Yukon Energy Strategy Background Research

Part 1: Jurisdictional Energy Strategy Analysis

Submitted to:
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Table of Contents

Background

Energy is a vital part of the day-to-day lives of all Yukon citizens. We use energy in the whole range of our daily activities, from home heating to transportation, from cooking to leisure pursuits. The energy sector provides employment to hundreds of Yukoners. The production, transportation and consumption of energy has major implications for our environment.

The Yukon energy sector is complex. Many forms of energy consumed in the territory have their prices determined in highly competitive world markets. Those same world markets also determine the pace of development of the Yukon's energy resources. The continuing and adequate supply of energy in its various forms affects Yukoners of all ages, of all occupations, in all communities.

While all jurisdictions have various energy-related issues in common, many energy issues are specific to each jurisdiction. For example, endowments of energy resources such as oil, gas and hydro-electric potential vary widely between Canada's provinces and territories. In addition, vast distances between energy sources and consumption locations can result in significant differences in energy costs among jurisdictions. Geographic location is also a factor in the distribution of the impacts of climate change.

The importance, complexity and location-specific nature of energy suggests the need for a comprehensive made-in-Yukon energy strategy. Accordingly, the purpose of this project is to prepare background research that will facilitate the development of a comprehensive Yukon energy strategy. The research has been undertaken in three parts:

> Part 1 consists of a high-level analysis of energy strategies and the associated development processes from British Columbia, the Northwest Territories, Saskatchewan, PEI and Quebec.
>
> Part 2 presents a summary analysis of existing federal and Yukon energy programs and initiatives.
>
> Part 3 presents an overview analysis of the Yukon energy sector through identification of key trends and issues related to energy production, management and use in the Yukon, and makes recommendations about the potential scope and process that might work in the Yukon for developing a long-term energy strategy.

This paper presents the findings of the Part 1 project work.

Jurisdictional Analysis

Energy strategies from five Canadian jurisdictions were examined: British Columbia, the Northwest Territories, Prince Edward Island, Quebec and Saskatchewan. High-level analyses of the energy strategies and their associated development processes are summarized below.

BRITISH COLUMBIA

The BC Energy Plan: A Vision for Clean Energy Leadership

February 2007

LEAD DEPARTMENT: Energy, Mines and Petroleum Resources

ENERGY SECTORS

- Hydro
- Oil and gas
- Hydrogen
- Biomass
- Solar
- Wind

STRATEGY DEVELOPMENT PROCESS

No formal consultation was held in the development of the strategy. An Energy Plan team was put together with members from each of the Ministry's major branches. The team members used their respective working groups to consult with energy stakeholders (industry, NGOs, other ministries, First Nations). Results of working group consultations were not published. Implementation plans are being developed within each of the branches. New legislation is also being developed.

LESSONS LEARNED

No comments made.

TARGETS/OBJECTIVES

The timeframe for the BC plan is 2006 – 2015 and it covers four priority areas:

- Environmental leadership (clean energy);
- Energy conservation and efficiency;
- Energy security;
- Investing in innovation.

Major targets include:

- 50 percent of BC Hydro's incremental resource needs will be met through conservation by 2020;
- All new electricity projects will have zero net greenhouse gas emissions;
- BC will be electricity self-sufficient by 2016;
- Clean or renewable electricity generation will continue to account for at least 90 percent of total generation;
- The elimination of routine flaring at oil and gas producing wells and production facilities by 2016 with an interim goal to reduce flaring by 50 percent by 2012;
- Implement a five percent average renewable fuel standard for diesel by 2010 to help reduce emissions and advance the domestic renewable fuel industry; and,
- Implement new cost-effective energy efficiency standards for new buildings by 2010.

Timeframes integrated with the BC Energy Plan that follow from other BC government strategies include:

- BC government will be carbon neutral by 2010;[1]
- BC will reduce its greenhouse gas emissions by 33 percent by 2020.

ACTIONS

Electricity:

- Establish a Standing Offer Program with no quota to encourage small and clean electricity producers with capacity of 10 MW or less. BC Hydro will purchase directly from suppliers at a fixed, guaranteed, regionally established price, under standard contract terms. The base prices will be reviewed at the end of the second year of the program and will be adjusted to accommodate annual increases in CPI and month and time of day delivery.[2]
- Upgrade transmission infrastructure and power plants;
- No nuclear power;
- Expand BC Hydro's Remote Community Electrification program and examine alternative intermittent energy sources.

Oil and gas:

- Further develop carbon sequestration technology;
- Develop the best coalbed gas practices in North America;
- Lobby to lift the federal and provincial moratorium on offshore oil and gas exploration;
- Develop unconventional gases such as tight gas, shale gas and coalbed gas;
- Promote the exploration and development of the interior basins with a priority focus on the Nechako Basin of north central and interior BC;
- Encourage the development of new technologies funded by royalty credits;
- Determine the viability of establishing a new petroleum refinery and petrochemical industry in BC;
- Increase First Nation's capacity to participate in and benefit from oil and gas development.

Biomass:

- Implement a BC Bioenergy Strategy;
- Issue an expression of interest/call for proposals for biomass electricity from sawmill residues, logging debris and beetle-killed timber.

Hydrogen:

- Continue to develop the hydrogen economy and establish a regulatory framework by 2010.

Research and development:

- Create an Innovative Clean Energy Fund of $25 million to support the development of clean power and energy efficiency technologies in the electricity, alternative energy, transportation, and oil and gas sectors.

[1] 2007 Province of British Columbia (http://www.leg.bc.ca/38th3rd/4-8-38-3.htm).
[2] For complete information visit the BC Hydro Web site (www.bchydro.com), and follow the links on the bottom left-hand side called "Standing Offer to advance BC Energy Plan".

Alternative energy sources:

- The plan does not identify specific action items for wind, solar, geothermal, etc., however, these energy sources will be considered under the Clean Energy Fund.

Transportation:

- Support the federal action of increasing the ethanol content of gasoline to five percent by 2010 and adopt quality parameters for all renewable fuels and fuel blends that are appropriate for Canadian weather conditions in cooperation with North American jurisdictions.

Energy conservation and efficiency:

- Encourage utilities to design electricity rates to encourage conservation;
- Undertake a pilot project for energy performance labelling of homes and buildings in co-ordination with local and federal governments, First Nations and industry associations;
- Expand the First Nations and Remote Community Clean Energy program;
- Develop an Industrial Energy Efficiency Program to address specific challenges faced by the province's industrial sector.
- All new provincial public sectors buildings will be required to meet the highest standards for greenhouse gas emission reductions, water conservation and other building performance results such as a certified standard.

Skills, training and labour policies:

- Develop an education program within high schools that highlights career choices in the electricity sector;
- Work with industry to identify trades training requirements for alterative energy sectors, leading to appropriate trades designations;
- Develop joint solutions with the Alberta government to harmonize policies and regulations to ease cross-migration burdens and assist in creating a more agile workforce.

NORTHWEST TERRITORIES

Energy for the Future: An Energy Plan for the Northwest Territories

March 2007

LEAD DEPARTMENT: Industry, Tourism and Investment (with contributions from the Department of Environment and Natural Resources)

ENERGY SECTORS

- Hydro
- Oil and gas
- Alternative renewable energy (demonstration).
- Transportation

STRATEGY DEVELOPMENT PROCESS

The consultation process began in June 2006 and the plan was released in March 2007. Steps in the process included:

1) Release and distribution of discussion paper *Energy for the Future: a Discussion Paper on Energy Policy and Planning for the Government of Northwest Territories;*

2) A brochure entitled *Energy for the Future: Energy Planning for the Northwest Territories* was published and sent to all First Nation and municipal governments;
3) Town hall-style meetings in six regional centers, led by local heads of governments; and,
4) Feedback incorporated into the development of the final Energy Plan.

The plan is overseen by an energy coordinating committee. An energy program guide is being developed to monitor the progress of the plan. No new legislation is being developed.

LESSONS LEARNED

1) Develop the energy strategy in a team environment.
    a. The team should include technical consultants, someone to write the plan, and someone who is responsible for marketing and communicating the plan;
    b. Do not rely on only one technical consultant. A range of expertise is valuable;
    c. Have someone from the federal government on the team to be kept informed of federal regulatory changes. The national picture will prove to be important.
2) Consultation with communities is important, but be prepared for the range of responses.

TARGETS/OBJECTIVES

Key objectives of the NWT Energy Plan include:

- Develop petroleum and hydro energy resources;
- Provide conservation and efficiency initiatives tools for communities and consumers;
- Support alternative energy technologies.

The plan is closely tied to the Government of Northwest Territories' (GNWT) *Greenhouse Gas Strategy 2007-2011*, which targets the reduction of greenhouse gas emissions from government owned assets by 10 percent from 2001 levels by 2011.

Other timelines include:

- Completion of a hydro strategy by November 2007;
- Completion of a comprehensive study on the feasibility of converting NWT communities to natural gas by 2009;
- Revise Good Building Practices Manual in 2008;
- Incorporate best practices in housing envelope design for new public housing design by 2010;

ACTIONS

Hydro:

- $2 million expansion of the Taltson hydro electrical generation facility.

Oil and gas:

- $100,000 to continue to study the feasibility of converting NWT communities to natural gas.

Alternative renewable energy:

- $250,000 for a central source of expertise in alternative energy;
- $200,000 fund for research and development;
- $100,000 investment for research and development in wind energy; and,
- $100,000 investment to install one geothermal pump.

Energy conservation energy efficiency initiatives:

- $2.5 million over two years for forgivable loans for energy efficiency upgrades to low-income homes;
- $150,000 for energy efficiency audits to low-income homes;
- $400,000 for energy efficiency audits for residential homes;
- $150,000 for residential incentive program for energy efficient upgrades;
- $150,000 for completion of community energy plans;
- $200,000 for conservation and efficiency improvements for NGOs and local governments;
- $100,000 for public education on energy issues;
- $150,000 per year for increased community presence of Arctic Energy Alliance; and,
- $100,000 for commercial energy audits.

Government leadership:

- $1 million to convert three GNWT assets to interruptible power;
- Increase Capital Asset Retrofit Fund;
- Conduct 25 energy audits on GNWT buildings and thermal scans on 350 buildings.

PRINCE EDWARD ISLAND

Prince Edward Island Energy Framework and Renewable Energy Strategy

June 2004

LEAD DEPARTMENT: Environment, Energy and Forestry

ENERGY SECTORS

- Wind
- Bioenergy
- Hydrogen
- Transportation

STRATEGY DEVELOPMENT PROCESS

Consultation began June 2003 and the strategy was released June 2004. Steps in the consultation process included:

1) Release and distribution of discussion paper;
2) Stakeholder consultations (10 in total) with both private and public sectors;
3) Release of strategy; and,
4) Development and passage of the *Renewable Energy Act*.

Implementation of the strategy has been the responsibility of four staff within the Department of Environment, Energy and Forestry. The staff have used the PEI strategy as a “check-list” by which they pursue the action items.

LESSONS LEARNED

The public was very supportive of the government pursuing a renewable energy plan. Wind energy was already showing significant potential and Islanders wanted to reduce

their reliance on fossil fuel energy. This support made development and acceptance of the plan relatively easy.

TARGETS/OBJECTIVES

- Renewable Portfolio Standard for electricity of 15 percent by 2010 (achieved);
- A commitment to evaluating opportunities for having 100 percent of its electrical capacity by renewable energy by 2015 (soft target);
- Commitment in Fall 2006 to produce 30 percent of total energy from local renewable resources by 2016.

ACTIONS

Wind:

- Continue to establish wind monitoring systems on PEI;
- Encourage small-scale wind power by removing sales tax rebates on wind turbine components and allow access to net metering;
- Establishing a guaranteed selling price of up to 85 percent of the retail residential rate for system generating between 100 kilowatts and one megawatt;
- Provide financial investment and community buy-in incentives. To date these include: Green Savings Bonds, compensating local landowners, compensating local community; and,
- Review role of PEI Energy Corp. vis-à-vis the growing role of wind energy.

Transportation:

- Assess the feasibility of a biodiesel plant on PEI;
- Introduce government fleet transportation efficiency standards and introduce hybrid fuel vehicles.

Energy conservation and efficiency:

- Encourage use of National Building Code and the Model National Energy Code for Houses for new building construction;
- Implement electricity efficiency programs within public buildings;
- Provide statutory direction that Maritime Electric must set demand side management targets.

Hydrogen:

- Pursue the Wind Hydrogen Village Project, a federal/provincial cost-shared program where wind powered electricity is converted to hydrogen to power generators. Key research is the development of a wind/diesel/hydrogen control system, suitable for use in remote communities.

Biomass:

- Evaluate feasibility of biomass-fuelled generating system and the feasibility of collecting gas from meat packing wastes.

QUEBEC

Using Energy to Build the Quebec of Tomorrow

May 2006

LEAD DEPARTMENT: Resources naturelles et Faune

ENERGY SECTORS

- Hydroelectricity
- Wind
- Oil and gas
- Solar
- Biomass

STRATEGY DEVELOPMENT PROCESS

The consultation process lasted one year and included:

- A consultation with experts around a series of energy related discussion questions;
- A parliamentary standing committee hearing;
- Online consultations.

The results of the Quebec consultations were incorporated into the strategy and summarized at the end of the strategy. *An Act respecting the implementation of the Québec Energy Strategy and amending various legislative provisions* was passed in December 2006.

LESSONS LEARNED

No comments made.

TARGETS/OBJECTIVES

The timeframe for the Quebec strategy is 2006 to 2015.

The objectives of the strategy include:

- Resume and accelerate the pace of development of hydroelectric potential;
- Develop wind power;
- Use energy more efficiently;
- Develop alternative energy sources;
- Consolidate and diversify sources of oil and gas supply; and
- Modernize the legislative and regulatory framework.

Targets outlined in the strategy include:

- By 2015, Québec should be in a position to save $2.5 billion per year on its energy bill, and to avoid 9.4 million tonnes of greenhouse gas emissions;
- An energy saving target for the petroleum products sector of 2 million tonnes of oil equivalent (TOE) by 2015;
- Energy performance requirements for buildings and dwellings built starting 2008 must improve energy efficiency by 20 percent to 25 percent;
- Reduce unit energy consumption in public buildings by 10 percent to 14 percent by 2010.

- Ensure 5 percent ethanol content in all gasoline by 2012;
- Establish a pilot cellulosic ethanol plant to begin operation by 2008, technology developed by 2010 and production facilities opened by 2012; and,
- Reduce fuel consumption in government transportation sector by 20 percent by 2010.

ACTIONS

Hydro:

- New hydro projects totalling 4,500 MW of new energy;
- 100 MW of wind power will be added for every 1,000 MW of new hydroelectricity;
- Examine combined wind/diesel power generation pilot projects in remote communities;
- Decentralize hydro production and propose conditions on which individuals and businesses may sell excess production to Hydro Québec, and, develop a program to purchase electricity from micro producers (less than 1 MW).

Oil and gas:

- Further develop oil and gas resources in the Gulf of St. Lawrence and estuary.

Wind:

- Complete existing wind energy processes totalling 3,000 MW of supply and issue other requests for proposals for wind power;
- To encourage direct involvement of small communities, an additional request for proposals of 500 MW will be issued for the supply of two separate blocks of 250 MW each, one earmarked for the regions, and one for First Nations.

Biomass:

- Use biomass in the production of ethanol.

Geothermal:

- Introduce a financial assistance program to improve market penetration of geothermal energy in the residential, institutional and commercial sectors;
- Systematically explore geothermal energy in building design in the public sectors;
- Develop an incentive program for the residential and commercial sectors.

Transportation:

- Reimburse the Quebec Sales Tax (maximum $1,000) for new hybrid vehicles; and examine other financial incentives;
- Change the standards governing vehicles sold in Québec to make them more stringent in respect to energy consumption (California standards);
- Make energy efficiencies in the public transit and the freight transportation sectors;
- Tax incentives for employers who pay for their employees public transit passes;
- Reimbursement of all fuel taxes for public transit authorities.

Energy conservation and efficiency:

- Develop assistance plan for new energy technologies financed by a levy on all forms of energy production (annual target of $10 million);

- The Agence de l'effficactie energetique (government agency similar to the Energy Solutions Centre) will draw up a comprehensive plan for the more effective use of energy for all of Québec's energy consumers;
- All energy distributors are expected to launch a review of their energy efficiency measures and increase their energy efficiency targets;
- Amend the regulations governing energy savings in new buildings in Québec, and include them in the Quebec Construction Code.
- Develop a new pricing structure for electricity rates to encourage greater conservation, without increasing the energy bill paid by consumers;
- Reduce unit energy consumption in public buildings by 10 percent to 14 percent by 2010. Twenty million dollars per year of funding will be allocated to this for 10 year period and government will pay any interest on any money borrowed to implement the projects; and
- Assist municipalities to develop energy action plans.

SASKATCHEWAN

Saskatchewan Energy and Climate Change Plan

June 2007

LEAD DEPARTMENTS: Executive Council Office / Industry and Resources

ENERGY SECTORS

- Coal
- Hydro
- Oil and gas
- Uranium
- Biomass
- Biofuel
- Solar
- Wind

STRATEGY DEVELOPMENT PROCESS

- The Energy and Climate Change Plan is part of a sustainable development strategy that is currently under development;
- Extensive consultation was held in the course of developing Saskatchewan's Green Strategy. Consultation findings from the Green Strategy were used to develop the energy and climate change strategy. An advisory group of stakeholders from energy and environment groups were consulted prior to the final development of this strategy;
- The next step will be to coordinate the various strategies (i.e., Energy and Climate Change Plan and Green Strategy, economic development strategy), set priorities and develop an implementation plan;
- Legislation in support of the Energy and Climate Change Plan is not being planned at this time.

LESSONS LEARNED

- Government cannot develop a good plan within “silo” departments;
- Energy plans require looking at climate change, which cuts across many departments;
- Saskatchewan ultimately had to take the plan from Industry and Resources and bring it to the Executive Council Office to fully develop it.

TARGETS/OBJECTIVES

The timeframe for the strategy is 2007-2050. The plan has five components:

- Conservation and efficiency;
- Carbon dioxide capture and storage measures;
- Increased use of renewable energy and further development of ethanol and biodiesel resources;
- Reduction of methane and other emissions in the oil and gas industry, and methane and nitrous oxide emissions in the agriculture industry; and creation of more natural carbon sinks in Saskatchewan's forests and soils.

Major targets in the plan include:

- Greenhouse gas (GHG) emissions stabilized by 2010;
- GHG emissions 32 percent lower than current levels (a reduction of 22 tonnes per capita) by 2020;
- GHG emissions 80 percent lower than current levels (a reduction of 55 tonnes per capita) 2050.

Other targets contained in the plan include:

- Develop a conservation program to reduce SaskPower’s electricity load by 300 megawatts by 2017;
- Work with industry to increase the current average 7.5 percent ethanol blend in gasoline sales by 2010;
- Working with municipalities and the construction industry to develop an Energy Code for Commercial Buildings by end of 2009 that will achieve standards 25 percent higher than current national standards.

ACTIONS

(Note: Saskatchewan previously announced a range of energy conservation and efficiency programs in their Green Strategy.)

Electricity:

- Develop a demand side management program to reduce SaskPower's electrical load;
- Continue to expand the Environmentally Preferred Power Program by adding purchased power capacity from independent power producers and SaskPower’s own projects;
- Begin transition to smart meters;
- Promote new technologies such as home energy monitors.

Oil and gas:

- Reduction of methane and other emissions in the oil and gas industry;
- Work with the oil and gas industry to prepare a report and recommendations, before the end of 2008, regarding initiatives and

policies to improve the industry's efficiency and competitiveness, and to reduce emissions from flaring and venting, along with fugitive emissions;
- Invest, through SaskEnergy, up to $20 million in pipeline expansions and up to $12 million with industry to participate in the development of flare gas processing opportunities;
- Continue research and development into carbon capture and storage.

Biomass:
- Establish a Bio-Products Centre of Excellence.

Research and development:
- Create a fund to support innovative greenhouse gas emission reduction technology;
- Establish a technology fund to receive voluntary industry payments as a method of complying with industry's mandatory emissions reduction obligations under the federal climate change plan.

Renewable energy:
- Expand eligibility for the Investment Tax Credit for Manufacturing and Processing to certain types of renewable energy and energy conservation equipment used to generate electricity;
- Ensure appropriate training opportunities for renewable energy sector.

Transportation:
- Work with industry to develop E-85 Corridors (fuel blends of 85 percent ethanol and 14 percent gasoline);
- Develop a 1.4 billion litre biofuels industry;
- Implement a government vehicle purchase policy that requires all vehicles to be hybrid electric, alternative or flex fuel, or within top 20 percent efficiency in their class; and
- Work with community organizations and existing programs to reduce emissions associated with older cars by initiating a voluntary province-wide vehicle retirement program.

Energy conservation and efficiency:
- Establish a performance standard of at least 30 percent greater than the National Model Energy Code for all new public sector buildings;
- Extend home energy improvement programs to 2011; and
- Establish a Climate Change Secretariat.

Education and training:
- Integrate principles of sustainable development into school curricula.

Common Energy Strategy Themes

Each of the jurisdiction strategies/plans had actions specific to the strengths and weaknesses of their respective energy resources. There were, however, many commonalities between the strategies. The common themes are listed in the table below. All of the themes identified have application to the Yukon.

Common themes in energy plans/strategies	**Applicable to Yukon?**
A strong connection between future energy use and climate change.	✓
A strong focus on developing renewable energy resources such as hydro and wind to meet rising demand for energy (electricity), including creating involvement opportunities for independent power producers.	✓
Addressing increased demand for electricity through energy conservation measures.	✓
Reducing wherever possible electricity production that relies on fossil fuels, for reasons related to economics, energy security and reducing greenhouse gas emissions.	✓
Funding research and development into new energy technologies, including supporting demonstration projects for alternative energy sources (biomass, geothermal, hydrogen, solar, biofuels, etc.).	✓
Setting targets, especially as they relate to reducing greenhouse gas emissions.	✓
Expanding and creating new programs that support consumer, commercial and industry energy conservation and efficiency, including incentive programs.	✓
Finding ways to support and fund communities to become more actively engaged in energy production and conservation, such as sales tax rebates on renewable energy equipment and assisting in the development of community energy plans and projects.	✓
Continuing to develop the oil and gas industry and exploring ways to reduce greenhouse gas emissions within the industry.	✓
Ensuring that First Nations are active partners in energy related initiatives that impact their communities.	✓
Exploring ways and setting targets to meet or surpass building standards in the Model National Energy Code for Houses.	✓
Supporting the Government of Canada target of having an annual average renewable content of five percent in gasoline by 2010.	✓
Showing government leadership by setting higher targets for energy conservation and efficiency in new government building construction, within existing assets, and fuel standards for vehicle fleets.	✓

Jurisdictional Contacts

To complete this review, interviews were held with staff in each jurisdiction. The following table provides information for follow-up contact.

NAME	TITLE	E-MAIL	PHONE
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Saskatchewan			
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