

## Tapping into the geothermal “gold mine”

Imagine a heating and cooling system for your residential, commercial, or institutional building that guarantees comfort year-round, cuts utility bills by up to 50 percent, requires little maintenance, and reduces environmental impacts, all at the same time. This revolutionary technology—called geothermal, geoexchange, or ground-source heating and cooling—taps the renewable, safe, and almost endless energy supply that lies just below the earth’s surface. In doing so, geothermal provides what the U.S. Environmental Protection Agency calls, “the most efficient and environmentally friendly heating and cooling system available.”

Here are examples of how geothermal technology is being applied in Kelowna.

### UBC-Okanagan

Groundwater geoexchange technology will be used to heat and cool \$400 million worth of buildings planned for the UBC-Okanagan campus in Kelowna. The existing natural gas plant—built to heat and cool today’s 500,000 square feet of space—is at capacity. An open-loop geoexchange system will service the additional 1.2 million square feet proposed in the Campus Master Plan. The first structures to be equipped with geoexchange will be a new multipurpose building in May 2007, and the engineering and management buildings in September 2007. “We will provide geoexchange technology for all new construction on campus and see if existing buildings can be retrofitted later,” says Aidan Kiernan, UBC-O’s associate vice-president of operations.

The open-loop system will pump groundwater from the aquifer, exchange heat with it (using high-efficiency heat exchangers), and then readmit it to the aquifer. The groundwater will not be chemically treated, and there will be no net loss to groundwater resources.

In winter, groundwater circulating through distribution pipes will lose heat through a heat exchanger in each building and be reinjected in the



**Aquifer testing and field-scale infiltration tests confirmed that rapid infiltration at the surface, as well as reinjection within the aquifer are feasible means of returning groundwater to the subsurface after transit through the geoexchange system. Where practical, infiltration structures could be sited beneath roads or parking lots.**

aquifer at a slightly lower temperature. Within each building, a heat pump will then concentrate this extracted heat to a higher temperature in a secondary loop for distribution within that building. In summer, the system will work in reverse, pulling heat from the buildings, and transferring it to the groundwater return line for reinjection into the aquifer at a slightly higher temperature.

Geoexchange will save a bundle in energy costs. Although building the system will cost \$6 million—about \$1 million more than a conventional gas-fired heating plant—it is expected to save at least \$100,000 a year in energy costs. “It’s a huge win-win for the environment and for the university,” says Kiernan. “Over a 25-year period, a groundwater geoexchange system will prevent 38,000 tonnes of carbon dioxide emissions from entering the atmosphere. That’s the equivalent of taking 7,150 cars off the road, or planting 18,000 acres of fruit trees or vineyards.”

Dr. Scott Schillereff, a hydrogeologist with Kelowna’s EBA Engineering who carried out the

geoexchange feasibility study, says, “The campus is sitting on a gold mine. Under the northeast quarter of the property sits a very productive aquifer almost 200 feet thick, with a year-round temperature of about 10.5°C. This, combined with the available space for a geoexchange well field and minimal interference between wells, makes this project technically feasible.”

Kevin Rafferty, P.E.—an Oregon-based veteran of geoexchange projects who also worked on the study—says tapping into groundwater is an energy-saving option that’s often overlooked. “There are lots of places where people have the nuts and bolts to do this, but they don’t. They don’t have the vision.”

But UBC does. Sustainability is not only reflected in UBC-O’s Academic Plan, but is also being built into operational plans. Kiernan has been working with the UBC Campus Sustainability Office in Vancouver to develop a comprehensive program that includes recycling and selecting environmentally friendly cleaning products, paint, building materials, and even

*(Continues on last page)*

## Understanding Geothermal Technology

Outdoor temperatures fluctuate with the changing seasons, but underground temperatures don’t. Four to six feet below the earth’s surface, temperatures remain relatively constant year-round; 45°F in northern latitudes, and 70°F in the deep-south. Geothermal systems capitalize on these constant temperatures to provide affordable, efficient, and environmentally friendly space heating and cooling, hot-water heating, and humidity control.

A geothermal system typically incorporates a buried earth ‘loop’ or heat exchanger, an indoor heat-pump unit, and a distribution system of either ductwork for forced air, or plumbing for radiant hydronic heating. The loop—which carries fluid from the earth to the heat pump—can either be open or closed.

Open-loop systems draw water from an aquifer through one well, pass it through the heat pump, and discharge it to the same aquifer through a second return well or saturation pit. While used successfully for decades, open-loop systems are less prevalent today due to heightened concerns about potential groundwater contamination and temperature changes.

In a closed-loop system, water (or a water and antifreeze solution) is circulated through a continuous

pipe either buried horizontally or bored vertically. Horizontal closed-loop systems are generally the most cost-effective for small installations, space permitting (e.g. single-family residences), while vertical closed loops are preferred in large installations (e.g. commercial and institutional buildings). The amount of piping varies



**Horizontal Closed-loop System**  
(Courtesy of Natural Resources Canada)

depending on ground temperature, thermal conductivity properties, soil moisture, and the heating/cooling loads of the building envelope.

In winter, fluid circulating through the system’s earth loop absorbs stored heat and carries it indoors. The indoor heat pump compresses the heat to a higher temperature and distributes it throughout the building. In summer, the system reverses, pulling heat from the building, carrying it through the earth loop and depositing it in the cooler earth. Some geothermal heat pumps can also provide all of your domestic hot water needs and heat swimming pools and hot tubs.

Geothermal systems are three to four times more efficient than the most energy-efficient conventional systems. Because geothermal systems do not burn fossil fuels to generate heat, they emit no greenhouse gases, which have been linked to global warming, acid rain, and other environmental hazards. Typically, electricity is used only to power the unit’s fan, compressor, and pump.

Geothermal systems require much less maintenance than conventional systems. When installed properly, the buried loop (heat exchanger) will last for generations. The indoor unit’s fan, compressor, and pump, need only periodic checking and cleaning. ♦

# Partners in Efficiency

**F**ortisBC has developed an innovative and effective way to reduce expensive power purchases while helping large power customers save energy and money. Called Partners in Efficiency, the program helps municipal, commercial, industrial, and institutional customers identify and implement a higher level of energy efficiency in their capital upgrades. By reducing a customer's peak demand, FortisBC is able to extend its own existing physical capacity to better serve customers.

After signing a Partners in Efficiency agreement, FortisBC will review the customer's annual capital plan to identify upcoming projects that have an electrical energy component. As part of the review, FortisBC will fund up to \$5,000 or one-half the cost of an engineering study aimed at increasing the energy efficiency of the customer's project. FortisBC will also provide financial incentives based on study recommendations that are adopted by the customer. The company will also monitor the project after it is completed to confirm that projected savings actually occur.

Kelly Hewson, the Partnership in Efficiency representative for FortisBC's central Okanagan region says, "The long-term benefits of this approach are to minimize bureaucracy and identify relevant efficiency measures that will actually be implemented. The whole idea behind efficiency is to do something that reduces costs and makes our local economy more competitive." A good example is the upgrading of the heating and cooling system for the Capital News Centre from standard to geothermal (see page 1).

Hewson has facilitated agreements with the City of Kelowna, TOLKO Industries, UBC-O, Okanagan College, Al Stober Construction, School District #23, Big White, Argus Properties, and Cascadia Brands. The annual energy savings associated with these agreements varies, but many participants achieve savings in excess of 100,000 kilowatt hours annually. That is enough energy to meet the annual energy requirements of ten non-electrically heated homes. Partnerships have also been struck with municipalities and commercial interests in FortisBC's South Okanagan and Kootenay/Boundary areas. ♦



**FortisBC recently donated an air source heat pump, ten compact fluorescent bulbs, and light-emitting-diode (LED) Christmas lights for the home being built in Kettle Valley by students of the Okanagan College's Residential Construction Program.**



**Checking things out are FortisBC's manager of energy efficiency, Brian Parent (left); Okanagan College's associate dean of the Faculty of Industrial Trades and Services, Randy Werger; and student Kyle Hystad.**

**FortisBC also recently provided more than 10,000 feet of LED lights to Homes for the Holidays and the Rotary Centre for the Arts. Unlike conventional filament bulbs, which burn out and can require up to 300 watts for a typical 70-light string, LEDs are illuminated by computer chips and use less than ten percent of the electricity consumed by filament bulbs. LEDs can be plugged into standard 110/120 wall outlets, and 47 70-light strings can be attached end-to-end—that's almost 1,000 feet of lights! Considering the financial and environment benefits of LEDs, experts predict they will soon completely replace conventional Christmas lights.**



One lucky Kelowna family will participate in Code Green Canada, an innovative home renovation show with an environmental twist. Intended to educate Canadians about reducing energy and water consumption and greenhouse gas emissions, the six-part reality miniseries will air next spring on CBC.

Produced by Daniel Leipnik and Ric Beairsto, the series is a fun yet effective way to promote behavioral change. Beairsto says, "Through Code Green, we hope to provide the public with information in a new and entertaining way that will show them how they can reduce energy consumption at home."

Don Degen, the City of Kelowna's water manager and chair of its Energy Management Committee, speaks for all city employees when he says, "We're thrilled to have been chosen as a participating community." Other B.C. show sites include Vancouver and Victoria.

"Being part of Code Green reflects our obligation and commitment to a sustainable future," says Degen. "It will also help us lay the ground work for our Community Sustainability Action Plan, which is being developed now and will be implemented in 2006."

Code Green producers are currently choosing twelve contestants from across Canada, the criteria being that homes must be typical single-family dwellings built before 1985 and heated with natural gas or oil.

Contestants will first work with utility consultants and Energuide for Houses' auditors to measure current energy and water consumption and greenhouse gas production, and to identify opportunities for improvement. Each homeowner will then receive \$15,000 for the installation of an efficient furnace, appliances, lighting fixtures, insulation, and windows. Once the retrofits have been completed, consumption will be measured again. The family with the greatest reduction in consumption will win a hybrid Prius, courtesy of Toyota Canada. Each homeowner will also qualify for a federal Energuide for Houses Retrofit Incentive grant worth as much as \$3,000.

"What's more," says lead producer Daniel Leipnik, "they'll see the value of their homes increase. And, for years to come, they'll enjoy reduced electricity and gas bills."

The series has attracted the financial support of an unprecedented list of organizations and businesses that agree on the urgent need for energy and water conservation. B.C. sponsors include the Ministry of Energy, Mines and Petroleum Resources, BC Hydro, FortisBC, and Terasen Gas. ♦

## The miracle of microturbine technology

**A**gain, the City of Kelowna is at the forefront of public works technology—this time at the Glenmore Landfill. Its Microturbine Gas Recovery Pilot Project—which converts landfill gas (LFG) to electricity—recently received a Leadership and Innovation Award at the Union of B.C. Municipalities' annual general meeting.

"The City of Kelowna is very excited about the potential for LFG-to-energy technology," says Mark Watt, the city's environment and solid waste manager. "The award from UBCM has provided both internal and external interest in the possibilities."

While attending a conference in California last year, city staff discovered that the Glenmore Landfill—with its size, waste conditions, and potential for LFG generation—was an ideal site for microturbine technology that converts LFG (methane) to electricity. City council endorsed the idea, believing it would reduce greenhouse gas emissions and eliminate odours by using a gas that otherwise dissipates ambiently.

"The Federation of Canadian Municipalities reports that landfills are the largest municipal generators of greenhouse gases," explains Watt. "Landfills produce three

percent, or 23 million, of the 720 million tonnes of greenhouse gases generated in Canada per year. The destruction of landfill gas through combustion, therefore, represents a major decrease in municipal generation of greenhouse gas."

The city entered into agreements with the federal CANMET Energy Technology Centre (CETC) and FortisBC. CETC provided the portable microturbine power system, while FortisBC agreed to purchase excess electricity generated from the microturbine at \$0.05 per kilowatt/hour for three years. The city then hired an LFG technician, who is responsible for daily operations of the landfill gas control system, and planned research and development projects like the microturbine pilot project.

At its current capacity, the microturbine can generate more than 80 percent of the landfill's

annual electrical needs, using just six percent of available LFG in the area (about 15 of the 350 standard cubic feet per minute anticipated from one million tonnes of waste). The leachate pump station is the landfill's main power consumer, and requires about \$15,000 in power per year to operate. The city anticipates \$20,000 in operating and maintenance costs per year for the microturbine trailer. Start-up costs were approximately \$15,000, including consultant and commissioning fees.

With just one microturbine potentially saving up to \$20,000 annually in electrical costs, the city is already exploring expansion opportunities. Potential economic benefits include reduced electricity costs and revenue from surplus electricity. Currently, the trailer can accommodate three more microturbines, which, if operating at maximum efficiency, could

generate enough electricity to power 300 homes, while still only utilizing a fraction of the available landfill gas. The payback period for each additional 25-kw microturbine is about two years.

It's also possible to use waste heat from the microturbine for other operations such as a greenhouse, or to enable accelerated gas recovery and greater power generation. If this pilot proves successful, the city

could look at a long-term contract with a power utility, creating and selling electricity. Gas or electricity could be exported for institutional or industrial use as well. A further benefit with on-site electricity generation is the elimination of the possibility of 'brown-outs' (the loss of power from the power grid) at the landfill.

The microturbine project may also offer a unique opportunity for the University of BC-Okanagan to partner with the City of Kelowna to reduce greenhouse gas emissions and undertake alternative energy applications and projects.

UBC-O has recently announced a new Engineering School, and is expanding its campus, located only a few kilometres southeast of the Glenmore Landfill. Future project partnerships could include providing direct energy or fuel to supplement the university campus' energy load. ♦



**The network of horizontal gas collector pipes enables landfill gas to be utilized (as converted electric energy or heat) or flared to eliminate greenhouse gas.**

# Replace that lazy energy hog

A lazy furnace can rob you of hard-earned dollars. That's why it makes sense to choose an ENERGY STAR® qualified home-heating system fuelled by natural gas.

If your furnace is more than ten years old, it's likely a low-efficiency model, averaging only between 60 and 70 percent Annualized Fuel Utilization Efficiency (AFUE). The AFUE rating tells you what percentage of the energy used is converted to usable heat. A higher AFUE rating means a more efficient heating system. And the more efficient the system, the lower the heating bill. A high-efficiency furnace will run at 90 percent AFUE or higher, while a high-efficiency boiler will run at 85 percent or higher.

A home-heating system featuring the ENERGY STAR® label meets technical specifications designed to ensure it is among the most energy efficient on the market. The ENERGY STAR® mark is administered and promoted in this country by Natural Resources Canada.

"Homeowners are demanding more energy-efficient products—both to save money on their utility bills and to help our environment," says Ruth Sulentich, a community relations manager with Terasen Gas. "To help with those goals, we're offering special programs and promotions that encourage the use of high-efficiency ENERGY STAR® natural gas heating systems."

From now until December 31<sup>st</sup>, homeowners can save as much as \$1,350 when they enrol in the Terasen Gas ENERGY STAR® Qualified Heating System Upgrade. ENERGY STAR® qualified heating systems are also exempt from provincial sales tax. Visit [www.terasengas.com](http://www.terasengas.com) for more information. ♦



**A lazy furnace can cost you hundreds of extra dollars a year in energy costs, and have a negative impact on the environment. If you're looking to replace that old energy hog, look for the ENERGY STAR® symbol. Appliances with ENERGY STAR® designation are from ten to 50 percent more efficient than standard models.**



## Cost-effective comfort

The following energy-saving tips will keep you comfortable while cutting your heating costs.

- Turn your thermostat down to 20 degrees Celsius during the day and 17 degrees Celsius at night. These two adjustments can save you as much as 15 per cent on the heating part of your energy bill.
- Buy a programmable thermostat. It will automatically save energy at night and when you're away.
- Check to make sure your home has enough insulation. Extra insulation helps make your home more energy efficient—keeping you comfortable in winter and cooler in summer.

## Energy Efficient Buildings: A Plan for BC

Responding to higher and more volatile energy costs, and recognizing new energy efficiency technologies, the provincial Ministry of Energy, Mines and Petroleum Resources worked with a broad-based advisory group and smaller working groups to outline cost-effective energy

efficiency targets for buildings in B.C. They also identified actions to achieve those targets. Proposed actions were then evaluated and ranked for technical feasibility, market acceptability, affordability, economic efficiency, compliance, energy savings, administrative feasibility, and linkages to programs, funding, and other measures. The resulting recommendations, outlined in *Energy Efficient Buildings: A Plan for BC*, will "deliver social, environmental, and economic benefits throughout B.C. by conserving energy and improving the energy efficiency of homes and buildings."

Specific targets for residential housing are:

- to achieve an EnerGuide for Houses rating of 80 for all new, detached single-family and row houses by 2010 (R-2000 energy standard); and
- to retrofit 12 percent of existing residential buildings to realize an average one percent saving per house by 2010.

Targets for businesses and institutions are:

- to achieve energy performance 25 percent better than the Model National Energy Code for Buildings for new industrial, commercial, institutional, and multi-unit residential buildings by 2010;
- to retrofit 20 percent of existing industrial, commercial, and institutional buildings to realize an average saving of 14 percent per building by 2010; and
- to retrofit 16 percent of existing multi-unit residential buildings to realize an average saving of nine percent per building by 2010.

These residential and commercial targets will be met through new information, education, and capacity building measures, voluntary measures by government and industry associations, regulations and standards for equipment and buildings components, and financial incentives.

As outlined in the plan, some of the returns we can expect are:

- savings for consumers throughout B.C.;
- an increase in the value of homes and buildings;
- a return on investment after an average of five years;
- improved comfort and indoor air quality;
- creation of equipment manufacturing, building design, and development trades jobs across the province; and
- reduced environmental impacts, including lower greenhouse gas and smog-creating emissions.

The plan recognizes that many B.C. businesses and associations have already adopted energy efficiency products and practices. It also complements ongoing local, provincial, and federal programs, including those of energy providers that support energy efficiency (e.g. FortisBC, BC Hydro, and Terasen Gas). It supports growth of the energy technology economy (e.g. the manufacture of high-performance windows), which in turn, improves the competitiveness of the provincial economy.

As noted in the plan, "By taking these actions today, we can promote responsible energy use and management. We can manage rising energy costs into the future while at the same time, improve the healthfulness and comfort of our homes and the buildings where we work, learn, and play."

For more information, please visit [www.empr.gov.bc.ca/AlternativeEnergy/](http://www.empr.gov.bc.ca/AlternativeEnergy/) ♦

## EMC Accomplishments

The City of Kelowna's Energy Management Committee (EMC) was struck in 1995 to make city facilities more energy efficient. The resulting upgrades at more than 80 city-owned buildings save almost four million kilowatt hours of electricity per year, thereby reducing annual energy costs by about \$170,000. In addition, EMC projects have reduced environmental impacts (including green house gas emissions), increased property values, improved indoor air quality, and deferred energy and infrastructure upgrades. Listed below are some of the more significant energy efficiency initiatives.

### Civic Properties Division

#### Capital News Centre (new)

- Ground-source heat pump, heat recovery, ice plant, lighting, controls

#### Chapman Parkade

- Controls for heating, ventilation, air conditioning (HVAC)

#### City Hall

- Lighting retrofit, HVAC, motors

#### City Yard Office

- Lighting retrofit

#### Kelowna Arts Centre (new)

- Lighting, HVAC

#### Library (new)

- Lighting, HVAC

#### Library Parkade

- Lighting, controls

#### Main Fire Hall

- Lighting retrofit

#### Parkinson Rec Centre

- Minor lighting retrofits, humidification

#### Prospera Place

- High-efficiency ice plant, controls, lighting

#### RCMP Detachment (new)

- Lighting retrofit

#### Rotary Arts Centre (new)

- Lighting, HVAC, controls

#### Rutland and Memorial Arenas

- Desiccant dehumidification, compressors, lighting

#### Wastewater Treatment Plant

#### Administration Office (new)

- Lighting, HVAC, controls

### Electrical Division

#### Streetlights

- Converted all streetlights to energy efficient high-pressure sodium lights
- Use energy-efficient LED Christmas lights
- Use high-efficiency electric motors at various locations

### Transportation Division

#### Traffic Lights

- Converted all traffic intersection lights to LED
- Use solar-powered pedestrian signals

### Water and Waste Divisions

- Water and sewer telemetry system improvements

These types of "smart" controls allow the city to provide individual premises peak shaving along with electrical system peak shaving. In other words, the water utility can fill all reservoirs when its customers are sleeping, allowing the pumps to be shut down during the peak energy time during the afternoon. ♦

# Save money and natural resources...

## Residential Rebates and Incentives

Nearly 20 percent of all energy used by Canadians is for heating and cooling our homes. Every time we use energy from fossil fuels such as coal, oil, and gas, we produce greenhouse gas emissions that contribute to climate change and harm our environment.

The good news is that with appropriate retrofits, homes more than 25 years old have the potential for energy savings up to 35 percent. Homes more than 50 years old can achieve even greater savings—an average of 38 percent!

Below is a list of incentives and rebates to help you start saving energy, money, and the environment!

### EnerGuide for Houses

EnerGuide for Houses (EGH) is a federal program that helps homeowners get independent, expert advice about energy efficiency in their homes. An EGH audit, conducted by an EnerGuide advisor, involves a test for air leakage, a comprehensive walk-through tour, and computer modeling. The resulting report provides customized recommendations for renovations such as upgrades to heating systems and insulation, and a standardized EGH energy efficiency rating.

The cost of pre-retrofit EGH audits has been reduced from \$150 to \$100. Post-retrofit audits are \$75. If you have electric heat and are served by Fortis BC, they will offset the cost by \$50.

Residents who have undergone EnerGuide audits are eligible for grants to improve their homes' energy efficiency. The average grant is \$650. For more info call 1-888-599-4999 or visit [www.oee.nrcan.gc.ca/residential/personal/index.cfm](http://www.oee.nrcan.gc.ca/residential/personal/index.cfm).

### CMHC Refund

Canada Mortgage and Housing Corporation offers a ten percent refund (worth \$741 on a \$240,000 home) on its mortgage loan insurance premium for homeowners who borrow money to build or buy an energy-efficient home or renovate an existing one. Homeowners also have the flexibility of extending their repay periods from 25 years to a maximum of 35 years. To qualify for this refund, the homes' energy efficiency must be rated using the EnerGuide for Houses rating system or be R-2000 certified and meet certain minimum requirements. Call your lender or 1-800-668-2642 for more information.

### ENERGY STAR® Incentives

ENERGY STAR® products save money, increase comfort, and protect the environment. Appliances with an ENERGY STAR® designation meet or exceed federal energy efficiency specifications, and are from ten to 50 percent more efficient than standard models.

ENERGY STAR® qualified furnaces, boilers, and heat pumps purchased until April 1, 2007 are exempt from PST along with insulation, draft-proofing materials, renewable energy, and double-glazed windows. For more information and/or a list of qualified products call the Consumer Taxation Branch at 1-877-388-4440 or visit [www.rev.gov.bc.ca/ctb](http://www.rev.gov.bc.ca/ctb).

Through its Residential New Construction Heating Program, Terasen Gas pays builders and developers \$500 to install ENERGY STAR® qualified natural gas furnaces and natural gas hot water tanks in new, individually metered residential homes. For more information call Brent Hunt at 250-868-4522 or visit [www.terasengas.com](http://www.terasengas.com).

## Geothermal gold mine

*(Continued from first page)*

office furniture. And, passive solar heating is being considered to help meet peak hot water demands in two residence buildings already under construction.

### Capital News Centre

The Capital News Centre on Gordon Drive houses two indoor ice rinks, two indoor soccer fields, and various other recreational amenities. From the outset, the city's primary goal was to design, build, and operate a highly energy-efficient facility with reduced greenhouse gas emissions.

This has been achieved with a closed-loop geothermal field, ultra-high efficiency heat-recovery

### ASHP Rebates and Loans

If you are an electric heat customer, you can save up to 40 percent on your annual energy costs by installing an Air Source Heat Pump (ASHP). Fortis BC's PowerSense program invites you to take advantage of one of the following ASHP offers:

- cash rebate of \$250 or more;
- \$5,000 loan at 4.9 percent for ten years (on approved credit); and
- a loan of up to \$10,000 with first-year interest rates at 4.5 percent (OAC).

In addition, get cash-back rebates or extended warranties from participating manufacturers Carrier, Frigidaire, Lennox, and York. Visit your ASHP dealer or call 1-877-392-2200 for more information.

### FortisBC New Home Construction Program

This program is targeted at multi-unit developers and single-family housing customers who heat with electricity. It provides incentives for high-efficiency lighting and energy-efficient windows. Upon implementing specified energy efficiency measures, participants are eligible for incentives on lighting and window upgrades, which reduce payback to a maximum three-year period. To meet this payback criterion, developers are eligible for up to \$2.50 per square foot of energy efficient window; single-family housing customers are eligible for \$1.50 per square foot. All customers are eligible for ten compact fluorescent light bulbs per residential unit. Call 1-800-363-3330 or visit [fortisbc.com/powersense](http://fortisbc.com/powersense).

### Terasen ENERGY STAR® Qualified Heating System Upgrade Program

There's never been a better time for homeowners to upgrade to ENERGY STAR® qualified natural gas home heating systems. Enroll between Sept. 1 and Dec. 31, 2006, and you'll receive Terasen bill credits and manufacturers' rebates up to \$1,350. Further incentives are offered by enrolling between Sept. 1 and Dec. 31, 2005, when you can use manufacturers' coupons to save another \$150 to \$1,000 in rebates and special offers. For more info visit [www.terasengas.com](http://www.terasengas.com).

And all ENERGY STAR qualified high-efficiency natural gas space-heating systems are exempt from PST until 2007. For more info visit [www.rev.gov.bc.ca/ctb/EnergyStarQualified.htm](http://www.rev.gov.bc.ca/ctb/EnergyStarQualified.htm).

## Commercial and Industrial Rebates and Incentives

### Federal Energy Efficiency Programs

#### Energy Innovators Initiative (EII)

Through advice, funding, and training, EII helps commercial businesses and public institutions improve energy efficiency in existing buildings. Eligible members can apply for funding of up to \$250,000 for planning and implementing building retrofits. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

#### Commercial Building Incentive Program (CBIP)

Building owners whose designs meet CBIP requirements will be awarded up to \$60,000. Program requirements are based on two documents:

the Model National Energy Code for Buildings (MNECB) and the CBIP Technical Guide. An eligible building design must demonstrate a reduction in energy use by at least 25 percent when compared to the requirements of the MNECB. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

#### Industrial Energy Innovators (IEI)

IEI members can access tools and services such as training programs, seminars, and planning documents to help them become more energy efficient. Companies must sign up to become IEI members. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

#### Industrial Building Incentive Program (IBIP)

The Office of Energy Efficiency (OEE) encourages the design and construction of new, energy efficient industrial facilities. The IBIP is a demonstration initiative, with funding of up to \$80,000 for eligible organizations based on process and building savings. Organizations must first become registered as Industrial Energy Innovators. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

#### Industrial Energy Audit Incentive

This incentive helps defray the cost of hiring a professional energy auditor to conduct an on-site facility audit. Funding is available for up to 50 percent of the cost of an audit, to a maximum of \$5,000. This is an exclusive service for companies registered as Industrial Energy Innovators. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

#### Renewable Energy Deployment Incentive (REDI)

Business and industry clients are eligible for a rebate of up to 25 percent of the cost of installing qualifying solar air, solar water, and biomass combustion systems. Contact National Resources Canada at 1-613-995-0947 or visit <http://oee.nrcan.gc.ca/corporate/incentives.cfm>.

## Provincial Energy Efficiency Programs

### FortisBC Existing and New Building Process Design

This program is to upgrade equipment and technologies to more energy efficient levels in new or existing commercial, institutional, and industrial buildings. It combines all applicable technologies to help customers increase their buildings' energy efficiency. Rebates are available up to \$0.05 per annual kilowatt/hour saved. Contact Kelly Hewson at 250-717-0809 or [Kelly.Hewson@FortisBC.com](mailto:Kelly.Hewson@FortisBC.com).

### Terasen Gas Efficient Boiler Program

Terasen Gas will help commercial building owners, developers, consulting engineers, or contractors select an efficient boiler configuration for new construction and retrofit projects. The program includes financial incentives for installing or upgrading to condensing or near-condensing boilers. Call toll free to 1-888-477-0777 or visit [www.terasengas.com](http://www.terasengas.com). ♦

devices, and ground-source heat pump technology. Incorporating the ice refrigeration equipment with the heating, ventilation, and air conditioning systems also contributes to the centre's overall efficiency. Heat recovered from the ice-plant heat exchanger is either transferred directly to the heating equipment in the building, or to one of the indoor fields, if heating is not required at the time.

The geothermal field was designed by Stantec Consulting and installed by GeoTility. Located under a portion of the parking lot, it is made up of fifty 250-foot boreholes drilled with specialized mud rotary drill rigs. Each borehole is inserted with a one-inch diameter high-density polyethylene looped pipe encased with thermally enhanced grout. ♦

EnergyMatters is published by:



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