

In 2016 our IFR was 0.85. IFR is defined as the number of lost-time and medical injuries for every 200,000 hours worked. Our ultimate goal is to achieve zero injury incidents, but annually we seek improvement over the prior year. We have experienced no fatalities during the last three years.

<b>Year ended Dec. 31</b>	<b>2016</b>	2015	2014
IFR	<b>0.85</b>	0.75	0.86

During 2015, we designed a new total safety management policy as a two-pronged approach. The policy builds on our occupational safety program, Target Zero, which is focused on protecting our workers on site, through means of personal protection equipment, inspections, safety controls, job safety analyses, field-level hazard assessments, and safety communications. The policy is supplemented by our newly launched Operational Integrity program, which is focused on preventing all hazards from equipment, through definition and measurement of safety-critical performance measures and operating limits.

### **Intellectual Capital**

Intellectual capital at TransAlta is another key to our value creation. We have developed innovative solutions to optimize and maximize value from our fleet. We are constantly exploring use of applied or new technologies to find solutions to expand or adapt our fleet in an ever-changing world, which helps protect our shareholder value and maintain delivery of reliable and affordable electricity.

### **Operations Diagnostic Centre**

TransAlta has maintained its Operations Diagnostic Centre ("ODC") since 2008. The ODC monitors coal-fired, gas-fired, and wind-generating assets across Canada, the United States, 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 in 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. 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.

### **Operational Integrity Program**

During 2015, we set the foundation for our Operational Integrity program. The program is designed to achieve process and equipment safety through understanding and monitoring of key risks and implementing of mitigation measures. In 2015, we completed our risk assessment at all facilities except Australia and Mining. We have also developed operator checks, maintenance tasks, and proof tests for various safety-critical elements at coal plants. Key performance indicators have been identified and are being integrated in a dashboard for ongoing monitoring. During 2016, we finalized developing the balance of safety-critical maintenance strategies and related engineering standards. We seek to optimize cost and reliability of our assets and maintain or increase their capacity. Our decentralized organization allows the sharing and deployment of technology-specific innovative practices within the respective businesses. Productivity projects are evaluated against criteria that include a two- to three- year financial payback. We also incurred \$3 million in 2016 on a productivity improvement blade enhancement technology at our Wolfe Island wind project. This investment is expected to increase the annual energy production of the Wolfe Island wind project by approximately three per cent. In 2017 we are planning to put into place our Total Safety Management System where we integrate our work in Process Safety with our existing Occupational Safety programs. We continue to observe a positive increase in self-reporting and addressing process safety hazards as awareness and new tools are being introduced.

### **Energy Trading and Marketing**

Our energy trading and marketing operations optimize the financial returns of our facilities in real time. The group purchases fuels to feed plants, bids the electricity we generate at our facilities into energy markets, and mitigates the associated risks associated with those purchases and sales. In addition, they buy, sell, schedule, and negotiate all of the electricity transmission for each facility. They do so while applying an overlay of complex, real-time information about weather, facility capacity, transmission congestion, and market pricing. Quantitative analysis, forecasting, mathematical models, and forward curves are key tools used to execute this responsibility. In addition, the application of these skills for proprietary trading allows us to generate positive margins.

Effective Jan. 1, 2016, a new Energy Trading and Risk Management System ("ETRMS") became operational, to further support optimization and trading capabilities, allowing for streamlined data flows, state-of-the-art linkages, and enhanced scalability for key optimization tools. The ETRMS was integrated into our internal control over financial reporting for the year ended Dec. 31, 2016.

### **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. To add context, these assets were developed at the same time as the automobile. We have been an early adopter of wind technology in Canada and today are the largest wind generator in the country. Today we run a Wind Control Centre, the only one of its kind in Canada, that monitors, to the second, each and every wind turbine we operate across North America. In 2015 we made our first investment in solar technology with the purchase of the Massachusetts solar facilities.

As we move towards becoming the leading clean power company in Canada by 2030 we will continue to seek solutions to innovate. The announcement of our proposed Brazeau hydro expansion, a 600-900 MW pumped hydro expansion, which will double our hydro capacity in Alberta, demonstrates our ability to seek solutions to create value for both our shareholders and society. Hydro is a clean alternative to both coal and gas and has long-term life. We still operate some of our legacy hydro assets from the early 1900s today.

We strive to keep up to date with power technologies that have the potential to redefine power markets today and in the future. Innovation is constantly happening on a more micro scale at TransAlta. For further communication on innovation at TransAlta please visit [www.transalta.com/about-us/innovation](http://www.transalta.com/about-us/innovation).

### **Social and Relationship Capital**

Creating shared value for our stakeholders is the key to social and relationship value creation at TransAlta. The most material impacts to our social and relationship performance are public health and safety, anti-competitive behaviour and fostering better relationships and conditions with all stakeholders, but with a key focus on indigenous groups. Each year we strive to do better in each of these areas.

#### **Public Health and Safety**

We seek to ensure public health and safety through measures such as restricting physical access to our operating sites and by minimizing our environmental impact. It is our goal to both keep our employees safe and the peoples and the communities in which we operate.

We specifically look to protect against the following risks:

- harm to person(s),
- damage to property,
- increased liability due to negligence, and
- loss of organizational reputation and integrity.

When addressing concerns such as occupiers liability, our Corporate Security team liaises with stakeholders to facilitate appropriate security countermeasures and controls to prevent or reduce the identified risk. For example, in 2016 our Corporate Security team initiated a security/safety signage campaign across the Hydro fleet to elevate the awareness of the safety risks associated with dams. By implementing signage from a safety perspective, Corporate Security and TransAlta also benefited from a security perspective. Signage gave notice of potential physical dangers, but also allows as an organization and landowner to reduce liability and increase safety through notice, awareness, and mitigation of trespassing and vandalism.

We actively monitor air emissions from our coal and gas plants. Our large coal facilities have Continuous Emissions Monitoring Systems ("CEMS") in place, which help us monitor our pollutant emission levels in line with acceptable limits. When we are in breach of regulatory limits we report this to Alberta Environment & Parks and conduct a root cause analysis to understand how we can eliminate future breaches from occurring. In 2016 we had two breaches at our Alberta coal facilities. Both breaches were minor and due to an instrumentation calibration failure at Keephills 3 and an opacity CEMS analyzer failure at the Sundance operations.