WHAT’S INSIDE:

POWER FACTS
ELECTRICITY AND THE ECONOMY
MAKING CENTS OF YOUR ELECTRIC BILL
Welcome to the fourth issue of Powering Albertans brought to you by the Alberta Electric System Operator (AESO). This magazine provides you with factual and unbiased information about the electricity industry in our province. The AESO is one-of-a-kind in Alberta’s power business. We operate the wholesale power market independent of industry, yet we don’t own or operate any power facilities. We are a not-for-profit organization without financial motivation to build transmission lines or power generators. We act in the public interest of all Albertans.

This issue focuses on the different players in Alberta’s electricity industry and the roles they play. We also look at the cost of electricity – from the moment it is generated until it reaches its final destination – the residential, farm, commercial or industrial customer.

We also look at the importance of electricity transmission and how it supports urban and rural economic development in Alberta. From creating jobs to building the infrastructure needed to support further development within the province, upgrading the electricity system will provide a foundation for sustained prosperity in Alberta.

Our aim with this magazine is to help Albertans better understand the complex electricity industry and the importance of growing our electricity system to meet the future needs of all Albertans.
Here are some tips to keep you warm this winter and save money at the same time. This year the federal government is providing assistance to improve your home’s energy efficiency, so there has never been a better time to make these simple home improvements.

**Furnace**
- Schedule annual maintenance for your furnace now. If your furnace is working at peak efficiency, it will use less energy and cost less to operate.
- Clean or replace your furnace filter every one to two months. A dirty filter reduces airflow and forces your furnace to run longer to heat your home.
- In the market for a new furnace? Consider upgrading to a new, higher efficiency ENERGY STAR® furnace with a variable speed motor and save over $500 in energy costs every year.
- You can save even more with Natural Resources Canada rebates for new energy efficient furnaces. There are also rebates for alternative heating systems such as heat pumps, earth-energy systems and integrated mechanical systems. Rebates range from $375 for an energy efficient furnace up to $4,375 for an alternative system.

**Thermostat**
- Pile on the blankets. Lower your thermostat by four to five degrees Celsius at night when you’re sleeping and when no one is at home.
- Install a programmable thermostat so you don’t have to remember to lower the temperature. It’s done automatically when you preset it.

**Windows, Doorframes, Sills and Joints**
- Stop those cold air drafts. On a windy day, identify leaks around windows, electrical outlets, vents and exterior doors.
- Apply a sealant or caulk around windows, doorframes, sills and joints where there are drafts.
- Use plastic window covers to prevent heat loss.
- Keep return air grills and heating vents clear of furniture, rugs and drapes so they don’t interfere with heat flow through your home.

**Learn More Ways to Save Energy**
- Learn how you can improve your home’s energy efficiency. Albertans who participate in the federal government’s ecoENERGY Retrofit Program are eligible for a provincial rebate of $200.
- The first $100 is provided to homeowners who complete a pre-retrofit evaluation by a Natural Resources Canada-certified energy advisor.
- The second $100 rebate is provided to homeowners who complete a post-retrofit evaluation by the energy advisor.
- No application is necessary. Your energy advisor submits all required documentation.

**After the Evaluation, Save Even More Money**
- Albertans who participate in the ecoENERGY Retrofit Program, replace their domestic hot water system with a qualifying model, and undertake a post-retrofit evaluation are eligible for rebates ranging from $250 to $300, depending on the type of water heating system.
- Up to $3,150 is available to homeowners who perform qualifying insulation upgrades identified in their home energy evaluation report.

For more information on rebates, go to Natural Resources Canada’s website: http://oee.nrcan.gc.ca/residential/personal/retrofit-homes/retrofit-qualify-grant.cfm
Key Industry Players

What’s really involved in moving electricity from where it’s produced to your home or business? The process involves several organizations, each with specific roles and responsibilities, that help ensure the lights go on when you flick the switch.

**Department of Energy**
The Department of Energy (DOE) is ultimately responsible for ensuring Alberta’s resources are developed in a way that is appropriate, environmentally sustainable and in the public interest. The province’s electricity system is owned and operated by a mix of investor-owned and municipally owned companies, not by the Alberta government. To assure Albertans of a long-term, reliable supply of competitively priced electricity, the DOE develops, supports and monitors policies to:

- bring new generation online.
- facilitate competitive electricity markets.
- ensure efficient power delivery systems throughout the province.

**Alberta Electric System Operator**
The Alberta Electric System Operator (AESO) is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System. As a not-for-profit entity, the AESO is independent of any industry affiliations and owns no transmission or market assets. The AESO takes a leadership role in interconnecting customers and planning and coordinating day-to-day activities of the province’s electric transmission system.

When the AESO determines the transmission system must be expanded or enhanced, it prepares a Needs Identification Document (NID) for approval.

**Transmission Facility Owners**
Transmission facility owners (TFOs) own, operate, build and maintain the system of high-voltage power lines and other electrical equipment that moves power from generators to large load centres (i.e., cities and large industrial customers). There are four major TFOs in Alberta: ATCO Electric, AltaLink, EPCOR Energy Inc. (owned by the City of Edmonton) and ENMAX Power Corp. (owned by the City of Calgary).

When new or upgraded facilities are needed within Alberta and the AESO’s NID is approved, a TFO’s facilities application will be considered by the Alberta Utilities Commission.

**Generators**
Thermal sources account for the majority of Alberta’s installed generating capacity. Coal-fired plants make up almost 50 per cent of the province’s total generating capacity and natural gas accounts for about 40 per cent. This includes cogeneration at industrial operations that produce electricity as a by-product of their normal activities. The remaining generation sources are hydro, wind and biomass (energy produced from organic sources such as wood waste, garbage or animal matter).
Distribution Facility Owners
Distribution facility owners (DFOs) own and operate the portion of the Alberta electrical system operating at 25 kilovolts (25,000 volts) or less. These distribution lines provide service to most consumers, except for the very largest industries who may purchase power directly from generators. For most others, the power must be stepped down or decreased to a lower voltage before it can be used. ENMAX and EPCOR operate distribution systems in Calgary and Edmonton respectively. ATCO Electric and FortisAlberta Inc. operate distribution systems in other parts of the province.

Retailers
Alberta’s retail electricity market gives consumers a choice of service providers. More than 20 companies currently compete to sell power to the province’s larger commercial and industrial users, who account for roughly 80% of all electricity consumed in the province. There are fewer retailers vying for residential customers.

Balancing Pool
The Alberta Government created the Balancing Pool in 1999 as a result of deregulation. The main role of the Balancing Pool is to oversee the remaining Power Purchase Arrangements (any unsold generation assets) post deregulation. The Balancing Pool is responsible for managing these assets on behalf of all electricity consumers in Alberta.

Market Surveillance Administrator
Alberta’s Market Surveillance Administrator (MSA) is appointed by the Minister of Energy and acts as a watchdog for the industry. The MSA monitors the performance of Alberta’s electricity and natural gas markets – ensuring that they operate in a fair, efficient and openly competitive manner.

Alberta Utilities Commission
The Alberta Utilities Commission (AUC) regulates investor-owned electric and natural gas utilities. It is the governing body for both the approval and siting of transmission projects in Alberta. The AUC is responsible for approving all costs of operating the electricity system and construction of transmission in the province. As a provincial regulator, it operates independently of government.

Utilities Consumer Advocate
The Office of the Utilities Consumer Advocate (UCA) was created in October 2003 to represent the interests of electricity and natural gas consumers – residential, small business and agriculture – in Alberta. The UCA works to ensure these consumers have the information, representation and protection they need to better equip them to make informed choices in Alberta’s restructured electricity and natural gas markets.
Electricity: Facilitator of Prosperity

Whether Alberta’s economy is booming or not, electricity has always been a facilitator of prosperity. Albertans need electricity for business and industry, as well as to sustain economic growth. The electricity industry stimulates our growing economy, making the province one of the best places in the world to live.

Alberta’s Provincial Energy Strategy, announced in December 2008, outlines the challenges our province will need to address to ensure Alberta continues to have access to the safe, reliable and affordable power needed to promote economic growth and development.

Because Alberta’s electricity market is based on the principle of balancing supply and demand, sufficient transmission capacity must be in place to allow new generation producers to use the system to transport their power to Alberta households and businesses.

The Provincial Energy Strategy has acknowledged the need to update and expand the electric transmission grid. No major upgrades have taken place in over 20 years. Specifically, the strategy includes actions to:

- develop a plan for a comprehensive upgrade to the transmission system that will identify the requirements, solutions and schedules necessary to improve the system.
- review and streamline the regulatory process for siting transmission.
- adopt and implement a policy to build interties to other markets to ensure supply to Albertans and facilitate additional wind generation.
- adopt a policy to build transmission to zones of renewable or low-emission electricity.

Building this new infrastructure will promote investment in the province, create jobs now and in the future, and stimulate the economy with the purchase of additional materials and services.

Wholesale Power Market

In addition to supporting economic development, electricity has also become a market in its own right. With the generation and retail sale of electricity now open to competition, wholesale power is a $9-billion per year market in Alberta. New electric energy sources, including renewables such as wind, are finding opportunities in Alberta’s energy market, especially with the growing awareness of environmental issues associated with the use of fossil fuels. In addition to wind and solar power, Alberta also has an abundant supply of renewable biomass (energy produced from organic sources such as wood waste, garbage or animal matter) that will drive future power generation.

Until recently these options were more expensive than the traditional coal-fired plants. But the cost of greenhouse gas control technology is levelling the playing field. Alberta’s development and use of renewables will help lower greenhouse gas emissions, promote diversity of energy supply, stimulate regional activity, and encourage collaboration across industry sectors.
The Potential of Wind and Sun

Nowhere is this more obvious than in the southwest part of the province. Bev Thornton, Director, Southwest Region, Alberta Finance and Enterprise, is excited about the opportunities the new electricity market is creating. She states proudly, “Our Cowley Ridge project was the first commercial wind generation project in Canada. We’ve watched the industry mature since then, to the point where the wind industry is an important economic driver for this section of the province.”

The Southwest Region has struggled in the past with economic development, but is now coming into its own. Thornton notes that the Southwest Region is a member of the Southern Alberta Alternative Energy Partnership which believes that southern Alberta has the natural resources available to lead the province in developing alternative energy options, specifically solar, wind and bioenergy.

This partnership is developing a wind energy cluster action plan to identify manufacturing and service opportunities related to wind. For example, the turbines are of interest to tourists, presenting the opportunity to conduct wind farm tours, to establish an alternative energy information centre and create souvenirs and information pieces.

An Increasingly Competitive Market

In other parts of Alberta, the opportunities are different. According to Bob Hall, Director, Peace Country Region, Alberta Finance and Enterprise, the big economic drivers in this region are oil and gas exploration, along with agriculture and forestry. This part of the province is rich in natural resources. There’s lots of demand for electricity, but not much capacity, he says, although there is a small hydro project in the planning stages.

According to Hall, the region is looking for investment in power generation. He adds that with the increasing demand for electricity across the province, future generation projects can provide a good return on investment. Industries are seeking ways to develop new partnerships to supply power to the energy marketplace.

Cogeneration is an attractive option for some industries. “Cogeneration has traditionally been all about burning waste to create electricity to sell to the grid,” says Hall. “Now we are seeing companies using alternative by-products to create gas to run power turbines. They are either using this electricity for their own purposes or selling it back to the market.”

The province will defer to the market to determine the mix and proportion of energy sources that Alberta will ultimately use for electricity, and to what extent electricity will be profitably imported or exported. An upgraded transmission infrastructure will offer economic benefits such as the creation of new jobs and the purchase of materials and services.

Strengthening the electric transmission system now will provide a reliable supply of competitively priced electricity for all Albertans.
Have you ever wondered about the different charges on your electricity bill?

The actual cost of the power itself is only one of the components in bringing electricity to your door. Generation, transmission and distribution costs have always been there but they were not visible to the consumer. Since the power industry was restructured in 2000, charges are clearly itemized as a result of efforts to increase transparency.

There are two main components to your electricity bill:
1. charges related to the power you use.
2. charges related to the delivery of that power to your door.

A residential bill may have the following components:

**Electric Energy Charges**

**Administration Charge**
These reflect the costs your supplier pays to prepare and send your bill, as well as costs associated with customer service activities.

**Energy Charge**
This is the cost of the electric energy you used in the billing period. These charges are expressed in cents per kilowatt hour (¢/kWh).

Alberta residential customers have several energy price options. You may be on a contract with your supplier, in which case you are charged a flat rate per kWh according to the terms of your contract. Customers who are not on a contract with their supplier are charged a regulated rate that is set by the Alberta Utilities Commission (AUC). The regulated rate option (RRO) is based on electricity purchases that include a blend of short-term and long-term market prices. RRO customers may notice the price of electricity changes from month to month depending on market conditions.

**Delivery Charges**
Delivery charges are related to the cost of delivering electricity to customers. Customers have always paid for the costs of receiving power from the interconnected grid (meter, wires and billing). These costs are regulated by the AUC.

Delivery charges show on your bill as transmission charges and distribution charges. These charges can be fixed or variable. Fixed costs are a flat fee regardless of consumption; variable costs fluctuate with the amount of power you consume.

**Transmission Charges**
Transmission charges are the costs associated with building, operating and maintaining the provincial power grid. All consumers pay for transmission service. Industrial customers pay the largest portion, followed by commercial customers, residents and farms.

**Distribution Charges**
Distribution charges are the costs associated with building, operating and maintaining the local distribution system (voltages lower than 25 kilovolts). Distribution lines move power into our homes and farms.
**Balancing Pool Allocation**

Under the *Electric Utilities Act*, each year the Balancing Pool is required to forecast its revenues and expenses to determine any excess or shortfall of funds. These line items will either show up as a credit on your bill for any excess, or a charge on your bill for any shortfall of the forecasted revenue. This year, Alberta electricity customers receive a rebate of $0.0065 per kilowatt of consumption on their power bills.

**Local Access Fee**

Your supplier collects this fee on behalf of your municipal government. The fee relates to the costs associated with accessing municipal land to construct, maintain and operate local distribution in your city, town or village. This fee does not require the approval of the regulator.

**Other Costs**

**Riders**

A rider is a temporary credit or charge approved by the regulator. Delivery rate riders are associated with distribution and transmission costs. Riders occur when the actual costs incurred by your distribution or transmission provider or your retailer differ from the approved rates. Distribution and transmission rates, which are regulated, are often based on forecast costs. Forecast costs may differ from actual costs so riders provide a way to update rates to reflect actual costs.

**Goods and Services Tax (GST)**

The five per cent GST calculation is based on the total cost of your bill. This results in a corresponding increase when the energy charge or other components of the bill rise.

Information for this article was adapted with kind permission from the Utilities Consumer Advocate website. For more information on electricity charges in Alberta, go to: www.ucanhelps.gov.ab.ca
Behind the Complex System that Keeps Our Lights On

Most of us don’t think much about electricity. We flip the switch and the light goes on. But behind that simple act is a complex interconnected system that involves many organizations and components.

Parts of the Electric System
All electric systems have three basic components: generation, transmission and distribution.

1. **Generation** is how electric power is created. Power can be produced using many different types of energy sources such as coal, natural gas, wind, nuclear, solar and water.

2. **Transmission systems** are similar to the provincial highways, allowing for the movement of large amounts of electricity across the province. In many parts of Alberta, the plants that generate electricity are a long way away from major population centres. This means power must be moved from where it’s generated to the homes, farms and businesses that use it.

   Transmission systems are composed of high voltage power lines that far exceed the standard 120-volt outlets in most homes. High voltage power lines are the most efficient way to move large amounts of power over long distances.

3. **Distribution systems** consist of smaller power poles and wires, common along city streets and rural roadways. These lines transmit power to large customers and distribution system substations in or near population centres. Power is then distributed in even smaller quantities to residential and small commercial customers.

The Importance of Transmission
“Transmission is the backbone of Alberta’s electric system,” states David Erickson, President and Chief Executive Officer. “Throughout the province, about 21,000 kilometres of transmission lines operate much like a system of highways. Major routes connect large centres and handle a high volume of traffic while smaller secondary routes branch into every community in Alberta.”

The power system must be managed every second. The AESO’s system controllers do this by using sophisticated technology to dispatch and constantly monitor power moving from generators through the transmission network and across the province.

*How transmission works*
Electricity is transmitted at high voltages over long distances such as the journey from a power plant to your home. Electrical utilities use transformers to step up or increase the voltage of electricity as it leaves the power generating plant enroute to where the power will be used. Since most home appliances are designed to operate at 120 volts, once the power reaches a regional centre the voltage is stepped down or decreased before it enters your home.
The impact of line losses
A major challenge in transmitting electricity is the power lost between leaving the generating plant and reaching consumers. This happens because some energy is always lost in the form of heat when electrical current travels through a power line. In addition, transmission lines are designed to carry a specific amount of electricity. When a line is consistently operated close to capacity, more energy is lost. We call this line loss because it is power that is used up in the transportation of electricity and does not make it all the way from the generating plant to the customer.

Line losses decrease the efficiency of our transmission system. They also have an economic impact since all power customers share in the cost. For example, line losses cost Alberta’s electricity system $220 million in 2008. Improving system efficiency can save Albertans money and reduce wasted energy, making it better for our environment.

Strengthening Alberta’s Transmission System
A commitment to reliability
The AESO has a mandate to make sure the system for keeping the lights on serves the needs of Albertans today and in the future. An important part of that mandate is ensuring the capacity of our transmission system keeps pace with the demand of electricity to help maintain a reliable power supply. For example, if one transmission line is unable to carry power due to equipment malfunction or a bad storm, other lines must be available to carry the load so customers don’t experience a power outage.

The case for competition in the energy market
Despite rapid growth in Alberta over the past several years, no major backbone transmission projects have been built in the last 20 years. The Alberta Interconnected Electric System (AIES) is a vital component of the power industry and is the basis for a competitive wholesale electricity market.

To enable competition, all generators must have access (through transmission lines) to provide supply to meet demand for electricity throughout the province. Economic and reliable transmission infrastructure encourages investment in new supply, while limited access to the market reduces competition and can result in higher electricity bills.

The electric system connects generators to those who need the power over a large geographic area, with the objective of delivering electric energy to Alberta customers reliably and efficiently under a wide range of system operating conditions and changing customer demand levels.

Through transmission lines that provide interconnections with neighbouring jurisdictions, the system also provides access to the North American electric grid. In addition to providing mutual assistance during emergencies, transmission interties are an essential part of a competitive market and give Alberta a way to import energy when we need it and export energy when supply exceeds demand.

What Lies Ahead?
One of the AESO’s top priorities is to strengthen the electric transmission backbone that runs through the province and links vital parts of the electric system. Upgrading and expanding the province’s transmission system is fundamental to ensuring Albertans continue to have access to safe, reliable and affordable power.

“As part of our planning role, early in 2009 the AESO released the latest update of its Long-term Transmission System Plan,” says Erickson. “The Plan identifies what needs to be done over the next 10 years to ensure Alberta’s interconnected electric system continues to meet Alberta’s current and future electricity needs.”
Questions and Answers

In this fourth issue of *Powering Albertans*, we again answer your questions about Alberta’s electricity system.

**What is micro-generation?**

Alberta’s Department of Energy created and implemented a micro-generation policy on January 1, 2009. It allows individual homeowners and small businesses to generate up to one megawatt (1,000,000 watts) of power through solar-powered technologies, windmills and other forms of renewable resources.

The output of the renewable resource is intended to meet all or a portion of a customer’s electricity need. There is no financial exchange under this option; homeowners and retailers work on a credit exchange on a month-to-month basis.

Homeowners work with their distribution facility owner to connect their generation source to the local distribution system. A distribution facility owner is a company that owns the lines that carry power to individual homes.

In Alberta this could be any one of the following:

- Alberta Federation of Rural Electrification Associations
- AltaGas Utilities
- ATCO Electric
- ATCO Gas
- City of Lethbridge
- City of Medicine Hat Electric
- City of Medicine Hat Natural Gas
- City of Red Deer Electric Light & Power
- EPCOR Distribution Inc.
- ENMAX Power Corp.
- FortisAlberta Inc.

Homeowners also need to work with their respective electricity retailer to ensure they are credited for the power they generate. The regulated rate providers (retailers) in Alberta are:

- City of Lethbridge Utilities
- EPCOR Energy Inc./EPCOR Energy Alberta Inc.
- Direct Energy Regulated Services
- ENMAX Power Corp.

To find out more about micro-generation, contact your local electricity retailer.

If you have a question you’d like us to answer in an upcoming issue of *Powering Albertans*, write us at: powering.albertans@aeso.ca
**Do we export power to the United States?**

While Alberta needs critical electricity transmission lines within the province, it also needs to make connections to regions outside the province. Alberta has one of the least externally interconnected electricity systems in Canada. In fact, since 2002 Alberta has been a net importer of electricity. That means we don’t produce enough power on a continual basis to meet the needs of Alberta’s industries, businesses, residents and farms.

Alberta currently has two interties, one with British Columbia and another with Saskatchewan. Interties are power lines that connect to other jurisdictions, providing us with the ability to import power into Alberta when provincial demand exceeds supply. This happens most often between 4 p.m. and 7 p.m. when the average Alberta household is turning on its television, cooking dinner or running the dishwasher. Interties also allow us to export surplus power to other jurisdictions when provincial supply exceeds demand. Since large amounts of electricity can’t be stored efficiently, we need to be able to send that power somewhere when we generate more than we need.

This typically happens in the middle of the night.

While Alberta currently has no direct connections to the United States, we can reach various jurisdictions through our two existing interties.

The AESO recently published its Long-term Transmission System Plan, which identifies potential intertie projects that will improve Alberta’s interconnections with neighbouring provinces and states. These projects will enable power to be imported and exported as needed. This flexibility supports and encourages market development, helping create the necessary environment for competitive prices and a more reliable electricity system for Albertans.
Transmission Critical

We forecast that we will need another 11,500 MW of new generation over the next 20 years in order to reliably meet the needs of Albertans. In order to entice investors to build more generation, they must have confidence that they will be able to move their product to market. A strong, robust transmission system enables this.

Over 2,000 MW of existing generation is expected to retire within 20 years. But generation is only one part of the equation. It is the AESO’s responsibility to ensure electricity from all available sources is there when we need it. That’s why we need a fully integrated, province-wide transmission grid based on the entire province’s electricity needs in order to provide adequate and reliable service to all Albertans.

A question the AESO is often asked is, “Why don’t you just build a power plant in a city that needs more power instead of transmitting it from far away places?” In Alberta, the natural resources we rely on for our electricity are usually located far from major population centres. It is not practical or economical to ship these resources hundreds of kilometres to generation plants near cities or towns, so power generators are built near natural resources and depend on transmission lines to carry electricity from where it is produced to where it is needed.

Transmission lines facilitate access between renewable generation zones and the integrated electric grid to transport electricity when the wind is blowing or when the river flows swiftly at hydro plants. For example, in the southern part of the province, electricity generated from wind must be connected to the power grid and then transmitted throughout the province in order for the entire province to benefit from this renewable energy source.

The AESO is mandated to ensure the transmission system supports competition in the marketplace.

We will continue to connect electricity generation from all available sources, while ensuring it is reliably transmitted across the province. An efficient transmission system incorporating a diverse mix of generation is key to Alberta’s quality of life and economic well-being, now and into the future.

Demand for new electricity generation in the province is rising. The requirement for new generation development is currently being driven by increased demand in the province and by the retirement of some existing generating units.
A **bulk transmission system** is similar to our major provincial highway grid, allowing for the movement of large amounts of electricity across the province. The bulk system, often referred to as the backbone, is comprised of high voltage transmission lines that interconnect large generating stations with major demand centres such as Calgary and Edmonton. Voltage on bulk transmission lines in Alberta is generally 240 kilovolts (kV) or higher.

Regional transmission systems are more like regional road networks, moving electricity to where it is needed within specific geographic areas such as between communities in central Alberta or across southern Alberta. Voltage on regional transmission lines in Alberta is typically 69 kV, 138 kV or 240 kV.

**Generation capacity in Alberta:** This refers to the total amount of all generation that can be produced in Alberta at any given time. Each generation facility (coal plant, hydro, wind farm) has its own specific capacity or amount of generation it can produce. For example, the largest coal facility in Alberta is Genesee #3, which is capable of producing 450 megawatts (MW) of power. If you add up all the individual power sources in Alberta, as of September 2009 we have 12,427 MW of installed generation.

**Congestion:** Congestion occurs when too much power tries to run through transmission lines at a particular point in time; this restriction limits or constrains the ability of some generators to move their power to various locations. A good comparison is a highway. Too many cars going down a highway can cause a traffic jam. The same is true for electricity. If too much power tries to push through a line, the line gets congested. The AESO takes steps to ensure congestion does not impact the overall reliability of our electricity system.

**Merchant transmission intertie or tie-line:** A merchant tie-line is an arrangement where a third party or private investor that is not a regulated utility builds and operates a transmission line for the purpose of selling transmission capacity, usually to generators or load customers who want to transmit power over the merchant intertie. These lines are paid for and built by private investors and not by ratepayers.

**Co-generation:** This is a process in which an industrial facility uses its excess waste energy to produce heat or electricity for either its own use or to sell back to the electric grid.

**Alternating current (AC) versus direct current (DC):** Electricity flows in two ways, either AC or DC. AC is current that flows alternately in one direction and then in reverse at 60 times per second. DC flows continuously in the same direction.

Alberta’s existing transmission system has been developed to work with the AC electricity generated at power plants and the AC power that we use in our homes, farms and businesses.

Some high voltage DC transmission lines, called high voltage direct current (HVDC), are able to carry a large amount of power. DC is typically used for long distance transmission because it has some major advantages over AC including:

- lower transmission line losses over long distances.
- smaller environmental footprint of towers.

As technology changes, the AESO continues to monitor both AC and DC technologies.
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