Options for government action to increase energy efficiency in Yukon

Draft 2

April 14, 1997

1.0 Preface

The Government of Yukon's Energy Work Plan indicates that government will "develop an energy conservation strategy for Yukon to set direction on government promotion and investment in energy efficiency, conservation, and environmental protection." Before undertaking this task , it would be beneficial for government to review information about how other jurisdictions approach energy conservation and to review various options on what role government can play in this area.

This paper does not make recommendations and does not require government to make a decision on any of the options presented here. Rather, the Department of Economic Development is seeking direction from Cabinet regarding item 7.3 in the Energy Work Plan, which was approved on March 13, 1997. This feedback is essential to the development of an energy conservation/energy efficiency strategy that fits with the goals and objectives of the Government of Yukon.

Also, although there may be opportunities for efficiency improvements in the transportation sector, this paper primarily addresses the electricity sector. However, some of the options outlined in the paper will also improve energy efficiency in buildings and houses that use other energy sources, such as propane, oil, and wood heating.

This paper presents nine options for consideration by government. Each option is summarized in the Executive Summary and then explored in more detail in section 6.0.

These options should not be viewed as "either/or" roles that government can play. Some of the options can be used in combination, while others represent a single action that government may wish to undertake or further explore.

Although the Energy Work Plan refers to "energy conservation" the term "energy efficiency" will also be used throughout this paper. Conserving energy means using less energy, but may also mean "doing without" or sacrificing comfort and convenience. Energy conservation is not always practical.

Energy efficiency, on the other hand, allows consumers to enjoy the same or better quality of energy services while reducing the amount of energy needed to provide those services. Energy-efficient technologies enable us to increase the activities fueled by the same quantity of energy supply. By using energy efficiently, we aim to increase economic wealth and improve our quality of life. Cost-effective energy efficiency is always practical.

Despite the benefits of using energy efficiently, there are several barriers to consumer investment in energy efficiency. To fully appreciate the options presented in this paper, it is useful to review these barriers, which have been widely recognized in the energy industry for more than a decade.

Barriers to energy efficiency

- **Lack of information about energy-efficient products, equipment and technologies.**

Energy consumers often don't have adequate information to help them compare the value of an energy efficiency investment with the avoided energy cost over a period of years. This complex calculation must take into account the cost of capital, changes in operating

costs, lifecycle costs, technological evolution that may make the investment obsolete, and other factors. Most consumers are either unwilling or unable to make this calculation.

- **Energy prices paid by consumers do not fully reflect the total costs, including economic and social costs, of providing energy services.**

The typical energy consumer in Yukon does not pay the entire cost of service for electricity because prices are subsidized through rate design and a rate relief program. These subsidies reduce the incentives for consumers to invest in energy efficiency.

- **Limited availability or access to the capital to invest in energy efficiency measures.**

Business and residential energy consumers do not always have adequate resources or access to capital required to improve energy efficiency. Low-income residents cannot justify investments in DSM when they are concerned about basic costs. Renters often don't expect to be in a place long enough to realize the economic benefits of energy efficiency investments. Businesses and industries often require a two-year or less payback period for investments in energy efficiency, and even then - they may not be in a financial position to borrow or front the necessary funds.

- **Equipment decisions for many buildings and houses are often made by persons who will not be responsible for paying the energy bills.**

Builders and developers often install appliances, heating systems, windows and insulation for newly constructed homes. Since the builder will not be paying the energy bills for that home, there is no incentive to spend extra money on energy efficiency.

2.0 Executive Summary

The Government of Yukon, through its Energy Plan, has indicated that it wants to take a more active role in promoting energy conservation and energy efficiency. This paper provides nine options that government may want to consider to help achieve this objective.

A review of the role played by the Yukon Government's provincial counterparts indicates that Yukon is not as active in energy efficiency as the rest of Canada. This may be due to limited resources dedicated to this area because of the population of the territory compared with the provinces. Also, in other jurisdictions, the gas and electric utilities have played a major role in promoting energy efficiency. In many cases, the utility regulators have directed utilities to implement demand-side management programs. Unlike most provinces, the regulator in Yukon (Yukon Utilities Board) does not have full-time staff, and this may limit its ability to provide appropriate direction in these matters.

Due to the unique nature of the Yukon's energy system and the relatively small population of the territory, cost-effective energy efficiency measures may provide a challenge for government . However, it should also be remembered that the cost of energy in Yukon is among the highest in Canada; therefore, energy efficiency measures that are not economic in other parts of Canada may be cost-effective in Yukon. The high cost of energy also reduces the amount of time it takes for the energy-saving measure "pay back."

Following is a summary of options that are outlined in this paper:

I. **Provide direction to Yukon Energy Corporation --** The Government of Yukon could direct its Crown corporation Yukon Energy, either directly or through the Yukon Utilities Board, to implement integrated resource planning (IRP) into its capital planning process. IRP seeks the right mix of demand-side and supply-side

resources to minimize cost, environmental impact and risk. Using IRP, energy efficiency is treated as part of the electricity supply resource. In traditional IRP, public involvement is key throughout the process. This involves holding meetings with key stakeholders, including consumers, professions such as builders and building designers, environmental groups, and others.

An alternative to requiring the utilities to do IRP is the requirement that utilities consider demand-side management (DSM) in their capital planning process.

In some other jurisdictions, where the energy industry is being deregulated, IRP is falling out of favour. A 1996 study done by the American National Association of Regulatory Utility Commissioners (NARUC), *Promoting Environmental Quality in a Restructured Electric Industry*, concluded that environmental considerations in utility capital planning can only be imposed on a regulated entity that has responsibility to conduct IRP. The study pointed out that companies that are required to do IRP face a competitive disadvantage with unregulated generators. However, since deregulation is not an issue in Yukon, and government remains the primary provider of electricity, IRP may still be relevant and beneficial to Yukon.

II. **Public Goods/System Benefits Charge --** The government could introduce a Public Goods or System Benefits Charge to fund energy efficiency programs. In California, where deregulation of the electricity industry is well underway, the California Public Utilities Commission (CPUC) has concluded that DSM should be funded by a Public Goods Charge on all retail electricity sales in the state. A system benefits charge has also been recommended by stakeholders in the B.C. energy sector. DSM funds collected through a public goods/system benefits charge could be administered by an entity selected by the Yukon Utilities Board or by a branch of the Government of Yukon.

III. **Energy efficiency procurement policy for government** -- Government is a major purchaser of energy-using equipment. Government also builds and renovates buildings and facilities that consume energy. A no-cost way to capture energy savings is to establish procurement specifications to ensure that energy-using products purchased by government (e.g. motors, lights, furnaces, computers, and photocopiers) meet high levels of energy efficiency. The Canadian Standards Association (CSA) recently published *Environmentally Responsible Procurement*, a voluntary guideline to green procurement. It has been so successful that it's being adopted internationally. The Government of Yukon could obtain a copy of this document.

IV. **Public securitization funds to leverage private sector funding for energy efficiency improvements** -- One of the barriers to energy efficiency improvements in all sectors is the lack of attractive, up-front financing for energy efficiency retrofits. One way to break down this barrier is to provide financial incentive programs through loans and/or grants. For example, the Government of Yukon can increase businesses' and residents' access to capital for energy efficiency retrofits by securing loans from the private sector. The loans would be paid back through energy savings by the building owners and/or occupants. Rather than providing subsidized loans, government leverages a much larger pool of private capital and helps reduce interest rates charged by private lenders.

V. **Public information and training programs** -- Energy-saving technology is constantly evolving. Continuous public information programs are a useful way to maintain consumer interest in efficient products and services. Government can play an important role by informing the public about these products and the benefits of using them. There is also an opportunity for increased energy efficiency in buildings and houses, through improved professional practices. Engineers, architects, contractors and building operators have a significant impact on energy consumption. In the absence of an energy code, government can encourage energy efficiency in new

construction by offering energy efficiency training programs for these groups. Courses in energy-efficient design and construction will result in large energy savings in commercial buildings and single and multi-family dwellings.

VI. **Building Codes** -- The Government of Yukon could adopt the federal government's new National Energy Code for both buildings and houses to ensure adherence to strict, mandatory energy efficiency standards.

VII. **Energy performance standards --** It may be advantageous for Yukon to create an energy efficiency act that enables the Government of Yukon to introduce new regulations that ensure new household appliances and other energy-consuming products and equipment sold or leased in Yukon meet minimum efficiency standards. Yukon could simply adopt the B.C. regulations, which are more stringent than federal regulations for some products. These standards work well in tandem with DSM programs.

VIII. **Energy rate structure/rate relief --** Although it may be unpopular with some consumers, an inclining rate structure for electric rates, and/or time-of-use rates would serve as a price signal for energy efficiency. Additionally, the government may want to consider reducing its expenditure on the rate relief program assisting only those customers that need it most -- low-income families and possibly small businesses.

IX. Project evaluation methodologies – Government could direct the Yukon Energy Corporation to employ multiple accounts evaluation methodology for new energy projects. Rather than evaluating projects against financial criteria only, multiple accounts analysis requires consideration of financial performance, environmental and social impact, economic development and customer service factors. If this option is chosen, the government could provide the YUB with direction on accepting costs higher than the least-cost alternatives for new generation, transmission and

distribution facilities. Comprehensive guidelines for multiple accounts evaluation is available from the Government of British Columbia.

X. **Partnering Programs** – All levels of government, utilities, and major electricity users are all interested in energy efficiency. By partnering with the business community, utilities, federal and municipal government, the Government of Yukon could facilitate the sharing of information and training programs among these three groups.

3.0 Current energy situation in Yukon

As an isolated system, Yukon does not have a transmission interconnection to the rest of the North American grid. No electricity is imported or exported. The electricity system is one of the smallest in Canada. Additionally, one major industrial customer (the Faro mine) accounts for about 40% of the electricity generated, when it is operating. To date, the operations of the mine have been inconsistent, making capital planning more challenging than in most jurisdictions.

These factors present a significant investment risk for major projects, compared with other jurisdictions. The energy system in Yukon is also unique because natural gas is currently not available in most of the territory, since Yukon does not produce natural gas. This may change in the future, with government looking to draw on local resources to displace the use of diesel. In the meantime, however, heating costs tend to be higher than in Yukon compared with most other parts of the country.

Although hydroelectricity supplies the majority of Yukon's electricity needs, the territory must rely on imported diesel fuel to supply base load when the Faro mine is operating. In addition to being environmentally unattractive, using diesel to generate electricity is inefficient and diesel prices are not stable. In the past year, the price of diesel increased

30 per cent. However, it should also be noted that a surplus of electricity often results when the mine is not operating

Utilities' energy efficiency activity

Currently, the Yukon's electric utilities provide a low level of energy efficiency services. This is primarily due to an unfavourable Yukon Utilities Board decision on the utilities' DSM costs included in the 1993-94 General Rate Application.

Between 1991 and 1994, efforts to help customers use energy more efficiently were significant. The Yukon Energy Corporation (YEC) and The Yukon Electrical Company (YECL) spent approximately $2 million on energy management and demand-side management (DSM) programs to reduce energy use by residential and commercial customers. These programs helped reduce the average annual electricity use in the residential sector by about 13 per cent compared with 1991. Energy consumption in the commercial sector decreased about two per cent.

The March 11, 1996 YUB decision on the utilities 1996-97 General Rate Application approved energy management costs of $100,000 per year. The board also directed the utilities to form a working group to make recommendations on energy management. A report was filed with the board on November 1, 1996; however, no response has been received to date.

Yukon Energy is currently taking steps to improve energy efficiency in their own facilities. For example, improvements to the heating system at YEC's generating facility in Whitehorse reduce the reliance on electric heat, and the utility is looking at ways to reduce station service loads at Aishihik. The utility is also working with industrial customers to help reduce demand on the system.

YECL provides energy management services to residential customers through brochures and billstuffers. A program called Opportunities Assessment has been developed for commercial customers and is provided on an as requested basis. YECL is also working with the municipalities to help them identify energy consumption patterns in city facilities and buildings.

City of Whitehorse energy efficiency activity

The City of Whitehorse is making great strides toward becoming more energy efficient. The city's five-year capital plan includes a budget of $475,000 for energy efficiency initiatives. Some recent energy efficiency initiatives include:

- A new ceiling in the Stan McGowan Arena, which caused a 25% reduction in the ice plant power bill. Energy-efficient lighting was installed for an additional 12% saving. In total, $75,000 was invested in both arenas, and the city expects a six to eight-year payback.

- Energy efficiency investments at the city's new sewerage facility are expected to pay back within the first quarter (five years) of the facility's life.

- A consultant has been hired to conduct energy audits in six city facilities (two arenas, the swimming pool, municipal services building, two fire halls, and city hall) to determine energy use and potential for savings. Audits are expected to be completed by the end of April 1997. Preliminary estimates show that energy consumption can be reduced by about 15%.

- The city ensures that equipment and products such as motors, lighting, and office equipment, are replaced with more energy-efficient products. Energy efficiency is also being considered in the design and construction of new municipal facilities.

4.0 Yukon Government's current role in energy efficiency

Following a period of general inactivity in energy efficiency over the past few years, the Government of Yukon is now beginning to take a more active role. However, the territory still lags behind the other provinces in terms of initiatives to promote energy efficiency. The following section will outline actions the government is currently taking, followed by an overview of the role other provincial governments play in energy efficiency.

Two notable Government of Yukon initiatives include the government's program to reduce energy consumption in government buildings, including schools, and the introduction of Canada's first Home Energy Rating System.

A one-year pilot program in six Yukon schools reduced energy use by more than seven per cent for a total savings of $74,000 in the first year. The potential for all schools is estimated at more than $240,000 per year or 10 per cent of the current utility budget for the Education department.

The recently developed Energy Plan for the Government of Yukon addresses energy efficiency improvements in government buildings. The strategic plan includes the following actions:

- creating awareness among government employees of ways to reduce energy costs in government facilities;

- identifying buildings with high energy use and identifying energy-saving measures and expected payback periods; financing and implementing retrofits using savings from low-cost and no-cost measures and from existing budgets;

- developing energy efficiency standards for new building design and retrofits, and building maintenance and operation practices; and

- monitoring buildings to ensure energy efficiency measures are effective.

In 1996, the Yukon Government also submitted a number of actions items to the federal Voluntary Challenge and Registry (VCR) program. New items that are not mentioned elsewhere in this paper include: adopting the new National Energy Code and providing training, neither of which have been done to date; and implementing time-of-use rates, which is being considered by the utilities.

Yukon Housing Corporation

In the spring of 1997, the Yukon Housing Corporation will launch Canada's first Home Energy Efficiency Rating System (CHEERS), with help from Natural Resources Canada. The YHC is working with the utilities to expand this program.

The CHEERS program will address both new and existing housing stock. An audit of the house will show homeowners what energy efficiency improvements should be made and how much money can be saved by making improvements. It will show how the house rates compared to others in Canada and in Yukon. A high rating will allow a 1/2% reduction on the homeowner's mortgage rate.

The current Home Repair Program, which provides up to $35,000 in low-interest loans to residents with home repairs including energy efficiency improvements, will be combined with CHEERS.

5.0 Role of provincial & territorial governments

In most Canadian provinces, government's commitment to energy efficiency is evidenced by direction provided to electric utilities, either directly or through a regulator. In Canada, more than $1 billion has been invested in DSM over the past decade.

Because Canadian utilities have been so active in promoting energy efficiency, there has not been a great need for provincial governments to become directly involved. However, the "behind the scenes" involvement of governments, as discussed in the following section, shows the important role that governments play in supporting and promoting energy efficiency in Canada. The lack of activity by Yukon's electric utilities, which is likely due to an unfavourable decision on DSM by the YUB, may require a higher level of involvement by the Government of Yukon. More detail on ways the government can become more involved is included in section 6.0.

Education and promotion

The three largest provincial crown corporations (electric utilities), which include Ontario Hydro, Hydro-Quebec, and B.C. Hydro, have each spent millions of dollars educating the public about how to use energy wisely, creating consumer and industry demand for energy-efficient products. When these efforts have "transformed" the market has been government introduces energy efficiency legislation to eliminate less efficient products from the marketplace. This approach is preferred by manufacturers, and a key element in the utility programs has been alliances with manufacturers and distributors/retailers of products that use electricity or help manage energy costs.

Standards and codes

Perhaps one of the most substantial contributions that provincial governments make to energy efficiency are through standards and codes. Quebec, Ontario, British Columbia, Manitoba and Alberta include stringent energy efficiency requirements in their building

codes for houses. In most cases, the codes cover: building envelope, windows, lighting, HVAC systems, service water heating systems and electric power requirements.

Although the B.C. Government has announced that all new provincially-owned buildings will have to meet the new National Energy Code for buildings, the province currently has no energy efficiency standards for high rise buildings outside Vancouver. They have indicated a need for training and enforcement, both of which will cost the government money. However, according to B.C. government officials, many economic tests and lifecycle costs analysis done on the cost-effectiveness of the National Energy Code have shown it to be economic.

In Saskatchewan, the National Energy Code for Buildings will be adopted, but not for houses. According to government officials, most houses are already built to R2000 standards and an additional layer of legislation would be more costly than it's worth, especially when electricity is still relatively inexpensive ($.07/kWh).

Another way that Canadian provinces support energy efficiency is through legislated energy efficiency standards for a variety of products. Energy efficiency standards overcome information barriers and reduce the risk to vendors of stocking and selling energy-efficient products. They are an effective way to remove energy-wasting products from the market and capture a large share of the least expensive energy-saving potential. Standards also help avoid lost opportunities for energy savings. Products such as appliances have a fairly long life and when consumers purchase less efficient models, there is no opportunity to convert them to energy-efficient appliances for 15-20 years.

In B.C. the Energy Efficiency Act covers 14 different products ranging from appliances and water heaters to furnaces and air conditioners. The B.C. government also recently announced new minimum efficiency standards for commercial refrigeration, which comprises a significant amount of energy consumption in supermarkets; and fluorescent lamps primarily used in general area lighting.

Although the federal government's national Energy Efficiency Act may eliminate the need for provincial legislation in some provinces where the cost of energy is low, such as B.C. , provincial/territorial legislation with more stringent requirements is still beneficial in areas where the cost of power is high, such as Yukon. A cost/benefit analysis would have to be done to ensure that consumers are not being forced to buy products that are more expensive but don't have a reasonable payback.

Ontario's energy ministry, by regulation under the provincial Energy Efficiency Act, also sets minimum efficiency levels for specified appliances and products sold in Ontario. In addition to regulating products such as air conditioners, appliances and water heaters, the provincial government has also proposed to amend Ontario's *Efficiency Standards Regulation* to add minimum efficiency standards for gas-fired room heaters, wall furnaces and fireplaces, and fluorescent lamps. Regulations for electrically-heated storage water heaters, "cobra-head" roadway lighting, parking lot and dusk-to-dawn lighting, will also be amended.

Government energy efficiency standards and utility DSM programs can work together in a "push/pull" manner. Standards pull the market to a minimum level of energy efficiency, while utility incentive programs push the market to higher efficiency levels. For example, in B.C. the provincial government increased its minimum standards for refrigerators after Power Smart had shifted the market to more efficient models than the prevailing standards.

Community programs

Other government initiatives include community planning, with a focus on energy efficiency and reduced reliance on fossil fuels. In 1995, the B.C. government launched a $20 million energy-saving and job creation program called BC21, which involved

participation by the province's gas and electric utilities, municipalities, financial institutions and others. B.C. homeowners received free energy audits and installation of various energy and water-saving devices. An additional community-based component included increased levels of community involvement and use of local resources for program delivery. The program, which wrapped up at the end of 1996, was considered extremely successful.

In Ontario, a "Green Communities" initiative supports the greening of communities through multi-sectoral community-based initiatives that integrate local energy and water efficiency, waste reduction and other pollution control activities.

Government-appointed regulators

Another way that governments show their commitment to energy efficiency is through government-appointed regulatory agencies.

The role of regulatory boards and commissions in promoting energy efficiency varies across Canada. For example, although B.C. Hydro is considered a leader for its successful Power Smart programs, the utility continues to receive regulatory pressure to ensure that energy efficiency programs are considered as part of the "resource mix" for generation, transmission and distribution. An excerpt from the B.C. Utilities Commission decision on B.C. Hydro's 1996 Wholesale Transmission Services Application says: "With respect to DSM, the Commission accepts that DSM is an alternative to transmission and that this should be reflected in the transmission revenue requirement. Therefore, the Commission directs B.C. Hydro to undertake a study to determine what portion of its DSM costs can be attributed to transmission."

The Ontario Energy Board believes that the regulator must be prepared to facilitate the transition to strategic DSM programs through regulatory or government intervention such

as setting specific efficiency and environmental standards that can be used as key measures to test DSM efficiency. While the utility retains its monopoly status, some degree of regulatory control is required to determine how DSM costs should be assigned. Since DSM provides system benefits as well as individual benefits, the costs associated with programs must be split fairly between participants and other ratepayers.

In the past, Ontario Hydro has been the main driver behind DSM programs in the electricity sector. However, the Ontario Energy Board has been directly involved in ensuring gas utilities pursue DSM. In 1995, the Ontario Energy Board instructed the three main natural gas utilities in Ontario to implement DSM plans for their 1995 test year.

6.0 Options

Following is a detailed explanation of the options outlined in the Executive Summary. Where applicable, information about how these options are employed in other jurisdictions is also included.

1) Provide direction to Yukon Energy Corporation

The Government of Yukon could direct the Yukon Energy Corporation, either directly or through the Yukon Utilities Board, to implement integrated resource planning (IRP). IRP seeks the right mix of demand-side and supply-side resources to minimize cost, environmental impact and risk. Using IRP, energy efficiency is treated as part of the electricity supply resource. An alternative to requiring the utilities to do IRP is the requirement that utilities consider demand-side management (DSM) in their capital planning process.

In IRP, alternatives to a project including (DSM), are evaluated in terms of multiple attributes, in particular, financial, environmental and social. IRP also requires that utilities look closely at uncertainty and that they develop flexible resource plans that meet a range of possible futures. IRP increasingly encompasses DSM, transmission and distribution investments, electricity purchases, rate design and some operation and maintenance expenditures, especially where these latter may have capital expenditures as alternatives.

In some other jurisdictions, where the energy industry is being deregulated, IRP is falling out of favour. A 1996 study done by the American National Association of Regulatory Utility Commissioners (NARUC), *Promoting Environmental Quality in a Restructured Electric Industry*, concluded that environmental considerations in utility capital planning can only be imposed on a regulated entity that has responsibility to conduct IRP. The study pointed out that companies that are required to do IRP face a competitive disadvantage with unregulated generators. However, since deregulation is not an issue in Yukon, and government remains the primary provider of electricity, IRP may still be relevant and beneficial to Yukon.

In its 1995 report "Towards Energy Sustainability" the Government of British Columbia addressed IRP in the following manner: "The government agrees that decisions to extend natural gas and electricity service should be consistent with IRP principles."

Additionally, former chair of the BC Utilities Commission Dr. Mark Jaccard, a strong advocate of IRP, was recently appointed by the BC Government to head a task force that will examine issues related to deregulation of the industry. Until his recommendations are received, it is unknown what action BC government will take on the IRP issue.

The British Columbia Utilities Commission (BCUC) in its 1995 Electricity Market Review notes the reliance by governments on IRP, DSM and other regulatory interventions in the energy sector to achieve public policy objectives. The report says: "

IRP is explicitly referred to as a national policy measure in Canada's National Action Program on Climate Change and the U.S. Climate Change Action Plan."

If this option is selected, government may also want to consider ordering the YUB to adopt rules that indicate how the utilities should recover DSM costs and how the YUB will provide appropriate financial incentives for the utility, sometimes called "incentive-based ratemaking."

As part of the IRP process it would be advantageous for the utilities to undertake an energy conservation potential review. This would identify cost-effective energy efficiency measures that are most likely achievable under a variety of levels of investment, public and private commitment, public acceptance, pricing, regulation and legislation. In British Columbia, a conservation potential review determined that if homeowners adopted all the "economic" electricity-savings technologies possible, the total residential electricity use in the year 2010 would be 57% lower than it would be if efficiency was unchanged from the base year. The 1992 Resource Plan developed by the Yukon electric utilities addressed conservation potential and could be updated to reflect current market realities.

Relevance of DSM and IRP in deregulated energy markets

With the current move toward deregulation of the electricity industry in North America, there has been a considerable amount of discussion about the relevance of IRP and DSM in a competitive market. The British Columbia Utilities Commission addresses this issue in its 1995 Electricity Market Review. The commission found that "while some market structure changes may hinder a few of the activities normally associated with IRP, such changes do not have the all encompassing detrimental effect on IRP that some participants have suggested."

Throughout the B.C. Electric Market Review process, the BCUC heard from parties who were concerned that insufficient levels of DSM were being achieved under the current market structure because electricity prices did not fully reflect environmental costs and because some DSM had a negative effect on utility revenues. Further, the commission was told that this could worsen under a restructured market.

The BCUC agreed that there are several market barriers to achieving cost-effective levels of energy efficiency. While the commission believes that appropriate price signals help stimulate appropriate investments in energy efficiency, it also stated that price signals alone may not be sufficient and sees a continued role for utility-sponsored DSM.

The BCUC concluded that IRP and DSM can be implemented under different market structures and that incorporating environmental and social considerations into operating decisions of existing electricity facilities is an issue that requires further review but is generally independent of the market structure.

Also, expert witness Kevin Bell, on behalf of the British Columbia Energy Coalition, provided the following testimony at a public hearing for B.C. Hydro's Wholesale Transmission Services Application. "Numerous restructuring processes around North America and elsewhere have uniformly concluded that the most effective way to develop cost-effective and socially beneficial DSM resources in a restructured industry environment is to collect revenues for DSM resource development on a non-discriminatory basis in the form of a uniform charge on energy moving over the wholesale transmission system. The BCUC should seek to institute a $0.001/kWh public benefits charge on all wholesale energy transmission transactions in the province, for the purpose of capitalizing a competitive market in cost-effective DSM resources."

Bell also indicated that neither DSM investments nor the effectiveness with which DSM investments are implemented should suffer as a result of the restructuring/deregulation

debate. On the contrary, this debate can be used as an opportunity to increase the benefits derived from DSM. "We view energy efficiency as one of the areas where a shift from regulation to competition has likely efficiencies without potential downside to particular customer classes. We recognize the role of DSM as both a customer service - and support the equal opportunity for all customers to realize lower bills - as well as the role of DSM as a statewide environmental and system benefit."

Surplus electricity and DSM

Another issue that seems to limit Yukon's DSM activity is surplus electricity. However, DSM may still make sense, even when the utility has surplus electricity, for the following reasons:

- When buildings and facilities are retrofitted, newly constructed, and when energy-using equipment is being replaced, it represents a "one-time" opportunity to capture energy savings through energy efficiency. Even if the (saved) energy is not immediately needed, failure to act on these infrequent opportunities can raise the *future* costs of saving and supplying energy. Therefore, utilities and/or government should take advantage of DSM opportunities even when surplus electricity exists.

- Even if there is surplus electricity on the generation side, DSM can still result in avoided utility system costs if transmission bottlenecks and future upgrade costs for transmission facilities and transformer equipment are reduced. The British Columbia Utilities Commission found that DSM is an alternative to transmission and that this should be reflected in B.C. Hydro's transmission revenue requirement. (B.C. Hydro and Power Authority's Wholesale Transmission Services Application, June 25, 1996).

customer and distributor rebates were used to increase market share of high efficiency motors from 4% to 64% in only 3 years, at a cost of $0.012 per kilowatt hour saved. Today, vendors stock high efficiency motors as a matter of course, without rebates from the utility.

- Even when surplus electricity exists, reduced demand for energy can still result in avoided utility system costs if transmission bottlenecks and future upgrade costs for transmission facilities and transformer equipment are reduced.

- DSM programs can create a market for energy efficiency improvements and energy-efficient products, which did not exist before.

- The public consultation process, which is a component of IRP would provide the government with meaningful input from consumers and the business community. It is widely recognized that an appropriate level of public involvement in developing energy efficiency solutions greatly increases the chances of success for these initiatives.

- Detailed guidelines for IRP already exist (BC Utilities Commission) and could be adopted by Yukon at little or no cost.

Cons

- In British Columbia, B.C. Hydro challenged the British Columbia Utilities Commission (BCUC) ruling that the utility must implement IRP. However, this could have been avoided if the B.C. Government had provided its Crown corporation B.C. Hydro with a mandate to do IRP.

- In its 1994 report to the B.C. minister of energy, mining and petroleum resources, the British Columbia Energy Council made the observation that DSM expenditures tend to come and go with short-term fluctuations in utility resource needs and financial situations. However, this inconsistency can undermine the confidence of customers and commercial allies such as builders, contractors, and equipment dealers, whose support is critical to program delivery. The report notes that "even in times of resource surplus and budget cutbacks, DSM programs should continue to operate at a level that maintains ties with commercial allies and associated occupations, through education and training."

- Some DSM measures may be effective in reducing the peak electricity demands of customers. In local planning areas where distribution capacity is constrained, DSM, along with local generation options, may delay or eliminate the need for upgrading existing distribution capacity.

1) Pros and cons of option one -- Provide direction to YEC

Pros

- Directing the utilities to implement IRP and or DSM would ensure that cost-effective energy efficiency investments are given equal consideration with other supply options. DSM programs help overcome many of the barriers to energy efficiency.

- From a societal perspective, energy efficiency investments appear to be a relatively low risk opportunity for providing energy services, especially given the high risk of supply-side projects in Yukon.

- DSM programs can transform markets by encouraging product and equipment distributors to stock, advertise and sell efficient products. For example, in B.C.,

- A full IRP process, including public consultation, may be cost prohibitive because costs must be distributed over a relatively small customer base in Yukon. A scaled down version of IRP may help reduce some of the costs. For example, market research could replace public consultation, and the analysis process could be simplified by reducing the need to use sophisticated computer modeling.

- It may be difficult to prove the energy savings attributed to DSM. Verifiable measurement and evaluation is necessary but can be costly. Costs can be reduced by developing appropriate computer databases at the beginning of the program. Only measures that provide verifiable savings would be pursued.

2) Public Goods Charge

The government could introduce a Public Goods or System Benefits Charge to fund energy efficiency programs. In California, where deregulation of the electricity industry is well underway, the California Public Utilities Commission (CPUC) has concluded that DSM should be pursued by a Public Goods Charge on all retail electricity sales in the state.

In its decision, the CPUC stated: "... the funds collected through a surcharge for energy efficiency should be competitively allocated by an independent, non-profit organization ... energy efficiency costs should no longer be embedded in electric rates and instead should be collected as part of the public goods charge." A memorandum of understanding (MOU) developed by the utilities and others and submitted to the CPUC recommends a surcharge equal to 3.3% of utility revenues to support continued investment in DSM, renewable resources, and R&D. If this percentage was applied in Yukon it would provide about $1.5 million.

The CPUC also notes that it is "appropriate to use public funding to ensure that energy users have information about managing their energy use. It may be appropriate to have more public resources available for educating residential and small business customers than large electricity users, because large users generally have more resources to dedicate to managing their energy use."

In British Columbia, a public interest group called the Association for Advancement of Sustainable Energy Policy offers the following suggestions to the B.C. Government: DSM funds collected through a public goods charge should be administered by an entity selected by the B.C. Utilities Commission or by another branch of government. In any case, the entity's performance should be subject to independent measurement and evaluation.

In 1995, Washington Water Power (WWP) received regulatory approval for a distribution charge to help finance DSM. A distribution charge of 1.55 per cent on retail electric sales and .52 per cent on retail natural gas sales is levied in its service territory in eastern Washington and northern Idaho. The money collected is exclusively dedicated to demand-side management programs, both electric and gas.

The charge has raised typical Washington residential electric bills by 81 cents a month, 78 cents in Idaho. These figures do not include any bill savings resulting from participation in DSM programs.

2) Pros and cons of option two - Public Goods Charge

Pros

- The Public Goods Charge would ensure funding for energy efficiency. It may not cause an increase to electricity rates. Properly administered, this fund may actually cause energy bills to decrease in the long term.

- It affords a stable and predictable source of funding from outside the utility, so DSM no longer competes for money with other internal utility costs.

- It provides up-front revenues for DSM programs, which may lead to a beneficial change in the utility's financial accounting for demand-side spending. Previously, the utility capitalized DSM costs and amortized them over a period of years. When the utility capitalizes an expense such as DSM, it has value on your books because of the regulatory order supporting it. By expensing its DSM costs in the same year they are incurred, the utility can reduce DSM program costs by eliminating the income tax effects and shareholder returns associated with capitalizing DSM over time.

- It would provide funding for education and training programs that may not otherwise pass DSM cost-effectiveness tests. Since the investor-owned utility cannot earn a rate of return on education and training programs, it is unlikely that they will implement ongoing, comprehensive education and training initiatives

Cons

- The cost to develop, implement, and administer the program may outweigh the benefits. Also, the cost of independent evaluation and measurement may be prohibitive.

- The local electric utilities may currently be the only entities in Yukon with the expertise to manage this fund. However, since the utilities will earn more revenue by selling more power, they may have an incentive to pursue DSM projects that look

good on paper but that do not achieve actual reductions in energy use. This may not be an issue for a government-owned utility such as YEC.

- Yukon residents, especially people who undertake energy efficiency improvements on their own initiative, may resent having to pay the public goods charge.

3) Energy efficiency procurement policy for government

Government is a major purchaser of energy-using equipment. Government also builds and renovates buildings and facilities that consume energy. A no-cost way to capture energy savings is to establish procurement specifications to ensure that energy-using products purchased by government (e.g. motors, lights, furnaces, computers, and photocopiers) meet minimum levels of energy efficiency.

In Canada, green procurement is being pursued by federal, provincial and municipal governments. The Canadian Standards Association (CSA) recently published *Environmentally Responsible Procurement*, a voluntary guideline to green procurement. It has been so successful that it's being adopted internationally. The Government of Yukon could obtain a copy of this document.

Pros and cons of option three -- Energy efficiency procurement policy

PROS

- Little or no cost to government.

- Guidelines are available from CSA.

- Government will be perceived as a leader in energy efficiency, setting an example for others.

CONS

- In some instances, but not always, energy-efficient products can be more expensive. However, the over the long-term payback in energy savings usually outweighs the extra cost.

4) Public securitization funds to leverage private sector funds for energy efficiency improvements

One of the barriers to energy efficiency improvements in all sectors is the lack of attractive, up-front financing for energy efficiency retrofits. One way to break down this barrier is to provide financial incentive programs through loans and/or grants. For example, in 1994, as part of a collaborative effort to retrofit municipally-owned buildings, 11 Ontario municipalities proposed a financial mechanism to the provincial government to make the municipalities more energy efficient. The municipalities proposed that the upfront costs of energy efficiency retrofits for businesses, municipal buildings, and low-income households be financed by the private sector and paid back through energy savings by the building owners and/or occupants.

Under this financing scheme, the territorial government would issue a request for proposals from financial institutions. The institution offering the most attractive financing terms would be selected to provide upfront financing and assume 100% of the risk for loans that met its normal lending criteria.

The loans would be paid back through an additional item on the participants' energy bill. The retrofit and financing costs would be such that loan payments would be smaller than

the expected energy and water savings by a suitable margin, so that the participant experiences a positive cash flow from day one.

Municipalities can play an important role in this program by facilitating comprehensive, community-wide building retrofit activities, involving energy saving companies (ESCOs). Municipalities also typically have extensive links with the trade, professional, business, and community associations that would be involved in retrofit activities and high efficiency designs in new buildings and houses.

Under property tax legislation in some jurisidictions, private sector loans can be secured using the land or improvements as collateral. This is not true in Yukon. However, under the Land Titles Act, a caveat can be placed on a property.

Pros and cons of option four -- Public securitization funds

Pros

- The private sector, not public sector, is used to provide up-front financing. Rather than providing subsidized loans, government leverages a much larger pool of private capital and helps reduce interest rates charged by private lenders.

- Societal costs that can be avoided through water and energy conservation measures include: costs of new or replacement electrical power plants; costs for diesel fuel; costs associated with power distribution and transformers; and costs associated with increasing the capacity of trunk sewers and water treatment facilities.

- Initial transaction costs could be reduced by involving the local electric utilities. The Yukon Electrical Company Limited has already designed an "Opportunities Assessment" program for commercial and municipal government customers. A pre-audit information package, which includes a menu of energy efficiency measures screened to match each of several building categories, would allow building owners to quickly estimate the capital cost and anticipated savings prior to committing to a detailed audit or engineering study.

Cons

- Program delivery costs per unit of saved energy may be prohibitive. Additional government resources would have to be allocated to administer the program. However, cost reduction strategies could include: addressing all energy sources in buildings, not just electricity; using the utility's existing billing system for collection of loan payments; using community-based organizations to disseminate information about the program; and targeting both water and energy conservation.

- The program may not be economic in communities on the WAF system in the event of a surplus electricity situation. A more detailed analysis would determine the feasibility of the program.

5) Public Information, education and training

Energy-saving technology is constantly evolving. Electric motors, residential appliances, furnaces, industrial processes, etc. are in a continuous state of redevelopment. Continuous programs, therefore, are needed to maintain consumer interest in efficient products and services. Public information programs can be carried out by government or by the electric utilities.

There is a great opportunity for increased energy efficiency in buildings and houses, through improved professional practices. Engineers, architects, contractors and building operators have a significant impact on energy consumption. In the absence of an energy code, government can encourage energy efficiency in new construction by offering energy efficiency training programs for these groups. For example, the location and size of windows, building materials and landscape, all affect energy consumption. Also, proper selection of energy-using equipment, such as heating and cooling systems and lighting can greatly increase energy efficiency. Courses in energy-efficient design and construction will result in large energy savings in commercial buildings.

The British Columbia Buildings Corporation, which manages provincial government buildings, has established a successful building operator training program. The Government of Yukon could model a training program after the BCBC's program, with special adjustments for Yukon conditions.

Pros and cons of option five -- Information, education and training

Pros

- A variety of training programs, including computer programs and other tools, have already been developed. This would provide a tremendous cost saving in the program development stage.

- Helps avoid need for legislation

Cons

- The training courses are not mandatory and there is no guarantee that engineers, tradespeople, builders, and contractors will attend. They may be reluctant to take

time out of their schedule to attend training, especially if they have to pay for it themselves.

6) Energy performance standards

It may be advantageous for Yukon to create an energy efficiency act that enables the Government of Yukon to introduce new regulations that ensure new household appliances and other energy-consuming products and equipment sold or leased in Yukon meet minimum efficiency standards. Rather than re-invent the wheel, Yukon could simply adopt the B.C. regulations, which are more stringent than federal regulations for some products.

Several Canadian provinces, most notably Ontario and British Columbia, have legislated energy efficiency standards for a variety of products. In B.C. the Energy Efficiency Act covers 14 different products ranging from appliances and water heaters to furnaces and air conditioners. The B.C. government also recently announced new minimum efficiency standards for commercial refrigeration, which comprises a significant amount of energy consumption in supermarkets; and fluorescent lamps primarily used in general area lighting. These additions to the 1990 British Columbia Energy Efficiency Act are anticipated to save British Columbians $15 million annually by the year 2000, and conserve enough electricity to serve 10,000 homes for one year, according to employment and investment minister Dan Miller.

Government energy efficiency standards and utility DSM programs can work together in a "push/pull" manner. Standards pull the market to a minimum level of energy efficiency, while utility incentive programs push the market to higher efficiency levels. For example, in B.C. the provincial government increased its minimum standards for refrigerators after Power Smart had shifted the market to more efficient models than the prevailing standards.

Pros and cons of option six -- Energy performance standards

Pros

- Energy efficiency standards are an effective way to remove energy-wasting products from the market and capture a large share of the least expensive energy-saving potential.

- Products such as appliances have a fairly long life and when consumers purchase less efficient models, there is no opportunity to convert them to energy-efficient appliances for 15-20 years. This "one-time opportunity" is lost if not exploited when the equipment is first purchased.

- Standards overcome information barriers and reduce the risk to vendors of stocking and selling energy-efficient products.

- To the consumer, standards overcome the uncertainty and invisibility of energy efficiency improvements. Energy performance standards are efficient because they eliminate much of the consumers' costs of purchasing energy efficiency.

- Energy efficiency standards have already been developed by other provinces, so there would be little or no development costs for Yukon.

Cons

- Generally, voluntary programs are preferable to legislation. Vendors of products and equipment may complain, especially if they have excess products/equipment in stock that do not meet the standards.

- There would be an administrative cost to government to ensure compliance. A cost/benefit analysis would determine the cost-effectiveness of introducing and enforcing standards.

- Since less efficient products are generally less expensive than energy-efficient models, it is possible that the purchase price would increase for consumers.

- It is possible the federal Energy Efficiency Act may be sufficient.

7) Building Codes

The Government of Yukon could adopt the federal government's National Energy Code for both buildings and houses to ensure adherence to strict, mandatory energy efficiency standards. These codes have been developed over a four-year period after extensive consultation with a provincial-territorial committee on building standards and provincial and territorial energy ministries.

The National Energy Code provides thermal performance standards regarding the optimal level of energy efficiency based on regional construction costs, energy prices and climate.

The federal government has no mandate to impose regulations in this area; however, they have recommended that each province and territory adopt the codes. While some of the codes' requirements are the same for all parts of the country, many vary by region. These requirements are based on detailed cost/benefit analyses, taking into account regional variations in climate, energy costs and construction costs.

Currently, five provinces already include energy efficiency standards in their building codes. (B.C., Ontario, Quebec, Manitoba, and Nova Scotia). The B.C. Government

recently announced its intention to adopt the National Energy Code for buildings for all provincially-owned buildings.

The benefit of implementing building codes is evident in Sweden. This country, with a climate similar to Yukon, has some of the strictest building thermal standards in the world. As a result, Swedish housing is among the most comfortable and energy efficient in the world, despite the severe climate.

Pros and cons of option seven -- Building Codes

Pros

- It is generally accepted that it is less expensive to "build in" energy efficiency than to retrofit later. Utilities and/or government should take advantage of DSM opportunities when buildings and facilities are retrofitted, newly constructed, and when energy-using equipment is replaced, even if the (saved) energy will not be immediately needed, i.e. in times of surplus. As these opportunities infrequently occur, failure to act on them can raise the future costs of saving and supplying energy.

- Adopting the National Energy Code would ensure that optimum levels of energy efficiency would be realized in new buildings and houses in Yukon.

Cons

- Implementing the National Energy Code for Houses may increase the cost of buying a home in Yukon.

- Training is required for builders, inspectors, and tradespeople involved in the design and construction of homes and commercial buildings. Local contractors are not

always trained to install or repair equipment such as high efficiency furnaces and Heat Recovery Ventilators.

- Yukon municipalities may not have the resources to administer the Code.

8) Energy Rate Structure/Rate Relief

Although it may be unpopular with some consumers, an inclining rate structure for electric rates, and time-of-use rates would serve as a price signal for energy efficiency. Additionally, the government could revise the current rate relief program to assist only those customers that need it most -- low-income families and possibly small businesses.

The price that consumers pay for energy sends a signal, and the extent to which consumers use energy efficiently, their readiness to invest in energy efficiency, and the profitability of the investment depends on the price they pay for energy. Consumers are often unaware of the true price of energy they consume, and prices and rate structure do not reflect the exact cost to the user.

A sustainable energy strategy would see the price of energy reflecting the total economic, environmental and social costs. It is important to remember that higher energy prices do not necessarily mean higher energy bills. If the rate increase causes consumers to use less energy, their bill may actually decrease. A gradual increase will allow energy efficiency measures to be implemented before the price increase causes bills to significantly increase.

Rate design is an appropriate DSM tool when used in conjunction with other DSM programs. Rate increases, time-of-use rates, seasonal rates, and demand charges for residential customers all serve as a price signal for energy.

Individuals and companies are unlikely to invest in energy efficiency if they do not benefit financially. The money that generates the benefits needs to come from somewhere -- and proponents of sustainable energy policy believe that money should come from charges on energy itself. The charges discourage undesirable outcomes and are returned in ways that reward desired outcomes.

A 1994 report of the BC Energy Council noted that "a transition to sustainability requires that people benefit financially from actions that support sustainability and pay for those that do not." Research shows that energy is used efficiently and supplied more sustainably in countries where energy costs are high for extended periods of time and where governments fund sustainable energy supply development (such as in the Netherlands). There are exceptions, however, such as in Scotland, where rates are high but products such as compact fluorescent lights are just being introduced.

Changes to rate structure could be combined with incentives to utility customers for maximum effectiveness. For example, incentives could be offered for: switching from electric heat to an alternative source; purchasing "off electric" hot water heaters, efficient refrigerators, programmable thermostats for water heaters, commercial lighting retrofits, light controllers, and efficient motors.

Also, if rates were restructured to encourage energy efficiency, government could provide assistance to low-income customers to help prevent additional financial hardship caused by a rate increase.

8) Pros and cons of option eight -- Energy Rate Structure/Rate Relief

PROS

- A correct price signal is sent to the consumer and energy efficiency becomes more attractive.

- The payback period for energy efficiency investments is shortened.

- There is little or no cost to government.

CONS

Energy rates are already fairly high in Yukon, compared with other jurisdictions. Another rate increase would be unpopular with consumers.

9) Project evaluation methodologies

Government could direct the utilities to employ a multiple accounts evaluation methodology for new energy projects. Rather than evaluating projects against financial criteria only, multiple accounts analysis requires consideration of financial performance, environmental and social impact, economic development and customer service factors. Comprehensive guidelines for multiple accounts evaluation are available from the Government of British Columbia.

According to guidelines for multiple account evaluation, developed by the B.C. government, there are four basic principles underlying multiple account evaluation. These are:

- Government and crown corporation plans and projects are generally part of, and have implications for, broader corporate and provincial goals and strategies. The evaluation process, therefore, must be seen as part of an integrated planning framework.

- Plans and projects are not ends in themselves; they are means of addressing problems or taking advantage of opportunities. When the problem or opportunity to be addressed by a proposed plan or project is clearly defined at the outset of the evaluation, the full range of alternatives can be identified and considered.

- Crown corporations and government departments have a number of different interests and objectives. Generally, no single measure of overall net benefit can adequately summarize performance in all relevant areas. A systematic analysis of performance under a number of evaluation accounts, e.g. financial performance, customer or public service, environmental impacts, economic development, and social impacts, is therefore required to understand the full range of implications of alternative plans or projects. Such "multiple account" evaluations may not determine which of a set of alternatives is unequivocally preferred. However, the goal is to clearly identify advantages and disadvantages and the trade offs that different alternatives entail -- to inform and assist decision making, not supplant it.

- The implications of alternative projects and plans are subject to considerable uncertainty. It is essential to identify the nature and extent of the uncertainty and its potential significance. In addition to using the traditional sensitivity analysis, uncertainty should also be considered in terms of the flexibility of different alternatives to respond to new information and unfolding events. An understanding of how and at what cost alternative plans and projects would respond to unexpected conditions can be as important as understanding their implications under what is considered most likely.

A complete set of guidelines on multiple account evaluation are available from the British Columbia Utilities Commission.

Pros and cons of option nine -- Project evaluation methodologies

Pros

- Multiple accounts evaluations ensure that all costs, including environmental and social, are considered in new projects.

Cons

- May cause a rate increase.

- It may be difficult to quantify environmental costs.

10) Partnering Programs

All levels of government, utilities, and major electricity users are all interested in energy efficiency. By partnering with the business community, utilities, federal and municipal government, the Government of Yukon could facilitate the sharing of information and training programs among these three groups. For example:

Information about new technologies identified in Opportunities Assessments, which are conducted by the utilities for their customers, could be shared with government and other major users of electricity.

To set energy efficiency targets, an Opportunities Assessment, using a representative sample of buildings throughout Yukon, could be conducted with the assistance of the utilities.

Joint training programs can be developed.

Government can work with local suppliers of energy-efficient products and technologies to promote the availability and benefits of these products.

All groups can work together towards the implementation of the National Energy Code in Yukon.

Pros and cons of option ten – Partnering Programs

Pros

- Avoids duplication of costs

- Helps government build and strengthen relationships with the business community, municipal and federal governments.

Cons

This is a win-win option, with no apparent disadvantages.

Bibliography

British Columbia Utilities Commission. **B.C. Hydro Wholesale Transmission Services Application: Decision, June 25, 1996.** Victoria, BC, 1996.

_____. **The British Columbia Electricity Market Review: Report and Recommendations to the Lieutenant Governor in Council.** Victoria, BC, 1995.

British Columbia. Crown Corporations Secretariat. **Multiple Account Evaluation Guidelines**, 1993.

_____. Ministry of Employment and Investment. **Energy Efficiency Act**, 1996.

_____. Ministry of Employment and Investment. Personal discussion with Warren Bell, 1997.

British Columbia Energy Council. **Report and Recommendations to the Lieutenant Governor in Council.** Victoria, BC, 1994.

Canada. Natural Resources Canada. **National Energy Code for Buildings**, 1995.

_____. **Report to Parliament on the Administration and Enforcement of the Energy Efficiency Act**, 1995.

_____. **Energy Efficiency Trends in Canada**, 1996.

City of Whitehorse. Personal discussion with George White, 1997.

International Institute for Energy Conservation. **Opportunities for North American Cooperation on Energy Efficiency**, January 1997.

Harvey, L.D. Danny. **Local actions to reduce greenhouse gas emissions in the context of national action plans**, University of Toronto, 1995.

International Utility Efficiency Partnerships Inc. **Energy efficiency: A proposal to meet the Western Hemisphere's Commitment to Sustainable Development - White Paper**, 1996.

Lazar, Jim. and Bell, Kevin. **Market Failure and DSM Achievement in British Columbia**, 1996.

Meek, Dan. and Bell, Kevin. **DSM Restructuring: Issues from the California Experience,** 1996.

_____ **Implementation of DSM in a restructured utility environment: The California Experience**, 1996.

Northwest Conservation Act Coalition. **What Electricity Utility Deregulation Means to the Northwest**, 1996. http://www.oz.net/ncac/qa.html

Ontario. Ministry of Environment and Energy. **Energy Efficiency Act**, 1996.

Quebec. Ministere des Ressources naturelles. **For an Energy Efficient Quebec: Report of the Consultation Panel for the Public Debate on Energy**, 1996.

_____ Proposal, **Quebec's Energy Efficiency Strategy: A Contribution to Sustainable Development.** 1992.

Swjsher, Joel N. **Regulatory and mixed policy options for reducing fuel use and carbon emissions**, UNEP Collaborating Centre on Energy and Environment, Rsio National Laboratory, Denmark, 1996

Yukon Energy Corporation and The Yukon Electrical Company Limited. **Energy Management Working Group: Final Report**, November 1996.

Yukon. Government Services, Personal discussion with Doug Maclean, 1997.

Yukon. Renewable Resources. Personal discussion with Jim Connell and Joe Ballentine, 1997.

Yukon Energy Commission. Personal discussion with Gary McRobb and William Buyers, 1997.

Yukon Energy Corporation. Personal discussion with Rob McWilliam and John Maissan, 1997.

Yukon Housing Corporation. Personal discussion with Dan Boyd, 1997.

Yukon Utilities Board. Personal discussion with Gordon Duncan, 1997.