REVIEW OF THE COST STATUS OF MAJOR TRANSMISSION PROJECTS IN ALBERTA

From The Transmission Facilities Cost Monitoring Committee

DECEMBER 2015 REPORT
Industry Abbreviations Commonly Found In This Report

Alberta Electric System Operator ............... (AESO)
Alberta PowerLine Ltd. ......................... (APL)
Alberta Utilities Commission ...................... (AUC)
Allowance for Funds Used During Construction .................. (AFUDC)
AltaLink Management Ltd. ...................... (AltaLink)
ATCO Electric Ltd. ................................. (ATCO)
Critical Transmission Infrastructure ............... (CTI)
Direct Assign Capital Deferral Account .......... (DACDA)
Distribution Facility Owner ....................... (DFO)
ENMAX Power Corp. .............................. (ENMAX)
EPCOR Distribution and Transmission Inc. ........ (EDTI)
EPCOR Utilities Inc. ............................... (EPCOR)
Facility Application ...................... (FA)
General Tariff Application ......................... (GTA)
High Voltage Direct Current ................. (HVDC)
In-Service Date ......................... (ISD)
Long-Term Plan .................. (LTP)
Needs Identification Document ............... (NID)
Proposal to Provide Service ............... (PPS)
Permit and Licence ....................... (P&L)
TransAlta Corp. .................. (TransAlta)
TransAlta Utilities .................. (TAU)
Transmission Facilities Cost Monitoring Committee .................. (TFCMC)
Transmission Facility Owner ................... (TFO)
Transportation Utility Corridor ................ (TUC)
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Message From the Chair

This is the tenth report from the Transmission Facilities Cost Monitoring Committee (TFCMC) to its stakeholders. The report provides a detailed and structured summary of the cost, scope and schedule information of the transmission projects monitored by the Committee on a monthly basis for the period of May 1, 2015 to October 31, 2015.

During this period the Committee examined the progression of 12 major transmission projects, with the total cost of these projects estimated at $8.177 billion. A listing of the 12 projects can be found in Section 1, while details for these projects are contained in Appendices B and C.

Section 2 of this report contains several key learnings and observations made by the Committee while monitoring the progress of the transmission projects.

The TFCMC is appreciative of the information provided by the Alberta Electric System Operator (AESO), Suncor and AltaLink as well as the time spent by their experts for the Committee's benefit.

Four transmission projects were completed during this period, namely the Christina Lake Area 240 kV Transmission Development; the Foothills Area Transmission Development – East Project; the East Calgary Transmission Project/ENMAX Shepard Energy Centre Connection, and the North South Transmission Reinforcement. The total costs of these four projects was just over $4.7 billion, which is about 16% higher than the sum of the Proposal to Provide Service (PPS) estimates for the four projects.

Through the TFCMC’s work in monitoring transmission project costs, it has and continues to identify opportunities to minimize costs. Since its inception, the Committee has made recommendations to take advantage of these opportunities. Section 3 provides an update on the status of all previous recommendations. The AESO is continuing its work in enhancing and strengthening Rule 9.1 in the areas of cost estimating, cost reporting and procurement.

There are no new recommendations contained in this edition of the TFCMC report.

During this reporting period, the Committee initiated two changes to its operating approach in its desire to be more efficient. After a trial, it decided to use the video-conferencing facilities available in Alberta Energy offices in Edmonton and Calgary for its monthly meetings. This arrangement should reduce the meeting attendance costs incurred by TFCMC committee members and support personnel.

Also, in response to a reduced project activity environment, the Committee agreed to a six-month trial of holding face-to-face meetings every second month, although project status reports will still be provided to TFCMC members each month. The Committee will decide at the end of the trial whether to continue with this approach.

In addition to issuing a limited quantity of hard copies of this semi-annual report, the report will be posted on the Utilities Consumer Advocate’s website for access by any interested party.

Thank you for your continuing support. The TFCMC’s next semi-annual report is scheduled for release in the fall of 2016. Your comments to improve the report will be much appreciated. Please email your comments to TFCMC@gov.ab.ca

Henry Yip
Chair, Transmission Facilities Cost Monitoring Committee

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1 This figure does not include costs for Project 1590 – Fort McMurray Area Transmission Bulk System Reinforcement (FMAC) – as this project falls under a competitive procurement process. If the cost of Project 838 is included, the 12 projects would be valued at just over $9.61 billion.
1. Transmission Projects Covered Under The TFCMC’s Mandate

The TFCMC has the authority to review records relating to the cost, scope and schedule of transmission facility projects expected to cost more than $100 million. These transmission projects include all lines and substations, which make up the transmission facilities required to transfer power between generators and loads.

Monitored Projects

The TFCMC monitored 12 projects valued at a total of just over $8.177 billion2 (based solely on the current estimated costs noted below and in Appendix B of this report).

The monitored projects, in alphabetical order, are:

- **CENTRAL EAST AREA TRANSMISSION DEVELOPMENT (CETD); PROJECT 811** – Transmission development in Wainwright, Lloydminster, Provost, Vegreville and Cold Lake. | **Current Estimated Cost:** $344 million |

- **COMPLETED CHRISTINA LAKE AREA 240 KV TRANSMISSION DEVELOPMENT (CHL); PROJECT 1101** – To establish transmission facilities to serve new oilsands developments and enhance reliability to existing oilsands operations. | **Current Estimated Cost:** $481 million3 |

- **COMPLETED EAST CALGARY TRANSMISSION PROJECT AND ENMAX SHEPARD ENERGY CENTRE CONNECTION (ECTP); PROJECT 719** – To serve growing demand for electricity in the Calgary and High River planning areas and to interconnect the ENMAX Shepard Energy Centre. | **Current Estimated Project Cost:** $164.26 million4 |

- **EDMONTON REGION 240 KV LINE UPGRADES (ERLU); PROJECT 786** – Upgrading 240 kV lines in the Edmonton area and adding one 240 kV phase shifter at Livock substation to gain more capacity out of the existing 240 kV network. | **Current Estimated Cost:** $178 million |

- **COMPLETED FOOTHILLS AREA TRANSMISSION DEVELOPMENT (FATD) – EAST PROJECT; PROJECT 1117** – To meet growing demand in South Calgary, High River and the surrounding area. | **Current Estimated Project Cost:** $465.23 million5 |

- **FORT MCMURRAY WEST AREA 500 KV TRANSMISSION BULK SYSTEM REINFORCEMENT (FMACW); PROJECT 1590** (formerly Project 838) – Construction of a West 500 kV transmission line from the Edmonton region to the Fort McMurray area. | **Current Estimated Cost:** $1.433 billion |

- **COMPLETED NORTH SOUTH TRANSMISSION REINFORCEMENT (HVDC); PROJECT 737** – Construction of two 500 kV HVDC transmission lines from the Edmonton area to the Calgary and south regions. | **Current Estimated Cost:** $3.6 billion6 |

- **NORTHWEST (OF) FORT MCMURRAY TRANSMISSION DEVELOPMENT (NW FMM); PROJECT 1180** – To provide service and connect future industrial customers in areas where there are no transmission facilities northwest of Fort McMurray. | **Current Estimated Cost:** $235.1 million |

- **RED DEER REGION TRANSMISSION DEVELOPMENT (RDTD); PROJECT 813** – 240/138 kV transmission system reinforcements in the Red Deer area. | **Current Estimated Cost:** $404.4 million |

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2 This figure does not include costs for Project 838 – Fort McMurray Area Transmission Bulk System Reinforcement (FMAC) – as this project falls under a competitive procurement process. If the cost of Project 1590 is included, the 12 projects would be valued at just over $9.61 billion.

3 While this project has been completed, the amount of $481 million does not reflect final project costs, which the AESO had not received at the time this report was put together.

4 While this project has been completed, the amount of $164.26 million does not reflect final project costs. Final costs are due on April 15, 2016.

5 While this project has been completed, the amount of $465.23 million does not reflect final project costs, which the AESO had not received at the time this report was put together.

6 While this project has been completed, the amount of $3.6 billion does not reflect final project costs, which the AESO had not received at the time this report was put together.
- **SOUTH AND WEST OF EDMONTON TRANSMISSION DEVELOPMENT (SWEATR); PROJECT 850** – Transmission system reinforcement to the 138 kV systems south and west of the City of Edmonton. [Current Estimated Cost: $306.6 million]

- **SOUTHERN ALBERTA TRANSMISSION REINFORCEMENT (SATR); PROJECT 787** – To accommodate wind generation in southern Alberta. [Current Estimated Cost: $1.866 billion]

- **THICKWOOD HILLS 240 KV TRANSMISSION DEVELOPMENT AND REACTIVE POWER REINFORCEMENT (THTD); PROJECT 1186** – To connect the Fort McMurray West 500 kV transmission project to the existing transmission system in the Thickwood Hills area, west of Fort McMurray. [Current Estimated Cost: $132.43 million]
2. TFCMC Observations To Date

As the Transmission Facilities Cost Monitoring Committee (TFCMC) moves forward with its mandate to review the cost of major transmission projects, it embarks on in-depth assessments of these undertakings (in the case of new projects) or focuses on a more detailed analysis of existing ones and relevant issues based on the monthly reports it receives.

This section describes some of the substantive observations made by the Committee during the six-month period covered by this report.

Dynamic Thermal Line Rating (DTLR) Design

Interested in exploring the possibilities of what Dynamic Thermal Line Ratings (DTLR) could mean in regards to keeping transmission infrastructure costs in check, the TFCMC received two DTLR presentations.

In geographic territories such as Alberta, ambient weather conditions vary greatly throughout the year. DTLR technology is designed to maximize the amount of power that can be transferred on a transmission line in real time. The expected benefit is more optimal use of the transmission grid, potentially reducing the need to build more transmission capacity.

Several organizations have reviewed and tested this type of technology. The Committee invited experts from the Alberta Electric System Operator (AESO) and Suncor to share their knowledge on DTLR and its potential benefits with the TFCMC.

Thermal line rating is the maximum amount of current a transmission line can transfer from a source to the load. It is based on:

- Size of the conductor;
- Operating temperature limitation of the conductor;
- Ground clearance between the conductor and the ground, and
- Ambient weather conditions such as temperature, wind and moisture levels.

The AESO began reviewing and testing DTLR in 2008. Their experience, based on installing DTLR equipment from Peigan to Pincher Creek as a test project with a tension-based measurement system, was:

- The technology used was not appropriate for the weather conditions in that area of Alberta (temperature and wind gust levels);
- DTLR requires extensive work for to implement in a transmission grid;
- The technology used was not plug-and-play;
- There were unexpectedly high occurrences of system “down ratings”, and
- Lack of redundancy caused numerous DTLR shut downs.

The AESO does not consider the use of DTLR to be an effective long-term solution for increasing the capacity of transmission lines in Alberta. However, the AESO continues to explore the DTLR option through:

- Partnering with the University of Calgary on a research initiative;
- Collaborating with industrial partners in Alberta and with Idaho National Labs;
- Using DTLR as a temporary measure such as for planned outages or for accommodating wind generation, and
- Monitoring activities in other jurisdictions.

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7 New projects added to the TFCMC’s purview receive an in-depth review in addition to being inserted into the Committee’s month-to-month examination process.

8 The TFCMC continues to receive monthly reports from the AESO, which originate from the TFOs, on all projects valued at $100 million and over.
Suncor, meanwhile, began testing the use of DTLR at their Poplar Creek/Firebag oilsands facility in 2013 in an effort to increase the amount of generation that could be exported to the grid without having to build additional transmission capacity. About half of Suncor’s total on-site generation capacity at Poplar Creek is available for export to the grid over a 4.5 km 240 kV transmission line owned by Suncor. Compared to the normal practice of using static capacity ratings, the use of DTLR typically allows Suncor to increase exports to the grid by about 10% in the spring and fall, but reduces allowed exports by about 10% during hot weather in the summer. However, since Suncor’s generators are less efficient during hot weather, the dynamic line ratings are a good fit with the pattern of Suncor’s available exports to the grid.

Suncor’s experience to date leads them to conclude:

- In Suncor’s situation, DTLR was a viable and cost-effective alternative to physical expansion or modification of their existing transmission line;
- Line re-rates based on DTLR can be achieved under existing AESO rules and processes;
- Safe and reliable DTLR technology is available ‘off-the-shelf’ and can be tested and deployed quickly in the field, and
- DTLR technology is robust, reliable and low maintenance.

Pipeline Mitigation Requirements

The Committee has noted an increasing occurrence of unexpected transmission project cost increases due to the need for pipeline mitigation work. AltaLink Management Ltd. (AltaLink) agreed to provide the TFCMC with a better understanding of the process it follows to manage this requirement.

The presence of an electromagnetic field near a metallic pipeline will cause corrosion to the pipes. The mitigation process is required in order to neutralize the electric currents induced on the pipelines by the electromagnetic field from the power line, thereby eliminating corrosion caused by the presence of electricity transmission systems in the vicinity of a pipeline.

Mitigation work is normally done to the fully rated capacity. However, an exception was made in regards to Project 629, the Alberta Industrial Heartland Bulk Transmission Development. In the Heartland project, AltaLink reached an agreement with the AESO to drop the power rating on that line for a specific time period so that the mitigation requirement was reduced9.

AltaLink has established a dedicated team to manage their AC pipeline mitigation requirements. The team’s role is to challenge pipeline owners to demonstrate that they have an economically and technically adequate solution. The team also validates costs. The team does not dictate solutions nor does it do the actual mitigation work.

The work of the AltaLink team has also resulted in the implementation of a program to standardize the management of pipeline mitigation. Over the last two years, this program has driven improvements both internally and among the pipeline owners on the execution of the projects.

Observations On New Projects

No new projects were added to the TFCMC’s roster of monitored projects during the period covered by this report.

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9 When AltaLink was developing the requirements for AC mitigation, it realized that the ultimate capacity on the Heartland transmission line would drive very high AC mitigation costs on pipelines in the area. AltaLink was able to get relief from the AESO for a 10-year period, where a lower capacity was used for the AC mitigation design requirements thereby deferring significant costs. The need for additional AC mitigation facilities will need to be reviewed in future years and will be a function of forecast flows on the Heartland transmission line.
Completed Projects

The AESO considers the following projects as closed and it will no longer report on them to the TFCMC. Where a project may have some work outstanding, such as pipeline mitigation, the AESO will advise the TFCMC as necessary. Projects are listed alphabetically.

**Christina Lake Area 240 kV Transmission Development (CHL) – Project 1101**

The Christina Lake Area project, which reinforces transmission facilities for oilsands developments and provides enhanced reliability to existing oil sands operations, has been virtually completed.

Project 1101 included work to reinforce the existing 138 kV network in its southern portion through the development of two new 240/138 kV substations, and reinforces the 240 kV network by closing the loop from the new Black Spruce 154S substation to the existing Heart Lake 898S substation.

While this project is considered closed and will no longer be reported on to the TFCMC, there is outstanding pipeline mitigation to be completed in early 2016 and the AESO will advise the TFCMC as necessary.

**East Calgary Transmission Project and ENMAX Shepard Energy Centre Connection (ECTP) – Project 719**

This project, which services growing demand for electricity in the Calgary and High River planning areas and interconnects the ENMAX Shepard Energy Centre, a new 850 MW combined-cycle generation facility, is now in service. The final in-service date (ISD) for this development was October 25, 2015.

Final project costs are expected to be provided to the AESO by the end of April 2016.

**Foothills Area Transmission Development (FATD) – East Project; Project 1117**

The Foothills Area Transmission Development, which meets growing demand in South Calgary, High River and the surrounding area, is another project that is now in service.

In addition to serving growing electricity demand in the aforementioned regions, Project 1117 will enable future generation facilities to reliably connect to the system. It will also facilitate wind generation development within adjacent areas and mitigate thermal overloads and voltage violations.

All Facility Applications (FAs) related to this project have been completed and the final ISD for this development was December 18, 2015.

The AESO is waiting for the Transmission Facility Owners (TFOs) to submit their Final Cost Report for review. If there are significant variances in the Final Cost Report as compared to the Authorized Budget, the AESO will advise the TFCMC.

**North South Transmission Reinforcement (HVDC); Project 737**

The construction of two 500 kV high-voltage direct current (HVDC) transmission lines from the Edmonton area to the Calgary and south regions, along with four converter stations, has been completed and was fully energized on December 18, 2015.

While each of the lines was built to transfer up to 1000 MW of power, both lines and their respective converter stations can be upgraded to 2000 MW at a future date.

The AESO expects to receive the Final Cost Report from the TFOs by June 2016. If there are significant variances in the Final Cost Report as compared to the Authorized Budget, the AESO will advise the TFCMC.
3. TFCMC Results to Date | Recommendations

This marks the tenth semi-annual report that the TFCMC has released. In the nine earlier editions, a total of 11 recommendations have been made – all with the goal of enhancing the monitoring and management of transmission costs in Alberta. Nine of the recommendations were directed to the Alberta Electric System Operator (AESO) and two were made to Alberta Energy.

Instead of recommendations, the TFCMC’s June 2013 report focused on a list of the Committee’s Top 5 transmission priorities. This list came about as Alberta Energy initiated a review of its transmission cost management policy and sought input from leaders in the electricity sector.

Recommendations to the Alberta Electric System Operator

The AESO, as noted in earlier editions of this semi-annual report, has been quite proactive in its response to recommendations made by the Committee, adopting a majority of the TFCMC’s recommendations. The TFCMC continues to be encouraged by the overall direction and response that the AESO has taken in regards to these recommendations.

Recommendations already implemented:

- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 1**: That the AESO improve future NID estimates by including fully loaded costs – allowance for funds used during construction (AFUDC), escalation, engineering and supervision, and owners’ costs.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 2**: That the AESO improve the estimates in the AESO Long-Term Transmission Plan by employing third-party cost estimates or cost estimate verification as well as from benchmark data being compiled by AESO.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 3**: That the AESO develop a transmission cost benchmarking competency and database.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 4**: That the AESO enhance compliance of the material procurement provisions of Rule 9.1.
- **JUNE 2011 REPORT, RECOMMENDATION NUMBER 6**: Initiate a review process on the current framework for cost accountability.
- **DECEMBER 2012 REPORT, RECOMMENDATION NUMBER 1**: The AESO, with assistance from TFCMC consultants, undertake a case study concerning the cost changes for Project 671 – from the NID through to the PPS and the authorized budget – and this should include lessons learned from the Yellowhead project and lessons about reporting under ISO Rule 9.1 (Compliance Monitoring).
- **DECEMBER 2013 REPORT, RECOMMENDATION NUMBER 1**: The Committee recommends that the AESO take the necessary steps to change the relevant rules so that it is clear that it will only review change orders for scope and in-service date changes.

The remaining AESO recommendations

The AESO has expanded the following recommendation into the broader context of the TFCMC’s earlier cost accountability recommendation. The AESO’s goal is still to coordinate with the Alberta Utilities Commission on the development of a reporting protocol with respect to the treatment of transmission project costs.

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10 To see the TFCMC’s Top 5 Transmission Priorities in their entirety, please consult the TFCMC’s June 2013 semi-annual report.
DECEMBER 2011 REPORT, RECOMMENDATION NUMBER 2: That for each Direct Assigned project, the AESO provide to the Alberta Utilities Commission a summary of the scope changes authorized by the AESO for that project including the following:

I. The AESO’s assessment on whether each scope change was needed;
II. A summary of the alternatives available to meet each scope change;
III. The AESO’s assessment on whether the alternative recommended by the TFO to address each needed scope change was the most appropriate alternative; and
IV. The AESO’s assessment on whether the cost of each scope change as estimated by the TFO was reasonable.

This information would form part of the AUC’s consideration, under section 25(4) of the Transmission Regulation, in determining the TFO’s prudence in managing the cost of the Direct Assigned project.

The AESO considers the following recommendation closed:

JUNE 2012 REPORT, RECOMMENDATION NUMBER 1: That for each Direct Assigned Capital project estimated to cost in excess of $100 million at the Needs Identification Document stage, the AESO will publish a cost benchmarking report at the time the Transmission Facility Owner files its Facility Application with the Alberta Utilities Commission for approval. To the extent that there are significant project cost changes between the Proposal to Provide Service stage and the TFO’s application before the AUC for rate base approval, the AESO will update and publish its cost benchmark report.

The AESO notes that the AUC has not expressed any interest in receiving or using such a report. The AESO has established a protocol with the AUC for transfer of cost information when projects exceed the cost estimate threshold. The cost information includes reports gathered under AESO Rule 9.1 and if pertinent, AESO benchmarking analysis.

Further, the AESO has made the cost benchmarking report available to the public. Therefore any interested party may create their own benchmarking report, for example, if they are intervening in a TFO proceeding. The AESO processes for cost estimate reviews also include a benchmarking analysis. These processes have been shared with the AUC and the TFCMC.

Cost Accountability Recommendation:
Status of ISO Rule 9.1 – Transition to Rule 504 Series

ISO Rule 504.5 (Service Proposals and Cost Estimating – Section 504.5) is replacing ISO Rules 9.1.2 (TFO Obligations to Provide Estimates and Proposals, and 9.1.3.6 Final Cost Report).

Between May 5, 2015, and May 20, 2015, the AESO consulted with stakeholders on the proposed new Section 504.5, together with associated new and amended definitions proposed for inclusion in the AESO Consolidated Authoritative Documents Glossary.

Following extensive revisions based on industry stakeholder feedback, the AESO held a second round of consultation on Section 504.5 in November 2015. In early 2016, the AESO will post stakeholder comments and AESO replies, as well as file the new Rule with the AUC. The AESO is expecting approval of the new rule in April of 2016. A supplementary Information Document will be available on the AESO’s website as soon as the rule is effective, which will elaborate on the application of the Association for the Advancement of Cost Engineering (“AACE”) cost estimating practices to transmission projects.

The AESO is currently planning activities to review and revise 9.1.3, Project Reporting by Designated TFOs, and 9.1.5, Project Procurement.

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11 According to Section 10 of Ministerial Order 64/2010, the mandate of the TFCMC is to review all Transmission Facility Projects forecast to cost in excess of $100 million. In a letter dated January 12, 2011, the Minister of Energy clarified that the starting point for the TFCMC when reviewing cost variances is the estimate in place when a project is approved by an Order in Council for Critical Transmission Infrastructure (CTI) projects, or, the estimate in place when the Needs Identification Document (NID) is approved by the Alberta Utilities Commission (AUC). The AESO, of course, is at liberty to file benchmarking cost reports with various stakeholders, including the AUC, in respect of projects below the $100-million threshold.
Transmission Cost Accountability Recommendation: Reporting and Oversight Protocol

In regards to the AUC’s Approved Cost Estimate (ACE) initiative – arising out of new transmission cost management legislation approved by the Government of Alberta in September 2014 – the AUC is currently working on a bulletin that is expected to be released in 2016 with details of the initiative.

Meanwhile, the Cost Oversight Management (COM) Pilot concluded at the end of June 2015 with a submission of the COM Pilot’s report to the COM Pilot subcommittee. The subcommittee, led by the AUC, reviewed and provided the COM Pilot’s report to Alberta Energy for further review and next steps. The decision on the COM is pending.

Recommendations to the Provincial Government

The TFCMC has directed two recommendations to the Alberta Energy through its semi-annual reports. One of the two, **Recommendation Number 5 in the June 2011 Report**, was considered premature by the Department given the implementation of the other recommendations from the same semi-annual report.

The TFCMC made a second recommendation for the Department to consider. This one, **Recommendation Number 1 in the December 2011 Report**, reads as follows:

- That the Minister of Energy modify the *Transmission Regulation* to require TFOs to seek AESO authorization of CTI pre-construction expenditures incurred prior to AUC approval of the Facility Application.

The Minister, in a letter to the Committee, advised that Alberta Energy would consider this recommendation as it reviews potential amendments to the Transmission Regulation, and Alberta Energy has considered this recommendation as part of its review. Amendments to the Transmission Regulation were made in September 2014. Numerous regulatory changes were put into effect on September 22, 2014, including the elimination of Critical Transmission Infrastructure (CTI) provisions for projects starting after September 22, 2014.

New Recommendations

The Committee has no additional recommendations at this point.

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12 The recommendation reads: That for non Critical Transmission Infrastructure (CTI) projects, the Department of Energy consider legislative changes to require a second approval stage by the AUC if cost estimates exceed a pre-determined limit. The TFCMC recognizes the need to avoid unnecessary project delays due to factors outside the control of the TFOs.
Appendix A: About The TFCMC

Origin And Composition Of The Transmission Facilities Cost Monitoring Committee

The Government of Alberta created the Transmission Facilities Cost Monitoring Committee (TFCMC) on July 31, 2010 through a Ministerial Order issued by the Honourable Ronald Liepert, then Minister of Energy, in order to ensure Albertans have the benefit of increased transparency on the cost of transmission projects.

According to the Ministerial Order, number 64/2010, the TFCMC can consist of up to 13 individuals as follows:

- the Alberta Association of Municipal Districts and Counties may appoint one member;
- the Alberta Chambers of Commerce may appoint one member;
- the Alberta Direct Connect Consumers Association may appoint one member;
- the Alberta Federation of Rural Electrification Associations may appoint one member;
- the Alberta Urban Municipalities Association may appoint one member;
- the Consumers’ Coalition of Alberta may appoint one member;
- the Canadian Federation of Independent Business may appoint one member;
- the Industrial Power Consumers Association of Alberta may appoint one member;
- the Independent Power Producers Society of Alberta may appoint one member;
- the Minister may also appoint up to two independent members with technical, regulatory, transmission facility development or other experience that, in the opinion of the Minister, will benefit the Committee;
- the Independent System Operator (“Alberta Electric System Operator”) shall appoint one member; and
- the Office of the Utilities Consumer Advocate shall appoint one member.

The TFCMC’s Mandate

The TFCMC’s mandate is to review records that relate to the cost, scope, schedule and variances of Alberta transmission facility projects forecast to cost in excess of $100 million. This may include more than one transmission facility, if it is a part of a contiguous transmission facility project. The Alberta Electric System Operator (AESO), a not-for-profit entity that is responsible for the safe, reliable and economic planning and operation of Alberta’s transmission system (also known as the Alberta Interconnected Electric System), determines which transmission facilities are part of a transmission facility project.

In a letter dated January 12, 2011, the Minister of Energy clarified that the starting point for the TFCMC – when reviewing cost variances – is the estimate in place when a project is approved by an Order in Council for Critical Transmission Infrastructure (CTI) projects, or, the estimate in place when the Needs Identification Document (NID) is approved by the Alberta Utilities Commission (AUC). The TFCMC, therefore, does not review any of the projects from an initial prudence, need, technology choice or staging perspective.

The TFCMC cannot delay or slow the development of transmission facility projects.

In late June 2011, the Minister of Energy provided his support of a request from the TFCMC to explore and develop innovative approaches to cost recovery for new transmission facilities in Alberta. The TFCMC was asked to undertake this initiative on a priority basis, together with the Transmission Facility Owners (TFOs), the AESO and Alberta Energy. The findings of this initiative were submitted in April 2012 to the Assistant Deputy Minister, Electricity, Alternative Energy and Carbon Capture and Storage, for consideration and action.
The TFCMC’s Members

The organizations and independent members named in the Ministerial Order forming the TFCMC represent a cross-section of industry, consumer and business groups with ties to Alberta’s electricity sector.

Organizations and independent members are listed alphabetically:

**Alberta Association of Municipal Districts and Counties (AAMDC)**
The AAMDC advocates on behalf of the province’s 69 municipal districts and counties. The association assists its members in achieving strong, effective local government. Their representative on the TFCMC is Dwight Oliver, a Past Director for AAMDC District 2.

**Alberta Chambers of Commerce (ACC)**
The ACC is a federation of 126 Chambers of Commerce, which in turn represents more than 23,000 businesses. The ACC ensures its members’ business interests are improved through the development and advocacy of policy to the provincial and federal governments. Their representative on the TFCMC is Ken Kobly, ACC President & CEO.

**Alberta Direct Connect Consumers Association (ADC)**
The ADC represents nine large industrial consumers who have facilities directly connected to the transmission system. The ADC members represent the key sectors of forestry, chemical and cement manufacturing. The aggregate electricity demand of the membership represents about 7% of the Alberta load. Their representative on the TFCMC is Colette Chekerda, ADC Executive Director.

**Alberta Electric System Operator (AESO)**
The AESO is a not-for-profit entity, is independent of any industry affiliations, and owns no transmission or market assets. It is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System. Their representative on the TFCMC is Kelly Yagelniski, AESO’s Director, Transmission Program Support.

**Alberta Federation of Rural Electrification Associations (AFREA)**
The AFREA is a not-for-profit cooperative association representing member Rural Electrification Associations (REAs) who provide rural power services throughout Alberta. It is committed to promoting the economic welfare and value of its cooperative members by providing strong representation to government and industry stakeholders with one voice. Their representative on the TFCMC is Dan Astner, AFREA President – 2014 Board of Directors.

**Alberta Urban Municipalities Association (AUMA)**
The AUMA represents urban municipalities including cities, towns, villages, summer villages and specialized municipalities, and more than 85% of Albertans. It represents and advocates for the interests of its members to the provincial and federal governments. Their representative on the TFCMC is Andre Chabot, AUMA Director, Cities Over 500,000.

**Consumers’ Coalition of Alberta (CCA)**
The CCA is comprised of the Consumers’ Association of Canada (Alberta Division) and the Alberta Council on Aging. The CCA, a coalition of two public interest groups, participates as a collective in public utility hearings to ensure rates, tolls and charges for residential customers are just and reasonable. Their representative on the TFCMC is Azad Merani, CCA Consultant.

**Independent Power Producers Society of Alberta (IPPSA)**
The IPPSA represents Alberta’s power producers. IPPSA is a forum for dialogue among Alberta’s power producers and a proponent of competition in Alberta’s electricity market. Their representative on the TFCMC is Evan Bahry, IPPSA’s Executive Director.
Industrial Power Consumers Association of Alberta (IPCAA)
The IPCAA is an organization representing large industrial customers, including such key sectors as oil & gas, forest products, petrochemicals and steel. Its mission is to take a leadership role in achieving a fair, open and efficient marketplace for electricity sales and service in Alberta. Their representative on the TFCMC is Vittoria Bellissimo, IPCAA's Executive Director.

Office of the Utilities Consumer Advocate (UCA)
The UCA is the voice of small consumers in Alberta's electricity and gas markets. The UCA advocates on behalf of Alberta's low-volume or smaller users of electricity and natural gas, those being residential, small business and farm utilities consumers, and helps them to make informed choices. As well, the UCA represents and protects their interests by participating in utility hearings and inquiries. The UCA representative on the TFCMC is Wayne Taylor.

TFCMC Independent Members:
Allen Snyder, of Winnipeg, brings a background and a wealth of knowledge in the electricity sector to the TFCMC. He held several key executive positions with Manitoba Hydro including Vice President of Transmission & Distribution, Power Supply and Corporate Services over the past 20 years. He also established a very successful Manitoba Hydro International with sales of software and services to more than 60 countries worldwide. Currently, he is Vice President of Energy Services for Wood West & Associates.

Henry Yip is a senior business executive with more than 30 years of broad business experience in Canada and the USA. He has held senior executive positions in large corporations and entrepreneurial business enterprises, and has advised governments in the area of city planning, strategy development, technology commercialization, international business collaboration and grant application approval. His current business interests include Executive Chair at Nirix Technology, and President of C’andcee Development. He is a past Chair of the Board at Edmonton Economic Development Corporation.

Former Members
Canadian Federation of Independent Business (CFIB)
The CFIB is an association representing small- and medium-sized businesses across Canada that takes direction from its more than 109,000 members, providing independent businesses a voice at all levels of government. The CFIB resigned in early 2014, stating it believes its involvement is no longer necessary due to the re-establishment of an independent regulatory review process and the repeal of Bill 50.
The primary purpose of the TFCMC meetings is to review reports provided by AESO on the cost status of transmission projects that are within the Committee’s purview. The first meeting took place in September 2010.

In the fall of 2015, the TFCMC moved to a videoconference model for its monthly meetings. Utilizing video-conferencing facilities made available by Alberta Energy in the cities of Edmonton and Calgary, Committee members can choose to attend in either location in order to allow them to minimize time and costs.

The TFCMC reviews the reasons for cost variances of all these projects. When appropriate, it retains external experts to prepare information requests (IRs) to the AESO and the Transmission Facility Owners (TFOs) for further illumination on the reasons for the variances.

Each calendar year, the TFCMC is required to provide at least two reports to the member organizations represented on the committee as well as at least one report to the Ministers of Energy and Service Alberta. The reports summarize the records it reviews and the status of the transmission facility projects.

The TFCMC strives for consensus in its decision-making process but a simple majority of those present at a meeting is the minimum threshold for agreement.

Independent member Henry Yip chairs the TFCMC. The TFCMC secretary is Laura Severs, engaged through Alberta Energy; she also serves as the Committee’s technical writer.

The TFCMC will also form subcommittees from time to time to facilitate the workings of the Committee. There were two active subcommittees in operation during the period of this report:

- A standing subcommittee to monitor and approve expenditures incurred by the members of the TFCMC during the course of discharging its mandate. Evan Bahry chairs this subcommittee.
- The Information Request (IR) subcommittee. This group develops appropriate questions for the TFOs in order to get clarifications on information previously provided by the TFOs on the cost status of the various transmission projects. This subcommittee is supported by external expert advisors when required. Allen Snyder chairs this subcommittee.

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13 Due to a reduced project activity environment, starting in 2016, the Committee will undertake a six-month trial of meetings every second month as opposed to meeting every month. The Committee will decide at the end of the trial whether to continue with this approach.
Appendix B: The Transmission Projects At A Glance

Facility Applications for each project are sorted by the forecast or actual in-service date (ISD). The Facility Application number column in each project’s initial chart is provided as an easy reference to its location on the accompanying map. Please note that due to updated information, some costs, dates and items may have changed from previous TFCMC reports and as such please use this latest material going forward.

1. CENTRAL EAST AREA TRANSMISSION DEVELOPMENT (CETD); PROJECT 811 – Transmission development in Wainwright, Lloydminster, Provost, Vegreville and Cold Lake.

THE PROJECT: To accommodate load and generation in central Alberta, additional substations and upgrades to existing facilities are required. The Alberta Electric System Operator (AESO) has outlined the need for the 138/144 kV augmentation and upgrade, with two stages of implementation. This Central East project serves the dual purpose of meeting the growing demand for electricity for pipelines moving oilsands production, and the connection of more than 500 MW of proposed gas-fired generation and wind farms in the eastern region of Central Alberta. Aging infrastructure, overloads, and low voltages in the large area east of Edmonton, from Cold Lake in the Northeast region to Hardisty, compels the substantial rebuild of the 138 kV and 144 kV systems, and the decommissioning of aging 69 kV and 72 kV lines.

THE COMPONENTS: Originally, there were two stages to this project, however, Stage 2 has been cancelled and the current Needs Identification Document (NID) is being amended to address the cancellations. Additionally, a new project is being developed to address system constraints.

The major components for Stage 1 of the project are: a new 144/25 kV Watt Lake substation; the conversion of three existing 72/25 kV substations to 144/25 kV; a new 240 kV switching station in the Cold Lake area, energized at 144 kV initially; a new double-circuit 144 kV line from the existing Mahihkan 837S to the new switching station; a new 240 kV double-circuit line (one-side strung) from the new switching station to the existing Bonnyville 700S and initially energized at 144 kV; a new single-circuit line from the existing Wainwright 51S to the existing Edgerton 899S; a new 144 kV capacitor bank at Vermilion 710S; the addition of one 138/72 kV transformer at the existing Wainwright 51S; rebuild six existing 138 kV or 144 kV lines to increase capacity, and restore ratings of existing 144 kV lines by mitigating line clearances and discontinuing the use of existing 72 kV equipment at existing substations or lines.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Clearance Mitigation</td>
<td>10</td>
<td>Restore ratings of existing 144 kV lines by mitigating line clearances</td>
<td>July 18, 2012</td>
</tr>
<tr>
<td>Heisler Area Upgrades</td>
<td>7</td>
<td>Convert Heisler 764S from 72 kV to 144 kV; addition of 144/72/25 kV transformer from Vermilion 710S; new 144 kV single-circuit line from Heisler 764S to existing 7L701 and discontinue use of existing 6L05</td>
<td>July 27, 2013</td>
</tr>
<tr>
<td>Vermilion 710S Substation Upgrade</td>
<td>6</td>
<td>Addition of 144 kV–25 kVAR capacitor bank; addition of a new 144/25 kV transformer; relocation of existing 144/72/25 kV transformer to Heisler 764S; discontinue use of existing 72 kV equipment at Vermilion 710S and discontinue use of 6L06 (Kitscoty 705S to Vermilion 710S)</td>
<td>September 15, 2013</td>
</tr>
<tr>
<td>FACILITY APPLICATION NAME</td>
<td>FACILITY APPLICATION NUMBER</td>
<td>FACILITY APPLICATION DESCRIPTION</td>
<td>FORECAST OR ACTUAL IN-SERVICE DATE</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>St. Paul Area Upgrades – Watt Lake, 7LA92</td>
<td>3</td>
<td>New 144/25 kV Watt Lake and new 144 kV line from Watt Lake to existing 7LA92</td>
<td>December 12, 2013</td>
</tr>
<tr>
<td>Cold Lake Area Reinforcements (Except Bonnyville to Bourque)</td>
<td>1</td>
<td>New 144 kV switching station (Bourque 970S); new 144 kV double-circuit line from existing Mahiikan 837S to new 144 kV switching station and rebuild existing 144 kV lines (7L87, 7L74 and 7L83)</td>
<td>January 30, 2014</td>
</tr>
<tr>
<td>St. Paul Area Upgrades – Whitby Lake</td>
<td>5</td>
<td>Rebuild St. Paul 707S from 72/25 kV to 144/25 kV substation; new 144 kV double-circuit line from St. Paul 707S to existing 7L70 creating an in/out configuration</td>
<td>June 25, 2014</td>
</tr>
<tr>
<td>Kitscoty Area Upgrades</td>
<td>8</td>
<td>Convert Kitscoty 705S from 72 kV to 144 kV; addition of 144/72/25 kV transformer from Heisler 764S, new 144 kV double-circuit line from Kitscoty 705S to existing 7L14</td>
<td>December 4, 2014</td>
</tr>
<tr>
<td>St. Paul Area Upgrades</td>
<td>4</td>
<td>St. Paul 707S and 7L139/7L70 in/out</td>
<td>August 1, 2016</td>
</tr>
<tr>
<td>Cold Lake Area Reinforcements – Bonnyville</td>
<td>2</td>
<td>New 240 kV double-circuit line (one-side strung) from new 144 kV switching station to existing Bonnyville 700S, initially energized at 144 kV</td>
<td>October 1, 2016</td>
</tr>
<tr>
<td>Line Clearance Mitigations</td>
<td>11,12</td>
<td>Restore ratings of existing 144 kV lines by mitigating line clearances</td>
<td>Cancelled</td>
</tr>
<tr>
<td>Wainwright Upgrades</td>
<td>13</td>
<td>25 km of single-circuit line from Wainwright 51S to 704L</td>
<td>Cancelled</td>
</tr>
</tbody>
</table>

THE TRANSMISSION FACILITY OWNER(S): AltaLink Management Ltd. (AltaLink) and ATCO Electric Ltd. (ATCO).
PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central East Area Transmission Development</td>
<td>$246 Million (2013$)</td>
<td>$344 Million (ISD$ with escalation for Stage 1)</td>
</tr>
</tbody>
</table>

**CURRENT STATUS:** As noted in the last TFCMC semi-annual report, two facilities remain under construction and are expected to be completed in the first quarter of 2017. Also, the AESO had previously identified 12 project components from the NID approval that are no longer needed or have been rendered inappropriate by changing needs in the Central East sub-region, and a NID amendment to address project cancellations was filed with the Alberta Utilities Commission (AUC) on December 23, 2014 (AUC Proceeding 3605). ATCO and TransCanada submitted a Statement of Intent to Participate in the proceeding and expressed concerns regarding the lack of attention being paid to system constraints in the region.

To address stakeholder concerns, the AESO requested the AUC to refrain from establishing further process steps until the AESO has addressed this issue through a subsequent submission. In view of the outcome of the 2015 AESO LTP, on January 29, 2016, the AESO requested AUC approval to withdraw the NID Amendment Cancellations. The AUC approved the withdrawal on February 9, 2016. The implementation of the needs identified in the 2015 LTP for the Central Region will address and remove current and future congestions in the region.

**PROJECT RISKS**

In regards to the NID Amendment Cancellations, ATCO and TransCanada submitted a Statement of Intent to participate in the proceeding.

Although the AESO has had conversations with both stakeholders to clarify their concerns and is working on a Need Cancellation validation, the NID amendment may end up in a hearing if the Need Cancellation validation recommendation is to proceed with the cancellations as filed.

There are no significant risks identified on the remaining facilities that are under construction.

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14 This updated information, which goes beyond the established timeframe of the December 2015 Report, was added during the production process of the report.
2. **COMPLETED CHRISTINA LAKE AREA 240 KV TRANSMISSION DEVELOPMENT (CHL); PROJECT 1101** – Reinforcing transmission facilities for oilsands developments and enhanced reliability to existing oilsands operations.

**THE PROJECT:** Oilsands development, including Steam Assisted Gravity Drainage (SAGD) and pump station facilities, in the Christina Lake area, located approximately 140 km south of the City of Fort McMurray and 100 km to the northeast of Lac La Biche, is driving this development. This project would ensure the area’s transmission network is reinforced to support current load and to ensure adequate capacity to connect customers in the near-and-long term. The Christina Lake plan will reinforce the existing 138 kV network in the southern part of the area through the development of two new 240/138 kV substations and will reinforce the 240 kV network by closing the loop from the new Black Spruce 154S substation to the existing Heart Lake 898S substation.

**THE COMPONENTS:** The AESO’s proposed transmission development plan for the area includes developing a 240 kV looped transmission system, including three new 240 kV substations, approximately 100 km to 150 km of new 240 kV transmission line, and modifications and expansion of existing transmission substations in the area. The project consists of a new 240 kV switching station and a new 240/138 kV substation.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Spruce substation and 240 kV lines</td>
<td>1</td>
<td>Black Spruce substation and interconnecting 240 kV lines</td>
<td>July 10, 2013</td>
</tr>
<tr>
<td>Pike substation and 240 kV lines</td>
<td>2</td>
<td>Pike substation and interconnecting 240 kV lines to Black Spruce</td>
<td>June 30, 2014</td>
</tr>
<tr>
<td>Heart Lake expansion</td>
<td>4</td>
<td>Expand Heart Lake substation for the termination of 9L930 in/out and the new 240 kV line to Ipiatik</td>
<td>June 30, 2015</td>
</tr>
<tr>
<td>Pike to Ipiatik to Heart Lake and 240 kV lines and modifications to Christina Lake 723S</td>
<td>3</td>
<td>New Ipiatik substation, new 240 kV line from Pike to Ipiatik to Heart Lake substation and modifications to Christina Lake 723S</td>
<td>October 22, 2015</td>
</tr>
</tbody>
</table>

**THE TRANSMISSION FACILITY OWNER(S):** AltaLink and ATCO.

**PROJECT COST:**

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christina Lake Area 240 kV Transmission Development</td>
<td>$390 Million (2013$)</td>
<td>$481 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

**CURRENT STATUS:** The project has been completed and will be closed pending receipt and review of final costs.

**PROJECT RISKS**

There are no significant risks to report at this time.

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15 The Christina Lake Area 240 kV Transmission Development and the Heart Lake expansion project identified in the AESO’s Long-Term Transmission Plan (filed June 2012) were combined into one NID.
Facility Application 3
New transmission line from Pike to Heart Lake through Ipiatik

Facility Application 3
Modifications to Christina Lake

Facility Application 2
New transmission line between Black Spruce and Pike

Facility Application 3
Build Ipiatik Substation

Facility Application 1
Build Black Spruce Substation

Facility Application 4
Modifications to ATCO Heart Lake

Project 1101
Christina Lake Area 240 kV Transmission System Development
3. **COMPLETED** EAST CALGARY 240 KV AND 138 KV TRANSMISSION SYSTEM UPGRADES AND THE ENMAX SHEPARD ENERGY CENTRE CONNECTION (ECTP); PROJECT 719 – To serve growing demand for electricity in the Calgary and High River planning areas and to interconnect the ENMAX Shepard Energy Centre.

**THE PROJECT:** The East Calgary Transmission Project and the ENMAX Shepard Energy Centre Connection is required to serve growing demand for electricity in the southeast Calgary area and enable new generation facilities to reliably connect to the system. The project supports the connection of the ENMAX Shepard Energy Centre Connection, a new 850 MW combined-cycle generation facility via a new substation – ENMAX No. 25.

**THE COMPONENTS:** Modifications to existing East Calgary 5S and ENMAX No. 2 substations (including the addition of one 240/138 kV – 240/320/400 MVA transformer); a new 138 kV transmission line between ENMAX No. 23 and ENMAX No. 2; a new 138 kV transmission line between Janet 74S and ENMAX No. 23; modifications to the existing 240 kV double-circuit towers (to maintain the connection between Janet 74S and East Calgary 5S); removal of line terminations at East Calgary 5S and Janet 74S; a new 240 kV double-circuit 240 kV transmission line (985L/1003L) from Janet 74S to ENMAX No. 25; the addition of a 240 kV switching station (ENMAX No. 25) for connection to the transmission system and the Shepard Energy Centre; addition of a second 240/138 kV – 240/320/400 MVA transformer at East Calgary 5S.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Calgary 240 kV and 138 kV transmission system upgrades and Shepard Energy Centre Connection (AltaLink Facility Application)</td>
<td>1</td>
<td>Rebuild East Calgary 5S substation; upgrade AltaLink-owned infrastructure to Janet 74S; build D/C 240 kV transmission line between Janet 74S and ENMAX No. 25 substations; replace existing transformer at East Calgary 5S</td>
<td>October 20, 2015</td>
</tr>
<tr>
<td>East Calgary 240 kV and 138 kV transmission system upgrades and Shepard Energy Centre Connection (ENMAX Facility Application)</td>
<td>2</td>
<td>Modifications to existing ENMAX No. 2 and No. 23 substations; addition of new ENMAX No. 25 substation; construct new 138 kV line between ENMAX No. 23 and Janet 74S substations</td>
<td>October 20, 2015</td>
</tr>
</tbody>
</table>

**THE TRANSMISSION FACILITY OWNER(S):** ENMAX Power Corp. (ENMAX) and AltaLink.

**PROJECT COST:**

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Calgary 240 kV and 138 kV Transmission System Upgrade and ENMAX Shepard Energy Centre Connection</td>
<td><em>$921 Million</em> (2013$) <em>entire FATD plan</em></td>
<td><em>$164.26 Million</em> (includes escalation and AFUDC)</td>
</tr>
</tbody>
</table>

*ECTP and Shepard Energy Centre PPS only
CURRENT STATUS: The final energization was completed on October 20, 2015. Final costs are due on April 15, 2016.

PROJECT RISKS

There are no risks to report at this time.

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The AESO’s Long-Term Transmission Plan identified the need for the Foothills Area Transmission Development. The East Calgary 240 kV and 138 kV transmission system upgrades are one of four components of the overall Foothills Area Transmission Development. The four components of the Foothills Area Transmission Development are:

a. East Calgary 240 kV and 138 kV transmission system upgrades and Shepard Energy Centre Connection;
b. Foothills Area Transmission Development – East Region;
c. Third 138 kV circuit from ENMAX No. 65 to existing ENMAX No. 54 and 41; and
d. Foothills Area Transmission Development – West Region.
4. **EDMONTON REGION 240 KV LINE UPGRADES (ERLU); PROJECT 786** – Upgrading 240 kV lines in the Edmonton area and adding one 240 kV phase shifter at the Livock substation to gain more capacity out of the existing 240 kV network.

**THE PROJECT:** More than 4,000 MW of baseload generation that serves as the main source of electricity for the majority of the province is situated near Wabamun Lake in the Edmonton region. This generation supports central and south Alberta loads, northwest regional loads, Edmonton-area loads and major industrial loads located in the Fort Saskatchewan area. There are major thermal overloads of transmission facilities throughout the Edmonton region. The 138 kV transmission paths from Wabamun to North Calder and East Edmonton to Nisku, and from East Edmonton to the Fort Saskatchewan area are weak during peak load conditions, and voltage violations occur in those two areas due to weak system support.

**THE COMPONENTS:** The 240 kV transmission system developments in the area include a rebuild of some sections of the existing transmission line, an increase in capacity of the lines by replacing conductors, the reconfiguration of the system, building new lines and the installation of a special protection scheme for multiple contingencies to ensure system reliability in the area. Additionally, a 240 kV phase-shifter transformer will be installed at Livock 939S in the Fort McMurray area.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AltaLink Keephills Substation addition</td>
<td>1</td>
<td>Additions at Keephills</td>
<td>July 31, 2010</td>
</tr>
<tr>
<td>AltaLink 1045L, 909L Restring</td>
<td>5</td>
<td>Restrung four km of 908L and 909L outside Sundance 310P substation (first four km of the lines); 908L is renumbered to 1045L</td>
<td>March 20, 2011</td>
</tr>
<tr>
<td>EPCOR Jasper, Petrolia</td>
<td>6</td>
<td>Upgrade bus work and protections</td>
<td>June 14, 2011</td>
</tr>
<tr>
<td>EPCOR 1044EL, 1045EL</td>
<td>3</td>
<td>Restrung approximately 24 km of existing 904L at Jasper 805S – in/out line section; renumber EPCOR’s portion of the line to 1044EL (going to Petrolia 816S) and 1045EL (going to Sundance 310P)</td>
<td>February 29, 2012</td>
</tr>
<tr>
<td>ATCO Phase Shifter</td>
<td>7</td>
<td>Add 600 MVA phase shifting transformer at Livock 939S</td>
<td>August 20, 2013</td>
</tr>
<tr>
<td>TransAlta 902L</td>
<td>8</td>
<td>Rebuild portion of 902L</td>
<td>November 12, 2014</td>
</tr>
<tr>
<td>AltaLink Rebuild 240 kV 904L (1043L) TransAlta 902L, Re-terminate 909L at Sundance</td>
<td>2 and 4</td>
<td>Delegate the work to AltaLink for re-termination of the existing 240 kV 909L at Sundance 310P (Ellerslie 89S to Sundance 310P); rebuild approximately 50 km of the existing 240 kV line 904L between Jackfish Lake west of Edmonton and Petrolia 816S; salvage the existing 240 kV structures, conductor and hardware; build a new section of approximately 12 km of 240 kV line utilizing double-circuit structures with one-side strung to connect Keephills 320P substation to the rebuild of 904L – renumbered to 1043L (Keephills 320P to Petrolia 816S)</td>
<td>July 31, 2017</td>
</tr>
</tbody>
</table>
THE TRANSMISSION FACILITY OWNER(S): AltaLink, EPCOR Distribution and Transmission Inc. (EDTI) and ATCO.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edmonton Region 240 kV Line Upgrades</td>
<td>$182 Million (2013$)</td>
<td>$178 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

CURRENT STATUS: All facilities, with the exception of 1043L, are in service.

Construction work is required for the completion of a small portion of the 1043L transmission line. This has been delayed due to land access issues. An in-service date (ISD) for the 1043L transmission line and re-termination of 909L cannot be determined at this time until land access issues are resolved.

A change proposal from TransAlta Utilities (TAU) extending the ISD has been approved and a change proposal from AltaLink to start work on identifying a possible new route around the Enoch First Nations’ land has been approved. The Permit and License (P&L) for both AltaLink and TAU has been extended to January 31, 2016. AltaLink submitted the requested NID Estimate for a possible new route on December 16, 2015; this estimate is currently under review.

PROJECT RISKS

The completion of 1043L is at risk of not being completed. Negotiations between the Enoch First Nations and TransAlta have recommenced. If negotiations fail, the line will need to be re-routed around the Enoch land. The current estimated ISD is 2018.
Review of the Cost Status of Major Transmission Projects in Alberta

Facility Application 2
AML 12km New 240kV for 1043L

Facility Application 5
AML 1045L, 909L Restring

Facility Application 6
EDMONTON

St. Albert

Stony Plain

Spruce Grove

Devon

Beaumont

Calmar

Leduc

19S

WABAMUN

868S KEEP HILLS MAKE-UP

657S Summerside

320P KEEPHILLS

866S SUNDAKE MAKE-UP

635S NEW ROSE VALLEY

89S ELLERSLIE

786_TFCMC_2015-10-05

cThomas 2015-10-05

Project Components
Completed / Not Completed

Project 786
Edmonton Region
240 kV Line Upgrades

Project 786 Components
Cities and Towns

Existing Substations

Existing 69 kV Transmission Line

Existing 138 kV Transmission Line

Existing 240 kV Transmission Line

Existing 500 kV Transmission Line
5. **COMPLETED** FOOTHILLS AREA TRANSMISSION DEVELOPMENT (FATD) – EAST PROJECT; PROJECT 1117 – To meet growing demand in South Calgary, High River and the surrounding area.

**THE PROJECT:** The FATD East development will ensure the transmission system will serve growing electricity demand in Calgary, High River, and the surrounding areas, and enable future generation facilities to reliably connect to the system. It will also facilitate wind generation development within adjacent areas and mitigate thermal overloads and voltage violations.

**THE COMPONENTS:** The project has both a 240 kV and 138 kV scope.

The 240 kV scope consists of building a new 240/138 kV substation designated Foothills 237S; adding a new 240 kV double-circuit line from the proposed Foothills 237S substation to ENMAX SS-65; a new 240 kV double-circuit line from the existing Langdon 102S to the existing Janet 74S; a new 240 kV double-circuit line from Langdon 102S to East Calgary 5S using a combination of existing lines; a 240 kV double-circuit line between the ENMAX SS-65 substation to the new ENMAX SS-25 substation; and the de-energization of sections of existing transmission lines.

The 138 kV scope consists of a new 138 kV single-circuit line from the proposed Foothills 237S to the existing Okotoks 678S; a new 138 kV single-circuit line from Foothills 237S to the existing High River 65S; a 138 kV single-circuit line from Okotoks 678S to Carseland 525S, and the de-energization of transmission lines and modifications to lines in the area.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
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<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Foothills Transmission Project</td>
<td>1</td>
<td>Construction of Foothills 235S 240/138 kV switching station, and construction of approximately 52 km of double-circuit 240 kV transmission line from Foothills 237S to ENMAX SS-65</td>
<td>May 25, 2015</td>
</tr>
<tr>
<td>Langdon to Janet Project</td>
<td>3, 4</td>
<td>Construction of approximately 18 km of double-circuit 240 kV transmission line from Langdon 102S to Janet 74S; expansion of Janet 74S substation; removal of terminations at Janet 74S resulting in two new circuit terminals at East Calgary 5S and Crossing 511S, and salvage of approximately six km of 240 kV transmission line from Janet 74S to ENMAX SS-25</td>
<td>June 1, 2015</td>
</tr>
<tr>
<td>ENMAX No. 25 substation 240 kV line additions and ENMAX No. 65 substation 240 kV line additions</td>
<td>2</td>
<td>Interconnection of two new AltaLink 240 kV transmission lines at ENMAX SS-25, and termination of three new AltaLink 240 kV transmission lines at ENMAX SS-65</td>
<td>December 18, 2015</td>
</tr>
<tr>
<td>Foothills 138 kV Project</td>
<td>5</td>
<td>Addition of two 240/138 kV transformers at Foothills 237S; construction of approximately 14 km of double-circuit 138 kV transmission line from Foothills 237S to High River 65S; rebuild of approximately seven km of existing transmission line to 678S, and salvage of approximately 30 km of existing line from Janet 74S to Okotoks 678S</td>
<td>December 18, 2015</td>
</tr>
</tbody>
</table>
THE TRANSMISSION FACILITY OWNER(S): AltaLink and ENMAX.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foothills Area Transmission Development – East Project</td>
<td>*$921 Million (2013$)</td>
<td>*$465.23 Million (ISD$ with escalation)</td>
</tr>
<tr>
<td></td>
<td>*entire FATD plan</td>
<td>*FATD East</td>
</tr>
</tbody>
</table>

CURRENT STATUS: All the project energizations have been completed as of December 18, 2015. The project will be closed pending receipt and review of final costs.

PROJECT RISKS

There are no risks to report at this time.
6. **FORT MCMURRAY WEST AREA 500 KV TRANSMISSION BULK SYSTEM REINFORCEMENT (FMAC); PROJECT 1590 (Formerly Project 838)** – Construction of a West 500 kV transmission line from the Edmonton area to the Fort McMurray area.

**THE PROJECT:** The Fort McMurray West Area transmission project is to serve load from the expected growth of the oilsands industry in the northeastern part of the province.

**THE COMPONENTS:** The major components for Stage 1 of the project (West 500 kV Line) are approximately 500 km of 500 kV single-circuit transmission line from Thickwood Hills 951S to Sunnybrook 510S; a 500 kV substation switchyard at Thickwood Hills 951S to terminate the north end of the West 500 kV line; modifications to the Sunnybrook 510S substation to terminate the south end of the West 500 kV line, and a 500/240 kV 1200 MVA transformer bank at Thickwood Hills 951S.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort McMurray Area Bulk System Development Stage 1 – West Line</td>
<td>1</td>
<td>One 500 kV transmission line will be constructed from a new substation at Thickwood Hills to the Genesee area, referred to as the West 500 kV line</td>
<td>2019</td>
</tr>
</tbody>
</table>

**THE TRANSMISSION FACILITY OWNER(S):** Alberta PowerLine Ltd. (APL).

**PROJECT COST:**

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort McMurray Area Transmission Bulk System Reinforcement</td>
<td>Stage 1: $1.796 Billion (2013$)</td>
<td>Stage 1: $1.433 Billion</td>
</tr>
</tbody>
</table>

**CURRENT STATUS:** APL filed its facility application (FA) with the AUC on December 1, 2015 and it is currently waiting for approval. The target ISD for the project is June 1, 2019.

**PROJECT RISKS**

Delays in the connecting substation projects, 1186 Thickwood Hills and 1655 Sunnybrook/Livock, may affect the ISD as well as any delay in the AUC’s approval of the FA.

**BACKGROUND NOTE**

In earlier TFCMC semi-annual reports this project was previously referred to as Project 838, Fort McMurray Area Transmission Bulk System Reinforcement. That project was to see the construction of two 500 kV transmission lines from the Edmonton area to the Fort McMurray area.

However, as reported in the June 2015 TFCMC Report, the AESO deferred the launch of Stage 2, the East 500 kV Line, due to the slower economic environment and sustained low oil prices. The East 500 kV Line would have been constructed from a new substation at Thickwood Hills to the Heartland area.

The major components for that East 500 kV Line were approximately 400 km of 500 kV single-circuit transmission line from Thickwood Hills 951S to Heartland 12S; modifications to the Thickwood Hills 951S substation to terminate the north end of the East 500 kV line; modifications to the Heartland 12S substation to terminate the south end of the East 500 kV line, and a second 500/240 kV 1200 MVA transformer bank at Thickwood Hills 951S.
Going forward, Project 838 has been renumbered and renamed and now only includes the West 500 kV Line. Further, 838 was the project number for both the West and East lines. Now that both projects are on separate deployment paths, the AESO needed to create different project numbers to separate them.

In addition, the project number has been updated from 838 to 1590 as the initial number was used when the project was originally conceived as a regulated project, which included pre-development by the incumbent TFO. Once the project was directed as a non-regulated project under the Competitive Process, it was assigned the new number.
7. **COMPLETED NORTH SOUTH TRANSMISSION REINFORCEMENT (HVDC); PROJECT 737** – Construction of two 500 kV HVDC transmission lines from the Edmonton area to the Calgary and south regions.

**THE PROJECT:** The North South Transmission Reinforcement is to address increased demand in southern and central Alberta, mitigate issues with reliability, maximize efficiency, accommodate long-term growth and lead generation decisions. The project calls for two high-capacity lines between Edmonton and Calgary to reinforce the backbone of the grid and replace aging 240 kV lines.

One line, the Western Alberta Transmission Line (WATL), will be located on the west centre portion of the province, connecting to the existing Wabamun Lake hub west of Edmonton to the Calgary area hub near the Langdon area. The second line, the Eastern Alberta Transmission Line (EATL), will be located on the east side of the province connecting the Heartland hub northeast of Edmonton to a southern hub near the Brooks area.

**THE COMPONENTS:** The two new lines will be 500 kV high-voltage direct current (HVDC) technology and will be built to transfer up to 1000 MW of power each. Each line and converter station can be upgraded to 2000 MW at a future date. For each line, two HVDC converter stations will be required, one at the source and one at the destination point, to convert AC power to DC and DC to AC.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Alberta Transmission Line Project Facility Application – AltaLink</td>
<td>3</td>
<td>Application to construct and operate an interface for the EATL converter stations</td>
<td>November 26, 2015</td>
</tr>
<tr>
<td>Western Alberta Transmission Line Project Facility Application – AltaLink</td>
<td>2</td>
<td>Application to construct and operate a high-voltage DC line from Genesee to Langdon</td>
<td>December 10, 2015</td>
</tr>
<tr>
<td>Eastern Alberta Transmission Line Project Facility Application – ATCO</td>
<td>1</td>
<td>Application to construct and operate a high-voltage DC line from Heartland to West Brook</td>
<td>December 18, 2015</td>
</tr>
</tbody>
</table>

**THE TRANSMISSION FACILITY OWNER(S):** AltaLink is the designated TFO to build WATL and ATCO is the designated TFO to build EATL.

**PROJECT COST:**

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>North South Transmission Reinforcement – EATL</td>
<td>$1.665 Billion (2013$)</td>
<td>$1.90 Billion (ISD$ with escalation)</td>
</tr>
<tr>
<td>North South Transmission Reinforcement – WATL</td>
<td>$1.499 Billion (2013$)</td>
<td>$1.7 Billion (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

**CURRENT STATUS:** WATL went into service on December 10, 2015, and EATL went into service on December 18, 2015. The project will be closed pending the receipt and review of final costs.

**PROJECT RISKS**

There are no risks to report at this time.
Review of the Cost Status of Major Transmission Projects in Alberta
8. NORTHWEST (OF) FORT MCMURRAY TRANSMISSION DEVELOPMENT (NW FMM); PROJECT 1180
- To provide service and connect future industrial customers in areas where there are no transmission facilities northwest of Fort McMurray.

THE PROJECT: The Northwest (of) Fort McMurray 240 kV Transmission Development includes a 240 kV looped system extending west from existing transmission facilities between the Dover 888S and Joslyn 849S substations, including the addition of two new 240 kV substations. This expansion of the transmission system will serve developing (electricity intensive) industrial growth as oilsands extraction facilities and related industrial developments are proceeding into areas where there are currently no transmission facilities to provide service, and connect future industrial customers.

THE COMPONENTS: Major components include a new 240 kV switching substation (Birchwood Creek 960S-NW FMM South); existing 9L57 line in/out at Birchwood Creek 960S; a new 240 kV switching station (Ells River 2079S-NW FMM North); 9L08 Joslyn to Dover line in/out at Ells River 2079S (approximately 50 km of 240 kV double-circuit line, designated as 9L08/9L76), and approximately 80 km of 240 kV single-circuit line (9L95) between Ells River 2079S and Birchwood Creek 960S.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
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<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birchwood Creek substation and 9L57 in/out</td>
<td>1</td>
<td>Birchwood Creek: new 240 kV switching substation; existing 9L57 line in/out at Birchwood Creek</td>
<td>March 10, 2015</td>
</tr>
<tr>
<td>Ells River substation, 9L76 and 9L08, in/out 240 kV double-circuit line from existing 9L08 to Ells River substation</td>
<td>2</td>
<td>9L08, Joslyn to Dover line in/out at Ells River (approximately 50 km of 240 kV double-circuit line)</td>
<td>2018/2019</td>
</tr>
<tr>
<td>Ells River to Birchwood Creek Line 9L95 240 kV line between Ells River and Birchwood Creek</td>
<td>3</td>
<td>Approximately 80 km of 240 kV double-circuit line, one-side strung, between Ells River and Birchwood Creek</td>
<td>2018/2019</td>
</tr>
</tbody>
</table>

THE TRANSMISSION FACILITY OWNER(S): ATCO.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest (of) Fort McMurray Transmission Development</td>
<td>$343 Million (2013$)17</td>
<td>$235.1 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

CURRENT STATUS: As noted in the June 2015 TFCMC Report, the Birchwood Creek switching substation and 9L57 240 kV in/out were energized on March 9, 2015. The FA for the Ells River substation and 9L76/9L08 240 kV in/out double circuit was to be filed in the second quarter of 2015. However, due to the timing of customer system access requests in the area, the AESO has advised ATCO to stop work until the re-assessment of the area is completed.

17 Referenced as the “240 kV double-circuit line from Livock to Joslyn Creek” in the Long-Term Transmission Plan filed in June 2012.
Re-assessment work is expected to recommence in 2016. As such, the Ells River ISD has been delayed from 2016 to 2018/2019. Further delays may mean a re-scoping of the project and a NID Amendment.

**PROJECT RISKS**

The remaining facilities of the project are on hold. As such, there are no risks to report at this time.
9. **RED DEER REGION TRANSMISSION DEVELOPMENT (RDTD); PROJECT 813 – 240/138 kV transmission system reinforcements in the Red Deer area.**

**THE PROJECT:** Growing demand from industrial, commercial, farming, and residential, along with existing constraints on the system, have created the need to strengthen the transmission system in the Red Deer region.

**THE COMPONENTS:** There are two stages of transmission development for the project.

The major components for Stage 1 of the project are building new 240/138 kV substations near Didsbury, Ponoka and Innisfail; upgrading substations near Benalto and West Lacombe; adding approximately 150 km of new and rebuilt transmission line, and salvaging more than 100 km of existing transmission line.

The only component left for Stage 2 of the project is building a third 138 kV line from Gaetz to Joffre.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Deer Area Transmission Development Stage 1 – Brownfields</td>
<td>1</td>
<td>Split 768L and 778L; 240/138 kV transformer at Benalto 17S; Capacitor Banks at Joffre 535S, Prentiss 276S and Ellis 332S</td>
<td>November 28, 2013</td>
</tr>
<tr>
<td>Red Deer Area Transmission Development Stage 1 – Greenfields</td>
<td>3</td>
<td>New Johnston 240/138 kV substation and new transmission lines; 138 kV line from NE Lacombe 212S to Ellis 322S; new Wolf Creek 240/138 kV substation and new transmission lines; new Hazelwood 240/138 kV substation and new transmission lines</td>
<td>December 15, 2016</td>
</tr>
<tr>
<td>Red Deer Area Transmission Development – New 423L</td>
<td>6</td>
<td>New 138 kV (423L) transmission line from 332S Ellis to 212S NE Lacombe</td>
<td>February 28, 2017</td>
</tr>
<tr>
<td>Red Deer Area Transmission Development Stage I – Salvage</td>
<td>5</td>
<td>Salvage 80L from Ponoka 331S to West Lacombe 958S; salvage 80L from Red Deer 63S to Innisfail 214S to Olds 555S; salvage 716L from Wetaskiwin 40S to Ponoka 331S</td>
<td>April 13, 2017</td>
</tr>
<tr>
<td>Red Deer Area Transmission Development Stage 2 – Rebuild 166L</td>
<td>4</td>
<td>Rebuild 166L from Didsbury 152S to Harmattan 256S</td>
<td>May 3, 2017</td>
</tr>
<tr>
<td>Red Deer Area Transmission Development Stage 2 – 2017 Facilities</td>
<td>7</td>
<td>Component energizations</td>
<td>May 22, 2018</td>
</tr>
</tbody>
</table>
THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Deer Region Transmission Development</td>
<td>$329 Million (2013$)</td>
<td>$404.4 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

CURRENT STATUS: As noted in the June 2015 TFCMC Report, Stage 1 development included FAs for Brownfields, Rebuilds and Greenfields. The Brownfields were energized in 2013, however, the Rebuilds and Greenfields that were expected to be energized by 2016 are now expected to be energized in late 2016.

The 423L AUC hearing resulted in a decision being made on November 27, 2015 to proceed with the 423L scope of work.

Stage 2 development is the rebuild of 166L; updated Central Region study results indicate that the line is not needed until 2030 or later. The AESO issued a Stop Work Direction to AltaLink in November 2015 to cease conducting all work related to the rebuild of 166L, until the AESO further directs that any work be done. A stakeholder notification will be sent out in January 2016 to update affected stakeholders.

PROJECT RISKS

Risks for Stage 1 include outage coordination with other projects, however, they were mitigated between the AESO and AltaLink’s operations teams.
Review of the Cost Status of Major Transmission Projects in Alberta

Facility Application 5
Salvage 716L from 331S Ponoka to 40S Wetaskiwin

Facility Application 716 from 331S Ponoka to 40S Wetaskiwin

Facility Application 80L from 63S Red Deer to 214S Innisfail

Facility Application 80L from 331S Ponoka to 958S West Lacombe

Facility Application 1
Add capacitor bank at 535S Joffre

Facility Application 2
Add capacitor banks at 276S Prentiss and 332S Ellis

Facility Application 3
New 240/138 kV 288S Wolf Creek Substation and transmission lines

Facility Application 4
Rebuild 166L from 152S Didsbury to 256S Harmattan (Status TBD)

Facility Application 5
Salvage 716L from 331S Ponoka to 40S Wetaskiwin

Facility Application 6
New 138 kV (423L) transmission line from 332S Ellis to 212S Northeast Lacombe

Facility Application 1
Second 240/138 kV Transformer at 17S Benalto

Facility Application 2
Rebuild 717L from 194S South Red Deer to 217S North Red Deer

Facility Application 2
Rebuild 80L from 194S South Red Deer to 63S Red Deer

Facility Application 1
Add capacitor banks at 535S Joffre

Facility Application 1
Add capacitor bank at 276S Prentiss and 332S Ellis

Facility Application 3
New 240/138 kV 288S Wolf Creek Substation and transmission lines

Facility Application 4
Rebuild 705L from 635 Red Deer to 247S Piper Creek to 535S Joffre

Facility Application 1
Add capacitor bank at 535S Joffre

Facility Application 1
Split 768L and 778L

Facility Application 1
Add capacitor bank at 535S Joffre
10. **SOUTH AND WEST OF EDMONTON TRANSMISSION DEVELOPMENT (SWEATR); PROJECT 850** – Transmission system reinforcement to the 138 kV systems south and west of the City of Edmonton.

**THE PROJECT:** In preparation of the South and West Edmonton Plan, the AESO considered the specific needs and timing of existing and future transmission facilities in the South and West Edmonton area. There is insufficient transmission capacity in the South and West Edmonton area and transmission reinforcements are required to provide the needed capacity to meet future load growth.

The South and West Edmonton Transmission Development will add two new 240/138 kV substations, one south of the town of Stony Plain and one close to the Nisku 149S substation; reconfigure the 138 kV network in the vicinity of the Cooking Lake 522S substation; rebuild portions of the 138 kV transmission lines, and modify existing substations in the area.

**THE COMPONENTS:** The list for the South and West of Edmonton Transmission System Development is as follows: a new 240/138 kV Harry Smith substation; a new 240/138 kV Saunders Lake substation; two new 138 kV lines between 780L and Cooking Lake, and reconfiguration; one 138 kV 27 MVar capacitor bank at Leduc 325S; existing 138 kV lines reconfiguration.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Capacitor Bank at Leduc 325S</td>
<td>5</td>
<td>One 138 kV 27 MVar capacitor bank at Leduc 325S</td>
<td>July 1, 2017</td>
</tr>
<tr>
<td>Open 133L from Wabamun 19s to 234L tap</td>
<td>4</td>
<td>Operate 133L line from Wabamun 19S to 234L tap normally open (operating condition)</td>
<td>December 31, 2017</td>
</tr>
<tr>
<td>Two new 138 kV lines between 780L and Cooking Lake, and reconfiguration</td>
<td>3</td>
<td>Two new 138 kV circuits, 780L to Cooking Lake 522S, and augmentation of Cooking Lake 522S Substation (upgrades existing bus, addition of circuit breakers with isolating switches)</td>
<td>December 31, 2017</td>
</tr>
<tr>
<td>New Saunders Lake Substation</td>
<td>2</td>
<td>New Saunders Lake 289S substation including two 240/138 kV 400 MVA transformers; modifications to Nisku 149S, Wetaskiwin 40S and Ellerslie 89S; proposed Wolf Creek 288S, Bigstone 86S; four new 240 kV lines, two new 138 kV lines, and rebuild 780L and 858L between Nisku and Saunders Lake</td>
<td>December 31, 2017</td>
</tr>
<tr>
<td>New Harry Smith Substation</td>
<td>1</td>
<td>New 240/138 kV Harry Smith 367S substation including two 240/138 kV 400 MVA transformers; modifications to Acheson 305S, Stony Plain 434S and Keephills 320P substations; two new 240 kV lines, and three new 138 kV lines</td>
<td>December 31, 2017</td>
</tr>
<tr>
<td>New EPCOR scope of work</td>
<td>N/A</td>
<td>P&amp;C line renumbering</td>
<td>December 31, 2017</td>
</tr>
</tbody>
</table>
THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>South and West of Edmonton Transmission Development</td>
<td>$194 Million (2013$)</td>
<td>$306.6 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

CURRENT STATUS: The start of project construction is pending AUC approval of AltaLink’s facility applications, which were filed in October of 2015.

PROJECT RISKS

The ISD for 1043L, part of the Edmonton Region 240 kV Line Upgrades (Project 786), remains unknown. The Harry Smith substation is planned to connect to 1043L, as an in-out configuration between Keephills and Petrolia substations. If 1043L has to be re-routed outside of the Enoch First Nations, there is a risk the location of the Harry Smith substation may need to be revisited.
11. **SOUTHERN ALBERTA TRANSMISSION REINFORCEMENT (SATR); PROJECT 787** – To accommodate wind generation in southern Alberta.

**THE PROJECT:** The existing capacity of the transmission system in southern Alberta is insufficient to provide adequate system access for the interconnection of additional wind-powered generation. Additional substations and upgrades to existing facilities are required. The AESO originally outlined the need for a 240 kV AC looped system with three stages of implementation.

**THE COMPONENTS:** The project includes three stages of development.

Stage 1: **COMPLETED** – To reinforce the 240 kV system in the Fort MacLeod and the Brooks–Medicine Hat corridor.

Stage 2: To reinforce the 240 kV and 138 kV systems in the Glenwood, Lethbridge, Blackie and City of Medicine Hat areas, including a 240 kV system loop connection to the 500 kV Langdon–Cranbrook line.

Stage 3: **CANCELLED** – Interconnect the Ware Junction–Langdon area via a 240 kV line.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
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<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milo Junction Switching Station</td>
<td>2</td>
<td>Build a switching station at Milo Junction</td>
<td>November 1, 2011</td>
</tr>
<tr>
<td>PST Addition at Russell 632S</td>
<td>3</td>
<td>Phase shifting transformer and new Russell substation</td>
<td>April 25, 2012</td>
</tr>
<tr>
<td>Ware Junction substation upgrade</td>
<td>13</td>
<td>933L line in/out at Ware Junction</td>
<td>October 4, 2013</td>
</tr>
<tr>
<td>Cassils to East Medicine Hat</td>
<td>4</td>
<td>240 kV lines from Cassils to new Bowmanton</td>
<td>November 27, 2013</td>
</tr>
<tr>
<td>East Medicine Hat to Whitla 240 kV Transmission Line</td>
<td>5</td>
<td>240 kV lines from Bowmanton to new Whitla</td>
<td>March 25, 2014</td>
</tr>
<tr>
<td>911L Line Replacement</td>
<td>1</td>
<td>Build new 240 kV lines from Foothills substation to Windy Flats substation</td>
<td>August 21, 2015</td>
</tr>
<tr>
<td>Medicine Hat Area 138 kV Line Development</td>
<td>6</td>
<td>138 kV system upgrades in the Medicine Hat area</td>
<td>April 30, 2016</td>
</tr>
<tr>
<td>Blackie Area 138 kV upgrade</td>
<td>11</td>
<td>138 kV system upgrade in the Blackie area</td>
<td>April 30, 2016</td>
</tr>
<tr>
<td>Castle Rock Ridge to Chapel Rock 240 kV line</td>
<td>7</td>
<td>240 kV Line from Goose Lake to new Chapel Rock 500 kV substation</td>
<td>June 28, 2019</td>
</tr>
<tr>
<td>Etzikom Coulee S/S and 240 kV line to Picture Butte S/S</td>
<td>8</td>
<td>240 kV line from Etzikom Coulee to Picture Butte (formerly called MATL) substation</td>
<td>ON HOLD</td>
</tr>
<tr>
<td>240 kV Line from Etzikom Coulee to Goose Lake</td>
<td>9</td>
<td>240 kV line from Etzikom Coulee substation to Goose Lake substation</td>
<td>ON HOLD</td>
</tr>
<tr>
<td>Etzikom Coulee S/S to Whitla 240 kV Line</td>
<td>10</td>
<td>240 kV line from Journault to Whitla substation</td>
<td>ON HOLD</td>
</tr>
<tr>
<td>Cypress Reactive Power Addition</td>
<td>12</td>
<td>Reactive power addition at Cypress 562S substation</td>
<td>ON HOLD</td>
</tr>
</tbody>
</table>
THE TRANSMISSION FACILITY OWNER(S): AltaLink.

PROJECT COST:

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Alberta Transmission Reinforcement</td>
<td>$2.493 Billion (2013$)</td>
<td>$1.866 Billion (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

CURRENT STATUS: Stage 1 has been completed.

The scope for Stage 2 includes eight FAs. One FA has been energized, two have received AUC approval and are under construction, one more is currently being prepared by AltaLink and four FAs have been stopped (the timing of these applications are being re-evaluated by the AESO).

Stage 3 has been cancelled.

PROJECT RISKS

There are two risks related to the FA in progress for the New Chapel Rock substation and the 240 kV lines between Chapel Rock and Castle Rock Ridge substations (Stage 2):

1. The AESO is currently assessing if any of the following could require a NID Amendment. If they do, it will most likely cause a delay to the project:
   - Addition of a 45 MVAr line reactor at Chapel Rock;
   - Reactive power solution different than was proposed in NID, and
   - Change in the connection point from Castle Rock Ridge to Goose Lake.

2. The outcome of an AUC proceeding resulting from the Livingstone Landowners Guild (LLG) inquiry may also cause delays to the project.
12. **THICKWOOD HILLS 240 KV TRANSMISSION DEVELOPMENT AND REACTIVE POWER REINFORCEMENT (THTD); PROJECT 1186** – To connect the Fort McMurray West 500 kV transmission project to the existing transmission system in the Thickwood Hills area, west of Fort McMurray.

**THE PROJECT:** This consists of a 240 kV substation and reactive power reinforcement for the 500 kV Fort McMurray West project. The present requested ISD is the fourth quarter of 2018, which is at least six months ahead of the 500 kV West Line.

**THE COMPONENTS:** The project includes the construction of a new 240 kV substation that will terminate four 240 kV lines and also includes the construction of approximately 20 km of new double-circuit 240 kV line.

<table>
<thead>
<tr>
<th>FACILITY APPLICATION NAME</th>
<th>FACILITY APPLICATION NUMBER</th>
<th>FACILITY APPLICATION DESCRIPTION</th>
<th>FORECAST OR ACTUAL IN-SERVICE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickwood</td>
<td>1</td>
<td>Construct a new 240 kV substation and 20 km of 240 kV double-circuit line</td>
<td>October 1, 2018</td>
</tr>
</tbody>
</table>

**THE TRANSMISSION FACILITY OWNER(S):** ATCO.

**PROJECT COST:**

<table>
<thead>
<tr>
<th>TRANSMISSION PROJECT</th>
<th>AESO LONG-TERM TRANSMISSION PLAN (FILED JANUARY 2014) ESTIMATED COST</th>
<th>CURRENT ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement</td>
<td>Not Applicable(^{18})</td>
<td>$132.43 Million (ISD$ with escalation)</td>
</tr>
</tbody>
</table>

**CURRENT STATUS:** ATCO filed their FA on December 11, 2015.

**PROJECT RISKS**

There are no risks to report at this time.

\(^{18}\) The ‘Not Applicable’ entry is because the costs for this project were not broken out in the AESO Long-Term Transmission Plan that was filed in January 2014.
Facility Application 1
New Thickwood Hills
240 kV Substation &
20 km of 240 kV Double
Circuit Line

Project 1186
Thickwood Hills 240 kV Transmission
Development and Reactive Power
Reinforcement
Appendix C: Previously Monitored Projects

Since the TFCMC began its deliberations, the Committee has monitored a total of 19 different transmission projects. To date, 10 of the projects have been completed, or are in service, and for the purpose of TFCMC reporting are considered closed. Those undertakings, and their final costs, are below. Projects are listed alphabetically.

For this edition, this appendix has been revised to bring readers a more complete view of the overall costs of these completed projects. This section now includes the Needs Identification Document (NID) and Proposal to Provide Service (PPS) estimated costs where applicable.

◊ **ALBERTA INDUSTRIAL HEARTLAND BULK TRANSMISSION DEVELOPMENT (HBTD); PROJECT 629** – Construction of a double-circuit 500 kV transmission line, connecting the Heartland region (northeast of Fort Saskatchewan) to existing 500 kV transmission facilities in the Edmonton area.

NID Estimate: Not Available\(^{19}\) | PPS Estimate: $580.7 million | Estimated Final Project Cost: $699.5 million\(^{20}\) |

Removed from monitoring: TFCMC December 2014 Report

◊ **NEWLY COMPLETED PROJECT: CHRISTINA LAKE AREA 240 KV TRANSMISSION DEVELOPMENT (CHL); PROJECT 1101** – Transmission facilities serving new oilsands developments and enhanced reliability to existing oilsands operations.

NID Estimate: $406.6 million | PPS Estimate: $418.9 million | Estimated Final Project Cost: $481 million\(^{21}\) |

Removed from monitoring: TFCMC December 2015 Report

◊ **NEWLY COMPLETED PROJECT: EAST CALGARY TRANSMISSION PROJECT AND ENMAX SHEPARD ENERGY CENTRE CONNECTION (ECTP); PROJECT 719** – Serving growing demand for electricity in the Calgary and High River planning areas and an interconnection to the ENMAX Shepard Energy Centre.

NID Estimate: $132.6 million | PPS Estimate: $136.3 million | Estimated Final Project Cost: $164.26 million\(^{22}\) |

Removed from monitoring: TFCMC December 2015 Report

◊ **ENMAX NO. 65 SUBSTATION (ESCS); PROJECT 922\(^{23}\)** – New 240 kV substation in south Calgary and 138 kV development due to overloading in south Calgary.

NID Estimate: Not Available\(^{24}\) | PPS Estimate: $38 million | Final Project Cost: $45 million |

Removed from monitoring: TFCMC June 2014 Report

◊ **NEWLY COMPLETED PROJECT: FOOTHILLS AREA TRANSMISSION DEVELOPMENT (FATD) – EAST PROJECT; PROJECT 1117** – Serving growing demand in South Calgary, High River and the surrounding area.

Part of the overall FATD project, which is estimated to cost $921 million according to the AESO’s LTP plan filed in January 2014.

---

19 A NID Estimate was not available. However, the Alberta Electric System Operator's (AESO) Long-Term Plan (LTP) showed a cost of $613 million in 2013 dollars.

20 The AESO is reviewing the final cost report for this project and this amount will be updated once it is available.

21 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

22 The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

23 The TFCMC monitored Project 922, ENMAX No. 65 Substation. While the value of the project is below the $100-million TFCMC threshold, the original project initially came in above the threshold and this is why the Committee kept it on its list of monitored projects.

24 A NID Estimate was not available. However, the AESO LTP showed a cost of $37 million in 2011 dollars.
NID Estimate: Not Applicable⁵⁻⁶ | PPS Estimate: $443.5 million | Estimated Final Project Cost: $465.23 million⁷⁻⁸ |

Removed from monitoring: TFCMC December 2015 Report

◊ **HANNA REGION TRANSMISSION DEVELOPMENT (HATD); PROJECT 812** – Transmission development in the Hanna, Sheerness and Battle River areas.

NID Estimate: $983 million | PPS Estimate: $940.9 million | Estimated Final Project Cost: $997.3 million⁹⁻¹⁰ |

Removed from monitoring: TFCMC June 2015 Report

◊ **NEWLY COMPLETED PROJECT: NORTH SOUTH TRANSMISSION REINFORCEMENT (HVDC); PROJECT 737** – Construction of two 500 kV HVDC transmission lines from the Edmonton area to the Calgary and south regions.

NID Estimate: Not Available¹¹ | PPS: $3.058 billion | Estimated Final Project Cost: $3.6 billion¹²⁻¹³ |

Removed from monitoring: TFCMC December 2015 Report

◊ **NORTH FORT McMURRAY TRANSMISSION DEVELOPMENT (NFMD); PROJECT 791** – Transmission development relieving constraints and for forecast demand north of Fort McMurray.

NID Estimate: $237.44 million | PPS Estimate: $237.44 million | Final Project Cost: $352.3 million |

Removed from monitoring: TFCMC June 2014 Report

◊ **NORTHWEST TRANSMISSION DEVELOPMENT (NWTD); PROJECT 535** – Transmission expansion and enhancement in northwest Alberta.

NID Estimate: $262 million¹⁴⁻¹⁵ | PPS Estimate: $669.4 million | Final Project Cost: $583 million |

Removed from monitoring: TFCMC December 2013 Report

◊ **SOUTHERN ALBERTA TRANSMISSION DEVELOPMENT (SATD); PROJECT 416** – Transmission development in Goose Lake-Peigan and North Lethbridge region.

NID Estimate: $77 million | PPS Estimate: $91 million | Final Project Cost: $238 million |

Removed from monitoring: TFCMC June 2013 Report

◊ **YELLOWHEAD AREA TRANSMISSION DEVELOPMENT (YATD); PROJECT 671** – Serving increased electricity demand; replaced aging infrastructure, and improved reliability for the Drayton Valley, Hinton, Edson and Alberta Beach areas.

NID Estimate: $84 million | PPS Estimate: $126 million | Final Project Cost: $141 million¹⁶⁻¹⁷ |

Removed from monitoring: TFCMC December 2013 Report

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²⁵ For this project, the TFO was not requested to provide NID cost estimates. Rather both AltaLink and ENMAX were directed to provide PPS Estimates. The AESO used this estimate in its NID application and the TFOs used these estimates when they filed their Facility Applications.

²⁶ The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

²⁷ Final costs for AltaLink developments were received and reviewed by the AESO in May 2015. Final Costs for ATCO developments were received in June 2015. The AESO is reviewing these costs.

²⁸ A NID Estimate was not available. However, the AESO LTP showed a cost of $3.164 billion in 2013 dollars.

²⁹ The AESO is awaiting the final costs for this project. This amount will be updated once it is available.

³⁰ In the June 2011 TFCMC Report it was reported that the need for this project was recognized in March 2006 and the need approval was granted in August 2006 with the total project scope envisioned at $262 million. However, due to project scope changes, the value increased.

³¹ The estimated final cost of this project was $148 million, as noted in the December 2013 TFCMC Report – at that time, final costs were not available. The actual final cost came in at $140,652,893.
Appendix D: TFCMC Working Documents

The TFCMC receives reports and cost summary updates, on a monthly basis, in order to better understand the costs and changes associated with the transmission projects it monitors. In this part of the report, samples of the cost summary updates are included to provide readers with a better insight as to the type of material the TFCMC studies.

The cost summaries on the following pages are just a portion of the individual documents, which also include detailed information on authorized cost changes and cost estimate changes from the Needs Identification Document (NID) phase to the Proposal to Provide Service (PPS) stage.

As the documents on the following pages are an example, or working documents, of just some of the material the TFCMC reviews, there could be cost discrepancies between Appendices B and D on a particular project. Please refer to Appendix B for the most recent and accurate estimated cost figures.

Project Cost Reporting for TFCMC, Project 719: East Calgary Transmission Project and ENMAX Shepard Energy Centre Connection (ECTP); October 2015 Meeting

<table>
<thead>
<tr>
<th>Project #</th>
<th>NID name</th>
<th>NID Filing Date</th>
<th>NID Approval Date</th>
<th>NID Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Total Changes</th>
<th>Percent Change of Auth'</th>
</tr>
</thead>
<tbody>
<tr>
<td>719</td>
<td>East Calgary Transmission Project / ENMAX Shepard Energy Centre</td>
<td>2011-05-10</td>
<td>2012-11-01</td>
<td>132.81M</td>
<td>138.33M</td>
<td>27.64M</td>
<td>165.96M</td>
<td>17</td>
<td>17.1%</td>
</tr>
</tbody>
</table>

Project 719 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Changes</th>
<th>Authorized Budget</th>
<th>No Of Changes</th>
<th>Percent Change Of Auth'</th>
</tr>
</thead>
<tbody>
<tr>
<td>AltaLink</td>
<td>1</td>
<td>1</td>
<td>FA1 - AltaLink Facilities</td>
<td>5</td>
<td>2011-06-27</td>
<td>2012-11-08</td>
<td>2015-10-20</td>
<td>70.73M</td>
<td>9.61M</td>
<td>79.38M</td>
<td>11</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

ENMAX | 2     | 2    | FA2 - Enmax Facilities      | 6     | 2011-06-10                    | 2012-11-08                      | 2015-10-20            | 85.20M             | 19.33M                   | 65.88M              | 6             | 22.8%                  |

Comments

Project closure pending Final Cost Report
### Project 737 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>Facility Name</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altalink</td>
<td>3</td>
<td>Facility Application 3 - AltaLink East DC Facilities (Currently known to TFO as P961)</td>
<td>6</td>
</tr>
<tr>
<td>ATCO</td>
<td>1</td>
<td>Facility Application 1 - ATCO East DC Facilities (Currently known to TFO as P961)</td>
<td>5</td>
</tr>
<tr>
<td>Altalink &amp; EPCOR</td>
<td>2</td>
<td>Facility Application 2 - AltaLink West DC Facilities (Currently known to TFO as P961)</td>
<td>6</td>
</tr>
<tr>
<td>EPCOR</td>
<td>4</td>
<td>Facility Application 4 - EPCOR East DC Facilities (Currently known to TFO as P961)</td>
<td>Null</td>
</tr>
</tbody>
</table>

### Comments

WATL: AltaLink ISD is Dec 8/15.
EATL: ATCO ISD is Dec 22/15.
### Project Cost Reporting for TFCMC, Project 786: Edmonton Region 240 kV Line Upgrades (ERLU); October 2015 Meeting

#### Project 786 Cost Summary for [Edmonton Region 240 kV Line Upgrades]

<table>
<thead>
<tr>
<th>Project #</th>
<th>ND name</th>
<th>Filing Date</th>
<th>Approved Date</th>
<th>Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Percent Change of Auth</th>
<th>Authorizing RIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>786</td>
<td>Edmonton Region 240 kV Line Upgrades</td>
<td>2006-06-25</td>
<td>2006-08-24</td>
<td>123,456</td>
<td>135,345</td>
<td>25,345</td>
<td>170,345</td>
<td>5%</td>
<td>13.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Date</th>
<th>Facility Approval Date</th>
<th>Overall Project ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Budget</th>
<th>Percent Change Of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Refurbish Substation Addition (Formerly P922)</td>
<td>2009-11-08</td>
<td>2010-03-19</td>
<td>2010-07-31</td>
<td>101,356</td>
<td>12,698</td>
<td>114,058</td>
</tr>
<tr>
<td>2</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Rebuild 24kV 54kV (1043)</td>
<td>2010-07-28</td>
<td>2011-08-12</td>
<td>2011-07-31</td>
<td>7,678</td>
<td>7,678</td>
<td>7,678</td>
</tr>
<tr>
<td>3</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Rebuild &amp; Re-string (Formerly P1057)</td>
<td>2011-08-05</td>
<td>2012-10-31</td>
<td>2017-07-31</td>
<td>4,655</td>
<td>2,856</td>
<td>7,206</td>
</tr>
<tr>
<td>4</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Rebuild 56kV (Formerly P1058)</td>
<td>2009-04-13</td>
<td>2010-02-10</td>
<td>2013-01-20</td>
<td>9,855</td>
<td>9,855</td>
<td>9,855</td>
</tr>
<tr>
<td>5</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Rebuild 56kV (Formerly P1058)</td>
<td>2009-04-13</td>
<td>2010-02-10</td>
<td>2013-01-20</td>
<td>9,855</td>
<td>9,855</td>
<td>9,855</td>
</tr>
</tbody>
</table>

#### Comments

FA 2. A FA associated with AALink, the work on 1043L and the re-termination of 909L from Hayihe to Sundance is delayed because of land access negotiations. Change request for AltaLink to start work on remote work for the portion of 1043L, going through the Enkoch area and extend the ISD in 2016 has been approved. TransAlta’s utility change proposal to extend the ISD until mid-2016 has been approved. TransAlta continues to work with the Enkoch.

### Project Cost Reporting for TFCMC, Project 787: Southern Alberta Transmission Reinforcement (SATR); October 2015 Meeting

#### Project 787 Cost Summary for [Southern Alberta Transmission Reinforcement]

<table>
<thead>
<tr>
<th>Project #</th>
<th>ND name</th>
<th>Filing Date</th>
<th>Approved Date</th>
<th>Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Percent Change of Auth</th>
<th>Authorizing RIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>787</td>
<td>Southern Alberta Transmission Reinforcement</td>
<td>2008-12-30</td>
<td>2009-09-17</td>
<td>1,800,983</td>
<td>1,800,983</td>
<td>23,315</td>
<td>1,824,308</td>
<td>10</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Date</th>
<th>Facility Approval Date</th>
<th>Overall Project ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Percent Change Of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Edmonton Coulee 2SS and 240kV line to Picture Butte 2SS (Formerly P1035)</td>
<td>2016-07-08</td>
<td>2017-08-07</td>
<td>2011-07-31</td>
<td>101,356</td>
<td>12,698</td>
<td>114,058</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Edmonton Coulee 2SS to Edmonton Coulee 2SS (Formerly P1036)</td>
<td>2016-07-19</td>
<td>2017-08-08</td>
<td>2011-07-31</td>
<td>7,678</td>
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<td>0</td>
</tr>
<tr>
<td>3</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Edmonton Coulee 2SS to White 240kV line (Formerly P1037)</td>
<td>2016-10-14</td>
<td>2017-07-31</td>
<td>2011-07-31</td>
<td>4,655</td>
<td>2,856</td>
<td>7,206</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Edmonton Coulee 2SS to White 240kV line (Formerly P1037)</td>
<td>2016-10-14</td>
<td>2017-07-31</td>
<td>2011-07-31</td>
<td>4,655</td>
<td>2,856</td>
<td>7,206</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>AALink</td>
<td>1,2,3</td>
<td>4446</td>
<td>Edmonton Coulee 2SS to White 240kV line (Formerly P1037)</td>
<td>2016-10-14</td>
<td>2017-07-31</td>
<td>2011-07-31</td>
<td>4,655</td>
<td>2,856</td>
<td>7,206</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Comments

FA 2. - The AESS received the PPS from AALink in early November.
FA 3. - The ND filing date has been extended. Waiting for pipeline cost project materials in the enkoch before filing the ND.
Project Cost Reporting for TFCMC, Project 811: Central East Area Transmission Development (CETD); October 2015 Meeting

<table>
<thead>
<tr>
<th>Project #</th>
<th>NID name</th>
<th>NID Filing Date</th>
<th>NID Approval Date</th>
<th>Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost</th>
<th>Authorized Budget</th>
<th>Changes</th>
<th>Percent Change of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>811</td>
<td>Central East Area Transmission Development</td>
<td>2013-03-17</td>
<td>2011-02-10</td>
<td>431.00M</td>
<td>243.38M</td>
<td>303.38M</td>
<td>343.88M</td>
<td>10</td>
<td>29.2%</td>
</tr>
</tbody>
</table>

### Project 811 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost</th>
<th>Changes</th>
<th>Authorized Budget</th>
<th>Percent Change of Auth</th>
<th>No. Of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>AFCD</td>
<td>1</td>
<td>FA 1 - Cold Lake Area 144 kV Reinforcements</td>
<td>6</td>
<td>2012-03-07</td>
<td>2012-12-11</td>
<td>2014-01-30</td>
<td>141.08M</td>
<td>54.83M</td>
<td>186.92M</td>
<td>3</td>
<td>28.0%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2</td>
<td>FA 2 - Bonnyville 700S and 7146</td>
<td>6</td>
<td>2012-04-27</td>
<td>2013-07-02</td>
<td>2016-01-01</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,4,5</td>
<td></td>
<td>3</td>
<td>FA 3 - St. Paul Area Upgrades - Watt Lake 850S</td>
<td>6</td>
<td>2011-12-23</td>
<td>2013-03-27</td>
<td>2013-12-12</td>
<td>50.83M</td>
<td>31.92M</td>
<td>18.91M</td>
<td>2</td>
<td>38.6%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>4</td>
<td>FA 4 - St. Paul Area Upgrades - St. Paul 707S and 71397/7159 Initial</td>
<td>6</td>
<td>2011-12-23</td>
<td>2012-03-26</td>
<td>2013-12-20</td>
<td>50.83M</td>
<td>31.92M</td>
<td>18.91M</td>
<td>2</td>
<td>38.6%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>5</td>
<td>FA 5 - St. Paul Area Upgrades - Whitby Lake 819S 144kV CB addition</td>
<td>6</td>
<td>2011-12-23</td>
<td>2012-06-26</td>
<td>2013-02-01</td>
<td>50.83M</td>
<td>31.92M</td>
<td>18.91M</td>
<td>2</td>
<td>38.6%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>6</td>
<td>FA 6 - Vermilion 7105 Substation Upgrade</td>
<td>6</td>
<td>2011-10-04</td>
<td>2012-05-18</td>
<td>2013-09-15</td>
<td>6.78M</td>
<td>2.92M</td>
<td>3.86M</td>
<td>1</td>
<td>30.4%</td>
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</tr>
<tr>
<td>7,8</td>
<td></td>
<td>7</td>
<td>FA 7 - Heisler Area Upgrades</td>
<td>6</td>
<td>2011-12-23</td>
<td>2013-02-07</td>
<td>2013-07-27</td>
<td>31.48M</td>
<td>10.91M</td>
<td>20.57M</td>
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<td>8</td>
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<td>FA 8 - Kitscoty Area Upgrades</td>
<td>6</td>
<td>2012-06-13</td>
<td>2013-01-02</td>
<td>2014-12-04</td>
<td>31.48M</td>
<td>10.91M</td>
<td>20.57M</td>
<td>4</td>
<td>25.7%</td>
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<tr>
<td>10</td>
<td></td>
<td>10</td>
<td>FA 10 - 7L701 Line Clearance Mitigation (Letter of Inquiry)</td>
<td>6</td>
<td>2011-10-24</td>
<td>2013-02-07</td>
<td>2013-07-18</td>
<td>13.28M</td>
<td>0.00M</td>
<td>13.28M</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>

Comments

Two energizations remaining to complete the project: Energization #4 St Paul Area Upgrades and Energization #5 Bonnyville 700S Transformer addition. Energization #3 has dependencies with Energization #4. Project ISD forecast is in June 2016.

Central East Sub-Region Supplemental Planning Study planned to be completed by end of December 2015.
Project Cost Reporting for TFCMC, Project 813: Red Deer Region Transmission Development (RDTD); October 2015 Meeting

Project 813 Cost Summary for [Red Deer Area Transmission Development]  

<table>
<thead>
<tr>
<th>Project #</th>
<th>ND name</th>
<th>NID Filing Date</th>
<th>NID Approval Date</th>
<th>NID Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Total Changes</th>
<th>Percent Change of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>813</td>
<td>Red Deer Area Transmission Development</td>
<td>2011-07-30</td>
<td>2012-04-10</td>
<td>222.85M</td>
<td>237.63M</td>
<td>40.78M</td>
<td>404.41M</td>
<td>58</td>
<td>15.0%</td>
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</table>

Project 813 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Changes</th>
<th>Authorized Budget</th>
<th>No Of Changes</th>
<th>Percent Change Of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>AltaLink</td>
<td>5</td>
<td>RDATD Facility Application 5 - Salvage</td>
<td>4</td>
<td>2015-12-16</td>
<td>2016-07-27</td>
<td>2017-04-13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>RDATD Facility Application 1 - Brownfields</td>
<td>6</td>
<td>2011-09-28</td>
<td>2013-11-26</td>
<td>2013-11-26</td>
<td>20.74M</td>
<td>10.95M</td>
<td>31.69M</td>
<td>16</td>
<td>34.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>RDATD Facility Application 2 - Rebuilds</td>
<td>5</td>
<td>2013-06-18</td>
<td>2014-07-28</td>
<td>2017-03-01</td>
<td>137.30M</td>
<td>5.05M</td>
<td>142.35M</td>
<td>13</td>
<td>3.9%</td>
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<tr>
<td></td>
<td></td>
<td>3.8</td>
<td>RDATD Facility Application 3 - Greenfields</td>
<td>5</td>
<td>2013-06-18</td>
<td>2014-07-28</td>
<td>2016-07-20</td>
<td>179.68M</td>
<td>90.40M</td>
<td>270.08M</td>
<td>29</td>
<td>21.9%</td>
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<tr>
<td></td>
<td></td>
<td>6</td>
<td>RDATD Facility Application 6 - 423L</td>
<td>4</td>
<td>2013-06-18</td>
<td>2016-01-04</td>
<td>2016-10-04</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Comments

- Development D32-Wolf Creek (WC) - 423L was energized between Ponoka 331s and WC 217s on October 1st, 421L was energized between Ponoka 331s and WC 288s on October 8th, 716L/80L was tied to affected substations.
- Development D3 - 423L tap was excluded from the AUC hearing for FA#2 and FA#3 and awaiting decision from the AUC on approval after hearing was completed Sept 30th. Possible P&L by January 2016.
- Development D11-80L-South - 80L between 198s and 217s was renumbered as 444L on October 14th.
- FA#4 filing of FA has been delayed until further notice. The 166L scope of work is not required in the near-term and the AESO is working to direct AML to stop any work on this scope of work.
- Development D32-Wolf Creek (WC) - 423L was energized between Ponoka 331s and WC 217s on October 1st, 421L was energized between Ponoka 331s and WC 288s on October 8th, 716L/80L was tied to affected substations.
- Development D3 - 423L tap was excluded from the AUC hearing for FA#2 and FA#3 and awaiting decision from the AUC on approval after hearing was completed Sept 30th. Possible P&L by January 2016.
- Development D11-80L-South - 80L between 198s and 217s was renumbered as 444L on October 14th.
- FA#4 filing of FA has been delayed until further notice. The 166L scope of work is not required in the near-term and the AESO is working to direct AML to stop any work on this scope of work.

Project Cost Reporting for TFCMC, Project 850: South and West of Edmonton Transmission Development (SWEATR); October 2015 Meeting

Project 850 Cost Summary for [South and West of Edmonton Transmission Development]  

<table>
<thead>
<tr>
<th>Project #</th>
<th>ND name</th>
<th>NID Filing Date</th>
<th>NID Approval Date</th>
<th>NID Estimated Cost</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Total Changes</th>
<th>Percent Change of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>850</td>
<td>South and West of Edmonton Transmission Development</td>
<td>2012-12-14</td>
<td>2014-05-05</td>
<td>172.17M</td>
<td>306.43M</td>
<td>134.26M</td>
<td>440.61M</td>
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<td>0.0%</td>
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Project 850 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>Cost Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Changes</th>
<th>Authorized Budget</th>
<th>No Of Changes</th>
<th>Percent Change Of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>AltaLink</td>
<td>1</td>
<td>Facility Application 1 - Harry Smith Sub</td>
<td>4</td>
<td>2015-10-30</td>
<td>2015-11-02</td>
<td>2015-12-31</td>
<td>306.43M</td>
<td>0.00M</td>
<td>306.43M</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Facility Application 2 - New Saunders Lake (2017) Substation - Re-terminate P99, 299, &amp; 899, at Saunders Lake; build line from Nelsi to Ralston 299, 899, &amp; 889, at Saunders Lake; recon of affected substations</td>
<td>4</td>
<td>2015-10-16</td>
<td>2015-11-02</td>
<td>2015-12-31</td>
<td>306.43M</td>
<td>0.00M</td>
<td>306.43M</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>Facility Application 3 - New 138kV Lines from TELA to Cooking Lakes &amp; 194, and recon of affected substations</td>
<td>4</td>
<td>2015-10-16</td>
<td>2015-11-02</td>
<td>2015-12-31</td>
<td>306.43M</td>
<td>0.00M</td>
<td>306.43M</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>Facility Application 4 - Open 133L from Wanamara to 214L stop</td>
<td>4</td>
<td>2015-10-16</td>
<td>2015-11-02</td>
<td>2015-12-31</td>
<td>306.43M</td>
<td>0.00M</td>
<td>306.43M</td>
<td>0</td>
<td>0.0%</td>
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<tr>
<td></td>
<td></td>
<td>5</td>
<td>Facility Application 5 - New Capacitor Bank at Leduc</td>
<td>4</td>
<td>2015-10-16</td>
<td>2015-11-02</td>
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<td>0.00M</td>
<td>306.43M</td>
<td>0</td>
<td>0.0%</td>
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<tr>
<td>EPOR</td>
<td>6</td>
<td>FA8 - EPOR R&amp;C and Line Renumbering (Facility Application Not Required)</td>
<td>4</td>
<td>2014-05-02</td>
<td>2015-04-02</td>
<td>2015-12-31</td>
<td>0.17M</td>
<td>0.00M</td>
<td>0.17M</td>
<td>0</td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>

Comments

- AltaLink completed 2 FA filings for the project; one FA for all developments except Harry Smith substation on October 16, 2015 and the other for Harris Smith substation on October 30, 2015.
Project Cost Reporting for TFCMC, Project 1101: Christina Lake Area Development (CHL); October 2015 Meeting

<table>
<thead>
<tr>
<th>Project #</th>
<th>NID name</th>
<th>Filing Date</th>
<th>Approval Date</th>
<th>Authorized Budget</th>
<th>Authorized Cost</th>
<th>Changes</th>
<th>Percent Change of Auth</th>
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<tbody>
<tr>
<td>1101</td>
<td>Christina Lake Area Development</td>
<td>2011-10-20</td>
<td>2012-04-24</td>
<td>416.68M</td>
<td>31.72M</td>
<td>10</td>
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</table>

Stage
- Facility Application 1 - CHL1 Black Spruce 154S
- Facility Application 2 - Black Spruce 154S to Pike 170S
- Facility Application 3 - Pike 170S to Christina Lake (CHL1 to 1117L)

Comments
Project closure pending Final Cost Report.

Project Cost Reporting for TFCMC, Project 1117: Foothills Area Transmission Development – East Calgary Development (FATD); October 2015 Meeting

<table>
<thead>
<tr>
<th>Project #</th>
<th>NID name</th>
<th>Filing Date</th>
<th>Approval Date</th>
<th>Authorized Budget</th>
<th>Authorized Cost</th>
<th>Changes</th>
<th>Percent Change of Auth</th>
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</thead>
<tbody>
<tr>
<td>1117</td>
<td>Foothills Area Transmission Development - East</td>
<td>2012-07-07</td>
<td>2013-10-07</td>
<td>485.25M</td>
<td>418.89M</td>
<td>23</td>
<td>12.9%</td>
</tr>
</tbody>
</table>

Stage
- Facility Application 1 - North Foothills Transmission Project - AltaLink Facilities
- Facility Application 3 - Langdon to Janet - AltaLink Facilities
- Facility Application 4 - Janet to Langdon - Enmax Facilities (by AltaLink)
- Facility Application 5 - Foothills 138kV - AltaLink Facilities

Comments
Project closure pending Final Cost Report.
### Project: 1180 Cost Summary for [NW Ft McMurray Transmission Development]

**Project**: 1180 Details by FA

<table>
<thead>
<tr>
<th>TFO</th>
<th>FA Grouping</th>
<th>FA #</th>
<th>FA name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost Change</th>
<th>Authorized Budget</th>
<th>Total Changes</th>
<th>Percent Change of Auth</th>
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<tbody>
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<td></td>
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<td>3</td>
<td>Facility Application 3 - 9L05</td>
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<td>2016-08-19</td>
<td>2017-09-06</td>
<td>2017-12-11</td>
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<tr>
<td></td>
<td></td>
<td>1</td>
<td>Facility Application 1 - Birchwood Creek</td>
<td>6</td>
<td>2013-10-31</td>
<td>2014-01-08</td>
<td>2015-03-10</td>
<td>35.60M</td>
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<tr>
<td></td>
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<td>2</td>
<td>Facility Application 2 - Ells River/9L08/9L76</td>
<td>4</td>
<td>2016-07-06</td>
<td>2016-12-21</td>
<td>2017-12-06</td>
<td>186.49M</td>
<td>0.00M</td>
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</tbody>
</table>

**Comments**

FA#2 and 3 are currently deferred until further notice.
## Project Cost Reporting for TFCMC, Project 1186: Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement (THTD); October 2015 Meeting

### Project 1186 Cost Summary for [Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement]

<table>
<thead>
<tr>
<th>Project #</th>
<th>NID Name</th>
<th>NID Filing Date</th>
<th>NID Approval Date</th>
<th>NID Estimated Cost</th>
<th>PPS Estimated Cost</th>
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<th>Total Changes</th>
<th>Percent Change of Auth</th>
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<tr>
<td>1186</td>
<td>Thickwood Hills 240 kV Transmission Development and Reactive Power Reinforcement</td>
<td>2015-12-16</td>
<td>2015-03-12</td>
<td>132.43M</td>
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<td>132.43M</td>
<td>132.43M</td>
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</table>

### Project 1186 Details by FA

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<th>Cost Grouping</th>
<th>FA #</th>
<th>FA Name</th>
<th>Stage</th>
<th>Facility Application Filing Date</th>
<th>Facility Application Approval Date</th>
<th>Overall Facility ISD</th>
<th>PPS Estimated Cost</th>
<th>Authorized Cost</th>
<th>Authorized Budget</th>
<th>No Of Changes</th>
<th>Percent Change of Auth</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATCO</td>
<td></td>
<td>1</td>
<td>1</td>
<td>Thickwood</td>
<td>2015-12-14</td>
<td>2016-06-27</td>
<td>2018-10-01</td>
<td>132.43M</td>
<td>0.00M</td>
<td>132.43M</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

### Comments

ATCO target is to file the Facility Application by the end of 2015.
Appendix E: Transmission Facility Owners Responses

Under the TFCMC’s mandate, the Committee shall allow Transmission Facility Owners (TFOs) to review and provide written comments on any report produced that references a TFO or a project a TFO is developing. The following responses were received in regards to the December 2015 Report.

May 13, 2016

Henry Yip
Transmission Cost Monitoring Committee
Email: hcyip@telus.net

Subject: 10th Semi Annual Transmission Cost Monitoring Committee Report

Henry,

Thank you for the opportunity to review the TFCMC’s tenth semi-annual Transmission Cost Monitoring Committee Report. AltaLink continues to be supportive of reviewing project progress with the TFCMC in order to provide customer associations more visibility to project costs.

As noted in the Message from the Chair, 2016 was a big year with 4 large project developments completing in the year; Christina Lake Area Development (4 projects), East Calgary Transmission Project (2 projects), Foothills Area Transmission Development (4 projects) and the North South Reinforcement HVDC Project (3 projects). The completion of these 4 project developments or 13 individual projects was a significant industry effort by AltaLink, ATCO and Enmax to deliver new transmission capacity as effectively and efficiently as possible by reinforcing Alberta’s bulk transmission system to meet new customer demand.

Both the Foothills Area Transmission Development and the Western Alberta Transmission Line (WATL) are critical components to support the Alberta Governments Renewable Plan. I am happy to report that since the commercial operation of WATL, we have sustained multiple days of high flow rates of 1000MW to move wind energy from the south to the north of the province thus truly demonstrating the value and capability of the HVDC technology.

I am also happy to update the Committee that TransAlta has reached agreement with the Enoch First Nations to gain access to their lands to allow completion of the 1043Line. AltaLink is working with both parties to plan the work and we are targeting project completion in Q4 of 2016. This is the last component of the Edmonton Region 240kv Line Upgrade Project.

Thanks you again for the opportunity to comment on the report.

Regards,

Johanne Picard-Thompson
SVP Projects, AltaLink

cc Greg Retzer - AESO, VP Transmission Projects
Kelly Yagelnisk – AESO, Director Transmission Program Support
May 17, 2016

Henry Yip, Chair
Transmission Facilities Cost Monitoring Committee
Email: hcyip@telus.net

Dear Mr. Yip:

RE: TFCMC December 2015 Report

EDTI appreciates the opportunity to review and comment on the December 2015 Report from the Transmission Facilities Cost Monitoring Committee (the “Committee”).

As stated in our comments to previous reports, EDTI remains supportive of the Committee and its efforts to understand Alberta transmission infrastructure projects and the various factors that can impact the cost, scope and schedule of these projects.

If you have any questions about EDTI’s comments, please do not hesitate to contact me at 780-441-7111.

Regards,

<original signed>

Jay Baraniecki
Director, EDTI Regulatory Affairs
May 16, 2016

Henry Yip  
Chair, Transmission Facilities Cost Monitoring Committee  
1701 TD Tower  
10088 – 102 Avenue  
Edmonton, AB T5J 2Z1

Dear Sir:


Thank you for the opportunity to review and comment on the Transmission Facilities Cost Monitoring Committee’s (TFCMC) tenth report dated December 2015. ATCO Electric (ATCO) remains committed to working on a collaborative basis with all industry participants to increase the levels of trust within, as well as the understanding of our complicated industry.

ATCO commends the TFCMC for initiating changes to its operating approach, namely, the use of video conferencing and move to bi-monthly meetings, in a desire to be more efficient and cost-effective in a reduced project activity environment.

As noted in the TFCMC’s ninth report dated June 2015, Alberta Energy had commissioned a review of the TFCMC’s mandate. ATCO looks forward to the TFCMC sharing the results of this review with stakeholders and implementing any other efficiencies that may have been identified as a result of this review.

Please contact me at 780-420-7434 if you have any questions or require any clarification to the comments included herein.

Yours sincerely,

Dennis A. DeChamplain, C.A.  
Senior Financial Officer  
ATCO Electricity Global Business Unit
Notes
DECEMBER 2015 REPORT
TFCMC@gov.ab.ca

Electronic versions of the TFCMC reports can be found at:
ucahelps.alberta.ca/regulatory-reporting.aspx

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