September 30, 2016

The Honourable Rachel Notley
Premier of Alberta
307 Legislature Building
10800 – 97 Avenue
Edmonton, Alberta T5K 2B6

Dear Premier and Members of Cabinet,

I have had the opportunity to work with the Alberta Department of Energy and the Alberta Electric System Operator on approaches to phase out emissions from coal-fired generation in Alberta and the treatment of the companies with coal-fired generation units which have operating lives beyond 2030. We have worked with the three coal plant owners to propose a framework that has considered the interests of all parties involved and was provided to you in the Cabinet Report.

The charge to the group was straightforward with three primary considerations for the outcome:

1. Maintain electric system reliability (which is paramount);
2. Maintain reasonable stability and electricity prices for consumers and businesses; and
3. Maintain investors' confidence in Alberta by not unnecessarily stranding capital and ensure that workers, communities and affected companies are treated fairly in this process.

My recommendation is that voluntary payments are provided to the three generation owners for their post-2030 units based on specific and transparent criteria. The criteria are based on net book value of the assets – which is fully auditable and transparent – pro-rated by the years stranded by the policy decision to account for depreciation, and discounted for the probability some of the components of the assets can be re-used.

These voluntary payments should be provided over time, 13 or 20 years, to lessen the financial burden on the province and to give the three incumbents a renewed opportunity to access capital markets. The companies will, if given policy certainty, build a portion of the next fleet of natural gas and renewables; new players will also be required to accomplish such a large build-out of new generation. I believe that voluntary payment will go a long way to securing a positive investment climate in the province.

Alberta is blessed with resources that will replace the retiring coal fleet. Natural gas is abundant, with low-cost production and major pipeline facilities readily available (though radial pipelines will have to be built for last mile delivery to some of the existing and new power plant sites). The oil sands have large amounts of co-generation using natural gas, which is a high efficient and low-carbon source of both electricity and process steam. Wind energy potential is abundant in the south and east. Summer solar power potential will grow as solar panel costs and installation costs continue to decline. The potential for further hydro development exists in both western Alberta and the far north.

Alberta also has the benefit of a very strong transmission system, although some upgrading and new infrastructure may be required to accommodate additional renewables (wind in the south and east, hydro in the north). The lack of transmission in other areas of the world has slowed renewable development. From meetings with the Alberta Electric System Operator, I do not believe the lack of transmission will present major obstacles on the critical path toward decarbonizing the Alberta electric system.

The combination of prevalent sources of renewable generation, abundant natural gas, and robust transmission present a golden opportunity for Alberta to take responsible and realistic action now to transition the energy system to cleaner resources. Alberta has the opportunity to be a credible leader for the rest of the world on the reduction of carbon dioxide and other pollutants from coal-fired resources.

The overall vision is to achieve a reliable, low emission electricity generation system by transitioning from coal generation to natural gas and renewable generation over the next 14 years. This time period allows for technological innovation in storage, renewables and other generation types to emerge. This transition will require $20 billion to $30 billion of investment in new gas-fired generation and renewables. Based on my experience, I recommend employing market forces as the best way to accomplish this level of investment from a diversity of market participants. A bid-based power market system encourages innovation to lower costs to customers while providing the needed capital from many different private investors. Co-generation (which is 80 per cent efficient, compared with 40 per cent for a coal plant) would never have occurred within a regulated system and is a great example of innovation within markets. Another example is the recent innovation in natural gas drilling, which has reduced input costs and allowed combined cycle natural gas generation to become 60 per cent efficient.

To achieve 5,000 megawatts of new renewable capacity, the retirement of over 6,000 megawatts of coal generation, and the build-out of 9,000 megawatts of natural gas to replace the retiring coal and to meet economic growth by 2030, Alberta will need to:

1. Provide a voluntary payment to the three generators with coal assets that expected to operate beyond 2030 to create a positive investor outlook in Alberta for market-based generation and renewables;
2. Make these payments over time (perhaps 13 years or 20 years), starting as soon as practical (once legislation and contracts are drafted to implement);
3. Integrate federal and provincial policies on natural gas emissions to provide investors with clear signals on the future of natural gas and its role in the transition;
4. Provide a capacity payment construct to ensure adequate supply of electricity;
5. Encourage demand-side management and energy efficiency to be larger contributors to the market (both demand response and energy efficiency tend to be more cost effective capacity than building simple cycle peaking plants, thus reducing carbon emissions at relatively low cost); and
6. Encourage hydroelectric development in the province to enable intermittent resources such as wind and solar.

Based on the input from 25 investment institutions and two of the largest independent power producers in North America, two essential elements are required for the level of investments for reliable capacity and renewable energy. First, is the provision of voluntary payments for the six coal plants with remaining life beyond 2030. Second, is continued confidence that Alberta's power market design produces competitive results which are fair and efficient, while encouraging the future investments needed to maintain reliability during the transition to cleaner sources of generation.

Within a competitive market, I believe that economic forces will drive efficient use of capital for coal-to-gas conversions, if provincial and federal policy frameworks align. The key to a smooth transition will be allowing part of the fleet (say about half of Alberta's 18 coal-fired units) to be converted to natural gas by changing out the burners in the existing boilers. Compared with new natural gas combined cycle plants, coal-to-gas conversions have the potential to reduce the capital costs by about 90%. Coal-to-gas conversions will save close to $10 billion of capital overall while providing a 50% reduction in carbon dioxide emissions with even greater reductions in sulfur oxides, lead, and other pollutants from the existing coal fleet.

Conversions of existing coal generation assets to natural gas will smooth out 'cliffs' caused by expected unit retirements under the federal regulation of coal-fired greenhouse gas emissions. These conversions can be undertaken by companies quickly in a spring or fall outage schedule, allowing for earlier reductions of carbon dioxide than the reductions from retirements anticipated under the federal regulation on coal-fired emissions. Conversions will also lead to re-purposing of some of the capital that has not yet reached the end of their useful lives.

New natural gas combined cycle units typically have a 35 to 40-year life. Instead of having all natural gas combined cycle plants replace the coal fired units, gas conversion for some of the 18 units would have a 10 to 20-year expected life. This ensures Alberta is not saddled with all new natural gas plants of the same age (thereby lessening the chance of truncated lifespans of gas generation assets due to future emissions reductions policies). It also allows time for Alberta to build out the renewables, which will likely see their capital costs reducing with time.

Aligning policy frameworks will require cooperation between the federal government and Alberta on natural gas emissions policies. The 420 kilogram per megawatt hour carbon standard and the capacity factor restriction of 9 per cent that has previously been proposed by the federal government would likely prevent economic coal-to-gas conversions. In partnership with Alberta and in consideration of its Climate Leadership Plan, a modification to this proposed federal policy should be assessed so that these conversions are not deterred. In addition, some type of payment for capacity performance at times of peak load should be implemented by the Alberta Electric System Operator to reward performance and ensure reliability. This would assist in the efficient use of capital and increase the flexibility for Alberta's energy future.

Currently, hydroelectric power (one of the most flexible resources) represents only about 6% of the electric generating capacity in Alberta. Hydro development in the province is small compared to other provinces primarily because of the location of the resources and the historical availability of low-cost coal, natural gas, and oil resources within Alberta.

Hydroelectric generation has a long history as a proven low-carbon technology across North America. Adding hydroelectric facilities as part of the 5,000 megawatts of renewable power would be a viable way to reduce greenhouse gas emissions. These are long-lived 100-year assets which provide operational support for frequency regulation and ramping for both wind mills and steel mills that have intermittent and highly variable demands on the system. Moreover, hydroelectric generation provides dependable capacity that other renewable resources do not provide.

Hydroelectric investment offers additional benefits by providing numerous, longer term construction job opportunities for the workforce which would otherwise be displaced by replacing or re-firing coal-fired units. Around 80 per cent of capital dollars for new hydroelectric development will be spent in Alberta as opposed to construction of other renewable resources (which use mostly imported equipment, resulting in less than 20 per cent of the investments for wind and solar being spent in Alberta's economy).

The cost of new hydroelectric generation will likely be twice that of wind but with four to five times the economic life. Historically, hydroelectric generation development has benefited from support through government involvement in loan guarantees or government ownership. This will likely need to be the case in Alberta. It will take both provincial and federal government support to develop hydroelectric generation and pumped water storage in Alberta. Given that at least two of the incumbent utilities have an active interest in hydroelectric development, I believe the province should explore with the federal government potential support for hydroelectric development like has already occurred in Québec, Ontario, Manitoba, and British Columbia.

If Cabinet determines that hydroelectric generation and pumped water storage are part of Alberta's low carbon future, I believe the province should:

1. Review the First Nations impacts and possible partnerships;
2. Classify hydroelectric generation as a renewable in the Renewable Electricity Program, thus optimizing the ability of hydroelectricity to enable other forms of renewables like solar and wind; and,
3. Determine the environmental acceptability of hydroelectric projects.

Combined with the team's recommendations in the Cabinet Report on voluntary payments, I believe the actions outlined in this letter will result in a transition with the least reliability risks, save about $10 billion of capital by conversion of some of the boilers to natural gas, and create a pro-investment atmosphere in Alberta, thus maintaining relatively stable electricity rates.

It has been an honor and a pleasure to serve as a facilitator in this process. Alberta is to be commended for their leadership in setting a price on carbon and developing a truly innovative climate leadership plan.

Yours Truly,

Terry Boston