Recommendations were provided in 5 of the 10 areas, for increasing cross functional communications, cross-training of compliance staff, scheduling of training components more frequently throughout a year, formalizing documentation of monitoring tools and performance review assessments for compliance.

TransAlta has accepted all of the recommendations in both reports.

## Natural Capital

All energy sources used to generate electricity have some impact on the environment. While we are pursuing a business strategy that includes investing in low-impact renewable energy resources such as wind, hydro, and solar, we also believe that natural gas will continue to play an important role in meeting energy needs as part of this transition. Regardless of the fuel type, we place significant importance on environmental compliance and continued environmental impact mitigation, while seeking to deliver low-cost electricity. Currently the most material natural or environmental capital impacts to our business are GHG emissions, air emissions (pollutants, metals), and energy use. Material impacts that we manage and track include our environmental management systems, environmental incidents and spills, land use, water usage, and waste management.

In the jurisdictions in which we operate, legislators have proposed and enacted regulations to discontinue, over time, the use of the technologies our coal-fuelled plants currently utilize. Our gas and coal facilities can also incur costs in relation to their carbon emissions, depending on the jurisdiction in which the facility is located. Our contracted facilities can generally recover those costs from the customer. Conversely, our renewable generation facilities are generally able to realize value from their environmental attributes. We continue to closely monitor the progress and risks associated with environmental legislation changes on our future operations.

Reducing the environmental impact of our activities has a benefit not only to our operations and financial results, but also to the communities in which we operate. We expect that increased scrutiny will be placed on environmental emissions and compliance, and therefore we have a proactive approach to minimizing risks to our results. Our Board provides oversight to our environmental management programs and emission reduction initiatives to ensure continued compliance with environmental regulations.

Our environmental initiatives include:

- Renewable power growth and offsets portfolio: Over the last 10 years, we have added approximately 1,300 MW in renewable energy capacity. From our Alberta wind fleet, 360 MW of capacity generates offsets that can be applied against GHG emissions in Alberta. Annual revenue generation from these offsets is in the range of $10 million to $15 million.
- Environmental controls and efficiency: We continue to make operational improvements and investments to our existing generating facilities to reduce the environmental impact of generating electricity. We installed mercury control equipment at our Canadian Coal operations in 2010 in order to meet Alberta's 70 per cent reduction objectives, and voluntarily at our U.S. coal-fired plant in 2012. In 2016 we achieved an 80 per cent capture rate of mercury at all coal facilities. Our Keephills 3 and Genesee 3 plants use supercritical combustion technology to maximize thermal efficiency, as well as sulphur dioxide ("$SO_2$") capture and low oxides of nitrogen ("NOx") combustion technology. Uprate or energy- efficiency projects completed at our Keephills and Sundance plants, including a 15 MW uprate finalized in 2015 at Sundance 3, have improved the energy and emissions efficiency of those units.
- Planning: With respect to environmental rules (as detailed in the following Regional Regulation and Compliance subsection), we investigate the cost effectiveness of multiple technological solutions and various operating models in order to prepare appropriate work scopes. In 2016 we announced our proposed coal to natural gas conversions and support for the Government of Alberta's renewable electricity plans.
- Policy participation: We are active in policy discussions at a variety of levels of government and with industry participants. Where capacity retirements are being mandated, we advocate minimizing the capital requirements of incremental regulation, to allow reinvestment in lower-intensity sources during the transition phase. In Washington State, the retirement of our Centralia coal plant was established through a multi-stakeholder agreement. In 2016 we entered into the MOU with the Government of Alberta, which entails co-operation and collaboration to enable the conversion of coal-fired generation to gas-fired generation.

In addition to these initiatives, we maintain similar procedures for environmental incidents as we do for safety, with tracking, analyzing, and active management to eliminate occurrence, and ongoing support from our Operational Integrity Program. With respect to biodiversity management, we seek to establish robust environmental research and data collection to establish scientifically sound baselines of the natural environment around our facilities and closely monitor the air, land, and water in these areas to identify and curtail potential impacts.

**Environmental Performance**

All of our 69 facilities have Environmental Management Systems ("EMS") in place, the majority of which closely mimic the internationally recognized ISO 14001 EMS standard. We have operated our facilities in line with ISO 14001 for 17 years, and our systems and knowledge of management systems are therefore mature. In 2016 we moved to no longer certify our Alberta coal plants as ISO 14001, but the plants continue to run best practice EMS, as do 97 per cent of our facilities. Only two of our facilities do not closely track ISO 14001, which is due to commercial arrangements (we are not the primary operator), but these facilities still have EMS in place.

**Environmental Incidents and Spills**

We recorded 16 reportable environmental incidents in 2016 (2015 - 12 incidents), which was above our target of 13. None of these incidents resulted in a material environmental impact. Our Gas & Renewables fleet recorded only three incidents in 2016, a record year. The remainder of our 13 environmental incidents occurred at our Alberta Coal business unit. Incident types included spills, which were highly recoverable, air emission exceedances or instrument failures, wastewater sampling errors, effluent releases, water blowdown exceedances, and process safety incidents. We will continue to target improvement in 2017 with a specific focus on Alberta Coal. Our corporate-wide 2017 target is 11 or fewer incidents. We also continue to track and manage all non-reportable (minor) environmental incidents, which helps us identify what leads to an incident. Understanding the root cause of incidents helps with incident prevention planning and education.

Typical spills at TransAlta are hydrocarbon spills, which happen in low environmental impact areas and are almost always contained and recovered. It is extremely rare that we experience large spills with impact on the environment. Spills that do occur that we must report are typically just above acceptable regulatory spill limits and these are always addressed with a critical time factor. The volume of spills in 2016 was 61 $m^3$ (2015 - 19 $m^3$), of which 78 per cent was recovered (2015 – 99 per cent recovered). The increase is attributable to three large spills, two at our Sundance coal operations and one at Mt Keith in southwestern Australia. All three incidents were contained at our sites and were reported to the appropriate bodies.

**Energy Use**

TransAlta uses energy in a number of different ways. We burn coal, gas, and diesel to generate electricity. We harness the kinetic energy of water and wind to generate electricity. We also utilize the sunshine to generate electricity. In addition to combustion of fuel sources we also track combustion of fuel in the vehicles we use and energy use in the buildings we occupy. Knowledge of how much energy we use allows us to optimize and create energy efficiencies.

The following are our millions of gigajoules of energy use. On a comparable basis, our energy use has declined over the last three years as a result of lower generation from our coal-generating assets.

| Year ended Dec. 31 | **2016** | 2015[(1)] | 2014 |
|---|---|---|---|
| Coal | **469.1** | 483.4 | 529.7 |
| Gas and Renewables | **59.2** | 58.7 | 54.3 |
| Corporate | **0.1** | 0.1 | 0.1 |
| **Total energy use** | **528.4** | 542.2 | 584.1 |

*(1) Gas & Renewable 2015 volumes were restated due to a diesel volume reporting error at our Solomon facility.*

**Greenhouse Gas Emissions**

In 2016, we estimate that 30.7 million tonnes of GHGs with an intensity of 0.84 tonnes per MWh (2015 - 32.2 million tonnes of GHGs with an intensity of 0.87 tonnes per MWh) were emitted as a result of normal operating activities.[1] Our GHG emissions decreased slightly in 2016, primarily as a result of lower production from coal plants. Other decreases in emissions of the Canadian Gas segment are attributable to the transfer of operational control of the Poplar Creek facility to our customer in September 2015, conversion of the Ottawa plant to a peaking facility in 2013, and conversion of the Solomon plant in Australia to burn natural gas instead of diesel.

The following are our GHG emissions in million tonnes $CO_2$:

| Year ended Dec. 31 | 2016 | 2015 | 2014 |
|---|---|---|---|
| Coal | **27.7** | 29.2 | 32.3 |
| Gas and renewables | **3.0** | 3.0 | 2.7 |
| **Total GHG emissions** | **30.7** | 32.2 | 35.0 |

Our continued investment in growth from renewable power generation further supports the decrease in emissions intensity observed in 2016. We believe in proactive measurement and disclosure of air emissions.

In 2016, TransAlta improved its scoring on the Carbon Disclosure Project Climate Change report to a B, our highest integrated score yet. We were also highlighted by Chartered Professional Accountants of Canada as the only company in Canada, out of 75 companies, that reports on climate change across all levels of disclosure: the annual information form, this MD&A, and our information circular.

Refer to the Climate Change section of this MD&A for further information.

**Air Emissions**

In 2016 air emissions were down compared with 2015. Air emissions decreased slightly in line with reduction in coal power generation.

| Year ended Dec. 31 | 2016 | 2015 | 2014 |
|---|---|---|---|
| Sulphur dioxide (tonnes) | **39,600** | 41,800 | 47,600 |
| Nitrogen oxide (tonnes) | **48,400** | 48,000 | 52,900 |
| Particulate matter (tonnes) | **4,900** | 4,900 | 5,200 |
| Mercury (kilograms) | **130** | 170 | 220 |

Our continued investment in growth from renewable power generation further supports the decrease in emissions intensity observed in 2016. We believe in proactive measurement and disclosure of air emissions.

*(1) 2016 data are estimates based on best available data at the time of report production. GHGs include water vapour, carbon dioxide ("$CO_2$"), methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons, and perfluorocarbons. The majority of our estimated GHG emissions are comprised of $CO_2$ emissions from stationary combustion.*

*Emissions intensity data has been aligned with the 'Setting Organizational Boundaries: Operational Control' methodology set out in The GHG Protocol: A Corporate Accounting and Reporting Standard. As per the methodology, TransAlta reports emissions on an operation control basis, hence we report 100 per cent of emissions at facilities in which we are the operator. Emissions intensity is calculated by dividing total operational emissions by 100 per cent of production (MWh) from operated facilities, regardless of financial ownership.*

**Water**

Our principal water uses are for cooling and steam generation in coal and gas plants, and for hydro power production. Typically, TransAlta withdraws in the range of 220-240 million $m^3$ of water across our fleet. In 2016 we withdrew 247 million $m^3$ and returned approximately 188 million $m^3$ back to its source. Water is withdrawn primarily from rivers where we hold permits to withdraw water and adhere to regulations on water quality. We return or discharge approximately 70 per cent of water back to the source, meeting the regulatory quality levels that exist in the various locations in which we operate. The difference between withdraw and discharge, representing consumption, is largely due to evaporation loss.

The following represents our total water consumption (million $m^3$) over the last three years:

| Year ended Dec. 31 | 2016 | 2015 | 2014 |
|---|---|---|---|
| Water from environment | **247** | 272 | 243 |
| Water to environment | **188** | 198 | 172 |
| **Total water consumption** | **59** | 74 | 71 |

Our areas of higher water risk are situated east of Perth in our simple-cycle gas plants in Western Australia and in our Southern Alberta hydro operations. We monitor and manage water risk in our operating areas east of Perth.

In Southern Alberta, following the flood of 2013, our hydro facilities are being used for an increased water management role than they have played in the past. During 2016, we signed a five-year agreement with the Government of Alberta to manage water on the Bow River at our Ghost reservoir facility to aid in potential flood mitigation efforts, as well as at our Kananaskis Lakes System (which includes Interlakes, Pocaterra and Barrier), for drought mitigation efforts.

**Land Use**

The largest land use associated with our operations is for surface mining of coal. Of the three mines we have operated, Whitewood is completely reclaimed and the land certification process is ongoing. Centralia is in the reclamation phase, and Highvale is actively mined with ongoing reclamation. Our reclamation plans are set out on a lifecycle basis and include contouring disturbed areas, re-establishing of drainage, replacing topsoil and subsoil, re-vegetation, and land management. Our mining practice incorporates progressive reclamation where the final end use of the land is considered at all stages of planning and development.

In 2016, we reclaimed 39 acres (16 hectares) at our Highvale mine, which was below our target of 74 acres (30 hectares) due to the impact of warm weather on soils in the winter, as cold temperatures facilitate reclamation work and the spreading of topsoil. The Centralia mine is no longer actively used for coal operations, but reclamation activity is ongoing. In 2016 we reclaimed 38 hectares of land.

Also in 2015, we donated 64 acres of land to the Alberta Wildlife Trust Fund. The land includes an area that was once a mine settling pond and is a site of ecological significance. The donation aligns with our objectives for community participation and stakeholder engagement.

**Waste**

Our operating teams work to minimize waste and maximize recoverable value from waste. Over the years, we have invested in equipment to capture byproducts from the combustion of coal, such as fly ash, bottom ash, gypsum, and cenospheres, for subsequent sale. These non-hazardous materials add value to products like cement and asphalt, wallboard, paints, and plastics. Byproduct sales and associated annual revenue generation typically ranges from $25 million to $35 million.

**Coal Transition**

Our coal transition, whether it is executing on our coal-to-gas conversion plans or completing a full phase-out by 2030, will vastly improve our environmental performance. Energy use, GHG, air emissions, waste generation, and water usage will all significantly decline. A conversion of coal-fired power generation to gas-fired generation is expected to eliminate all mercury emissions and the majority of nitrogen oxide emissions.

**Climate Change**

*Governance*

TransAlta's Governance and Environment Committee ("GEC") is a Board-appointed committee that reports directly to the Board of Directors to help fulfil oversight responsibility with respect to environment, health, and safety. In conjunction, the GEC and Board hold the highest levels of oversight in regards to TransAlta's climate change policy and sustainability initiatives.

*Strategy*

Climate change related risks are monitored through our company-wide risk management processes and actively managed. Identified climate change risks and opportunities are also reviewed by our management team . We attribute regionally specific carbon pricing, both current and anticipated, as a mechanism to manage future risks pertaining to uncertainty in the carbon market and as a safeguard to anticipate future impacts of regulatory changes on facilities. It is also a method of modelling for future electricity prices and to analyze the viability of acquisitions. Identified climate change risks or opportunities and carbon pricing are recognized in the annual TransAlta long-and-medium range forecasting processes. Regulatory risk/compliance (coal electricity generation), physical risks (hydro and drought/floods), and monetary opportunities (gas and renewable electricity generation) are the main drivers of integration into business strategy.

Aligned with our business strategy is our climate change strategy, which is implemented and managed on a corporate-wide business unit level, consisting of four main areas of focus:

- Energy-efficiency improvements,
- Development of emissions offsets portfolios to achieve emissions reductions at competitive costs,
- Development of clean combustion technologies,
- Growth of our renewables portfolio as an increasing component of our total generation portfolio.

We seek investment in climate change related mitigation solutions where we can maximize value creation for our shareholders, local communities, and the environment. Anticipated conversion of our large coal fleet to gas-fired generation highlights this approach, which will allow us to run our assets longer than the federally mandated coal retirement schedule. Our anticipated actions maximize value for our shareholders, ensure low-cost and reliable power for Albertans, and reduce the environmental impact from coal-fired generation.

Our investment and growth in renewable energy is highlighted by our diverse portfolio of renewable energy generating assets. We currently operate and are invested in over 2,200 MW of hydro, wind, and solar power. We are the largest producer of wind power in Canada and the largest producer of hydro in Alberta. Production from renewable energy in 2016 resulted in avoidance of over 3.1 million tonnes of CO2e, which is equivalent to removing over 730,000 vehicles from North American roads. For further details on governance and risk, see our Governance and Risk Management section of this MD&A.

*Targets*

We recognize climate change risk and the goal set out in the 2015 Paris Agreement to prevent two degrees Celsius of global warming above pre-industrial levels. Our GHG reduction targets have been established to align with the UN Sustainable Development Goals, specifically Goal 13, which calls for "urgent action to combat climate change and its impacts." Our 2030 GHG reduction target is set based on climate-based science and the goal of preventing two degrees Celsius of global warming. This target is approved by the Science Based Targets initiative, which is a partnership between the Carbon Disclosure Project, UN Global Compact, World Resources Institute and World Wildlife Fund, which helps companies determine how much they must cut emissions to prevent the worst impacts of climate change.

Our GHG reduction targets are as follows:

1. Our goal, in line with a commitment to the UN Sustainable Development Goals ("SDGs"), is to reduce our total GHG emissions in 2021 to 30 per cent below 2015 levels.
2. Our goal, in line with a commitment to the UN SDGs and prevention of two degrees Celsius of global warming, is to reduce our total GHG emissions in 2030 to 60 per cent below 2015 levels.

**Regional Regulation and Compliance**

Carbon issues and related legislation will continue to have an impact on our business. We are committed to complying with legislative and regulatory requirements and to minimizing the environmental impact of our operations. We work with governments and the public to develop appropriate frameworks to protect the environment and to promote sustainable development.

Recent changes to carbon regulations may materially adversely affect us. As indicated under "Risk Factors" in our Annual Information Form and within the Governance and Risk Management section of this MD&A, many of our activities and properties are subject to carbon requirements, as well as changes in our liabilities under these requirements, which may have a material adverse effect upon our consolidated financial results.

*Canadian Federal Government*

In November 2016, the Canadian federal government announced that coal-fired generation would be phased out by 2030, following a similar commitment by the Alberta provincial government in November 2015. These two decisions changed the coal plant closure requirements, which had previously been guided by the federal regulations that became effective on July 1, 2015 which provided for up to 50 years of life for coal units. According to the new shut-down requirements, the Corporation's older coal units (which retire prior to 2030) will be guided by the 50-year life rule, while newer units (which were previously scheduled to retire post-2030) will face the new 2030 shutdown date. In November 2016, the Corporation signed an OCA with the Alberta Government that confirmed the 2030 shutdown commitment for the impacted units.

On Nov. 21, 2016, the Canadian federal government announced that the Department of Environment and Climate Change will be developing regulations for gas-fired generation. The announcement confirmed plans to include specific rules for coal-to-gas converted units, including a proposed 15-year life and a separate emissions intensity standard. The Canadian federal government will conduct consultations on the proposed regulation in the first two quarters of 2017. Finalized regulations are currently expected by the end of 2018.

On Oct. 3, 2016, the Canadian federal government announced its intention to implement a national price on GHG emissions. Under this proposal, beginning in 2018, there would be a price of $10 per tonne of carbon dioxide equivalent emitted, rising to $50 per tonne by 2022, or a comparable reduction in GHGs under a cap-and-trade program. The application of the price would be co-ordinated with provincial jurisdictions. We do not yet know how such a price mechanism will affect our operations.

*Alberta*

On Nov. 22, 2015, the Government of Alberta announced through the Climate Leadership Plan its intent, among other things, to phase out emissions from coal-fired generation by 2030, replace two-thirds of the retiring coal-fired generation with renewable generation, and impose a new carbon price of $30 per tonne of $CO_2$ emissions based on an industry-wide performance standard. On March 16, 2016, the Government of Alberta announced the appointment of a Coal Phase-out Facilitator to work with coal-fired electricity generators, the Alberta Electric System Operator ("AESO"), and the Government of Alberta to develop options to phase out emissions from coal-fired generation by 2030. The Coal Phase-out Facilitator was tasked with presenting options to the Government of Alberta that would strive to maintain the reliability of Alberta's electricity grid, maintain stability of prices for consumers, and avoid unnecessarily stranding capital.

In March 2016, Alberta began development of its renewable energy procurement process design for the AESO to procure a first block of renewable generation projects to be in-service by mid-2019. On Sept. 14, 2016, the Government of Alberta reconfirmed its commitment to achieve 30 per cent renewables in Alberta's electricity energy mix by 2030.

On May 24, 2016, the Government of Alberta passed the *Climate Leadership Implementation Act* which establishes the carbon tax framework for its application to fuels. It is expected that additional regulations will be developed governing the treatment of large industrial emitters. The Climate Leadership Plan will be implemented for the electricity sector on January 1, 2018.

On Nov. 24, 2016, we announced that we had entered into the OCA, which provides for transition payments for the cessation of coal-fired emissions from the Keephills 3, Genesee 3 and Sheerness coal-fired plants on or before Dec. 31, 2030. The affected plants are not, however, precluded from generating electricity at any time by any method other than the combustion of coal. Under the terms of the OCA, the Corporation will receive annual cash payments of approximately $37.4 million, net to the Corporation, commencing in 2017 and terminating in 2030. For further details, refer to the Highlights section of this MD&A.

Additionally, we announced that we had reached an understanding set out in the MOU to collaborate and co-operate with the Government of Alberta in the development of a policy framework to facilitate the conversion of coal-fired generation to gas-fired generation, facilitate existing and new renewable electricity development through supportive and enabling policy, and ensure existing generation and new electricity generation are able to effectively participate in the recently announced capacity market to be developed for the Province of Alberta.

Since 2007, we have incurred costs as a result of GHG legislation in Alberta. On June 29, 2015, the Alberta government announced an increase to its provincial Specified Gas Emitters Regulation:

- On Jan. 1, 2016, an increase in the GHG reduction obligation for large emitters from 12 per cent to 15 per cent of emissions, with the compliance price of the technology fund rising from $15 per tonne to $20 per tonne.
- On Jan. 1, 2017, a further increase to a 20 per cent reduction requirement and a $30 per tonne compliance price.

Our exposure to increased costs as a result of environmental legislation in Alberta is mitigated to some extent through change-in-law provisions in our PPAs that allow us the opportunity to recover capital and operating compliance costs from our PPA customers. The GHG offsets created by our Alberta wind facilities are expected to increase in value through 2017, as GHG emitters can use them as compliance instruments in place of contributing to the technology fund. As part of the Climate Leadership Plan, the government has stated its intention to establish a new system of obligations and allowances, benchmarked against highly efficient gas generation, beginning in 2018. The initial compliance price would be set at $30 per tonne, escalating annually.

In Alberta there are additional requirements for coal-fired generation units to implement additional air emission controls for oxides of NOx and $SO_2$ once the units reach the end of their respective PPAs, in most cases in 2020. These regulatory requirements were developed by the province in 2004 as a result of multi-stakeholder discussions under Alberta's Clean Air Strategic Alliance ("CASA"). The release of the federal regulations in 2012 adopted by the Government of Canada and the Government of Alberta, and the accelerated coal-fired generation retirement schedule, creates a potential misalignment between the CASA air pollutant requirements and schedules, and the retirement schedules for the coal plants, which in themselves will result in significant reductions of NOx, $SO_2$, and particulate emissions, something which has been identified as a matter yet to be addressed in the MOU.

The Government of Alberta's Renewable Electricity Program is intended to encourage the development of 5,000 MW of new renewable electricity capacity by 2030. The AESO is currently soliciting interest in the first competitive procurement for 400 MW under the program. Proponents must submit an expression of interest by late March 2017. The process will be followed by a request for qualification in late April 2017, request for proposal in mid-September 2017 and successful proponents announced in December 2017. Eligible projects must be 5 MW or larger and can be hydro, wind, solar, and certain biomass. The successful projects will be awarded a Renewable Electricity Supply Agreements that utilizes an indexed renewable energy credit or contract for difference mechanism that will fix the price to the proponent over 20 years. The contracts are expected to require the facility to be operational by 2019.

The Government of Alberta has tasked the AESO with transitioning Alberta's energy-only market to a capacity market structure. The capacity market will help to ensure that there is sufficient supply adequacy as over 6,000 MW of coal generation retires by 2030. The new market structure is expected to reduce the reliance on scarcity pricing, which drives energy price volatility and the price signal for new investment, and compensate resource owners with monthly capacity payments for making their capacity available in the energy and ancillary services market. The AESO plans to engage stakeholders in determining the design and implementation of the capacity market over 2017 and 2018 and conduct the first auction in 2019 with a contract delivery year targeted for 2021. The AESO has suggested they will need new capacity in 2021.

*Pacific Northwest*

On Dec. 17, 2014, Washington State Governor Jay Inslee released a carbon-emissions reduction program for the state, which is where our U.S. Coal plant is located. Included in this program are a cap-and-trade plan and a low-carbon fuels standard. The proposed emissions cap will become more stringent over time, providing emitters time to transition their operations.

On Aug. 3, 2015, former U.S. President Obama announced the Clean Power Plan. The plan sets GHG emission standards for new fossil-fuel-based power plants and emission limits for individual states. States will have the option of interpreting their limits in mass-based (tons) or rate-based (pounds per MWh) terms. The plan is intended to achieve an overall reduction in GHG emissions of 32 per cent from 2005 levels by 2030. It will be implemented in two stages: 2022 to 2029, and 2030 and beyond.

On Feb. 9, 2016, the U.S. Supreme Court stayed the implementation of the Clean Power Plan pending consideration as to whether the regulations are lawful. It is not clear yet how this may affect the future of the Clean Power Plan. As a result of our 2011 agreement for coal transition with the State of Washington, we do not expect the proposed regulations to significantly affect our U.S. operations.

These additional regulations for existing power plants are not expected to significantly affect our U.S. operations. TransAlta has agreed with Washington State to retire units in 2020 and 2025. This agreement is formally part of the State's climate change program. We currently believe that there will be no additional GHG regulatory burden on U.S. Coal given these commitments. The related TransAlta Energy Bill was signed into law in 2011 and provides a framework to transition from coal to other forms of generation.

*Ontario*

On Feb. 25, 2016, Ontario released draft regulations for its GHG cap-and-trade program that were finalized on May 19, 2016. The regulations became effective Jan. 1, 2017, and will apply to all fossil fuels used for electricity generation. The majority of our gas-fired generation in Ontario will not be significantly impacted by virtue of change-in-law provisions within existing power purchase agreements.

*Australia*

In Australia, the Senate recently passed amendments to the country's Renewable Energy Target Scheme. The scheme was initially introduced in 2001 with three objectives: to establish a mandatory renewable energy target to be achieved in 2020; to provide incentives for large-scale renewable energy generators in the form of one large-scale generation certificate earned for each MWh of generation; and to require retailers and wholesale industrial customers to purchase a specified volume of their electricity from large-scale renewable-sourced electricity or incur a penalty of AUD$65/MWh on any shortfall. The amendments reduced the annual targets for large-scale renewable sourced electricity down from 41,000 GWh in 2020 to 33,000 GWh in 2020, held constant at this level until 2030. It is estimated that this will require an additional 5,000-6,000 MW of new renewables capacity to be installed to add to the slightly more than 4,000 MW already operating. Since our Australian assets are fully contracted it is not expected that these amendments will have a significant impact on our operations.

**Weather**

Abnormal weather events can impact our operations and give rise to risks. In addition, normal year-over-year variations in wind, solar, water, and temperatures give rise to various levels of volume risk depending on the input fuel of each facility; events outside the design parameters of our facilities give rise to equipment risk; and fluctuations in temperatures can cause commodity price risk through impact on customer demand for heating or cooling. Refer to the Governance and Risk Management section of this MD&A for further discussion of each risk and our related management strategy.

During the past three years, some deviations from expected weather patterns have negatively impacted our annual financial results:

- the Southern Alberta flood of 2013 disrupted our hydro operations and caused us to invest in substantial repair work. Our losses have been largely covered through insurance,
- warm weather in Alberta in 2015 increased derates at our coal facilities due to its impact on the Sundance cooling ponds. These cooling ponds are susceptible to warm weather; however, we anticipate that decreased coal production and the retirement of Sundance Units 1 and 2 in the medium term will reduce the stress from such occurrence, and
- our Alberta mine was susceptible to significant rain starting in August of 2016, which resulted in several weeks of flooding and impacted our coal deliveries. We focused on improving drainage infrastructure and use of stockpiles to mitigate future risks.

Over the same period, other deviations have positively impacted our financial results, such as the cold temperatures in Eastern North America in the winter of 2014 that caused market volatility and benefitted our Energy Marketing Group.

# Other Consolidated Analysis

## Asset Impairment Charges and Reversals

As part of our monitoring controls, long-range forecasts are prepared for each Cash Generating Unit ("CGU"). The long-range forecast estimates are used to assess the significance of potential indicators of impairment and provide a criteria to evaluate adverse changes in operations. When indicators of impairment are present, we estimate a recoverable amount for each CGU by calculating an approximate fair value less costs of disposal using discounted cash flow projections based on the Corporation's long-range forecasts. The valuations used are subject to measurement uncertainty based on assumptions and inputs to our long-range forecast, including changes to fuel costs, operating costs, capital expenditures, external power prices, and useful lives of the assets extending to the last planned asset retirement in 2073.

In 2016, we concluded that an indicator of possible impairment existed with respect to our U.S. Coal facility as the plant has merchant exposure and price expectations in the Pacific Northwest region continued to decline. The results of the impairment analysis are outlined in section III below.

During 2016, uncertainty continued to exist within the province of Alberta regarding the government's previously announced Climate Leadership Plan and the future design parameters of the electricity market. Additionally, economic conditions, while more stable than in 2014 and 2015, contributed to continued over-supply conditions and depressed market prices. We assessed whether these factors presented an indicator of impairment for our Alberta Merchant CGU, and in consideration of the composition of this CGU and events arising during the latter part of 2016, which are more fully discussed below in I, determined that no indicators of impairment were present with respect to the Alberta Merchant CGU. Due to this determination, we did not perform an in-depth impairment analysis, but sensitivities associated with these factors were performed to confirm the continued existence of an adequate excess of estimated recoverable amount over net book value.

There was one impairment charge of $28 million (2015 - $2 million reversal) made during the year ended Dec. 31, 2016 as a result of the sale of our 51 per cent interest in the Wintering Hills merchant wind facility as discussed below in II.