 25-34 years old
- M) 35-44 years old
- N) 45-54 years old
- O) 55-64 years old
- P) 65 years old and up
- Q) Other (please specify: _____)

5. Please circle the letter that corresponds to your gender:

- A) Male
- B) Female

6. What is your occupation (please fill in the blank)? _____

7. Would you say that your electric bill presents one of the most challenging aspects of living on Isle au Haut?

- A) Yes
- B) No
- C) Not sure

8. In the proposal of an energy cooperative for the island, are you willing to support the proposed erection of wind turbines in the effort to stabilize electricity costs?

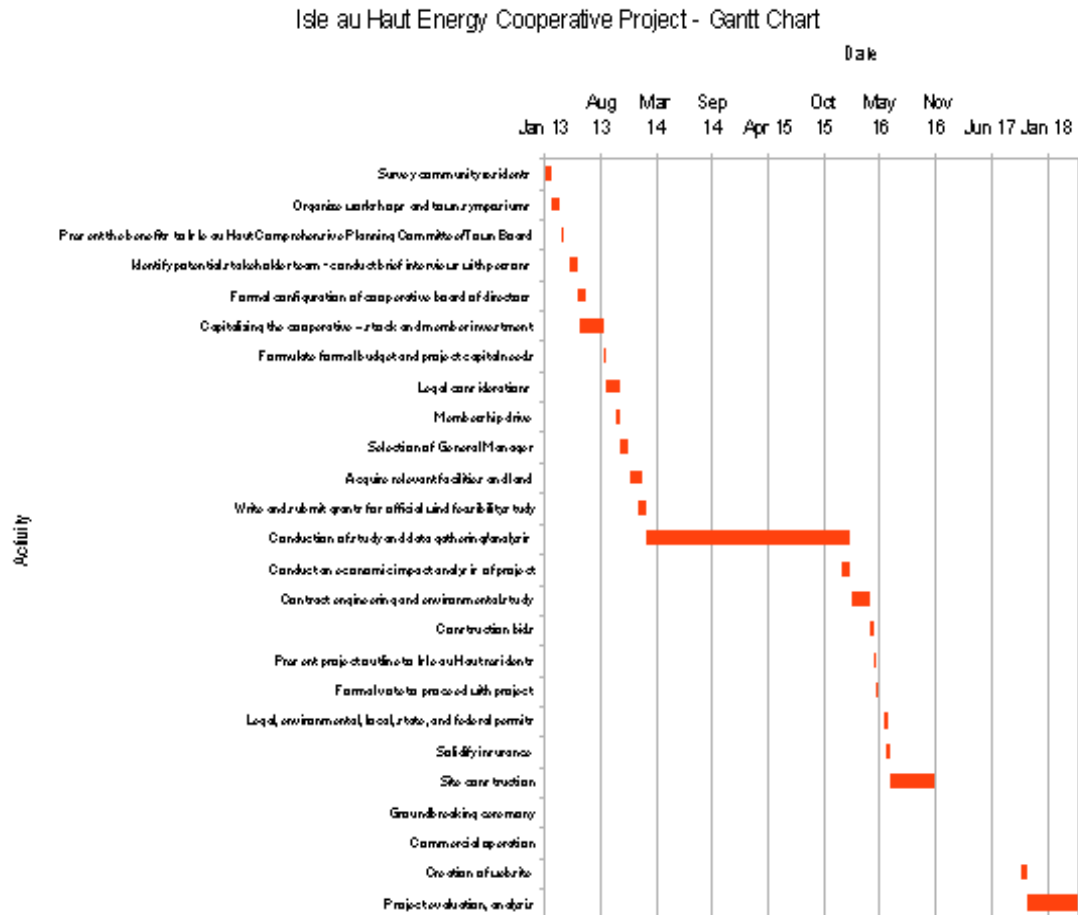
- A) Yes
- B) No
- C) Not sure

9. It is typical that bank requirements dictate cooperative owners own in the range of 40-50% of the necessary capital. Presuming cooperative practicability and feasibility, would you be willing to make monetary investments to support your electricity use?

- A) Yes
- B) No
- C) Not sure

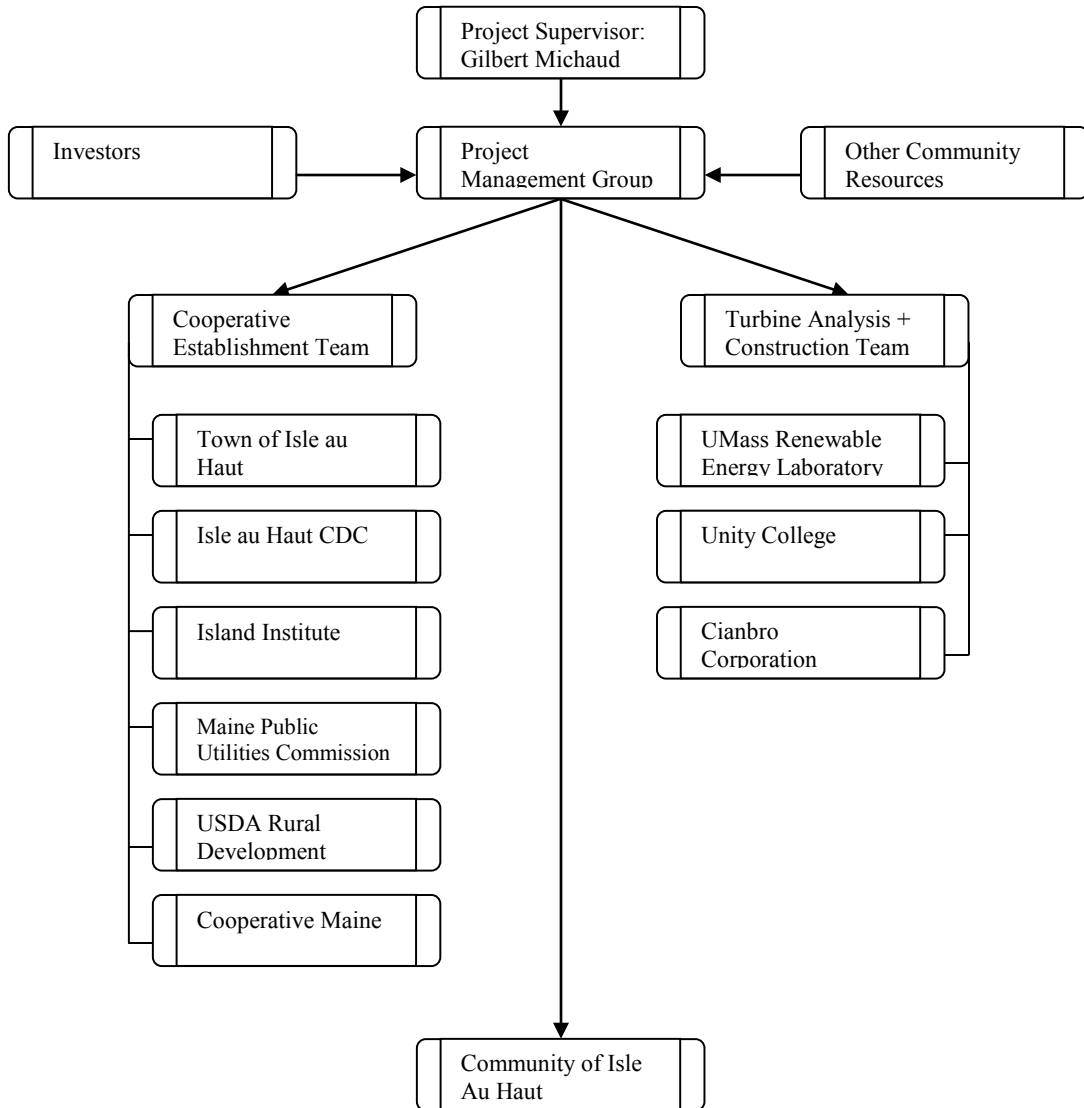
10. What is the maximum amount you are willing to invest? (please fill in the blank)? _____

Appendix c – Project Gantt Chart



Appendix d – Project Organizational Chart

Isle au Haut Cooperative Project Organizational Chart



Appendix e – Sample Membership Certificate

This certificate certifies that ____ (name) ____ of Isle au Haut, Maine, USA, is a member of the Isle au Haut Energy Cooperative and is therefore eligible to the privileges, benefits, and conveniences of the Isle au Haut Energy Cooperative.

_____ Date

_____ President, Isle au Haut Energy Cooperative Board of
Directors

Appendix f - Project Monitoring Matrix

ACTIVITIES	DATES	STATUS	TIMELINES	EXPLANATION FOR DELAY	ALTERNATIVE ACTION	ATTAINMENT OF OUTPUT
Survey community residents on current state of the town, outlook toward the future, and interest in wind energy development	February 2013 – March 2013	In development, have drafted up survey questions and thought about best way to administer the survey	We will allow about 4-6 weeks for the survey to be sent out and completed before we start to analyze the data	More community connections need to be made, need more time to properly develop survey and determine best way to fund the process	In alternative to paper surveys, web-based surveys might be an option.	Establish a benchmark in which 75% of residents are in favor of alternative energy development for communal benefit
Organize workshops and town symposiums that lay out positive effects that wind energy can have on the community	February 2013 – March 2013	In the very beginning stages of determining what approach would be best and what venue might be most appropriate	We would like to organize at least 2-3 workshops/meetings, and it might be appropriate to facilitate over a 7-8 week period	Yet to have funding to organize this, still need to gain a better game plan as well as gather data of relevance from survey(s)	Might be an alternative to host a few very informal, informational meetings of relevance to gain community approval and understanding	Raise awareness to at least 50 residents of environmental sustainability, community involvement, and ways on the personal level to save money and be more socially responsible
Present the benefits of community collaboration, environmental	April 2013	Some research has been done but will need survey results and	This can be done in April, and will only need to take place once	Need to administer survey first and engage community members	Informally gain entrance to town comprehensive planning committee and board, lobby	MOU with town comprehensive planning committee

sustainability, and renewable energy development to Isle au Haut Comprehensive Planning Committee and Town Board		community buy in				
Identify potential stakeholder team - conduct brief interviews with persons	May 2013	Have developed potential stakeholder team and potential cooperative board of directors	This will need to be put on hold until the previous steps have been completed and we would like to allow at least 2 weeks to meet with stakeholders	Again we need to first conduct survey and learn more from community residents before we begin more formal stages of operation	Might be necessary to change stakeholders and/or push completion date back to late spring because of holiday and seasonal complications	Gain a well thought out understanding of who the stakeholders will be for the Isle au Haut Energy Cooperative Project
Formal configuration of cooperative board of directors	May 2013 – June 2013	Have not started, but again, have thought of whom will be relevant	This step does not really involve a long period of time, it is more of a formality to officially state organizational leaders	Once again, need to conduct former steps before this can be done	There is no alternative action to this activity, the board of directors is absolutely essential to the organization's leadership and direction and therefore needs to be identified and	Identify formal team, and further work to develop relationships with those who will be influential in the project: UMASS Renewable Energy Laboratory, Unity College, USDA,

					announced	Rural Utilities Service, Island institute, Coastal Enterprises Inc., Fox Islands Electric Cooperative
--	--	--	--	--	-----------	---

Appendix g - Project Evaluation Matrix

Type of Outcome	Outcome	Indicators	Data Gathering Techniques	Data Source(s)	Time-frame
Long-term Outcome	Lower poverty rates, influx of immigrants to island as permanent residents (and school-aged children), and lower costs of living to amount to higher quality of life for residents.	Statistically noticeable lower poverty rates, increase in population (especially children), and lower costs of living all via US Census reports	-Secondary gathering of qualitative data (U.S. Census) -Non-participant observation	-U.S. Census Bureau 2020 and 2030 reports -Personal observation of community members	Observation will be ongoing starting from the development of the cooperative organization and construction of wind turbines, Census data will be looked at in the years 2020 and 2030.
Intermediate Outcome	Increased community collaboration as a result of this project, and more socially responsible behaviors to better the community as a whole	-Sustained awareness of benefits of cooperative organization and development of wind energy can provide for community – keep approximately 50 residents	-Qualitative, self-administered survey of residents -Non-participant observation	-Personal observation of community members and respective actions -Survey results -Bivariate descriptive statistics	Follow up every 6 months after the project is operating with surveys to judge community residents' opinion of the success of the project. October 2015 – October 2020

		pleased with direction of the project			
Short-term Outcome	Identification of cooperative board members and key project stakeholders	-Clearly identify 5-6 board members for cooperative organization -MOU with town comprehensive planning committee	-Questionnaire -Focus group discussions -Key informant interviews	-Personal data gathering as a result of interviews/discussion/questionnaire	May 2013
Short-term Outcome	Increase community knowledge that renewable energy can consequently help other community needs	-Establish a benchmark in which 75% of residents are in favor of alternative energy development for communal benefit	-Quantitative, self-administered survey of residents -Secondary gathering of qualitative data -Literature Review	-Town of Isle au Haut Comprehensive Plan Survey (2007) has identified already that 85% of residents are in favor of exploring alternative energy development -Create frequency/percentage distribution tables from results of quantitative survey	February 2013 – March 2013
Short-term	Development	-Raise	-Narrative	-Personal	February 2013 –

Outcome	of skills in which community members are acting in a collective interest in order to sustain island life and flourish moving toward the future	awareness to at least 50 residents of environmental sustainability, community involvement, and ways on the personal level to save money and be more socially responsible	account of the history of the problem -Qualitative, self-administered survey of residents -Non-participant observation	observation of community members and respective actions -Survey results -Bivariate descriptive statistics	March 2013
---------	--	--	--	---	------------