

2019 YEAR IN REVIEW

LEADING AND LISTENING

ENGAGEMENT AND AGILITY KEY TO RELIABILITY

VISION

As the trusted leader, the AESO is shaping the transformation of Alberta's electricity future to deliver reliability and enhance the quality of life for Albertans.

MISSION

The AESO provides for the safe, reliable and economic operation of the Alberta electricity system while facilitating a fair, efficient and openly competitive market for electricity.



The electricity industry is undergoing a transformation. As the steward of reliability for the province, the Alberta Electric System Operator (AESO) is well-positioned to lead through these challenging and exciting times. The AESO has been engaging with stakeholders on numerous fronts, recognizing that successfully evolving Alberta's electricity market, maintaining investor confidence, integrating innovative technology advances, and cost-effectively managing the grid will be best accomplished by working collectively as an industry, now and into the future.



This *Year in Review* provides a snapshot of how the AESO delivered on its mandate and moved the electricity industry forward, as contemplated in its 2019-2023 Strategic Plan. While this review is a look back, the AESO recognizes it is being published during a truly unprecedented time as the world adapts to the realities of the COVID-19 pandemic. The AESO is committed to the provision of a reliable electricity system and competitively priced power, and will continue to deliver its mandate through this crisis to support Alberta's future prosperity.



PEOPLE

Growing and developing skills and knowledge

As the AESO leads the electricity industry's transformation, employees recognize the importance of being agile, responsive and expanding their capabilities. The AESO encourages its employees to understand how evolving technologies, processes and practices impact – as well as support – a strong and reliable grid. People have the opportunity to identify specific skills and knowledge they require, which the AESO helps them to grow and develop, to ensure the organization is well-positioned to meet industry's future needs. Collaboration and the exchange of knowledge and information among employees, government, industry and other electric system operators is encouraged to understand what it means to be best in class, and how the AESO can maintain a leadership role.

Recognizing and appreciating what people need at work in order to be motivated and successful, in 2019 the AESO implemented modern online learning programs and flexible work practices supported by a strong technology platform. When all AESO employees in non-business critical roles transitioned to working from home in response to the COVID-19 pandemic, the new practices and the technology were unexpectedly and successfully put to the test, with the online courses optimally designed for people to learn at their convenience in the work-from-home environment.

Supporting real-time operations

An expansion of the AESO's System Coordination Centre (SCC) was completed on time and under budget. The SCC was originally constructed in 2006 as a standalone purpose-built facility to ensure the continuing safe, reliable, and efficient operation of the Alberta Interconnected Electric System (AIES) and wholesale energy market. The expansion, called the Operations Support Centre, is adjacent to the SCC and provides staff with space to support around-the-clock, real-time operations.



FRAMEWORK

Evolving the energy market

The AESO is committed to ensuring Albertans benefit from a reliable system and competitively priced power. In July 2019, the Government of Alberta announced that the province will continue with an energy-only market and tasked the AESO to review certain aspects of the market to ensure its future sustainability. The AESO began its analysis last year and is engaging stakeholders in 2020 to inform a final recommendation to government by July 31, 2020.

The Independent System Operator (ISO) tariff is an essential component of a well-functioning market. The AESO engaged stakeholders on various components of the tariff in 2019 and will advance a tariff-redesign engagement in 2020. The redesign is intended to enhance the effectiveness and alignment of the tariff through long-term price signals, which will help to facilitate innovation and flexibility as the electricity sector evolves.

Introducing a Stakeholder Engagement Framework

Electricity sector transformation is happening across the globe. The AESO works closely with stakeholders to keep them informed, as well as seek their input and expertise to successfully shape the transformation in Alberta. A *Stakeholder Engagement Framework* was introduced in 2019 and stakeholders were invited to provide feedback. The Framework – which includes new standards, processes, tools and templates – is designed to provide consistency in the AESO's engagement approach, and to help ensure stakeholder needs and interests are consistently, transparently and meaningfully considered.

Supporting the coordination of transmission and distribution planning

The transformation of the grid from a one-way delivery of electrical energy to a future state of two-way power flow will require an increase in coordination and planning between the transmission and distribution systems. The AESO is working with owners of both distribution and transmission facilities to develop a *Transmission/Distribution Coordinated Planning Framework*. The goal of this initiative, scheduled for delivery in 2020, is to create a framework that focuses on enabling coordination and alignment of planning, forecasting and reliability requirements at the transmission and distribution interface to help the AESO make cost-effective decisions on the need for new transmission infrastructure while seeking to optimize the use of existing infrastructure.

MOVING THE
ELECTRICITY INDUSTRY
FORWARD



TECHNOLOGY

Facilitating new technology integration

Social demands and consumer preferences are driving new and innovative technologies across the entire electricity value chain – including how electricity is produced, consumed and exchanged. Progress was made last year on the development of an *Integrated Flexibility Roadmap*, designed to ensure there continues to be sufficient flexibility on the grid in response to the sector's transformation, and to facilitate the integration of new technologies.

Aligning roadmaps to navigate and avoid barriers

Ongoing technology integration and market design work will be aligned with the AESO's *Energy Storage Roadmap* and the pending *Distributed Energy Resources Roadmap*. This work is critical to reduce barriers to technological development, and to ensure that tariff structures appropriately recognize the unique aspects of storage systems.

Enabling energy storage in Alberta

The AESO's *Energy Storage Roadmap* marked an important step in enabling storage in Alberta, following guiding principles that include treating energy storage as its own unique asset class and removing barriers to its integration. The Roadmap sets out the AESO's plan to incorporate energy storage technologies and services into Alberta's regulatory and market framework, and grid and market systems. Stakeholders were engaged to provide input on the Roadmap, and help to identify issues and priorities. It continues to be refined, and recommendations are being prepared for long-term implementation in 2020.

Integrating distributed energy resources

The transformation of an electricity system where the traditional one-way power flow from large, centralized generators to the AIES, to a highly variable two-way power flow from many smaller, decentralized and geographically dispersed electricity sources, or distributed energy resources (DER), is underway in Alberta. The AESO is developing a *Distributed Energy Resources Roadmap* (DER Roadmap) to explore and manage the challenges and opportunities associated with the transformation of the AIES. The DER Roadmap, which is being progressed in collaboration with stakeholders, is a directional plan and a step in preparing for a future state of higher penetration of DER.

The Alberta Utilities Commission is also currently mapping out key issues related to the future of Alberta's electric and natural gas distribution system through a public Distribution System Inquiry. The AESO is participating in the inquiry, and the DER Roadmap has been introduced as part of this process.

LOOKING TO THE FUTURE

The AESO remains focused on advancing work that will create more certainty for investors while preparing the electricity system for the transformational changes that are being driven by technology and consumer choice.

The AESO's top priorities are the health and well-being of employees and stakeholders, and continuing to meet the electricity needs of all Albertans throughout and beyond the pandemic. The COVID-19 situation has tested policies, processes, and people, and the AESO takes pride in its employees' unwavering commitment to the short- and long-term delivery of cost-conscious essential services in the province.



**PROVINCIAL
ELECTRICITY
DEMAND**



84,925 GWh

▼ 0.5% decrease from 2018

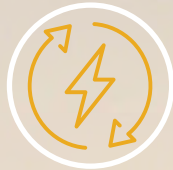
**TOTAL
GENERATING
UNITS**



352

▲ increase of 89 units from 2018

**TOTAL
GENERATION
CAPACITY**



16,532 MW

▲ 3% increase from 2018

**AVERAGE
POOL
PRICE**



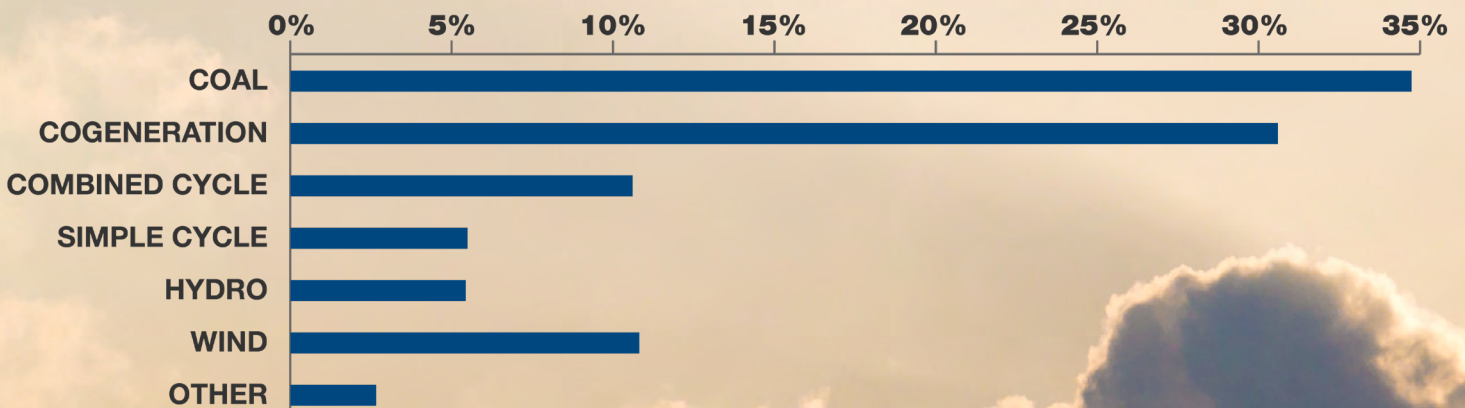
\$54.88 MWh

▲ 9% increase from 2018

 **SUMMER
PEAK DEMAND 10,822 MW**

 **WINTER (NEW ALL-TIME)
PEAK DEMAND 11,698 MW**

INSTALLED CAPACITY 2019



NOTE FROM THE PRESIDENT AND CHIEF EXECUTIVE OFFICER



The electricity industry globally continues to transform at an unprecedented pace as technology evolves, pressure mounts to reduce greenhouse gas emissions, and consumer behaviours continue to shift. The increasing adoption of distributed energy resources (DER), advancements in storage technologies and ease of access to information is driving change in how electricity is produced, consumed and exchanged.

These are also factors in the transformation of our provincial electric system, and the Alberta Electric System Operator (AESO) is prepared to guide the industry through these changes. As we look to the future, there are many short-term issues that we must focus on to ensure a reliable, cost-effective power system that encourages investment in Alberta.

Facilitating business and investment requires ensuring that sufficient transmission infrastructure is developed to maintain reliability and connect new generation, while at the same time balancing such development with near- and long-term cost implications, including increases in the delivered cost of electricity. Cost management is a foremost consideration across the initiatives that the AESO is advancing, and is key to achieving the objectives of maintaining investor certainty in the market and striving to keep costs as low as possible for consumers.

The transformation of the electricity industry also requires shifts in our peoples' skill sets and how we view the world and the work we do. The AESO continues to focus on our employees' growth and professional development, and ensure we have the right people with the expertise and agility to assume leadership roles to help guide the transformation. We are implementing appropriate workplace practices and technology to enhance productivity and promote cross-functional knowledge sharing and engagement.

The AESO operates in the public interest, and there are a broad and diverse range of issues and priorities that factor into our decision making. In order to meet our multi-faceted mandate and effectively manage the complex issues that industry as a whole is facing, we need stakeholders to be well-informed and involved.

In 2019, we introduced the AESO's *Stakeholder Engagement Framework* (Framework) as part of our commitment to continuous improvement in our engagement approach. Stakeholders are instrumental to the work we do and, through the principles and objectives established in our new Framework, we aim to optimize the value of our engagements for stakeholders and the AESO.

The better we understand all perspectives and work toward mutually beneficial outcomes, the greater success we will have, and the stronger Alberta will become. There are a number of initiatives that the AESO has progressed over the past year to ensure a reliable, affordable power system that facilitates business in the province:

- Thorough budget management and significant reduction of AESO cost structures.
- Policy review and recommendations to the Government of Alberta in November 2019 on market power and market power mitigation for both the energy-only and ancillary services markets.
- Development of the *Transmission/Distribution Coordinated Planning Framework* initiative, to design a framework in consultation with industry that helps the AESO make cost-effective decisions on the need for new transmission infrastructure while seeking to optimize the use of existing infrastructure.
- Publication and implementation of the *Energy Storage Roadmap*.
- Technology integration market design work in alignment with the *2018 Dispatchable Renewables and Energy Storage Report*.
- Publication of the *2019 Transmission Capability Assessment for Renewables Integration*, which includes Renewable Electricity Program results, proposed system project impacts, long-term transmission plan initiatives, DER and other system integration impacts.
- Updates to the *Optimal Integration Capability Map*, an online interactive tool that helps investors to identify potential project locations based on proximity to the nearest transmission infrastructure.

The publication of the AESO's *2019 Year in Review and Corporate Governance and Financial Results* comes at an unprecedented and challenging time as the world deals with the current COVID-19 pandemic. The AESO will continue to find ways to safely work with industry, government and other electric system operators to advance these important initiatives, and maintain a reliable and cost-effective electric system throughout and after the crisis.

Looking to the future, the AESO has the systems, processes, tools, technology, policies and people in place to support a robust and flexible energy-only market framework that will encourage investment in the province through its economic recovery, and continue to provide Albertans with reliable power every minute of every day.

Sincerely,



Michael Law • President & Chief Executive Officer