WHAT’S INSIDE

Tips on saving electricity

Major work advances critical electricity transmission in Alberta

Expanding Alberta’s power connections
Who is the AESO?

Nancy H. Arab, Publisher

The Alberta Electric System Operator (AESO) is an independent, not-for-profit organization responsible for the coordinated operation of Alberta’s Interconnected Electric System (AIES). The AESO acts in the public interest of all Albertans and has no financial interest or investment of any kind in the power industry.

THE ROLE OF THE AESO

The AESO’s role includes ensuring a robust transmission system that provides reliable service to all Albertans, encourages investment in Alberta and facilitates a competitive energy marketplace.

The AESO manages Alberta’s electricity grid on a 24/7 basis to ensure reliable power is available to meet the needs of all Albertans.

The AESO plans the provincial transmission system, including all its interconnections with neighbouring provinces, to ensure this important infrastructure keeps pace with the growing demand for power.

The AESO operates Alberta’s wholesale electricity market, with 200 participants and about $9 billion in annual energy transactions, ensuring a fair, efficient and openly competitive wholesale market for all participants.

Eco-Audit

By using 30% post-consumer recycled paper in this publication we have achieved these environmental savings as compared to virgin fibre paper:

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- 285,600,000 BTUs energy saved

The AESO gratefully acknowledges Beattie Homes for providing the location for photos on pages 1, 10 and 13.

Message from the editor

Leanne Dawkins

Thank you for taking the time to read this edition of Powering Albertans. The AESO is responsible for providing information about the electricity industry and how it works by offering objective, fact-based information to help people understand this complex system.

We would love to hear what you think about our publication. If you are interested in providing feedback or would like to request previous editions of Powering Albertans, please feel free to contact us at powering.albertans@aeso.ca or call us at 1-888-539-AESO (2376).

Table of Contents

1 Power Facts
2 Major work advances critical electricity transmission in Alberta
5 Expanding Alberta’s power connections
8 Alberta – a unique player in the electricity world
12 Questions and Answers
13 Power Lingo
Start with your lights
Compared to regular bulbs, new energy-efficient compact fluorescent light bulbs can last up to 10 times longer and use up to 75 per cent less electricity. You can improve efficiency and save money by using energy-saving, lower wattage bulbs such as a 52W replacement bulb for a 60W. It’s also important to match the right light to the right task. Use task lighting such as fluorescent under-cabinet lighting for kitchen sinks and countertops instead of lighting up an entire room. And remember to turn the lights off when they’re not in use.

Cut down on “vampire power”
Some appliances draw electricity even when they’re turned off. For example, if your toaster is plugged in and you’re not using it, you may be surprised to learn that current is still running through the plug. This phenomenon is called vampire power, and every year it costs the average homeowner about $40 in extra electricity spending. Other power-sucking appliances and gadgets include televisions, stereos, radios, computers and chargers. So turn off TVs and other appliances either directly or with a power bar when you’re not using them.

Less is more in the kitchen
Use small appliances such as a microwave oven, slow cooker or electric kettle instead of the stove. Use microwaves to heat or defrost small amounts of food as they use about half the energy as conventional ovens and produce less heat.

Make it simple – program your heat and light
Use a programmable thermostat to make controlling the temperature easy. Keep your thermostat at 20 degrees Celsius during the day and 17 degrees Celsius at night to save on your heating bill. Install motion sensors to turn lights on and off automatically.

Keeping your house warm or cool
Install blinds or curtains on windows to keep your home cooler in the summer and warmer in the winter. On sunny winter days, open curtains and let the sun warm your home naturally. Landscaping can also help reduce heating and cooling costs. When strategically placed, trees can provide excellent protection from the hot summer sun while allowing winter sunlight to reach and warm your house.

Clean up on dishwashing
Use your dishwasher wisely. Run it when it is full and use the energy-saving cycle, which cleans regularly soiled dishes as well as the normal cycle. Remember that most new dishwashers do not require a pre-rinse. If you need to pre-rinse dishes before loading them, do it manually and use cold water.

Repair weather stripping
Make your house leakproof to keep heat in and save electricity. Check for potential air leaks that make your furnace work harder. Inspect weather stripping and repair any gaps. Caulk around doors and windows to prevent drafts. Apply insulating foam around pipes and electrical wall outlets. Seal possible air leaks where plumbing, ducts or electrical work pass through exterior walls, floors and ceilings.

Outdoor lighting provides savings
Take advantage of different options for outdoor lighting with today’s wide range of solar-powered lights for the backyard or along walkways. These energy-efficient lights do not require external extension cords or special electrical hookups. They charge during the day and light up at night to showcase your yard and keep walkways safe.

Track your kilowatt-hours
Start tracking how much energy you use to make further savings. Remember the saying, “what gets measured, gets done.” Track how many kilowatt-hours you use by noting your electric bill each month. Most retailers provide a graph on their electricity bills that shows energy consumption for the previous year. Try to beat the numbers and lower this year’s energy consumption.
Major work advances critical electricity transmission in Alberta

Construction is expected to begin on critical transmission projects after a rapid chain of events transformed the future of electricity transmission in Alberta.

The foundation was laid late in 2008 when the Alberta government issued its Provincial Energy Strategy that called for increased renewable and low emission generation and a comprehensive upgrade to the province’s transmission system. Then in 2009 the AESO filed its Long-term Transmission System Plan, which identified the need for a number of critical transmission projects.

Under the Electric Statutes Amendment Act, 2009, the government approved the need for four critical transmission projects that the AESO identified in the Long-term Transmission System Plan:

- Two 500 kilovolt (kV) direct current DC lines that will create a stronger system between Edmonton and Calgary.
- A 500 kV double circuit alternating current (AC) line between Edmonton and the Industrial Heartland area northeast of Edmonton.
- Two 500 kV AC lines to Fort McMurray, including one from the Wabamun Lake area and one from the Industrial Heartland area.
- Facility improvements, including an additional substation or new transmission line, to strengthen the system in and around Calgary.

A fifth project that the AESO identified – new transmission development in southern Alberta to connect more wind farms and deliver that power where it is needed throughout the province – was granted approval for need by the Alberta Utilities Commission (AUC) in September 2009.

“These important projects align with the Alberta government’s Provincial Energy Strategy, which includes building critical transmission infrastructure so it leads business investment decisions that rely upon electricity,” says David Erickson, AESO president and chief executive officer.

Neil Brausen, senior planning advisor, transmission, concurs. “What’s happened is we’ve established a long-term road map for transmission in Alberta. The need for the major elements has been approved and now siting and permitting work is underway. Following approval of the Facilities Application by the AUC, construction will begin.

“The five projects fit together as one package,” adds Brausen. “The lines to Fort McMurray will serve oilsands projects and enable the addition of more low emission electricity sources like cogeneration to be built and reach consumers. The lines to the Industrial Heartland address the power needs of local industry including petro-chemical, chemical, and oil & gas facilities. The reinforcement in southern Alberta will permit more wind power sources to be added. And the Edmonton to Calgary lines help knit the province together by strengthening the backbone of the system. All the projects are timely and urgently needed.”
Critical timing
For industry professionals like Brausen, the push for new transmission projects provides a much needed boost to Alberta’s aging transmission system – and it comes at a critical time.

Alberta has had few major transmission upgrades since the 1980s. Yet over that time, the province’s population and economy have continued to grow, increasing the need for more power. Between 2003 and 2007, Alberta’s demand for power grew at a rate equal to adding two cities the size of Red Deer (a population of about 86,000) to the system each year. Today’s system is stretched to its limits, making it increasingly difficult to connect electricity to the people, businesses and industries that power the province’s prosperity.

The situation is clear: to handle the extra power needed to satisfy the province’s growing population and economy, Alberta will need more generation plants and transmission lines to generate and deliver more power. About 11,500 megawatts (MW) of new generation – nearly equal to the current amount of electricity that can be produced in the province today – will be needed over the next two decades to meet forecast demand and replace aging power plants.

“We need to reinforce the transmission backbone that runs through the province and links vital parts of the system,” says Erickson. “Transmission investment is needed to reliably serve the expanding demand, reduce congestion and facilitate a competitive market.”

Brausen adds, “Our current transmission system is reaching full capacity and the end of its life. Now we need to ensure we’re planning for Alberta’s future.”

The AESO’s role in the planning process
Major changes will be needed to improve and reinforce Alberta’s transmission system. The AESO’s job is to keep a close watch on how well the provincial transmission system is meeting Albertans’ needs. These efforts include conducting technical studies and consulting with the public to find ways to improve the power highway across the province. The AESO’s Long-term Transmission System Plan provides a detailed analysis of what is needed now and in the future to ensure the electricity transmission system stays strong, reliable and efficient as the province continues to grow.

“To prepare the Plan, our planners look at the demand and supply picture of electricity in the province to see where the transmission system will be under stress. They also look at new sources of electricity demand and changes in supply. Putting this information together, they figure out the best transmission solutions over the short and long run,” says Brausen.
Work on the Heartland project is well underway and public consultation on different route options has been ongoing since 2008. Transmission facility owners are expected to file their Facilities Application in 2010 and construction will begin pending AUC approval.

The AESO is also developing a competitive bid process to select a transmission facility owner to build the Edmonton to Fort McMurray transmission reinforcement. A contract should be awarded early in 2011 pending AUC approval.

The initial phases of the five projects are projected to cost between $5 and $6 billion. This will result in an increase of about $5 to $6 per month to the transmission charge on a typical residential customer’s bill after the projects are completed.

The AESO’s Plan identifies additional transmission infrastructure projects that are at a less advanced stage of planning and include upgrades and regional projects. The Plan also includes potential intertie projects that will improve the province’s interconnections with neighbouring provinces and states.

Together, the different projects in the Plan add up to significant improvements for the province’s transmission system, upgrades that will encourage the building of new generation projects and a more reliable system in the future for Alberta’s electricity consumers.

“Over the last year, we’ve seen some major milestones accomplished. A lot of projects have moved from the needs identification phase to starting work to prepare routing options. We’ve taken a big step in strengthening the transmission system,” says David Erickson. “It’s an exciting and challenging time for transmission planning in the province.”
The interties work much like valves that can be opened and closed to control how much electricity flows through depending on system and market conditions. Interties provide many benefits including:

- **Access to other markets for increased reliability of supply.**
- **Support for neighbouring jurisdictions in situations like severe storms which can cause short-term equipment failure.**
- **Development and management of renewable generation.**

Today, however, Alberta’s electric system can’t fully benefit from these interties because the backbone of the province’s transmission system has not been reinforced in over 20 years. The transmission system is running near capacity and can’t move any more power on the interties. The result is the interties are operating well below their design capacity.

This vision of the future, however, is stark contrast to the current reality – Alberta today is one of the least interconnected electricity systems in Canada.

“If you look at a map of electricity interconnections throughout North America, it’s a spider web,” says Kelly Gunsch, AESO vice-president, market services. “But if you look at Alberta, our province has only two links to other jurisdictions, and none directly to the U.S. Our interconnections are relatively limited compared with other electricity markets.”

These links are the province’s two interties – high voltage transmission lines that allow us to exchange electricity with British Columbia (B.C.) and Saskatchewan.
system s. A  private com pany assum es a
m erchant intertie’s cost and associated
risk. C om panies using the intertie pay
a fee to the owner of the merchant
transm ission line. Individual ratepayers
do not pay any costs for merchant
interties. The A ESO ’s role is to ensure
proposed merchant interties can
be reliably connected to A lberta’s
transm ission system.

C urrently, w ork on at least one
m erchant intertie is in progress.
M ontana A lberta Tie Ltd., a C algary-
based energy transm ission com pany,
is building a 230 kilovolt (kV),
345  kilom etre (km ) transm ission line
betw een Lethbridge, A lberta and
G reat Falls, M ontana. W hen com pleted
in 2011, it w ill be the first direct
connection betw een A lberta and
the U .S., and w ill enable developm ent
of new  projects in both regions.

O ther longer-term  projects are being
considered that could connect central
A lberta to the U.S. Pacific Northwest or
east to M anitoba. If built, the projects
could create opportunities for electricity
trade between regions.

Market facilitation
of new interties
As these developments move forward,
the AESO continues to work to
facilitate interties for Alberta’s market
and ensure system reliability as
directed by government policy. In 2009,
the organization examined the use of
interties in other electricity jurisdictions
and will shortly publish a discussion
paper for review.

“As we expand our interconnections
with other areas, we need to look
closely at rules and procedures that
will allow us to accommodate new
interties,” says Gunsch. “That’s why
we’re studying other jurisdictions in
North A m erica to assess how  they
approach interties. O ur plan is to
develop products, rules and business
practices that w ill support new
interconnections and are appropriate
for the A lberta electricity market.”

All exporters of electricity must pay
a fee for access to the transmission
system as well as a charge for the
power they export.
To industry observers, the growing drive to support the province’s interties is all part of a larger phenomenon—a movement across North America that is seeing increased interconnections to improve system reliability and market competitiveness. And here in Alberta, these same industry observers say taking action to increase our electricity system’s interties makes good sense.

“We understand the value of exporting our oil and gas resources, our agricultural products, our wood products—you name it. So, why should we look at electricity as being any different?” says Bahry.

“Increasing our electricity interconnections creates more competition. The more choice and the more competition we have, the more consumers will benefit by having greater liquidity in the marketplace,” adds Bahry.

Others say improving and adding interties will provide the stimulus for new economic growth as interties connect new sources of electricity, including wind, cogeneration and hydro, to the system and other markets.

A promising growth area is the development of future wind power projects in southern Alberta. A challenge to widespread growth of renewable electricity is its intermittent nature—if the wind isn’t blowing, power can’t be produced. And any surplus cannot be stored. This means there is a growing need for reliable interconnections to other provinces.

“As we develop more wind power in Alberta, we’re going to need better interconnections with B.C.’s hydro-focused generation,” explains Bahry.

“Expanded and improved interties provide a huge benefit to southern Alberta because of the exponential growth in wind farm development,” says Kris Hodgson, senior manager of economic development for Economic Development Lethbridge. “The southern region currently has more than 629 MW of wind power operating, with over 2,700 MW of additional wind generation forecast to be added to the grid during the next decade. Improving intertie interconnections is extremely important because it allows excess wind energy to be developed, exported and not wasted. And exporting electricity is important to Alberta because it opens up the opportunity for further wind development.”

As new electricity projects are built or planned, there is a growing awareness that interties—and along with them, the export and import of electricity—can benefit more than one region. They offer a new link to a stronger electricity future for all Alberta.

“Exports and imports of electricity provide us with diversification,” says Gunsch. “Just as diversification is healthy in our investment portfolios, it is also important for our generators who are subject to market prices. An ability to diversify will encourage generation to be built in Alberta, which will ensure we have adequate electricity to meet Albertans’ future needs.”

Studying the benefits of new interties...
At the same time, new generation technology was providing industrial customers with the ability to install small, efficient natural gas-fired combustion turbine units in simple cycle or cogeneration plants to meet their own energy requirements. Moreover, these facilities could be built and brought online quickly compared to large coal plants and could be more responsive to the growth in demand for electricity.

In the early 1990s, the Alberta government implemented a strategy to decrease its role in the industry, increase competition, and expose businesses to the discipline of market conditions. The generation and sale of electricity were opened up to competition.

Power is moved from where it is generated to homes and businesses across the province by a network of wires called transmission (high voltage) and distribution (low voltage) lines. Transmission lines are like a highway connecting generating facilities to communities and distribution lines are like the roads and lanes to individual sites. Transmission is characterized by large economies of scale and is considered a natural monopoly. After restructuring, the transmission and distribution systems continued to be regulated by the Alberta Utilities Commission (AUC), which means the company that provides the service is fully regulated to avoid the unnecessary and expensive duplication of competing sets of wires across the province.

Almost 15 years into a restructured electricity market, industry participants say it is the new industries, new jobs and greater market diversification that prove its success.

An ambitious undertaking

In 1996, the Alberta government began the most ambitious, significant change experienced by the electricity sector since its inception in the late 1800s. A new industry structure introduced competition to the industry’s generation and retail markets in place of regulation. The goals: to create a wholesale market to facilitate the buying and selling of power; to shift the risk associated with building new power plants from ratepayers to independent, commercial interests; to offer consumers a choice of supplier for electricity services; and to ensure a level playing field for all retailers so consumers would benefit from open competition.

Until the 1990s, companies producing power in the province were vertically integrated utilities that generated, transmitted and distributed power to retail and wholesale customers in a mandated geographic service area. By the early 1990s, the Alberta government, industry players and many consumers began to believe that vertically integrated companies operating in service territory monopolies were not equipped to respond to emerging changes in electricity occurring around the world. Other industries, such as telecommunications and natural gas distribution, had undergone restructuring. Various jurisdictions, most notably the United Kingdom and the U.S., were beginning to restructure their electricity industries to keep pace with technological changes, address issues such as increasing globalization, and deliver more value to consumers.

Almost 15 years into a restructured electricity market, industry participants say it is the new industries, new jobs and greater market diversification that prove its success.
Although the cities of Calgary (ENMAX) and Edmonton (EPCOR) also own their electric distribution systems, the AUC, not municipal councils, regulates the distribution rates.

In Alberta’s remaining communities, the distribution systems are owned by either Fortis Alberta or ATCO Electric. The AUC regulates the distribution rates of these two investor-owned utilities.

**Alberta’s unique energy mix**

In Alberta, energy is primarily produced from coal or natural gas. Almost half of the electricity in Alberta is generated through coal-fired plants, with an increasing amount being fuelled by natural gas including cogeneration. Renewable plants generate the remainder of the supply (e.g., hydro, biomass and wind-powered plants).

**Alberta Generation Capacity 2010**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MEGAWATTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>5,946</td>
</tr>
<tr>
<td>Gas</td>
<td>5,071</td>
</tr>
<tr>
<td>Hydro</td>
<td>871</td>
</tr>
<tr>
<td>Wind</td>
<td>629</td>
</tr>
<tr>
<td>Other (Biomass)</td>
<td>264</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,781</strong></td>
</tr>
</tbody>
</table>

Alberta’s robust economic and population growth in recent years has placed pressure on the provincial electricity system to meet the increasing demand for electric power. Investors began showing interest in building generation facilities in the province and the resulting private investment has provided increased supply to meet load growth. From 1998 through to 2009, the industry brought more than 5,600 megawatts (MW) of new capacity online. In addition, there are currently 1,219 MW of projects under active construction, 1,060 MW of projects have received regulatory approval and 11,170 MW of projects have either been announced, have applied to the AESO for interconnection, and/or have applied for regulatory approval.

Generation additions have directly enhanced the provincial supply margin and system reliability and contributed to more diversity of generation fuels, including increasing renewable energy sources.

Prior to restructuring, the majority of Alberta’s electric generation used coal as the primary fuel. For example, in 1998, natural gas generation made up only 1,176 MW of the generation fuel mix. Today, that figure has risen to more than 5,000 MW. While renewable energy sources make up about 14 per cent of the overall generation capability, significant new green energy sources have been developed in the province – in particular wind energy.

**Wind integration**

Integrating intermittent sources of renewable energy like wind power into the existing electrical system – while ensuring reliability – is challenging, explains Kelly Gunsch, vice-president, market services for the AESO. “Wind generation ramps up and down very quickly as the wind starts or stops blowing,” she says. “Alberta’s existing baseload generation – which generates the majority of the power we need to have running all the time – is predominantly coal-fired. Coal-fired power plants do not ramp up or down very rapidly.”

Sudden changes in wind power are backed up with quickly dispatchable fuel sources like hydro or gas generation. The AESO has also procured a wind forecasting service that will serve as a valuable tool to help keep generation and demand safely in balance on the electric system at all times.

“It’s a challenge being faced by many jurisdictions around the world, and we’re all working diligently to find the right solutions,” adds Gunsch.

Another feature of the Alberta market uncommon among other electricity markets is the province’s large industrial load. About 60 per cent of load in Alberta is industrial, which is high compared to most other jurisdictions.
Gunsch says this has a number of implications. “First, power is a critical input into Alberta’s economy. It also means that the demand for power is much steadier across the day because industrial sites run 24/7.” Alberta’s load factor (the ratio of average power or demand over a period of time compared to the maximum or peak demand for that same period) hovers around 80 per cent. That’s positive for encouraging generation companies to invest in Alberta and build new plants, as the demand for their product is steadier and more predictable than in other jurisdictions.

“It also means that demand tends to increase in large, rather than steady increments,” Gunsch adds.

**For example, in primarily residential markets, demand for power tends to increase slowly and steadily over time. In Alberta that residential growth exists, but on top of that, when new industrial sites come online, it creates a large incremental increase in that demand.”**

Wholesale market competition has spurred innovation, fuelled diversity and encouraged more efficient and competitive producers. Since Alberta’s electricity system ensures economic dispatch (lowest priced generators are dispatched first by the system controller), the result has been a more diverse generation mix and downward pressure on prices. In fact, Alberta has some of the lowest non-hydro bills in the country.

**More players in the market**

New generation development has added billions in new investment in Alberta along with jobs and research and development.

In January 2000, a total of 48 market players were active in Alberta’s energy market. Most of these participants were independent, small power producers. Twelve months later, 138 market participants were active, and by the end of 2009, there were 214. In addition, the market participant mix had shifted from mostly generators to generators, consumers and retailers.

Retail customer choice began in January 2001. Large industrial consumers transitioned to competitive contracts offered by retailers immediately, while smaller residential, farm, and commercial customers could remain on a regulated rate option. Over the last five years, the formula used to calculate the regulated rate option was gradually changed so that on July 1, 2010 it will be calculated 100 per cent on month-ahead projected pricing instead of a blend of short and long-term pricing. For any customers who have not chosen to sign a contract with a competitive retail supplier, the regulated rate option will still be available as the default supply option.

Direct Energy, one of North America’s largest integrated providers of electricity and natural gas in competitive markets, also operates separately as a regulated business and is one of the regulated rate providers in Alberta. The company has been a key participant in the electricity sector and employs about 650 people directly and indirectly across the province.

Direct Energy entered the retail energy market in 2004 with the $90-million purchase of ATCO’s regulated retail business and the creation of its competitive energy supply and services businesses. The company has invested hundreds of millions of dollars in Alberta since entering the market in 2000 with the acquisition of its natural gas production business, explains Gary Newcombe, vice president of government and regulatory affairs. “Looking at our upstream natural gas business and our services business that sells and services heating, ventilation and air conditioning equipment, together with our community partnerships, sponsorships and advertising, employee wages and provincial taxes, we’ve invested significantly and continue to support Alberta’s economy.”

In addition to capital investment, Direct Energy also plays a critical role in shaping retail energy market structure and development.
This includes assisting in the creation of plain-language contracts; acting as a market leader by applying robust retail sales quality assurance practices; taking the lead in working towards finding solutions to serve vulnerable customers; and offering long-term sales contracts that provide a stable market for new and green generation.

“Healthy energy markets like Alberta’s enable the investor confidence needed to fund the billions of dollars of investment required to build a long-term, reliable energy infrastructure,” says Newcombe. “The restructuring of Alberta’s electricity market attracted investment in new power generation that is poised to help the province not only avoid a generation shortage, but keep pace with one of the country’s fastest growing demands. Since market restructuring, an investment of some $4 billion has been made in generating capacity in Alberta – all of it funded by investors, not taxpayers or ratepayers.”

The retail market continues to evolve and retailers, along with other interested parties such as consumer groups, continue to work to inform customers about their retail electricity options.

**Significant benefits to consumers**

In 2003, the Independent Power Producers Society of Alberta (IPPSA) commissioned a study to compare deregulated market prices against regulated rates if they had been available at that time. The report concluded that Alberta’s restructured market is on track and that the restructured market already provides a number of significant benefits to consumers. With an abundance of new supply, Alberta’s market prices are lower than they would have been with regulated rates. An update in 2004 confirmed the outcome. Despite increasing natural gas prices, researchers concluded that competitive market prices are at or near the “crossover point” relative to the rates that would have prevailed had Alberta’s market remained regulated. The research also pointed out the “very tangible” benefits already secured by electric restructuring in Alberta, including:

- Over 3,000 MW of new capacity has been built, meeting demand growth and improving reliability.
- New capacity is being built through private investment, not at ratepayer risk.
- Average market heat rates continue to decline, reflecting continued operational improvements, the effect of competitive pressure on prices, and the addition of efficient new generating capacity.
- New technologies – especially wind power – are flourishing now that a robust marketplace exists for their output.

**A promising outlook**

Alberta’s maturing market holds promise, says Direct Energy’s Gary Newcombe. “We are always looking for strategic opportunities and when the right conditions are present, we critically evaluate the opportunities for investment. As Alberta’s natural gas and electricity markets continue to evolve and grow, we certainly see sustained opportunities in Alberta and are committed to serving our customer base by providing competitive, innovative products and solutions that serve the needs of the market.”

Unleashing these competitive forces has spurred new investment in generation supply, provided an opportunity for new market entrants, allowed customer choice, and increased the ability of customers to manage their energy costs. All of this has supported continued economic growth in the province and enhanced the Alberta Advantage.
Questions and Answers

I have heard that selected communities in rural Alberta can be a part of their own provincial electric distribution community. How does this work?

Yes, this is the Alberta Federation of Rural Electrification Associations Ltd. (AFREA). The AFREA is a not-for-profit association registered in the Province of Alberta operating under the Rural Utilities Act. The AFREA was formed in 1950, is managed by an elected Board of Directors, and is funded by its membership.

“Rural Electrification Associations (REAs) were, and are, a very important part of Alberta’s history,” says Al Nagel, chief executive officer, AFREA. “They provide rural communities with support for their electricity needs and services.”

The AFREA currently represents 42 REAs with over 33,000 services throughout Alberta.

“We are committed to promoting the economic welfare and value of our cooperative members by providing strong representation to government and industry stakeholders with one voice,” says Nagel. “As the umbrella organization, the AFREA sponsors workshops, facilitates networking opportunities, provides quality administrative services and supports relationships that are economically beneficial to its member REAs.”

The cooperative strategy is designed to assist REAs in attaining necessary steps to self-sufficiency while recognizing opportunities within the marketplace for the provision of reliable and efficient services to its own members.

“The AFREA provides effective leadership in all areas of operation,” says Nagel. “It begins by listening to the member REAs in order to identify their needs and interests. Although the goal is self-governance on an individual district level, the AFREA recognizes and appreciates the diversity within the membership and the necessity to facilitate cooperation.”

Signature AFREA strengths include:

- The AFREA Board of Directors is elected from the membership and is, in turn, transparent and accountable to the members.
- Historical roots built the foundation of the AFREA and continue to be the backbone of the organization.
- A focused mission and defined business objectives serve to deliver a renewed vision of “innovative and dynamic” REAs.

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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
Reliability
There are two components to electric system reliability: adequacy and security. Adequacy is the ability of the electric system to respond to the demand for power from consumers. Security is the ability to withstand sudden disturbances or the unanticipated loss of facilities on the system.

Peak Electricity Demand
The demand for electricity is measured each hour. The highest hourly consumption of electricity during a year is called peak demand. The peak demand for power is reported in megawatts (MW) and measures the amount of electricity necessary to serve all Alberta customers during times when they use the most power. In Alberta, the highest hourly consumption of power typically occurs during the dark and cold winter months. On December 14, 2009, Alberta’s demand for electricity reached a record high of 10,236 MW during the hour of 6:00 p.m., breaking the 10,046 MW record set just a week earlier on December 7, 2009.

Load or Demand
The power industry uses the terms load or demand to define how much electricity is needed and used by customers. It can be measured for an overall system or at specific points along the electric system like at a city, town or home.

AC versus DC
The two main types of electricity are alternating current (AC) and direct current (DC). The difference between AC and DC systems is in how the power moves through the lines. With AC the flow of power reverses direction 60 times per second. With DC the power only moves in one direction. Both technologies were developed around the same time, but AC has become the predominant system. Alberta’s transmission system has been built to work with the AC generated at our power plants. To connect an AC system to a DC system, a converter station must be built. These converter stations require additional infrastructure to be built.

Supply-Demand Balance
One of the most important things to remember about electric systems is that the supply and demand for power must always be equally matched. Electricity cannot be stored efficiently and must be used at the same instant it is produced. If an imbalance occurs and more power is demanded than is available, a shortage, outage or, in severe cases, a blackout will occur. If more power is created than is used, the system will shut down to protect itself.

Kilowatt/Megawatt
Power is measured in watts. Households consume power in kilowatts, which represent 1,000 watts. Power is normally produced in large volumes called megawatts, which represent 1,000 kilowatts.

Alberta Interconnected Electric System
The system of interconnected transmission power lines and generators managed by the AESO, making sure that the supply of electricity matches the demand for power every second.
empowering energy education in Alberta classrooms

Inside Education, Canada’s largest natural resources and environment education society, is pleased to partner with the AESO, the Government of Alberta, AltaLink and ATCO Electric in engaging, electricity education for Alberta students and teachers.

If you are a teacher, or know someone who is, you can help Alberta students get a charge out of learning by sending them our way!

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