

Preliminary Report

**A COMMUNITY WIND ENERGY PROGRAM
FOR NEW BRUNSWICK**

Presented to the

New Brunswick Department of Energy

by

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1. INTRODUCTION

This document presents a series of recommendations for a Community Wind Energy Program for the province of New Brunswick.

In regards to the energy sector, elements of the Charter of Change of the current Government of New Brunswick include:

- Lead the country in energy generation, green power technology and conservation;
- Make New Brunswick a pioneer in the implementation of green power technology;
- Establish New Brunswick as a model user of green power;

while being “responsible to New Brunswickers today and in the future by committing to fiscal accountability and environmental sustainability”.

Within this framework, the Government of New Brunswick has recently published an Action Plan on Climate Change (2007) to address this global issue. Key elements of the Action Plan that relate to the present work state that the province will:

- Develop a range of renewable energy generation opportunities;
- Amend the Municipalities Act to remove barriers to municipal green energy generation;
- Work with communities to construct their infrastructure... to minimize greenhouse gas emissions; and,
- ... reducing greenhouse gas emissions... are shared responsibilities... where communities also play an important role.

On the other hand, after extensive consultation with the population and the business community of the province, the Government of New Brunswick has engaged in a bold plan for New Brunswick to be self-sufficient by 2026. Relevant elements of the Road to Self-Sufficiency report (2007) include:

- Act as a model user for alternative energy applications including wind, biofuels and small scale energy production; and
- ... to consider ways to more effectively support and employ community groups in the development of community-based solutions.

The research work at the K.C. Irving Chair in Sustainable Development of the Université de Moncton has identified the extent and the quality of the wind resource in the province of New Brunswick¹. This work confirmed that New Brunswick has a significant wind resource, distributed in various regions of the province.

The province of New Brunswick has embraced wind energy as a viable, secure and renewable source for its electricity portfolio. Notably, the province has a Net-Metering Policy for individual renewable energy generation up to 100 kW, while an Embedded Generation Policy allows for the generation of electricity from renewable sources up to 2 MW of capacity. Finally, through the two recent Request For Proposals (RFP) by NB Power, projects of 20 MW and above have been submitted by private developers (in this regards, a 21 MW wind farm proposed by a private developer was approved for Fairfield Hills in the south-east of the province). New Brunswick thus has a policy gap for electricity generation capacity between roughly 2 and 20 MW. Based on the wind and renewable energy sectors in other jurisdictions, it appears that the best policy option

¹ See www.nbwindatlas.ca for the various wind resource maps available for the province of New Brunswick.

for this range of electricity generation capacity is with community-based renewable energy projects.

Because of the potential for significant economic, social and environmental benefits of wind energy, its development in New Brunswick has attracted the attention of communities in general. In this regards, European models, notably, have shown that wind energy can be developed with a strong community involvement; such models are also emerging in North America and in Canada through the desire of the People to benefit from the development of wind energy.

Normally classified as wind energy projects of approximately 10 MW, and often connected to the distribution system of the electricity grid, community wind energy projects are locally developed, owned and operated by a municipality, community group or cooperative. While being a source of electricity generation that contributes to the global supply of renewable energy in a jurisdiction, community wind energy projects also have the following advantages:

- Greater impacts on local economies than projects owned by external developers;
- Increased local energy independence;
- Delayed need for new transmission capacity;
- Easier integration of small, community based wind farms in the landscape and on the electricity grid;
- Greater acceptance of wind energy projects;
- Develop citizen and community engagement in the sustainable development of their region;
- Develop community entrepreneurship and stronger rural communities; and,
- Allows for opportunities for collaboration between communities in the development, installation and operation phases of the community wind energy projects.

Community wind energy projects are thus developed in the perspective of benefits for the community, both economically and in regards to sustainable development.

In Canada, Ontario has used the Renewable Energy Standard Offer Program (RESOP)² to stimulate the development of community-based wind energy projects, along with solar, water and bio-energy projects, throughout the province, while British Columbia has recently implemented a similar program³ to develop community based renewable energy projects. On the other hand, the Province of Québec launched a program⁴ specifically for municipalities and First Nation communities.

The concept of well designed community wind energy programs is thus a vehicle to increase the participation, ownership and engagement in wind farm development at the local level. It is an elegant solution to the local calls for more community participation and involvement in the development of the wind energy sector, without compromising a jurisdiction's ability to develop large, utility scale wind farms to meet its Renewable Portfolio Standard requirements.

The wind energy strategy developed in this report is based on the facts that wind energy is an economically viable source of renewable energy; that the technology for wind energy extraction

² See www.powerauthority.on.ca/Page.asp?PageID=861&SiteNodeID=209 for a description of the Ontario RESOP program.

³ See www.bchydro.com/info/ipp/ipp51323.html for a description of the Standard Offer Program of British Columbia.

⁴ See www.mrnf.gouv.qc.ca/presse/communiqués-energie-detail.jsp?id=6883 for the concept of the Municipality and First Nation program in Québec.

is available and affordable; and that New Brunswick is characterized by a significant wind resource distributed throughout the territory.

The elements and recommendations presented in this report relate to a program destined for communities in general. This work is based on comments, briefs and expressions of interest received in a series of ten public consultation sessions throughout the province, along with the results of research work and best practices from other jurisdictions. All financial numbers are in 2008 dollars and they are based on best available estimates at the time of writing the report. The financial projections have to be taken as potential scenarios and they are thus not a guarantee of future economic indicators. All proponents interested in the development of a community wind farm must validate the financial scenarios on the basis of the economic and financial markets in general and the wind energy industry in particular at the time of the project.

A specific report will address the issues and the recommendations for an eventual First Nation Wind Energy Program in New Brunswick.

2. GLOBAL RESULTS OF THE PUBLIC CONSULTATIONS

When the community wind energy initiative was launched, it was an objective of the Government of New Brunswick to allow New Brunswickers the opportunity to significantly contribute to the growth of the energy hub by providing an opportunity to significantly contribute to renewable and clean forms of electricity generation in the province and to play a major role in policy development.

To reach this objective, a series of ten public consultation sessions were held throughout the province of New Brunswick, with an emphasis on regions where the wind resource was significant and viable to establish wind farms. Furthermore, opportunities were given for citizens, organizations and stakeholders to submit briefs and Expressions of Interest in regards to the development of the community wind energy in the province. Finally, several direct communication and correspondence were received from several citizens, stakeholders and organizations throughout the duration of the development of this report. Annex 1 presents a summary of the results of the process followed for the consultation of the public in regards to community wind energy in the province.

Since community wind energy is a relatively new concept, and based on preliminary discussions that were held with various stakeholders, it was agreed that the objectives of the public consultation process would be:

- To inform citizens and participants in the public consultation process in regards to community wind energy;
- To identify issues, barriers and obstacles in the development of community wind energy projects in New Brunswick; and,
- To measure the level of interest of New Brunswick communities and stakeholders for community wind energy.

To reach the objective of informing the citizens and participants in the public consultation process, a specific web site was created and presented in both official languages⁵, while a series of seven information documents were prepared and published on the web site. Also, each information sessions began with a presentation on the concept of community wind energy.

In total, 314 citizens participated in the various public consultation sessions. While the research team prompted occasional questions to stimulate the discussions, most of the issues were identified by the participants. Naturally, the issues identified covered a broad spectrum of considerations. However, the vast majority of the issues identified were relevant to the concept of community wind energy, thus providing solid information for the research team to identify the main concerns and desire of the population of New Brunswick and the stakeholders of community wind energy. Table 1 presents the list of the main issues mentioned by the participants in the public consultation sessions.

In summary, the main elements identified in the public consultation sessions throughout New Brunswick for the design of an eventual Community Wind Energy Program include the following:

- Communities throughout the province want to participate in the New Brunswick Energy Hub, through wind and other renewable energy initiatives;
- Citizens of New Brunswick prefer to have 100 % local or New Brunswick ownership of the community wind farms;

⁵ See the web sites of the initiative at www.nbcommunitywind.ca or www.eoliencommunautairenb.ca.

Table 1

Main issues mentioned by the participants in the public consultation sessions – 314 participants

<u>Issue</u>	<u>Number of times the issue was raised</u>	<u>Percentage of the participants</u>
Local or NB ownership of the community wind farms	123	39 %
Maximize economic benefits in the regions of NB	90	29 %
Concerns regarding the financing of projects	60	19 %
Importance of the concept of Community Investment Funds	57	18 %
Support in the development of community wind energy projects	43	14 %
Purchase price of the electricity	41	13 %
Connection to the electricity grid	40	13 %
Extend the community approach to other renewable sources of energy	17	5 %

- Citizens want to have a program that will distribute the ownership of the community wind farms to a maximum number of New Brunswick citizens and organizations;
- The Power Purchase Agreements should be based on a Standard Offer Contract, or Feed-In Tariff, approach;
- There should be a streamlined approach to integrate the power from community wind farms to the electricity grid;
- A concept of “Community Investment Fund” should be created to allow all citizens of New Brunswick to invest in the development of community-based wind energy projects in the province;
- Provisions should be made to provide technical, logistic and financial support in the development of the community wind energy projects, including the joint purchase of wind turbines and the joint construction of wind farms; and,
- NB Power should be involved in the development of wind energy in general, and in community-based wind energy projects in particular.

In regards to barriers, the following has been identified as elements that need to be addressed in a Community Wind Energy Program; these are indeed barriers that have been identified in other jurisdictions that have developed community-based wind and renewable energy initiatives:

- Grid access to integrate the electricity;
- Getting the price right for the purchase of electricity;
- Financing of the projects; and,
- Technical expertise.

3. ALLOCATION FOR THE COMMUNITY WIND ENERGY PROGRAM

Renewable Portfolio Standards (RPS) are policies that set a minimum percentage of electricity generation from renewable energy, thus assuring that renewable energy is part of the electricity portfolio of a jurisdiction. In New Brunswick, the RPS is currently at 10% of the quantity of electricity sold by the standard service supplier in the province, i.e. NB Power, to be installed before 2016. Currently, the RPS obligations of NB Power correspond to approximately 575 MW of wind energy capacity⁶.

Assuming that the first 400 MW of wind energy capacity from the two Request For Proposals from NB Power are effectively installed, NB Power will still need additional renewable energy generation before 2016 to meet the Renewable Portfolio Standard (RPS) obligations. Recent estimates thus evaluate that, if the RPS is met using wind energy, an additional 175 MW of wind energy capacity will need to be added to the New Brunswick electricity portfolio for NB Power to meet its RPS obligations. This allocation should be shared between a Community Wind Energy Program, a First Nation Wind Energy Program and eventually other forms of renewable energy.

Recommendation 1

It is recommended that the Government of New Brunswick implements a Community Wind Energy Program with an initial allocation of 100 MW for the pilot phase of community wind energy projects in the province.

At an estimated cost 2.2 million dollars (M\$) per megawatt (MW) of installed capacity to construct the wind farms, this 100 MW program will generate approximately 220 M\$ of investments in New Brunswick communities.

While there are risks associated in developing any business ventures, and since the renewable energy sector is poised to continue to grow, it appears important for New Brunswick to have a long term vision for the development of community-based wind and renewable energy initiative.

Recommendation 2

The allocation for the Community Wind Energy Program should be increased in subsequent phases of development, depending on the successes of the pilot phase of development of the Community Wind Energy Program.

⁶ Jean Finn, NBSO 2008 Energy Conference, St John NB, May 2008.

4. CHARACTERISTICS OF INDIVIDUAL COMMUNITY WIND ENERGY PROJECTS

The objective of the community wind energy initiative in New Brunswick is to maximize the economic impacts of wind energy developments throughout the province. During the public consultation process, participants have requested the largest possible projects, within accessible financial limits, in order to benefit from economies of scale. Equilibrium must thus be achieved in order to maximize the distribution of wealth in all regions of the province, while providing accessible projects for all potential participants. Furthermore, community wind energy projects should not replace or overlap existing wind energy segments in New Brunswick, notably the RFP process for large wind farms, and the Embedded Generation Policy for industrial size wind energy projects.

Based on the above and considering the policy gap in New Brunswick in regards to renewable energy installed capacity, and in coherence with similar community wind energy programs in other jurisdictions,

Recommendation 3

It is recommended that the individual wind farms developed through the Community Wind Energy Program have a maximum of 15 MW of installed capacity.

Based on current technologies available, a 15 MW community wind farm would have between 5 and 10 turbines per project, for total investments of approximately 33 M\$ per community wind farm for the development and the construction of the wind farm (at an estimated 2.2 M\$ per MW of installed capacity). In the pilot phase of the Community Wind Energy Program, potentially between 7 and 9 community wind energy projects could be developed in New Brunswick.

Standard Offer Contracts (SOC) are recognized as successful mechanisms to stimulate the growth of renewable energy in a jurisdiction. Essentially, SOC, or Feed-In Tariffs (FIT), specify the rate paid for electricity generated from renewable sources by Independent Power Producers (IPP) in a jurisdiction. The rate can be at a fixed price per kWh, or as a percentage of the retail price of electricity. When SOC or FIT are used, the Power Purchase Agreements (PPA) are thus not solely awarded on the basis of prices, but rather on other attributes that will maximize benefits or will allow to attain the policy objectives of the jurisdiction.

In the wind energy sector, the SOC or FIT mechanism is used to stimulate the growth of community-based wind energy projects. Effectively, after the initial phase of utility scale wind farm development in Canada, a second phase of wind energy development appears to be at the level of Community Wind projects. On the World scale, a total of 41 jurisdictions have adopted Feed-In Tariff approaches for renewable energy⁷, while in Canada, the SOC and FIT approach has been adopted by Ontario and British Columbia to develop community based renewable and wind energy projects.

Recommendation 4

The Power Purchase Agreements (PPA) for community wind energy projects should be awarded through a Standard Offer Contract (SOC).

⁷ World Future Council, Feed-In Tariffs – Boosting Energy for our Future, 2006.

An SOC approach implies that the terms of the contract of the Power Purchase Agreements are fixed and are identical for all community wind energy projects, with the purchase price of the electricity being set as a policy of the New Brunswick Department of Energy. Furthermore, the electricity generated through a SOC must be sold in the province of New Brunswick, to the benefit of the population of the province.

In order for municipalities and community groups to prepare credible projects, it will be important to define the earliest possible the rules of the program and the terms of the Standard Offer Contract.

Recommendation 5

NB Power, in consultation with the New Brunswick Department of Energy, should develop a Standard Offer Contract (SOC) within six (6) months of the launch of the Community Wind Energy Program.

Besides the usual elements of Power Purchase Agreements, the terms of the Standard Offer Contract should include:

- “Must Buy” condition by NB Power of the electricity generated from the community wind farms;
- Term of 25 years for the Power Purchase Agreement; and,
- No penalties for the proponent if the project has a life cycle that is less than the term of the Power Purchase Agreement.

During the public consultation process, communities have said that they prefer not to have a direct competition, but rather to design a program that would promote the collaboration and the synergies between communities. On the other hand, with a cap on the program, albeit a soft cap since it could eventually be increased, and considering that projects will take three to four years to materialize, it is important to set a process that will limit the entry of participants beyond a reasonable number of projects.

Recommendation 6

The Power Purchase Agreements (PPA) for the community wind energy projects should be awarded on a first come first serve basis through a transparent process for projects to register.

The transparent approach through a registry mechanism of projects is intended to limit the flow of projects beyond the allocation for the program. The registry mechanisms will include a web site where projects are registered and the stages, and dates, of development are indicated. The various stages would include, but not be limited to, the following:

- Intention to develop a community wind energy project;
- Land identified for the community wind farm;
- Preliminary assessment study completed for connection to the electricity grid;
- Initial public consultation completed;
- Met tower installed;
- Wind measurement completed (at least one year of credible wind data);
- Environmental Impact Assessment completed;
- Application for System Impact Assessment for connection to the electricity grid;
- Financing secured for the community wind farm;
- Public consultations completed;

- System Impact Assessment completed for connection to the electricity grid;
- Power Purchase Agreement signed;
- Turbines purchased; and,
- Beginning of construction.

Finally, participants in the public consultations have clearly said that an eventual community wind energy program in New Brunswick should be structured to distribute the wealth to a maximum number of communities, and individuals. In the pilot phase of the initiative, it thus appears important to limit the number of projects per proponent.

Recommendation 7

In the pilot phase of the Community Wind Energy Program, it is recommended to limit the Power Purchase Agreements to one project per proponent as a majority owner of a community wind farm.

5. OWNERSHIP OF COMMUNITY WIND ENERGY PROJECTS

During the consultation process, participants felt that the ownership of community wind farms was a crucial issue. Indeed, participants requested certain general elements in regards to the ownership of community-based wind farms in New Brunswick, such as:

- Maximum ownership of community wind farms by New Brunswick people or organizations through the majority ownership of shares in a community wind energy project;
- Distribute the ownership of the community wind farms to a maximum number of New Brunswick people and organizations;
- The ownership of community wind farms has to be controlled by New Brunswick communities or community groups; and,
- Provisions should be included in order to allow private or corporate participation, as minority partners, in the capital of community wind energy projects.

This approach of increasing the number of participants in community wind energy projects allows to share the wealth, but also to share the risks in the business venture.

Recommendation 8

Eligible majority owners of, and participants in, community wind energy projects include New Brunswick municipalities and New Brunswick based cooperatives, not-for-profit organizations and institutions. Other potential participants, as minority partners, in community wind energy projects include New Brunswick based private corporations and private investors, along with NB Power.

In regards to the eligible majority owners of a community wind energy project, the following provides details on the potential elements and restrictions in the structure of the ownership of the community wind farms.

- New Brunswick Municipalities:
 - Minimum of 51% of ownership by the municipality, i.e. control 51 % of the total capital of the community wind energy project.
 - Community wind farm owned by the municipality or a subsidiary company owned by the municipality, including the existing municipal energy subsidiary companies in New Brunswick.
 - Other potential investors in a municipality project:
 - NB based cooperatives.
 - Private corporations:
 - Maximum of 15% of the total capital of the community wind energy project for each private corporation involved in a project.
 - Minimum of 51% of the shareholders of the private corporation are New Brunswick residents.
 - Private investors:
 - Maximum of 15% of the total capital of the community wind energy project for each private investor involved in a project.
 - NB residents (Medicare number required).
 - A municipality can own a community wind farm that is not installed within its boundaries; however, the community wind farm owned by a municipality must be within 50 km from the boundaries of the municipality.

- Municipalities can group to do a joint venture on a specific community wind farm; however, they can't combine their individual allocations. At least one municipality must respect the 50 km limit for the project.
- Municipalities can build individual projects on the same site.
- Grants and unconditional grants to municipalities must not be reduced for municipalities with a community wind farm.
- The New Brunswick Municipalities Act has been reviewed to allow municipalities and rural communities to be generators of electricity, as defined in the Electricity Act.
- New Brunswick based Cooperatives:
 - Minimum of 51% of ownership by the Cooperative, i.e. control 51 % of the total capital of the community wind energy project.
 - Cooperatives owned by individual members who are New Brunswick residents.
 - Other potential investors in a cooperative project:
 - Corporate members (non-voting members of the Cooperative):
 - Maximum of 15% of the total capital of the community wind energy project for each corporate members involved in a project.
 - Minimum of 51% of the shareholders of the corporation are New Brunswick residents.
 - New Brunswick municipalities or subsidiary company owned by a municipality.
 - Private corporations:
 - Maximum of 15% of the total capital of the community wind energy project for each private corporation involved in a project.
 - Minimum of 51% of the shareholders of the private corporation are New Brunswick residents.
 - Private investors:
 - Maximum of 15% of the total capital of the community wind energy project for each private investor involved in a project.
 - NB residents (Medicare number required).

Recommendation 9

It is recommended to review the Co-operatives Associations Act to optimize the development of community wind energy projects, notably to allow for Multiple Membership Cooperatives (similar to the *Coopératives de solidarité* in the province of Québec) and the emission of privileged shares in order for cooperatives to have access to new forms of capital.

- The *Chaire des caisses populaires acadiennes en études coopératives* of the Université de Moncton and the *Coopérative de développement régional – Acadie Ltée*, a regroupment of 43 French cooperative organizations in New Brunswick and 11 support members including the Fédération des caisses populaires acadiennes and Coop Atlantique, should be consulted in this review process.
- Cooperatives can group to do a joint venture on a specific community wind farm; however, they can't combine their individual allocations.

- New Brunswick based not-for-profit organizations and institutions:
 - Minimum of 51% ownership by the not-for-profit organization or institution, i.e. control 51 % of the total capital of the community wind energy project.
 - Other potential investors in projects of not-for-profit organizations and institutions:
 - New Brunswick municipalities or subsidiary company owned by a municipality.
 - NB based Cooperatives.
 - Private corporations:
 - Maximum of 15% of the total capital of the community wind energy project for each private corporation involved in a project.
 - Minimum of 51% of the shareholders of the private corporation are New Brunswick residents.
 - Private investors:
 - Maximum of 15% of the total capital of the community wind energy project for each private investor involved in a project.
 - NB residents (Medicare number required).
 - Not-for-profit organizations and institutions can group to do a joint venture on a community wind farm, but they can't combine their individual allocations.

During the consultation process, several participants throughout the province have said that they would like to see NB Power be more involved in the wind energy sector, both at the large scale level and in community-based wind energy projects. In regards to the latter, the following are clear advantages of having NB Power as a participant in community-based wind energy projects:

- The participation of NB Power in community wind energy projects can be beneficial to the projects, notably in regards to the technical and financial aspects;
- As a Crown Corporation, the advantages for NB Power to participate in community wind energy projects are to the benefits of the population of New Brunswick; and,
- Proponents of community wind energy projects should have the option to invite NB Power to participate in their project, while NB Power should have the right to decide to participate or not in any given community wind energy projects in which it is invited to participate.

Recommendation 10

When offered by the proponent of a community wind energy project, NB Power can participate with an equity stack of up to 20% ownership of any given project. The decision for NB Power to participate in a community wind energy project will be at the discretion of NB Power on the basis of the Business Plan of the project.

Access to owned land should not be a barrier to develop community wind energy projects. Indeed, during the consultation process, concerns were expressed in regards to access to land for the development of community wind energy projects, notably for municipalities.

Recommendation 11

The owners of a community wind farm, including municipalities, don't necessarily own the land where the community wind farm is installed.

Finally, during the consultation process, the sale of wind farms was a concern for many citizens of New Brunswick. Notably, citizens were concerned that large corporations, including foreign investors, could eventually own the community wind farms through the purchase of the shares of the initial partners of the community wind farms. Several comments were made to impose constraints on the sale of community wind farms to make sure that community wind farms remain the ownership of New Brunswick communities and community groups.

On the other hand, imposing restrictions on the sale of community wind farms could negatively affect the capacity to raise capital through debt financing. Effectively, in the case of default of payments of the debt, the banks will want to sell the wind farm or its assets to any potential buyer in order to recover their loan.

Recommendation 12

The sale of community wind farms or its assets should be constrained to the following sequence in order to maintain the ownership objectives of the Community Wind Energy Program:

- **First right of refusal to the other partners of the community wind energy project (new ownership structure must still meet the ownership conditions of the Community Wind Energy Program);**
- **Offer to other organizations that will allow for the new ownership structure to meet the conditions of the Community Wind Energy Program;**
- **Right of refusal to NB Power, who can own shares beyond the 20% limit when the community wind farm is installed; and,**
- **Sale to other interested parties or organizations.**

6. PRICE PAID FOR THE ELECTRICITY

In Standard Offer Contracts, the price of electricity is set as a term of the Power Purchase Agreement. Several factors are relevant in determining the price paid for the electricity from community-based wind energy projects, notably:

- The price paid for the electricity generated from a community wind farm must provide a reasonable, but not excessive, profit for the communities;
- Community owned wind farms will retain the profits in the communities and will thus stimulate the economy, along with providing revenues for community development;
- Over the term of the Power Purchase Agreements, the cost of operations and maintenance will increase due to inflation;
- In New Brunswick, the first community wind kWh could be generated in 2011 or later; this needs to be factored in the price structure of the electricity;
- The price of electricity will normally increase throughout the term of the community wind farm Power Purchase Agreements; and,
- The cost to generate electricity from a strong fossil fuel based portfolio of electricity generation, such as in New Brunswick, will continue to increase throughout the term of the community wind farm Power Purchase Agreements.

The concept of Feed-In Tariffs offers various approaches to set the price of electricity paid to community-based wind energy projects⁸. Conceptually, the models for Feed-In Tariffs for electricity include⁹:

- Fixed price for the duration of the contract;
- Fixed price, indexed at specific periods at a predetermined rate specified in the Standard Offer Contract;
- Fixed price, indexed to the cost of living, based on an economic indicator (Consumer Price Index, inflation rate, etc.), at specific periods;
- Stepped tariffs, with higher price in initial years to pay off equity and debt; lower price in later years;
- Tariff reduction model as a function of the time of installation of the project; and,
- Premium price model, as a percentage of the retail price of electricity.

Considering the political landscape of New Brunswick and the general perception of the population in regards to electricity rates, it appears that the best option is to adopt a Fixed Price Model with the price of electricity indexed at specific periods at a predetermined rate specified in the Standard Offer Contract. This approach is similar to the Power Purchase Agreements signed by NB Power for large wind farms.

The issue then boils down to the price paid for the electricity and the indexation factor for the price of electricity. The scientific literature and the best practices adopted by jurisdictions show that these factors are set to allow for reasonable, but not excessive, profits for the communities, while mitigating the financial risks of the project.

With regards to the indexation factor, it appears that a factor aligned with the Consumer Price Index offers the best mechanisms to adjust the price of electricity on a yearly basis. However, in

⁸ See the recent book by Miguel Mendonça, *Feed-In Tariffs – Accelerating the Deployment of Renewable Energy*, World Future Council, 2007, for a detailed description of the Feed-In Tariff concept.

⁹ For details on the various Feed-In Tariff models, see Couture T. and Gagnon Y., 2008. “Overview of Feed-In Tariff Policy Models for Community Power”, World Wind Energy Conference, WWEC 2008, Kingston, Canada.

order to maximize revenue prediction certainty, the indexation factor is often fixed at a predetermined rate which matches the average annual increase in the Consumer Price Index.

On the other hand, the initial price of electricity requires significantly more analysis. In order to develop potential scenarios for the financial analysis of community wind farms, estimates of the development, construction and operation costs must be determined. Table 2 provides a summary of the main estimates used to perform the financial analysis of community wind farms in New Brunswick.

In recent months, community wind energy programs have been implemented, or have been announced, in Canada. Every program is announced with an initial price paid for electricity and an indexation of this price, whether in whole or in part. Table 3 provides a summary of the initial price and average price of the current community-based wind energy programs in Canada, whether as Feed-In Tariffs or as expected rates.

Recommendation 13

It is recommended that the initial price paid for the electricity in the Community Wind Energy Program be set at \$0.09 / kWh (\$90 / MWh), in 2008 dollars. The annual indexation of the price of electricity should be 2%, which corresponds to representative annual increases in the Consumer Price Index. The average price paid for the electricity will be \$0.115 / kWh (\$115 / MWh) over a 25 year term.

From the estimates of Table 2 and an initial price of \$0.09 / kWh (\$90 / MWh), a cash flow analysis is performed and is presented in Annex 2. In this model, representing a probable scenario using best available estimates for costs and expenses, the values of the parameters in Table 2 are used, while an equity ratio of 20 % of the total cost is assumed. From these estimates, and the recommended price for the electricity, a 15 MW community wind farm could generate, over a 25 year period, net cumulative revenues of approximately 30 M\$ and provide an Internal Rate of Return of nearly 20 % and an average pre-tax Return On Investment of over 10 %, while the project has a net present value of over 10 M\$. Indeed, while the estimates used in the financial analysis must be validated for every project, this analysis indicates that there are potentially significant revenues generated from community wind farms, while the financial risk is mitigated by the economics of the project.

It is noteworthy to mention that the financial analysis presented does not include any federal production incentives or tax credits. Indeed, while the current federal EcoEnergy provides a production subsidy of \$0.01 / kWh for the first ten years of production, this program is ending in 2012, or when the funds are all spent, and there are no indications of a renewal of this program. Thus, all eventual financial incentives for wind energy generation would be added to the financial returns estimated.

Sensitivity analysis has shown that the main factors affecting the economics of a community wind project include the cost for the installation of the wind farm, the capacity factor of the wind farm and the interest rate for the debt financing. Sensitivity analysis has thus been performed with the values indicated in Table 4, while Figure 1 shows the cumulative net cash as a function of the capacity factor for the test cases with various scenarios. In the figure, the probable scenario corresponds to the case presented in Table 2, with the recommended price structure; the best case scenario corresponds to the values of the parameters that maximizes the cumulative net cash; while the worst case scenario corresponds to the parameters that minimizes the cumulative net cash.

Table 2

Estimation of the main financial parameters for a community wind farm (excluding the price and indexation of the electricity)

Parameter	Estimate Value	Explanation
Capacity of the wind farm	15 MW	Maximum recommended capacity
Capacity Factor	36 %	Average capacity factor of wind farms in Canada (NRCan data, 2007)
Installation costs	2.2 M\$ / MW	Values of installation costs of wind farms in North America: <ul style="list-style-type: none"> ▪ East Point, PEI: 1.6 M\$ / MW ▪ Expected average costs in the USA for 2008¹⁰: 1.9 M\$ US / MW ▪ Typical values announced in Eastern Canada: between 2.0 and 2.2 M\$ / MW ▪ Estimates of Hélimax¹¹: 2.8 M\$ / MW
Interest rates – Debt financing	6 %	Corresponds to current data
Term for Debt	20 years	Terms for debt vary from 15 to 20 years
O&M costs	10 % of revenues	Comparisons of O&M costs can be misleading since they are not necessarily accounted the same way. For this study, the O&M costs do not include the land lease payments and the insurance costs, which are accounted separately. The estimated O&M costs correspond to general figures seen in the region, and they correspond to the cost estimated by Wisner and Bolinger (2008) for wind farms installed in the USA in the 2000s.
Inflation rate	2 %	Corresponds to current inflation rates
Term for the project	25 years	Typical terms of projects vary from 20 to 25 years
Annual land lease payments	\$2500 + 2.5% of gross revenues per turbine	This corresponds to the best conditions of the known annual land lease payments in the region. It corresponds to approximately \$16,000 per year for a 1.5 MW wind turbine.

¹⁰ Wisner R. and Bolinger M., 2008. « Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2007 », NREL Report LBNL-275E, 31 pages.

¹¹ Hélimax Énergie Inc., 2008. « Analyse du coût d'un projet dans le cadre des blocs de 250 MW issus de projets communautaires et autochtones », submitted to the Canadian Wind Energy Association, 14 pages.

Table 3

Current, anticipated and recommended price paid for electricity generated from community wind programs in Canada

<u>Jurisdiction / Organization</u>	<u>Initial price (2008)</u>	<u>Estimated average price (25 year term)</u>
Ontario ¹²	\$0.110 / kWh	\$0.116 / kWh
British Columbia ¹³	\$0.081 / kWh	\$0.092 / kWh
Government of Quebec ¹⁴	\$0.095 / kWh	?
Hélimax Study (2008) ¹⁵	\$0.125 / kWh	\$0.132 / kWh
CanWEA ¹⁶	\$0.115 to \$0.135 / kWh	\$0.127 to \$0.150 / kWh
New Brunswick (See Recommendation 13)	\$0.090 / kWh	\$0.115 / kWh

¹² Ontario sets the initial price of electricity at a fixed rate of \$0.088 / kWh, plus a supplement of \$0.022 / kWh indexed annually based on the Consumer Price Index.

¹³ BC has recently adopted a program that includes a factor for the region where the community wind farm is established and the time of day of production. The median values of the program, without time of day factor, sets the base price at \$0.077 / kWh with 50% indexed annually based on the Consumer Price Index, plus a supplement of \$0.0031 / kWh indexed annually based on the Consumer Price Index.

¹⁴ The Government of Quebec has announced that they will issue two separate RFPs of 250 MW specifically for Municipalities and First Nation communities. They have indicated that the expected price for the electricity will be 10% above the price paid for wind generated electricity in their most recent RFP for large wind farms (\$0.087 / kWh); no indication is given in regards to the indexation of this price.

¹⁵ Hélimax Énergie Inc., in a study (2008) sponsored by the Canadian Wind Energy Association for the anticipated 250 MW programs in Quebec, recommends a price structure with an initial price of \$0.1254 / kWh, of which 25 % is indexed at 2 % annually.

¹⁶ Based on the Hélimax study (2008), CanWEA recommends to the Government of Quebec that the initial price of electricity paid for the electricity from community projects should be between \$0.115 and \$0.135 per kWh, of which 25 % is indexed at 2 % annually. This price is based on equity of 30% in the capital of a project, and an Internal Rate of Return of 12 % on that equity.

Table 4

Sensitive analysis of the main financial parameters of community wind farms – Value of the significant parameters

<u>Parameter</u>	<u>Low Value</u>	<u>Estimated Value</u>	<u>High Value</u>
Installation costs	2.0 M\$ / MW	2.2 M\$ / MW	2.4 M\$ / MW
Capacity factor	32 %	36 %	40 %
Interest rates	5 %	6 %	7 %

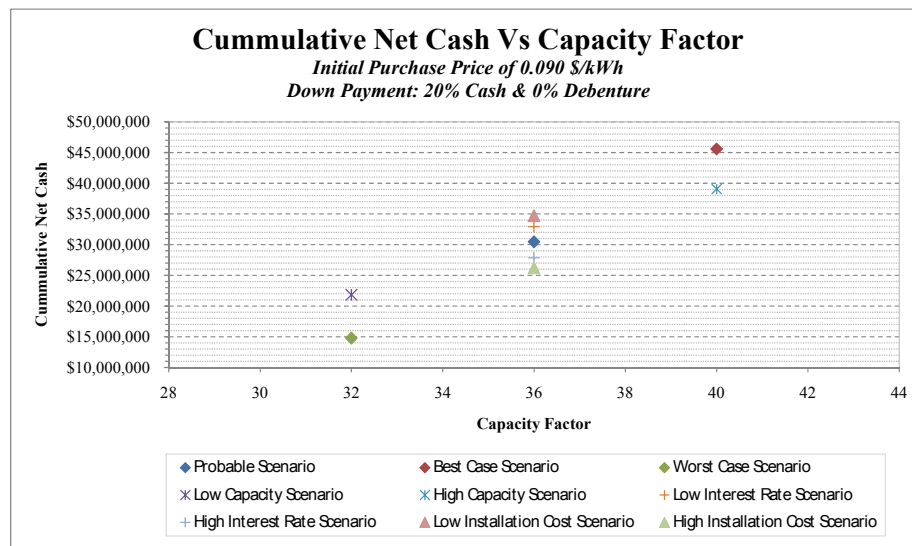


Figure 1: Cumulative net cash as a function of the capacity factor for various scenarios of the significant financial parameters.

As mentioned, Standard Offer Contracts and Feed-In Tariff mechanisms are designed as long term policies to allow guaranteed prices for the electricity and to allow for a reasonable rate of return for the proponent and owner of the community wind farm. Fundamentally, the policy objectives of Standard Offer Contracts is to increase the local and community participation in renewable and wind energy projects, and thus to maximize the economic and social benefits of this new economic sector. On the other hand, the higher price paid for the electricity by the utility, i.e. NB Power, must not induce excessive increases in the price of electricity for the ratepayers.

In order to estimate the impact of the proposed Community Wind Energy Program on the rate of electricity in New Brunswick, a number of hypotheses must be made:

- The price of electricity paid by NB Power to large wind farms is proprietary and confidential information and is thus not disclosed publicly;
- Based on estimates and aggregate numbers from New Brunswick and other jurisdictions, a current price of \$0.08 / kWh (\$80 / MWh) represents a fair estimate of the price paid for electricity generated from large wind farms;
- It is generally agreed that a 10 M\$ increase in the cost to generate electricity by NB Power induces a 1% increase in electricity rates for the ratepayers; and,
- The average capacity factor of wind farms in Canada is 36%.

Based on these estimates and hypotheses, it appears that:

The 100 MW Community Wind Energy Program will induce a 0.3 % increase in the price of electricity in New Brunswick, i.e. less than three tenth of one percent or less than \$0.0003 / kWh; this increase is largely compensated by the provincial and local economic impact generated by the provincial and local ownership of the community wind farms.

This estimate does not take into account the average cost for the electricity generation in New Brunswick, which could increase at a rate higher than the indexation of the price of electricity generated from community wind farms, notably because of the high level of penetration of fossil fuel based electricity generation in the province. Furthermore, if the retail price of electricity increases at a rate higher than 2 %, which is the indexation of the price of electricity from community wind farms, the incremental cost of the Community Wind Energy Program will reduce and could eventually reduce the rate of increase of the price of electricity for the ratepayers.

Community wind farms will take three to four years to get installed, notably due to the time needed to do a rigorous wind resource assessment study and to receive delivery of the wind turbines. The cost of living will thus have increased between the time of the launch of the program and the first revenues generated from the community wind farms. Therefore, provisions must be planned in order to assure that the initial price of electricity escalates with the same indexation as the price of electricity.

Recommendation 14

In future Power Purchase Agreements (PPA), the initial price paid for the electricity in the Community Wind Energy Program escalates with the same indexation as the price of electricity, up to the year in which the PPA is signed.

Electricity generated from renewable sources comprises two distinct commodities: electricity and green attributes related to the environmental benefits of generating electricity from renewable sources.

With regulations on reduction of greenhouse gas (GHG) emissions being implemented in a growing number of jurisdictions, the reductions can be met by effectively reducing the amount of GHG emissions or by buying Renewable Energy Credits (REC). RECs are unbundled from the electricity generated and are tradable units. Carbon markets are thus being established where RECs are being traded between entities that have reduced their GHG emissions and entities that

have the obligation to reduce their GHG but are not capable at the present time. In Canada, the Montréal Stock Exchange has signified its intention to become the organization to manage the carbon exchange in the country through the trading of RECs.

In New Brunswick, to meet its Renewable Portfolio Standard obligations, NB Power must own the environmental attributes of a renewable energy project. On the other hand, NB Power has some incremental costs to integrate new renewable energy on the transmission grid; these can be compensated by the green credits of the environmental attributes.

Recommendation 15

In the Community Wind Energy Program, NB Power will own the environmental attributes of the community wind energy projects and NB Power will be the market participant for the individual community wind farms.

7. FINANCIAL NEEDS

The construction of a wind farm is capital intensive, notably for the purchase of the wind turbines. However, since approximately 75 % of the capital costs of a wind farm corresponds to the purchase of the wind turbines, the financial risks are very low in the construction of a wind farm.

As mentioned, 15 MW community wind farms could be built at approximately 2.2 million dollars (M\$) per megawatt (MW) of installed capacity. Therefore, a 15 MW community wind farm will require approximately 33 M\$ to construct in New Brunswick.

On the other hand, the cost of development of a wind farm can vary significantly, in particular if the proponent can put in-kind contributions in the development of the wind farm (such as time by its employees in the case of a municipal project). Since it is a local initiative and since it is anticipated that several development work could be shared between the projects (e.g. development of a model Business Plan, development of common lease agreements, etc.), this should reduce the cost of development of community wind farms. Nonetheless, the development of community wind farms could necessitate between 100 k\$ and 200 k\$ for every project. Assuming that 10 projects would go forward in the pilot phase of the program, at 200 k\$ for every project, then the total capital needed to develop the community wind farms amounts to approximately 2 M\$; which is a significant amount of money for municipalities and community groups in New Brunswick.

During the consultation process, participants have requested financial assistance in the development of the community wind project. Indeed, while all participants are willing to put in some sweat equity along with some cash, they feel that a financial assistance program could remove significant barriers for projects to go forward.

Recommendation 16

The Government of New Brunswick should implement a program to support the equivalent of up to 50% of the costs for the development of the community wind energy projects in the pilot phase of the Community Wind Energy Program, with the matching contributions coming from the proponents, including accountable in-kind contributions, or other sources.

In a classical approach, this support program would be providing matching financial contributions to the project as expenses are made. However, it is clear for participants in the consultation process that there should be a way for community wind energy projects to work together to share knowledge, share best practices and reduce costs. In this perspective, the provincial funds could be used to create a not-for-profit Community Wind Energy Service Center that would have the mandate to accompany the proponents and to assist in the development of community wind energy projects in the pilot phase of the New Brunswick Community Wind Energy Program (this concept is explained in a later section).

A provincial program to support up to 50% of the costs for the development of the community wind energy projects would need 1 M\$ of government funds. To secure this 1 M\$ fund, the Government of New Brunswick could work with partner organizations, notably the Government of Canada, ACOA or the Federation of Canadian Municipalities.

After a site as proven to be viable for the installation of a community wind farm and a decision has been made to go forward with a community wind farm, proponents will need to secure financing for the project, notably equity financing and debt financing. Best practices show that the equity portion of wind farms corresponds to between 20 and 40 % of the total cost of the project. At 33 M\$ capital cost for a wind farm of 15 MW, the equity portion of a community wind energy project would be between 6 M\$ and 13 M\$ per project, while the debt portion of the project would typically correspond to between 20 M\$ and 27 M\$. For a 100 MW program, the equity portion of the program would correspond to between 44 M\$ and 88 M\$, while the debt portion would be between 132 M\$ and 176 M\$.

The equity financing of a community wind energy project could be secured from the following sources, depending on the ownership structure of the project:

- Municipal funds;
- Gas Tax Fund;
- Cooperatives, through the members;
- Not-for-profit organizations or institutions;
- Renewable Energy Investment Fund, reimbursable with interest and cost of administration (explained later);
- Renewable Energy Revolving Fund or Renewable Energy Foundation (explained later);
- Private corporations;
- Private investors;
- New Brunswick Regional Economic Development Funds; managed by the Regional Development Corporation (RDC);
- ACOA (Innovative Community Fund or other programs);
- NB Power;
- Etc.

For its part, the debt financing of a community wind energy project could be secured from the following sources, depending on the ownership structure of the project:

- Renewable Energy Investment Fund (explained later);
- Renewable Energy Revolving Fund or Renewable Energy Foundation (explained later);
- Chartered Banks;
- Credit Unions / Caisses populaires acadiennes;
- New Brunswick Investment Management Corporation;
- Etc.

8. SOURCES OF FINANCING

This section provides information on some of the sources of financing for community wind energy projects in New Brunswick. Some of the sources are existing, while other sources would need to be created in New Brunswick.

RENEWABLE ENERGY INVESTMENT FUND

A Renewable Energy Investment Fund (REIF) is a financial product that can be used to develop community-based renewable energy projects, including community wind farms. Essentially, a REIF is a capital pool formed through the sale of units or shares, eligible to persons living in a specific jurisdiction or community. The REIF invests its funds in specific renewable energy projects such as a community wind energy projects. Investors can receive tax credits (RRSP and/or provincial tax credits) for their investments while the REIF allows for the local capital and dividends to remain in the region. In New Brunswick, the NB Investment Management Corporation or the Credit Union / Caisses populaires acadiennes could be involved in the management of this REIF and could provide matching contributions as investments in the community wind energy projects.

Prince Edward Island has used this mechanism to raise money to install the 30 MW East Point wind farm; the program has the following characteristics:

- Exclusively reserved to PEI residents (possession of a provincial Medicare number);
- Minimum one time investment of \$500 and a maximum annual investment of \$10 000; invested in bonds guaranteed by the Government of PEI;
- Interest rate of 5 %;
- Investments locked for a period of 5 years; and,
- Monies invested exclusively in the East Point wind farm.

Nova Scotia also has a series of Community Economic Development Investment Funds (CEDIF)¹⁷ in various areas of the province. Implemented to reduce the amount of capital that left the province to mutual funds administered elsewhere in Canada, the Government of Nova Scotia created the concept of CEDIFs to pool the capital of persons living within a defined community for investments in local businesses. While the Nova Scotia CEDIFs can invest in any business ventures within the community, the concept can be structured so that the investments are specifically within a single industry, such as community-based wind energy projects. Eight CEDIFs in Nova Scotia have invested in the creation of Scotian Windfields Inc., which has the mandate to develop community-based wind energy projects in Nova Scotia.

The province of Ontario has created the Community Power Fund¹⁸, a financing organization established to support community-owned renewable energy projects in Ontario, where its mission is to provide financial and technical support to communities working to develop, build and own renewable energy projects. The 3 M\$ fund will support project development activities of Ontario-based community organizations pursuing local renewable energy projects, with a short term objective of developing 75 MW of community power projects.

¹⁷ See www.gov.ns.ca/econ/cedif for details.

¹⁸ See www.cpfund.ca for details.

Recommendation 17

It is recommended that the Government of New Brunswick create a Renewable Energy Investment Fund (REIF) where investors would obtain fiscal benefits similar to the existing investment tax credit. The proceeds of the Renewable Energy Investment Fund would be used to invest in community-based renewable energy projects, including community wind energy projects.

The New Brunswick Renewable Energy Investment Fund (REIF) should be structured along the following concepts:

- Open to New Brunswick citizens (need to pay income tax in New Brunswick to be able to invest in the REIF);
- Minimum of \$500 (one time investment), maximum of 10 k\$ per year;
- Investment for a minimum period of 5 years;
- RRSP and Investment Tax Credit:
 - Create a Renewable Energy Tax Credit program
 - Same model as the existing Investment Tax Credit program of NB
 - Model:

Investment	\$5,000
RRSP deduction 40%	-\$2,000
Investment Tax Credit 30%	<u>-\$1,500</u>
Real cost of investment / Exposure	\$1,500
- Interest rate based on the Canadian prime rate;
- Governance: Create an arm's length corporation, governed by a non-political and non-partisan Board of Directors, who has the mandate to secure the funds and to distribute the funds on the basis of the Business Plans of the community-based energy projects; and,
- Initial objective: Raise 10% of the total funds needed in the Community Wind Energy Program, i.e. 22 M\$.

GAS TAX FUND

As part of the federal Building Canada plan, the Gas Tax Fund targets exclusively municipal infrastructure to improve water and air quality and to reduce greenhouse gas emissions. In New Brunswick, the Gas Tax Fund can be used for feasibility studies (“capacity building”) of municipality-owned wind farms or in the equity of a community wind energy project. Furthermore, municipalities can lump their contributions in a joint project.

LOAN GUARANTEES

A loan guarantee is a binding agreement under which a guarantor agrees to pay any or the entire amount due on a loan instrument in the event of non-payment by the borrower. Since many of the proponents of community wind energy projects will not have a business track-record to secure important loans, loan guarantees would provide great assistance for community wind energy projects to secure loan and debt financing. Furthermore, loan guarantees would allow community wind energy projects to secure loans and debt financing with favourable conditions.

Recommendation 18

The Government of New Brunswick, in partnership with the Atlantic Canada Opportunities Agency, should look at the opportunity to provide loan guarantees for community wind energy projects in New Brunswick.

RENEWABLE ENERGY REVOLVING FUND OR RENEWABLE ENERGY FOUNDATION

The concept of a Revolving Fund consists in creating a fund that is used to invest in projects in a specific sector; and the funds invested are reimbursed at favourable terms to be reinvested in future projects. A Revolving Fund could be created with end of year funds (removed from government books) or Regional Economic Development Funds.

Recommendation 19

It is recommended that the Government of New Brunswick create a Renewable Energy Revolving Fund or Renewable Energy Foundation along the concept of a Revolving Fund, where funds invested in a renewable energy project are reimbursed at favourable terms in order to be reinvested in future renewable energy projects.

The Renewable Energy Revolving Fund or the Renewable Energy Foundation normally invests in the equity portion of a project; however, it could be used for debt financing. In both cases, the funds are reimbursed at favourable terms. When invested in the equity portion of a project, the funds would be reimbursable without interest or administration fees, and a grace period of up to four (4) years could be allowed to reimburse the capital.

In terms of governance, the Government of New Brunswick should create an arm's length corporation, governed by a non-political and non-partisan Board of Directors, who would have the mandate to distribute the funds on the basis of the Business Plans of the community-based renewable energy projects. Furthermore, this corporation could be the same arm's length corporation that manages the Renewable Energy Investment Fund.

The initial objective of the Renewable Energy Revolving Fund or the Renewable Energy Foundation could be to raise 10% of the total funds needed in the Community Wind Energy Program, i.e. 22 M\$.

With their respective objectives, the combination of the Renewable Energy Investment Fund (REIF) and the Renewable Energy Foundation (REF) could provide the 20 % of equity needed for community-based wind energy projects, with this equity being reimbursed at favourable terms for the projects (noting that the terms for the reimbursement to the REIF would be different than the terms for the reimbursement to the REF). These funds could eventually invest in the debt portion of the projects.

DEBT FINANCING

In simple terms, banks are in business to make money; and they achieve this by lending money to people or organizations that need money. Debt financing of community wind projects could thus be obtained from chartered banks. Also, it is hoped that the Credit Unions and the Caisses populaires acadiennes will participate in the financing of community-based wind energy projects.

For its part, the New Brunswick Investment Management Corporation (NBIMC)¹⁹ is the trustee and investment manager for the pension assets of approximately 45,000 members of the Public Service, Teachers' and Judges' pension plans in New Brunswick. As of March 2007, NBIMC

¹⁹ See www.nbimc.com for details.

had assets under management totalling \$8.718 billion, making it the largest institutional investment manager in Atlantic Canada.

Recommendation 20

The Government of New Brunswick should work with the New Brunswick Investment Management Corporation so that NBIMC invests in the debt financing of community wind energy projects in the province.

NB POWER

When solicited by the proponent of a community wind energy project, and upon acceptance to participate, NB Power can have a participation of up to 20 % in the capital of the project, and thus own 20 % of the shares of the project. This participation would normally be based in the participation in the equity portion of the project.

9. SUPPORT IN THE DEVELOPMENT OF COMMUNITY WIND ENERGY PROJECTS

In the consultation process, many citizens, stakeholders, community groups and municipal representatives have requested various forms of support to optimize the development of community wind energy projects in the province. Notably, the support requested was regarding the financial support in the development of the community wind energy projects and, ideally, loan guarantees. Furthermore, many stakeholders requested some sort of technical and logistic support to optimize the development of the community wind energy projects, in particular during a pilot phase of an eventual Community Wind Energy Program.

In this regards, in Nova Scotia, eight Community Economic Development Investment Funds (CEDIF) have created Scotian Windfields Inc. to effectively and efficiently develop community-based wind energy projects in the province, while the Community Power Fund in Ontario assists communities in the development of their projects.

Recommendation 21

Within a period of three (3) months after the announcement of a Community Wind Energy Program, the New Brunswick Department of Energy should organise or sponsor a series of workshops to explain the program and to further explain the concept of Community Wind Energy. The workshops should address the technical aspects, financial aspects, legal issues, governance, etc. of community wind energy projects. The series of workshops should be complemented with a web site that provides specific information on the concept of Community Wind Energy in New Brunswick.

Recommendation 22

Through a Request for Proposal process, the New Brunswick Department of Energy should initiate the creation of a not-for-profit Community Wind Energy Support Center to accompany the proponents and to assist in the development of community wind energy projects in the pilot phase of the New Brunswick Community Wind Energy Program.

The type of support that the Community Wind Energy Support Center (CWESC) would provide in the development of community wind energy projects would include:

- Coordinate the registration of community wind energy projects and maintain a web site that follows the development of the projects;
- Prepare a model of development and a general best practices framework for the development of community wind farms in New Brunswick;
- Develop a model of a Business Plan for community wind energy projects:
 - Technical aspects
 - Financial aspects
 - Legal aspects
 - Lease agreements with land owners
 - Governance
 - Etc.;
- Develop a framework for environmental impact assessments;

- Assist the proponents in performing the feasibility studies:
 - Identification of land
 - Preliminary Assessment for the connection to the transmission grid or the distribution system
 - Wind resource assessment
 - Layout of the community wind farm
 - System impact study for the connection to the transmission grid or the distribution system
 - Etc.;
- Assist in securing the Power Purchase Agreements;
- Share information with the other community wind energy projects to reduce costs and to increase the quality of information;
- Coordinate the technology integration through the joint purchase of wind turbines; and,
- While the CWESC does not build or operate the community wind farms, it will coordinate the deployment of projects so that community wind farms can be built in parallel in order to reduce costs and to share information.

The specific tools needed could be developed internally by the CWESC or through a series of RFP. To have access to the CWESC services in the development of the projects, the community wind energy projects must register with the CWESC. The funding from the Province of New Brunswick would be tagged to the CWESC, while proponents would be responsible for specific costs that would amount to approximately half of the total costs for feasibility studies (e.g. met tower purchase and installation, cost of the environmental impact assessment, cost of the preliminary assessment and the system impact study for the integration on the electricity grid, etc.).

10. POWER PURCHASE AGREEMENTS (PPA)

As mentioned in Section 4, the Power Purchase Agreements would be awarded under Standard Offer Contracts. Furthermore, the PPA would be awarded through a transparent process, where community wind energy projects would register and would provide their level of development on a continuous basis.

Under the model of the Community Wind Energy Support Center (CWESC), or through an existing organization (e.g. NB Power), the process to have a PPA would include the following steps:

- Community wind energy projects register with the CWESC:
 - Registration gives access to the support service;
 - CWESC publishes the various stages of development of the projects;
- From the registration of the project up to the PPA:
 - The project proponent is accompanied by the CWESC and benefits from its services;
- To get the PPA, the proponent must show that they have a credible project, determined by an analysis of the Business Plan of the project by NB Power, as the purchaser of the electricity.

Recommendation 23

At the latest six (6) months after the launch of the Community Wind Energy Program, NB Power, in collaboration with the New Brunswick Department of Energy, will develop a series of criteria to assess and analyse the viability of community wind energy projects.

The criteria to assess and analyse the viability of community wind energy projects should include, but not be limited to, the following elements:

- Quality of the wind resource;
- Financial structure of the project;
- Ownership and governance of the project;
- System Impact Study;
- Cost to integrate the power to the electricity grid;
- Overall quality of the Business Plan; and,
- Provisions for the decommissioning of the community wind farms.

Once a PPA is signed, the proponent would have a maximum delay of three years (mainly due to the delivery of turbines) to install and commission the wind farm; after this delay, the PPA would not be valid and would thus be cancelled. The proponent would be responsible of the construction and the operation of the community wind farm, while NB Power would be responsible of integrating the power to the transmission grid or the distribution system and be the market participant for the electricity.

At the end of the PPA, it would be possible to extend the PPA with NB Power, at the discretion of NB Power, for the duration of the remaining life of the community wind farm. The decommissioning of the community wind farm would be the responsibility of the proponent; the funding needs to decommission would have to be factored in the Business Plan of the project.

11. CONNECTION TO THE ELECTRICITY GRID

While community wind energy projects are often connected to the distribution grid, the particularity of the New Brunswick electricity system, where small communities with small electricity load but good wind resource are distributed on a relatively large territory, it appears that integrating a community wind farm on the distribution system in certain areas would be a challenge. Indeed, in certain areas, connection to the distribution system would present greater technical complexities, notably because of the potential back-feed of power to the transmission grid.

Other jurisdictions, notably in Denmark, have faced the same challenges. It thus appears that flexibility is an important characteristic in regards to connecting community wind farms to the transmission grid or the distribution system. Essentially, each connection is site specific as a function of the load in the area, the distance to transmission or distribution lines, etc. However, if a community wind farm is connected to the distribution system, the proponent, in consultation with NB Power, would need to plan the connection to the grid in order to allow back-feed from the distribution system to the transmission system.

Recommendation 24

Community wind farms can be connected on the transmission grid or the distribution system. Each site will be studied independently in order to identify the best way to connect the community wind farm to the transmission grid or the distribution system in an area.

The Standard Offer Contract will clearly specify the obligations of the proponent, NB Power and the New Brunswick System Operator in regards to the connection to the electricity grid. Since NB Power will be the market participant, and since there could be some costs for NB Power to integrate the community-based power to the electricity system, NB Power will retain the environmental attributes and the power generated by the community wind farm will count for NB Power's Renewable Portfolio Standard obligations.

It will be important to know diligently the rules for the connection to both the transmission grid and the distribution system. Notably, it will be important to identify the responsibilities of all parties in regards to the integration of the power, along with constraints related to critical issues such as the distance to the transmission grid or distribution system and the maximum allowable costs to integrate the power on the electricity system.

Recommendation 25

At the latest six (6) months after the launch of the Community Wind Energy Program, NB Power, in consultation with the New Brunswick System Operator (NBSO), will be required to set-up and publish the rules for the connection of community wind farms to both the transmission grid and the distribution system.

Recommendation 26

At the latest six (6) months after the launch of the Community Wind Energy Program, the New Brunswick System Operator (NBSO) will be required to establish a special queue and policies for community wind energy projects for the purpose of preliminary assessments and system impact studies to connect the community wind farms to the electricity grid.

12. CALENDAR

The general calendar for the deployment of a Community Wind Energy Program could be along the following timelines:

- Adopt and announce the Community Wind Energy Program;
- Organize a series of workshops on the development of community wind energy projects; (Fall 2008)
- Create the Community Wind Energy Support Center; (Fall 2008)
- Modify the various New Brunswick Acts, as required; (Fall 2008)
- Implement the Renewable Energy Investment Fund; (Fall 2008)
- Secure initial funding for the Renewable Energy Revolving Fund or the Renewable Energy Foundation; (March 2009)
- Create the arm's length corporation(s) to manage the Renewable Energy Investment Fund and the Renewable Energy Revolving Fund; (March 2009)
- Development of projects: (2008-10)
 - Registration of projects; gives access to the services of the CWESC;
 - Preliminary Assessment for integration on the grid;
 - Wind resource assessment;
 - Layout of the community wind farm;
 - Secure financing;
 - System Impact Study for integration on the grid;
 - Sign Power Purchase Agreement;
 - Etc.
- Wind turbine delivery (2 years):
 - Joint purchase of wind turbines by several community wind energy projects;
- Installation of community wind farms (2011-13):
 - Joint installation of community wind farms;
- Joint operation of community wind farms (2011+).

13. GENERAL RECOMMENDATIONS

In practically all consultation sessions, it was requested to extend the community and Standard Offer Contract approach to other forms of Renewable Energy, albeit at a different purchase price for the electricity. Furthermore, data indicates that small and medium enterprises in New Brunswick are not benefiting from the current Embedded Generation Policy; comments were made in the consultation sessions that the price paid for the electricity in the Embedded Generation Policy should be aligned with an eventual Community Wind Energy Program. Finally, concerns were often expressed in regards to the future development of large wind farms in general and in particular the construction of large wind farms for the export electricity markets.

On the basis of the comments heard in several public consultation sessions, and considering the importance that many citizens, stakeholders and community groups have for the above issues, the following recommendations are provided in the perspective of the development of the global energy sector in New Brunswick.

Recommendation 27

It is recommended to extend the Standard Offer Contract and community approach to other forms of Renewable Energy, albeit at a different purchase price for the electricity.

Recommendation 28

It is recommended to adjust the Embedded Generation Policy to have the same price paid for the excess electricity generated from an embedded generation unit for New Brunswick based industries and institutions as the price paid for the Community Wind Energy Program.

Recommendation 29

All future development of large wind farms in New Brunswick should be done under the same principles as the Community Wind Energy Program, i.e. to maximize provincial economic impacts through the provincial ownership of the wind farms.

14. SUMMARY OF THE RECOMMENDATIONS

ALLOCATION FOR THE COMMUNITY WIND ENERGY PROGRAM

Recommendation 1

It is recommended that the Government of New Brunswick implements a Community Wind Energy Program with an initial allocation of 100 MW for the pilot phase of community wind energy projects in the province.

Recommendation 2

The allocation for the Community Wind Energy Program should be increased in subsequent phases of development, depending on the successes of the pilot phase of development of the Community Wind Energy Program.

CHARACTERISTICS OF INDIVIDUAL COMMUNITY WIND ENERGY PROJECTS

Recommendation 3

It is recommended that the individual wind farms developed through the Community Wind Energy Program have a maximum of 15 MW of installed capacity.

Recommendation 4

The Power Purchase Agreements (PPA) for community wind energy projects should be awarded through a Standard Offer Contract (SOC).

Recommendation 5

NB Power, in consultation with the New Brunswick Department of Energy, should develop a Standard Offer Contract (SOC) within six (6) months of the launch of the Community Wind Energy Program.

Recommendation 6

The Power Purchase Agreements (PPA) for the community wind energy projects should be awarded on a first come first serve basis through a transparent process for projects to register.

Recommendation 7

In the pilot phase of the Community Wind Energy Program, it is recommended to limit the Power Purchase Agreements to one project per proponent as a majority owner of a community wind farm.

OWNERSHIP OF COMMUNITY WIND ENERGY PROJECTS

Recommendation 8

Eligible majority owners of, and participants in, community wind energy projects include New Brunswick municipalities and New Brunswick based cooperatives, not-for-profit organizations and institutions. Other potential participants, as minority partners, in community wind energy projects include New Brunswick based private corporations and private investors, along with NB Power.

Recommendation 9

It is recommended to review the Co-operatives Associations Act to optimize the development of community wind energy projects, notably to allow for Multiple Membership Cooperatives (similar to the *Coopératives de solidarité* in the province of Québec) and the emission of privileged shares in order for cooperatives to have access to new forms of capital.

Recommendation 10

When offered by the proponent of a community wind energy project, NB Power can participate with an equity stack of up to 20% ownership of any given project. The decision for NB Power to participate in a community wind energy project will be at the discretion of NB Power on the basis of the Business Plan of the project.

Recommendation 11

The owners of a community wind farm, including municipalities, don't necessarily own the land where the community wind farm is installed.

Recommendation 12

The sale of community wind farms or its assets should be constrained to the following sequence in order to maintain the ownership objectives of the Community Wind Energy Program:

- First right of refusal to the other partners of the community wind energy project (new ownership structure must still meet the ownership conditions of the Community Wind Energy Program);
- Offer to other organizations that will allow for the new ownership structure to meet the conditions of the Community Wind Energy Program;
- Right of refusal to NB Power, who can own shares beyond the 20% limit when the community wind farm is installed; and,
- Sale to other interested parties or organizations.

PRICE PAID FOR THE ELECTRICITY

Recommendation 13

It is recommended that the initial price paid for the electricity in the Community Wind Energy Program be set at \$0.09 / kWh (\$90 / MWh), in 2008 dollars. The annual indexation of the price of electricity should be 2%, which corresponds to representative annual increases in the Consumer Price Index. The average price paid for the electricity will be \$0.115 / kWh (\$115 / MWh) over a 25 year term.

Recommendation 14

In future Power Purchase Agreements (PPA), the initial price paid for the electricity in the Community Wind Energy Program escalates with the same indexation as the price of electricity, up to the year in which the PPA is signed.

Recommendation 15

In the Community Wind Energy Program, NB Power will own the environmental attributes of the community wind energy projects and NB Power will be the market participant for the individual community wind farms.

FINANCIAL NEEDS

Recommendation 16

The Government of New Brunswick should implement a program to support the equivalent of up to 50% of the costs for the development of the community wind energy projects in the pilot phase of the Community Wind Energy Program, with the matching contributions coming from the proponents, including accountable in-kind contributions, or other sources.

SOURCES OF FINANCING

Recommendation 17

It is recommended that the Government of New Brunswick create a Renewable Energy Investment Fund (REIF) where investors would obtain fiscal benefits similar to the existing investment tax credit. The proceeds of the Renewable Energy Investment Fund would be used to invest in community-based renewable energy projects, including community wind energy projects.

Recommendation 18

The Government of New Brunswick, in partnership with the Atlantic Canada Opportunities Agency, should look at the opportunity to provide loan guarantees for community wind energy projects in New Brunswick.

Recommendation 19

It is recommended that the Government of New Brunswick create a Renewable Energy Revolving Fund or Renewable Energy Foundation along the concept of a Revolving Fund, where funds invested in a renewable energy project are reimbursed at favourable terms in order to be reinvested in future renewable energy projects.

Recommendation 20

The Government of New Brunswick should work with the New Brunswick Investment Management Corporation so that NBIMC invests in the debt financing of community wind energy projects in the province.

SUPPORT IN THE DEVELOPMENT OF COMMUNITY WIND ENERGY PROJECTS

Recommendation 21

Within a period of three (3) months after the announcement of a Community Wind Energy Program, the New Brunswick Department of Energy should organise or sponsor a series of workshops to explain the program and to further explain the concept of Community Wind Energy. The workshops should address the technical aspects, financial aspects, legal issues, governance, etc. of community wind energy projects. The series of workshops should be complemented with a web site that provides specific information on the concept of Community Wind Energy in New Brunswick.

Recommendation 22

Through a Request for Proposal process, the New Brunswick Department of Energy should initiate the creation of a not-for-profit Community Wind Energy Support Center to accompany the proponents and to assist in the development of community wind energy projects in the pilot phase of the New Brunswick Community Wind Energy Program.

POWER PURCHASE AGREEMENTS (PPA)

Recommendation 23

At the latest six (6) months after the launch of the Community Wind Energy Program, NB Power, in collaboration with the New Brunswick Department of Energy, will develop a series of criteria to assess and analyse the viability of community wind energy projects.

CONNECTION TO THE ELECTRICITY GRID

Recommendation 24

Community wind farms can be connected on the transmission grid or the distribution system. Each site will be studied independently in order to identify the best way to connect the community wind farm to the transmission grid or the distribution system in an area.

Recommendation 25

At the latest six (6) months after the launch of the Community Wind Energy Program, NB Power, in consultation with the New Brunswick System Operator (NBSO), will be required to set-up and publish the rules for the connection of community wind farms to both the transmission grid and the distribution system.

Recommendation 26

At the latest six (6) months after the launch of the Community Wind Energy Program, the New Brunswick System Operator (NBSO) will be required to establish a special queue and policies for community wind energy projects for the purpose of preliminary assessments and system impact studies to connect the community wind farms to the electricity grid.

GENERAL RECOMMENDATIONS

Recommendation 27

It is recommended to extend the Standard Offer Contract and community approach to other forms of Renewable Energy, albeit at a different purchase price for the electricity.

Recommendation 28

It is recommended to adjust the Embedded Generation Policy to have the same price paid for the excess electricity generated from an embedded generation unit for New Brunswick based industries and institutions as the price paid for the Community Wind Energy Program.

Recommendation 29

All future development of large wind farms in New Brunswick should be done under the same principles as the Community Wind Energy Program, i.e. to maximize provincial economic impacts through the provincial ownership of the wind farms.

Annex 1

Details of the Public Consultation Process

ANNEX 1**DETAILS OF THE PUBLIC CONSULTATION PROCESS**

PUBLIC CONSULTATION SESSIONS

<u>Location</u>	<u>Date (2008)</u>	<u>Number of participants</u>
Cap Pelé	March 25	38
Dahousie	March 26	20
Grand Falls	March 27	61
Sussex	March 31	48
Caraquet	April 1	27
Miramichi	April 2	11
Memramcook	April 7	32
Bouctouche	April 8	33
Tracadie-Sheila	April 9	12
St John	April 14	32
Total number of participants		314

LIST OF BRIEFS RECEIVED

The following is the list of organizations, citizens and stakeholders who have submitted a total of 14 briefs as part of the consultation process:

- Association francophone des municipalités du Nouveau-Brunswick
- Amanda Barry
- Don Bustin
- Michel Collins
- Conservation Council of New Brunswick
- Coopérative de développement régional – Acadie Itée
- Énergie Edmundston Energy
- EOS-Energy
- Claude Gallant
- Paul Gipe
- Donald Long
- Paula Tippett
- Val-Éo
- Vigilance acadienne

EXPRESSIONS OF INTEREST (EOI) RECEIVED

Participants at the public consultation sessions were invited to submit a form as an Expression of Interest (EOI); this information was also available on the web site of the initiative. This EOI approach was designed to have another level of measurement of the interest of community wind

energy in the province. The following provides statistical information in regards to the EOI received:

	<u>Number</u>	<u>%</u>
Number of EOI received	23	
Answers to the EOI questions:		
I am interested in participating in a CWE project	19	83
I am part of a group interested in developing a CWE project	7	30
I am part of a group currently developing a CWE project	3	13
The Province of NB should develop a CWE Program	22	96

It is important to note that the EOI results do not reflect the total number of expressions of interests received through the public consultations or the direct communications with the researchers. Rather, the information above is only indicative of the results for those who have submitted a written EOI form.

STAKEHOLDERS CONSULTED

The concept of community wind energy attracted the attention of several stakeholders in the province. The following is a list of stakeholder groups or stakeholder organizations that were consulted during the research work of this project:

- Association francophone des municipalités du Nouveau-Brunswick
- Business New Brunswick
- Canadian Wind Energy Association
- City of St John, Environment Committee
- City of St John, St John Water
- Elmtree Resources Ltd.
- Énergie Edmundston Energy
- NB Power
- New Brunswick Aboriginal Affairs Secretariat
- New Brunswick Department of Energy
- New Brunswick Department of Environment
- New Brunswick Department of Local Governments
- New Brunswick Innovation Foundation
- New Brunswick System Operator
- Nova Scotia Department of Energy
- PEI Energy Corporation
- Regional Development Corporation (RDC)
- Scotian WindFields Inc.
- SIDEM – Matapédia
- Village de Memramcook
- Ville de Bouctouche
- Wind Energy Institute of Canada

DIRECT COMMUNICATION OR CORRESPONDENCE

Throughout the process of the public consultations and the research work, a large number of emails, direct correspondence were received from citizens, organizations, private companies and stakeholders of community wind energy in the province. Also, the project attracted the attention of several other jurisdictions; numerous emails, direct communications and media interviews were also received from other provinces and other regions of Canada.

Annex 2

Financial Analysis of a 15 MW Community Wind Farm

Cash Flow Model For 15 MW Community Wind Farm**Scenario K1 - Probable Scenario**

July 11, 2008

Assumptions

Number of WTG	10 Turbines
Nameplate Capacity of WTG	1.5 MW
Installed Capacity	15 MW
Capacity Factor	36%
Annual Energy Output	47,304,000 kWh/yr
Installed Cost per MW	\$ 2,200,000
Total Installed Cost	\$ 33,000,000
O&M	10.0% of Revenues
Insurance	0.2% of Capital Costs
Purchase Price of Electricity (Year 1)	0.0900 \$/kWh
Indexation of Price of Electricity (Annual)	2.0%
Inflation Rate	2%
Down Payment	20%
Equity Cash	\$ 6,600,000
Equity Loan (Debenture)	\$ -
Loan Term	20 yrs
Loan Interest	6.0%
Start of Debenture Repayment (Year)	4
Debenture Term	0 yrs
Debenture Interest	0%
Income Tax	35%
Landowners Royalties	\$ 2,500 per WTG 2.5% of Revenues
Property Taxes	0.80% of Capital Costs

Cash Flow Table (2008 Dollars)

Year	0	1	2	3	4	5	6	7	8	9	10
	01/01/2008	01/01/2009	01/01/2010	01/01/2011	01/01/2012	01/01/2013	01/01/2014	01/01/2015	01/01/2016	01/01/2017	01/01/2018
CASH RECEIPTS											
Cash Sales		4,257,360	4,342,507	4,429,357	4,517,944	4,608,303	4,700,469	4,794,479	4,890,368	4,988,176	5,087,939
TOTAL CASH RECEIPTS		4,257,360	4,342,507	4,429,357	4,517,944	4,608,303	4,700,469	4,794,479	4,890,368	4,988,176	5,087,939
CASH PAID OUT											
<i>Operating Expenses</i>											
Wind Farm Construction	33,000,000										
Interest During Construction	660,000										
Down Payment	6,600,000										
Landowners Royalties		131,434	133,563	135,734	137,949	140,208	142,512	144,862	147,259	149,704	152,198
O&M		425,736	434,251	442,936	451,794	460,830	470,047	479,448	489,037	498,818	508,794
Insurance		66,000	67,320	68,666	70,040	71,441	72,869	74,327	75,813	77,330	78,876
Property Taxes		264,000	269,280	274,666	280,159	285,762	291,477	297,307	303,253	309,318	315,504
Loan Interest Payment		1,584,000	1,540,940	1,495,296	1,446,913	1,395,628	1,341,265	1,283,640	1,222,559	1,157,812	1,089,180
Loan Principal Payment		717,672	760,733	806,377	854,759	906,045	960,407	1,018,032	1,079,114	1,143,861	1,212,492
Debenture (Loan) Interest Payments	0	0	0	0	0	0	0	0	0	0	0
Debenture (Loan) Principal Payments	0	0	0	0	0	0	0	0	0	0	0
TOTAL OPERATING EXPENSES	7,260,000	3,188,842	3,206,086	3,223,674	3,241,614	3,259,913	3,278,578	3,297,616	3,317,035	3,336,842	3,357,045
NET CASH FROM OPERATING EXPENSES	-7,260,000	1,068,518	1,136,421	1,205,683	1,276,330	1,348,391	1,421,892	1,496,863	1,573,334	1,651,334	1,730,894
<i>Other Expenses</i>											
Income Tax		625,167	664,004	704,221	745,881	789,052	833,805	880,213	928,357	978,318	1,030,185
Decommissioning Reserve		0	0	0	0	0	0	0	0	0	0
Reserves		0	0	0	0	0	0	0	0	0	0
TOTAL CASH PAID OUT	7,260,000	3,814,009	3,870,090	3,927,895	3,987,495	4,048,965	4,112,382	4,177,829	4,245,391	4,315,160	4,387,230
CASH ON HAND (End of year)	-660,000	443,351	472,418	501,462	530,449	559,338	588,087	616,650	644,977	673,016	700,709
CUMULATIVE CASH (End of year)	-660,000	-216,649	255,769	757,231	1,287,680	1,847,018	2,435,105	3,051,755	3,696,732	4,369,748	5,070,457
OTHER OPERATING DATA											
Depreciation		1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000
Price of Electricity (\$/kWh)		0.090	0.092	0.094	0.096	0.097	0.099	0.101	0.103	0.105	0.108
Average Price of Electricity (\$/kWh)	0.115										
Pre-tax IRR	19.9%										
Pre-tax ROI		5.4%	5.7%	6.1%	6.5%	6.8%	7.2%	7.6%	8.0%	8.5%	8.9%
Average Pre-tax ROI	10.7%										
After-tax ROI		3.5%	3.7%	4.0%	4.2%	4.4%	4.7%	5.0%	5.2%	5.5%	5.8%
Average After-tax ROI	7.0%										
NPV OF TOTAL CASH ON HAND	10,674,372										

Note: This financial information is based on best estimates of costs and expenses for community wind farms at the date of production of the report. The actual numbers must be validated with real projects and should be validated for individual projects.

11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
01/01/2019	01/01/2020	01/01/2021	01/01/2022	01/01/2023	01/01/2024	01/01/2025	01/01/2026	01/01/2027	01/01/2028	01/01/2029	01/01/2030	01/01/2031	01/01/2032	01/01/2033
5,189,698	5,293,492	5,399,362	5,507,349	5,617,496	5,729,846	5,844,443	5,961,332	6,080,558	6,202,170	6,326,213	6,452,737	6,581,792	6,713,428	6,847,696
5,189,698	5,293,492	5,399,362	5,507,349	5,617,496	5,729,846	5,844,443	5,961,332	6,080,558	6,202,170	6,326,213	6,452,737	6,581,792	6,713,428	6,847,696
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
154,742	157,337	159,984	162,684	165,437	168,246	171,111	174,033	177,014	180,054	183,155	186,318	189,545	192,836	196,192
518,970	529,349	539,936	550,735	561,750	572,985	584,444	596,133	608,056	620,217	632,621	645,274	658,179	671,343	684,770
80,454	82,063	83,704	85,378	87,086	88,827	90,604	92,416	94,264	96,150	98,073	100,034	102,035	104,075	106,157
321,815	328,251	334,816	341,512	348,342	355,309	362,415	369,664	377,057	384,598	392,290	400,136	408,139	416,301	424,627
1,016,431	939,316	857,575	770,929	679,084	581,729	478,532	369,144	253,192	130,283	0	0	0	0	0
1,285,242	1,362,356	1,444,098	1,530,744	1,622,588	1,719,943	1,823,140	1,932,528	2,048,480	2,171,389	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3,377,653	3,398,672	3,420,112	3,441,981	3,464,287	3,487,040	3,510,247	3,533,918	3,558,063	3,582,691	1,306,139	1,331,762	1,357,897	1,384,555	1,411,746
1,812,045	1,894,820	1,979,250	2,065,368	2,153,209	2,242,806	2,334,196	2,427,413	2,522,495	2,619,478	5,020,074	5,120,975	5,223,895	5,328,873	5,435,950
1,084,051	1,140,012	1,198,172	1,258,639	1,321,529	1,386,962	1,455,068	1,525,980	1,599,841	1,676,804	1,757,026	1,792,341	1,828,363	1,865,105	1,902,583
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4,461,703	4,538,684	4,618,284	4,700,620	4,785,816	4,874,002	4,965,315	5,059,898	5,157,905	5,259,495	3,063,165	3,124,103	3,186,260	3,249,661	3,314,329
727,995	754,808	781,078	806,729	831,680	855,844	879,128	901,434	922,654	942,675	3,263,048	3,328,634	3,395,532	3,463,767	3,533,368
5,798,452	6,553,260	7,334,338	8,141,067	8,972,747	9,828,591	10,707,719	11,609,153	12,531,807	13,474,482	16,737,530	20,066,163	23,461,695	26,925,462	30,458,830
1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000
0.110	0.112	0.114	0.116	0.119	0.121	0.124	0.126	0.129	0.131	0.134	0.136	0.139	0.142	0.145
9.4%	9.9%	10.4%	10.9%	11.4%	12.0%	12.6%	13.2%	13.9%	14.5%	15.2%	15.5%	15.8%	16.1%	16.5%
6.1%	6.4%	6.7%	7.1%	7.4%	7.8%	8.2%	8.6%	9.0%	9.4%	9.9%	10.1%	10.3%	10.5%	10.7%

Note: This financial information is based on best estimates of costs and expenses for community wind farms at the date of production of the report. The actual numbers must be validated with real projects and should be validated for individual projects.

Cash Flow Model For 15 MW Community Wind Farm

Scenario K1 - Probable Scenario

July 11, 2008

Assumptions	
Number of WTG	10 Turines
Nameplate Capacity of WTG	15 MW
Installed Capacity	15 MW
Capacity Factor	30%
Annual Energy Output	4730400 kWh/yr
Installed Cost per MW	\$ 2,200,000
Total Installed Cost	\$ 33,000,000
O&M	10.0% of Revenues
Insurance	0.2% of Capital Costs
Purchase Price of Electricity (Year 1)	0.0900 \$/kWh
Inflation of Price of Electricity (Annual)	2.0%
Inflation Rate	2%
Down Payment	20%
Equity Cash	\$ 6,000,000
Debt Cash (Debt/Equity)	\$ -
Loan Term	20 yrs
Loan Interest	6.0%
Start of Debt/Equity Repayment (Year)	4
Debt/Equity Term	0 yrs
Debt/Equity Interest	0%
Income Tax	35%
Landowners Royalties	\$ 2,500 per WTG
	2.2% of Revenues
Property Taxes	0.80% of Capital Costs

Cash Flow Table (2008 Dollars)																											
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
CASH RECEIPTS																											
Cash Sales		4,257,360	4,342,507	4,429,357	4,517,944	4,608,303	4,700,469	4,794,479	4,890,368	4,988,176	5,087,939	5,189,698	5,293,492	5,399,362	5,507,349	5,617,496	5,729,846	5,844,443	5,961,332	6,080,558	6,202,170	6,326,213	6,452,737	6,581,792	6,713,428	6,847,696	
TOTAL CASH RECEIPTS		4,257,360	4,342,507	4,429,357	4,517,944	4,608,303	4,700,469	4,794,479	4,890,368	4,988,176	5,087,939	5,189,698	5,293,492	5,399,362	5,507,349	5,617,496	5,729,846	5,844,443	5,961,332	6,080,558	6,202,170	6,326,213	6,452,737	6,581,792	6,713,428	6,847,696	
CASH PAID OUT																											
Operating Expenses																											
Wind Farm Construction	33,000,000																										
Interest During Construction	600,000																										
Down Payment	6,000,000																										
Landowners Royalties		131,434	133,963	135,734	137,949	140,208	142,512	144,862	147,259	149,704	152,198	154,742	157,337	159,984	162,684	165,437	168,246	171,111	174,033	177,014	180,054	183,155	186,318	189,545	192,836	196,192	
O&M		436,736	434,251	442,936	451,794	460,833	470,047	479,448	489,037	498,816	508,794	518,970	529,349	539,936	550,736	561,750	572,985	584,444	596,133	608,058	620,217	632,621	645,274	658,179	671,343	684,770	
Insurance		60,000	61,920	63,866	65,940	68,141	70,469	72,927	75,513	78,220	81,048	83,997	87,067	90,268	93,601	97,067	100,667	104,412	108,304	112,345	116,538	120,885	125,388	130,048	134,867	139,847	
Property Taxes		264,000	269,260	274,686	280,159	285,762	291,477	297,307	303,253	309,318	315,504	321,811	328,250	334,819	341,512	348,342	355,309	362,415	369,664	377,057	384,598	392,290	400,136	408,139	416,301	424,627	
Loan Interest Payment		1,584,000	1,546,940	1,465,246	1,440,919	1,396,026	1,341,206	1,283,640	1,222,559	1,157,812	1,089,180	1,016,431	939,516	857,575	770,529	679,084	581,729	478,532	368,144	253,152	130,263	0	0	0	0	0	0
Loan Principal Payment		717,072	760,733	806,377	854,759	905,045	959,407	1,018,032	1,079,114	1,143,891	1,212,492	1,284,242	1,359,356	1,444,058	1,530,744	1,622,598	1,719,843	1,822,140	1,932,628	2,044,480	2,161,269	2,284,678	2,415,389	2,554,112	2,701,557	2,858,444	
Debt/Equity (Loan) Interest Payments		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Debt/Equity (Loan) Principal Payments		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL CASH PAID OUT	7,260,000	3,188,842	3,206,066	3,223,674	3,241,614	3,259,913	3,278,678	3,297,616	3,317,036	3,336,842	3,357,045	3,377,683	3,398,672	3,420,112	3,441,981	3,464,287	3,487,040	3,510,247	3,533,918	3,558,063	3,582,691	3,607,819	3,633,446	3,659,572	3,686,298	3,713,624	
NET CASH FROM OPERATING EXPENSES	-7,260,000	1,068,518	1,136,421	1,206,683	1,278,330	1,348,391	1,421,892	1,496,863	1,573,334	1,651,334	1,730,894	1,812,045	1,894,820	1,979,250	2,065,368	2,153,209	2,242,866	2,334,196	2,427,413	2,522,495	2,619,478	2,718,261	2,818,844	2,921,227	3,025,410	3,131,493	
Other Expenses																											
Income Tax		625,167	664,004	704,221	745,881	789,002	833,806	880,213	928,357	978,316	1,030,185	1,084,051	1,140,012	1,198,172	1,258,639	1,321,529	1,386,962	1,455,068	1,525,980	1,599,841	1,676,604	1,757,026	1,792,341	1,828,363	1,865,105	1,902,567	
Commissioning Reserve		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Reserves		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL CASH PAID OUT	7,260,000	3,814,009	3,870,090	3,927,895	3,987,495	4,048,965	4,112,362	4,177,629	4,245,391	4,315,160	4,387,230	4,461,703	4,538,684	4,618,284	4,700,620	4,785,816	4,874,002	4,965,315	5,059,898	5,157,905	5,259,495	5,364,819	5,473,926	5,586,850	5,703,623	5,824,296	
CASH ON HAND (End of year)	460,000	443,351	472,418	501,482	530,449	559,338	588,087	616,650	644,977	673,016	700,769	727,995	754,808	781,078	806,729	831,680	855,844	879,128	901,434	922,654	942,675	961,498	979,123	995,548	1,010,773	1,024,898	
CUMULATIVE CASH (End of year)	460,000	-216,649	255,769	757,231	1,287,680	1,847,018	2,435,105	3,051,755	3,696,732	4,369,748	5,070,457	5,798,452	6,553,260	7,334,338	8,141,067	8,974,747	9,835,891	10,724,719	11,641,153	12,586,807	13,561,202	14,564,027	15,595,881	16,657,274	17,748,707	18,870,691	
OTHER OPERATING DATA																											
Depreciation		1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	1,320,000	
Price of Electricity (\$/kWh)		0.090	0.092	0.094	0.096	0.097	0.099	0.101	0.103	0.105	0.108	0.110	0.112	0.114	0.116	0.119	0.121	0.124	0.126	0.129	0.131	0.134	0.136	0.139	0.142	0.145	
Average Price of Electricity (\$/kWh)		0.115	0.116	0.117	0.118	0.119	0.120	0.121	0.122	0.123	0.124	0.125	0.126	0.127	0.128	0.129	0.130	0.131	0.132	0.133	0.134	0.135	0.136	0.137	0.138	0.139	
Pre-tax ROI		5.4%	5.7%	6.1%	6.5%	6.9%	7.2%	7.6%	8.0%	8.5%	8.9%	9.4%	9.9%	10.4%	10.9%	11.4%	12.0%	12.6%	13.2%	13.9%	14.5%	15.2%	15.9%	16.1%	16.5%		
Average Pre-tax ROI		10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	10.7%	
After-tax ROI		3.5%	3.7%	4.0%	4.2%	4.4%	4.7%	5.0%	5.2%	5.5%	5.8%	6.1%	6.4%	6.7%	7.1%	7.4%	7.8%	8.2%	8.6%	9.0%	9.4%	9.9%	10.1%	10.3%	10.5%	10.7%	
Average After-tax ROI		7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	
NPV OF TOTAL CASH ON HAND		10,674,372																									

Note: This financial information is based on best estimates of costs and expenses for community wind farms at the date of production of the report. The actual numbers must be validated with real projects and should be validated for individual projects.