

Intellectual Capital

At TransAlta, we define intellectual capital as our knowledge-based assets. Measuring these assets serves two purposes. First, we seek to understand our knowledge-based assets to improve our management and performance of these assets. Second, we seek to understand these assets to communicate their real value. The following highlights some of our knowledge-based assets, that we believe provide us with a competitive edge and contribute to shareholder value.

Brand Recognition

Our employee culture is supported by a purpose-based, long-term and sustainable business strategy: growth in affordable and clean electricity generation. TransAlta has operated power-generation assets for over 100 years, which reflects this approach to long-term and sustainable business. A long-term commitment to business and partnerships lends itself to goodwill and brand recognition, something we value and don't take for granted. We believe our low-cost and clean electricity strategy, supported by our internal values and sustainable approach to business, will help reinforce and continue to increase our brand recognition positively.

We are a leader in sustainability – publishing our first sustainability report in 1994. We are the first company in Alberta to combine our sustainability report with our financial report and we have been recognized by EXCEL Partnership for demonstrating best-in-class examples in sustainability reporting. Being members of working groups such as the EXCEL Partnership, the Energy Sector Sustainability Leadership Initiative, Canadian Electricity Association Steering Committee and Future-Fit provides validation and support with our sustainability strategy. We are listed on many of these organizations' websites, which further increases awareness of our sustainability practices. In addition, in early 2020, TransAlta was one of 325 companies globally to be added to the Bloomberg Gender-Equality Index. We believe that as we continue to invest in and strengthen our sustainability initiatives, the association of the TransAlta brand with sustainability will increase.

Diversified Knowledge

The experience and acumen of our employees further enhances our capital value creation. Our business has been operating for over 100 years, and many of our employees have been with us for over 30 years.

Our experience in developing and operating power-generation technologies is highlighted below. The transition of our coal assets to natural gas is a natural fit with our operating experience. Relative to coal, natural gas operations have lower operating costs, have increased operating reliability and flexibility, require less manpower and reduce GHG and air emissions. Our trading and marketing business complements our knowledge of operating power-generation assets.

Power-Generation Type	Operating Experience (years)
Hydro	108
Natural Gas	69
Coal	69
Wind	17
Solar	4

Innovation: Idea Generation and Project Management

As innovation continues to disrupt and advance the global marketplace, we believe that our business, employees, systems and processes must remain competitive, agile and adaptive. Project Greenlight has been a key driver in ensuring the Corporation continues to provide year-over-year improvements in these areas. The program is focused on bottom-up innovation, which means ideas are generated by employees. Emphasizing bottom-up innovation across the Corporation has resulted in a strong culture of idea generation, where employee ideas are developed and advanced into business cases, adhering to project management best practices to ensure the delivery and success of the initiative.

For further details on our investment in our workforce, please see the Talent and Employee Development discussion in the Human Capital section of this MD&A.

Innovation: Applied Technologies

TransAlta has been at the forefront of innovation in the power-generation sector since the early 1900s when we developed hydro assets. We have been an early adopter and developer of wind technology in Canada and are now one of the largest wind generators in the country. Today we run a Wind Control Centre that monitors, to the second, every wind turbine we operate across North America. In 2015, we made our first investment in solar technology with the purchase of a 21 MW solar facility in Massachusetts.

As we move towards our goal to be a leading clean power company in Canada by 2025, we continue to seek solutions to innovate and create value for investors, society and the environment. This is evidenced by our announcements of the accelerated coal-to-gas conversion plans, the expansion of our Kent Hills wind farm in New Brunswick, the 90 MW Big Level and 29 MW Antrim wind projects recently completed in the US and the 207 MW Windrise wind project in Alberta. We have also announced the construction of our SemCAMS Cogeneration Project. Cogeneration is recognized by regulatory bodies for its efficiency in generating power compared to traditional methods. It reduces the natural gas required for several industrial processes by using high-efficiency steam production rather than boilers. The distributed system also provides independence from the power grid and avoids the need to construct additional transmission lines.

Battery storage is another technology we are investing in. TransAlta will begin construction on Alberta's first utility-scale lithium-ion battery storage facility in March 2020, called WindCharger. This project is unique as it will use TransAlta's existing Summerview Wind Farm to charge the battery, allowing WindCharger to be a truly renewable battery energy storage system. The project will use Tesla technology and will have a nameplate capacity of 10 MW with a total storage capacity of 20 MWh. TransAlta will receive co-funding for this project from Emissions Reduction Alberta. Commercial Operation for WindCharger will begin in June 2020. The potential exists for the expansion of this technology, and TransAlta is continually investigating the viability of battery storage at our various wind farm locations.

Our teams continuously explore the use of applied or new technologies to find solutions to expand or adapt our fleet in an ever-changing world. This helps protect our shareholder value and maintain delivery of reliable and affordable electricity. The following are further examples of how we have developed innovative solutions to optimize and maximize value from our fleet:

Operations Diagnostic Centre

TransAlta has run its Operations Diagnostic Centre ("ODC") since 2008. The ODC monitors coal-fired, gas-fired and wind generating assets across Canada, the US and Australia. A centralized team of engineers and operations specialists remotely monitors our power plants for emerging equipment reliability and performance issues. ODC staff are trained in the development and use of specialized equipment monitoring software and can apply their experience to power plant operations. If an equipment issue is detected, the ODC notifies plant operations to investigate and remedy the issue before there is an impact to operations. This support is critical to reliability and performance of our operations. By way of example, if a wind turbine starts to underperform compared to the others, our operation team is notified and will work to investigate and remedy the issue. The monitoring, analysis and diagnostics completed by the ODC are focused on early identification of equipment issues based on longer-term trend analysis and complements day-to-day plant operations.

Data & Innovation

TransAlta created the Data & Innovation team in 2019 for the purpose of modernizing its data infrastructure and processes to take advantage of new opportunities in analytics and artificial intelligence. The Data & Innovation team is cross-functional, composed of data architects, data scientists, data analysts, software developers, engineers, project managers, and financial and systems analysts. The team focuses its efforts on the delivery and enhancement of TransAlta's Modern Data Architecture, the rapid delivery of data-driven applications, the design and implementation of machine learning and artificial intelligence models and the advancement of process automation through the Robotic Process Automation Centre of Excellence.