2024 Budget Development Process and 2024 Preliminary Forecast and Budget Information Stakeholder Presentation

October 5, 2023

Evacuation – 240Fourth

- **Slow alarm:**
  - Stand by for further announcements. Scripted PA announcements will be made by QuadReal Security Personnel
- **Fast alarm:**
  - Evacuate immediately to muster points
- **Muster points:**
  - If leaving the building via the NW stairwell, your assembly point is the Plaza area to the North of Livingston Place, located immediately north of 240FOURTH
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Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

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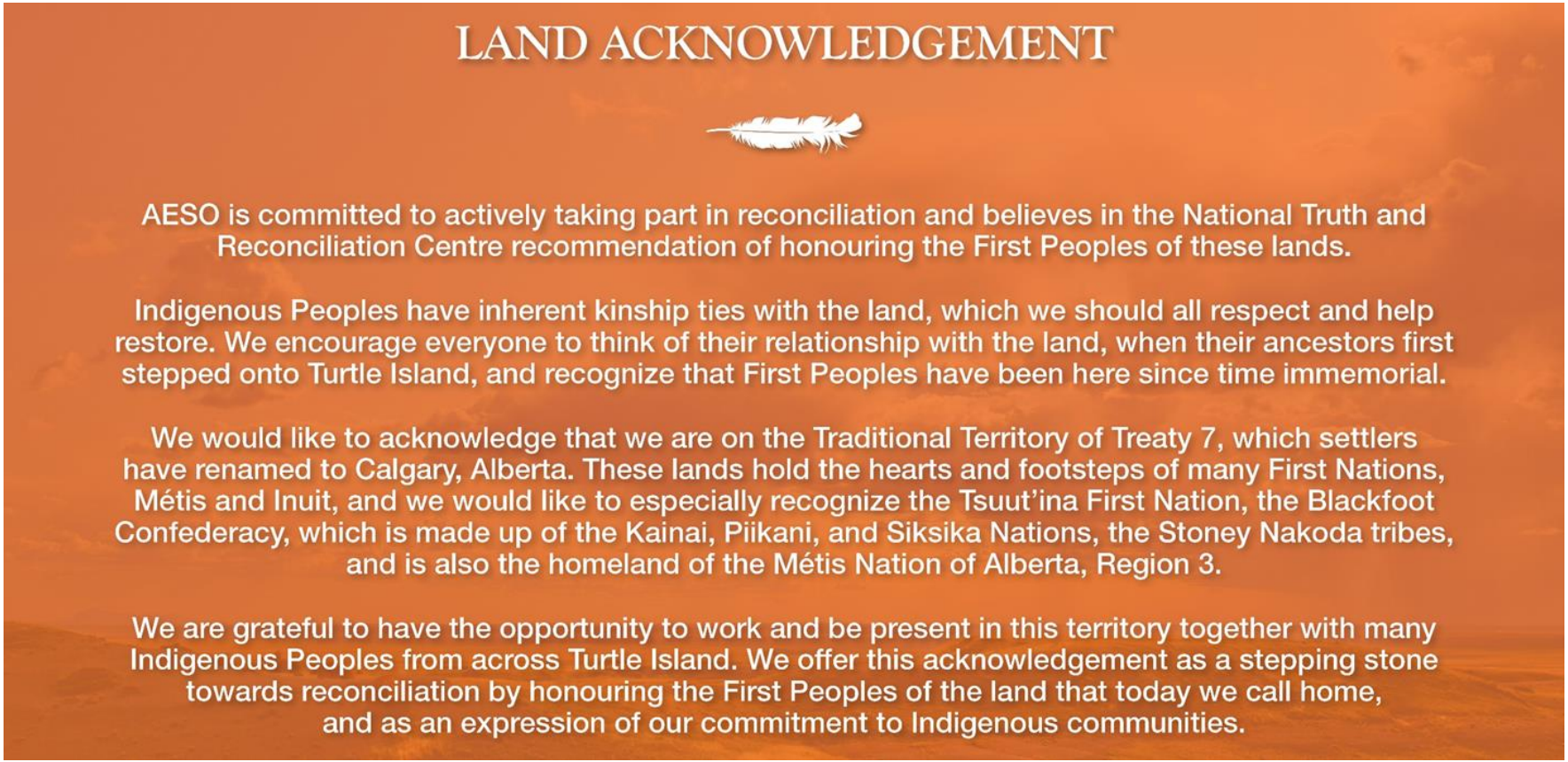
Participating in a hybrid session

- **Please introduce yourself including the organization you work for before your question/comment**
- In-Person Attendees
  - Please flip your name tent vertical if you have a question or comment & we will call on you
  - Table microphones will pick up audio
- Online Attendees
  - For verbal questions/comments, please raise your virtual hand. We will call on you to unmute your microphone
  - For written questions, please use the webinar chat.
- Conference call attendees
  - Press *5 to raise your hand
  - Press *6 to unmute your microphone

Welcome and Introductions

Land Acknowledgement



AESO Stakeholder Engagement Framework

Stakeholder Participation

- The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:
  - Listen to understand others' perspectives
  - Disagree respectfully
  - Balance airtime fairly
  - Keep an open mind

Welcome and introductions

- Nicole Kinch, VP, Finance
- Rob Davidson, VP, Grid Reliability – Projects & Planning
- Nicole LeBlanc, VP, Markets
- Kevin Dawson, VP, Strategic Integration & Chief Economist
- Marie-France Samaroden, VP, Grid Reliability – Operations
- Karen Campbell, Director, Settlement, Credit & Business Planning
- Pam Tretiak, Director, Finance – Accounting & Treasury
- David Johnson, Director, Forecasting and Analytics
- Amir Hallak, Data and Economic Analyst

Agenda

Time	Agenda Item	Presenter
8:45	Doors open for in-person participants	
9:00-9:15	Welcome, Introductions, Agenda and 2024 BDP Overview	Karen Campbell
9:15- 10:00	Strategic Focus and Associated Cost Impacts • Q&A	Nicole Kinch
2024 Preliminary Forecast and Budget Information		
10:00 10:30	• AESO Own Costs and General & Administrative • Other Industry Costs and Energy Market Trading Charge • Capital Budget • Forecast Transmission Operating Summary Costs and Wires Costs • Q&A	Pam Tretiak Karen Campbell
10:30 – 10:50	• Forecast Pool Price, Load Outlook, AS Costs and Transmission Line Loss Costs • Q&A	Amir Hallak David Johnson
10:50 – 11:30	• Management Control and Contingency • Next Steps and Session Close-Out • Q&A	Karen Campbell

Session purpose

- The purpose of the session is to engage stakeholders in a discussion of the AESO's budget, areas of focus and associated priorities for 2024.

Registrants (as of September 27, 2023)

- Alberta Direct Connect Consumers Association (ADC)
- AltaLink Management Ltd.
- Augesco Group Consulting
- Best Consulting Solutions Inc.
- Capital Power Corporation Ltd.
- City of Medicine Hat
- Customized Energy Solutions Ltd.
- DJA Electrical Engineering
- Edmonton Global
- ENMAX Corporation
- Evolugen
- Government of Alberta
- Heartland Generation Ltd.
- Hill + Knowlton Strategies
- Industrial Power Consumers Association of Alberta (IPCAA)
- Lionstooth Energy Inc.
- Suncor Energy Marketing Inc.

Overview

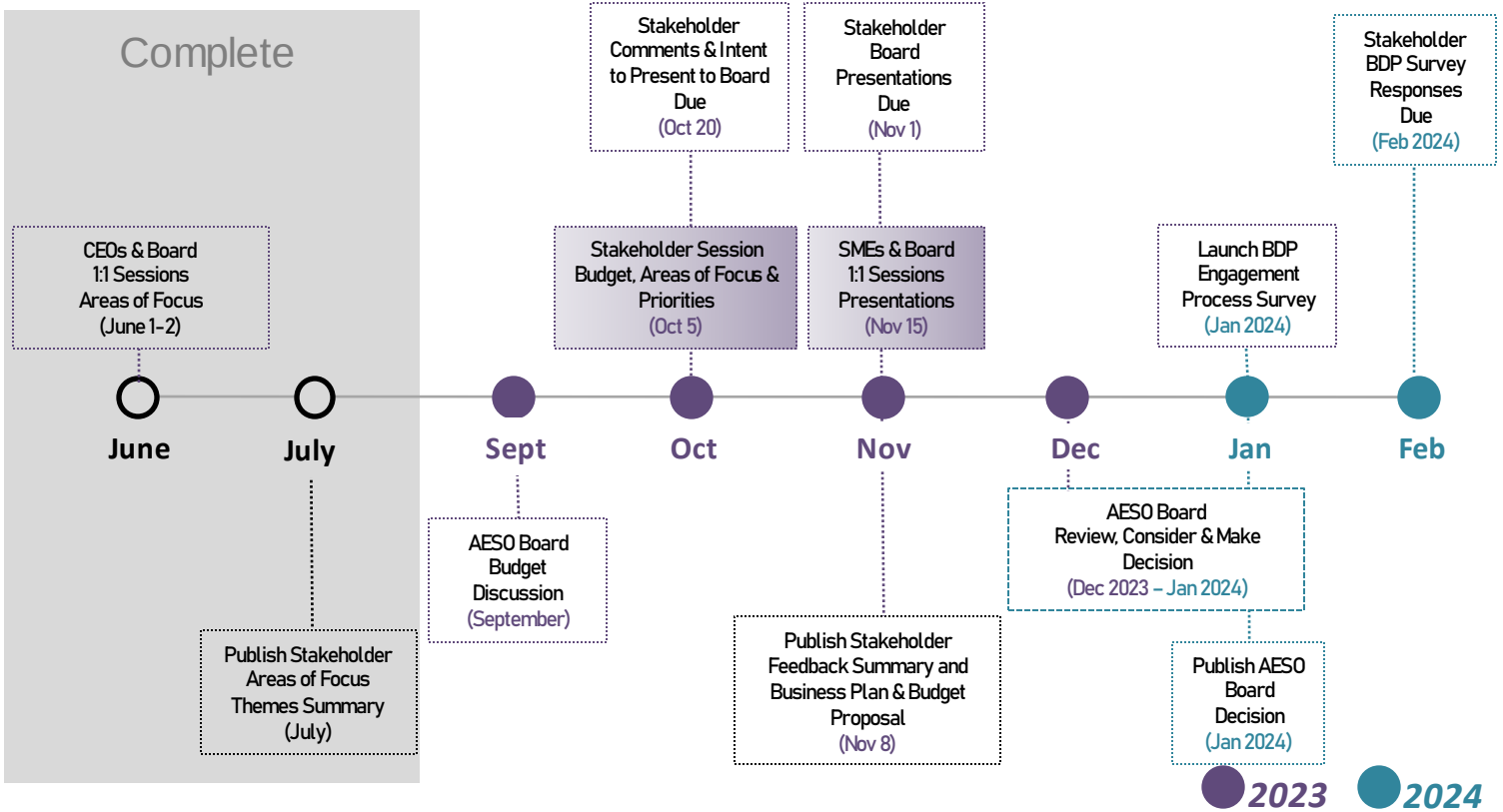
1. 2024 BDP Strategic Focus
   - Continued Focus on Enabling Transformation
   - Executive Commentary
   - 2024 Budget: Policy Pathways
   - Strategic Priorities and Drivers

2. 2024 Preliminary Budget and Forecast Information
   - AESO Own Costs Budget
   - Transmission Operating Forecasts

Continued Focus on Enabling Transformation

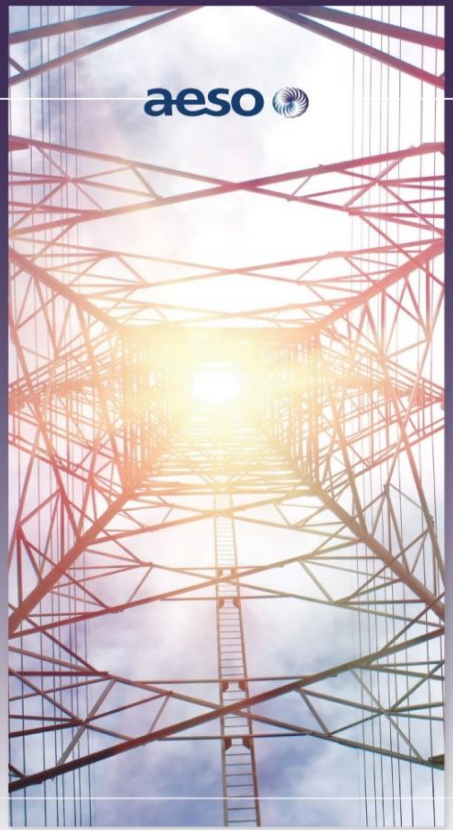
- Based on the AESO's Strategic Plan and the corresponding alignment with the identified stakeholder themes of strategic importance and concerns, Management has determined that "**Enabling Transformation**" will be the **prominent focus area for 2024** and will concentrate its efforts and resources in its budgeting process accordingly.
- Priorities
  I. Reliability
  II. Market Evolution
  III. Affordability
  IV. Policy Clarity
  V. Connection Process Streamlining

2024 Budget Development Process



Strategic Focus

The Complexity of Transformation



THE FUTURE OF ELECTRICITY

The AESO is committed to providing a leadership role in enabling the transformation while maintaining system reliability, acting in the public's interest, and providing guidance to policy-makers and industry.

- It is clear the work ahead of us is critical and timing is crucial. The pace of change continues to accelerate.
- We must be adequately prepared with the required expertise and resources to effectively deliver the AESO's priorities.
- A lack of proper execution and planning today could have far-reaching cost and reliability impacts in the future.

Executive Commentary

"The electricity sector is at a critical point where we need to evolve and innovate the entire power system, from wholesale and transmission down to retail and distribution, or face the unintended consequences of delaying decisions we cannot afford to delay."

- The AESO sees the system in its entirety, and it is clear to us that the entire value chain is being impacted in a number of ways by the large-scale adoption of renewables generation.
- This radical transformation in how electricity is produced, consumed and exchanged offers a compelling and exciting future. But the AESO is also realistic that it brings with it new challenges in grid management, infrastructure development, market design, affordability, and paramount to all, reliability.
- Among the challenges is uncertainty in policy, which has adverse effects on Alberta's deregulated market, including renewables integration, implications of decarbonization, and investment uncertainty.
- Navigating uncertainty through the transformation requires the AESO to be agile in the execution of our mandate, which in turn has implications for our planning and budget process.
- The case for change is clear and the AESO must start moving the needle in some key areas.
- The need to effectively address the complex transformation is driving increased funding requirements.

Successfully Navigating Uncertainty

- To be agile in the face of uncertainty, the AESO must be able to continuously pivot, incorporating new information to deliver the most effective and affordable solutions.
- Given the critical need for agility, the AESO must approach all aspects of its business with this mindset, including its approach to prioritizing and budgeting.
- The 2024 Budget incorporates the minimum costs considered necessary to deliver the AESO's mandate; however, the considerable uncertainty in policy pathways creates the potential for future adjustments.

Successfully Navigating Uncertainty

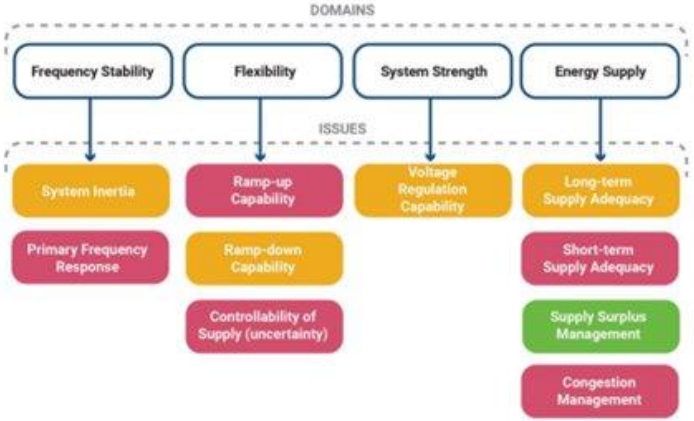
- Recent publications by the AESO document the significant impact to the AIES from the rapid transformation of the electricity industry, which has been reiterated by industry and realized by the AESO in managing the grid.
- There is significant and critical work that must be done to ensure the reliability of the electric system is maintained and markets are efficient in supplying Alberta's energy future.
- These priorities form the basis for costs underlying the 2024 Budget, for which significant drivers are discussed in the following slides.

Potential policy pathways will impact the timing, priority and significance of the work required to deliver on these priorities.

Reliability

Reliability is Paramount

- As the AIES continues to transform and new information on specific trends impacting the timing or direction of the transformation becomes available, the impacts of these changes will need to be continuously analyzed to ensure current and future reliability implications are understood and mitigated.
- The greatest challenge from a resourcing/talent perspective is the ability to perform the necessary studies and analysis to support reliability through the transition.
  - Increased analysis in the four domains shown to the right is required to respond to the issues in a timely manner
  - There is a need for more complex congestion, restoration and dynamic studies, as well as identifying and analyzing the impacts from electrification of the load



The colour assigned to each issue in the above figure corresponds to the urgency of the issue. Red indicates that the issue is of high urgency, yellow indicates medium urgency, and green indicates low urgency.

Grid Management

- Real-time operational challenges have increased due to the rapid pace of renewables generation connecting to the grid, including the appearance of multiple congestion areas that require continuous mitigation.
- Additionally, outage planning, outage management and forced outage response in weaker areas of the system are becoming more complex.
  - To ensure the continued safe, reliable and economic operation of the transmission system, additional investment is required for studies, data collection and storage, modelling upgrades and monitoring tools.
  - This requires engineering resources for reliability, operational complexity, policy advice and more complex modelling; congestion management and analytics; system restoration work and engineers/application resources for increased support of technology tools in the Control Room.

Operational Readiness is Critical

- **The AESO must be aware, informed and adequately prepared operationally for the impacts of the rapid pace of transformation.**
  - This includes ensuring that Grid Operations can analyze what it is observing in real time and inform the rest of the organization.

Critical Systems and Data

Operational Readiness is Pervasive

- There is a need for critical systems operational readiness for the Transformation that is being driven by an increasing number and complexity of systems in recent years with increases expected to continue and at a faster pace.
  - Assessment and implementation of tools is necessary to improve capabilities for modelling and maintaining situational awareness
- There is a need for additional cyber protections driven by the growth in number and complexity of systems due to both digital and grid transformation, in addition to rapidly growing cyber threats generally.
- Advancement in digital and data technology is one of the drivers of the global electricity transformation. Resources are needed to advance the AESO's Data Strategy to enhance the accessibility and use of data for AESO and stakeholder decision-making and prepare for increased application and pace of digitalization within our industry.
  - Building continuity and skills related to business intelligence, analytics, and data engineering are critical for building a successful data program.
  - The AESO will utilize the conversion of current contracted employees to gain efficiencies.

Market Evolution

The AESO believes that a well-defined electricity framework that leverages competitive forces will yield the most efficient, lowest-cost outcomes for Albertans

- Alberta's current energy market is already experiencing the impact of the transformational change occurring in the electricity system, including increased participation of zero-priced offers and short-term supply adequacy concerns.
- Given the transformation in the system, the market structure and rules need to be revisited to ensure a robust, fair, efficient and openly competitive ("FEOC") platform for attracting investment and maintaining reliability going forward.
- The current Transmission Regulation was written in 2005, when supply adequacy was the primary concern, provided by conventional generation that shared roughly the same development timelines as our transmission system. The framework is not adequately meeting the needs of today.
- As we are embarking on significant change in the market design and potential tariff and commercial activities, an incremental number of resources are required to support and build greater sustainability in the activities of design, stakeholder engagement, analysis, regulatory process, government relations and project management.

Fostering Engagement

It is increasingly important for industry leadership to collaborate and work together in novel ways

- Continuing to build on our engagement with stakeholders is critical to the AESO's success. The breadth of stakeholders that influence our planning and decisions is vast, as are their specific needs, interests and priorities.
- We understand that the decisions we make and the actions we take in delivering our mandate affect many different stakeholders and we are dedicated to ensuring we understand the forces impacting the industry, which is vital to making informed decisions.
- Knowledge sharing will drive the industry forward as a tool to navigate uncertainty and inform broader decision making.
- The continued complexity of the transformation and growth in the number of stakeholders invested in its outcome require greater levels and types of engagement.

Enabling the Transformation

The pace and change in the connection space continues to increase

- Connection projects have become more complex, requiring longer durations and more effort per project to manage, compounded by an overall increase in volume.
- Resources are needed to manage an increased workload of system applications; MATL, WECC Path rating, AB/SK, impact of SMRs, hydrogen, CCUS, etc., as well as the need for engineers to support the additional projects.
- Changes to the connection process require additional resources to ensure the design expectations are delivered in a timely manner.
- There continues to be a high volume of interest in generation and storage applications in Alberta even after the pause announcement.
  - **Cluster Study #1 Applications Statistics as of August 29, 2023**
    - Total applications 102 (17,052 MW)
    - Renewable Generation 77 (12,657 MW)
    - Non-Renewable 17 (3,207 MW)
    - Storage 9 (1,188 MW)
  - **Additional connection resources will be funded by fees collected through the cluster studies. Fees are anticipated to be approximately $4.2 million in 2024.**

Enabling the Transformation

- In addition to growth from connections, the electrification of the pipeline industry is coming, and coordinated planning is necessary and imminent. The magnitude of load required will have significant impacts that need to be assessed and managed.
- "Request for Information" work continues to fall behind day by day, and additional compliance support for generators on how they are responding to frequency events is needed.

The pace and change goes beyond the connection space

Enabling the Transformation

High Competition for Required Technical Expertise

- The pool of System Controllers (“SCs”) and Engineers with required knowledge and expertise is limited and shared with the rest of industry, creating pressures on retention.
- Ensuring resources are available includes the need for additional SCs and Engineers in training (“EITs”), driven by low retention and proximity to retirement age.
- Uncertainty and increasing complexity, processes, projects and technical expertise requirements drive the need for core business functions to support agility and the prioritization of strategic work.
  - People and Culture requires system enhancements that will create greater talent mobility and a consultant to support recruitment efforts.
  - Finance needs additional resources to support the connection process, increasing ancillary services and to reorganize; centralizing accounting and procurement functions that are currently decentralized in order to prioritize time for strategic work and better utilize skills, driving efficiencies and strengthening controls.

Enabling the Transformation

The radical transformation in how electricity is produced, consumed and exchanged has already begun

- A transformation of the electricity system has begun, but the path to navigate its course is uncharted and uncertain.
- What is certain is the need to be agile, focused and prepared for potential changes in direction, pace and outcome.
- To ensure the industry is prepared, we must address the grid management, infrastructure development, market design, affordability, and reliability concerns faced today and develop insight into what tomorrow may bring.
- The AESO's budget reflects the critical nature of the tasks ahead. While the path may diverge and the final outcome may vary, the need to take action is now, or risk unintended consequences.

Associated Cost Impacts

General and Administrative - Budget Reconciliation

		($ millions)
2023 Approved Budget	**$**	**108.3**
Additional resources to deliver on strategic work		6.6
Impact of market, inflation, timing and turnover on staff costs		8.5
Contract services and consultants		2.8
Increase in Board remuneration		0.1
REP land registration fees		0.5
Increase in facilities costs (operating costs, utilities, taxes, etc.)		0.8
Increase in IT maintenance and telecommunications costs		1.4
2024 Preliminary Budget	**$**	**129.1**
Forecasted connection fee revenue offset		(4.2)
2024 Preliminary Budget Impact	**$**	**124.9**

Potential Market Adjustment Scenario**

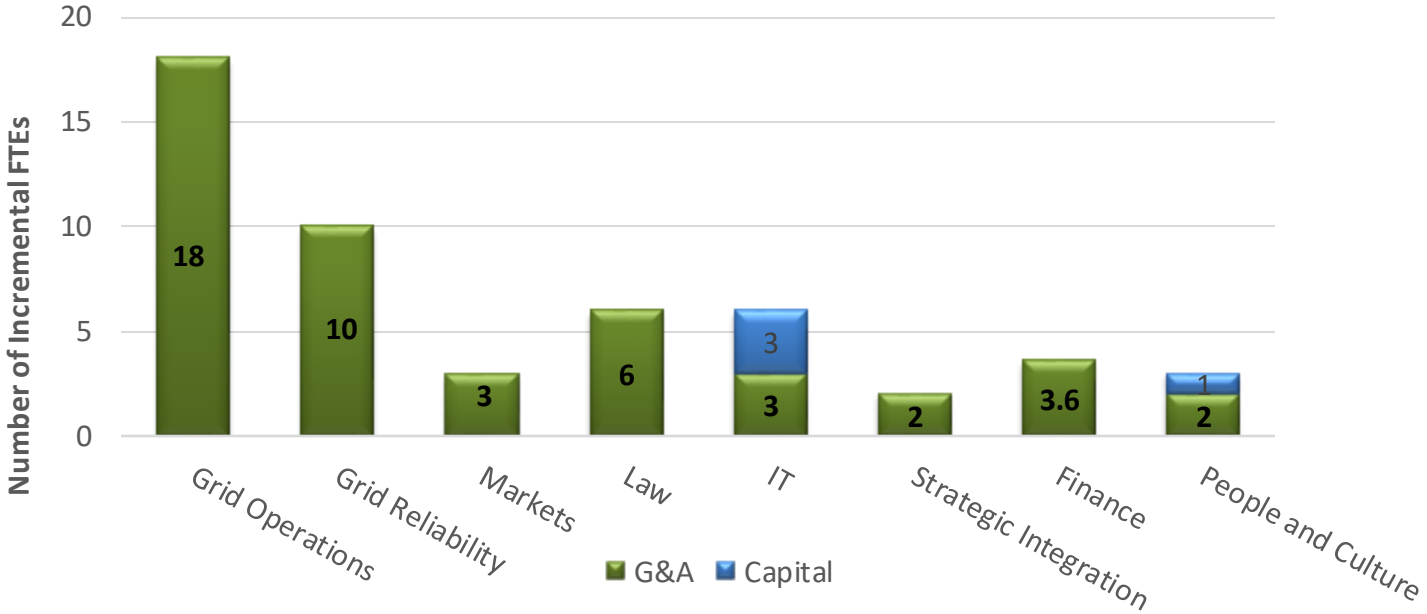
2024 Preliminary Budget - Base	**$**	**129.1**
Maximum market adjustment incremental impact		2.0
2024 Preliminary Budget	**$**	**131.1**
Forecasted connection fee revenue offset		(4.2)
2024 Preliminary Budget Impact	**$**	**126.9**

**Expected industry salary increase range is between 5% and 8% and will be finalized with market data prior to Board approval of the budget. The maximum budget impact above the 5% is noted to the left.

Differences are due to rounding

Resource Requirements

It is forecasted that the equivalent of approximately 48 new G&A resources and 4 new Capital resources will be required to support the rapid pace of transformation



Note: Capital resources have a minimal G&A impact. Those for IT are also contractor conversions.

Consulting Request

- Consultants and legal support are utilized for specialized skills, where deemed to be more cost effective, or to supplement internal resources for work that is not anticipated to be required long-term.
- Consulting requests for 2024 include the following $4.4 million in support of strategic initiatives:
  - Forecasting and analytics support ($0.3 million)
  - Commercial support in anticipation of increased ancillary service procurement efforts ($0.4 million)
  - Market design consultation and facilitation ($1.2 million)
  - Policy and regulation implementation support, government relations and facilitation training ($0.4 million)
  - Reliability support, studies and MATL engineering and implementation ($1.5 million)
  - Recruitment support ($0.2 million)
  - Connection support - **offset by connection fee revenue** ($0.4 million)

Associated Budget Impacts (cont.)

- The complexity, pace and associated impacts related to the transformation are echoed broadly across Independent System Operators, as is the need for additional funding and resources to deliver on critical priorities.

The AESO's 2023 increase includes the impact of salary adjustments related to the release of salary restraint. This is a factor not impacting other ISOs.
Decrease in G&A from 2020 to 2021 for MISO, ISO-NE, PJM, ISO-NY, ERCOT, SPP and CAISO is due to CAD strengthening against USD.
* Only total expense available - backed out depreciation/interest/taxes using 2022 numbers given relative stability

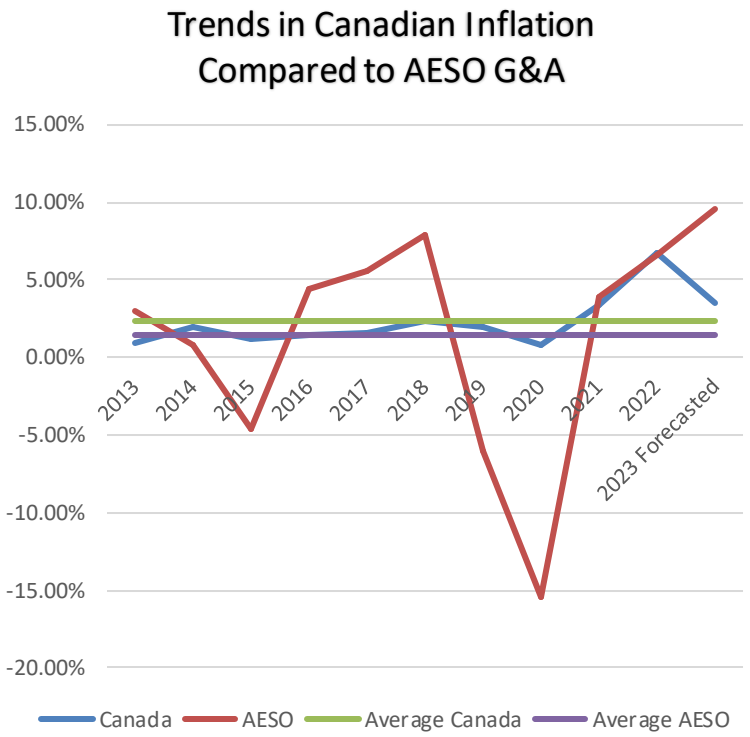
The Reporting Currency of IESO and AESO is CAD; all other ISOs presented are reported in USD.
The AESO's 2023 increase includes the impact of salary adjustments related to the release of salary restraint. This is a factor not impacting other ISOs.
* Only total expense available - backed out depreciation/interest/taxes using 2022 numbers given relative stability

We are not unique in our requests

Cost Management

- The chart to the right provides insight to the trends in total AESO budgeted general and administrative costs compared to trends in the Canadian Inflation rate.

- The AESO's growth in budget from 2012 to 2023 averages 1.5% compared to an average inflation rate of 2.3%.
  - This is despite the growth required to address the magnitude of the transformational impact to the electric system and the significant lift related to the Capacity Market implementation work in 2016-2018.



2023 Inflation rate based on Statistics Canada and Bank of Canada calculations and projections

Questions

2024 Preliminary Forecast & Budget Information

AESO Own Costs Summary

($ millions)	*2024 Budget	2023 BDP	2022 Actual	2021 Actual
General and Administrative	$ 129.1	$ 108.3	$ 97.9	$ 91.8
Borrowing Costs**	0.7	1.0	0.6	47.1
Amortization	25.3	23.3	24.1	28.1
Total Costs	**$ 155.1**	**$ 132.6**	**$ 122.7**	**$ 167.0**

Differences are due to rounding

*Preliminary

**Borrowing Costs in 2021 were significantly higher than budget and normal operations due to recalculation of historical loss factor charges.

Other Industry Costs

($ millions)	*2024 Budget	2023 BDP	2022 Actual	2021 Actual
AUC Fees - Transmission	$ 11.2	$ 10.2	$ 8.9	$ 9.7
AUC Fees - Energy Market	8.4	7.8	6.8	7.3
Regulatory Process Costs	2.2	4.3	6.5	2.3
WECC/NWPP/NERC** Costs	3.2	2.7	2.4	2.3
Total Costs	**$ 25.0**	**$ 25.0**	**$ 24.7**	**$ 21.6**

Differences are due to rounding

*Preliminary

**Western Electricity Coordinating Council / Northwest Power Pool / North American Reliability Corporation

Preliminary Energy Market Trading Charge

Trading Charge Components (cents per MWh)	*2024 Budget	2023 Actual	2022 Actual	2021 Actual	2020 Actual	2019 Actual	2018 Actual
AESO Costs	29.6	25.6	23.0	28.5	29.8	34.7	23.7
Energy Market Deficit (Surplus)**	(3.3)	(1.8)	(2.8)	1.2	6.6	3.0	(5.5)
Total AESO Component	26.3	23.8	20.2	29.7	36.4	37.7	18.2
AUC's Portion of Energy Market Administration Fee	6.9	6.3	6.3	5.4	6.2	4.8	3.2
Total	**33.2**	**30.1**	**26.5**	**35.1**	**42.6**	**42.5**	**21.4**

Differences are due to rounding

*Preliminary. This information does not include the Market Surveillance Administrator (MSA). The MSA cost recovery amount is approved by the Chair of the AUC in an independent budget process.

**Surplus to be refunded in 2024 resulting from variances in volumes vs forecast and costs allocated to Energy Market vs budgeted allocation in previous years.

The trading charge for 2024 is higher than 2023. This is the result of the increase in the 2024 G&A budget and related allocation to the Energy Market, slightly offset by the continuity of a refund of overcollection from previous years.

Preliminary Energy Market Trading Charge – Recoverable Costs

Trading Charge Components (Recoverable Costs - $ millions)	*2024 Budget	2023 As Posted
AESO Costs	$ 35.7	$ 31.9
Energy Market Deficit (Surplus)**	(4.0)	(2.3)
Total AESO Component	31.7	29.7
AUC's Portion of Energy Market Administration Fee	8.4	7.8
Total	**40.0**	**37.5**

Differences are due to rounding

*Preliminary. This information does not include the Market Surveillance Administrator (MSA). The MSA cost recovery amount is approved by the Chair of the AUC in an independent budget process.

**Surplus to be refunded in 2024 resulting from variances in volumes vs forecast and costs allocated to Energy Market vs budgeted allocation in previous years.

2024 Preliminary Capital Budget

Capital Budget Categories

- **Strategic Related Initiatives**
  - Strategic related initiatives that must be completed within the timeframe identified
- **Critical Initiatives**
  - Includes the most critical projects, which must be initiated in 2024, but there is flexibility on how they are paced
  - More internal AESO operational, business and/or security related
- **Other Capital Initiatives & Life Cycle Funding**
  - Other business projects and leasehold improvements that may have more flexibility in planning or delivery, so timing may have more flexibility
  - Includes hardware replacements (end of useful life) and recurring software upgrades that have required cyclical timing for updating / replacement
- **Special Capital**
  - Major projects that are over $10 million and have obtained specific AESO Board approval.
  - These tend to be nontypical capital projects that are not part of operational initiatives or life cycle programs

2024 Preliminary Capital Budget

($ millions)	2024 Budget*	2023 BDP	2022 Actual	2021 Actual
Strategic Related Initiatives	**7.8**	**13.8**	**8.6**	**5.8**
Enabling **Transformation**	4.8	6.1	0.5	0.3
EMS Sustainment	2.9	7.7	8.1	5.5
Critical Initiatives	**9.6**	**1.6**	**3.1**	**1.6**
Business System Modernization	0.4	0.2	1.4	0.8
Security & Compliance	1.3	1.4	1.7	0.8
Critical Systems Modernization & User Device Refresh	7.9	-	-	-
Other Capital Initiatives & Life Cycle Funding	**12.5**	**10.1**	**11.5**	**14.9**
Total General Capital	**29.9**	**25.6**	**23.2**	**22.4**
Special Capital**	**18.0**	**-**	**-**	**-**
	47.9	**25.6**	**23.2**	**22.4**

Difference are due to rounding
Due to categorization changes some 2023 budget items have shifted categories, historical values remain in previous category
**Preliminary*
**Downtown Office Relocation Project

Preliminary 2024 Capital Budget

- The AESO's 2024 preliminary general capital budget is $29.9 million, an increase of 16.8% or $4.3 million from $25.6 million for 2023.
  - Includes $7.8 million in strategic related initiatives for 2024, down from $13.8 million for 2023. This 43.5% decrease is mainly attributable to the EMS sustainment project nearing completion.
    - $4.8 million of the $7.8 million includes the following initiatives related to Enabling Transformation:
      - $0.9 million - Market Sustainability & Evolution (tariff changes, ancillary services, market design)
      - $1.8 million - Grid Reliability Operations (technology integration)
      - $2.2 million - Modern Data Management
    - $2.9 million relates to EMS Sustainment
    - Critical Initiative projects include an increase of $7.9 million for the critical systems modernization & user device refresh category.
      - Critical systems modernization relates to projects such as Automated Dispatch and Intra Alberta Control Room Messaging, *as* well as some critical large end of life / lifecycle replacements required, including the Oracle database platform and upgrades related to critical systems.
- The AESO's 2024 preliminary capital budget also includes special capital for the downtown relocation project, at an additional $18.0 million. This project has obtained specific AESO Board approval and coincides with the end of the AESO current downtown leases.

Difference are due to rounding

Preliminary Capital Budget Other & Life Cycle – Summary

- Life Cycle Funding ($2.6 million)
  - Base-load lifecycle investment in infrastructure and application platforms to provide reliable, secure, efficient and timely business operations. Provides a solid foundation to enable reliability today and transformation in the future.
- Operational Effectiveness and Management Services ($2.8 million)
  - Allow for advanced capabilities in AESO Operations by exploring and improving tools, products, markets, and processes to improve the safe and reliable operation of the grid to accommodate Renewable Resources, Distributed Energy Resources ("DERs"), Energy Storage Resources ("ESRs") and advancements in technology as well as new connection and transmission projects, in general.
- System Controller Effectiveness ($0.6 million) - Improving application functionality to support the System Controllers
- Digital Workplace Services ($1.1 million)
  - Modernize tools and automate routine processes to help AESO staff focus on more strategic work, while adapting to latest security threats
- System Enhancements program ($1.6 million)
  - Program to efficiently implement high priority enhancements and efficiencies into the AESO developed systems
- Business Technology Solutions ($2.7 million)
  - Electronic Records Management; Forecasting software; Governance, Risk and Compliance ("GRC"); Various other
- AOC Facilities ($1.2 million) – Refurbishments and security related projects

Difference are due to rounding

2024 Preliminary Forecast Transmission Operating Costs

Transmission Operating Costs
2024 Forecast Summary

($ millions)	2024 Forecast [1]	2023 Updated Forecast [2]	2023 Approved Forecast [3]	2022 Actual	2021 Actual
Wires Costs	1,937.2	1,899.5	1,918.3	1,933.8	1,713.6
Ancillary Services	363.9	527.1	303.0	535.3	381.2
Transmission Line Losses	178.3	327.9	183.8	332.7	201.8
TOTAL	**2,479.4**	**2,754.5**	**2,405.1**	**2,801.8**	**2,296.6**

Differences are due to rounding

[1] Forecast : Cost estimates for AESO Board approval for 2024
[2] Updated Forecast: Update of previous cost estimates for 2023
[3] Approved Forecast: 2023 AESO Budget Review Process (BRP) approved numbers for 2023

2024 Preliminary Forecast Wires Costs

Wires Costs Summary 2024 Forecast

($ millions)	2024 Forecast	2023 Updated Forecast	2023 Approved Forecast	2022 Actual	2021 Actual
Wires	1937.2	1,899.5	1,917.9	1,932.2	1,709.6
Invitation to Bid on Credit (IBOC)	-	-	-	-	2.0
Location Based Credit Standing Offer (LBC SO)	-	-	0.4	1.6	2.0
TOTAL	**1,937.2**	**1,899.5**	**1,918.3**	**1,933.8**	**1,713.6**

Differences are due to rounding

- Wires costs are the amounts paid to transmission facility owners (TFOs) in accordance with their Alberta Utilities Commission (AUC) approved tariffs and are not controllable costs of the AESO.
- IBOC and LBC SO programs were 20-year contracts that were initiated in 2001 and 2002 and served as incentives for generation to locate closer to major load centres.

Questions

2024 Forecast Pool Price

2024 Pool Price Forecast

- Natural gas prices are still a key input to Alberta power prices, but not the main contributor recently
- Scarcity prices coupled with higher operating costs causing an increase

2023	EDC Forecast RoY	Forward Market RoY*	2023 Updated Forecast	2023 BDP Forecast
Average Hourly Pool Price ($ /MWh)	166.69	194.67	158.90	94.34
AECO-C Natural Gas Price ($ /GJ)	2.69	2.53	2.72	4.97

2024	EDC Forecast	Forward Market**
Average Hourly Pool Price ($ /MWh)	83.42	87.16
AECO-C Natural Gas Price ($ /GJ)	3.05	3.23

RoY = remainder of year (July – December 2023)
* Source: NGX (June 30, 2023)
** Source: NGX (August 14, 2023)

2024 Load Outlook

Load Outlook

- As part of the BDP process, the AESO prepares a near term load outlook as context for the AESO's cost forecasts
- 2023-2024 load outlook considers:
  - Alberta real GDP, population, and employment predictions from the Conference Board of Canada (CBoC) June 2023 Outlook
  - Oilsands production from the July 2023 S&P Global forecast
  - The impact of the pandemic on load
  - Historic weather patterns (P50 weather)
  - Impact of the 2023 wildfires
  - Calendar effects
  - Time-series trend variables
  - Historical load profile to train/estimate the models
- Alberta Internal Load (AIL) is estimated to:
  - Increase by 0.2% from 2022 to 2023
  - Increase by 1.4% from 2023 to 2024

Load Outlook (cont.)

- In 2023 AIL increases slightly because:
  - Slower economic growth than previously projected
  - Wildfires reducing load in NW region
- In 2024 AIL is expected to increase due to:
  - Forecasted growth in the economy and oil sands production

(GWh)	2024 Forecast	2023 Updated Forecast	2023 BDP Forecast	2022 Actual	2021 Actual	2020 Actual
AIL Volumes	88,002	86,748	86,832	86,571	85,214	83,115
Per cent change (YoY)	1.4%	0.2%	0.3%*	1.6%	2.5%	

YoY = Year over Year
* 2023 BDP compared to 2022 actual

2024 Preliminary Forecast Ancillary Services Costs

2024 Forecast Ancillary Services Cost

($ millions)	2024 Forecast	2023 Updated Forecast	2023 Approved Forecast	2022 Actual	2021 Actual
Operating Reserves (OR) – Contracted and Conscripted	308.4	488.5	265.5	494.1	333.7
Load Shed Service (LSS), Fast Frequency Response (FFR), Voluntary Load Curtailment Program (VLCP) and Transferred Frequency Response (TFR)	42.1	26.3	26.6	30.7	31.4
Transmission Must-Run (TMR) – Contracted and Conscripted	3.7	3.7	4.3	3.3	8.1
Reliability Service	2.9	2.9	2.9	2.9	2.9
Black Start	2.8	2.6	2.7	2.5	2.4
Transmission Constraint Rebalancing (TCR)	4.0	3.1	1.0	1.8	2.7
TOTAL	**363.9**	**527.1**	**303.0**	**535.3**	**381.2**
Pool Price ($ /MWh)	83.42	158.90	94.34	162.46	101.93
Gas Price ($ /GJ)	3.05	2.72	4.97	5.07	3.41

2024 Preliminary Forecast Transmission Line Losses Costs

Transmission Line Loss Costs Summary

($ millions)	2024 Forecast	2023 Updated Forecast	2023 Approved Forecast	2022 Actual	2021 Actual
Cost ($ million)	178.3	327.9	183.8	332.7	201.8
Volume (GWh)	2,077	2,105	1,906	2,016	1,884
Pool Price ($ /MWh)	83.42	158.90	94.34	162.46	101.93

- Forecasted losses in 2023 are slightly higher than previous years due to:
  - Significant increase in exports (more net generation on the grid = more losses)
  - Congestions and constraints increase
  - Wildfires impact on the transmission grid
- Losses in 2024 are forecasted to be slightly lower than 2023
- Costs are higher in 2022 and 2023 due to high pool prices, with an expected decrease in 2024

Questions

Management Controls and Contingency

Management Controls and Contingency

Results of Forecast	Related Stakeholder Communication Process
If the forecast is below or in line with the previously approved budget amount	At management's discretion, any under-budget amounts will be used to advance future year business priorities or will be accumulated in the deferral accounts
If the forecast is above the previously approved budget amount and the amount is determined to be a 'manageable variance'	Management would request approval from the AESO Board and subsequently issue a stakeholder communication
If the forecast is above the previously approved budgeted amount and the amount is in excess of a 'manageable variance'	Management will review the new funding requirements with stakeholders, followed by a request for approval from the AESO Board

A '**manageable variance**' is a forecast to actual variance that would be:
Less than 10% of budgeted general and administrative expenditures
Less than 20% of budgeted capital

Next Steps and Session Close-Out

Next Steps

- **Oct. 20, 2023 |** Stakeholder feedback & stakeholder intent to present to the AESO Board
- **Oct. 24, 2023 |** Post stakeholder feedback received
- **Nov. 1, 2023 |** Stakeholder presentations for AESO Board due
- **Nov. 8, 2023**
  - Publish *AESO 2024 Business Plan and Budget Proposal*
  - Stakeholder feedback directional summary
- **Nov. 9, 2023 |** Post stakeholder presentations
- **Nov. 15, 2023 |** Stakeholders present to the AESO Board
- **January 2024**
  - Publish AESO Board Decision
  - Launch 2024 BDP engagement process survey

Request for feedback

- The AESO is seeking feedback from all interested stakeholders to:
  - Affirm that we have determined the appropriate areas of focus, priorities and pace, based on June stakeholder consultations. We will also determine all crucial issues have been included in our priorities to support the future of electricity in the province, and any associated impacts on capital or consulting dollars.
- We invite all interested stakeholders to provide their input on the questions set out in the Stakeholder Feedback tool: **Request for Feedback | Engagement Session October 5, 2023 on or before October 20, 2023**.

Session Close-Out

- We want to thank you for attending the 2024 Budget Development Process session and we would appreciate your feedback on the session
- Launch poll
  - The purpose of the session was clear
  - The information was presented in a clear manner
  - The presentation content was clear and informative
  - I found this session valuable

Questions

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *stakeholder.relations@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Appendix – Forecast Details & Methodologies

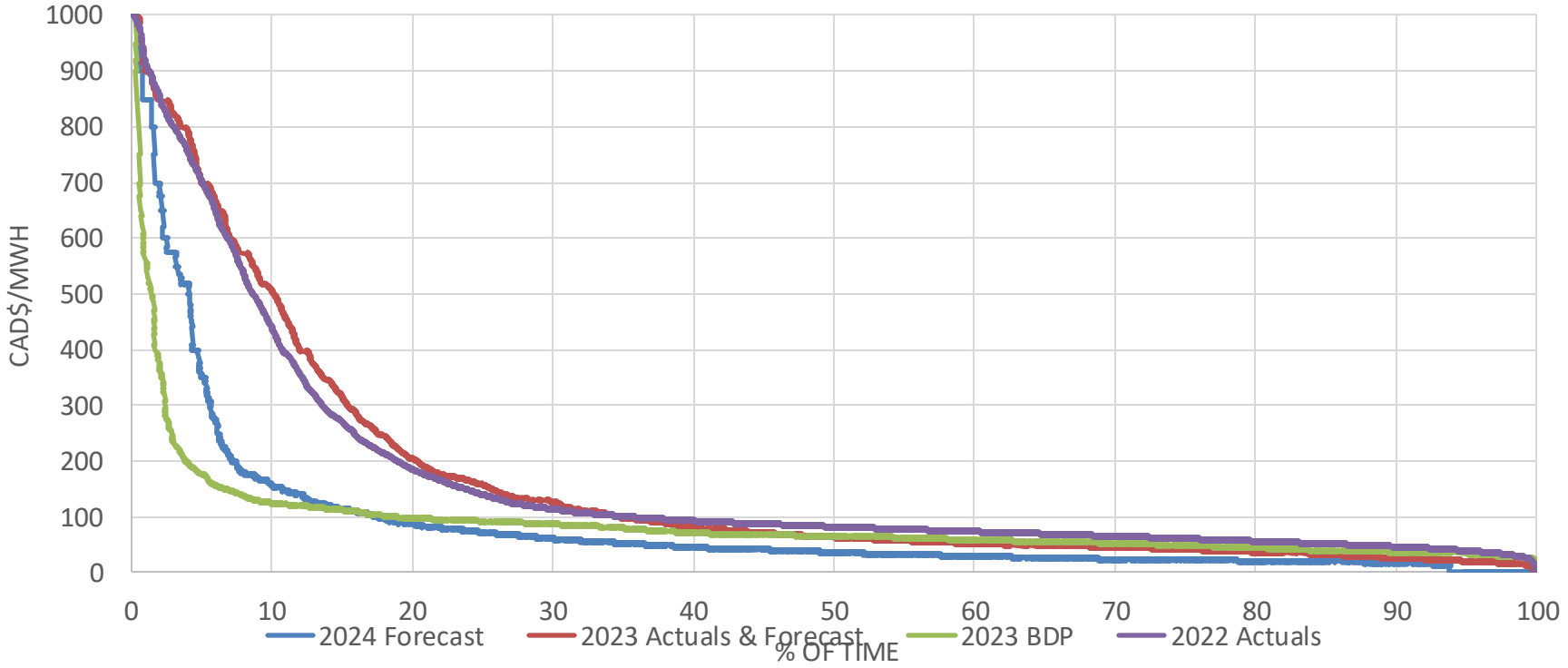
Pool Price Forecast 2023 and 2024

- EDC Associates are a 3rd party consultancy and is a commonly utilized industry information source.
- The hourly pool price is used to calculate the following costs:
  - Forecasted costs of ancillary services
  - Forecasted costs of transmission line losses
- In the 2023 BDP (2024 forecasted year) the following is applied:
  - The actuals for 2023 up until June 30th are used.
  - EDC price forecast for July to December of 2023.
  - EDC price forecast for 2024.
- EDC provides a sample of 100 seeds. To preserve variability, the seed closest to their average forecast is used in this analysis.

EDC Associates

- The assumptions used in the pool price forecast:
  - Considers Provincial and Federal energy policies
  - Natural gas prices
  - Increase in operating costs (carbon compliance, supply chain disruptions, inflation, and higher interest rates)
  - Extended outages and coal-to-gas conversions
  - Tight supply issues particularly when wind and solar output is low
  - Extreme weather conditions
- Factors driving pool price for 2023 and 2024 in EDC's forecast:
  - Significant renewables growth
  - HR Milner's front-end re-power was anticipated to be completed by the end of 2022, but a fire has since delayed it in to mid/late-2023
  - 900 MW Cascade combined-cycle and Capital Power's Genesee re-power are expected to commission through 2023 and 2024

Pool Price Duration Curves



Load Measurement Definitions

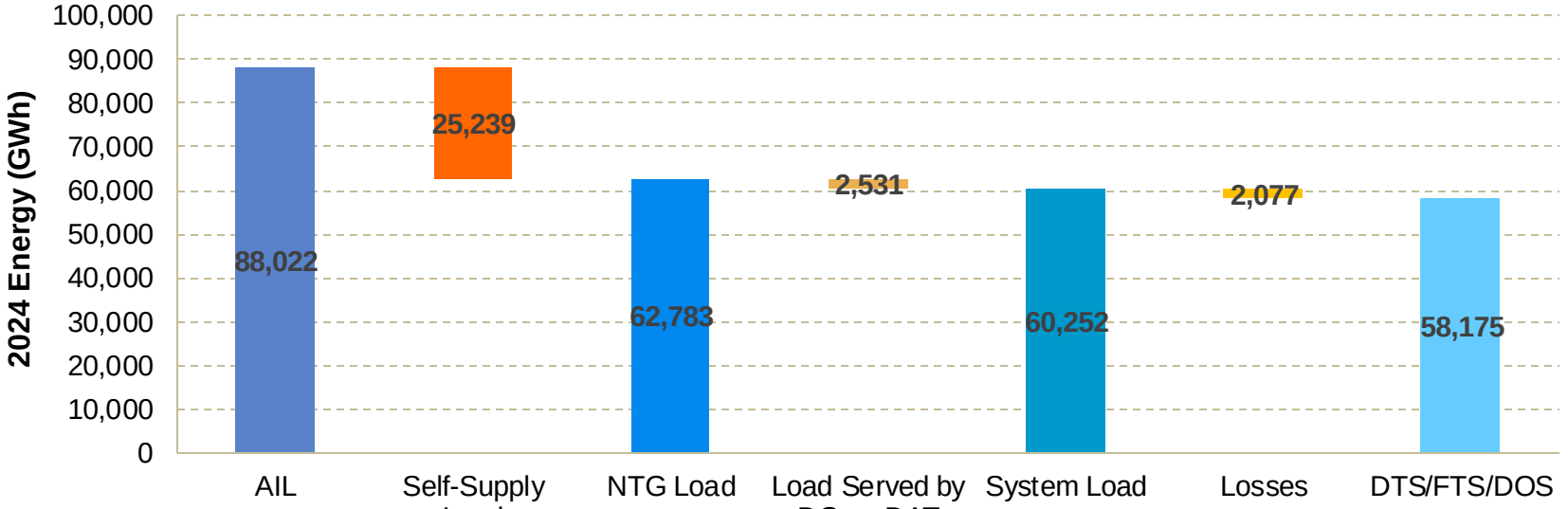
Alberta Internal Load (AIL): System load plus load served by on-site generating units, including those within an industrial system and the City of Medicine Hat

Input in the OR volumes forecast (active contingency reserves during high imports)

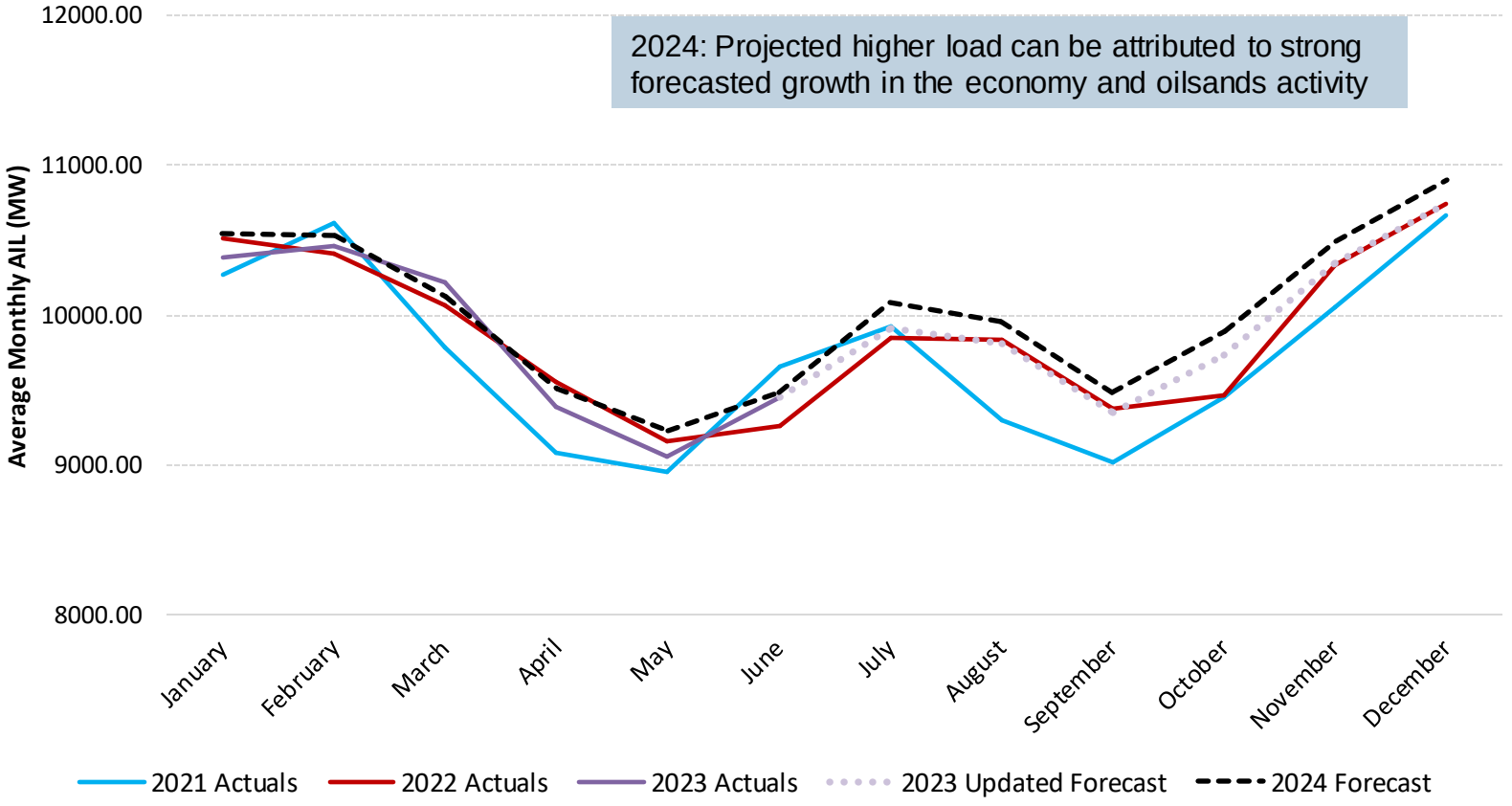
Net-to-grid (NTG) Load: System Load + Load Served by Distributed Generation (DGs) > 5 MW and Duplication Avoidance Tariff (DAT) Volumes

One of the primary inputs in the OR volumes forecast (active contingency reserves)

System Load: DTS/FTS/DOS Net Load + Transmission Line Losses Volumes ("Losses")



Load Outlook (cont.)



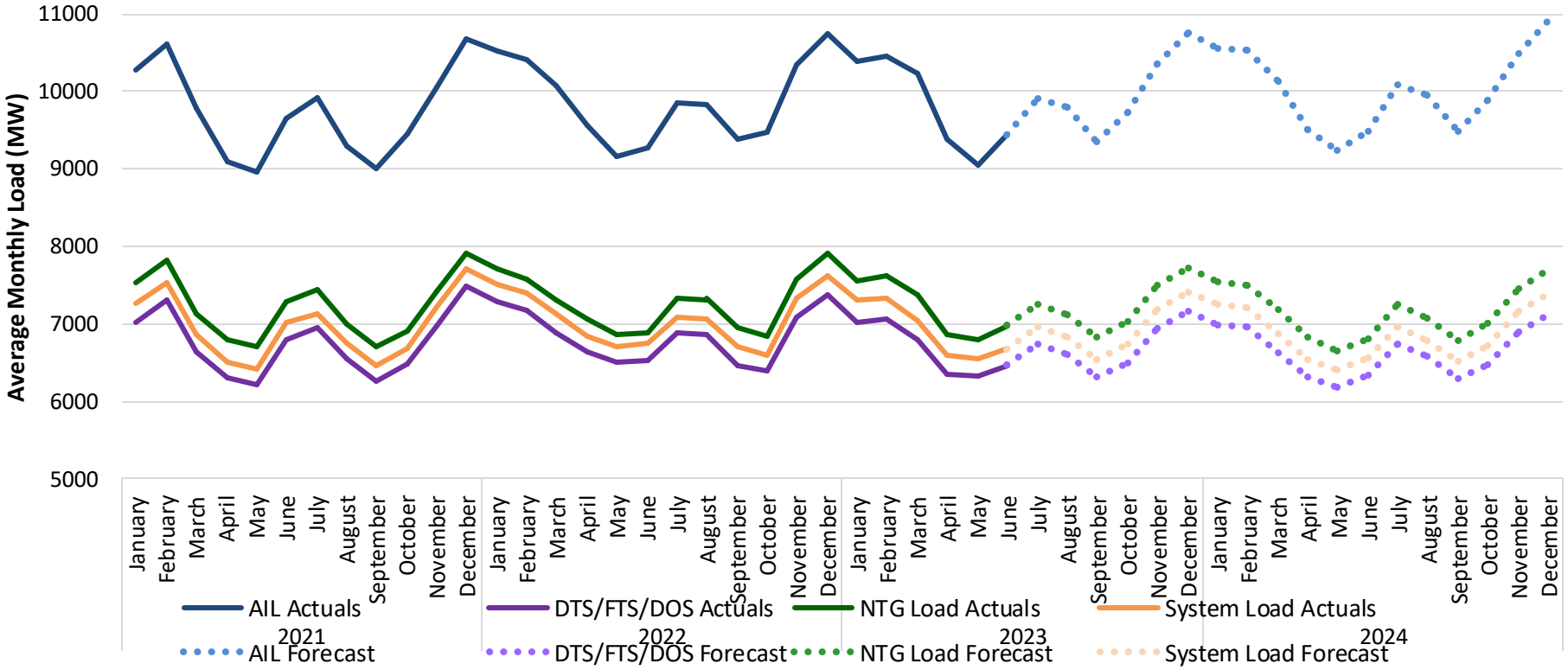
Load Outlook (cont.)

- In 2023, NTG load, System load and DTS,FTS & DOS are all down due to:
  - Increases in self supply load
- In 2024 AIL load is expected to increase primarily due to:
  - Higher oilsands production
  - Economic and employment growth

GWh Volume	2024 Forecast	2023 Updated Forecast	2022 Actual	2021 Actual	2020 Actual
AIL (% YoY growth rate)	88,002 (1.4%)	86,748 (0.2%)	86,571 (1.6%)	85,214 (2.5%)	83,115
NTG Load (% YoY growth rate)	62,783 (-0.7%)	63,110 (-0.8%)	63,739 (0.9%)	63,206 (1.4%)	62,337
System Load (% YoY growth rate)	60,252 (-0.7%)	60,671 (-1.9%)	61,850 (1.5%)	60,961 (1.4%)	60,112
DTS,FTS & DOS (% YoY growth rate)	58,175 (-0.7%)	58,566 (-2.2%)	59,872 (1.3%)	59,083 (1.6%)	58,164

Load Outlook (cont.)

AIL load measurements have a similar shape:



OR Forecast Methodology

- All OR (Operating Reserve) products are forecast:
  - Active Market: procurement of regulating, spinning, and supplemental reserves
  - Standby Market: procurement and activations of regulating, spinning, and supplemental reserves
- OR costs is the sum of hourly volumes multiplied by the hourly OR price:

$$cost = \sum_{\substack{hour,\\ product}} volume * OR\ price$$

- **Volumes**: set by Alberta Reliability Standard requirements:
  - The active regulating reserves volumes are set by the ARS and are consistent throughout the year
  - The active CR (Contingency Reserves) volumes are based on the 3&3* rule
  - The procured standby volumes are set by the ARS and are consistent throughout the year
  - Activation volumes are based on a probabilistic model based on historical data
- **OR price**: hourly price of operating reserves determined for each product type:
  - Based on the relationship between pool price levels and OR premiums (discounts)
  - Historical prices used range from April 2021 till June 2023

*3n3 = 3% NTG load + 3% NTG generation

Forecast Methodology: Line Losses

- Forecast transmission line losses costs is the sum of hourly volumes multiplied by hourly pool prices

$$cost = \sum_{hour} volume * pool\ price$$

- **Volumes**: derived from a statistical model that utilizes an economic outlook, weather (P50), and calendar effects
  - This model maps out the relationship between historic load drivers and losses, using historical losses to train/estimate the model
- **Pool price**: hourly pool price provided by EDC Associates Ltd