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BACKGROUND PAPER

NORTHERN DIALOGUE ON RENEWABLE ENERGY:

IMPLEMENTATION, CHALLENGES AND OPPORTUNITIES

A. Purpose and Objective of the Dialogue

The purpose of the Northern Dialogue on Renewable Energy is to bring together the most knowledgeable group of Canadians, to discuss this subject. One answer to adaptation in the North is for the North to reduce the use of fossil fuels as its main source of energy. This reduction in use would be based on an increasing supply of renewable energy.

It is our hope that this Dialogue will result in specific recommendations going forward to Premiers which suggest a pathway for implementation of a full suite of renewable energy sources.

This background paper will attempt to summarize the positions of each Territory relating to sources of renewable energy and the challenges and opportunities faced by Territories as they attempt to implement a renewable agenda

A second paper to be released before the Dialogue takes place will inventory the Territories current renewable energy resources.

B. Climate Change – Need to Address Adaptation

At the CSEE Workshop in October 2009 the effects of Climate Change were addressed along with the need for adaptation.

The NWT is working to reduce diesel and move to biofuels, mini hydro projects, along with wind. Nunavut has assumed a worst case scenario given climate change models as it is 100 percent dependant on burning of fossil fuel. Also in Nunavut there is no grid connecting communities. Yukon has the problem of aging and vulnerable infrastructure – making the effects of climate change dangerous.

Adaptation will have to take many forms – with infrastructure changes – permafrost is affected as are roads, sewage and water treatment plants as well as distribution systems.

One of the conclusions of the Workshop was that Northern Canada is a guinea pig to the world. The upside is we have the first opportunity or first mover advantages to develop processes and

technology. The North may learn lessons to teach the rest of the world and can capitalize on technology to combat climate change through adaptation.

As well as developing capacity for energy produced by water, wind, sun, wood, geothermal and tidal, energy conservation and efficiency must also be addressed. The best molecule of carbon is the one not used.

But any approach to a comprehensive Adaptation strategy must have concerted, coordinated action across all territories. There must be an integrated approach and strong partnerships among the interests of residents, First Nations and Inuit, businesses, industry and all levels of government.

C. Suite of Renewable Energy Resources Across the Territories: Opportunities and Issues

1. Hydroelectricity

- Yukon and Northwest Territories have legacy projects from mining developments
- All three Territories are pursuing new hydro projects over the next three years

Issues:

- High cost of transmission lines
- Small localized grids
- Lack of competent technicians
- Hydro power source far from communities
- Issue of hydro generated electricity being more expensive than diesel generated electricity

2. Solar Electricity

- Works for off grid applications
- Needs to be tied to battery banks – reduces consumption of diesel fuels
- Integration of solar into community grids is being considered across the north

Issues:

- Seasonal availability of the sun
- Expensive to install

3. Solar Hot Water Heating

- Effective to reduce heating costs from diesel
- Potential for household use is great

Issues:

- Mostly available in Spring and Summer
- Subsidized

4. Wind

- Alaska experience is positive – reduced amount of diesel fuel use in remote communities
- Control systems have improved
- Wind resources exist in the north
- Three projects to be highlighted
 - Tuktoyaktuk – Hub and Spoke
 - Nunavut – Cape Dorset
 - Yukon – Haeckel Hill near Whitehorse

Issues:

- High installation costs, transportation
- Location of turbines close to communities
- Training of local maintenance staff is an issue
- Needs precise citing to be effective

5. Biomass – Wood Pellets

- Use or potential use of this energy source is uneven across the Territories, mainly as a result of the lack of availability of trees
- Conventional woodstoves produce 65,000 MWh in Yukon – Nunavut has virtually no trees and little wood
- Northwest Territories Biomass Energy Strategy
 - Builds on greater use of wood pellets – provide transportation, local harvesting
 - Produces clean and efficient heat
 - Use large boilers for district heating systems
 - Pilot projects will begin to use biomass to generate electricity
- Yukon
 - Developing bioenergy (wood) strategy to reduce fossil fuel dependency
 - Use for direct heating in larger buildings in urban areas replacing oil and propane – mainly wood as alternative
 - Would be beneficial for smaller buildings as well as those which are far from a district energy grid

Issues:

- Does not really help with Nunavut energy issues
- Lack of transportation system for wood pellets as they are currently brought from Alberta and BC
- Cost of transport – supply interruption

- Need to carefully manage forestry harvest
6. Geothermal
- This source is mainly in the exploration stage
 - NWT
 - Yellowknife – potential from mine tunnels and shafts – could produce 20 MW of heat capacity
 - Fort Simpson to Hay River – study shows potential
 - Fort Liard – another project with potential for 2 MW of electricity is in early development
 - Yukon
 - Geothermal for heat pump systems
 - Has great potential – used now in Whitehorse to keep sewer and water pipes from freezing
 - Potential is great – 500-1500 MW of geothermal energy for electricity production; 12 sites for heat production

Issues:

- High cost of electricity to operate heat pumps
- Cool ground temperatures

7. Residual Heat Recovery – From Diesel Generation

- Source of heat converted to electricity or used to heat buildings at less cost than oil
- Nunavut Power Corporation and NWT Power Corporation use heat captured from diesel generators to heat their own facilities and residual heat can be piped into nearby buildings
- Residual heat systems could be designed to accept heat from conventional oil boilers and renewable energy sources
- District heating systems could use heat from biomass or geothermal to heat buildings

Issues:

- Large capital cost for installing necessary infrastructure
- Desire to get off diesel generation

D. Overarching Challenges and Opportunities Presented Through Renewable Energy Agenda

1. Opportunities to Reduce GHG's through Renewables

- All Territories are committed to tackling adaptation through implementing a renewable agenda

- All Territories recognize that they must contribute to adaptation through meaningful GHG reductions
- Yukon – Energy Strategy goal is to expand supply of renewable energy by 20 percent by 2020 – has financial program to assist in this goal
- Northwest Territories – in its Energy for the Future document encourages growth of renewables targeting GHG reductions
- Nunavut – Ikummatiit, The Government of Nunavut’s Energy Strategy sets out a framework for reducing dependence on fossil fuels – which will include a plan for introducing renewable energy sources

2. Challenges and Questions

- Financial
 - The shift to renewables is expensive.
 - To date the Territorial governments have provided financial incentive to move to renewables, but this is a drain on limited resources.
 - What policy proposals can incent the financial investments needed to implement a renewable energy agenda?
 - Role of Federal Government?
- Grid Connections
 - Vast distances make it difficult to connect power sources – often power sources are far from communities
 - How to incent development of grid transmission lines or district heating systems?
- Infrastructure
 - As climate change persists, it will affect the permafrost – making it more difficult to transport over vast distances
- Pilot Projects
 - How to incent the initiation of pilot projects so that the introduction of renewable energy can begin?
- Role of Government – Role of Private Sector
 - A renewable energy agenda will only be implemented with a strong partnership between all governments and the private sector
 - What is the role of the federal government?
 - What is the role of the territorial and municipal governments?
 - What is the role of private sector?
 - What is the role of Aboriginal communities?
- Training, Education and Capacity Building
 - This was one of the major themes that emerged in CSEE’s October 2009 “Workshop” – the need for capacity building and Skills Training in the North
 - Obtaining and keeping qualified teachers

- Canada is the only Arctic country without an Arctic or Northern University – graduates who are educated in the North, stay in the North
- First Nations education is needed to contribute to work force
- Need a local resident workforce to develop and maintain renewable energy agenda
- There are capacity issues in government – support is needed for all industries and services
- There is a labour supply gap and an education supply gap, there is no shortage of jobs but of skilled resident Northerners to fill the jobs
- Regulatory Reform
 - The major study on regulation in the North is Neil McCranks “Road to Improvement: The Review of the Regulatory Systems across the North” suggests local input into regulatory development at an early stage
 - Regulations must be addressed to ensure they accommodate and promote renewable energy production
 - Northerners on regulatory boards – setting the mandates and policies