Proceedings Report

Remote Community Wind Energy Conference

Tuktoyaktuk, NT
November 28 to 30, 2007

Northwest Territories

NORTHWEST TERRITORIES POWER CORPORATION

Canada

Acknowledgements

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Executive Summary

The NWT Wind Energy Committee was established to provide a forum to coordinate the efforts of different agencies and partners interested in the development of wind energy projects. The Tuktoyaktuk wind conference was organized by the Committee to bring together communities interested in learning more about wind energy. The stated goal of the conference was "to provide community leadership with social, economic, environmental and technical information, including experience from other communities, about wind energy."

Close to 100 participants attended, including community representatives from Tuktoyaktuk, Sachs Harbour, Paulatuk, Ulukhaktuk, Inuvik, Aklavik, Norman Wells and Gameti. A list of conference delegates are available in **Appendix A**.

Congratulations to all those who helped make the Remote Community Wind Energy Conference such a success. The NWT Wind Energy Committee would particularly like to thank Conference Chair Nellie Cournoyea of the Inuvialuit Regional Corporation and Western Arctic MP Dennis Bevington for opening the conference and reaffirming the North's commitment to renewable energy.

Setting the Stage for Wind-Diesel in Canada

Wind energy is the fastest growing renewable energy source in the world with projects operating from Antarctica to the Arctic Circle, from the great plains of the Canadian Prairies to the Baltic Sea. Wind turbine technology is rapidly improving and as people are becoming acutely aware of the environmental costs of fossil fuels, wind and other renewable energy sources are taking off.

Wind energy has long been seen as a possibility for Canada's northern and remote communities to reduce the costs of diesel powered generation and to create long-term sustainable energy supply options. However, the experience of wind energy in Canada's North has been mixed. While commercial wind turbines have been operating in the Yukon for over 15 years in extremely harsh icing conditions, no wind-diesel projects in the NWT and Nunavut have operated more then a year.

Across the border in Alaska, however, a very successful foray into wind energy in has begun. Alaska's goals of creating long-term employment, local skills, reduce dependence on importing diesel fuel, and reduce costs and emissions of diesel-powered electricity generation. This program began in 1997 in the community of Kotzebue and has grown to a total of four community-based projects, with two more currently under construction and at least ten other communities currently monitoring their wind resource and undergoing other preliminary steps towards developing wind energy systems.

Kotzebue, Alaska, currently has 17 wind turbines installed, the first three of which were commissioned in 1997 and, thus, have been operating for ten years at the time of the conference. The present total in Kotzebue is one megawatt of wind power capacity, while the community is aiming to reach two to four MW in order to reach "high-penetration" wind levels, i.e. enough wind capacity to be able to shut off the diesel generators for extended periods of time.

In 1999, a high-penetration wind-diesel system was commissioned on St. Paul's Island using a single 225 kW turbine, which also provides additional heating to the local school with the excess energy. By the year 2002 Wales, Alaska, had installed two wind turbines in a high-penetration configuration and, in 2004, Selawik, Alaska, installed 150 kW of wind energy capacity onto their remote grid.

Currently, the total installed wind energy capacity in the state is close to two MW, while in the summer of 2006, Toksook Bay and Kasigluk began installing 400 kW and 300 kW high-penetration systems respectively.

During this same period of time, six 65 kW wind turbines were installed in the remote fishing village of Ramea by Frontier Power Systems. Ramea is on the south shore of Newfoundland, and the turbines that were installed in 2003 have been operational ever since, demonstrating this technology can also work in the Canadian context.

Going Forward in Canada's North

There are currently at least eight communities in the Canadian Arctic that are monitoring their wind resources with the hopes of developing wind energy projects. In addition to wind energy, many communities in the Canadian North have undertaken or are undertaking community energy planning processes in making long-term energy decisions in the context of local energy financial and environmental costs.

Meanwhile, the Canadian Wind Energy Association has been working for the past two years with its Northern Caucus to create a federal Remote Community Wind Incentive Program (ReCWIP) to assist wind energy development in the North the same way that it has in the rest of Canada. This conference is aimed at bringing together local communities, industry leaders, utilities and various levels of government in order to help foster this development strategically and from the "ground up".

Opening Ceremonies

Local wind energy champion and Tuktoyaktuk Hamlet Councillor **Jim Stevens** opened the conference by welcoming delegates to Tuktoyaktuk. Western Arctic MP **Dennis Bevington** followed by welcoming delegates to the NWT and highlighted his commitment to advancing renewable energies in the North. The Chair of the Conference Planning Committee, **Wade Carpenter** (ENR), reiterated the main goal of the conference "to provide community leadership with social, economic, environmental and technical information, including experience from other communities, about wind energy."

Keynote Address

Conference Chair – **Nellie Cournoyea** highlighted that the "North is not just bearing the brunt of rising global fuel prices, but is also on the front lines of a changing global climate. Many Arctic communities who are faced with rising sea levels and melting ice packs want to be a part of the solution." Ms. Cournoyea explained that the use of renewable energy is deeply compatible with Inuvialuit values and added that wind turbines were used in the Delta region in the '50s. She noted that renewable energy systems have been most successful in jurisdictions where commitments have been made both financially and politically. She called on the federal government to support long-term, stable and comprehensive programs to support our remote communities to take advantage of renewable energy resource. The complete speech is available in **Appendix B**.

Speech Highlights

"Pilot projects, feasibility studies and short-term policy commitments alone will not generate the critical mass that is required for success in the North. Looking around the world, renewable energy systems large or small have been most successful in jurisdictions where long-term stable commitments have been made, both financially and politically."

"A strong regional hub would have the capacity to provide support to a number of smaller, more remote regional communities with stronger wind regimes at a lower cost than multiple stand alone projects. A regional hub develops and maintains local capacity, reducing the reliance on remote and more costly suppliers. I encourage planners to partner with operators of remote sites in the Arctic, such as the north warning site and natural resource companies, and these organizations have high diesel costs, good wind regimes and a desire to reduce their carbon footprint."

Session One – Wind-Diesel 101

Session One – Wind-Diesel 101 was designed to provide community leaders with the basic technical, operational and policy information required to make informed decisions about wind energy.

- **Sean Whittaker** from the Canadian Wind Energy Association reviewed the policies and mechanisms that led to the boom of the wind energy industry in southern Canada, commenting that the remote and northern wind industry is set to follow a similar path.

  On what a successful wind-diesel installation will require:

  "…and there's just absolutely no doubt that it will take a concerted effort from the utilities, from governments, particularly from the communities if this is going to work."

- **Carl Brothers**, President of Frontier Power Systems and Project Manager of Canada's only functional wind-diesel operation located in Ramea, Newfoundland, outlined technical and economic factors which lead to successful projects. Mr. Brothers explained the difference between utility scale wind and the community scale; he went on to emphasized that high average wind speeds provide good energy output and economic viability.

  On the realities on wind-diesel installations in remote communities:

  "So, the opportunities in northern Canada: All the communities are powered by diesel, many have commercial wind resources but there's no easy money. Put this out of your head, there's no way to get rich on this in the near term. Wind energy is not going to decrease rates. It may stabilize rates. To be perfectly blunt, it will offer some economic benefits to the community, but this is not the silver bullet, this is not an enormous economic boom here. And, the technology needs to be carefully evaluated on a community by community basis depending on the diesel, the wind resource and the load."

  On the requirements for a successful project:

  "The question is we can't afford to do it wrong and we're going to discuss it over the next couple of days. So, we need to find a way of moving forward and it's really all about minimizing risk… we're going to face logistical risks and you can control that by careful equipment selection and packaging and finding ancillary equipment. So, when you do the tenth project you'll be a lot better doing it than when you did the first project. And so, the costs should come down over time."

- Whitehorse based wind prospector **JP Pinard** described the quantity and quality of the wind resources in Paulatuk, Sachs Harbor, Ulukhaktok and Tuktoyaktuk, indicating that throughout the Yukon, NWT and Nunavut approximately 60 communities exist with promising wind resources. "…There's above 60 sites there that are passing, that are about five meters per second."

- **Malcolm Lodge**, President of Entergrity Wind Energy, ended the session by describing his first-hand experience in successfully moving one Alaskan based project forward from start to finish.

  On the requirements for a successful project:

  "We need to look at the costs. What are the real fixed and variable costs of supplying energy? Because, ultimately, the economic performance of a project will be assessed every bit as much as its technical performance in terms of energy production from the wind turbines. So, we need to marry these things together to know which communities are the most appropriate to develop and identify those, and begin with those."

  On community benefits realized with successful wind energy projects:

  "It is a very, very laudable goal [community wind energy] in that it does things to a community to have a feeling of self-sufficiency. And there would be some increase in regional employment and economic activity, both during the construction phase and in the ongoing operations and maintenance of the systems. The reality is, and in many communities where there are significant wind developments, it has increased things like tourism. People will come to see them…"

Keynote Address

Leon Courneya, President and CEO of NTPC, addressed the community of Tuktoyaktuk and conference delegates at a community feast held in Kitty Hall at the end of the first day. (Recording equipment was not available at this venue.)

Mr. Courneya explained that NTPC has explored the use of wind-diesel power and concluded that there is currently no financial incentive for wind. He identified two reasons why a utility may want to move forward with wind development. First, the reduction of greenhouse gas emissions and, second, lower cost to serve the customers. In his analysis, however, Mr. Courneya explained that NTPC's greenhouse gas emissions are currently 58% below 1990 levels and that emissions in diesel-powered communities are within acceptable levels, adding "there are more cost effective means other than wind to reduce emissions". Mr. Courneya went on to explain that power from wind was intermittent and that savings from wind is equal only to the avoided cost of the diesel operation – not the full cost of the power.

Although increasing diesel prices have improved wind energy economics in recent years, the costs of construction have also risen. Mr. Courneya outlined the challenges of wind power in the North, identifying that some communities do not want turbines near residences. As a result, projects would require longer transmission lines, thus making it cost prohibitive. He explained that cold weather turbine technology was not mature, citing icing and maintenance issues. In addition to these challenges, Mr. Courneya explained that skilled maintenance people are not available in small communities, "which would result in higher costs (to fly in technicians) and potentially more down time".

Mr. Courneya described what NTPC could do to help in the deployment of wind energy systems. He stated that the Corporation is willing to establish power purchase agreements with independent power producers and that inter-connection guidelines for wind turbines to diesel systems have been developed. NTPC will issue an RFP on wind purchases to encourage the private sector to access government funding to construct and operate a wind project. NTPC will also assist proponents in preparing funding applications for such developments.

In conclusion, Mr. Courneya outlined three things that need to happen before proceeding with wind. More information on wind as a resource is needed, the challenges of harsh environments must be addressed, and government support is needed to make the economics more favourable.

Session Two – Experience with Remote and Northern Systems

- **Stephen Kerr** of the Northwest Territories Power Corporation (NTPC) explained the history of wind-diesel systems in the NWT, concluding that a combination of technical immaturity of the wind systems and lack of local capacity for operation and maintenance caused failures in the past. It was also noted that NTPC was left with the majority of the financial risk associated with these projects.

  On what factors lead to successful wind energy installations:

  "And we really think there needs to be an established, coordinated policy framework between all the players, particularly government, utilities; everybody has to get on board with this thing and come up with some kind of plan on how it can work."

  "You need a commitment from all the stakeholders, suppliers, developers, utility, customers, government. We've been down this road. We've indicated that we did form a partnership with government agencies and everybody backed out of this thing. So, I mean, this is our experience with this and I guess we're going to go down this road. As somebody indicated yesterday, you all need to be holding hands here and everybody can't be backing out at the last minute."

  On NTPC's view of renewable energy technologies:

  "…the Power Corporation is not anti-wind, we're not anti-alternative energy, but we're not an R&D company either. We are not big enough to take on R&D projects. Our customers can't afford us to be doing R&D. We need things [equipment] to come in here that work. I think it was pointed out yesterday; we need to get it right. And I think before we head down a road where we're going to install wind turbines into these systems, we need these things to be proven. We need the bugs ironed out…"

  "…the Power Corporation will be issuing an RFP early in January, or early in 2008, for the purchase of wind-generated energy and we are definitely looking for input from the folks that are here on how we can format that RFP so we will get some response, that, try to make this [wind energy] a viable thing for everybody."

- **Dennis Meiners** from Alaska Power Authority outlined similar struggles in the early days of developing its wind-diesel industry, but commented that in Alaska these barriers had been overcome and were no longer significant to their growth and operations.

  On why wind energy systems are now relevant in Alaska:

  "And everyone was saying, 'Oh, no, it (wind technologies) didn't work in the '80s, it's not going to work, it won't work.' I'm telling you, it's inevitable, and you better get out of the way or you better get on board because it will occur. These high costs are not going to go away. People would laugh at you three or four years ago when you'd say, 'You know oil could reach $100.00 a barrel,' and they go, 'Oh, you've got to be kidding me.' The [Alaska] state plan was based on oil never going above $50.00 a barrel, okay. So, the [renewable energy] programs are becoming more relevant… because they're being pushed by their customers to make them relevant."

- In 1997, the Koztebue Electrical Association (KEA) spearheaded the first wind-diesel system in Alaska. KEA President **Brad Reeve** described the events that lead to the successful installation, operation and maintenance of 17 turbines in Koztebue.

  On the role of wind energy in Koztebue Alaska:

  "So, for us, what role does wind play? It reduces the amount and cost of fuel. We're looking at local jobs, trying to keep those dollars in the community as opposed to sending them to Seattle and San Francisco where they don't do our community much good. We're looking at reducing emission at our power plant as well too; our carbon footprint is something that we're concerned with."

  "We're big enough, where the Environmental Protection Agency prescribes that we have to have an air permit. That air permit is also taxed, in a sense, on the per ton discharge of nitrous oxide and sulphur dioxide. So, any emissions that we can reduce – there is something that goes to our bottom-line. It diversifies our strategic, our energy supply and it contributes to what we have as a board, is to build a sustainable energy future and we're looking way out."

Session Three – Going Forward in the North

- **Antoine Lacroix** from Natural Resources Canada described the research and development for small wind turbines in cold climates. He explained that Canada is often considered the birthplace of the modern small wind turbine.

  "NRCan is active in small wind turbines and cold climates R&D. There is a growing interest in net metering. Utilities are allowing consumer-generated electricity. However, performance and reliability of hardware are two key factors. Wind energy in cold climate is definitely an issue in Canada. The best wind resources are often located in ice prone areas. A lot remains to be known about rime icing, and mitigation methods to address cold air temperature and icing need to be developed."

- **Mike Kennedy** from the Pembina Institute presented the Barriers to Wind-Diesel systems. Mr. Kennedy explained that there have been "lots of tries at wind-diesel in Canada, but by and large, their success has been marginal." Alaska, on the other hand, has found success. Indeed their wind-diesel industry is growing, and so what is going wrong [with the Canadian effort]?

  Mr. Kennedy reviewed research conducted by **Tim Weis** of Pembina. The focus was on the barriers to wind-diesel deployment in the Canadian context, particularly looking at perceptions of different stakeholders as to what's stalling the development.

  The main drivers for the deployment of wind-diesel systems in remote communities were identified as pollution reduction, the cost of imported diesel, minimize risk of spills, increase local sustainability and retention of energy money within the community.

  A survey of wind energy stakeholders identified "cost" as the most significant barrier, including capital costs and operation and maintenance. Perception of technical risk and access to local equipment and labour were also cited, however, only utility and government employees ranked technical maturity among top five barriers. Utilities stated that technical maturity was the number one barrier, while governments listed it as the fifth most important barrier.

  In order to overcome these barriers, strategic projects need to be developed first, and production incentives are required to ensure that projects are operated and maintained over the long term. Capital costs were also a significant barrier for small communities. Mr. Kennedy concluded by stating that the proposed "Remote Community Wind Incentive Program" could be adopted by the federal government to meet these challenges.

- **Andrew Applejohn** of the Aurora Research Institute explained the history of the research that the institute has undertaken to advance renewable energy projects in the NWT. He explained that various funding sources, along with the community partnerships that have evolved over the years, are working.

  "…this collaborative multi-agency, multi-level partnership actually worked. We hope in the future that we'll be able to maintain those partnerships and expand beyond the assessment stage and expand beyond the [Beaufort] region. I think there's a series of communities across the NWT that could also use this approach, this community research institute collaboration."

- **Yvonne Carpenter** from Municipal and Community Affairs (MACA) identified that gas tax funds could be used for community energy planning, including wind-related projects. MACA is willing to work with communities, in conjunction with Arctic Energy Alliance, to establish local community energy plans and the exploration of wind energy solutions.

  On gas tax money:

  "…it's going to help facilitate the development of those [renewable energy] projects. And, like everybody else has said it here, it's time for industry, private corporation, government to all sit down together to figure out how we're going to get this happening in each of our communities. And, we're [MACA] very much ready there to be a player and supportive of this."

- **Melanie Swain** and **Afzal Currimboy** from Industry Tourism and Investment, Government of the Northwest Territories, and Business Development and Investment Corporation (BDIC) respectively, identified their business development funds as potential sources for communities to access for investigations into wind energy.

  "The Business Development Fund provides contributions to individual entrepreneurs and small business. This program is designed to assist businesses to meet pre-establishment or pre-expansion costs. Priority is given to projects that have a good possibility of increasing regional sales or displacing imported goods and services. So, replacing imported diesel would definitely meet that criteria. Costs that may be covered include feasibility studies, business plans, engineering, preconstruction or legal costs." – Melanie Swain

  "ITI does support the development of feasibility studies, business plans and pilot projects where there's economic benefit and there's an equity contribution from an NWT business." – Melanie Swain

- **Barry Sugden** of NorthwesTel described their experience with small-scale wind turbines on their remote repeater stations in the North.

  On the realities of wind energy technologies:

  "If you're trying to shut off your diesels and get rid of oil completely, it's not going to happen, but you will offset diesel consumption with wind doing the project right. The project will work as long as we don't underestimate the technical challenges involved, and that's easy to do. And, we did that on our first go-round. We went cheap, and yeah it broke on us. So, don't overestimate the power potential. If you just look at the nameplate rating of the wind, you know, if it's a 50 kilowatt unit, you know, you're not going to get 50 kilowatts continually, it just doesn't happen. Do keep the installations rugged and simple."

  "Alternative energy is a long-term investment. It's not going to pay back over night, but you definitely can offset your costs and do something good for the environment in the meantime."

Session Four – Project Planning for Success

- **Leslie Whitby** from Indian and Northern Affairs Canada reviewed the qualities of renewable energy projects under the Aboriginal and Northern Community Action Program (ANCAP) that were successful. ANCAP projects exceeded greenhouse gas reduction targets set by the federal government to evaluate their climate change programs.

  On the ten measures for success developed by Aboriginal leaders regarding energy-related projects:

  "Leadership: It doesn't necessarily have to be the chief or the council, but somebody in the community has to emerge as the leader. It's going to be almost a full-time job of sheparding one of these projects though, and you can expect to devote months and years to it. Having a good governance system is another. Support of chief and council will help your leader, whoever he or she is, to move this through. Putting it in the context of sustainable development, economic interests, environment, youth, the social, the reality then of the jurisdiction, all of those things come into the decision you make about building the business case. Putting together the right partnership. People in this room certainly are many of the partners that will end up helping to make wind in this region a reality. Using an enterprise model, which is jargon for a business case, bringing it down to dollars and cents. How are you going to deal with the payback period. It's what you're going to take to the banks, or to whoever else is going to help you raise the equity there. A strong management system. As you go through this project, as I say it's going to be a number of years that you're going through it, you need strong management. Start negotiating the financing, especially with the utilities right up front. As early as you can. If, for example, the proposal for doing an RFP here is going to play into any business case, I would suggest that those negotiations and those discussions start before the actual document goes forward so that what you're presented with is something you can actually use. There have been other jurisdictions that weren't able to go forward in the RFP that was put before them. Equity, if you can put in-kind and dollars and cents into the proposal, you'll help move it along. Utility support and then, finally, your corporate financing."

- **Ron Alward**, Senior Engineer at Natural Resources Canada, has worked on remote energy systems in over 76 countries. He reviewed several case studies, focusing on what has worked and what has not. In his experience, successful projects resulted when communities fully embraced, supported or developed the project from start through to completion and beyond. He listed "community support" as most important, above technical, logistical and monetary variables.

  On lessons learned from past NWT attempts at wind energy:

  "Sure, we've learned a lot technically, but did we learn why they didn't work from the people point of view, from the community point of view. I think we have to concern ourselves with that. So, I think the people of Tuktoyaktuk should really look at what happened in those communities. Talk with folk up there, don't talk with utility, don't talk with people like me, talk with people from Cambridge Bay, from Sachs Harbour. And they [wind energy systems] work if there's a local development of capacity for construction, operations and maintenance of the system…"

- **Dennis Meiners**, Director of Powercorp Alaska, explained that his state decided to pursue wind energy because the technology was maturing, it was the most cost-effective renewable (except for large hydro). They had excellent wind resources, the scale of turbine used was relatively easy to install and, with proper training, diesel mechanics could handle most maintenance and repairs.

  On planning for a wind energy project in Tuktoyaktuk:

  "First of all you evaluate, you set your objectives for how you're going to spend your money, then tell everybody what you're doing. Because then they'll tell you, well, you're stupid or that's a good idea. If it's a good idea they'll say, hmm, I'll put some money in on that, right. So, by telling everybody what you're doing and being very open about it and very clear about where you're going, people are going to help you. Have enough money in the program to support it to the goal. Get there, know you're going to get there and just stay with it until you get there. If it's totally impractical, you'll figure that out, but stick with the goal. Once you get to the goal, evaluate it. If it makes the return you need, then tell everybody about it. When you tell everybody about it, then they're going to jump on board and say, gee, I should do that. That has magnified your investment. That's created additional value above and beyond what you do, and I think that's the function of government agencies or whoever helps organize this."

- **Carl Brothers** of Frontier Power Systems explained the successes and challenges of developing Canada's only operating wind-diesel installation in Ramea Newfoundland.

  On the Ramea Project:

  "…it has given us an enormous learning opportunity and I don't think there's anybody in Canada that has really got the understanding that we have in terms of working with utilities and in the communities in getting this stuff installed in a fairly cost-effective way. There's actually not too many in the world. If you have no constraints in terms of resources, (i.e. you've got lots of money), anybody can make this stuff work. But making it work in a very, very tight fiscal regime as we were, it was an accomplishment…"

Facilitated Break-out Groups

The second day ended with break-out group discussions on wind-diesel topics, including the Alaskan experience, low penetration vs. high penetration, government support and policy, regional thinking and NWT funding programs. "The Alaskan Experience" was the best attended. Brad Reeve answered detailed policy and technical questions about how Alaska has successfully integrated wind-diesel systems into its energy mix.

Session Five – Importance of Community Engagement

No recordings were available for this session due to technical problems.

- Andrew Robinson, Executive Director of the Arctic Energy Alliance, described the importance of community energy planning. The implementation of renewable energy technologies such as wind-diesel systems could be included as part of a communities energy plan.
- John Oliver from BC Hydro described The Remote Community Electrification Program. The success of the program was dependent on community engagement. BC Hydro meets with all levels of government as well as the local people in order to instil ownership in community projects.
- Brad Reeve from Alaska's Kotzebue Electric Association (KEA) explained how their wind-diesel systems are operated and maintained by locals in the community. KEA's goal is to use local and utility driven training. The Alaska Rural Electric Cooperative Association (ARECA) Training Council will soon offer a wind turbine operations and maintenance course to train local workers. An Alaskan school-age curriculum has been developed to educate students about wind energy in the state school system.
- Paul Dockrill, Technical Director from the Wind Energy Institute of Canada (WEICan), described the opportunities in research and training at WEICan's Atlantic Wind Test Site in Prince Edward Island. WEICan will be a leader in research, development and demonstration projects undertaken in collaboration with industry, research institutions and governments within Canada. WEICan will strategically support college and university wind energy training programs and engage in outreach and public education efforts to support its mission.

Session Six – Taking the Next Steps

- Paul Pynn, President of Eon Wind Electric described the lessons learned from an RFP put out by Nunavut in 2003 for a wind-diesel installation. Although five proponents answered the RFP no developments proceeded. The challenges faced by developers included fuel costs, timing and scope of RFP were not defined, lack of political will, land ownership and taxation issues, construction and logistical risks, i.e. equipment availability, diesel plant upgrades and shipping. Challenges for the utilities included the need to maintain reliable electricity supply above all else, little operating experience with wind-diesel systems and the poor track record of wind turbines in Canada's North. Mr. Pynn said responding to the RFP cost his company well over $20,000 and they were very disappointed when Nunavut cancelled the project without awarding any contracts.

  On what is required for a successful project:

  "Okay, so challenges for utilities. I can totally understand the perspective of utilities. Their mandate is to maintain reliable electricity supply. Typically, they don't have much experience with wind-diesel so, you know, it's risky stuff and they've got to be very aware of this. And the projects that have happened so far have got a poor track record. I mean, I don't think anybody will argue with that."

  "So, this is my two cents worth on the way forward with this. Local partnerships, I think this has been covered a lot. Very, very important. The only way for these projects, I think, to make sense is if there are tangible benefits to the community. And, you know, there's going to be construction jobs, yes, and that's a good thing. There's going to be one or two long-term operation and maintenance jobs. That's a good thing. There's potential for a training centre for cold climate wind-diesel systems. That's a good thing. There is some potential to increase tourism, that's a good thing. But, I think the real tangible benefits will come through to this thing if the developer is local and can actually take advantage of the economics of these things."

  "Economy of scale is important. Hub and spoke, I think, is a very good way to do it. As we've seen, one turbine, 1,000 miles away from the next turbine, is not going to work."

  "Government commitment, make sure that's there. Utility buy in, well, you know, utilities are going to do what they want to do, but I think things like this conference and being able to point to projects like Alaska and have Brad here to talk about the positive side of the potential of these projects, I think that goes a long way."

  "Basic maintenance is the key. These turbines don't require a lot of maintenance, but the maintenance that they require is very, very important. And it's difficult to find people that can do that because you've got to find somebody that's got electrical aptitude, mechanical aptitude, not afraid to climb towers and is going to be there when you need them. And that's difficult to find, so that's important."

- **Sean Whittaker**, Director of Policy at the Canadian Wind Energy Association (CanWEA), described the proposed federal Remote Community Wind Incentive Program (ReCWIP) and its importance in sparking the wind-diesel industry in Canada. The incentive for small remote communities is 15 cents per kWh total, including 10 cents per kWh production incentive for ten years, plus up-front capital grant of $900 per installed kW of capacity. CanWea is lobbying for the inclusion of ReCWIP in the 2008 federal budget. Letters of support for ReCWIP have been sent to the federal government by a host of Northern governments, agencies and communities.

  On three things that ReCWIP will do if enacted:

  "…first of all, it's going to make the economics make sense. You're looking at sharing the risk with the federal government so they're ponying up a part. It's not going to cover that whole thing. Down south, when the wind power production incentive came in, it didn't cover all the risk either, but what we saw is that once that first ante was on the table, then the other parties came around and they threw in their ante as well and that really made it make sense. So, it helps to bridge the cost gap, right, and especially with that 15 cent per kilowatt-hour. And particularly if you're dealing in a situation where you're competing against the avoided cost of fuel. If your avoided cost of fuel is 20/25 cents, it's pretty hard to make a project work on 20/25 cents. But if you're looking at, you know, 20/25 cents plus 15 cents for kilowatt-hour, you know, 40 cents per kilowatt-hour, then that actually starts to be more of an interesting proposition."

  "The second thing is, we really feel that it will create the wave. We think this is the spark that you need. It's big enough to build a critical mass and it's got that hub and spoke notion that is going to build up that local capacity that's really going to get things rolling."

  "And third, we really feel that it's going to promote very sound community-oriented projects that are, that are really centred on that basis. That you've got to have community support and you've got to have a technically sound project. The two of them go hand in hand. And we feel that with ReCWIP you're going to be able to essentially, screen out the projects that are the really serious ones that have, you know, the serious technical view, or the technical know how and that also have the local capacity."

- **John Maissan**, President of Leading Edge Projects, described what it would take to make wind-diesel work in the North (territories). In addition to a reasonable wind resource, support from community governments and the grass roots will be vital. Federal and territorial government support will be needed for the success of initial projects. The stakeholders will need to develop a detailed financial analysis and use practical business structures. Wind energy developers will need to factor in the technical challenges that exist with cold weather turbines. The economies of scale affect project viability, therefore, the initial developments will need to be strategically planned using a "hub and spoke model". In this model, the technical and human capacity required for the operation and maintenance of wind-diesel systems are perfected in a start-up community (hub) and then are transferred to outlying communities (spokes) within the region. It has been demonstrated that a single turbine installation (known as a "one-off") in a remote community is bound to fail. If wind-diesel is to work in Canada's North then "everyone: communities, governments, utilities, businesses, suppliers, etc. will need to put their shoulders to the wheel to get wind-diesel going."

  On the requirements for a successful project:

  "…we need reasonable wind resources for projects, but we also need a whole lot of other things: community support, government support, practical business structures, you know, the detailed financial analysis, etcetera. And there are still some technical challenges, but, you know, those I think can be dealt with, especially if we start with hub communities and build out."

  On the future of wind-diesel industry Canada:

  "I think if we all put our shoulders to the wheel, we can get this buggy rolling and when it's rolling I don't think there'll be any stopping it. And when we do get it right, those who follow behind us will thank us."

Community Leadership Workshop – What was Learned

This facilitated workshop allowed community leaders to review and discuss the topics presented at the conference. The community leaders present at the conference passed four motions unanimously. The Leadership Workshop Consultation Report is available in Appendix C.

Resolutions

1. We urge the Government of Canada to promptly introduce a Remote Community Wind Energy Incentive Program that is easily accessible by small remote communities and provides capital and operating incentives similar to or better than those proposed by CANWEA.
2. We urge the GNWT, the Power Corporation and Public Utility Board to promptly adopt comprehensive enabling policies for renewable energy specific to remote communities that are at least as favourable as the most progressive renewable energy policies in Canada relative to wind energy. (Last four words added at the meeting.)
3. We fully support the commitments made by the GNWT in the NWT Greenhouse Gas Strategy and the Energy Plan for the NWT tabled in the Legislative Assembly in March 2007 to: "develop a detailed business case and chose a community for an operating wind turbine in 2008 and have an operating wind turbines by 2009" as a first step in development of a long-term comprehensive program to develop sustainable energy systems in remote communities. We encourage the government to do all things necessary to complete the demonstration project on schedule and consistent with the recommendations of this workshop.
4. The Northern Leadership Group of the Remote Wind Energy Conference endorse the selection of Tuktoyaktuk for the wind turbine demonstration project.

Closing Ceremonies and the Weather Delay

The Chair of the NWT Wind Energy Committee closed the conference by presenting gifts of local art to wind-diesel pioneers Brad Reeve, Malcolm Lodge, Carl Brothers and Dennis Miners.

A weather delay in Inuvik resulted in the conference delegates being held over in Tuktoyaktuk for an extra night. The delay provided an opportunity for members of the wind committee and others to meet and plan for next steps. The group was able to compile a "framework for advancement" document designed to help potential wind proponents move forward. A copy of this framework is available in Appendix D. The Aurora Research Institute has contracted Leading Edge Projects Inc. to develop a detailed analysis of a proposed wind development based on the framework. This report will be available in April 2008.

Appendix A: Attendee List

Alfzal Currimbhoy
Albert Bouchard
Aleta Fowler
Andrew Robinson
Andrew Applejohn
Anita Oliktoak
Antoine Lacroix
Barry Sugden
Billy Emaghok
Brad Reeves
Brian Raddi Jr.
Calum MacPherson
Carl Brothers
Chad Abbey
Charles Gruben
Charles Lucas
Chris Harbord
Clifford H. Samuels
Darren Nasogaluak
Darwin Mouita
Dave Nightingale
David Connolly
Dean Green
Deborah J. Raddi
Dennis Bevington
Dennis Meiners
Eric Cockney
Eugene Rees
Evelyn Storr
Fred Bennett
Fred Kuptana
Fred Wolki
James Pugsley
Jean-Paul Pinard
Jen Hinze
Jim Sparling
Jim Stevens
Joe Acorn
John Curran
John Maissan
John Oliver
John Stuart Jr
Josh Gruben
Juanie Pudluk
Julie Coad
Larry Hastie
Leon Courneya
Leslie Whitby
Lisa Digmard Bailey
Lucy Cockney
Maja Haogak
Malcolm Lodge
Manny Kudiak
Margaret Kanayok
Marino Casebeer
Maureen Gruben
Melanie Swain
Melba Ruben
Mervin Gruben
Mike Harlow
Mike Kennedy
Nellie Couunoyea
Patrick Akhialtak
Paul Dockrill
Paul Kowmageak
Paul Pynn
Peter Clarkson
Peter Wilson
Phil Bergel
Pippa Seccombe-Hett
Ray Ruben
Robert Eldridge
Ron Mongeau
Ronald Alward
Ruben Ruben
Sandy Fleming
Scott Harper
Sean MacKinnon
Sean Whittaker
Steven Kerr
Terry Halifax
Tim Melnyk
Wade Carpenter
Wayne Gordon
William Hurst
Yvonne Carpenter

Appendix B: Keynote Address – Nellie Cournoyea

Opening Comments
Remote Community Wind Energy Conference
"Making Wind Work in the North"

Welcome to the Inuvialuit Settlement Region and my home community of Tuktoyaktuk. We have been working hard to showcase the region's abilities to support conventions, meetings and technical programs.

As a people, the Inuvialuit have always looked to their environment to provide for their ongoing needs. In the face of the ever escalating costs of diesel-generated electricity, the resulting burden on our communities and the negative impact on our environment, we must again look to the renewable resources at our disposal for a solution. Wind energy is increasingly one possibility for select communities where appropriate conditions exist.

It is exciting to see delegates from Alaska, who have successfully included wind in their communities' energy plans over the past decade.

I am pleased to see so many leaders here from communities from across the North, who are considering wind energy as part of their future energy plans.

Just as developing wind energy is a partnership, this conference is a partnership. While, logistically it might have been easier to have been held in Yellowknife, it was important to hold it in the windiest region of the NWT as well as in the region where the people who are affected by these decisions live.

I want to thank all of the groups that worked to make this a reality. The Community Corp. the Hamlet, Pembina Institute, many groups in the GNWT and federal government lead by ENR as well as members of the Inuvialuit Group. The conference budget of close to $300,000 was raised in just six months. A particular thanks to over a dozen corporate sponsors, including the Power Corp., Connoco Phillips, Shell, NWTel, Entegrity Wind, Frontier Power Systems and Inuvialuit Group of Companies.

This conference is an opportunity.

It is an opportunity for community leaders to learn from the experience of northern leaders, developers, academics, researchers and experts who have developed wind energy projects in remote Northern communities from Alaska to Newfoundland.

It is an opportunity for community leaders to clearly state their wishes to governments regarding the development, support and purchase of wind energy.

While wind energy has been shown to work in remote locations, wind is not a magical solution for all Northern communities.

Your time here is valuable if it gives you the information to decide to move ahead with wind for your community or that wind is not a good fit and your community might be better served by other sustainable energy sources such as hydro, bio-diesel or solar as well as examining ways to save energy through efficiency and conservation.

If you want to move forward with wind in your energy plan, many of the experts, funders, suppliers, partners, customers, engineers and business planners that you would need to draw upon have been brought together here. I encourage you to take advantage of this unique gathering of expertise.

This conference is an opportunity for community leadership to call upon the Government of Canada, the Government of the Northwest Territories, the Public Utilities Commission and the Power Corporation to adopt enabling policies and programs that are more supportive of wind energy and are comparable to progressive jurisdictions in Canada.

In Alaska, over ten years of real world application has demonstrated that wind power technology is successful in reducing the amount of imported diesel required by remote communities. Among those successes are community ownership and the development of a regional hub that can help support other outlying or "spoke" communities.

I understand that you will consider the lessons learned from their successes over the past decade and how community commitment, local champions, regional logistical support, training and the opportunity for communities to participate in ownership, in addition to enough actual wind, are crucial ingredients to community wind power projects.

A number of northern and remote communities, telecommunications sites, mining, north warning sites, research and exploration facilities have sufficient wind resources to warrant further investigation into the feasibility of developing a full-scale wind energy projects. This is particularly true for off road locations with high diesel costs and good wind.

The Inuvialuit are proposing a regional "hub and spoke" model based on the success that we have observed in Alaska. This model identifies Tuktoyaktuk's infrastructure and human resource capacities and economies of scale together with the training and research capabilities of the Aurora College and Aurora Research Institute as making it a good candidate for a wind turbine demonstration project and hub.

A strong regional hub would have the capacity to provide support to a number of smaller more remote regional communities with stronger wind regimes at a lower cost than multiple stand alone projects. A regional hub develops and maintains local capacity, reducing the reliance on remote and more costly suppliers.

I encourage planners to partner with operators of remote sites in the Arctic, such as the north warning sites, and natural resource companies. These organizations have high diesel costs, good wind regimes and a desire to reduce their carbon footprint. The more users of wind the better the economics of a hub and spoke business plan. I also suggest you call upon traditional knowledge. In Tuk, elders will tell you the windiest spot closest to the community is the north warning site hill – so, yo.

While sustainable energy projects must be built on a solid economic model, they must also be given credit for the environmental and social contributions they provide. In the past, wind energy models have been based purely on the former and not the latter. To date, the reduction in greenhouse gas emissions, the sale of carbon credits and oil hitting $90 per barrel have not been fully considered, nor have potential government incentive programs such as the proposed Remote Community Wind Energy Incentive Program.

Many of the maintenance issues involved in servicing the cold weather wind turbines have been addressed and are being continually improved in Alaska as well as recent developments in Newfoundland.

Most wind-diesel experts agree that the majority of the technological issues have been addressed and that the most significant barriers to establishing these types of systems is the absence of enabling policy.

While wind energy may not work for every community in the North, enabling policy that would level the playing field for wind energy will ultimately also enable other renewable and alternative energy options.

The effort should not fall disproportionately on any one group and, therefore, the federal government, the territorial government and Northern utilities and utility boards need to work together with local communities and research institutes to make this a reality.

This process has already begun, as the Aurora Research Institute has begun a wind monitoring program over the past two years with many communities that are represented here today, and the GNWT has committed to selecting a community for wind energy development by 2008, with a working turbine installed by 2009.

While a federal wind energy incentive program exists, it is not designed to meet the unique challenges of working in the North. Earlier this year, both the GNWT and I wrote the Government of Canada supporting the timely implementation of CanWEA's Remote Community Wind Incentive Program proposal. I hope that the federal representatives present will be able to update you on our requests.

A federal incentive tailored to the North is a key ingredient for wind energy to succeed here, but the North must be ready to accept that assistance by ensuring that there are progressive territorial policies in place. Such policies could include supplementary territories incentives, requirements for utilities to share their distribution systems, requirements on utilities to purchase the power generated by wind at a fixed price greater than simply the cost of the fuel saved and an absence of penalties or stand-by fees to producers.

For wind energy to be successful there is a need to increase northern capacity and to create North-North partnerships, for example between jurisdictions like Alaska and the NWT, but also between utilities, governments, communities, the Department of Defence, research institutes and corporations across the North.

Our guest from Alaska, Brad Reeve, was recently quoted on the CBC about the benefits of wind energy: "When you deal with the extreme transportation costs we've got up here to get anything into the community, and especially fuel, that any time you don't have to bring a gallon of fuel into the community, that leaves money in the community." This is as true in Canada as it is in Alaska.

The North is not just bearing the brunt of rising global fuel prices, but is also on the front lines of a changing global climate. Many Arctic communities who are faced with rising sea levels and melting ice packs want to be a part of the solution.

Pilot projects, feasibility studies and short-term policy commitments alone will not generate the critical mass that is required for success in the North. Looking around the world, renewable energy systems, large or small, have been most successful in jurisdictions where long-term, stable commitments have been made both financially and politically.

The time is right for long-term, stable and comprehensive programs in Canada to support our remote and Northern communities to take advantage of this resource.

Appendix C: Leadership and Community Consultation Report

Remote Community Wind Energy Conference
Making Wind Work in the North

Tuktoyaktuk, NWT
November 2007

Leadership and Community Consultations

Facilitated and Prepared by:
David Connelly
Ile Royale Enterprises Ltd.

Acknowledgements

These consultations were funded by the Inuvialuit Regional Corporation and the Tuktoyaktuk Development Corporation. The contributions of the members of the NWT Intergovernmental Wind Energy Committee are appreciated and, in particular, those of: Aleta Fowler, Indian and Northern Affairs Canada; Tim Weis, The Pembina Institute; and Wade Carpenter, Energy and Natural Resources, Government of the NWT, who refined and vetted the questions and motions. Likewise, I am grateful for the diligent efforts of the scribes: Jim Sparling, Energy and Natural Resources, Government of the NWT; Jennifer Hinze, Inuvialuit Community Economic Development Office; and Aleta Fowler, Indian and Northern Affairs Canada, who recorded the community delegates workshop.

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1. Beaufort Delta Regional Council's Motion

The Beaufort Delta Regional Council (the elected leaders from all the region's municipal and Aboriginal governments) received a summary presentation during their meeting in Inuvik on November 27, 2007. Following the presentation the members of the Beaufort Delta Regional Council voted unanimously to support the motions.

The passed motion was referred to the Chair of the Beaufort Delta Regional Council for action and to the Community Delegates Workshop at the Remote Community Wind Energy Conference for their consideration.

Please see the following section for the wording of the motions.

2. Community Leaders' and Delegates' Motions

The community leaders and delegates attending the Community Leaders and Delegates Workshop following the Remote Community Wind Energy Conference considered the motions which had been forwarded from the Beaufort Delta Regional Council.

At the suggestion of the GNWT, the community delegates amended the third motion regarding enabling policy to focus it on wind energy.

At the request of the GNWT, the community delegates were asked to make clear their preference of a community for the NWT Demonstration Project. The community delegates developed a fourth motion which endorsed the selection of Tuktoyaktuk as the location for the NWT demonstrations turbine.

All of the following motions, one through four, were passed unanimously.

1. *We urge the Government of Canada to promptly introduce a Remote Community Wind Energy Incentive Program that is easily accessible by small remote communities and provides capital and operating incentives similar to or better than those proposed by CANWEA.*

Moved by Georgina Masuzumi (Tuk); seconded by Bob Eldridge (Sachs); unanimous

2. *We urge the GNWT, the Power Corp.oration and Public Utility Board to promptly adopt comprehensive enabling policies for renewable energy specific to remote communities that are at least as favourable as the most progressive renewable energy policies in Canada relative to wind energy. (Last four words added at the meeting.)*

Moved by Wayne Gordon (Aklavik/Inuvik); seconded Ray Ruben (Paulatuk); unanimous

3. *We fully support the commitments made by the GNWT in the NWT Greenhouse Gas Strategy and the Energy Plan for the NWT tabled in the Legislative Assembly in March 2007 to: "develop a detailed business case and chose a community for an operating wind turbine in 2008, and have an operating wind turbines by 2009" as a first step in development of a long-term comprehensive program to develop sustainable energy systems in remote communities. We encourage the government to do all things necessary to complete the demonstration project on schedule and consistent with the recommendations of this workshop.*

Note: This refers to point 22 of the GNWT strategy. Moved by Maureen Pokiak (Tuk); seconded Terry Halifax (Inuvik); unanimous

4. *The Northern Leadership Group of the Remote Wind Energy Conference endorse the selection of Tuktoyaktuk for the wind turbine demonstration project.*

Note: This Motion was added at the meeting. Moved by Manny Kudlak (Sachs); second Bob Eldridge (Sachs); unanimous

3. Community Leaders' and Delegates' Questionnaire Responses

What problems might exist with having wind energy in your community?

Aklavik
- Not enough wind
- No real high spots close to community
- Good wind at community's summer camp (Shingle Point)

Cape Dorset (Nunavut)
- There should not be any problems as the wind measurements have been over the required minimums based on the historic data

Inuvik
- Low and intermittent wind
- Apathy
- Pessimism

Gameti
- No problems are anticipated at this point.

Norman Wells
- No funding identified
- Might not have favourable winds

Paulatuk
- Remoteness of location
- Depending on the technology and equipment – icing, breakdown, availability of parts
- Limited human resources, training and lack of funding
- Capacity of community to have enough funding

Sachs Harbour
- No community trades people such as electricians
- Isolated location – fly-in or once a year barge are the only routes

Tuktoyaktuk
- Tying into the existing grid
- Training programs applicable to wind energy
- Educating and convincing the entire community about the confeversion

Ulukhaktok
- Finding the right spot to set up the structure
- Maintenance crew
- The supplies to replace parts, considering the barge comes once a year

What benefits would wind energy provide to your community?

Aklavik
- Hopefully less noise
- Cleaner air
- Lower power costs to residents

Cape Dorset (Nunavut)
- Bring down need for burning diesel fuel.

Inuvik
- Fix the cost for energy
- Future source of energy
- Is a sustainable form of energy

Gameti
- Clean energy
- Reduced reliance on fossil fuel
- Health benefits – less contaminates in air
- Potential jobs
- Knowledge
- Possible education benefit in children's interest

Norman Wells
- Provide an angle to explore all opportunities open to us

Paulatuk
- Less dependence on diesel burning generators
- Experience with using renewable resources
- Cheaper power source over the long term
- Lessen the need to have diesel fuel

Sachs Harbour
- Less green house gases
- A sense of pride to have a green community
- Cheaper power bills

Tuktoyaktuk
- Local capacity building
- Employment
- Training

Ulukhaktok
- Provide power and heating for many houses and buildings in the community

Does your community have an energy plan? If so, does wind fit into it?

Aklavik
- We will be doing an energy plan over the next year.

Cape Dorset (Nunavut)
- No, we are going to be looking at establishing an energy plan.

Inuvik
- Not yet. The communities energy plan is in progress.

Gameti
- Not at this time. It is anticipated that wind in some capacity will fit into the eventual Community Energy Plan.

Norman Wells
- Yes, we have an energy plan and, yes, wind fits into it.

Paulatuk
- We have an energy planning committee and a vision statement for the energy plan. Yes, wind is a definite in our plans. Presently we have workshops to deal with wind energy.

Sachs Harbour
- Our Community Energy Plan is in the works. For now, wind does not fit into our plans, but done the road it will be a good fit for our community.

Tuktoyaktuk
- Not yet, however, the Hamlet has identified counsellors and TCC will be naming their board members to sit on the energy plan committee.

Ulukhaktok
- Just recently wind was brought up as an idea for having an alternate source of energy.

Do communities have the human resource capacity to operate and maintain wind energy projects?

Aklavik
- I feel we have people in our communities who can be trained.

Cape Dorset (Nunavut)
- There needs to be education and community awareness and interested people to champion the cause.

Inuvik
- Yes.

Gameti
- Our community does not have all the skills, however, they can be learded.

Norman Wells
- Yes, electricians, engineers and volunteers.

Paulatuk
- With proper training and work experience, we have the human resources available, if the community gets together and makes it work.

Sachs Harbour
- No, they would have to fly in and now it would be possible. There will be opportunities in the future to train people to maintain wind energy projects.

Tuktoyaktuk
- Probably not yet, but I assume that training programs can be developed with local input and delivered by accredited institutions.

Ulukhaktok
- We will need properly trained operators and maintainers.

Other than training, is your community ready for wind?

Aklavik
- I think that if this can work in our community a presentation on the pros and cons could help the community look at the options.

Cape Dorset (Nunavut)
- Yes, the winds are favourable.

Inuvik
- No.

Gameti
- On a small scale so the youth and elders can see a small wind unity operate in various weather and seasons.

Norman Wells
- Yes.

Paulatuk
- Yes, with more consultation and assurances such as: Will we be able to access the required funding; will the equipment work?

Sachs Harbour
- When there is sufficient background and studies done the community will be ready.

Tuktoyaktuk
- Yes, there is a feeling that this new technology will benefit everyone.

Ulukhaktok
- At the moment the community would need to order the equipment for project set up.

Should plans be based on equipment with a proven Northern track record or suppliers who promised a discount or low price to prove or demonstrate their equipment in the North?

Aklavik
- Yes, anything to cut costs.

Cape Dorset (Nunavut)
- Yes, proven Northern track record.

Inuvik
- Proven Northern track record.

Gameti
- Wind energy is in its infancy. As such, new companies with new technologies may be best suited. Basically, at this point, do not rule out anyone. Trial and error, communications are forums to say what works and what does not.

Norman Wells
- You get what you pay for.

Paulatuk
- Proven Northern track record.
- Community should have equipment with proven Northern track record.

Sachs Harbour
- Sachs Harbour has been through this and we would have to go with a proven Northern track record.

Tuktoyaktuk
- A viable formula might be: experience plus technical expertise equals acceptable output.

Ulukhaktok
- Yes, it would be costly to set up, operate and maintain a system in working order.

Wind turbines must be built on the windiest, safe spot closest to the community. Is there any reason your community would abject to this?

Aklavik
- Location would be very important. If it can be done I do not see the community opposing.

Cape Dorset (Nunavut)
- No. Proper community input throughout planning stages and implementation and continuing monitoring.

Inuvik
- Possibly.

Gameti
- More education and consultation are required before this can be answered.

Norman Wells
- No.

Paulatuk
- There will be concerns in regards to wildlife, especially birds and maybe caribou calving grounds. Migrating birds may be one of the community's concerns.

Sachs Harbour
- The only objection is that the airport is too close to town, so the wind farm would have to be a little ways out of town.

Tuktoyaktuk
- I don't see why they would. I would suppose the turbines will become landmarks that can be used for navigation and, of course, there will be a sense of pride in seeing what a community can accomplish when it puts its mind to it.

Ulukhaktok
- This will be a community decision as to where it can be set up.

Does it make sense to choose a standard set of equipment for the region or for each community to design its own project?

Aklavik
- Each community needs to design its own and this could have similarities with other communities.

Cape Dorset (Nunavut)
- It would be good if equipment was standard equipment to keep costs down, especially in the Eastern Arctic.

Inuvik
- Standardize, with the ability to customize to each community.

Gameti
- Do not close the door. Technology is evolving. Communications throughout the North is essential – we can all learn from each other.

Norman Wells
- Same equipment, different concepts.

Paulatuk
- We should first consider both, but I believe, for a number of reasons, such as location, icing, wind speeds, etc., that we may have to adopt our own.
- Choose as standard of equipment for the region.

Sachs Harbour
- It would make sense to standardize everything. We will know better down the road.

Tuktoyaktuk
- I would imagine, with the hub and spoke model, there would be collaboration among all the communities on design so that parts and maintenance would be standardized, or else we would end up with differing models and differing spare parts and differing expertise to maintain them.
- It just makes sense to standardize.

Ulukhaktok
- Throughout the conference it sounds like we should start out with a medium scale electric wind turbine.

The GNWT has announced the intention to select a community in 2008, and have a demonstration wind energy facility operating by 2009. What can communities do to help the GNWT, Power Corp. and Public Utilities Board stay on schedule?

Aklavik
- Be supportive in identifying locations and getting information to community residents.

Cape Dorset (Nunavut)
- I would hope that Nunavut would get a similar opportunity. The community of Cape Dorset would be interested in getting involved.

Inuvik
- Provide full support from community council, re: zoning, development plan approval.

Gameti
- GNWT, etc. should keep every community appraised of developments and the communities can provide feedback/advice as well as encouragement.

Norman Wells
- The monitoring schedule is very late/rushed for Norman Wells, however, we are ready to participate in June.

Paulatuk
- Work together to stay on top and support each other, stronger voice as a region.
- Stay on top of file – provide updates.

Sachs Harbour
- Communities need to support initiatives like these by writing letters, motions from the Hamlet and Community Corporations.
- All organizations and communities need to be educated.

Tuktoyaktuk
- Keep the pressure on political leaders and begin the ground work at the community level, i.e. Community Energy Planning, etc.

Ulukhaktok
- Order the equipment early. Find trained operators and maintainer ahead of time. Find a proper area. Identify all the complications and be ready to solve them.

Question A – If feasible, does your community want to use wind energy?

Evelyn, Aklavik
- If feasible, it will provide benefits to communities. If it is feasible, communities want to look at it.

Georgina, Tuk
- Price of oil will continue to rise and must examine alternative energy sources
- Use the people operating the water plants and get them training for the wind energy systems – new monies from MACA for the water plants exists anyway.
- Do it big and do it right, do clean energy. Go big.
- All Beaufort communities get wind, it is environmentally clean, which is very important to the region and people.
- Tuk plans to train people with gas tax money.

Ray, Paulatuk
- Not a lot of clean energy in the North.
- Evaluate options.
- Not too many options, solar maybe, mostly wind.

Terry, Inuvik
- Price of diesel will continue to rise, therefore, price of wind will continue to be more attractive and more reasonable.
- Not attractive for Inuvik now, but thinking long-term, something for the future.
- Won't work if just Tuk.
- It is a big problem and we will all have to deal with it together – economies of scale, to do it together. Tuk cannot go out on its own, bringing people up to work on five or six projects will accrue financial savings and work the learning curve
- Measure in Inuvik not currently in the best place. Must move the anemometer. Need to rethink location.
- Inuvik must look at it better.
- It will eventually become feasible,

Nellie
- Want to look at wind.
- If it is feasible, do what we have to do?
- GNWT mandates to make people sustainable.
- When people own their own homes and try to pay all bills the prices are horrendous.
- We support the government philosophy to bring prices down and help people support themselves.
- Government wants out of social housing, 85% of people in social housing is a problem. 85% of people currently in social housing and never see their bills, if wind can help people support themselves then do it.
- Wind is in Tuk. Positive.

Lucy, Tuk
- Stop trying and just go for it. Go for it. It is windy in Tuk.

Bob, Sachs Harbour
- Lack of communication in past projects, therefore, support has declined in the communities
- No consultation with earlier Sachs installation.

Question B – If generating wind energy is feasible and profitable, does your community want the option to participate in the ownership and governance of the facility?

Fred, Paulatuk
- Community Corps want Development Corps and Hamlets to be involved in ownership.
- Develop the Community Corps and Development Corps to help on own.

Bob, Sachs
- All Dev. Corps and Hamlets can come together for ownership.
- All of the Dev. Corps should get together.
- All Dev. Corps could help.

Ray, Paulatuk
- Dev. Corps and Community Corps.

Nellie
- May need to join with other communities, but want ownership.
- Good idea to talk about community ownership. Then, if it is feasible, then community group ownership may indicate multi-community ownership, but some form of community ownership is important.
- Community may put together a group to look at it. This is important.

Georgina, Tuk
- All the same peoples in Tuk (Inuvialuit), makes sense for Hamlet, TCC and TDC to work together at one time.
- Could hamlet be an equity owner? Work together as a team.

Jim, Tuk
- Not sure Hamlets could be owner, but could provide support and service.

Terry, Inuvik
- Really have to start looking at going on our own for power.
- Have to look at doing it together. Inuvik is not happy with NTPC costs.
- Northlands could come in, what is the future of the NTPC?
- Costs of services and people in the south going to continue to rise.
- Inuvik is the largest customer of the Power Corp. now. If Inuvik goes on its own, what is going to happen? Costs will skyrocket and NTPC will fall apart. Northlands cherry picks.
- Inuvik could do their own billing. They already do their own water, etc.
- People in Inuvik sick of paying high salaries to Hay River and not getting services.
- Community currently provides and bills its own water and sewer, could do the same with power.
- Blended rate throughout NWT could cushion costs. Blended rate may be the only way to survive across territory to cushion the cost of wind energy. South gets cheap hydro.
- Move to one rate system or Inuvik will not stick around.
- Ownership is key; pride for the community and keep it moving, want to see it through.

David C.
- Is there desire for the four communities to work together?

Evelyn, Aklavik
- Doing feasibility studies, it only makes sense to do it together, no use for each community to spend money to do the same thing: one call for service and get one study.
- Four communities need to talk, maybe one RFP for study once instead of four times.

Nellie
- Each community? Or together?
- Power Corp. did something similar, assessment for billing.
- Must do each community individually. If not feasible, then look at joint ownership.

Georgina, Tuk
- Can this piggyback with Community Energy Plan?
- Communities have to do energy plans.

Nellie
- Must get government support to move forward.
- Will come from lots of places, GNWT, feds, etc., but must have energy plan in place first.
- Funders will ask for Community Energy Plan.

Barney, Tuk
- Community Energy Plan must be done on more than paper.
- Communities must develop plans, etc. or it won't go.
- There was a workshop in Inuvik last summer to help communities prepare Community Energy Plans.
- Wind is only one option, must piggyback with, say, home design. Community designed with a comprehensive approach for 10 to 20 years down the road.
- Operations and maintenance costs are increasing. If wind is part of comprehensive plan, if it is consistent with other communities, then we are on to something.
- Wind is not a stand alone solution, must be in conjunction with other initiatives.
- Wind is not the only answer. Each community needs unique plan.
- AEA have excellent staff to help with that.

Yvonne, MACA
- AEA developed regional plan, phenomenal interest in developing regional plan, strong regional voice, way to do it is to work together and with industry.
- AEA already help the communities do a regions vision. It is a strong message from regional leadership after full day meeting. The communities have that from last spring.
- Working together makes sense.

Nellie
- ConocoPhillips willing to help

Bob, Sachs
- Sachs has local energy committee established.
- Need to get the Community Energy Plans going.

Paulatuk
- Paulatuk already has local energy committee established and hiring coordinator.

Evelyn, Aklavik and Lucy, Tuk
- Still working to get started.

Bob, Sachs
- Sachs has hired co-coordinator for their local committee.

Evelyn, Aklavik
- Alaska was successful because community saw potential and was involved.
- Different governing groups can sometimes hinder moving ahead.
- Kitzebue had a supportive community.
- Looking for locations around Aklavik, may have to look at something that benefits only some of the people, but things like this always benefit the community and the people.
- Maybe it won't work in town, but set up at Shingle Point, which now uses diesel generators – 25 to 60 houses where people spend three months out of the year.

David C.
- Sense is that communities want ownership and to be part of the governing structure.

Question C – Should the generation and sale of wind power in remote communities be governed and owned by: (i) the Power Corp.; (ii) GNWT; (iii) community(ies) and or regional development corporations; (iv) regional development corporation; (v) private beneficiary owned company; (vi) non-beneficiary owned company; (vii) a partnership, including the community(ies) and/or regional development corporation? – Do you see community ownership being shared with other partners such as Power Corp.?

Nellie
- Wouldn't ownership be by the communities, THEN decide who to get in bed with, if they need too.
- One entity because of economies of scale.
- Most interest and dedication is by community, then look at cost to figure out if they need partner. They will have to make deal with Power Corp. who will buy the power.
- Develop as community owned and see if factors dictate a partnership.
- Better for community to know issues and then figure out when and where information is lacking and look to see if partnership is necessary; look at how project will be moved along.
- There is still a political question about NTPC buying power.

Georgina, Tuk
- It is still two early to answer this question.

Nellie
- Need to identify issues, then figure out model.
- The people are becoming more sophisticated and capable than when first power plants went in.

Jim, Tuk
- This is a pilot project first. It is too early to know partners
- Looking at pilot project it may not have a business case at first, non-economic factors must be considered.
- There are various models, none are economically feasible without ReCWIP or large amounts of grant capital.
- Do Dev. Corps want to put in large amounts of capital or is it better to lobby governments?
- Alaska received 80% of initial capital costs from somewhere else.
- As technology develops and economies of scale develop payoff may come, but do Development Corps want to put in large amounts of equity in the beginning?
- Is that something we (the community) wants to own?
- How much equity does do TDC, etc. want to put in at first? How much do investors want to put up as risk money?

Ray, Paulatuk
- Has mixed feelings.
- Agree with Jim, but also with Nellie.
- We don't want a pilot project, tests, etc. It is feasible in other areas, at this point we should go ahead and do it.
- We should go big.

Georgina, Tuk
- Go big or go home.

Nellie
- Need to work this through Community Energy Plan to assess community desire for this (ownership), then get back together to do this.
- Too early to know about ownership model.
- How does it work alone, how does it work in partnerships?
- It has to come from the community first, then look to possibly regional plan.

Ray, Paulatuk
- We should look back at regional vision.

Terry, Inuvik
- Still need to a place? that makes sense, business plan and federal subsidy question. Need to know this to look at ownership.

Georgina, Tuk
- Through the CEPs, we need to talk to each other.

Yvonnne, MACA Inuvik
- Will coordinate CEPs.
- Piggy back on upcoming regional meeting.

David C., Facilitator
- The demonstration project is the operating turbine in the NWT by 2009 – the hub and spoke business plan in 2008, along side the demonstration project, could answer a lot of the unknowns.
- Seems to be a consensus that it is too early to determine partners.

Discussion turned to a more general discussion on next steps and how to move forward.

Georgina, Tuk
- We should go to Alaska and investigate.

Nellie
- Come from those who are most affected but need plan – some stuff works for the community, some stuff needs to go together in multiple communities, some stuff may need outside partners.

Yvonne, MACA
- MACA can provide some monies to get all energy folks together.

Jim, Tuk
- Hamlet does Community Energy Plan, work with Community Corps.
- Make sure Hamlets and Dev. Corps are represented or communities or Hamlets responsible for energy plans, but the Dev. Corps in potential ownership.

Evelyn, Aklavik
- Maybe partner with Alaska.
- If wind energy is not a priority within the Community Energy Plan, Aklavik won't go forward.
- Needs are different in every community and wind may not be priority for all communities

Georgina, Tuk
- There are lots of things in common between communities, but not everything
- The communities have developed a vision at the regional level.

Ray, Paulatuk
- If there is a regional vision and local visions, they should point in the same direction.
- We do have regional vision it is similar to local vision.

Yvonne , MACA
- This is the regional Community Energy Plan vision and target that was developed by the regional meeting of Community Energy Plan representatives in Inuvik this spring. It is consistent with wind energy; These were read into the record:

  Regional Community Energy Plan Vision
  "Our traditional values provided everyone's need using Renewable Resources. Our Community Energy Plans will enable these traditional values by adopting modern technologies that reduce pollution from energy and also reduce energy costs."

  Regional Community Energy Plan Target
  "To reduce energy bills and green house gas emissions by 25% by 2010 over 2004 levels."

Facilitator prompted discussion asking: How do we start? How do we plan for the four wind communities?

Terry, Inuvik
- Look at formulas, cost/KW and go to government, this is subsidy we need to make it economically viable.
- At the end of the day, the price has to be attractive to Power Corp.
- Cannot ask people to make a business decision with a lot of unknowns.

Nellie
- Community Energy Plan reveals true cost of power.
- Territorial government give subsidy plus government rate which is higher. (There was a lengthy discussion of government rate structure, hidden subsidies, etc.)
- Communities need knowledge.
- Each community has funding for an energy plan coordinator.

Mr. Archie
- Start with Community Energy Plan.

Jim, Tuk
- Tuk has a part-time energy person.
- Each Community Energy Plan will not go into detail for each technology.
- Some communities have hired coordinators, but not a requirement.
- Very few Community Energy Plans are very detailed.

David, Facilitator
- Leslie Whitby has suggested $75K to $150K would be available to bring in three to four experts to help build the case for the hub and spokes.

Wayne, Inuvik and IDC
- This is getting more complicated than needed.
- Each community has different priorities.
- Look at these and decide next step.
- Once a turbine is up then fuel costs can be cut.

Jim, Tuk
- Community Energy Plans not due until 2010.
- If tied to Community Energy Plans we will we have lost all momentum.
- Can IRC represent us collectively to do so some lobbying, find grants, loans and government programs to push this forward?

Nellie
- Can work together for sure, we will do anything necessary in a supportive role, not a take-over role, to help move communities forward.
- Push to get energy plans along now and keep momentum.
- We need to dedicate ourselves to get energy plans done.

Georgina, Tuk
- Go to motions for consideration and make it as broad a statement as possible too.
- Get motions from our community councils.
- Get GNWT to get something into the Leg to develop policy as we in communities workings as quickly as possible to complete the Community Energy Plans.

Consideration of Motions

The meeting brought forward the draft motions. See Community Leaders' and Delegates' Motions Section 2.

There was no substantive discussion around Motion One, which passed unanimously.

Motion Two

Jim, GNWT
- Too broad – gets into a number of different issues not related to wind in the Beaufort.

Georgina, Tuk
- Leave it broad to include everything.

Nellie
- Leave it too broad and everyone may try to get involved from other regions with their issues.

Yvonne, MACA
- Highlight wind and suggest meeting to discuss priorities as outlined in Community Energy Plans, but communities must finish plane, don't want hydro, for example, from Yellowknife or southern communities.

Nellie
- Focus on more specific for #2, as #3 covers broad stuff.
- Add words relative to wind energy.

There was no substantive discussion around Motion Three which passed unanimously.

Concluding Discussions

David, Facilitator
- This confirms the hub and spoke model. Do we go to INAC to get funding for the business plans?

Nellie
- Where funds might be, not just INAC. Figure out how much money communities may need for various activities (technical, feasibility, marketing, etc.)

Jim, Tuk
- Target to INAC for wording of funding application.

Dean, AEA
- Offered to post (record of community meeting) on AEA web site.

Nellie
- As conference chair, will follow through and give support for the necessary work.
- Will write follow up letters and act on motions.
- The Community Energy Plans open the door for full financial support.

Appendix A

Attendees at Workshop:
Jim Stevens – Tuk
Melba Ruben – youth, Paulatuk
Terry Hastie – Gameti
Dean Green – AEA
Ray Ruben – Paulatuk (Mayor)
Bob Eldridge – Sachs (Mayor)
David Connelly
Evelyn Storr – Aklavik (Elder)
There were two young men, whose names I didn't get...
Fred Bennett – Paulatuk (Dev. Corp.)
Yvonne Carpenter – GNWT
Jen Hinze – IRC
Wayne Gordon – IRC
Nellie Courneyea – IRC
Manny XXX – Sachs
Another young man, whose name I didn't get...
Terry Halifax – Inuvik (Council)
A woman from Tuk Council, whose name I didn't get...
Maureen (Pokiak?) – Tuk (Council)
Georgina Masuzumi – Tuk (Council)
Jim Sparling – ENR
Paul XXX – Cape Dorset
Barney Masuzumi – Tuk
Patrick Ahkiak – Ulukhatktok

Appendix D: Framework for the Advancement of a Wind Development Project in Tuktoyaktuk, NWT

Prepared December 11, 2007

Summary

This framework has been prepared to assist decision makers and planners with suggestions in preparing their work plans to advance a potential wind project in Tuktoyaktuk. Six work areas are identified, each with a list of tasks that we suggest would help lead to a successful project.

Introduction

The informal NWT wind committee and a group of interested and qualified individuals met following the conference and developed a framework of suggested activities that can be used to help decision makers and planners to develop their own plan for a wind project in Tuktoyaktuk.

The committee assumes that it is the intent of a successful project to grow into the hub of a "hub and spoke" model wind development for the Western Arctic, similar to the Kotzebue, Alaska, area wind-diesel development.

The committee believes that the proposed ReCWIP program will be key to advancing NWT wind-diesel development. Without this program, and other financial support, a Tuktoyaktuk wind-diesel project is unlikely to be financially viable. Therefore, without this program it will be very difficult to move forward on any wind-diesel development in the North.

This project will require a champion or champions that will be present through the first five to ten years of a project. The wind committee is prepared to support this person or persons by providing the necessary expertise and tools to help make this project successful and to help develop it into a long-term wind program for the NWT.

The wind committee support people include staff from GNWT (ENR, ITI), INAC, NRCan, Pembina Institute, and private sector experts such as JP Pinard.

Our primary goal would be to help the owners of any new wind-diesel installation in the Western Arctic be successful. We suggest that project planners proceed with careful steps and not set any firm goals until they have done the necessary feasibility work and are in a position to commit to a project.

Potential funding partners for a project in Tuktoyaktuk in addition to IRC or IDC, would include:

- Private sector businesses (ConocoPhillips, Shell, SNC Lavalin, …)
- Governments
- Institutions (WEICan, ARI, AEA, …)
- NGOs (Sierra Club, …)
- Others (Federation of Canadian Municipalities – FCM, …)

Framework

The framework is divided into six main work areas, each of which may be advancing in parallel with the others. There may be items that those who prepared this framework have not thought of, so the users of this guide could consider this to be a starting point for their plans.

If the decision makers wish to proceed, the next steps could be: 1) carrying out a detailed scoping of the work to be done (including the suggestions below) and how to accomplish the tasks (decision makers may wish to solicit funds for this scoping and the next work phase); 2) carry out the identified tasks and studies; and, if all continues to look positive, 3) carry out any required studies that remain (feasibility, environmental, etc.) and commence negotiations for partnerships, agreements, funding, etc.

A. Communications/Social

- Hold community meetings to discuss the project and to obtain input.
- Identify the importance of wind energy relative to other priorities and energy issues for the people in each community.
- Build on the community energy planning efforts of Aleta Fowler and Dean Green.
- Familiarize community leaders with hub and spoke wind projects (possibly have them visit Kotzebue and one of the small communities).
- Identify the project goals (social, environmental, financial).
- Identify potential project interactions with other community functions.

B. Governance

- Determine business structure of the initial project.
- Determine business structure of the overarching organization when the Tuktoyaktuk project is successful and begins to fulfill the hub functions.
- Identify the potential partners in the Tuktoyaktuk wind project and in the spoke projects (including potential equity partners such as listed above). Identify the type of partnership that the community wants and the partnerships it can live with.

C. Environmental and Permitting

- Identify environmental permits and permitting process.
- Identify any required studies (for example, follow the guide for environmental assessment for wind turbines and birds from Environment Canada, Canadian Wildlife Services).
- Identify any Transport Canada and Nav Canada permitting requirements.
- Identify any Land Use Permits required.

D. Business

- Identify the risks in the Tuktoyaktuk wind project.
- Identify business partners (NTPC or NWT Energy Corp., GNWT, WEICan, IDC?) to share those risks.
- Identify supplier partners (e.g. wind turbine manufacturers).
- Identify procedure to tender the various project components.
- Discuss a conceptual power purchase agreement (PPA) with NTPC to determine if a PPA is possible and what the terms are likely to be.
- Identify strategies to pressure the federal government to implement proposed ReCWIP.
- Identify the project human resources training and capacity building requirements (construction and O&M).
- Determine where training and capacity building will take place.
- On completion of technical work and cost estimating, determine an optimum project size.
- Identify the risks and opportunities in a potential "hub and spoke" business approach in which Tuktoyaktuk is the hub.
- Identify the potential "spokes" and other clients that could be served by a "hub and spokes" centred business enterprise.

E. Financial

- Retain third party experts to review and update, if necessary, the Aurora Research Institute study pre-feasibility costs.
- Identify the probable project revenues (PPA, ReCWIP, carbon or green attribute sales, etc.).
- Identify the rate of return and evaluate against risks and social/community (long-term) benefits.
- Identify the funding partners/sources for planning and feasibility work.
- On completion of the technical work outlined in section F below, determine the capital and O&M costs for a practical project.
- Identify funding sources for capital cost components of project (e.g. training, R,D&D aspects).

F. Technical

1. Identify potential project sites (including land tenure review):
   - Review available geotechnical information.
   - Conduct geotechnical investigation on preferred site or sites if required.

2. Identify and evaluate wind turbine options:
   - Turbine manufacturers (Entegrity, Distributed Energy, AOC, WES, etc.).
   - Hold preliminary discussions with short listed manufacturers.
   - Identify turbine modifications required (e.g. rotor diameter, tower height, cold weather modifications, icing modifications).
   - Prepare foundation preliminary design.
   - Identify equipment requirements for installation and ongoing O&M.

3. Wind-diesel integration:
   - Discuss technical interconnection requirements with NTPC (including site specific issues).
   - Discuss power quality and reliability requirements with NTPC.
   - Perform preliminary assessment of wind-diesel equipment requirements.
   - Obtain detailed load information from NTPC.
   - Obtain detailed wind data from studies.
   - Retain a consultant to model wind penetration into the Tuktoyaktuk load.
   - Determine optimum number of wind turbines for an initial project (but not high penetration to limit risk).

4. Other:
   - Evaluate transport and logistics options for wind plant and construction equipment.
   - Confirm winter road and/or barge capacities for equipment requirements.
   - R&D: testing of extended blades and taller towers for low wind communities as well as blade anti-icing or de-icing measures for locations subject to icing.
   - Identify the potential roles for organizations like WEICan and ARI.
   - If the potential for future hub and spoke projects is a consideration, some thought could be given to purchasing the necessary construction/installation equipment (if not already available) for later use in spoke communities or other contracting opportunities.