

The purpose of this section of the quarterly report is to provide stakeholders with an update on the Alberta Electric System Operator's (AESO) progress on the initiatives outlined in its [2022 Business Plan and Budget](#) (Business Plan). The reader of this report should reference the Business Plan published on the AESO's website for additional information to fully understand the various progress updates provided.

Reporting on Business Plan Initiatives

| Business Initiative | Update Q3 2022 | Next Steps |
|---|---|--|
| <i>Market Sustainability and Evolution – Business Initiative</i> | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> In progress Merged Market Sustainability & Evolution I & II and Operating Reserve (OR) Market Competitiveness Enhancement from 2021 Budget Review Process (BRP) <p>Anticipated completion</p> <ul style="list-style-type: none"> 2022 (dependent on findings) Implementation will follow if determined to be required <p>Objective</p> <ul style="list-style-type: none"> To maintain the long-term sustainability and competitiveness of the energy-only market structure and to enable the integration of new technologies with a long-term view of potential market changes needed to facilitate continued resource adequacy and increased flexibility with an ever-increasing variable system <p>Interdependencies</p> <ul style="list-style-type: none"> Technology Integration | <p>Update</p> <p>The AESO held two stakeholder consultation sessions on Sept 13 and Sept 26, 2022, following the receipt of stakeholder comments on the Draft Energy Storage ISO Rule Amendments. Final Draft Energy Storage ISO Rule Amendments were published on Nov 22, 2022. Written comments from stakeholders are due on Dec 19, 2022</p> <p>OR Market Competitiveness Review: The AESO held a third stakeholder session on Sept 8, 2022, to share recommendations, considering stakeholder feedback received on the draft recommendations presented in session 2. The AESO also shared further information on design elements requiring further input from stakeholders</p> <p>Received stakeholder comments on proposed Mothball Rule Amendments Sept. 16, 2022. Progressed rule development process, considered stakeholder comments received on proposed Mothball Rule Amendments. Continued planning for internal processes and system changes implementation</p> | <p>Design, Implementation</p> <p>The AESO may conduct another stakeholder session in early 2023 on the energy storage rules, if necessary (subject to stakeholder feedback on if another session would be helpful). The AESO written responses on the Final Draft Energy Storage ISO Rule Amendments to be published Feb 2023. Application filed with the Commission in Q1, 2023. Planning for implementation of energy storage changes, including ALM, underway</p> <p>Final design consultation on OR market competitiveness review in Q1, 2023. Rule drafting to follow</p> <p>Publish AESO replies to stakeholder comments on proposed Mothball Rule Amendments in Q4, 2022. Progress rule development and continue planning for implementation</p> |

| Business Initiative | Update Q3 2022 | Next Steps |
|---|--|--|
| <i>Settlement Audit – Business Initiative</i> | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> In progress <p>Anticipated completion</p> <ul style="list-style-type: none"> 2022 Settlement Audits will become part of ongoing base business, performed regularly with the frequency to be determined <p>Objective</p> <ul style="list-style-type: none"> Perform an audit of the AESO's financial settlement processes <p>Interdependencies</p> <ul style="list-style-type: none"> No interdependencies | <p>Update</p> <p>Audit deferred to 2022 due to COVID-19 and other priorities</p> <p>In the replies to stakeholder comments from the Aug. 26, 2021, BRP Session 1, the AESO provided some additional information and a diagram that is a conceptual overview of the AESO's settlement operations and the related control framework that will be considered in the Settlement Audit</p> <p>Readiness complete and audit underway</p> <p>Auditors conducted six-month Settlement Audit testing over Q2 and Q3 (started Apr. 1, 2022)</p> | <p>Implementation</p> <p>Upon completion, share a post-audit report with stakeholders upon request, subject to non-disclosure agreement</p> <p>Preparation and completion of Settlement Audit report in Q4 2022</p> |
| <i>Red Tape Reduction – Mandated, Top Priority Business Initiative</i> | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> Mandated in 2020 Anticipated completion March 31, 2023 Red tape will become part of ongoing base business <p>Objective</p> <ul style="list-style-type: none"> To be in compliance with the Government of Alberta's (GoA) Red Tape Reduction (RTR) Initiative, the AESO is committed to reducing regulatory requirements by one-third by March 31, 2023 <p>Interdependencies</p> <ul style="list-style-type: none"> Tariff Modernization Technology Integration | <p>Update</p> <p>A workplan was prepared in 2020 re: the sequence of documents to be reworked or removed in order to reduce regulatory requirements as per the GoA's schedule</p> <p>Implementation of the workplan has resulted in a reduction of requirements by 25 per cent at Q3 2022</p> | <p>Implementation</p> <p>Continue to advance the workplan with a reduction in requirements via AESO-initiated changes to non-authoritative documents in addition to changes that will need to be filed with the Alberta Utilities Commission (AUC) for approval</p> |
| <i>Optimizing the Grid – Top Priority Business Initiative</i> | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> In progress <p>Anticipated completion</p> <ul style="list-style-type: none"> 2023 Optimizing the Grid will continue to be part of ongoing base business | <p>Update</p> <p>Congestion analysis is integrated into system planning processes and used to identify the timing of the planned transmission projects and maximize use of existing infrastructure</p> <p>Cost saving for deferring system projects</p> | <p>Design, Implementation</p> <p>Next CETO re-affirmation study in Q4 2022</p> <p>Continue to use congestion analysis for the timing of PENV</p> <p>Developing dynamic line rating</p> |

| Business Initiative | Update Q3 2022 | Next Steps |
|---|--|---|
| <p>Objective</p> <ul style="list-style-type: none"> Optimize use of existing grid and minimize need or extend timing out for new infrastructure while ensuring reliability and market access <p>Interdependencies</p> <ul style="list-style-type: none"> Distribution Coordination Technology Integration Market Sustainability & Evolution | <p>such as Provos to Edgerton and Nilrem to Vermilion Transmission Development (PENV) two-year deferral; Central East Transfer-out Transmission Development (CETO) through using re-affirmation studies; and Chapel Rock-to-Pincher Creek Transmission Development (CRPC)</p> <p>The power flow control pilot project was successfully completed in Q3. The objective of this pilot project was to test the proof of concept for the power flow control device</p> | <p>(DLR) implementation plan</p> <p>Seek enhanced flexibility to further optimize the network by engaging in the Department of Energy's Bulk System Planning engagement</p> |

Tariff Modernization – Top Priority Business Initiative

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|---|---|--|
| <p>Initial proposal</p> <ul style="list-style-type: none"> In progress <p>Anticipated completion</p> <ul style="list-style-type: none"> 2023 Will be followed by the implementation of Tariff Modernization and any potential related Business Initiatives <p>Objective</p> <ul style="list-style-type: none"> Modernize ISO tariff price signals and simplify the ISO tariff to be more accessible, clear and agile <p>Interdependencies</p> <ul style="list-style-type: none"> Red Tape Reduction Distribution Coordination Technology Integration | <p>Update</p> <p>The Commission denied the AESO's Bulk and Regional Rate Design and Modernization Demand Opportunity Service (DOS) Rate Design Application in Proceeding 26911. Guidance and directions to the AESO were provided in the decision</p> <p>The AESO is advancing work on the Adjusted Metering Practice (AMP) Implementation Plan and proposed amendments to Section 502.10 of the ISO rules, Revenue Metering System Technical and Operating Requirements in accordance with the Post-Disposition Notice the AESO released on June 30, 2022</p> <p>The AESO is progressing a 2022 Tariff Modernization application which is intended to make administrative and non-structural changes to the ISO tariff. Draft changes and background on the changes was released for consultation. Based on feedback adjustments were made to the scope of the filing</p> | <p>Design, Implementation</p> <p>Reviewing the decision to Proceeding 26911 to assess and plan next steps</p> <p>Follow up on the next steps identified for AMP</p> <p>File the revised 2022 Tariff Modernization application</p> |
|---|---|--|

Distribution Coordination – Top Priority Business Initiative

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|---|--|--|
| <p>Initial proposal</p> <ul style="list-style-type: none"> In progress <p>Anticipated completion</p> <ul style="list-style-type: none"> 2024 Distribution Coordination will continue to be part of ongoing base business | <p>Update</p> <p>Launched Distributed Energy Resource (DER) locational static data portal (Supply Demand - Dashboard)</p> <p>Q1 2022 published DER Ride-through Performance Recommendations</p> | <p>Design, Implementation</p> <p>Work with DFOs to adopt frequency and voltage ride-through performance requirements into DFO interconnection documents</p> |
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| Business Initiative | Update Q3 2022 | Next Steps |
|--|---|---|
| <p>Objective</p> <ul style="list-style-type: none"> • Ensure coordination across the distribution and transmission system as the transformation evolves, focused on optimizing the transmission system while ensuring reliability and market access <p>Interdependencies</p> <ul style="list-style-type: none"> • Technology Integration • Optimizing the Grid • Tariff Modernization • General Tariff Application • Market Sustainability & Evolution | <p>(frequency and voltage ride-through performance requirements technical paper)</p> <p>Q1 2022 published AESO-DER-Integration-Paper-Effective-Grounding</p> <p>Published and implementing the AESO's Decision-Making Framework for responding to distribution facility owner (DFO) system access service requests</p> <p>Published Anti-islanding and Screening and Study Guideline in Q3 2022</p> <p>Published DER Commissioning and Testing Recommendations in Q3 2022</p> | <p>Work with DFOs to understand engineering practices with respect to effective grounding</p> <p>Pursue connection process improvements for DFO reliability and capability projects</p> <p>Engage in policy/regulatory - related initiatives to share the AESO's principles and perspectives as they relate to mandate implications</p> <p>Remove unnecessary DER market access limitations; the AESO is proposing to reduce operating reserve minimum asset capability requirements, aligned with ongoing Operating Reserve Market Review engagement</p> |

Technology Integration – Top Priority Business Initiative

| Initial proposal | Update | Design, Implementation |
|--|--|---|
| <ul style="list-style-type: none"> • In progress <p>Anticipated completion</p> <ul style="list-style-type: none"> • 2024 • Technology Integration will continue to be part of ongoing base business <p>Objectives</p> <ul style="list-style-type: none"> • Enable timely planned integration of new technologies onto the grid and into our markets • Enable proactive awareness of future new technologies and the potential impacts to reliability, markets and tariffs <p>Interdependencies</p> <ul style="list-style-type: none"> • Tariff Modernization • Market Sustainability & Evolution • Optimizing the Grid • Distribution Coordination • Red Tape Reduction | <p>Update</p> <p>Published the AESO's first Technology Forward report focused on the electricity value chain and future implications to the Electricity Value Chain</p> <p>Engaged in the Ministry of Energy's Energy Storage policy development</p> <p>Posted Energy Storage (ES) proposed rule amendments May 9, 2022</p> <p>Carried out two stakeholder engagement sessions in September to provide details about AESO's approach for modification of ISO rules to integrate ES</p> <p>Issued a Request for Information (RFI) for Solutions to Mitigate the Instantaneous Impacts of Sudden Supply Loss in Q3,</p> | <p>Design, Implementation</p> <p>Implement any ES-related policy changes</p> <p>Publish supply technology research report</p> <p>Continue implementation for Adjustment for Load on the Margin (ALM)</p> <p>Progress <i>Distributed Energy Resources Roadmap</i>, including the remaining technical review areas</p> |

| Business Initiative | Update Q3 2022 | Next Steps |
|--|--|---|
| Grid Resiliency – Top Priority Business Initiative – New for 2022 | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> • New initiative for 2022 <p>Anticipated</p> <ul style="list-style-type: none"> • 2022/2023 <p>Objectives</p> <ul style="list-style-type: none"> • Enhance system frequency response • Ensure extreme event preparedness across gas/electric interdependencies • Identify additional reliability needs as supply transforms • Assess need for climate adaptation plans • Enhance cyber-security capabilities <p>Interdependencies</p> <ul style="list-style-type: none"> • Market Sustainability & Evolution • Technology Integration | <p>Update</p> <p>Improving system frequency response following a disturbance; implemented AGC blocking on specific generators; working with specific generators regarding plant level controller coordination; working with specific DERs to revise frequency ride-through settings</p> <p>Identify gas/electric interdependencies. The AESO and NGTL are operationally coordinated and have a risk matrix and protocols in place to deal with events</p> | <p>Design</p> <p>2022 will focus on these initiatives, by priority:</p> <ul style="list-style-type: none"> • Implement system frequency response improvements including rule changes if necessary • Assess future reliability needs to ensure resilience as grid transforms towards decarbonization, followed in 2023+ with any needed market-based approaches on how to deliver those requirements • Assess climate change implications on grid resilience |
| ARS Development & Monitoring – Business Initiative – New for 2022 | | |
| <p>Initial proposal</p> <ul style="list-style-type: none"> • New initiative for 2022 (Initiative added based on stakeholder feedback received during 2022 BRP consultation) <p>Anticipated completion</p> <ul style="list-style-type: none"> • 2023 • Will become part of ongoing base business <p>Objectives</p> <ul style="list-style-type: none"> • Review and enhance the development and compliance monitoring and audit processes for ARS requirements • Align the internal governance with the changes driven by the outcomes (processes, accountabilities) <p>Interdependencies</p> <ul style="list-style-type: none"> • Grid Resiliency • Technology Integration | <p>Update</p> <p>RoadMap</p> <p>Stakeholder feedback on the draft incorporated in the final version</p> <p>RoadMap Implementation</p> <ul style="list-style-type: none"> • Risk-based methodology drafted • Risk-based approach in development • Risk-based CMP in development • Reliability Standards Workshop hosted for CIP-012 • Advancing the planning for Nov stakeholder session • Internal governance considerations in development | <p>Design, Implementation</p> <p>2022 Workplan and Milestones</p> <ul style="list-style-type: none"> • Finalize the risk-based methodology and approach • Draft risk-based CMP • Work with stakeholders to finalize risk framework • Establish process to collaborate with stakeholders and keep them apprised of roadmap progress on a regular basis <p>Roadmap implementation and operationalization work will extend through 2023</p> |

Financial Update – As of September 30, 2022

Transmission Operating Costs (\$ million)

| | 2022 Actual | 2022 Forecast | 2021 Actual |
|---|----------------|------------------|----------------|
| Wires costs | 1,420.2 | 1,422.6 | 1,308.9 |
| Operating reserves | 333.1 | 107.2 | 258.8 |
| Transmission line losses | 218.7 | 97.7 | 147.0 |
| Other ancillary service costs | 35.3 | 30.6 | 38.9 |
| Total Transmission Operating Costs | 2,007.3 | 1,658.1 | 1,753.7 |

Numbers may not add due to rounding

Wires costs – Wires costs represent the amounts paid primarily to transmission facility owners (TFOs) in accordance with their Alberta Utilities Commission (AUC)-approved tariffs and are not controllable costs of the AESO.

Wires costs in 2022 are \$1,420.2 million, which is \$111.3 million or 8.5 per cent higher than the 2021 costs of \$1,308.9 million due to an increase in regulated rates charged by the TFOs for the current year.

Operating reserves – Operating reserves are generating capacity or load that is held in reserve and made available to the System Controller to manage the transmission system supply-demand balance in real time. Operating reserves are procured through an online, day-ahead exchange, where offer prices are indexed to the pool price. While the prices of operating reserves procured through the online exchange are indexed to the pool price, changes to the average pool price do not result in proportional changes to the operating reserve costs; the pool price for each hour has a significant impact on the operating reserve costs for that hour.

Operating reserve costs in 2022 are \$333.1 million, which is \$74.3 million or 28.7 per cent higher than the 2021 costs of \$258.8 million. The cost of operating reserves is impacted by actual volumes, hourly pool prices and operating reserve prices. The average hourly pool price is \$145 per megawatt hour (MWh) in 2022 compared to \$100 per MWh for the same period in 2021, representing an increase of 45.0 per cent. This increase in pool price is primarily due to an increase in natural gas prices. Operating reserve volumes financially settled in 2022 are 5,197 gigawatt hours (GWh) compared to 5,316 GWh in 2021, representing a 2.2 per cent decrease. The overall increase in operating reserve costs year over year is the result of the increase in the average hourly pool price, which has more than offset the impact of the decrease in volumes.

Transmission line losses – Transmission line losses represent the volume of energy that is lost as a result of electrical resistance on the transmission lines. Volumes associated with line losses are determined through the energy market settlement process as the difference between generation and import volumes, less consumption and export volumes.

The hourly volumes of line losses vary based on load and export levels, generation (baseload, peaking units and imports) available to serve load, weather conditions, and changes in the transmission topology. System maintenance schedules, unexpected failures, dispatch decisions on the Alberta Interconnected Electric System (AIES), and short-term system measures (such as demand response) may also affect the volume of losses. The value of line losses is calculated based on the hourly pool price.

The cost of transmission line losses in 2022 is \$218.7 million, which is \$71.7 million or 48.8 per cent higher than the 2021 cost of \$147.0 million due to the impact of a 45.0 per cent higher average pool price in 2022, as well as an increase in volumes. Line loss volumes financially settled in 2022 are 1,500 GWh compared to 1,373 GWh in 2021, representing a 9.3 per cent increase.

Other ancillary services costs – The AESO procures other ancillary services for the secure and reliable operation of the AIES. These services are procured through a competitive procurement process where possible, or in instances where such procurement processes may not be feasible, through bilateral negotiations.

| Other Ancillary Services Costs (\$ million) | | | |
|---|----------------|------------------|----------------|
| | 2022 Actual | 2022 Forecast | 2021 Actual |
| Load Shed Service for imports | 26.3 | 22.1 | 26.5 |
| Transmission must-run | | | |
| Contracted | 0.6 | - | - |
| Conscripted | 2.7 | 3.8 | 5.9 |
| Reliability services | 2.1 | 2.1 | 2.1 |
| Black Start | 1.9 | 1.9 | 1.8 |
| Transmission constraint rebalancing | 1.1 | 0.7 | 2.5 |
| Fast Frequency Response | 0.6 | - | - |
| Total Other Ancillary Services | 35.3 | 30.6 | 38.8 |

Numbers may not add due to rounding

Load Shed Service for imports (LSSi) is interruptible load that can be armed to trip, either automatically or manually, on the loss of the Alberta–British Columbia intertie to allow for increased import available transfer capability (ATC). LSSi costs are impacted by volume availability, contract prices and AIES requirements for arming and tripping. The 2022 costs for LSSi are \$26.3 million, which is consistent with the 2021 costs of \$26.5 million. Included in the 2022 LSSi costs are \$0.4 million of costs related to the Voluntary Load Curtailment Program, which was assumed by the AESO from the Power Pool of Alberta.

Transmission must-run (TMR) occurs when generation is required to mitigate the overloading of transmission lines associated with line outages, system conditions in real time or the loss of generation in an area. In circumstances when TMR services are required for an unforeseeable event and there is no contracted TMR, non-contracted generators may be dispatched to provide this service (referred to as conscripted TMR). The 2022 costs for Conscripted TMR are \$2.7 million, which is \$3.2 million or 54.2 per cent lower than the 2021 costs of \$5.9 million due to decreased unforeseen TMR events, as well as the commencement of a new TMR contract in July 2022, which will reduce the need for conscripted TMR services in the northwest region of Alberta.

Reliability services are procured for grid restoration balancing support in the event of an Alberta blackout and emergency energy in the event of supply shortfall.

Black start services are provided by generators that can restart their generation facility with no outside source of power. In the event of a system-wide blackout, black start services are used to re-energize the transmission system and provide start-up power to generators that cannot self-start. Black start providers are required in specific areas of the AIES to ensure the entire system has adequate start-up power.

Transmission constraint rebalancing costs are incurred when the transmission system is unable to deliver electricity from a generator to a given electricity-consuming area without contravening reliability requirements. When this occurs, a market participant downstream of a constraint may be dispatched for purposes of transmission constraint rebalancing under the Independent System Operator (ISO) Rules and would receive a transmission constraint rebalancing payment for energy provided for that purpose.

The 2022 costs for transmission constraint rebalancing are \$1.1 million, which is \$1.4 million or 56.0 per cent lower than the 2021 costs of \$2.5 million due to significant transmission constraint rebalancing events that occurred in January and February 2021.

| Other Industry Costs (\$ million) | | | |
|---|------------------------|------------------------|------------------------|
| | 2022 Actual | 2022 Budget | 2021 Actual |
| Alberta Utilities Commission (AUC) fee – Transmission | 6.3 | 7.7 | 7.2 |
| AUC fee – Energy Market | 4.9 | 5.9 | 5.3 |
| WECC/NWPP/NERC costs | 1.8 | 1.9 | 1.7 |
| Regulatory process costs | 5.1 | 2.6 | 1.5 |
| Total Other Industry Costs | 18.1 | 18.1 | 15.7 |

Numbers may not add due to rounding

Other industry costs represent fees or costs paid based on regulatory requirements or membership fees for industry organizations, which are not under the direct control of the AESO. These costs relate to the annual administration fee for the AUC, the AESO's share of Western Electricity Coordinating Council (WECC), Northwest Power Pool (NWPP) and North American Electric Reliability Corporation (NERC) membership fees, regulatory process costs and non-compliance penalties. Regulatory process costs are associated with the AESO's involvement in an AUC proceeding to hear objections and complaints to ISO Rules or a regulatory application and costs incurred to respond to specific agency-related directions or recommendations that are beyond the routine operations of the AESO; this does not include application preparation costs.

Other industry costs in 2022 are \$18.1 million, which is \$2.4 million or 15.3 per cent higher than 2021 costs of \$15.7 million. The increase is attributable to increased regulatory process costs primarily related to the Bulk & Regional Tariff proceeding in 2022, which more than offset the decrease in AUC fees for 2022.

| General and Administrative Costs (\$ million) | | | |
|--|------------------------|------------------------|------------------------|
| | 2022 Actual | 2022 Budget | 2021 Actual |
| Staff costs | 55.0 | 53.9 | 50.6 |
| Contract services and consultants | 1.8 | 3.4 | 3.1 |
| Facilities | 3.4 | 3.7 | 3.1 |
| Administration | 2.5 | 3.8 | 2.2 |
| Computer services and maintenance | 7.7 | 8.1 | 7.8 |
| Telecommunications | 1.0 | 1.1 | 1.0 |
| Total General and Administrative Costs | 71.4 | 74.0 | 67.8 |

Numbers may not add due to rounding

In 2022, staff costs are \$55.0 million, which is \$4.4 million or 8.7 per cent higher than the 2021 costs of \$50.6 million. The increase year-over-year is attributable to the impact of market adjustments resulting from the Government of Alberta's lifting of the Salary Restraint Regulation in July 2022, as well as the timing of vacation accruals.

In 2022, contract services and consultants are \$1.8 million, which is \$1.3 million or 41.9 per cent lower than the 2021 costs of \$3.1 million. The decrease is due to the timing of and changes to activities and initiatives requiring external legal and consulting services.

| Amortization and Depreciation and Borrowing Costs (\$ million) | | | |
|---|------------------------|------------------------|------------------------|
| | 2022 Actual | 2022 Budget | 2021 Actual |
| Amortization of right-of-use assets, intangible assets and depreciation of property, plant and equipment | 18.4 | 19.1 | 21.3 |
| Borrowing costs | 0.7 | 1.9 | 45.5 |

In 2022, amortization of intangible assets and depreciation of right-of-use assets and property, plant and equipment (PP&E) collectively total \$18.4 million, which is \$2.9 million or 13.6 per cent lower than the 2021 amortization of \$21.3 million. The decrease is primarily due to the change to the asset base being amortized and depreciated year-over-year.

Borrowing costs in 2022 are \$0.7 million, which is \$44.8 million or 98.5 per cent lower than the 2021 costs of \$45.5 million. The decrease is primarily due to the 2021 interest expense of \$44.5 million related to the Module C line losses resettlement, for which offsetting interest income was recorded. Excluding this, interest costs of \$0.7 million in 2022 are \$0.3 million or 30.0 per cent lower than the 2021 costs of \$1.0 million due to reduced borrowing requirements to support operations in 2022.

Capital Expenditure Update – As of September 30, 2022

| Capital Program (\$ million) | | | | | | | |
|---|------------------------|----------------------|-----------------------|-------------|-------------------|-----------------|--------------------------------------|
| | Total Project Approved | Prior Year(s) Actual | Spent in 2022 to-date | ETC in 2022 | ETC Future Yr.(s) | Total Cost Est. | Variance Approved to Total Cost Est. |
| Key Capital Initiatives | | | | | | | |
| Business System Modernization | 1.9 | 0.6 | 1.1 | 0.2 | - | 1.9 | 0.1 |
| Cyber Security and Critical Infrastructure Protection (CIP) | 1.5 | 0.0 | 1.0 | 0.5 | - | 1.5 | 0.0 |
| Energy Management System (EMS) Sustainment | 14.6 | 1.2 | 6.7 | 1.3 | 4.0 | 13.2 | 1.3 |
| Market Sustainment & Evolution | 2.4 | - | 0.0 | 0.1 | 1.2 | 1.3 | 1.0 |
| Optimizing the Grid | 1.6 | 0.2 | 0.1 | - | 1.1 | 1.4 | 0.1 |
| Technology Integration | 0.3 | 0.0 | 0.2 | 0.1 | 0.1 | 0.3 | 0.0 |
| Other Capital Initiatives | 13.8 | 2.4 | 5.2 | 2.3 | 0.3 | 10.2 | 3.5 |
| Life Cycle Funding | 6.0 | 1.5 | 3.6 | 0.9 | - | 6.0 | 0.0 |
| General / Total Capital | 42.0 | 6.0 | 17.9 | 5.4 | 6.6 | 35.9 | 6.1 |

Numbers may not add due to rounding

| General Capital Program (\$ million) | |
|--------------------------------------|-------------|
| Spent to September 30, 2022 | 17.9 |
| General Capital Approved | 25.3 |
| Remaining Budget | 7.4 |

Appendix I - Notes

The following tables provide information on the AESO's capital for 2022.

These are the most critical capital projects over the planning period that the AESO believes must be completed within the identified timeframe.

| Key Capital Initiatives | | |
|---|--------------------|---|
| Business System Modernization | Description | Includes providing a single, secure, standardized user experience for external stakeholders exchanging data with various departments across the AESO. This includes sharing data & information, receiving data and information with market participants, government agencies and the public |
| | 2022 Plan | Continued implementation and expansion of an external-facing portal to provide a single platform to exchange data for ARS External Compliance Monitoring (ECM), FOIP requests and distributed energy resource (DER) static data from DFOs. Initiate other opportunities for data exchange with external market participants |
| Cyber Security and Critical Infrastructure Protection (CIP) | Description | Build on the existing cyber security foundation to protect the AESO from ever-expanding cyber threats. Deliver improvements in the way that cyber security threats and vulnerabilities are identified, providing better visibility of security events, improved responses and coordinated recovery |
| | 2022 Plan | Implementation of various cyber security and CIP-related projects |
| EMS Sustainment | Description | The EMS is used by System Controllers in grid operations to monitor, control and optimize the performance of the power system. Upgrades relating to the sustainment and optimization requirements of the EMS evergreen strategy include vendor software upgrades and improved analysis and reporting capabilities |
| | 2022 Plan | Continue the capital investment via the Grid Reliability Support program to sustain and enhance the EMS in order to support renewables integration and maintain the reliable operation of the Alberta grid and market Deliver a sustainable long-term EMS required to monitor and control the grid at the lowest possible cost, while generating maximum value from the investment |
| Market Sustainability and Evolution | Description | Implement system changes required to maintain the long-term sustainability and competitiveness of the energy-only market structure |
| | 2022 Plan | Includes the system changes required to implement the Adjustment for Load on the Margin (ALM) |
| Technology Integration | Description | Related capital to help ensure coordination across the distribution and transmission system as the transformation evolves, focused on optimizing the transmission system while ensuring reliability and market access |
| | 2022 Plan | Includes projects related to energy storage long-term solution implementation and DER integration |
| Key Initiatives | 2022 Budget | \$11.2 million |