

INVESTING IN OUR ECONOMY:  
NORTH-SOUTH CORRIDOR  
TRANSMISSION REINFORCEMENT

*Government of  
Alberta Response  
to the Critical  
Transmission  
Review Committee  
Report*

**Government  
of Alberta** ■

February 23, 2012

# Alberta's Electricity Transmission Needs

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Alberta's transmission system requires reinforcement and expansion.

Building a robust grid is an absolute necessity if Alberta is to continue to support the strongest economic growth and fastest growing population in the country. Economic and population growth are widely recognized as reliable predictors of growth in demand for electricity. Provincial demand for power is forecast to nearly double over the next 20 years.

The existing transmission lines that deliver power from the Edmonton to Calgary areas were built 40 years ago when Alberta's population was two million less than it is today. Indeed, there are 700,000 more Albertans today than when the need for North-South transmission upgrades was first identified 10 years ago.

These new Albertans have brought new ideas and have built new communities. They're still coming. By the time the new North-South lines are expected to be in service in 2015 our population will have grown another 200,000. We welcome these new Albertans. But to be ready, we need to make wise decisions today that will support our continued growth into the future. It is a time for foresight.

The right choice requires that we proceed intelligently and prudently. The Alberta government appointed an expert panel in December 2011 to take one more look at the North-South lines to ensure we had confidence to proceed.

This is not a simple or easy choice. This means billions in investment and increased costs on Albertans' power bills. But this is not about what's best for Alberta for the next four years, but rather what's best for the next four decades.

Because these projects provide long-term benefits they should also be paid for over the long-term. We will therefore ensure the costs for these transmission projects are shared equitably by all those who benefit from this investment.

What we have before us is a defining opportunity to prepare for our province's future. This report outlines the Alberta government's response to the report submitted by the Critical Transmission Review Committee – and the actions we will take to secure that future.

# Government of Alberta Action Plan

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The Government of Alberta has reviewed and accepted the conclusions of the Critical Transmission Review Committee. Their report makes it clear that transmission reinforcement is necessary for the continued growth of our economy, but along with the positive benefits, there are costs. The investment in transmission development made a generation ago has facilitated the prosperity and economic growth Alberta has experienced over the past 30 years.

The Government of Alberta will ensure that we have the electricity transmission infrastructure necessary to facilitate Alberta's continued development, economic prosperity and the quality of life we enjoy. This infrastructure is not without cost and the Government of Alberta will examine ways to mitigate the impacts to consumers.

Specifically, the Government of Alberta will:

1. Request the Alberta Utilities Commission (AUC) to proceed with its consideration of the existing facilities applications for siting of the Western and Eastern Alberta Transmission Lines.
2. Pursue options to reduce the impact to consumers of the cost of transmission projects. This work will include:
  - Developing preliminary transmission cost recovery options by the existing Transmission Cost Recovery Subcommittee.
  - Directing the AUC to conduct a public transmission cost recovery inquiry into approaches that could mitigate the rate impact of new transmission on consumers.
  - Implementing changes to transmission cost recovery approaches as appropriate prior to the completion of the Western and Eastern Alberta Transmission Lines.
3. Amend the *Electric Utilities Act* so that all future transmission development proposals will require need and routing approvals from the AUC. This legislation will be introduced in the fall Session of the Legislature.
4. Ensure that all future major transmission infrastructure projects are awarded using a competitive procurement process.
5. Undertake a review of the Regulated Rate Option to ensure it meets the needs of Alberta consumers in the context of an open and competitive retail sector.
6. Evaluate the electricity system education and awareness activities in the province and identify areas and programs that would enhance Albertans' knowledge about electricity and transmission costs and retail market choices.

# Powering Our Economy Findings

In December 2011, the Minister of Energy appointed the Critical Transmission Review Committee to review the process and information used by the Alberta Electric System Operator (AESO) in considering and developing the North-South transmission reinforcement plan.

The Critical Transmission Review Committee submitted its report to the Minister of Energy on February 10, 2012. The report concluded that the Alberta Electric System Operator’s forecast, selection of high-voltage direct current technology (HVDC), and the timing of the two North-South transmission lines were reasonable. They also recommended that:

- the government amend legislation to repeal Cabinet’s authority to designate future critical transmission infrastructure;
- the AUC consider options that will mitigate transmission rate increases to consumers; and,
- competitive procurement be used for future critical transmission projects.

The Government of Alberta has reviewed and considered the findings of the report. The following sections provide a brief summary of the government’s position on each of the Committee’s conclusions from which the Action Plan is derived.

## RECOMMENDATION 1: THE AESO’S ECONOMIC, LOAD, AND GENERATION FORECASTS FOR ALBERTA ARE REASONABLE.

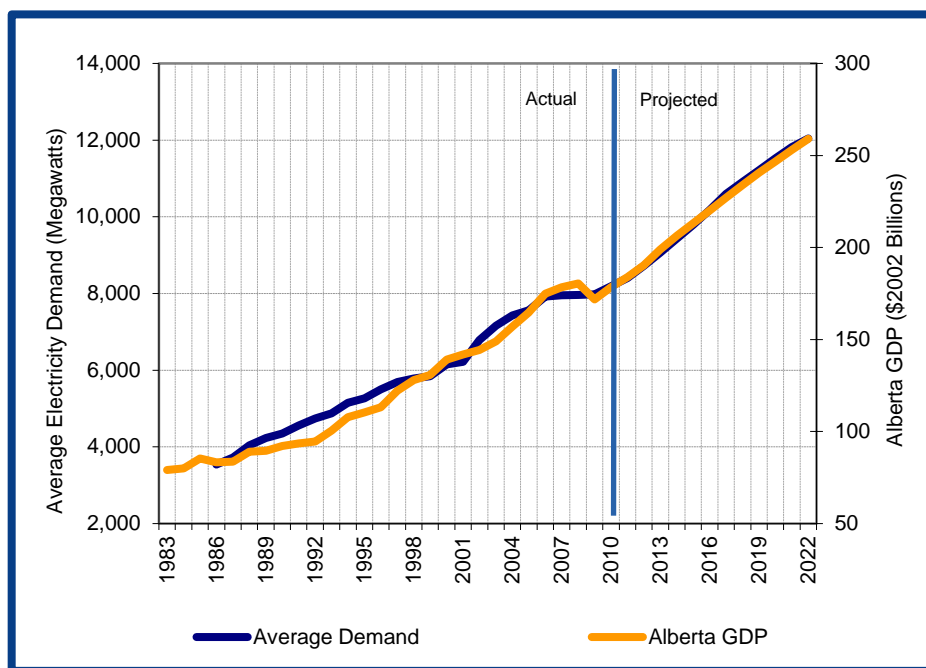


Figure 1 - Average Alberta Electricity Demand and Alberta GDP

**Accepted.** The AESO’s forecast is consistent with government’s forecasts as well those of the Conference Board of Canada, and other independent forecasters. The Conference Board of Canada forecasts annual real GDP growth for Alberta of over 3% over the next 10 years<sup>1</sup>. Most private sector forecasters also expect Alberta to lead all provinces in economic growth. The Scotiabank Group predicts real GDP growth for Alberta of 3.1% in each of 2012 and 2013<sup>2</sup>.

Alberta's abundance of natural resources combined with a positive business climate continues to attract investment to Alberta and allows businesses to compete around the globe. A large portion of this investment is the \$180 billion of oil sands development forecast over the next 10 years<sup>3</sup>.

This proposed investment impacts electricity demand directly, but also indirectly through its impact on other economic sectors and population growth. Alberta's GDP and population growth closely

track the growth in Alberta's demand for electricity and the AESO's forecast is in line with forecast GDP and population growth. Economic and population growth are widely recognized as reliable predictors of growth in demand for electricity. This reinforces the reasonableness of the AESO's electricity load forecast of 2.5% annually over the next 20 years.

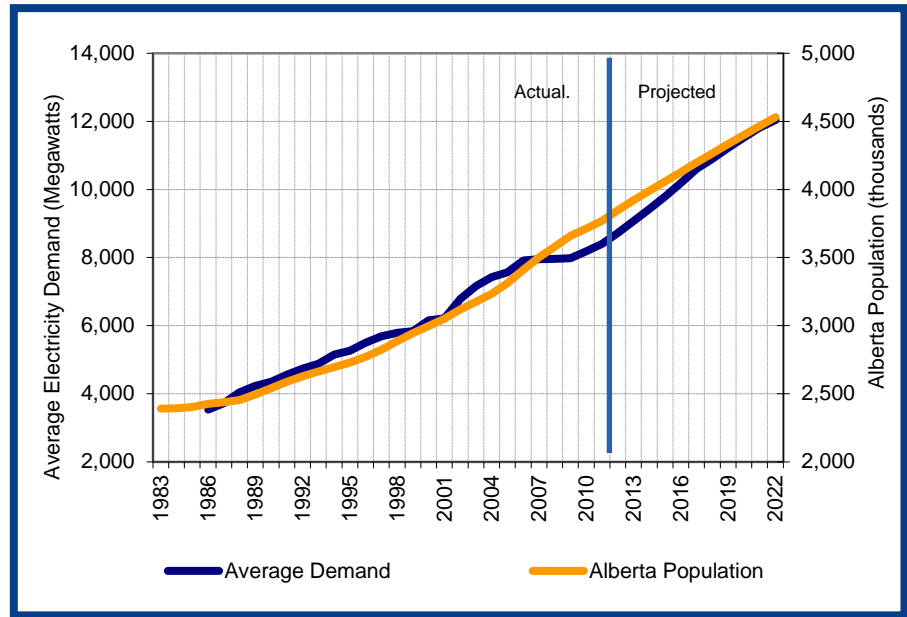


Figure 2 - Average Alberta Electricity Demand versus Alberta Population

Finally, the AESO's 2012 generation forecast accounts for changes in federal environmental policy and low natural gas prices resulting from increasing shale gas production. The AESO also accounts for a variety of other factors such as location of generation, uncertainties in individual investor plans and the ability to accommodate a wide range of potential future outcomes. The AESO is the only organization in the province that has access to the confidential investment information to predict future generation and demand locations. This uniquely positions the AESO to develop comprehensive transmission plans based on their detailed and complete knowledge of the Alberta electricity system.

**RECOMMENDATION 2: THE AESO'S RECOMMENDATION TO PROCEED WITH THE DEVELOPMENT OF TWO 500 kV TRANSMISSION LINES IS REASONABLE.**

**Accepted.** The need for reinforcement of the North-South transmission corridor has been consistently affirmed numerous times over the past decade. In 2002, the need for reinforcement of the North-South corridor was identified in the 10-year transmission plan. The Alberta Energy and Utilities Board (now the AUC) approved the need for reinforcement of the North-South corridor in 2005. The AESO reaffirmed the need for the immediate reinforcement and confirmed the need for a second line within five years of the first. In fact, since 2002 the AESO transmission planning documents have consistently identified the need for two North-South transmission lines.

The transmission system must be capable of accommodating the maximum demand at any point in time, not the average. This is necessary to avoid system constraints which could limit the most economic energy from

reaching consumers, resulting in higher energy costs. Since the last major investment in North-South transmission, 40 years ago, Alberta's population has grown by approximately two million people. There are 700,000 more Albertans since the need for North-South transmission upgrades was first identified 10 years ago. By the time the new North-South lines are expected to be in service in 2015 there is forecast to be over four million Albertans, an increase of over 200,000 from 2012. The transmission system must be designed to accommodate the increasing power demands of Alberta's growing economy.

As noted in the Energy and Environmental Economics (E3) report submitted to the Critical Transmission Review Committee during the public hearings, the development of adequate transmission in Alberta's market mitigates the asymmetric risk of not having sufficient transmission to support Alberta's economy<sup>4</sup>. Simply put, this means that the cost of building transmission in advance of need is known. Whereas, the cost of inadequate transmission, although unknown, can be much higher due to potential increases in market prices as a result of constraining the most efficient generation, or in the worst case scenario widespread outages, which has significant negative impacts on our economy and is not acceptable.

In order to maintain system reliability, major transmission lines should also be geographically separated<sup>5</sup>. This reduces the probability of losing both lines due to a common cause such as a severe weather event.

The addition of two high capacity North-South transmission lines also frees up capacity in the existing 240kV transmission lines to serve the growing loads in the central Alberta region. The ability to provide improved regional transmission is essential as the central Alberta region is forecast to grow by 30 percent in the next decade<sup>6</sup>. In addition, the reinforcement of the North-South lines will assist in enabling new clean energy to Alberta's system over the longer-term, such as hydro generation in northern Alberta and more wind generation in southern and central Alberta.

### **RECOMMENDATION 3: THE AESO'S DECISION TO USE HVDC TECHNOLOGY IS REASONABLE.**

**Accepted.** The integration of HVDC into the grid takes a long-term view that mitigates land use impacts, better manages the variability of wind resources across Central and Southern Alberta, and enables improved access for the diverse generation assets spread throughout the province.

Conversely, reversing the decision to use HVDC technology at this point will result in the loss in the order of \$200 million in sunk costs, as well as increased project costs for labour, materials, and land. There will also be an additional delay of approximately two to four years pushing the in-service date for these lines out as far as 2019/2020. This substantially increases the risk that Albertans will not have a safe, reliable, and efficient transmission system.

HVDC is a proven technology. It has been in use for several decades in British Columbia, Manitoba and Quebec, throughout the United States and many other places in the world. The following table lists a few HVDC transmission projects in North America and the world including some with line lengths in the order of the North-South lines.

### Sample List of HVDC Projects Worldwide<sup>7</sup>

Project	Length of Overhead Line	Year	Location
Thailand-Malaysia	110 km	2002	Thailand - Malaysia
Leyte – Luzon	430 km	1998	Philippines
Sileru-Barsoor	196 km	1989	India
Quebec-New England Ph 1	172 km	1986	Canada-US
Intermountain	785 km	1986	US
Nelson River Bipole II	937 km	1985	Canada
Nelson River Bipole I	895 km	1987	Canada
HVDC Inter-Island	570 km	1965	New Zealand

During the AESO’s consultations in 2008 and 2009 Albertans asked for a technology that would minimize land-use impacts, maximize the efficiency of right-of-ways and meet long-term needs. In short, the feedback from landowners was: if you are going to build it, build it once so you don’t have to keep coming back. The Government of Alberta identified HVDC technology as an option to address these concerns while continuing to enable economic growth<sup>8</sup>. HVDC structures are smaller than those of equivalent capacity for high-voltage alternating current lines (HVAC), have lower profiles, and require a smaller right of way. The amount of land required for an HVDC line is 30 to 50% less than for an equivalent HVAC transmission system.

The capacity of HVDC transmission lines can be increased to accommodate long-term growth without having to modify or add additional transmission wires, eliminating the requirement for future land access when additional capacity is required. Furthermore, the energy flow on HVDC lines can be controlled. This allows for better integration of variable generation sources such as clean energy wind projects in Southern Alberta, and the control of energy flows that reduce costly energy line losses on the rest of the system. Recognizing these benefits the Provincial Energy Strategy directs the use of HVDC technology where possible as a robust, long-term solution for transmission infrastructure which minimizes the impact on land use<sup>9</sup>.

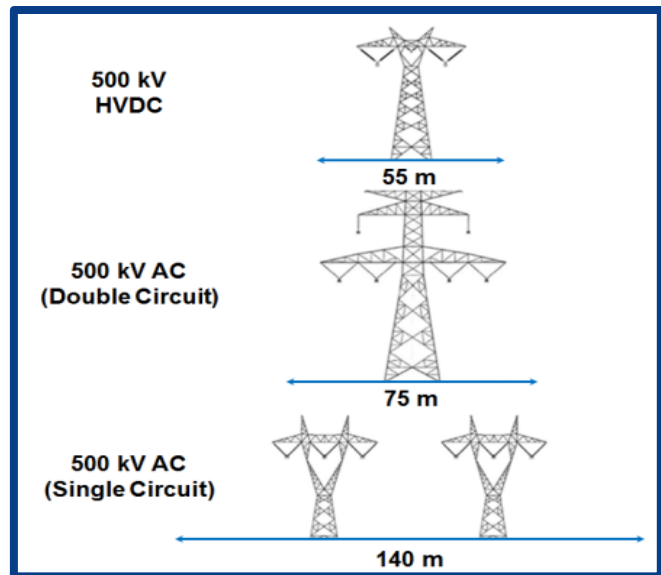


Figure 3 – Comparison of 500 kV Transmission Towers

HVDC does have a greater capital cost than comparable alternating current (AC) options. However, the additional investment in these long-term assets minimizes the impact to those most affected by their construction; the landowner on whose property the lines must be constructed.

**RECOMMENDATION 4: IT IS REASONABLE FOR THE ALBERTA GOVERNMENT TO PROCEED WITH THE DEVELOPMENT OF THE TWO 500 kV HVDC TRANSMISSION LINES AS SOON AS POSSIBLE.**

**Accepted.** The North-South transmission lines will provide the backbone of Alberta’s system for decades into the future. They will provide the AESO the ability to respond to events and contingencies without violating North American reliability requirements. Providing additional capacity by the planned in-service dates will accommodate growth in electricity demand, ensure reliability requirements are met, and minimize land use impacts. By proceeding with both lines at this time it will also decrease the risks associated with delays in regulatory approvals and project construction that are often associated with large mega-projects.

*The Canadian Federation of Independent Businesses estimates the 2003 power blackout in Eastern Canada represented “a shock of between \$1 and \$2 billion in unanticipated costs or reduced sales.” (Power Struggle, CFIB Research, 2003)*

In determining the need for both North-South lines, the AESO undertook detailed engineering studies of paths and flows under a variety of scenarios and system conditions such as demand projections, generation schedules and transmission line contingencies. The AESO has access to real time data points across the provincial grid to assist in analysing the needs of the transmission system.

Building a robust grid not only supports economic development, and provides investor certainty; it also mitigates the significant economic risk of not having the lines in place in advance of need. These risks include system reliability, inefficient market operation, higher market prices due to system congestion, not being able to access the most economic generation and, in the worst case, outages to consumers. The financial impact of not being able to fully supply Alberta’s growing economy over time is estimated at many times the cost of the North-South transmission reinforcements.

*...benefits of an enhanced transmission grid tend to be wide-spread geographically, diverse in their effects on individual market participants, occur over long periods of time (i.e. several decades), and, as we show with several examples, more than offset the rate impacts of investment cost recovery. (Brattle Group, May 2011)*

**RECOMMENDATION 5: AMEND THE LEGISLATION AUTHORIZING CABINET TO DESIGNATE CRITICAL TRANSMISSION INFRASTRUCTURE.**

**Accepted.** The Government of Alberta took action in 2009 with the Electric Statutes Amendment Act, 2009 (formerly Bill 50) to strengthen our provincial transmission system. The action was primarily out of concern for having critical transmission infrastructure (CTI) in place in advance of need to keep pace with Alberta’s strong economic growth.

The Government of Alberta believes that, with the “catch-up” provided by the CTI projects and improvements to the regulatory approval process, the Cabinet authority to approve future CTI is no longer



required. Accordingly, the government will introduce legislation in the fall 2012 session to amend the *Electric Utilities Act* placing both the need assessment and routing of future transmission projects under the AUC.

Many jurisdictions across North America have identified the need to replace aging transmission infrastructure, as it is an enabler and supporter of economic activity and growth. The Conference Board of Canada recently released a report indicating that “the \$35.8 billion estimate of transmission investment [in Canada] understates the level of future investment that will likely be required” during the 2010 to 2030 period<sup>10</sup>.

...a modern and reliable electricity sector contributes to efficient overall economic production and plays an important role in determining Canada’s economic advantage.” (Conference Board of Canada, February 2012)

**RECOMMENDATION 6: THE AUC CONSIDER OPTIONS THAT WILL MITIGATE THE IMPACT OF TRANSMISSION COST INCREASES TO CONSUMERS.**

**Accepted.** The expansion of the transmission system will allow the most economically priced electricity to reach consumers as more low-priced generators compete to sell electricity into the market. This will put downward pressure on electricity prices, however, it will increase the amount consumers pay for transmission. Transmission costs comprise the cost for the lines, as well as the cost to maintain and operate the electricity system in a safe and reliable manner. The AUC approves these costs after public rate hearings.

As shown in Figure 4, transmission costs are a relatively small portion of consumers’ total electricity bills.

Recognizing the need to review alternative methods of recovering costs of large transmission projects, the Minister of Energy approved the formation of the Transmission Cost Recovery Subcommittee, a subcommittee of the Transmission Facilities Cost Monitoring Committee. The Transmission Facilities Cost Monitoring Committee was established by the government to give consumers regular and timely access to project information related to the construction of large transmission facilities. This committee includes representatives of municipal, rural, business, industry and consumers, as well as the AESO and transmission facility owners.

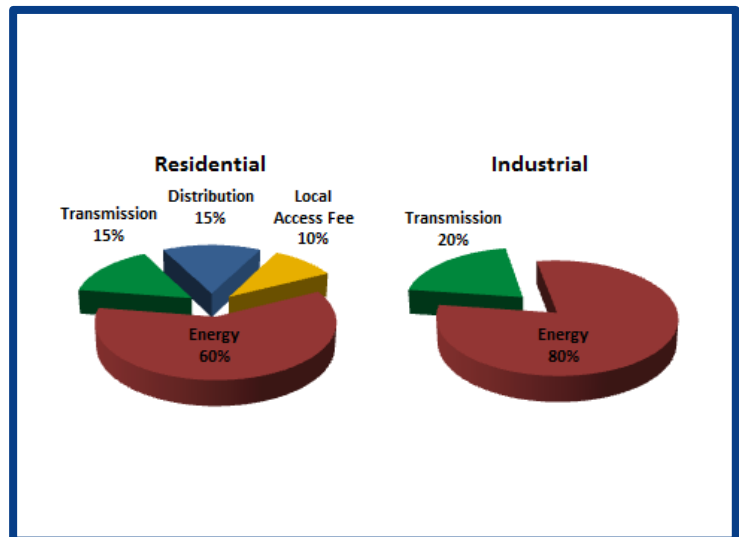


Figure 4 – Breakdown of Alberta Electricity Bills

The subcommittee has been assessing alternatives and modeling the implications of each to determine ways to mitigate the transmission cost increases to consumers while also assessing the impact of these options.

Transmission rate design is a very complex matter and any changes to the present practices must be carefully considered prior to implementing. As the agency responsible for rate setting, the AUC is uniquely positioned to properly consider and make recommendations on the subcommittee's proposals. Thus, the Government of Alberta will direct the AUC to conduct a public transmission cost recovery inquiry following receipt of the Transmission Cost Recovery Subcommittee's preliminary options. The Government of Alberta expects to review the AUC's findings and implement changes as appropriate before completion of the Western and Eastern Alberta Transmission Lines.

#### **RECOMMENDATION 7: ENCOURAGE THE USE OF THE COMPETITIVE PROCUREMENT PROCESS FOR FUTURE CRITICAL TRANSMISSION INFRASTRUCTURE PROJECTS.**

**Accepted.** The *Electric Statutes Amendment Act, 2009* (Bill 50) requires the AESO to develop and implement a competitive procurement process for the construction of the new Edmonton to Fort McMurray transmission lines. It also provides for the use of competitive procurement for future critical transmission infrastructure, and interties. The Government of Alberta continues to support the use of competitive procurement.

Historically, transmission projects have been assigned to specific transmission facility owners based on geographic regions within the province. A competitive procurement process provides improved transparency for major transmission projects, and the potential for reduced overall costs. For example, the AESO estimates that competitive procurement will save \$100 to \$200 million dollars for the Edmonton to Fort McMurray transmission lines.

The competitive procurement process for critical transmission infrastructure projects was developed by the AESO and is currently being considered by the AUC. The desired outcome is to create a fair, transparent and openly competitive opportunity for incumbent and new participants to develop and own critical transmission facilities. It is important to get this right from the start as the rules for competitive procurement will set the framework to implement the process and realize cost savings in the major transmissions projects in the future. The Government of Alberta supports the AUC, the AESO, and other stakeholders in the development of this process.

#### **RETAIL ELECTRICITY RATE REVIEW**

Another issue that became clear through the review process and conversations around electricity pricing is the volatility of regulated electricity rates and how customers are able to respond to that volatility. The AESO and the Utilities Consumer Advocate each have a mandate to inform the public about the cost of transmission and electricity. Both of these organizations have made significant efforts toward this goal, and they are continuing their efforts in this regard. However, the recent impact of higher regulated electricity rates, specifically the regulated rate option, has prompted calls for a review of how electricity rates are set for customers who pay a regulated rate. The Government of Alberta will strike an independent committee to review the structure and delivery of the regulated rate option to reduce the volatility of electricity prices

for consumers on the default rate. Government will provide details on the regulated rate option review process in the very near future.

### **ELECTRICITY SYSTEM EDUCATION AND AWARENESS**

The Government of Alberta is also concerned about the level of awareness regarding electricity and transmission costs and retail options available to consumers. To become better informed, the government will evaluate the electricity system education and awareness activities in the province and identify areas and programs that would enhance Albertans' knowledge about electricity and transmission costs.

This could include bolstering the current resources available within the Utilities Consumer Advocate (UCA) to both educate consumers about electricity, and to provide greater consumer protection oversight of retail sales of electricity. The UCA exists to educate and advocate for the interests of Alberta electricity consumers. They provide information on their website and conduct regular open houses for the public. The AESO has a website with extensive information regarding the electricity system and ongoing projects. Albertans can visit this at <http://poweringalberta.com>.

## **Conclusion**

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Strengthening the backbone of the transmission grid will ensure we can power our economy for the foreseeable future. Alberta's transmission story is about wisdom, necessity and foresight. It is a story about Alberta's future.

We have acted wisely and courageously in the past: to pioneer investment in oil sands development, in ring roads for Calgary and Edmonton, in water projects for Albertans and agriculture in the south, in the Rural Development Fund, and in Alberta Innovates.

Upgrading North-South transmission is an absolute necessity. Using decades-old transmission infrastructure in a province growing as quickly as Alberta is like betting on a two-lane road between Edmonton and Calgary: slow, inefficient, impossible. Reinforcing Alberta's transmission system will also encourage new investment in electrical generation plants, which will lead to increased competition and therefore put downward pressure on the price of electricity.

The Alberta government's job is to ensure we are providing the necessary infrastructure to meet our needs today and into the future. Our job is to serve all Albertans' best interests.

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<sup>1</sup> Conference Board of Canada, Gross Domestic Product at Basic Prices, Alberta, February 2012.

<sup>2</sup> Scotiabank Group Global Forecast Update, February 2, 2012.

<sup>3</sup> AESO Presentation to Critical Transmission Review Committee, January 24, 2012.

<sup>4</sup> Energy+Environmental Economics, *Economic Assessment of North/south Transmission Capacity Expansion in Alberta*, 2012.

<sup>5</sup> Transmission Regulation, AR 86/2007, Section 15.1(1).

<sup>6</sup> Powering our Economy, Critical Transmission Review Committee.

<sup>7</sup> Thailand-Malaysia: North-South Reinforcements, Alberta Electric System Operator December 13<sup>th</sup>, 2011 presentation to the Critical Transmission Review Committee.

Leyte – Luzon: Leyte – Luzon HVDC Power Transmission Project, ABB.

Sileru-Barsoor: HVDC Transmission: Power Conversion Applications in Power Systems; Kim, Chan-Ki [et al.] (2009).

Quebec-New England Phase I: HVDC Transmission: Power Conversion Applications in Power Systems; Kim, Chan-Ki [et al.] (2009).

Intermountain: ABB, The Intermountain HVDC Transmission.

Nelson River Bipole I and II: Manitoba Hydro, DC Transmission System.

HVDC Inter-Island: HVDC Pole 3 Inter-Island Link Project Fact Sheet, Transpower, November 2010.

<sup>8</sup> Provincial Energy Strategy, Section 4.5.

<sup>9</sup> Provincial Energy Strategy, Section 4.5.

<sup>10</sup> Conference Board of Canada, *Shedding Light on the Economic Impact of Investing in Electricity Infrastructure*, February 2012.