Integrated Yukon Energy Strategy: A Discussion Proposal

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1.0 Introduction

Energy is a vital part of the day-to-day lives of all Yukon citizens. We use energy in our whole range of 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, a great 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. Sometimes vast distances from sources of energy supply result in significant differences in energy costs. 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 proposal is to present a schema for the examination of Yukon energy issues and to propose options for the development of an integrated Yukon energy strategy.

2.0 The Yukon Energy Puzzle

The overall energy situation in the Yukon may be characterized by a four-piece puzzle with each piece representing one of the territory's four major energy issues: supply, consumption, infrastructure and the environment. This section briefly introduces each of the four pieces and some of the key sub-issues.

Energy Supply

The Yukon is home to an abundance of energy in a variety of forms. Conventional sources of energy exist in the form of oil, natural gas and coal. Renewable energy comes from sources which do not require the depletion of resources such as water, biomass (wood), wind and solar. Electricity is the product of many sources of energy --

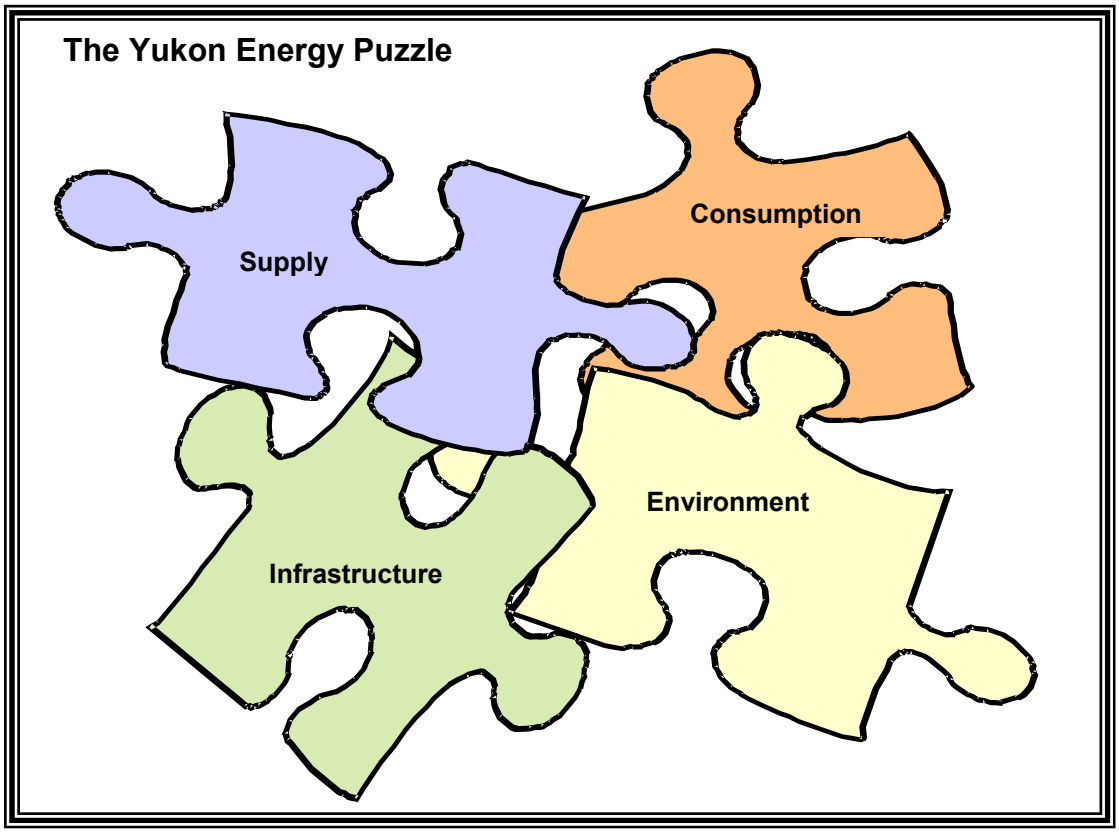
Yukon Sources of Energy and Electricity

	Energy	Electricity
Conventional		
• oil	✓	✓
• natural gas	✓	
• coal	✓	
Renewable		
• water	✓	✓
• biomass (wood)	✓	
• wind	✓	✓
• solar	✓	✓

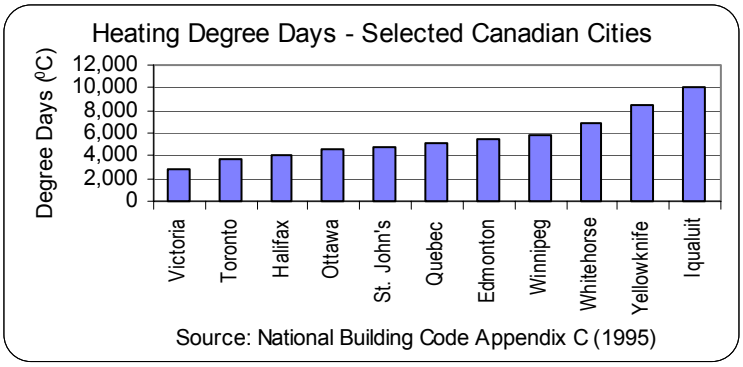
both conventional and renewable -- and is in turn often regarded as an energy source unto itself.

The Yukon has enough oil and gas reserves to meet its own demand for products derived from oil and gas for decades into the future. In fact, more energy is produced every year from the two Kotaneelee natural gas wells than is consumed on an annual basis in the Yukon. Despite the Yukon's rich endowments of conventional energy sources, all quantities of products derived from oil and natural gas consumed in the Yukon are imported from outside the territory. The Yukon's absolute reliance on oil and gas imports leaves consumers exposed to price shocks which originate outside of the territory.

The current situation for renewable energy in the Yukon is quite the opposite to that of conventional energy. More renewable energy is produced within the territory than is consumed. With the closure of the Faro mine in 1998 overall demand for electricity in the Yukon declined by 40 percent. Since most of the electrical energy generated in the territory comes from hydro-electric sources, and because the Yukon's transmission grid is isolated from other markets, the 40 percent drop in demand has resulted in a surplus of hydroelectric energy.



Energy Consumption



Yukoners are high intensity energy consumers. In general, more energy is consumed per person in the Yukon than in the southern parts of Canada. While partly the result of local consumption habits, the higher relative consumption levels are also the result of geographic factors. For example, our northern latitude brings colder winter temperatures and shorter days which translates into higher demand for energy used for space heating and lighting. Similarly, the long distances between communities and from southern sources of supply of food and dry goods means relatively higher motor fuel consumption levels.

As high intensity energy consumers, the potential benefits for Yukoners from the integration of energy efficient solutions into residential, commercial and industrial applications are also high. Yukon-specific energy efficiency endeavors have already resulted in nationally-recognized advances in the field.

Energy Infrastructure

Yukon's system of energy infrastructure is underdeveloped and underused. For example, while clean hydro-generated electricity is available in surplus quantities in Whitehorse, several Yukon communities rely solely on imported diesel for electricity generation. At the same time as the North American electricity distribution market has become interconnected, surplus hydro in the Yukon is stranded from southern markets. The vast distances between Yukon electricity supply and southern export markets mean that the Yukon's electricity distribution system will likely remain isolated for decades to come.

Future electricity infrastructure development which could serve to bridge the fragmented supply situation within territory is constrained by scale considerations. With isolated demand and the absence of major new resource-based customers, the financial risks associated with the construction of large scale electricity generation projects are high. For all resource-based projects currently on the drawing board, those risks outweigh the scale advantages which could result from building large.

The Yukon's oil and gas transmission infrastructure is also undeveloped. It consists of a short distance of 20 inch natural gas pipeline which delivers natural gas from two wells in the Kotaneelee field into the Westcoast transmission system in British Columbia. For the Yukon to further advance the development of

its own oil and gas reserves additional pipelines will need to be built. While interest in transporting northern natural gas from Alaska and/or the NWT to southern markets is again on the front burner, the projects under consideration are not intended for the transmission of Yukon oil or gas.

Environment

The burning of fossil fuels over the past 200 years is now generally accepted as causing overall global temperatures to increase. While work continues apace at the national level on the ratification of the Kyoto protocol, the Yukon's climate change circumstances are unique. For example, by quirk of the benchmarking process, Yukon is already well ahead of its provincial and territorial counterparts in terms meeting Kyoto commitments. The emissions benchmark was set in 1990 when the Faro mine was still in operation and large quantities of diesel fuel were being burned to meet its electricity requirements. The 40 percent "Faro gap" places the Yukon in good stead in the Kyoto context.

In addition, most of the territory's electrical generation requirements are being met through renewable sources (e.g., hydro, wind) which do not emit greenhouse gases. The Yukon is already a "green" jurisdiction in relation to those such as Alberta and Saskatchewan which burn coal and other fossil fuels to generate electricity.

While the Yukon appears to be well positioned from an emission perspective our situation from an impact perspective is not so positive. The impacts of climate change are more concentrated at northern latitudes. As a result, the Yukon is expected to be on the receiving end of a disproportionate share of the impacts of climate change. Given the global nature of the climate change issue the Yukon's relatively small voice on the world stage will need reinforcement from its southern neighbors.

3.0 Options for an Integrated Yukon Energy Strategy

The next question is, of course, how to solve the Yukon energy puzzle. This section of the paper presents a series of scope and process options for putting the energy puzzle together.

With regard to the scope of the exercise, all of the major issue areas which make up the pieces of the energy puzzle need not to be examined. Also, the depth of examination of each of the issue areas could also be varied. Note, however, that the wider the range of issue areas examined at a greater depth of examination, the more comprehensive and integrated the end result is likely to be.

A wide variety of process options for the development of an integrated energy strategy are possible. To borrow a phrase from the financial audit field, one option is to undertake a "compilation engagement". Existing energy-related policy

documents from one or more of the four major issue areas could be collected and the information synthesized into an umbrella energy policy document.

A second option is to build on the compilation engagement option by adding in an internal government consultation component. An interdepartmental working group could be struck to assist with the identification of the relevant information sources. The group could also serve to highlight issues which have become more pressing in the recent time period.

A third option is to build on the first two options by adding in a public consultation component in order to identify a likely broader range of energy issues. The consultation could be small-scale in nature and consist of a telephone or mail-in survey. Alternatively, the public consultation could be more formal and include town-hall meetings in some or all Yukon communities.

The full range of scope and process options are summarized below:

Option 1: Compilation Engagement

	Degree of examination		
Issue	none	low	high
Supply	●	●	●
Consumption	●	●	●
Infrastructure	●	●	●
Environment	●	●	●

Option 2: Option 1 + Internal Working Group

	Degree of examination		
Issue	none	low	high
Supply	●	●	●
Consumption	●	●	●
Infrastructure	●	●	●
Environment	●	●	●

Option 3: Option 2 + Public Consultation

	Degree of examination		
Issue	none	low	high
Supply	●	●	●
Consumption	●	●	●
Infrastructure	●	●	●
Environment	●	●	●