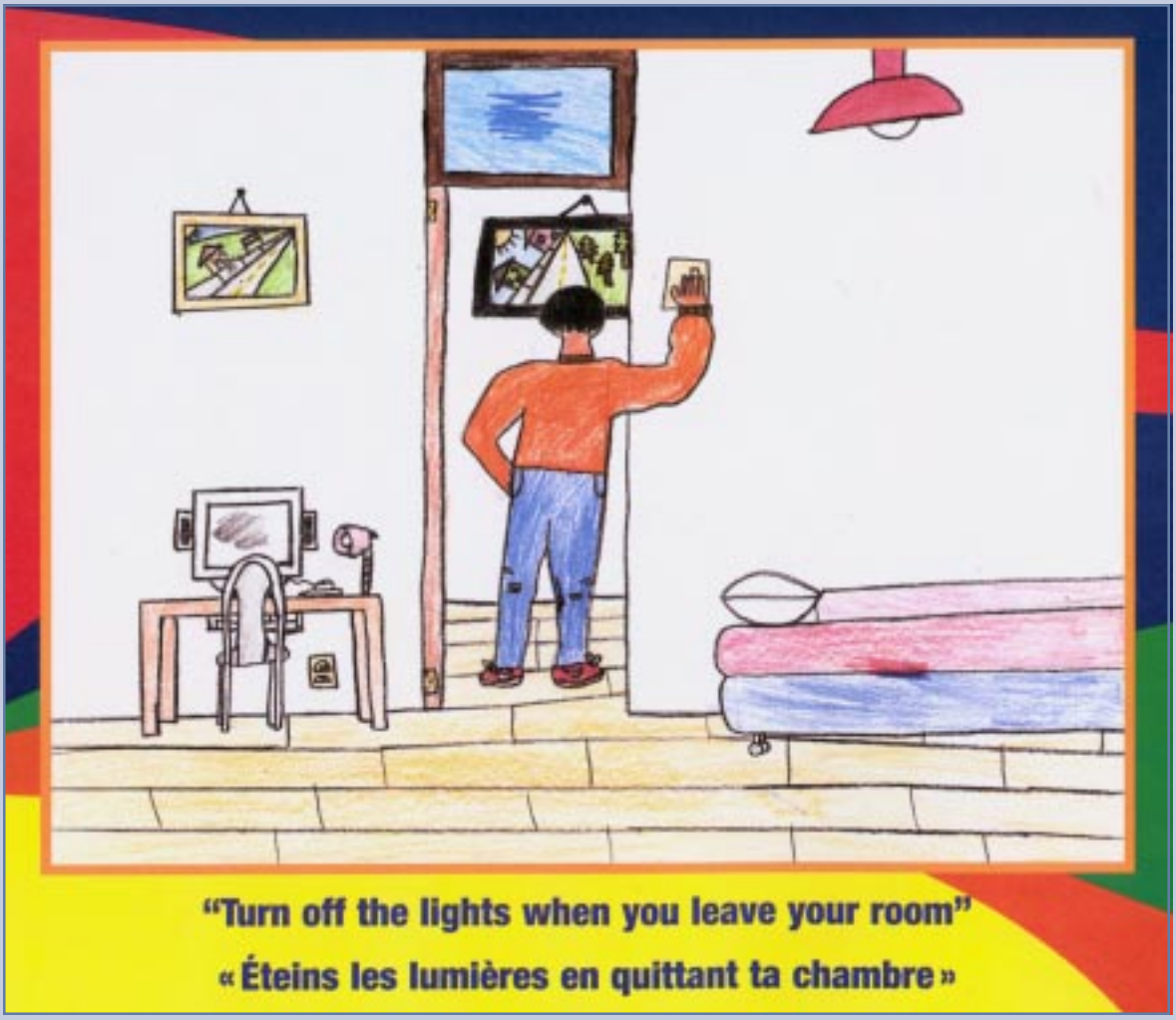

ENERGY MANAGEMENT IN THE YUKON

IMPLEMENTING THE YUKON GOVERNMENT'S ENERGY STRATEGY

February 2000

Yukon
Economic Development

Economy 2000
A Yukon Partnership

Front cover: Illustration for August, 2000 page of Energy and Environment calendar, published by Natural Resources Canada. It was drawn by Sylvio Lin, age 10, Selkirk Elementary School, Whitehorse, Yukon.

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INTRODUCTION

Energy is everybody's business. Whether we are at home or at work, the way we use energy in the Yukon affects us all. Plug in a kettle, turn up the heat, drive to town —all of these actions are part of the big energy picture.

Principles of the Yukon Energy Policy

Five fundamental principles guided the work of the Cabinet Commission on Energy as the foundation to a comprehensive energy policy for the Yukon:

- sustainable development of energy resources
- efficient use of energy
- secure supply of reliable energy
- affordable energy
- openness and accountability in energy decision-making

The Yukon government knows how important energy is to people's everyday lives. It also recognizes the broader implications of smart energy management on individuals, businesses, communities, governments and the environment. That's why it established the Cabinet Commission on Energy in 1996.

The Cabinet Commission on Energy explored these issues at great length — examining everything from the cost of power to reducing greenhouse gas emissions. The Commission came up with 56 short-, medium- and long-term recommendations.

The Yukon government responded within two months of the release of the Commission's report and accepted all 56 recommendations. The government committed to implementing those measures in its November 1998 *Implementation Plan for the Final Report on the Cabinet Commission on Energy*, and it allocated $16 million to four early actions to address specific energy issues: rate stabilization, green energy, wind power development and energy efficiency. The *Energy Implementation Plan* outlined how the government intended to take action on the Commission's recommendations.

This report reviews the progress on measures ranging from low interest loans to encourage homeowners to find alternatives to electric heat, to testing new technologies which increase energy efficiency in government operations. This report builds on the *Energy Implementation Plan* by providing a more comprehensive look at the approaches the government has taken, as well as ones it will be taking, to turn the Commission's recommendations into a coordinated approach to addressing the Yukon's energy issues.

Many innovative projects have been undertaken to improve the Yukon's energy situation and prepare us for the future. Many more are in the concept stage with plans to implement them in the next decade.

Solar panels capture the sun's rays and turn them into electricity. The Green Power Iniative promotes the development of environmentally sustainable renewable energy.

MANAGING ENERGY
IN OUR HOMES

One of the top priorities of the government's Energy Implementation Plan is to promote efficient energy management. This includes providing information and financial assistance to help Yukon people improve energy efficiency at home and in their everyday lives.

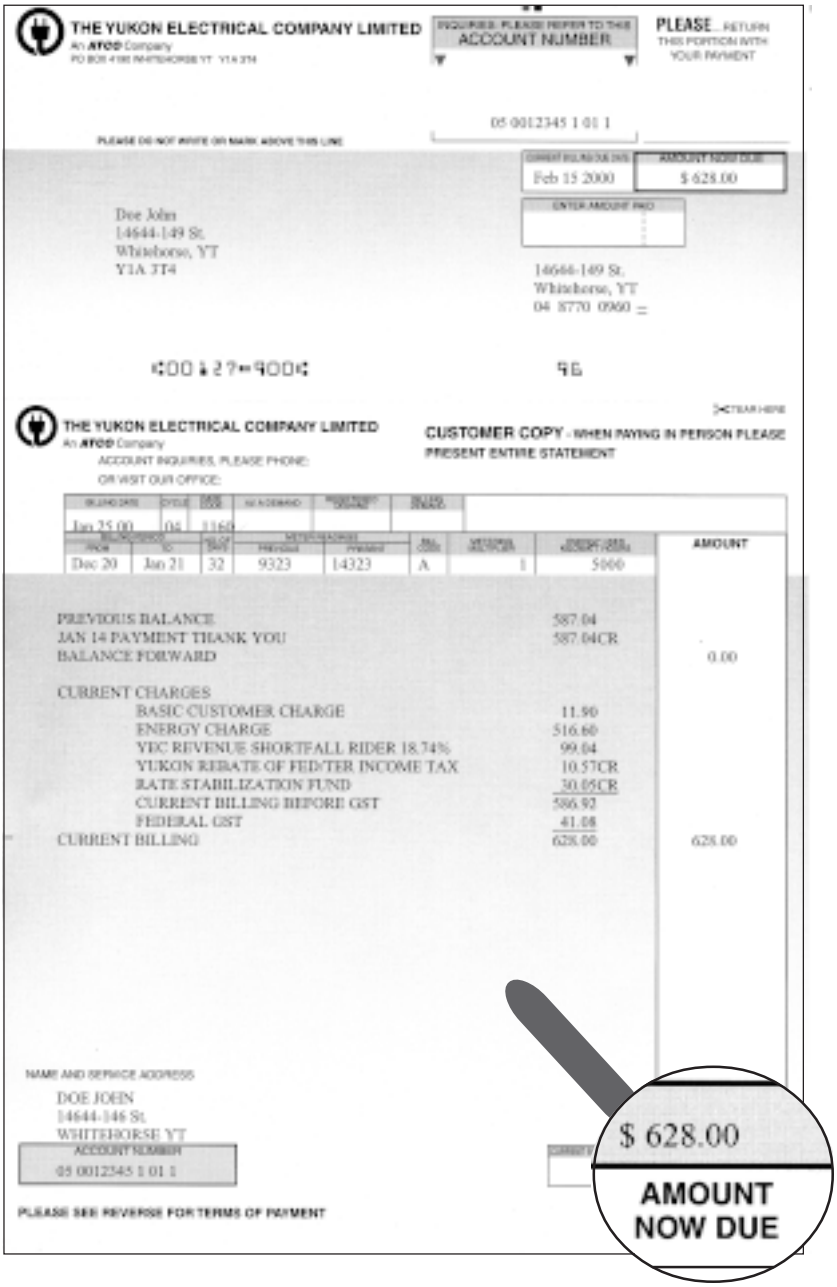
In this section:

- ✓ *Replacing electric heat*
- ✓ *Green mortgages*
- ✓ *Energy Efficiency Initiative*
- ✓ *EnerGuide for Houses*
- ✓ *R-2000*
- ✓ *Home Show 2000*
- ✓ *Future considerations*

Replacing electric heat

One of the first recommendations of the Cabinet Commission on Energy was to encourage Yukon people to move away from electric heating systems as a primary heating source. Many Yukon people heat their homes and businesses with electric heat, at one time considered a clean and inexpensive primary heating choice by home builders. Electric heaters consume huge amounts of electricity during the winter when the demand for power is greatest, and when the capacity to produce cheaper hydro power is reduced.

In the *Energy Implementation Plan,* the government agreed to provide continued support to programs and



Your power bill need not look like this. Over 200 homeowners have taken advantage of the Residential Electricity Management Program since its introduction in 1997. Each is saving an average of $2,000 per year on heating. Together, these heating system conversions have reduced the Yukon's annual carbon dioxide emissions by over 2,500 tonnes.

initiatives geared towards helping people switch from electric heating as the primary source of heat in their homes.

Conversions have increased significantly since the introduction of the *Residential Electricity Management Program* (REMP) in 1997. REMP, offered through the Yukon Housing Corporation (YHC), provides low-interest loans for heating system conversions.

The program was improved this past year by opening it to more Yukon homeowners.

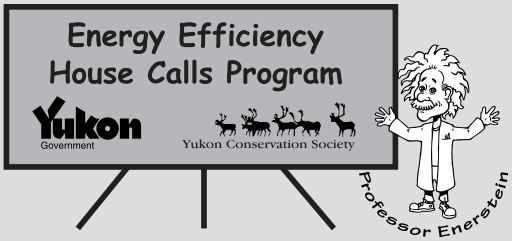
More homeowners are saving money on heating costs and adding to the value of their home by making the switch to alternative forms of heating. REMP has helped over 200 Yukon homeowners to convert from electricity to other heating fuel types. The result — savings of over $400,000 a year on energy bills, and a net reduction of 2,500 tonnes of greenhouse gas emissions.

Green mortgages

In March 1999, the Yukon government introduced the *Green Mortgage Program* through the Yukon Housing Corporation.

This program provides mortgages for energy efficient homes at a rate one per cent lower than the average posted bank interest rates. To qualify, clients must construct an energy efficient home or upgrade an existing home to the standards set out in the *EnerGuide for Houses* rating system. Participants must hire a Yukon contractor, purchase at least 75 per cent of their building materials from Yukon businesses and provide the resulting greenhouse gas emission credits to the Yukon government.

This program stimulates the residential building industry and serves to educate local builders about the latest standards. There is an added benefit: interest payments to the program will be used toward seniors' housing needs.



It's a wrap

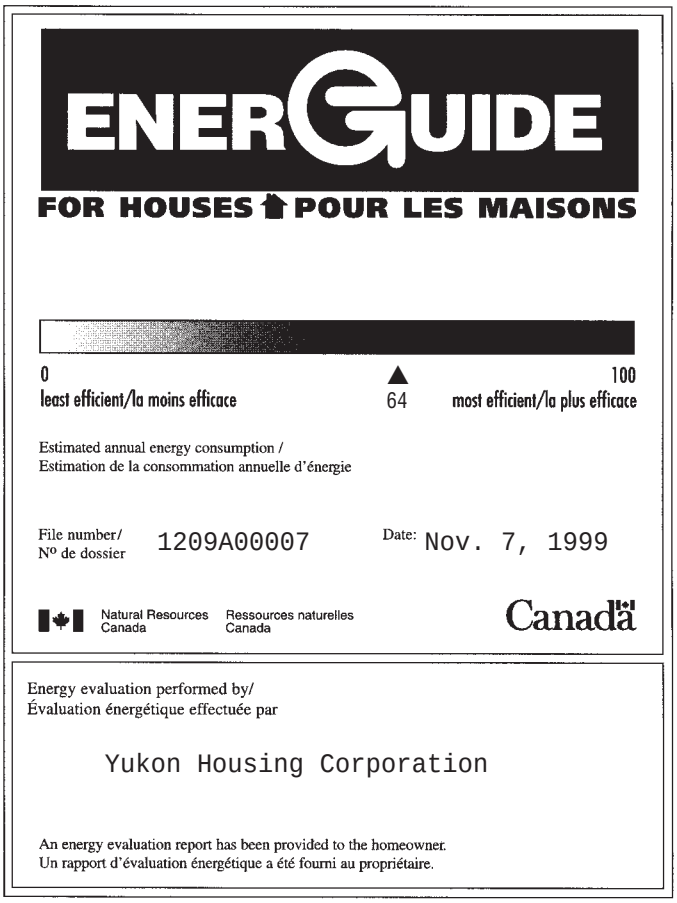
Hot water tanks burn a lot of energy. The simple act of wrapping your tank and pipes with extra insulation can save you money — as much as $30 a year on a $50 investment. This is equivalent to a bond that pays 30% interest, after taxes. Turning down the temperature a few degrees can also help.

Energy Efficiency Initiative

In the fall of 1999, the Yukon government launched the *Energy Efficiency Initiative*. It is designed to promote efficient use of energy in the home and in the workplace, and to raise public awareness of the connection between energy use and climate change due to emissions of greenhouse gases.

To date, one of the key public awareness aspects of this initiative was the *Energy Efficiency House Calls* pilot project, sponsored by the Yukon government, in cooperation with the Yukon Conservation Society.

Energy technicians visited 125 homes in Dawson City and Whitehorse. They demonstrated energy-saving devices like block heater timers, motion sensor light switches, timers for bathroom fans and energy efficient lighting. Participants received free hot water tank blankets (and free installation!) and compact fluorescent light bulbs (also installed). Energy technicians



ENERGUIDE

FOR HOUSES POUR LES MAISONS

0 least efficient/la moins efficace

▲ 64

100 most efficient/la plus efficace

Estimated annual energy consumption /
Estimation de la consommation annuelle d'énergie

File number/ Nº de dossier 1209A00007

Date: Nov. 7, 1999

Natural Resources Canada / Ressources naturelles Canada

Canada

Energy evaluation performed by/
Évaluation énergétique effectuée par

Yukon Housing Corporation

An energy evaluation report has been provided to the homeowner.
Un rapport d'évaluation énergétique a été fourni au propriétaire.

Air sealing

Seal chimney at ceiling. Attic hatch should be weatherstripped to close tightly. Remove window trim and inject low-expanding foam to seal window frames. Seal and insulate floor joist header.

Clean/Replace furnace filter

Clean or replace your furnace filter at least once a month. A pleated type filter is more expensive but will do a better job of filtering all sizes and types of dust particles and improve indoor air quality. Some suppliers carry permanently electrostatically charged filters, which are washable and reusable.
Remember - you will get what you pay for.

Recommended DHW heating temperature

The recommended temperature setting for domestic hot water heaters is 55°C/130°F.

Reduce water consumption

Install low-flow showerheads, faucet aerators, and low-flush toilets to reduce water consumption.

Energy efficient lighting

When replacing lights, install energy efficient lighting to reduce electricity consumption (energy efficient light bulbs also last longer).

Energy efficient appliances

When replacing appliances, use the EnerGuide label to select the most energy efficient models

Examples of an EnerGuide label and typical summary recommendations for a Yukon home built in the 1970s.

discussed energy saving tips and how the energy used in our homes impacts climate change.

Participants in the *House Calls* project were also asked to help identify the time of day that energy is used to heat water in their home. Residents completed a survey that will be used to implement a new pilot project designed to shift heating water to non-peak hours.

EnerGuide for Houses

Since May 1999, more than 200 Yukon households have participated in *EnerGuide for Houses*, an energy auditing and rating program developed by Natural Resources Canada (NRCan). The Yukon government delivers this program in the territory.

The program is helping people identify ways to make their homes more energy efficient, and more comfortable. For a fee of $149, a qualified energy auditor will audit and test a home and suggest improvements. Yukon Housing Corporation provides low-interest financing to help carry out the energy auditor's recommendations.

Once the improvements are completed, the energy auditor will return to give the home its new energy rating. This new energy rating will likely play an important role in determining the value of a property in the future.

R-2000

The *R-2000* program sets a new standard in comfortable, healthy, low-maintenance, energy efficient housing.

The new *R-2000* program also promotes reduced environmental impacts through the use of recycled building materials. Reduced water consumption means less energy is required for the municipality to collect, treat and pump water.

Virtually eliminating random air leakage and providing forced ventilation places the homeowner in control. Paying special attention to the materials that go into a home further reduces ventilation requirements. Well designed windows to take advantage of solar gains, and high efficiency space and water heating systems reduce energy use even more.

An *R-2000* house means that its plans were evaluated to ensure that it will achieve a specified energy performance target. It also means that it has been constructed by a fully trained, registered builder and that it was inspected and tested during the construction stage to ensure that it meets program standards for insulation and ventilation levels. Already, a number of newly constructed homes have received *R-2000* certification.

Yukon Housing will continue to offer *R-2000* certification courses for residential contractors and home builders.

New and retrofit house construction in the Yukon.

Home Show 2000

Each spring, Yukon Housing Corporation sponsors a Home Show in cooperation with the Canadian Home Builders Association (Yukon). The Home Show is a housing-industry focused trade show, promoting the professional quality of the industry's good and services. It features presentations by industry leaders, seminars for the public, and exhibits by local businesses. Seminars provide an opportunity to inform the public about such programs as *R-2000, EnerGuide, Home Repair* and other programs of interest to those purchasing, building or renovating a home.

Home Show 2000 will be held March 31-April 1 at Yukon College and will focus on home repair, new home construction, seniors' housing and energy efficiency.

Future considerations

To further reduce energy consumption in homes, the government will continue to encourage energy awareness through its existing programs and through initiatives now under development. Yukon Housing will offer courses on heating and ventilation systems and energy efficient construction.

MANAGING ENERGY **IN BUSINESS**

As part of the government's Energy Implementation Plan, steps have been taken to make it easier for private businesses and the construction industry to build and operate energy efficient commercial buildings. In implementing steps to increase energy efficiency in commercial buildings, the government has reviewed and revised its existing programs and funding support to expand eligibility and encourage more participation in programs.

In this section:

- ✓ *Encouraging energy efficient designs*
- ✓ *Commercial Energy Management Program*
- ✓ *C-2000*
- ✓ *Rental Rehabilitation Program*
- ✓ *Performance contracts*
- ✓ *Energy infrastructure loans*
- ✓ *Future considerations*

Encouraging energy efficient designs

Energy efficiency can improve the financial health of a business. It can also contribute to a positive corporate image. For example, the new headquarters of the Yukon Energy Corporation was recognized for its practical and effective energy-efficient design, through a National Energy Efficiency Award in the commercial/institutional category. This new building is located at Whitehorse Rapids. It has been viewed by the public and builders as a commercial building that saves money on heating costs while creating a good working environment for employees.

Switch on the savings

When it comes to saving energy at work, lighting is often at the top of the list. Converting a lighting system to electronic ballasts and low-energy fluorescent tubes represents a low-risk, high-return investment.

The Yukon government is not only encouraging businesses to consider alternatives, it's offering a helping hand. The Commercial Energy Management Program (CEMP) offers non-repayable contributions to businesses, municipalities, and First Nation governments.

CEMP provides energy audits and direct financial assistance based on the expected first-year savings. After a retrofit to a new energy efficient lighting system, the savings continue year after year.

Commercial Energy Management Program

In early February 2000, the *Commercial Energy Management Program* was revised to expand eligibility for program assistance to municipalities and First Nation governments, as well as business. It helps owners and tenants of existing commercial buildings to implement energy efficient renovations. The Yukon Housing Corporation (YHC) delivers the program on behalf of the Yukon government.

YHC offers financial incentives and information to building owners who wish to install more efficient heating systems as an alternative to electric heating systems.

C-2000

The C-2000 rating is a proactive design process for new commercial buildings that results in increased energy efficiency and improved environmental performance.

Yukon Housing is working with Natural Resources Canada to make C-2000 building certification more readily available for Yukon contractors and building owners.

Rental Rehabilitation Program

The *Rental Rehabilitation Program* provides low-interest loans to landlords to improve the energy efficiency of rental units. Landlords who want to address accessibility and health and safety issues in their properties can also take advantage of the program.

Performance contracts

The government is also providing advice to building owners who do not want to make energy efficiency improvements themselves, but who wish to increase energy efficiency through a performance contract. Under a performance contract, an energy service contractor takes the initial risk by performing the necessary improvements. Their investment is recovered by sharing the savings generated with the building owner over a specified period of time.

Energy infrastructure loans

The *Energy Infrastructure Loans for Resource Development Program* (EILRDP) is under review to ensure its objectives, guidelines and project conditions address industrial energy infrastructure issues. This review is one part of a comprehensive review of industrial support programs.

Future considerations

To encourage further reduction in energy consumption in business and industrial operations, the government will continue to encourage energy awareness. Training to certify commercial energy auditors will be conducted in February, 2000 and upgrading courses will be offered on a regular basis.

When new industrial developments are taking place, the government will identify ways to pursue cost-effective, efficient operations, including residual heat recovery.

The Yukon government will continue helping Yukon companies offering energy services, through its trade and investment initiatives, the *Northern Climate Exchange*, and through listings such as the business directory on the Yukon Economic Development website.

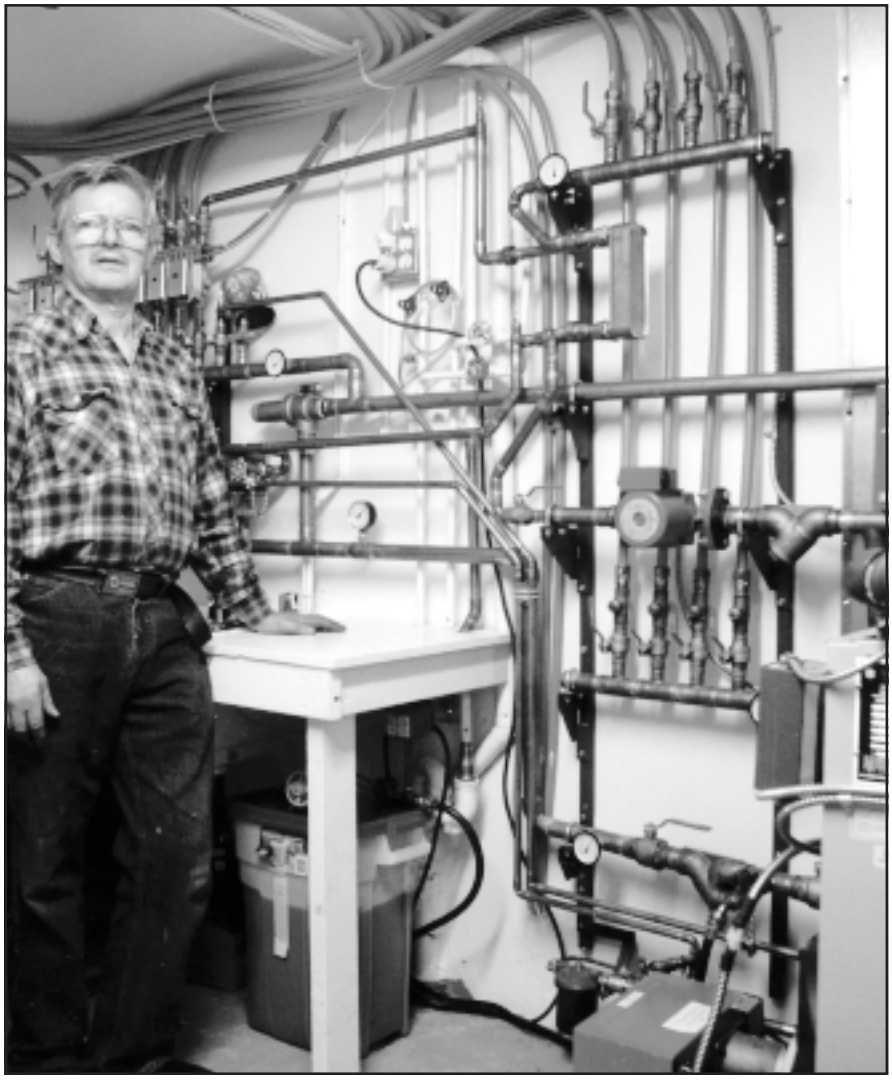
Hold the juice

In a typical situation where plug-in parking is offered to workers, vehicles are plugged in for the whole day. A Yukon government pilot project will test a device that works in accordance with the outside temperature to regulate power to the block heater as the temperature warrants.

At minus 40°C, vehicles will receive constant power. But at minus 30°C, power to the block heater 80 per cent of the time is sufficient, and at minus 20°C, vehicles will receive power only half the time.

The timing control devices to be used in the Yukon project have been specially programmed for our severe winter temperatures. The new technologies will be piloted in Whitehorse and in a rural community, and will involve both private and public sector applications. The intelligent parking lot controllers for this project are produced by a company in Manitoba, and have been successfully field tested for the past four years.

With assistance from the Commercial Energy Management Program, Ken Bennett designed and installed the new oil-fired hot water heating system to replace the electric baseboard heaters at the Whitehorse Physiotherapy Clinic.



MANAGING ENERGY **IN COMMUNITIES**

When it comes to responsible energy management, every community can play a vital role. Whether it is by setting a good example, or by spearheading an experiment with new technologies, the Yukon government is encouraging communities to take the lead.

In this section:

- ✓ *Identifying opportunities*
- ✓ *Working in partnership*
- ✓ *Future considerations*

Identifying opportunities

The government is working with Yukon communities to identify opportunities for new community energy management projects, or to find ways to make present ones more viable. Energy consumers within Yukon communities have a critical role to play in making new energy projects economically effective.

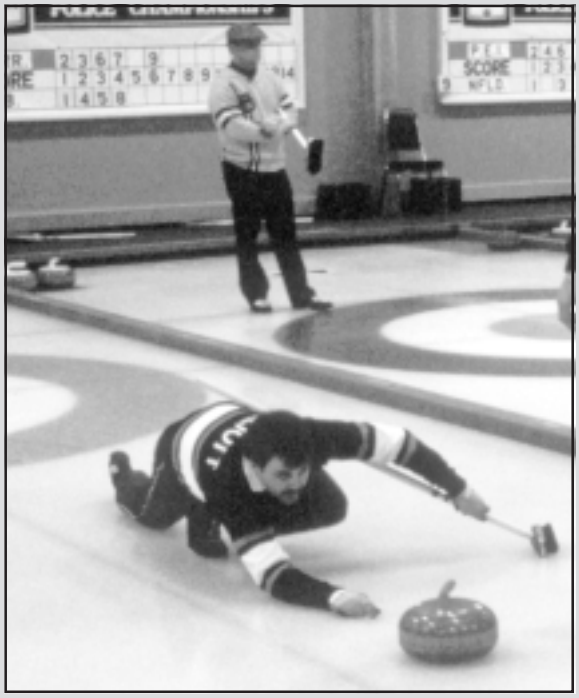
The Yukon government is helping to raise awareness of energy management opportunities for communities and individuals through workshops, school programs, and programs such as the *Green Power Initiative* and the *Commercial Energy Management Program*.

Working in partnership

In the *Energy Implementation Plan*, the government committed to working with community and other government partners to facilitate three community-based sustainable energy projects over the next two years.

The Yukon government worked with the Town of Watson Lake and the Yukon Electrical Company Limited (YECL) to build an innovative community heating project. The district heating system turns residual heat from the YECL diesel generators into heat for several buildings.

Projects like the Watson Lake district-heating project demonstrate



Community Development Fund

A number of organizations have received a total of $150,000 in assistance from the *Community Development Fund* to carry out energy-related community projects.

- In partnership with the Champagne & Aishihik First Nations and the Yukon Energy Corporation, the Boreal Alternative Energy Centre established a wind-monitoring station at the Bear Creek summit near Haines Junction.
- The Braeburn Lake Christian Camp installed solar power.
- The science students at École Émilie Tremblay built a wind turbine.
- The Kluane First Nation installed a woodchip heating system.
- The Watson Lake Rodeo Association accessed reliable power for their rodeo grounds.
- The Yukon Transportation Museum installed a radiant heating system in its annex building.
- This winter the *Community Development Fund* is helping the Yukon Curling Association to run a series of workshops in 11 communities to help reduce overall operating costs. Energy represents a major portion of operating costs for many recreation facilities.

technically and economically viable energy opportunities and increase community awareness of the benefits of using an alternate heat source.

The Yukon government is examining similar projects for Beaver Creek, Haines Junction, Pelly Crossing, Old Crow and Whitehorse.

District heating can also be done on a smaller scale. In the Granger subdivision of Whitehorse, Cyr Place, a 12-unit seniors' residence housed in six buildings, uses one central heating plant. This project also provides a valuable demonstration of metering technologies for energy distribution since each unit can be directly billed for the heat it consumes.

The government is facilitating community energy management projects by helping communities obtain expertise to conduct initial evaluations and financial assistance to implement their projects, and by providing a guaranteed market for the energy produced.

The Yukon government has also helped to fund several community energy projects through the *Community Development Fund*.

Community energy management projects demonstrate effective partnerships among all levels of government, major customers and the utilities. Providing alternate heat sources makes good economic and environmental sense. It saves money and helps reduce greenhouse gas emissions.

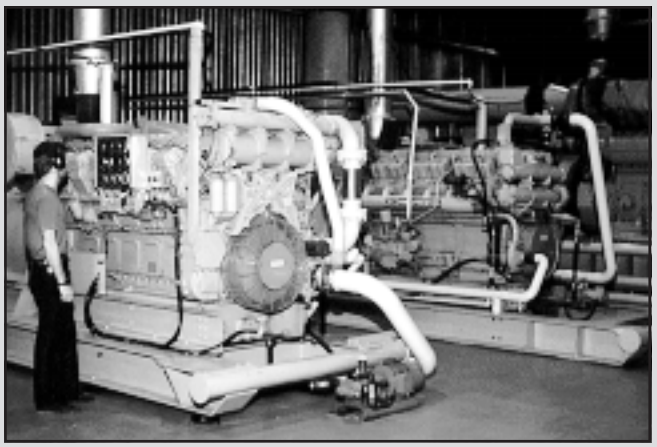
Waste not — want not

A new district heating system in Watson Lake was built last summer through a partnership between the Yukon government, the Town of Watson Lake and the Yukon Electrical Company Limited.

The town is harnessing the residual heat from the community's diesel generator and using it to heat the school, YECL's offices and residences, and the town's new recreation complex.

In most cases, residual heat is sent into the atmosphere while buildings are heated by expensive imported fossil fuels. The town's diesel generators provide the most residual heat when that heat is needed the most — in the coldest part of the winter.

It's expected this system could save more than 300,000 litres of heating fuel a year. That means reduced greenhouse gas emissions of 800 tonnes every year.



Future considerations

The Yukon government will encourage further partnerships between governments and communities. It will develop special community land use and zoning standards to be used as guidelines for community planning. This work will be carried out in conjunction with projects to demonstrate community energy management.

The government will promote planning for energy efficiency in the design of new subdivisions. The Yukon Housing Corporation is currently incorporating a cluster design into the new Range Road Mobile Home subdivision in Whitehorse. A cluster design saves energy by reducing the need for infrastructure: roadways and sewer and water, by taking the emphasis off the automobile, and by opening the potential for heating the entire cluster from a common source. Clustering is recognized internationally as a means of reducing greenhouse gas emissions.

MANAGING ENERGY
IN GOVERNMENT OPERATIONS

Government has an increasingly important role to play in encouraging energy efficiency in the community. It is striving to set the example of sound energy management by demonstrating energy-saving systems and by providing a market for energy efficient products and services.

In this section:

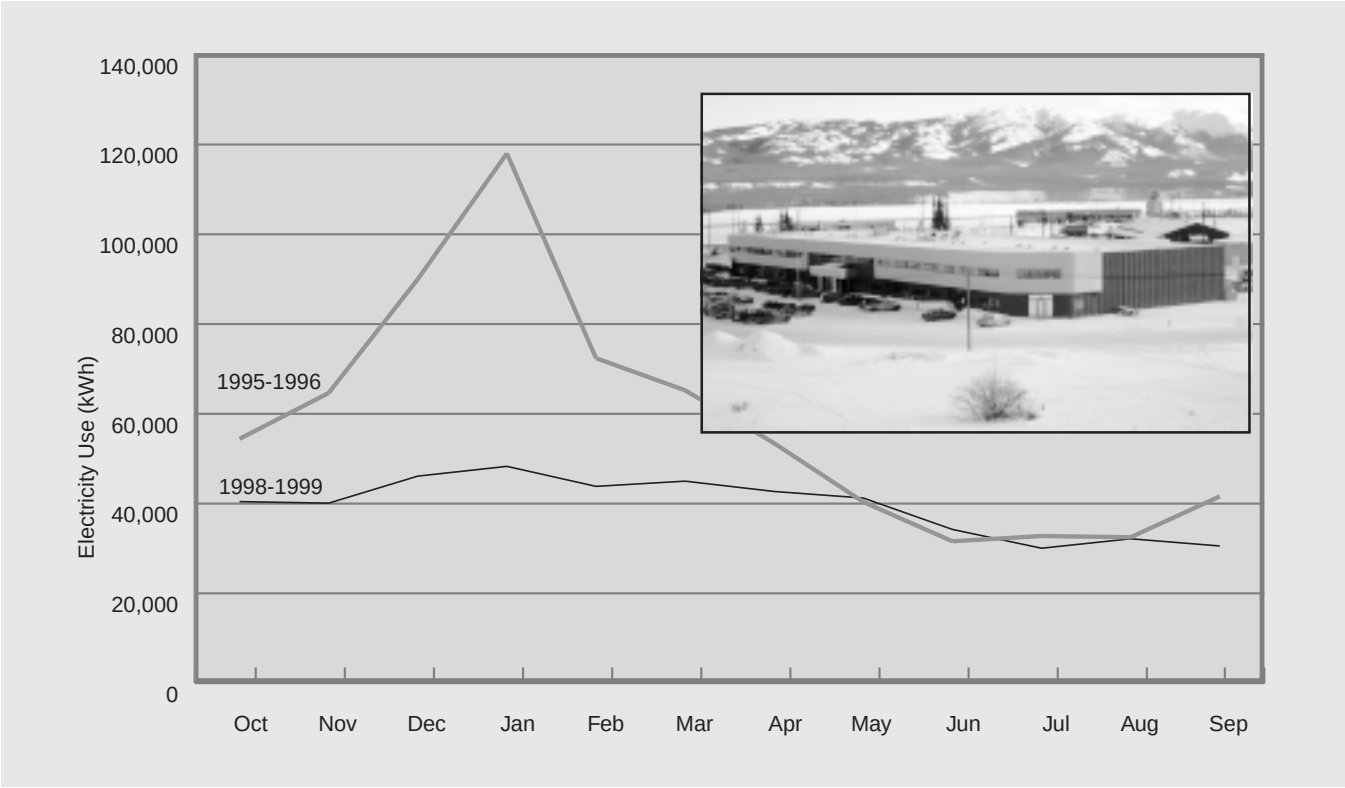
✓ *Leading by example*
✓ *Future considerations*

Leading by example

Five years ago the Yukon government initiated an energy saving pilot project in six schools, and saved more than $120,000 in the first two years, mostly through improved lighting and heating and ventilation controls. In the third year, the program was extended to other interested schools. Cumulative savings in Yukon schools now exceed $325,000.

During the past year, the Yukon government has continued to advance the efficient use of energy in its transportation system and in its buildings. The heating and electrical requirements for government facilities around the Yukon are being monitored to optimize energy efficiency. The government has developed energy performance standards, an overall energy management plan that identifies opportunities to reduce operating costs and greenhouse gas emissions, and specific energy plans for six buildings.

After the change to energy efficient T-8 lamps at F.H. Collins Secondary School, electricity use for lighting dropped by over 50 per cent.



The dramatic reduction in energy consumption at the Renewable Resources building on Burns Road in Whitehorse came about through changing the heating system from electricity to propane and installing energy efficient lighting. Other energy saving changes included motion sensors to control lighting and a controller to limit the power supplied to vehicles in the parking lot.

Refining the design

A number of energy-saving features are considered in the design of new government buildings. In recent new buildings, designs have been evaluated through integrated computer modeling, to determine whether features contribute to overall energy efficiency, cost savings, and health and safety objectives. Improved designs reduce operating and maintenance costs for years to come, and reduce initial construction costs because of smaller boilers and smaller motors for the heating and ventilation systems.

The new school to be built in Mayo during the 2000 construction season includes a number of energy-saving design features:

- building orientation to optimize daylighting and reduce heating cost;
- use of solar shading in summer and solar heating in winter;
- optimum window and glazing types;
- high insulation levels and improved insulation types;
- ventilation designed to improve control and reduce requirements for ducting and electricity; and
- digital control of heating and ventilation settings.

Projected energy use is 25 per cent less than the performance standards specified in the proposed National Energy Code for Buildings, and will qualify the building for an $80,000 grant under the federal *Commercial Building Incentives Program*.

Future considerations

To realize further reductions in energy consumption within government operations, the Yukon government will further develop energy efficiency performance standards for all Yukon government buildings, whether leased or owned. These standards will be designed to reduce the amount of energy the government uses, while making the work environment more comfortable.

MANAGING ENERGY IN TRANSPORTATION

The Yukon government is taking a lead role in encouraging its employees to reduce vehicle use for both personal and government use. It is testing a prototype electric car as a first step in investigating vehicles for fleet use that can run on alternate fuels. An initial report of the results will be prepared this winter.

In this section:

- ✓ *Researching alternatives*
- ✓ *Reducing emissions*
- ✓ *Future considerations*

Researching alternatives

To help promote a reduction in personal vehicle use, over 4,400 workers in Whitehorse were surveyed on how they travelled to work. The survey was conducted in the summer of 1999 and included employees of territorial, municipal and federal governments, NorthwesTel, Yukon Energy, Yukon Electrical, Yukon College, Council of Yukon First Nations and Whitehorse General Hospital.

Based on the 2,300 survey responses, the Yukon government is now designing a pilot program to encourage employees to walk, cycle, car pool or take the bus to work.

Reducing emissions

Vehicle emission clinics are held in Whitehorse each year to give motorists advice on getting better mileage and reducing greenhouse gases and other air pollution. These clinics are sponsored by Yukon Renewable Resources, Environment Canada and the City of Whitehorse.

The Yukon is also participating in national discussions about greenhouse gases associated with the transportation sector. This cooperation means that the government is aware of options being considered for greenhouse gas reduction, and can identify opportunities to adopt those with potential to benefit the Yukon.

Taking the bus to work reduces fuel emissions, traffic congestion, parking problems and vehicle repairs.

Running on empty

It's called the ZAP car. ZAP stands for Zero Atmospheric Pollution. It doesn't need gas — just electric batteries. Power is supplied to the electric motor by 18 six-volt lead acid batteries. It takes between eight to 12 hours to fully charge.

The ZAP car is a 1993 Ford Escort Sedan which cost about $6,000 to convert for the purposes of this project. It was tested this summer in the Yukon government fleet. A report on the test is to be prepared this spring. More tests are being planned at Yukon College.

Future considerations

To encourage energy efficiency in the transportation sector, the Yukon government will encourage alternative transportation in its work force, both for getting to and from work, and for business travel throughout the Yukon.

It will do further testing of transportation alternatives, and will conduct a cost/benefit analysis of emissions testing on government vehicles.

In preparation for a possible pilot project, it will conduct research on the potential energy savings from teleworking, whereby some employees could work some of the time from their homes.

Top: Bicycling is a convenient and inexpensive mode of urban transportation that saves energy, promotes fitness, relieves air pollution, and reduces parking and traffic congestion. Bottom: Motorists at the 1999 Vehicle Emissions Clinic.

MANAGING ENERGY
SUPPLY PLANNING

The Yukon government recognizes the importance of proper planning to ensure the territory's energy supplies meet the demand. At the same time, the government is striving to reduce the impact of energy production and use. Currently most of the Yukon's electricity needs are supplied by hydro and diesel generation, although research with pilot project scale wind turbines indicates that wind could play an increasingly important role in supplying future electricity needs.

In this section:

- ✓ *Green Power Initiative*
- ✓ *Rural electrification*
- ✓ *Future considerations*

Green Power Initiative

Green power is energy produced from renewable sources in an environmentally sustainable manner such as electricity produced from water, wind, solar and biomass (organic material).

The *Green Power Initiative* has four key objectives.

1. To displace diesel production and reduce emissions, particularly in communities served only by diesel-generated electrical power;
2. To provide consumers with a green power option and to take action to contribute to sustainable development;
3. To expand the technical capability to develop green power alternatives in the territory; and
4. To improve the cost-effectiveness and long-term competitiveness of green power alternatives.

A number of projects are underway to give the *Green Power Initiative* a head start, including:

- developing a portable solar power demonstration unit;
- surveying rural residents who could benefit from a stand-alone green power system;
- producing a how-to booklet on micro-hydro to assist Yukon people with planning and implementing projects;
- sponsoring learning projects for youth; and
- developing technical standards for a net metering program.

Rural electrification

The *Rural Electrification Program*, available through Community and Transportation Services, has been restructured to provide rural residents with low-interest loans for renewable alternative energy systems, such as wind, solar, and micro-hydro. Remote customers can still use this program to connect to the power grid.

This wind generator is currently installed on Haeckel Hill. Yukon Energy has plans to install a second, larger unit this summer.

Secondary power

Secondary power refers to electricity produced from surplus capacity, normally from run-of-river hydro plants, or from wind. Although it cannot be stored, secondary power can be sold on an interruptible basis to be used for space and water heating. Water that would otherwise have been spilled over the dam can make electricity to displace heating oil.

By using all available water resources, the utility is able to make better use of existing equipment and generate revenue from increased sales. Customers save about 20 to 35 per cent on heating bills. Every $50 saved this way also reduces CO_2 emissions by one tonne.

Let the sun shine

Renewable power, such as the new Yukon-made *Solar 2000* Transportable Hybrid Power system, has potential in the Yukon.

Designed to produce energy in places without access to the power grid, the *Solar2000* system may be just the answer for remote homes and camps. It is clean, quiet, reliable and easy to maintain. It is portable and can be relocated by road, or even by aircraft.

The system can store up to 18 kilowatt-hours, about three days of light residential use. It is also wired to accommodate a backup generator to ensure reliability. It can also be modified to meet greater power requirements.

Yukon Energy is looking for customers who would like to lease one of these stand-alone renewable power systems.

Converting Whitehorse to wood heat?

A district heating system fuelled by fire-killed wood may be just the answer to some of the Yukon's energy needs.

To find out more, the Yukon government partnered with B.C.-based Autumn Industries to study the feasibility of this alternative in the Whitehorse area.

In addition to reviewing possible projects for this new heating system, the study looked at the market potential of fuel pellets made from fire-killed wood, as well as its potential to create jobs for Yukon people. Wood pellet heating could reduce fossil fuel emissions and increase local control of the fuel supply.

The results, released in November, are an important first step for the government and the community to gauge whether to pursue this option for the downtown core of Whitehorse. Work is ongoing to evaluate the viability of this option.

Wood fired district heating systems are in place in many communities in Sweden.

Future considerations

The government is working with the Yukon Energy Corporation to improve the ongoing process of energy supply planning, load diversification and infrastructure development. It is developing a policy to give priority consideration to locally-supplied green power projects for isolated industrial customers. This policy will be based on the results of the present *Green Power Initiative*.

Discussions are underway with municipal and First Nation councils in several communities to supply electricity through renewable, green alternatives or to capture and use residual heat from diesel generation. The government hopes to implement appropriate green power or heat recovery options within ten years in Yukon communities currently supplied by diesel generation. Green power developments are expected to lead to new business opportunities in the energy supply and service sector.

Yukon Energy Corporation (YEC) is reviewing options for extending a power line from Mayo to Dawson City. However, grid extensions and interties will be pursued only if they serve to stabilize rates and keep electricity affordable.

YEC is determining potential sites to further expand the wind-monitoring program, and plans to install a second wind turbine on Haeckel Hill this year.

YEC is investigating the sale of interruptible surplus power, at a reduced rate.

And, it is identifying opportunities for portable solar power for remote homes and camps.

Yukon Development Corporation (YDC) is negotiating with the federal government to exempt secondary power from the provisions of the flexible term note, through which it is repaying the debt to the federal government on the fourth turbine at the Whitehorse Rapids hydroelectric plant. If YDC is successful, the cost of secondary electricity for heating could be significantly reduced.

MANAGING ENERGY
GREENHOUSE GAS EMISSIONS

All of us are affected by greenhouse gas emissions and their effect on the climate — as individuals, communities and businesses.

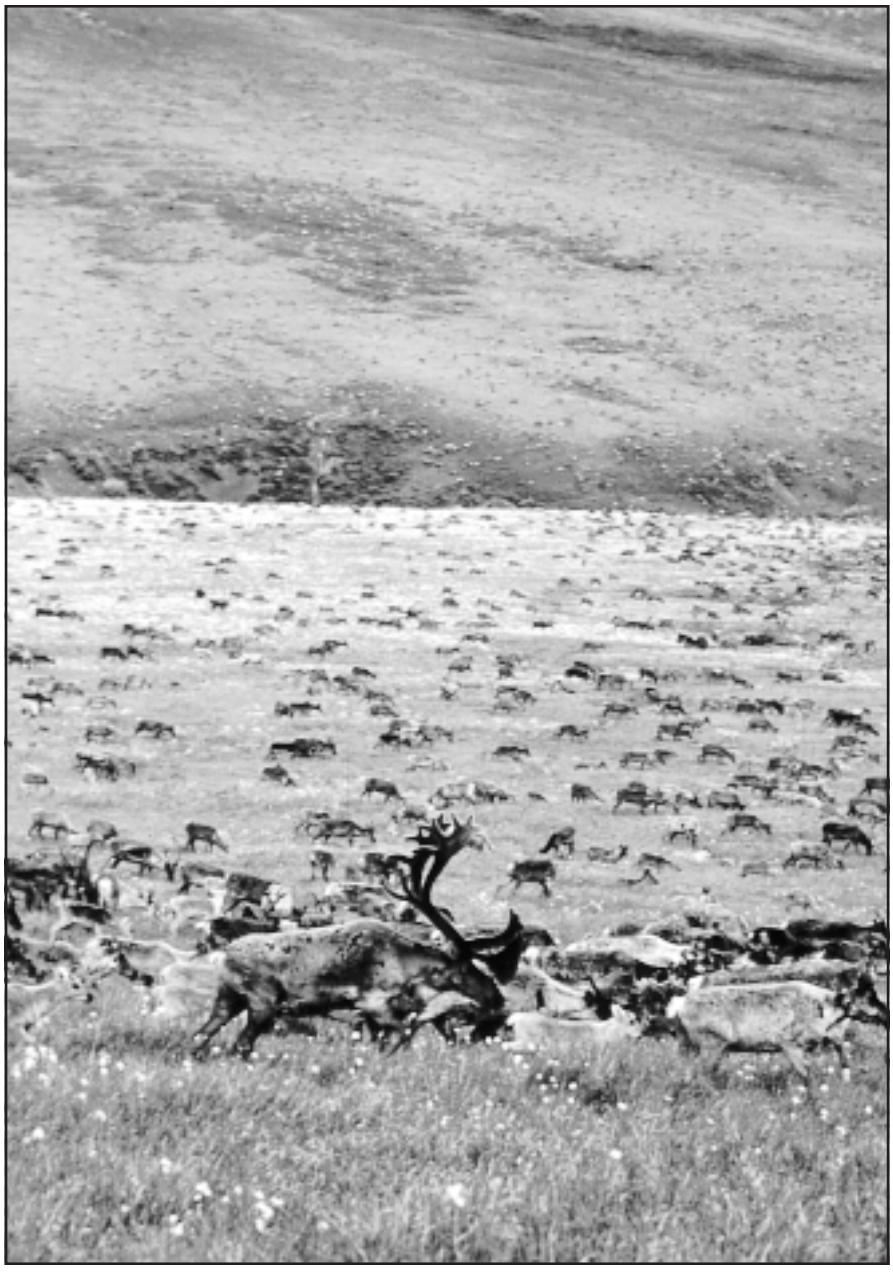
In this section:

- ✓ *Keeping track*
- ✓ *Future considerations*

Keeping track

The Yukon contributes approximately a tenth of one per cent of Canada's carbon dioxide emissions — about the same per capita as other jurisdictions. The Yukon government is currently working with Natural Resources Canada to develop greenhouse gas emission projections based on statistical data and population and economic forecasts.

Climate change resulting from emissions of carbon dioxide and other greenhouse gases will have a significant impact on the environment for years to come. However, the impact will not be evenly distributed around the globe.



The Yukon is participating in a national study on the impact of climate change on migratory caribou. This continent-wide assessment of the impact of climate change will focus on two of 12 migratory caribou herds in North America.

In fact, the north will receive more than its share of impact from global warming. Yukon people may experience more frequent and larger storms, changes in precipitation patterns, and changes in permafrost soils. In addition, the warmer weather will affect the habitats of birds and wildlife.

The Yukon government is participating in national efforts aimed at meeting Canada's international commitments. (See "Trading in credits.")

The Yukon is already addressing this issue by committing $6 million to three special initiatives to reduce greenhouse gas emissions:

- $3 million to establish the *Green Power Initiative* to reduce dependence on diesel generation;
- $2 million to advance wind power research and development by installing a second commercial wind turbine; and
- $1 million to complement existing programs through an *Energy Efficiency Initiative*.

All Yukon people have a role to play in identifying ways to reduce the effects of climate change. The government is helping to facilitate research and identify solutions through several public awareness initiatives.

Future considerations

The Yukon government is investigating ways to encourage greenhouse gas emission reduction through greenhouse gas emissions trading, which can provide a financial incentive for investment in and development of Green Power.

A report on tradable emission credits is being prepared for the Yukon Energy Corporation. It will look at two Yukon projects: the Haeckel Hill wind generator; and the possible extension of the power grid from Mayo to Dawson City.

Keeping tabs on climate change

The *Northern Climate Exchange* was established in September 1999.

Jointly funded by the Yukon and federal governments, the exchange provides an innovative approach to looking at the impact of climate change in the north by involving both science and traditional knowledge.

Yukon College's *Northern Research Institute* is administering the $300,000 project.

The project will document and disseminate research being done in the area of climate change impacts. It will also help Yukon entrepreneurs become more aware of the economic opportunities in marketing Yukon energy management products and services.

The *Northern Climate Exchange* will provide an opportunity for Yukon people to examine global concerns at a local level. It may also lead to new research opportunities in the Yukon.

Trading in credits

The Kyoto Protocol to limit greenhouse gas emissions is an international agreement adopted in principle by 160 nations in December 1997. If ratified, it will obligate 38 developed nations, including Canada, to reduce greenhouse gas emissions by 2012 by over five per cent from 1990 levels. Canada's target is a six per cent reduction in emissions; the target for the U.S is seven per cent.

The impacts of the Kyoto protocol are significant. Canada's greenhouse gas emissions have risen nearly 20 per cent since 1990, resulting in the need to reduce emissions by 25 per cent from the current levels to meet the 2012 targets.

Emissions credit trading can be used to help achieve targets. A project that causes net increases in greenhouse gas emissions can purchase "credits" from other projects that reduce greenhouse gas emissions.

A Canadian example is Suncor Energy in Alberta, which is expanding its operations and increasing emissions by 12 per cent. To partially offset this increase, Suncor purchased 100,000 tonnes of credits from a power company in New York State that installed a small hydro plant to offset a coal-fired generator.

Although Kyoto is not yet ratified, companies such as Suncor have begun trading credits in anticipation of enforced implementation. Canada has at least two pilot projects that actively match buyers and sellers in greenhouse gas credit markets.

Should ratification occur, these greenhouse gas credits will become a global commodity, likely traded in markets similar to stock exchanges.

MANAGING ENERGY
ELECTRICITY

Yukon people rely heavily on electricity to provide their basic needs, and they expect it to be affordable. Stabilizing electricity bills was a key recommendation of the Cabinet Commission on Energy and the Yukon government is following through on its commitment to achieve this objective.

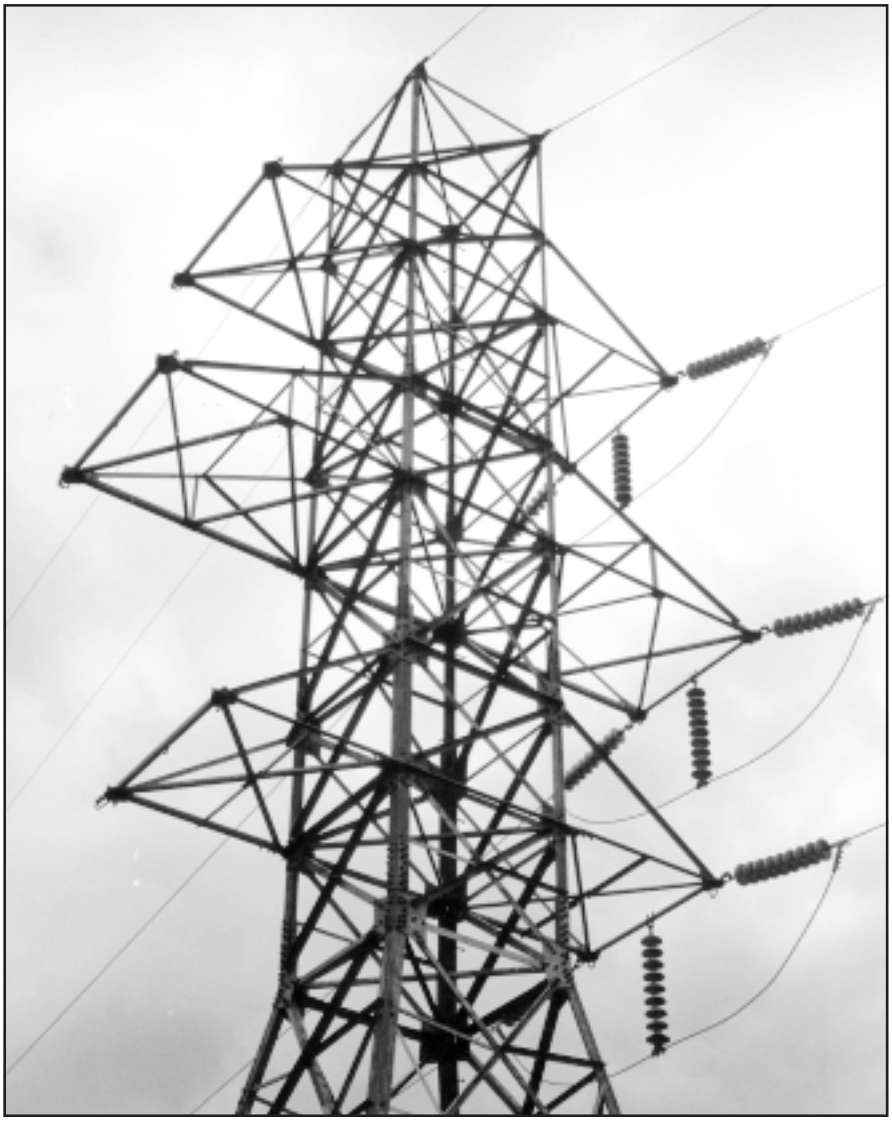
In this section:

- ✓ *Rate stabilization*
- ✓ *Rate equalization*
- ✓ *Electricity supply*
- ✓ *The regulatory process*
- ✓ *Future considerations*

Rate stabilization

The Yukon government established the *Rate Stabilization Fund* for non-government residential customers in December 1998. Four months later, it extended the benefits to municipal and non-government general service consumers.

This $10-million fund is one of various measures that will contribute to the long-term stability of electrical rates. It is managed by the Yukon Development Corporation and is delivered to customers through the electrical billing systems of the Yukon Energy Corporation and the Yukon Electrical Company Limited. It applies to basic levels of use, and will continue through to March 2002. During this time, YEC is investigating various options, in partnership with the Yukon government, to provide long-term stable and affordable electricity for Yukon consumers.



Providing reliable and affordable electricity is a key commitment of the Yukon government.

Rate equalization

The Yukon government believes that all residential electrical consumers should share the benefits of the publicly owned hydroelectric generation assets, and has reaffirmed its commitment to rate equalization. In keeping with the principles of fairness and affordability, the Yukon government believes that all residential electrical consumers should pay the same rate for basic levels of service.

Electricity supply

Infrastructure development options are currently under review to determine their potential contribution to reducing the long-term costs of supplying power throughout the territory. Preliminary system engineering and updated cost analysis of a transmission line extension is proceeding.

The *Green Power Initiative* will increase the cost-competitiveness of green power and facilitate the installation of new generation facilities that will play a role in stabilizing the cost of producing power.

The regulatory process

Electricity rates in the Yukon are set by the Yukon Utilities Board. Electricity producers apply to the Board to charge a certain rate for power. The Board then determines what is fair. Officially, it is referred to as the regulatory process.

The government is reviewing options for governance structure in the electricity sector.

Future considerations

The Yukon government will work to keep electricity affordable.

A comprehensive review of the effectiveness of the *Rate Stabilization Fund* will be conducted in 2001. The criteria for evaluating the effectiveness of this fund will be determined through consultations with energy stakeholders.

A review is underway to assess alternative rate designs and rate structures for industrial customers, such as commodity-based and seasonal electricity rates. For industrial sites where new fossil fuel generation is appropriate, the government is developing a process to assist industry in developing cost-effective and efficient on-site energy infrastructure, such as residual heat recovery.

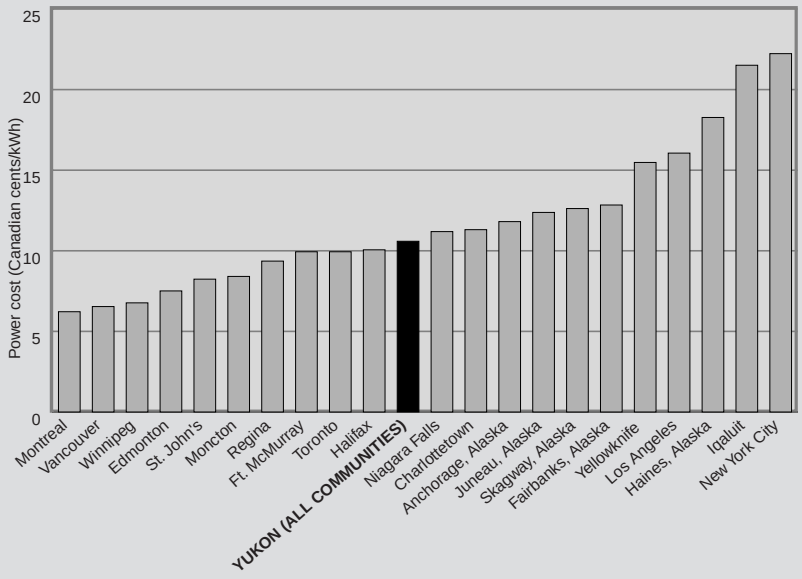
The current *Yukon Industrial Support Policy* and the *Energy Infrastructure Loans for Resource Development Program* are being reviewed to improve the investment framework and to ensure effective partnerships in energy infrastructure development.

The Yukon government will continue to improve the regulatory process. It will review recommendations from previous consultations to encourage further streamlining and to make the regulatory process as cost-effective as possible, while ensuring accountability and protection of the greater public interest.

A set of recommendations will be developed on the timing of full General Rate Application type reviews, electronic regulatory filing, and coordinated/simultaneous filings by the Yukon Energy Corporation and the Yukon Electrical Company Ltd.

Before the next General Rate Application hearing, interim solutions will be identified to improve intervenor access to relevant information.

The government plans to release the results of its review of rate policy regulations under the *Public Utilities Act* to identify any inconsistencies between the *Regulations* and the *Act*.



Electricity is expensive, but Yukon consumers get a break compared to many who live elsewhere. Yukoners pay less for power than people in Niagara Falls or New York City.

MANAGING ENERGY
PUBLIC EDUCATION

In its consultations throughout the Yukon, the Cabinet Commission on Energy learned that Yukoners want help in becoming more aware of new technologies and opportunities to make cost-effective investments in energy efficiency. It recommended that the government continue and enhance education and outreach programs for the general public and for the energy services industries.

In this section:

- ✓ *Energy awareness*
- ✓ *Energy efficient buildings*
- ✓ *Climate change*
- ✓ *Future considerations*

Energy awareness

Since 1997, November has been designated as *Energy Awareness Month* in the Yukon. Last fall, the month was marked with displays, newspaper articles, tours, radio interviews, hands-on workshops, and presentations on everything from how our climate is changing, to how to make homes more energy efficient, to surviving winter cycling.

In conjunction with the *Yukon Economic Forums*, the Pembina Institute for Appropriate Development studied economic opportunities for developing renewable energy in the Yukon and presented its findings. Copies of the report are available from the Department of Economic Development.

During the past ten years, many Yukon elementary school students have learned about the relationship between energy use and the environment and submitted their designs for a national, annual calendar contest. The Yukon government works with National Resources Canada (NRCan) to produce the calendars, which are distributed through the schools.

Public education is a key component of the *Green Power Initiative*. A portable solar power

Professor Enerstein is a regular guest during Energy Month. Here he poses with his apprentice.

display has already visited several community events to demonstrate the potential for using electricity directly from the sun.

Each spring, the *Home Show* provides a convenient opportunity for Yukoners to learn more about energy efficient design and construction, and to meet staff from government assistance programs, builders, suppliers, designers and others involved in the housing industry.

Energy efficient buildings

For those who want to manage their own home construction, the Yukon Housing Corporation offers a self-help course and other training programs which emphasize energy efficiency. For the building industry, Yukon Housing is delivering training programs developed by the federal government and the Heating, Refrigeration, and Air Conditioning Institute of Canada (HRAI).

In partnership with NRCan, Yukon Housing is delivering *R-2000* courses to keep residential builders abreast of the best available technologies, practices and materials. Workshops are offered regularly to contractors and homeowners/builders.

NRCan's *EnerGuide for Houses* program is available for homeowners and tenants through Yukon Housing. Low-cost reports on airtightness testing and energy use analysis provide residents with a checklist of cost-effective ways to save energy and increase comfort.

The EnerGuide audit report provides a detailed description of energy saving opportunities identified during the first visit. Later, the auditor returns to explain the analysis and recommendations to the homeowner.

For commercial buildings, the *Commercial Energy Management Program* provides a similar but more detailed report that a business owner can take to the bank.

Climate change

The lion's share of greenhouse gases comes from using energy — burning fossil fuels. Everyone uses energy, and energy is a component of everything we do. Effective reduction of greenhouse gases will require a concerted effort from all sectors of society, and must be undertaken by all sectors of society in a spirit of understanding. The Yukon government is increasing public awareness about greenhouse gases and climate change through several projects, including:

- a series of fact sheets on climate change to show the link between energy use, environmental impacts, greenhouse gas emissions and climate change;
- energy awareness campaigns to increase public knowledge and understanding of energy issues, and of the scientific, economic and social aspects of greenhouse gas emissions and the international efforts to bring it under control;
- annual vehicle emissions clinics sponsored by the Yukon government, Environment Canada and the City of Whitehorse;
- the *Energy Efficiency House Calls* pilot project; and
- a new school program to help students learn more about the issue of greenhouse gas and global warming.

Future considerations

A booklet is being prepared under the *Green Power Initiative* to help people plan and implement micro-hydro projects.

COMMENTS

The Yukon government is working to find long-term solutions to the territory's energy needs, and to develop systems to provide clean, affordable energy well into the next millennium.

We welcome your comments and suggestions on the Yukon government's energy programs. We also encourage you to find out more about these programs and how you can participate in efforts leading to a strong energy future.

For more information

To obtain information on any of the programs and projects listed below, call the Yukon government at (867) 667-5811, or toll free at 1-800-661-0408.

C-2000	Yukon Housing Corporation
Climate change fact sheets	Renewable Resources
Commercial Energy Management Program	Yukon Housing Corporation
Community Development Fund (CDF)	Economic Development
District heating	Economic Development, Government Services
EnerGuide for Houses	Yukon Housing Corporation
Energy Awareness Month	Economic Development
Energy Economic Forum	Economic Development
Energy Efficiency House Calls Project	Yukon Development Corporation
Energy Efficiency Initiative	Yukon Development Corporation
Energy Infrastructure Loans	Economic Development
Energy Management Plans	Government Services
Green Mortgages	Yukon Housing Corporation
Green Power Initiative	Yukon Development Corporation
Home Repair Program	Yukon Housing Corporation
Kyoto Protocol	Economic Development, Renewable Resources
Net metering	Yukon Development Corporation
Northern Climate Exchange	Renewable Resources
Performance contracts	Yukon Housing Corporation
Power Grid Extension	Yukon Energy Corporation
R-2000 program and builder certification courses	Yukon Housing Corporation
Range Road Mobile Home Subdivision	Yukon Housing Corporation
Rate Stabilization Initiative	Yukon Development Corporation
Rental Rehabilitation Program	Yukon Housing Corporation
Residential Electricity Management Program	Yukon Housing Corporation
Rural electrification	Community & Transportation Services
Solar 2000 Power System	Yukon Energy Corporation
Transportation Survey	Public Service Commission
Vehicle Emissions Clinics	Renewable Resources
Wind Power	Yukon Energy Corporation
Yukon Industrial Support Policy	Economic Development
ZAP Car	Government Services