

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

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Participant-Related Costs for DFOs (Substation Fraction) and DFO Cost Flow-Through Technical Session (1). This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4 or by telephone at 403-539-2528.

Participant-Related Costs for DFOs (Substation Fraction) and DFO Cost Flow-Through Technical Session (1)

Feb. 27, 2020

Welcome and Introductions

Time	Agenda Item	Presenter
9:00 – 9:05	Welcome, introduction, purpose and session objectives	Stack'd / AESO
9:05 - 9:30	Overview of engagement process: <ul style="list-style-type: none"> • Share overall approach and schedule for engagement • Clarify what stakeholders can expect as we move through the process • Discussion on approach and schedule 	AESO
9:30 – 10:45	Level-setting: Getting to a common understanding <ul style="list-style-type: none"> • AESO to present on legislation, terminology, purpose and application of the treatment of participant-related costs for DFOs • Discussion period to follow presentation 	AESO All
10:45 – 11:00	Break	
11:00 – 11:45	Level-setting: Getting to a common understanding <ul style="list-style-type: none"> • FortisAlberta to present on participant-related cost impact and DFO flow-through of costs • Discussion period to follow presentation 	FortisAlberta All
11:45 – 12:15	Lunch	

Time	Agenda Item	Presenter
12:15 – 1:45	<p>Level-setting: Getting to a common understanding</p> <ul style="list-style-type: none"> • The following to present on participant-related cost impact and DFO flow-through of costs: <ul style="list-style-type: none"> ○ BluEarth Renewables ○ Innogy Renewables Canada ○ Siemens Energy • Discussion period to follow presentations 	<p>BluEarth Renewables, Innogy Renewables, Siemens Energy, All</p>
1:45 – 2:00	Break	
2:00 – 3:45	<p>Present initially identified principles (AESO)</p> <p>Discussion on any missing, duplicative or unnecessary principles (All)</p> <p>Instructions for breakout discussions (Stack'd)</p> <p>Breakout discussion on principles (All)</p> <p>Group report back</p>	<p>All</p>
3:45 – 4:00	Session close out and next steps	Stack'd / AESO

- Objectives of the technical sessions(s) include facilitation of:
 - i. a common understanding of the purpose and application of the substation fraction formula;
 - ii. agreement on high-level principles applicable to the substation fraction formula including, for instance, cost certainty for DCGs, parity between TCGs and DCGs regarding local interconnection costs, and certainty for DFOs regarding the flow-through of costs to be attributed to DCGs; and
 - iii. a common understanding of the financial impacts associated with the substation fraction and any associated flow-through of local interconnection costs to different stakeholder groups, including DCGs, transmission connected generation (TCGs), DFOs, and ratepayer.

- Purpose
 - Build a common understanding of the purpose and application of participant-related costs for DFOs (substation fraction formula) and DFO cost flow-through; and
 - Develop and identify high-level principles applicable to participant-related costs for DFOs and DFO cost flow-through.

Overview of Engagement Process

OUR ENGAGEMENT PRINCIPLES

Inclusive and Accessible

Strategic and Coordinated

Transparent and Timely

Customized and Meaningful

- The AESO intends to:
 - engage with stakeholders regarding the issues to be examined and the action items to be undertaken, as identified in the technical session(s)
 - work towards the development of a joint proposal with distribution facility owners (DFOs) and distribution connected generation (DCGs) regarding a path forward based on the feedback gathered at the technical session(s)
- A joint proposal, if achieved, or individual proposals regarding the attribution and flow-through of transmission costs to DCGs would then be filed in the consolidated proceeding for consideration and determination by the Commission

Alberta Utilities Commission (AUC) Participation in Working Sessions

Overview of process schedule

Session 1 <i>Feb. 27, 2020</i>	Session 2 <i>March/April 2020</i>	Session 3 <i>April 2020</i>	Session 4 <i>If required</i>
<p>Session objectives:</p> <ul style="list-style-type: none"> • Clarify intent and understanding of participant-related costs for DFOs (Substation Fraction) and DFO cost flow-through • Review and collect input on high-level principles 	<p>Session objectives:</p> <ul style="list-style-type: none"> • Review high-level principles • Discuss and evaluate proposals for participant-related costs for DFOs (Substation Fraction) and DFO cost flow-through 	<p>Session objectives:</p> <ul style="list-style-type: none"> • Final discussion and evaluation of proposals • Share process for preparation of report for the AUC 	<p><i>Session objectives to be shared if required</i></p> <p><i>This session would likely be held via webinar.</i></p>

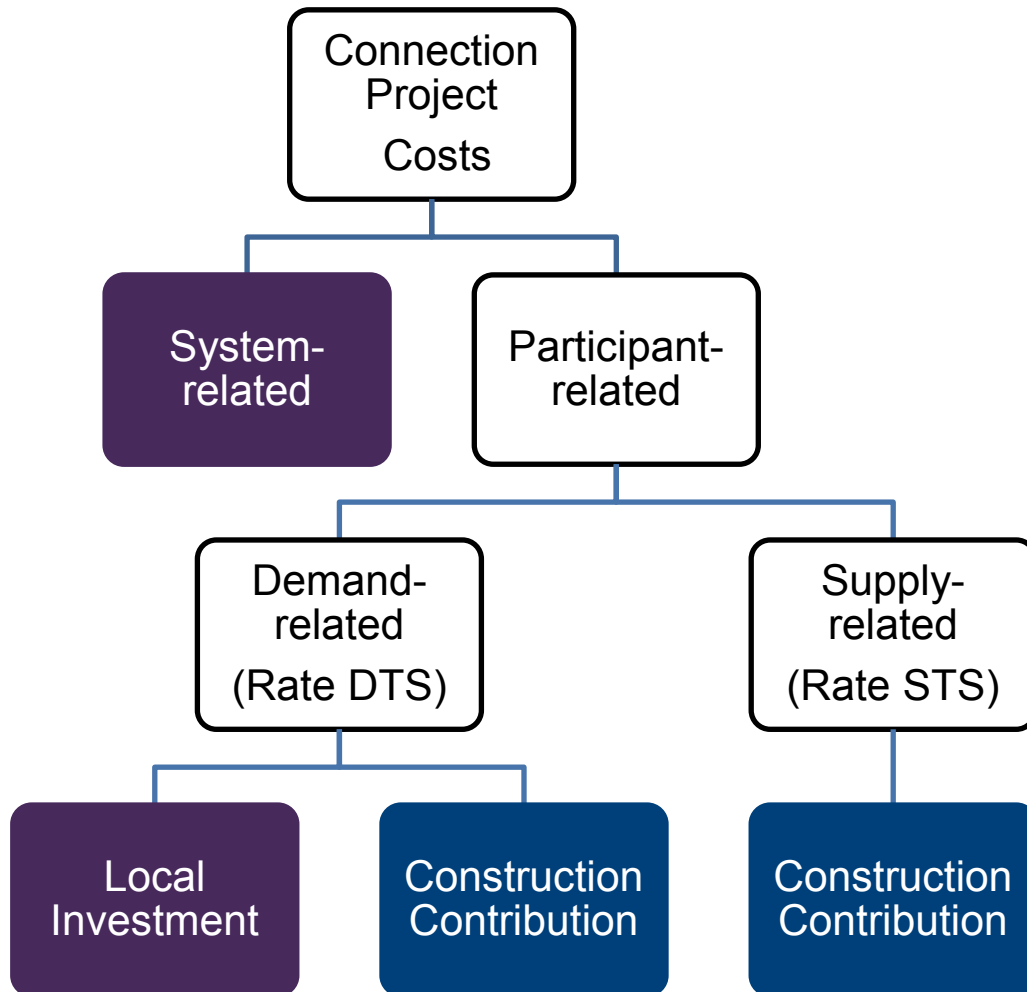
The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Speak one at a time
- Balance airtime fairly
- Keep an open mind

Level-setting: Getting to a Common Understanding – AESO

- Loads pay for most costs:
 - Non-radial/networked transmission costs, through monthly charges for system access
- Bulk system, regional system, and point-of-delivery (POD) charges
 - Participant-related (radial transmission facility) costs, through upfront contribution payment and investment
 - Ancillary services costs and the AESO's own costs, through monthly charges
- DFOs pay for the just and reasonable costs of the transmission system, to the extent required by the ISO tariff
 - DFOs do not pay “local interconnection costs”

- Generators pay for fewer costs:
 - Participant-related (radial transmission facility) costs, through upfront contribution payment
 - aka “**local interconnection costs**”
 - no investment available to generator connections
 - Generating unit owner’s contribution, through upfront contribution payment which is refundable over time based on performance
 - Line losses, through monthly charges



Transmission facility owner (TFO) incurs connection project costs which are “paid back”

Costs classified as system-related or participant-related

Average substation fraction methods are used to determine:
(1) cost allocation for shared facilities; and
(2) for load, eligibility for investment

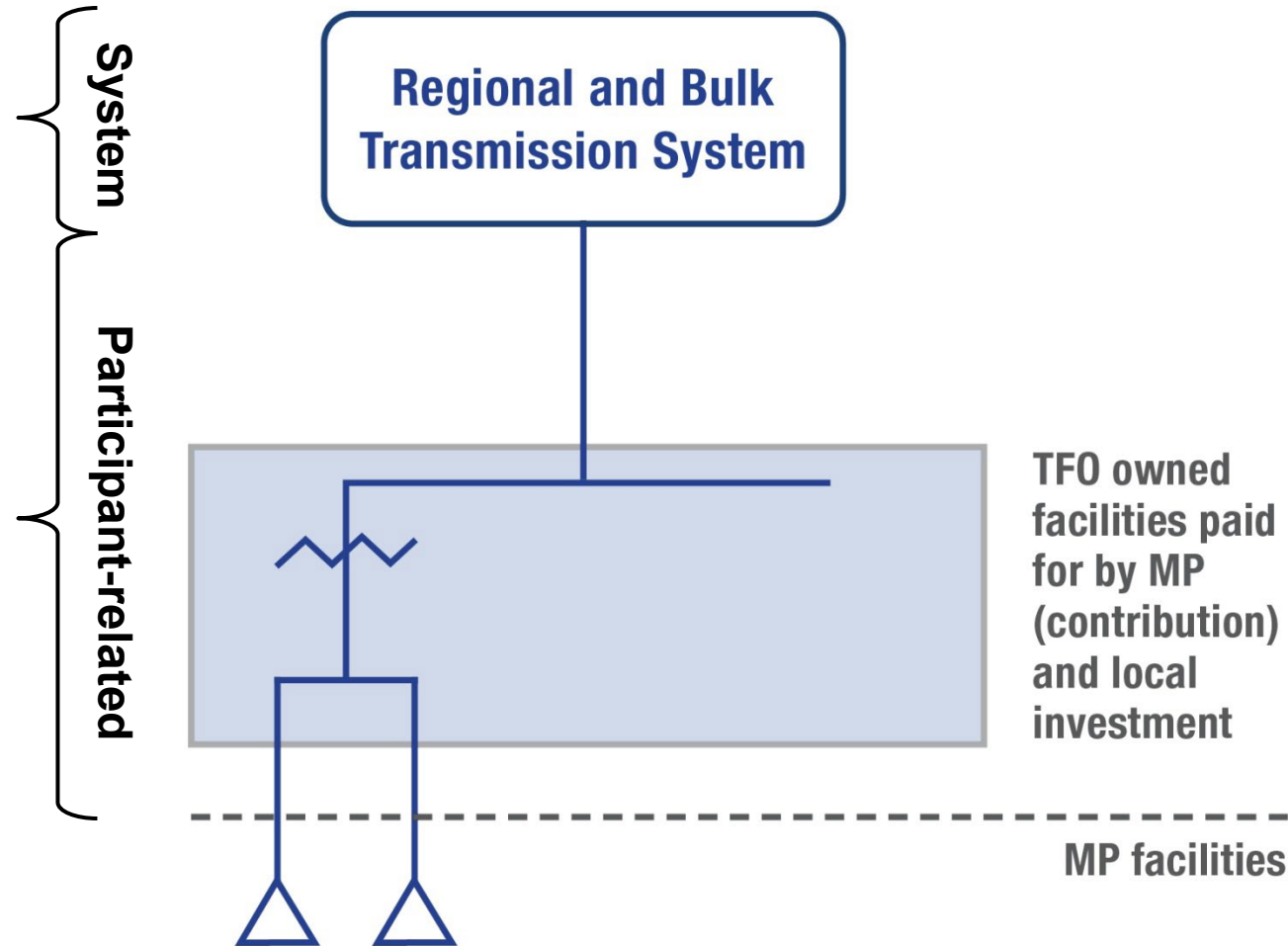
Local investment is only available for load; costs exceeding local investment are paid through upfront contribution (by market participant)

System versus participant-related costs

System costs, or **system-related costs**, are non-radial/network transmission costs paid by rate payers

Connection project costs classified as **participant-related** are paid by market participants (MP) and local investment (for load)

The substation fraction used only to allocate **participant-related** costs



Example 1a: Current practice for determining participant-related costs (Non-DFO)

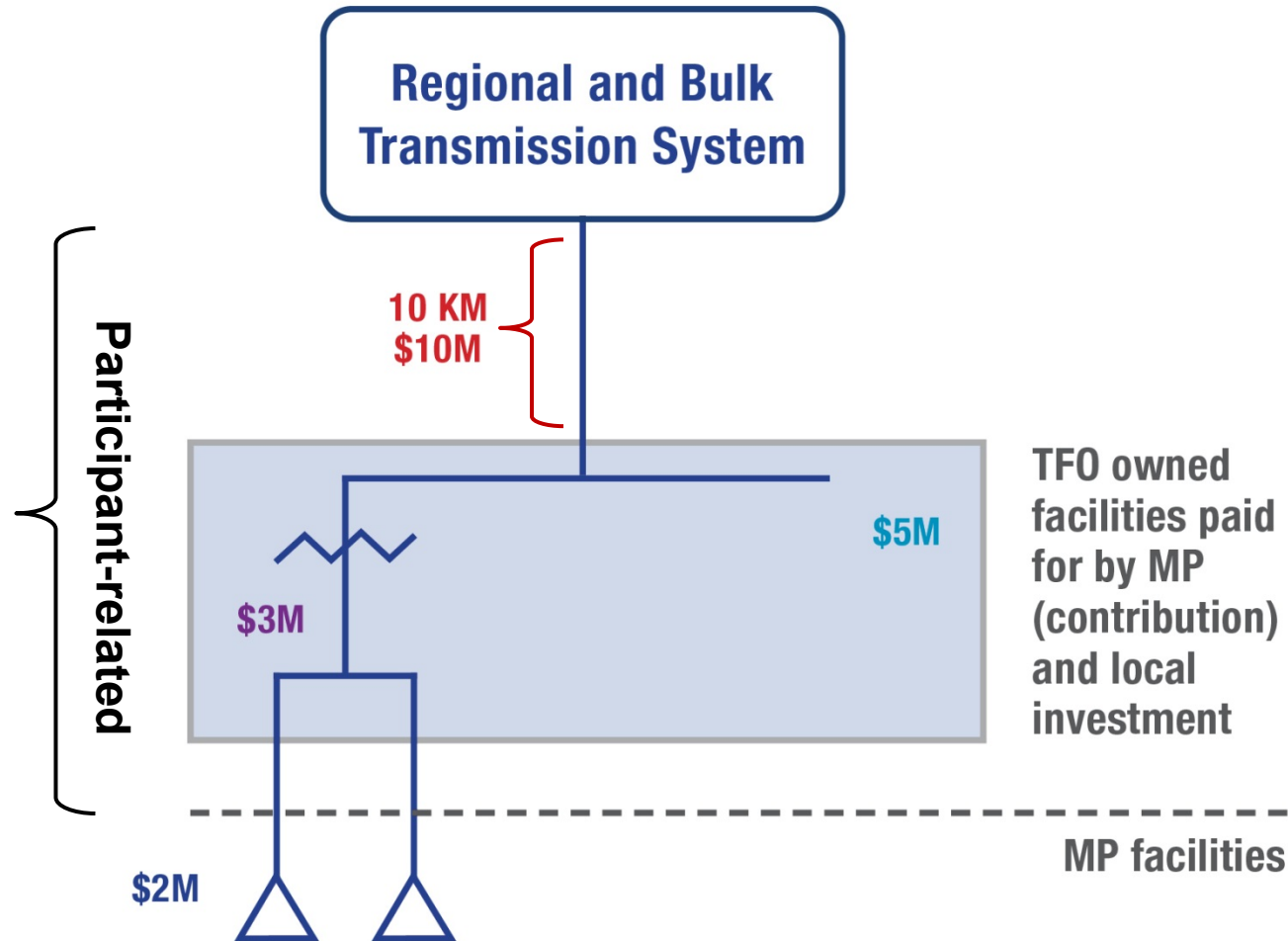


TFO incurs costs that are paid back by MP and local investment:

\$10M transmission line
+ \$5M substation
+ \$3M transformer
=\$18M

The portion of \$18M not covered by local investment is paid by the MP via a construction contribution

Costs for MP facilities:
\$2M



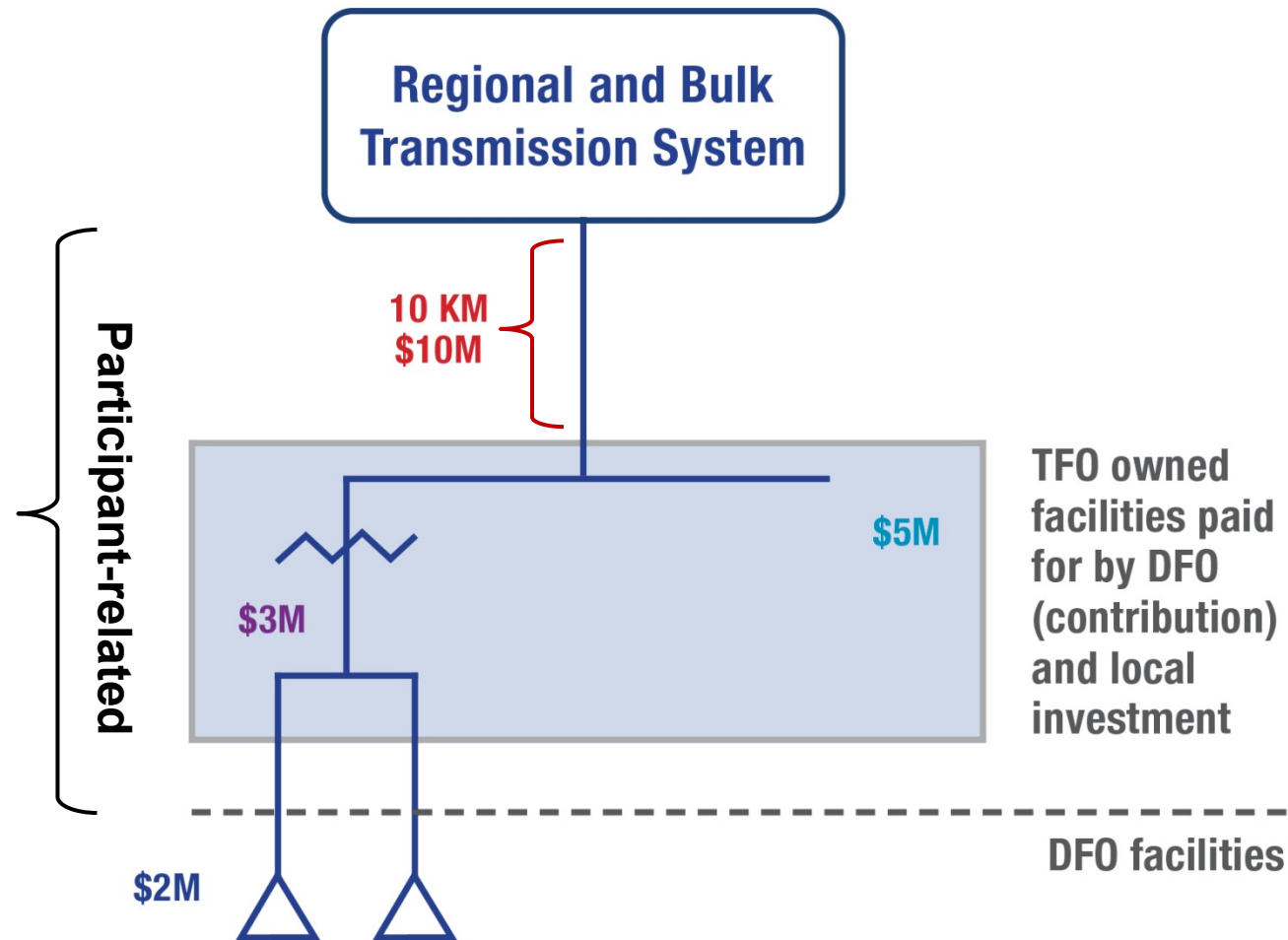
Example 1b: Current practice for determining participant-related costs (DFO)

TFO incurs costs that are paid back by DFO and local investment:

\$10M transmission line
+ \$5M substation
+ \$3M transformer
=\$18M

The portion of \$18M not covered by local investment is paid by the DFO via a construction contribution

Costs for DFO facilities:
\$2M



- Load market participants taking service under Rate DTS are eligible for “local investment”
 - available for participant-related costs deemed demand-related
- Investment dollars are an economic incentive provided to load customers by transmission ratepayers to manage the upfront costs of connecting to the grid
- Investment is recovered from all load market participants through the monthly POD charge in Rate DTS
 - amount is based on capacity
 - investment levels are based on contribution policy
- Generators are not eligible for investment; Rate STS does not have a monthly “repayment” element

Local investment – how is it calculated?

Column A	Column B	Column C
Tier	Investment for Service Under Rate DTS	Investment for Service Under Rate DTS with Rate PSC
(c) Substation fraction (for new points of delivery only)	\$79 900/year	\$16 780/year
(d) First ($7.5 \times$ substation fraction) MW of contract capacity	\$32 350/MW/year	\$6 790/MW/year
(e) Next ($9.5 \times$ substation fraction) MW of contract capacity	\$20 250/MW/year	\$4 250/MW/year
(f) Next ($23 \times$ substation fraction) MW of contract capacity	\$14 150/MW/year	\$2 970/MW/year
(g) All remaining MW of contract capacity	\$9 150/MW/year	\$0/MW/year

Changes to construction contribution – single market participant

- As per the current ISO tariff, when a market participant requests a change to Rate DTS contract capacity, the AESO adjusts the construction contribution decision (CCD) for the last construction project within 20 years:
 - if DTS capacity increases, the market participant may be eligible for additional local investment (i.e., a refund of prior construction contribution)
 - if DTS capacity decreases, the AESO may “claw-back” local investment (i.e., the market participant will be required to pay an additional construction contribution amount)

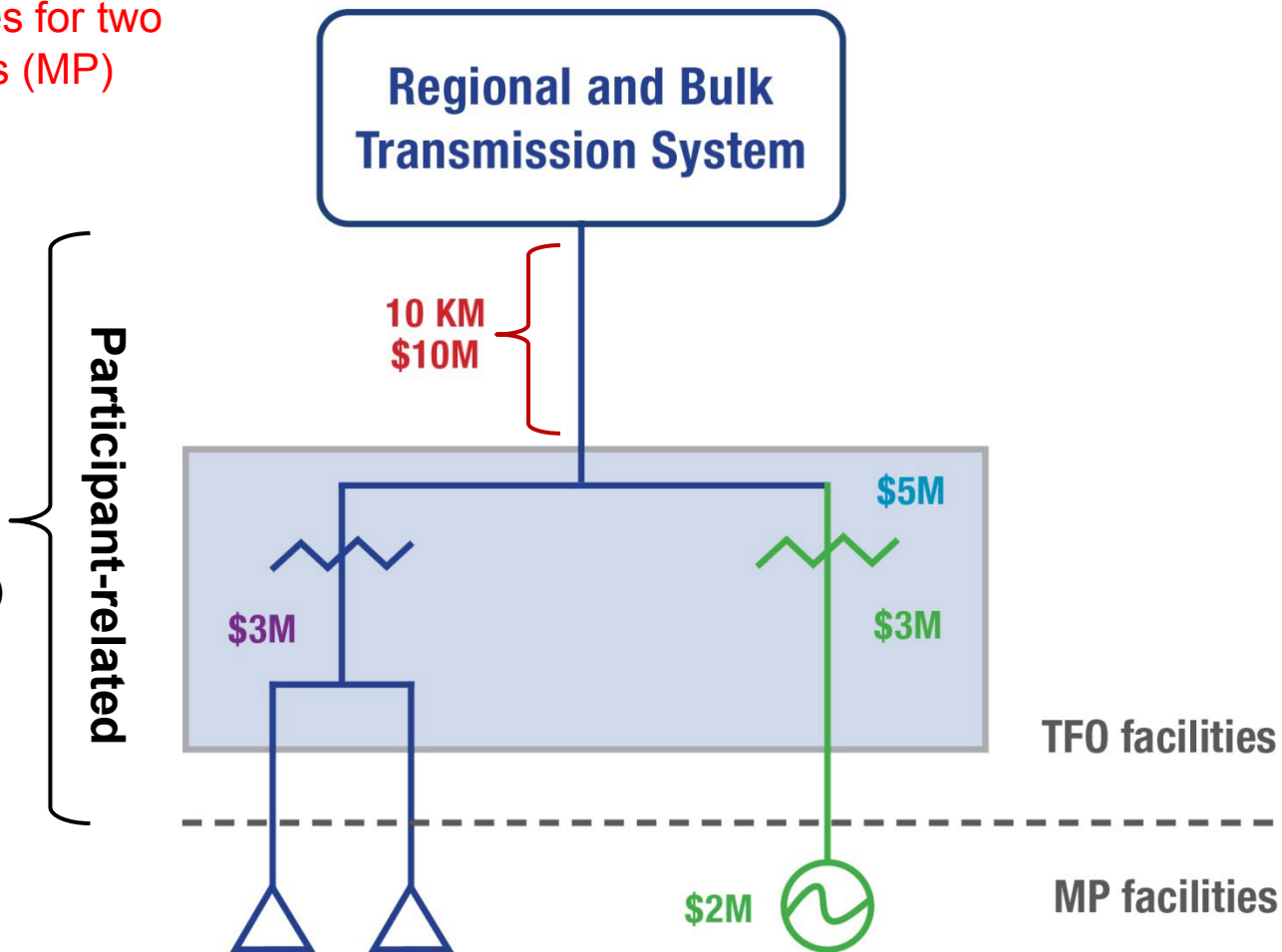
Changes to construction contribution(s) – multiple market participants

- When a market participant obtains system access service through facilities that have already been paid for by another market participant, the ISO tariff provides that the participant-related costs of that access are **not** limited to the incremental costs of connecting
 - instead, the participant-related costs will also **include** a portion of the shared costs previously paid by the other market participant for existing transmission facilities
- To allocate participant-related costs used by multiple market participants, the ISO tariff requires the AESO to calculate the **average substation fraction** over a 20-year period for each market participant

Example 2a: Multiple market participants

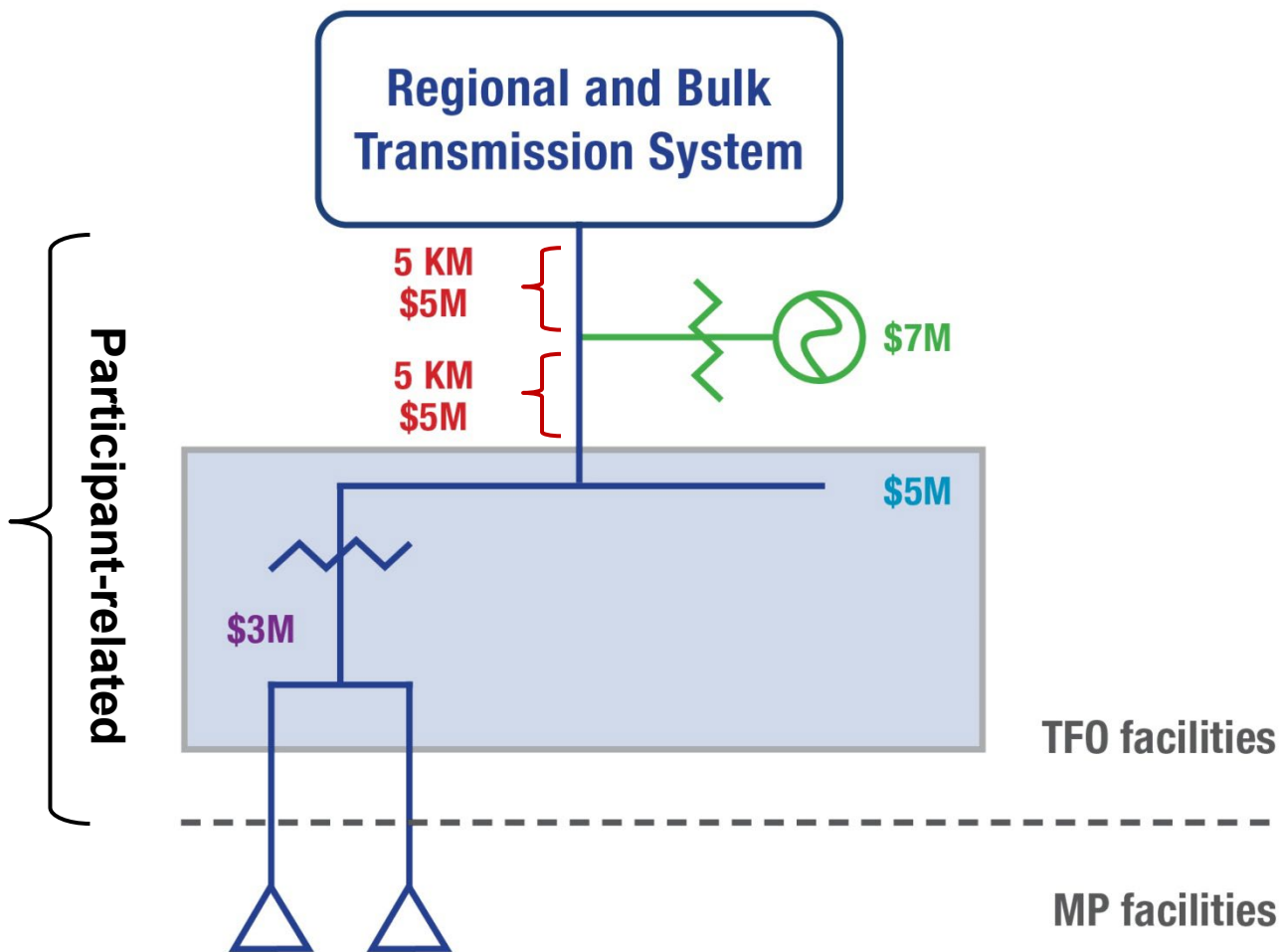
There is a provision for the shared costs of transmission facilities for two (or more) market participants (MP)

Generator to “share” substation:
\$3M transformer addition
+ \$2M other generator costs
+ Share of \$15M
(capacity and time weighted)
for radial transmission line
and substation



Example 2b: Multiple market participants

Generator connects to transmission line:
\$7M new generator facilities
+ **Share of \$5M** (capacity and time weighted) for **5km portion of radial transmission line**



- The “substation fraction” definition, and the requirement to allocate costs using the substation fraction, has not changed since the 2005 ISO tariff:
 - A substation fraction is **“the share of a substation's capacity attributable to a market participant under Rate DTS or Rate STS, calculated by dividing the contract capacity of the individual system access service by the sum of all contract capacities of all system access services provided at the same substation under Rate DTS and Rate STS.”**

- The AESO uses the substation fraction to:
 - calculate the POD portion of Rate DTS monthly charges
 - calculate the amount of local investment available
- The practice of calculating and applying the substation fraction is straightforward when:
 - the market participant requests both Rate STS and Rate DTS on day one (SASR – System Access Service Request)
 - Rate STS service is not contracted for at a POD
 - determining the shared costs at a POD with multiple market participants

What happens to the substation fraction when Rate STS capacity is introduced?

- No longer straightforward
- The addition of Rate STS contract capacity at a POD affects the substation fraction, which is an input to determining local investment
- Changing the substation fraction by adding Rate STS capacity results in:
 - an increase in supply-related costs; the corresponding decrease in demand-related costs means that less participant-related costs are eligible for local investment (i.e. market participant pays additional construction contribution)
- There is only one way to calculate the substation fraction, but different approaches to allocating demand and supply-related costs can be taken in these circumstances

- Previous versions (before 2019) of the AESO’s Contribution Calculator Information Document (“ID”) used an “incremental substation fraction” method to calculate the demand and supply-related cost allocation and construction contribution
- The “incremental” approach:
 - only looks at the incremental cost to connect (point-in-time); and
 - was used at a time when the addition of Rate STS service to a DFO POD was not contemplated (historically, we only had straightforward scenarios)
- The AESO determined that the incremental methodology doesn’t capture the full share of costs reasonably attributed to DCG

Incremental methodology does not capture all participant-related costs

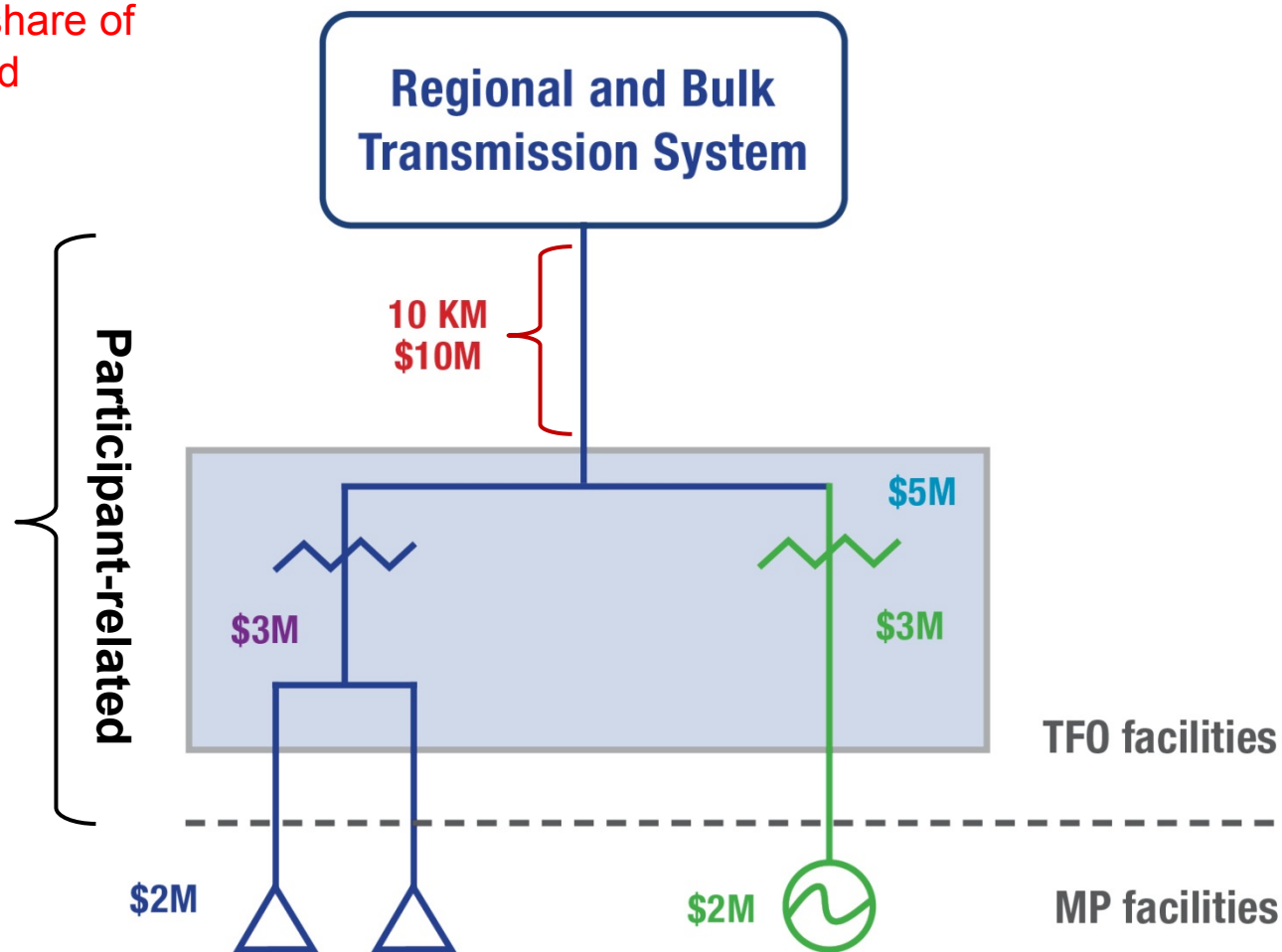
- To determine the share of costs for facilities already constructed and reasonably attributable to DCG, the AESO refined the methodology to:
 - reflect a time-weighted average to account for changing contract capacities over time
 - account for historical costs and not just the point-in-time incremental costs of connection / capacity changes
- The AESO reflected this refinement in the calculation of demand and supply related costs in its 2019 Contribution Calculator ID
 - however, CCDs based on prior versions of the ID were manually adjusted on a case-by-case basis to reflect the concepts above

- To better allocate the costs of services being obtained by a single market participant such as a DFO, the AESO refined the demand and supply-related cost methodology, to address and reflect the increase in DCGs
- Under the refined cost methodology, a market participant pays for a share of the historical cost of facilities that have already been constructed:
 - certain events, including changes to contract capacity, warrant adjustments to a market participant's previous CCD
 - instead of replicating the shared facilities concepts by accounting for all costs in the previous 20 years, the AESO limited the historical look-back to the last construction project in the last 20 years

Example 3a: One market participant

Shared facilities provision provides that MPs should pay for a share of facilities already constructed

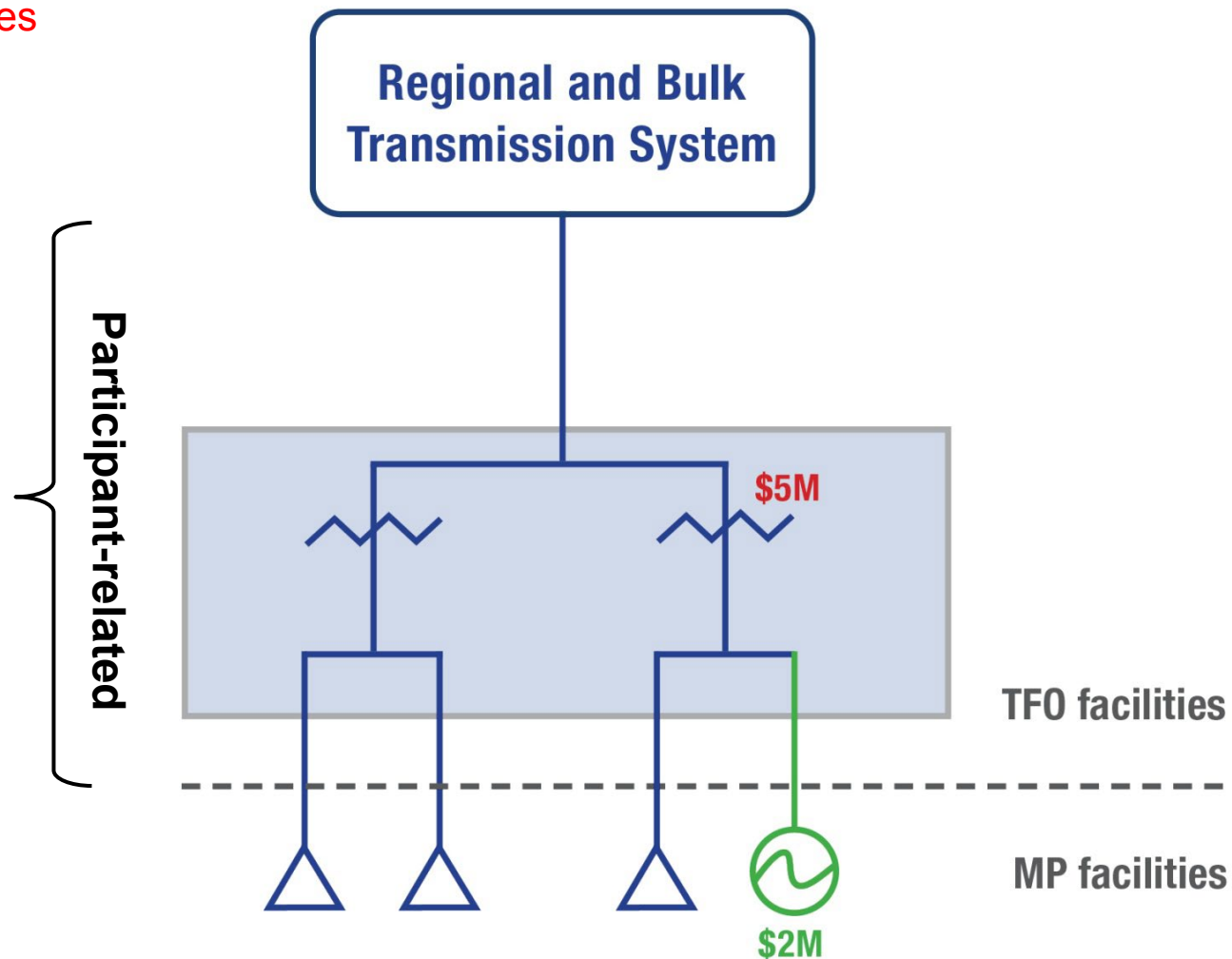
Generator to “share” substation:
\$3M transformer addition
+ \$2M other generator costs
+ Share of \$15M (capacity and time weighted) for radial transmission line and substation



Example 3b: One market participant

Current ISO Tariff provides that changes to contract capacities warrant an adjustment to a previous (most recent) construction contribution

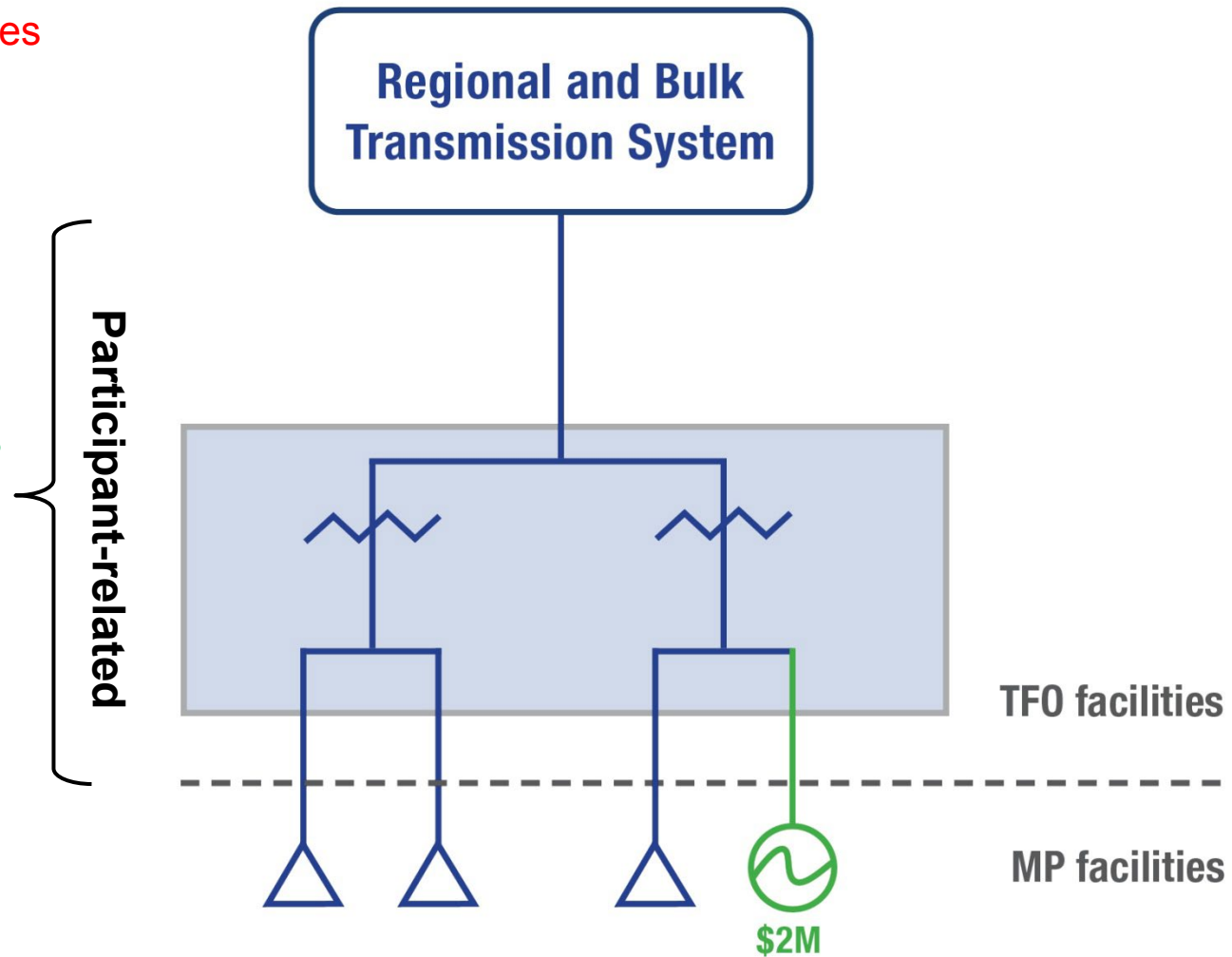
No transmission build:
\$2M other generator costs
+ **Share of \$5M** (capacity and time weighted) for a **transformer addition** 5 years ago



Example 3c: One market participant

Current ISO Tariff provides that changes to contract capacities warrant an adjustment to a previous (most recent) construction contribution

No transmission build:
\$2M other generator costs
+ Share of \$0 since no construction in the last 20 years



Initial AESO cost allocation principles – for discussion

1. Parity between transmission interconnection costs calculation for transmission connected customers and distribution connected customers
 - **Fairness, effective price signals**
2. Market participants should be responsible for an appropriate share of the costs of transmission facilities that are required to provide them with access to the transmission system (may include paying a contribution towards facilities paid for by other customers and refund to the customer that paid)
 - **Fairness, cost causation**
3. Costs should not be allocated to a DCG customer after the DCG has energized, if the DCG is not directly causing those costs
 - **Certainty of future costs, stability**
4. DFOs should be provided with reasonable certainty re: cost treatment/recovery
 - **Certainty of future costs, stability**

- Changing the substation fraction by adding DCG leads to an increase in supply-related costs
 - ultimately results in the market participant paying additional construction contribution
- A fair allocation of demand- and supply-related costs should reflect that DCGs are using DFO facilities previously paid for by transmission ratepayers. The reduction of participant-related costs eligible for local investment safeguards against the subsidization of generation by transmission ratepayers.
 - DFOs are responsible for the increase in construction contribution but can determine what costs should be flowed-through to end customer and/or paid for by distribution ratepayers

Contract change:

1. It is the AESO's practice to go back to the last construction project at the DFO sub to recalculate investment and determine supply-related costs.
 - i. Is this appropriate if it is a load reliability project? (e.g., a DFO reliability project with a cost of \$20M)
 - ii. Or any upgrade project (breaker, transformer, etc.)?
2. Should we go back to the actual POD construction if in the last 20 years?
3. If there has not been any construction in the last 20 years, there is no recalculation of contribution. Is this reasonable?
4. Where the radial sub is a TFO asset, the DFO/DFO customers pay for the asset by way of contribution and DTS contract. Is this reasonable?
5. The calculator is not built to allocate costs when there is more than one DCG at a POD

Adding transmission assets:

1. Charged a contribution for the asset
2. Could be a breaker, could be a transformer?
3. Recalculate contribution from last construction project (additional contribution required from DFO)

Break

Level-setting: Getting to a Common Understanding – FortisAlberta

AESO 2018 Tariff Decision Substation Fractioning Overview

Miles Stroh & Kevin Noble

February 27, 2020

FORTIS
ALBERTA

MISSION  **ZERO**
Bring it Home Preventable
Injuries

Electricity Delivery for Albertans, by Albertans

We deliver safe and reliable electricity service to more than 60 per cent of Alberta's total electricity distribution network.

- Serve over 240 communities
- Own and operate 124,000 km of power lines
- Employ over 1,100 Albertans
- With a service territory of more than 224,000 square km – conducive to renewable DCG
- Arrange for transmission system access with AESO at 255 Points of Delivery (PODs)

FORTIS
ALBERTA

MISSION  **ZERO**
Bring it Home Preventable
Injuries

Allocation of ISO Tariff Local Interconnection Costs to DFOs Distribution Tariff Flow-through to DCG

- EUA Framework for DFO Duties re: System Access Service (SAS) and Distribution-connected Generation (DCG)
- Overarching Principles for Solutioning
- ISO Tariff Substation Fraction Calculations – Case Studies

EUA Framework for DFO Duties re: SAS and DCG

Section 106:

(a) “to provide electric distribution service that is not unduly discriminatory”

(d) “..to arrange for the provision of system access service to customers in that service area”

(h) “to undertake financial settlement with the Independent System Operator for system access service”

(k) “to connect and disconnect customers and distributed generation in accordance with the owner’s approved tariff and with principles established by the Commission regarding distributed generation”

Principles for Substation Fraction Allocation to DFOs / DCG

- Reflect Cost Causation
- Provide Effective and Timely Price Signals to DCG
- Open, Non-discriminatory System Access for both T and D connected Generation
- Clear, Transparent and Timely Administration of Tariff(s) to DCG

Reflect Cost Causation

- Transmission Interconnection Costs for DCG
 - Consistent with Alberta tariff practice that Generators pay their full Interconnection Costs (T&D)
- STS-related costs (as determined by ISO tariff) are Supply (generation) driven transmission costs which are the cost responsibility of DCG
- DCG should not be responsible for costs properly attributed to load (DTS)
- All Transmission Costs are a Distribution Tariff Flow-through item
 - Must accord with Transmission Regulation - section 47(a) and approved tariffs
 - DFO “discretion” implies DFO interfering with AESO cost allocation signal to STS

Provide Effective and Timely Price Signals to DCG

- Contribution price signal can only be effective when the DCG proponent is aware of the costs it would be subject to, prior to proceeding with its project, and/or the TFO/DFOs and DCG being required to deploy of capital.
- DCG should not be allocated additional STS contribution costs after connection, unless STS levels (related to their project) change at POD
 - Represents an ongoing immitigable financial risk to DCG
- Timing of CCDs / STS Contribution(s) to DFO/DCG should be coordinated with: GUOC, establishment of STS contract level, STS losses factor, T&D interconnection costs for each DCG? - to enable DCG cost certainty before DCG project proceeding

Open, Non-discriminatory Access for both T and D Generation

- Level playing field and parity between T and D connected generation
- AESO's Substation Fraction method and practice was designed for the allocation of DTS and STS costs to a single T-connected participant; not suited for application to DFO's / DCG in its present form
- AESO's Metering Information Document raises AESO concerns with respect to same (transmission price signal to DCG, Option M)
- Adjusted Metering Practice (as approved) requires feeder metering for DCG, different from T-connected generation

Clear, Transparent and Timely Administration of Tariff(s) to DCG

- While substation fraction has been around for 20 years, AESO has not applied to DFOs/DCG until recently
 - Evolving and varying application of ISO tariff substation fraction / CCDs
- AESO's Adjusted Metering Practice
 - mechanics of grandfathering, establishment of STS levels, etc.
- In Distribution Tariffs, DFOs can establish corresponding STS levels in DCG interconnection agreements that mirror SAS Agreements with AESO
- AESO should develop an Information Document to make its CCD timing and contracting practices and rules more clear, consistent and transparent for DFOs / DCG

Construction Contribution Decision (CCD) Overview

- AESO completes and issues CCDs to:
 - Calculate construction contribution for system access service under Rate DTS
 - Calculate construction contribution & GUOC for system access service under Rate STS
- CCDs determine:
 - Allocation of Participant Related Costs between Demand and Supply Related
 - TFO Local Investment amounts
 - Construction Contribution Required

CCD Substation Fraction Summary

- Calculations based on ratio of total contracted DTS and STS and duration each is in effect
- TFO local investment is allocated proportionally to Demand Related Substation Fraction
- Substation Fraction allocation is applied over the 20-year AESO Local Investment period

- Events that can trigger a recalculation of Substation Fraction:
 - DCG connects and triggers STS contract at an existing substation
 - Substation upgrade occurs and an STS contract exists at that substation
 - DTS and STS contract levels are adjusted through time

CCD Substation Fraction Calculation

- Before 2019 AESO CCDs utilized incremental capacities
- 2019 AESO CCD utilizes total capacities

Contract Stages			Contract Capacities at Substation (MW)					
No	Start Date	Duration Months	Contracted After Project			Contracted Prior to Project		
			This Participant	STS	Other Participant	This Participant	STS	Other Participant
(1)	Jun 2019	240	20.00	15.00		8.00	15.00	
Total		240	CCD Attachment A1: Capacity Entries					

Attachment A3: Allocation of Costs and Substation Fractions

Participant: FortisAlberta Tariff: AESO 2019
 Project: Substation Fraction Presentation - Project after DG Effective: 1 Jan 2019
 Number: Project Number Type: DTS and STS To: Current

INCREMENTAL ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Participant-Related Costs of Required Facilities \$7,500,000

Contract Stages No	Start Date	Duration Years	Incremental Contract Capacity			Incremental Substation Fractions		
			This Participant	STS	Other Participant	This Participant	STS	Other Participant
(1)	Jun 2019	20.00	12.00	0.00	0.00	1.00000	0.00000	0.00000
Incremental Capacities								
Total		20.00	Duration-Weighted Average			1.00000	0.00000	0.00000
Allocation of Participant-Related Costs						\$7,500,000	\$0	\$0

CONTRACT AND TIME ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Contract Stages No	Start Date	Duration Years	Contract Capacity After Project			Substation Fractions After Project		
			This Participant	STS	Other Participant	This Participant	STS	Other Participant
(1)	Jun 2019	20.00	20.00	15.00	0.00	0.57143	0.42857	0.00000
Total Capacities								
Total		20.00	Duration-Weighted Average			0.57143	0.42857	0.00000
Allocation of Participant-Related Costs						\$4,285,714	\$3,214,286	\$0

Example #1 – DCG Connects After Upgrade Project



Example #1 – DCG Connects After Upgrade Project

- \$7,500,000 Substation Upgrade Project
 - In Service Date = June 1, 2019
 - DTS prior to upgrade = 8 MW
 - DTS after upgrade = 20 MW
 - Local Investment (TFO) = \$4,494,000
 - Construction Contribution (DFO) = \$3,006,000
 - 100% Demand Related Costs

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$7,500,000		\$0	8-6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant		NA	\$0	8-9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$7,500,000		\$0	8-6
(k)	Allocated Ratio	Other Participant NA	1.00000	0.00000	NA	8-6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$7,500,000	\$0	\$0	8-6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$4,494,000	NA	NA	8-8
(n)	Construction Contribution Required	(l) – (m)	\$3,006,000	\$0	\$0	8-7
(o)	Total Construction Contribution Required			\$3,006,000		8-7

Example #1 – DCG Connects After Upgrade Project

- 15 MW STS DCG Connects
 - In Service Date = June 1, 2021
 - 61.4% Demand Related Costs
 - \$4,607,143
 - 38.6% Supply Related Costs
 - \$2,892,857
 - New contribution allocated to DCG

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$7,500,000		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$7,500,000		\$0	8:6
(k)	Allocated Ratio	Other Participant NA	0.61429	0.38571	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$4,607,143	\$2,892,857	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$3,694,029	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$913,114	\$2,892,857	\$0	8:7
(o)	Total Construction Contribution Required		\$3,805,971			8:7
(p)	Construction Contribution Previously Paid for Project		\$3,006,000			5:2(8) or 9:2(2)
(q)	Additional Construction Contribution Required		\$799,971			5:2 or 9:4

Example #2 – Upgrade Project After DCG Connects



Example #2 – Upgrade Project After DCG Connects

- \$7,500,000 Substation Upgrade Project
 - In Service Date = June 1, 2019

	PRIOR	AFTER
DTS	8 MW	20 MW
STS	15 MW	15 MW

- Local Investment (TFO) = \$3,605,143
- Construction Contribution (DFO) = \$680,571
- Construction Contribution (DCG) = \$3,214,286
- 57.1% Demand Related Costs
- 42.9% Supply Related Costs

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$7,500,000		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant		NA	\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$7,500,000		\$0	8:6
(k)	Allocated Ratio	Other Participant NA	0.57143	0.42857	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$4,285,714	\$3,214,286	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$3,605,143	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$680,571	\$3,214,286	\$0	8:7
(o)	Total Construction Contribution Required			\$3,894,857		8:7

Example #2 – Upgrade Project After DCG Connects



Sub Fraction:

DTS 57.1%

STS 42.9%

Total Project Cost \$7.5M

TFO Local Investment \$3.6M

Fortis Contributions \$0.7M

DCG Contributions \$3.2M

$$\text{DTS} \frac{\frac{20\text{MW}}{15\text{MW} + 20\text{MW}} * 20\text{Yr}}{20\text{Yr}} = 57.1\%$$

$$\text{STS} \frac{\frac{15\text{MW}}{15\text{MW} + 20\text{MW}} * 20\text{Yr}}{20\text{Yr}} = 42.9\%$$

Example of Evolving Substation Fraction Methodology – Hayter Substation

Example Project #	CCD Date	DTS	STS	Total Project Cost	Demand Costs	Supply Costs	AESO Calculation Methodology
1	Mar 2016	29	0	\$4,998,437	\$4,998,437	\$ -	DTS Only
1	Jun 2017	29	10	\$4,998,437	\$62,480	\$4,935,957	Incremental Capacity & Time
1	Jul 2017	29	20	\$4,998,437	\$62,480	\$4,935,957	Incremental Capacity & Time
1	Nov 2017	29	25	\$4,998,437	\$ -	\$4,998,437	STS Only
1	Nov 2018	29	25	\$4,998,437	\$2,818,185	\$2,173,227	Total Capacity & Time
2	Nov 2017	29	0	\$18,073,889	\$18,073,889	\$ -	DTS Only
2	Aug 2018	29	25	\$18,073,889	\$9,036,945	\$9,036,945	Incremental Capacity & Time
2	Nov 2018	29	25	\$19,394,495	\$10,407,669	\$8,986,826	Total Capacity & Time

Lunch Break

Level-setting: Getting to a Common Understanding – DCGs

BluEarth Renewables Inc.

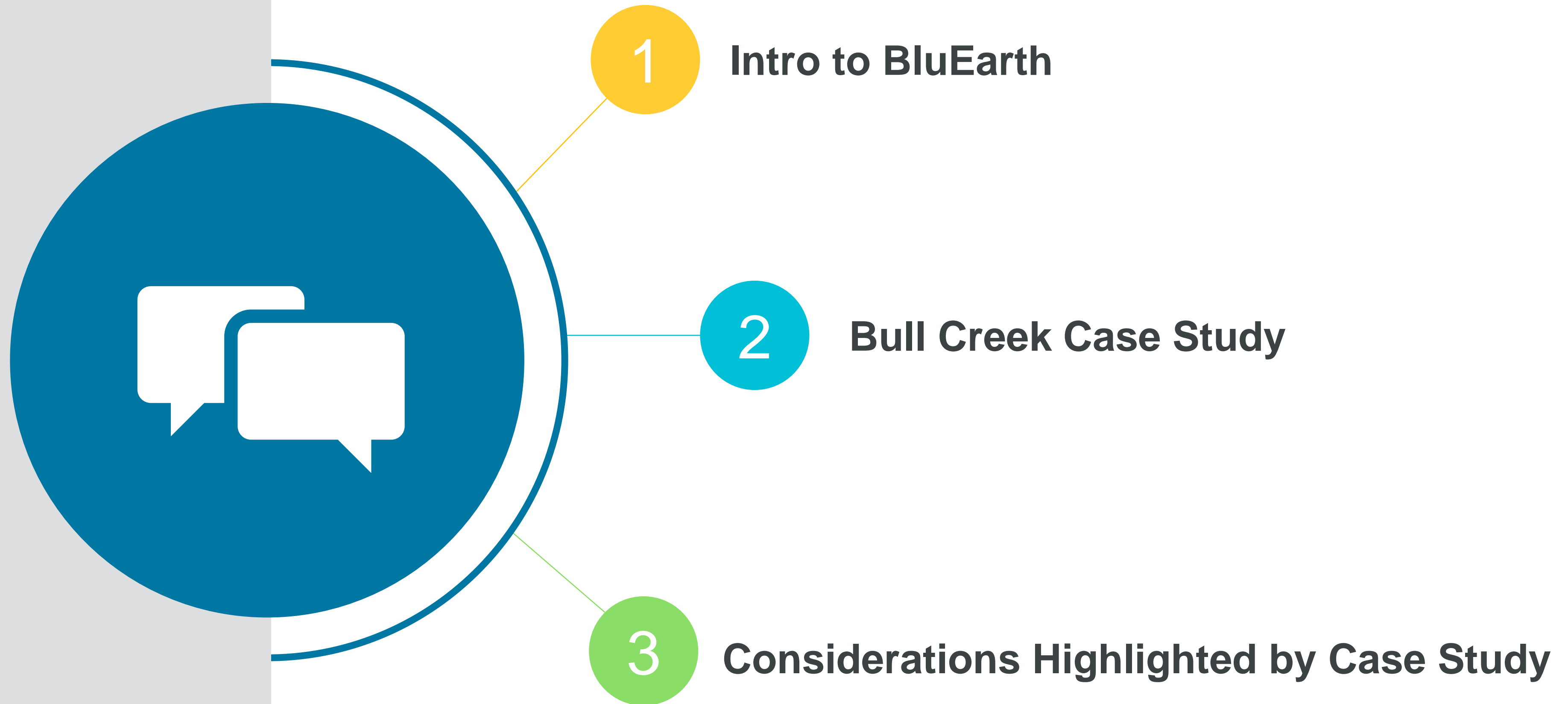


Bull Creek Wind Facility

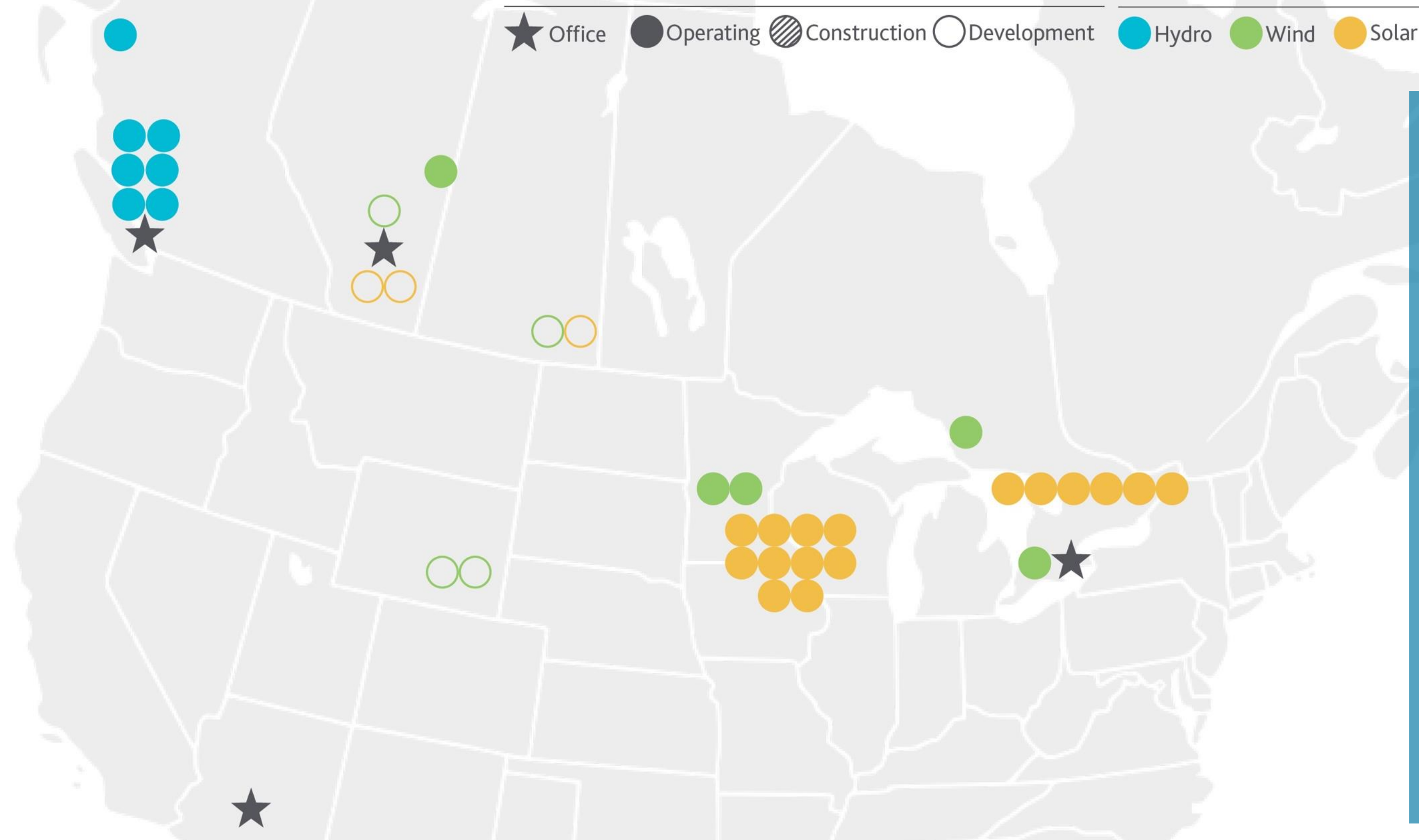
A Case Study in Substation Fractioning



Agenda

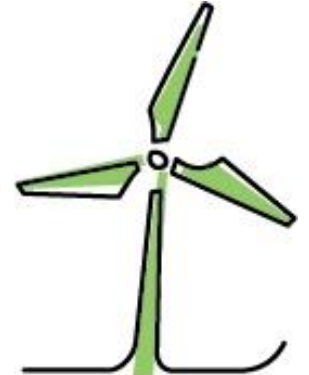


BluEarth Background



Highlights

- Headquartered in Calgary
- 24/7 Remote Operations Centre in Calgary
- Over 115 employees, 58% located in Alberta
- Over 170 MW of development projects in Alberta



160 MW

Wind in Operation (gross)



126 MW

Solar in Operation (gross)



120 MW

Hydro in Operation (gross)



1+ GW

Advanced Development



Bull Creek

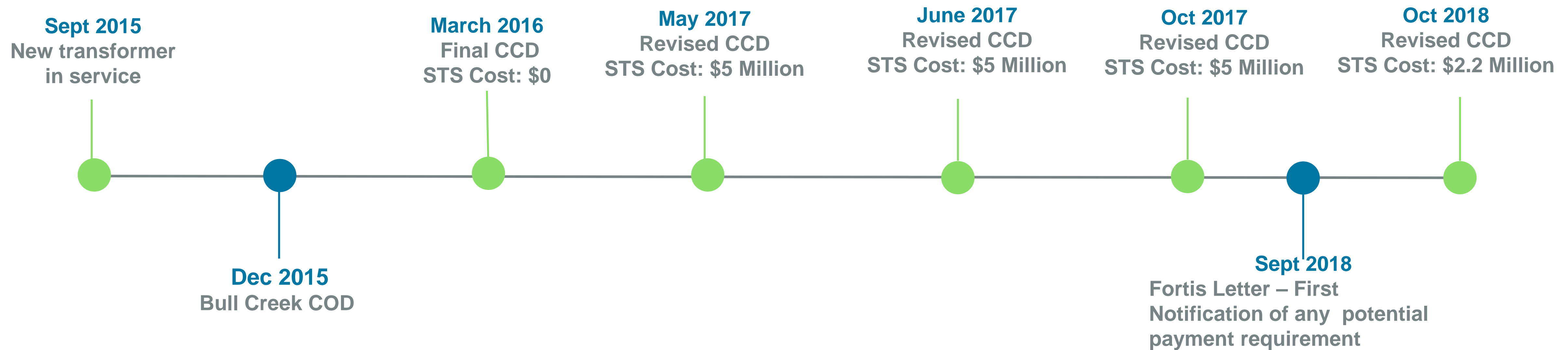
29.2 MW
Capacity

2015
COD

\$80M
CAPEX

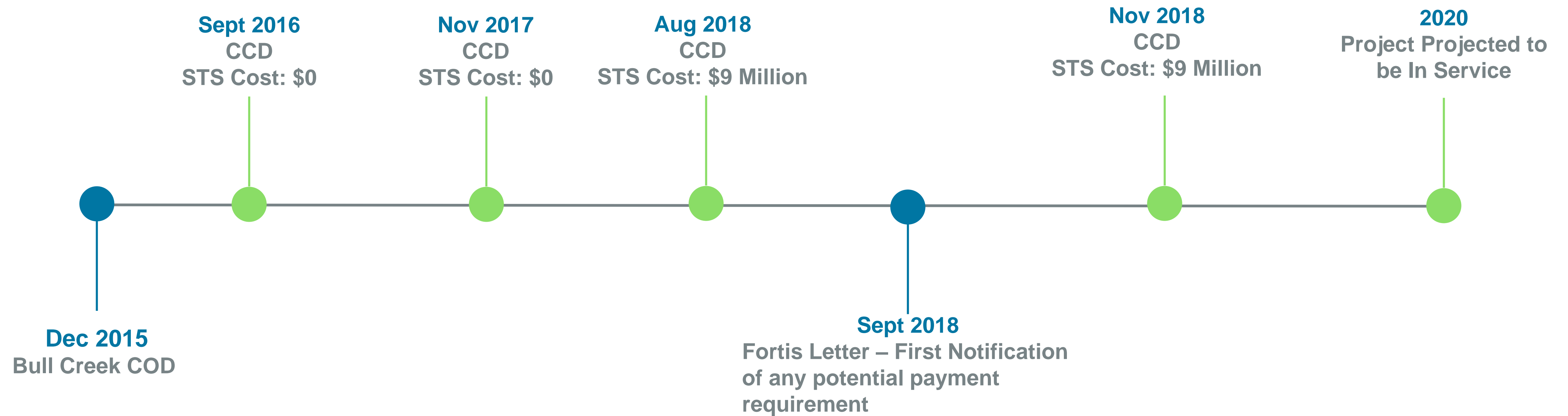
- **Connected at 25kV in Fortis territory to the Hayter Substation**
- **The only STS contract at the Hayter substation**
 - STS of 25.3 MW
 - DTS of 29.3 MW
- **Alerted by Fortis in September 2018 to potential exposure to two substation fractioning costs.**
 - P1495 – Substation Upgrade: New Transformer Installation (In Service September 2015)
 - P1782 – Transmission Reliability Project (Expected In Service 2020)

Project 1495: New Transformer Install at Hayter Substation



Source: Exhibit 22942-X0539

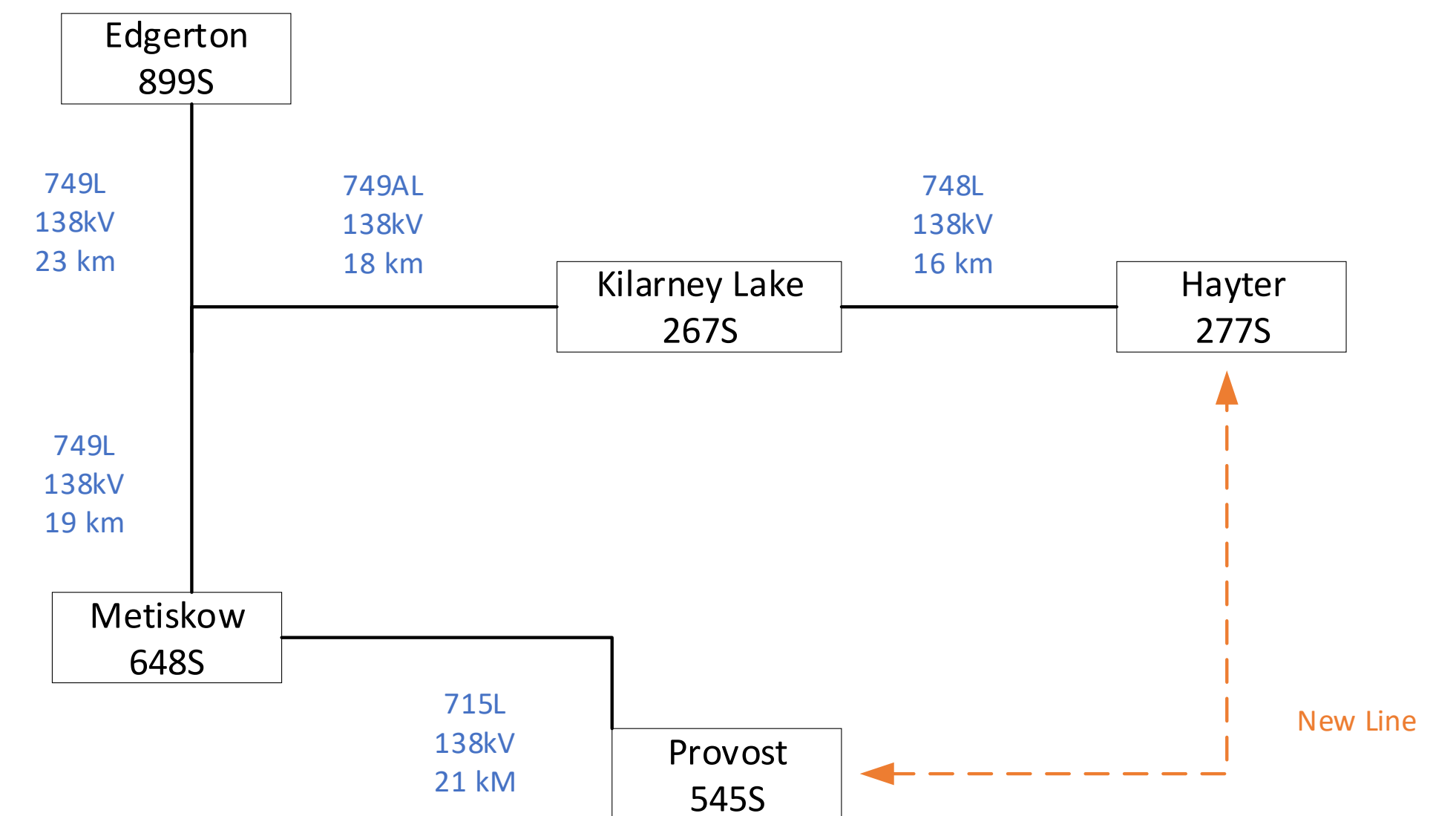
Project 1782: Reliability Upgrade



Source: Exhibit 22942-X0539

Project 1782 – Provost to Hayter Reliability Upgrade

- Cause – Load Reliability Project
 - With load increasing in the area, there is expected to be potential for transmission outages to create unacceptable amounts of unsupplied load.
 - No generation (either cause or benefit) mentioned in the DFO Need for Development Report or the AESO Needs Identification Document.
- Description
 - Add one 138 kV transmission line to connect the existing Hayter 277S substation and the existing Provost 545S substation
 - Associated required upgrades at affected substations
 - Construction not yet started
- Project Cost
 - \$ 41,877,164
- Portion of Project Cost Assigned to Hayter Substation
 - \$ 19,394,495



Source: Needs Identification Document,
NID Appendix E: DFO Need for Development Report

Project 1782 Costs Allocated to STS

CCD issued September 2016

- Project Type: **DTS**
- STS cost :\$0

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$35,201,000		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$35,201,000		\$0	8:6
(k)	Substation Fractions	Other Participant NA	1.00000	0.00000	NA	8:6(3)
(l)	Allocated Costs (j) x (k)	Other Participant NA	\$35,201,000	\$0	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$35,201,000	\$0	\$0	8:7
(o)	Total Construction Contribution Required		\$35,201,000			8:7

CCD issued November 2018

- Project Type: **DTS / STS**
- STS cost at Hayter (Bull Creek cost): \$8,986,826

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$19,394,495		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$19,394,495		\$0	8:6
(k)	Substation Fractions	Other Participant NA	0.53663	0.46337	NA	8:6(3)
(l)	Allocated Costs (j) x (k)	Other Participant NA	\$10,407,669	\$8,986,826	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$10,407,669	\$8,986,826	\$0	8:7
(o)	Total Construction Contribution Required		\$19,394,495			8:7



Benefit of Increased Reliability

Increased reliability from reliability projects has been presented as a benefit to DCG; however, the actual magnitude of that benefit has not been evaluated in recent proceedings.

With the Bull Creek example, we have the opportunity to evaluate benefit vs. proposed SF cost allocation.

Bull Creek Lost Opportunity from COD to Present Related to Transmission Down Time

Year	No. Transmission Related Outages	Lost MWh
2016	0	0
2017	3	184.5
2018	7	143.5
2019	1	1.9

Total, 4 years	329.9
Average per year	82.5

What is 82.5 MWh / Year in Dollars?

Present Value

MWh	82.5			
Years	20			
		Price (CAD/MWh)		
		40	60	80
Discount Rate	7%	\$34,950	\$52,424	\$69,899
	10%	\$28,086	\$42,129	\$56,172

Bull Creek Cost / Benefit





Transmission Project Exposure to Costs after COD

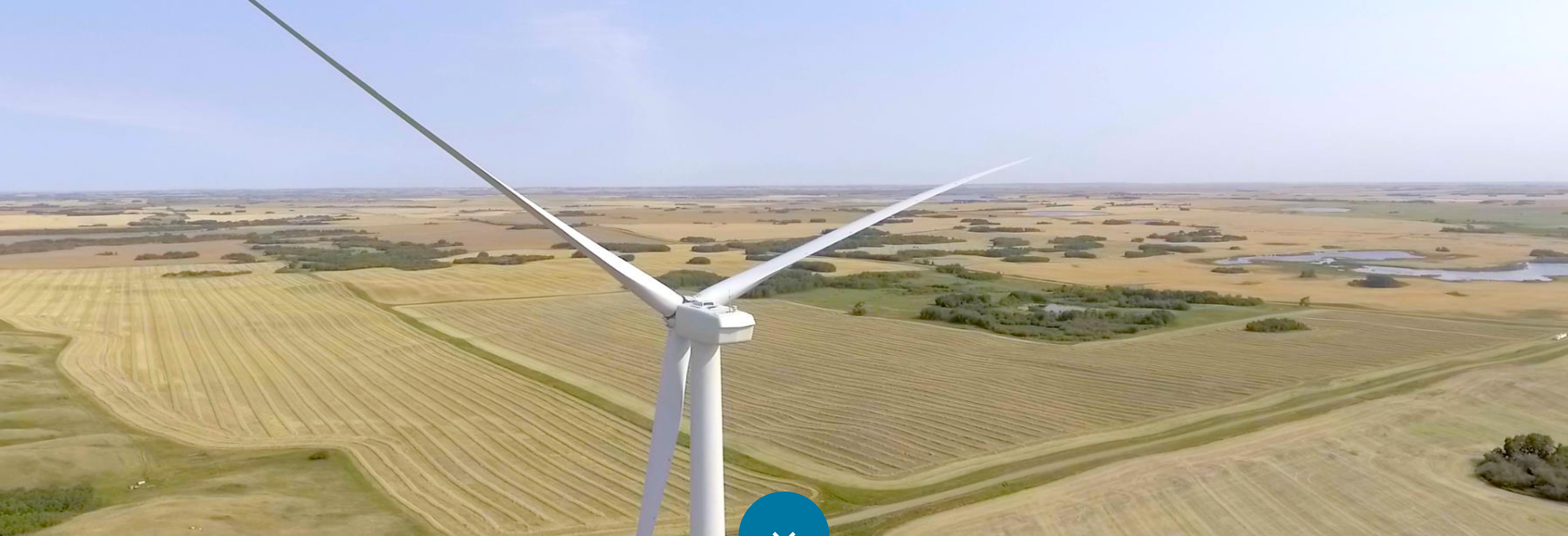


\$0

Once a transmission project is tapped onto a transmission line that project is not required to pay for costs they did not cause.

Considerations Highlighted by this Case

- **Substation fraction methodology is flawed**
 - Considers neither the cause of the cost nor the benefit to relevant parties
 - Unequal treatment between distribution and transmission connected customers – inappropriate allocation of costs means generation is exposed to load driven costs and vice versa
- **Substation fraction use risks future investment in new and existing generation of all types**
 - Precedent setting for all types of generation that unknowable costs can be applied after COD
 - Halting of shovel ready projects due to unreasonable risk of inappropriate and unknowable costs being applied to DCG projects
 - Unmitigable market participant risk to existing facilities due to overwhelming substation fraction costs
- **Counter to market efficiency and red tape reduction goals**
 - Creates DCG Opposition to Reliability Projects as DCG incented to intervene against projects that may be required by load customers in order to protect their investment and mitigate unforeseen costs
 - Unfair allocation of costs using the substation fractioning method means load is also exposed to the potential to pay for costs caused by generators
 - Inefficient energy pricing as generators increase the price of energy sold to allow for unknown costs or fluctuations. Uncertain future costs would also affect access to capital, thereby increasing the cost of capital
- **Ratemaking principles not being met**
 - Cost causation, fairness, efficiency



QUESTIONS?

Innogy Renewables Canada Inc.



Participant-Related Costs for DFOs and DFO Cost Flow Through - Technical Session 1

Gregor Herklotz - COO innogy Renewables Canada Inc ·
Feb 27th 2020

First 2 utility-scale Solar Tracker in Alberta under construction

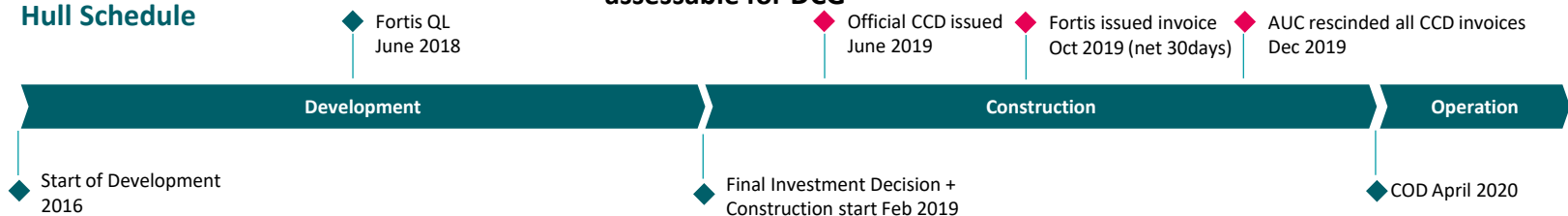


- innogy with its inhouse EPC Belectric is commissioning right now two large scale Solar Farms near the Town of Vauxhall with 57 MWp in total
- both **subsidy free** assets are designed to track the position of the sun and will produce renewable power and carbon offsets for 30 years+, revenues partly hedged via corporate PPA
- the Vauxhall Solar Farm achieved ISD Feb 19th 2020, Hull Solar Farm ISD targeted for April 2020

The Hull case:

- **one year** after the Quote Letter has been provided by the DSO for the project specific interconnection Cost (Project # 1878), innogy received a CCD of **4.3 mCAD** in June 2019 for a load-driven substation upgrade to support growing load in and around that area (Project #1052, ISD May 2014, 13.6 MW DTS, 10.3 mCAD)
- **CCD cost allocated to innogy (based on 17 MW STS) is ~7 times higher** than the actual Quote Letter and came too late to be mitigated
- impact of **Future CCD's or changes to the existing CCD unknown and not assessable for DCG**

Hull Schedule



The application of a substation fractioning mechanism must integrate at least following principles:

- **cost causation and fair assignment of project specific grid connection cost**
- **avoidance of unmitigable market participant risk**

to create a reasonable level of Investor certainty to allow further growth in this power market segment.

Siemens Energy

Siemens Energy – AESO Tech Session 1
Innovative Emissions-Free Waste Heat to Power
DCG Investment Jeopardized by AESO 2018 Tariff

Siemens sCO₂ Waste Heat Recovery Technology Project Overview



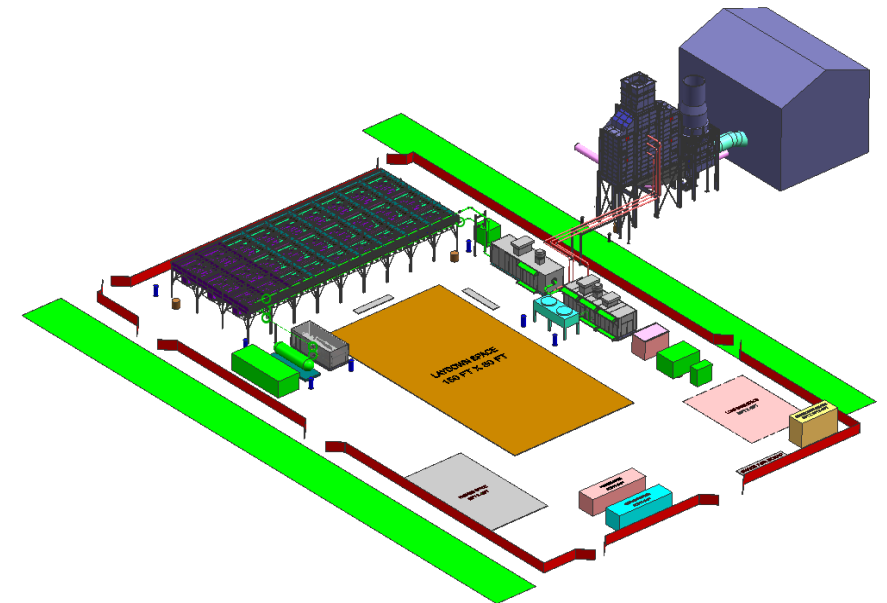
Project – The First of its Kind Commercial Installation

- Partnering with TC Energy on Pilot Project at Compressor Station in Alberta
- Innovative clean energy technology converting waste heat from gas turbine exhaust into **emission-free power (9MWe)**
- Partially funded by **Emissions Reduction Alberta (ERA)**
- Targeting **first in the world commercial scale supercritical CO₂ (sCO₂)** waste heat recovery installation, as pilot for future deployment in Alberta
- TC Energy goals: **Enhance facility efficiency**, reduce greenhouse gas (GHG) emissions
- Siemens objectives: Introduce new technology solution that makes fossil energy greener; CO₂-neutral power supply; **Develop sCO₂ expertise and supply chain in Alberta market**

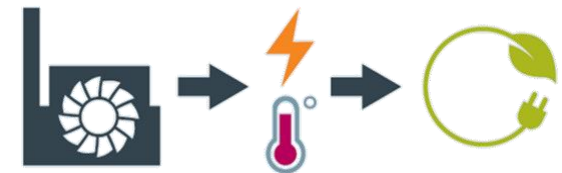
Technology – Innovative Clean Energy Conversion

- Closed-loop power cycle based on proven Rankine / Brayton Cycle principle
- Working fluid is Carbon Dioxide (CO₂) operating in supercritical region where advantages of liquid and gas are simultaneously leveraged
- **Zero water requirements**; small footprint / no new land disturbances
- **Safe, stable, non-flammable, non-toxic, benign**, and readily available working fluid

Innovative Technology Deployment – No Water Required – 9MW Emissions Free Power in Alberta



Convert waste heat into emissions-free power; improve plant efficiency and generate carbon offsets.



Siemens sCO₂ Waste Heat Recovery Technology Technology Deployment and Impact

Projected Business Case Benefits in Alberta

25-30 simple cycle gas turbines across ~20 potential sites. GHG emissions offset independently verified



~270 MWe
of recoverable power generation capacity
without burning any additional fuels



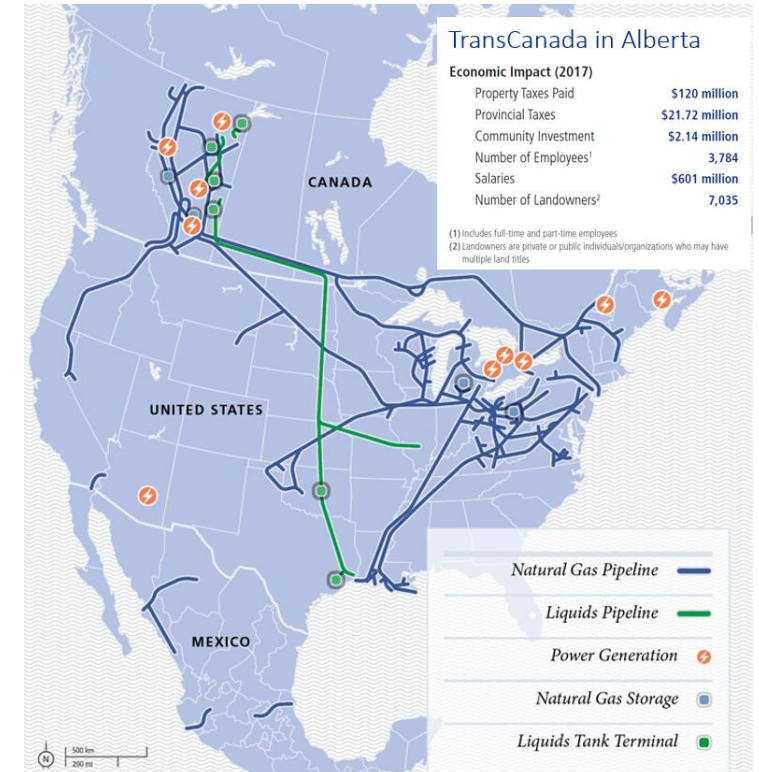
~10% Efficiency Increase
to existing midstream compressor station
operating efficiency



Avoids 1,200,000 tons GHG
emissions per year avoided by Waste Heat
Recovery power conversion

TC Energy Potential

- TC Energy operates 91,900 km (57,100 miles) of pipeline across Mexico, USA, and Canada. ~50% of installed base in Canada
- Canada: 120+ simple cycle gas turbines, with ~30% fit for current Siemens solution



Siemens sCO₂ Waste Heat Recovery Technology Business Case Jeopardized by 2018 Tariff

Grid Connection Details and 2018 Tariff Impacts to Siemens – TC Energy Pilot Project and Future Deployment

- Fortis is DFO, consultation and HLS started in **Jun '18** - **sufficient capacity at substation at that time**
- \$8 MM CAD substation upgrade completed in **Nov '19** to **increase load capacity benefiting Fortis distribution system** – upgrade was not required for Siemens Project to connect
- Pilot Project assigned Rate STS: 9.5 MW. Power flow 100% to transmission system (AltaLink) through feeder
- CCD assigned and Fortis **flow through** of previous substation upgrade **costs to Siemens – despite project not driving requirements**
- **Potential exists for future fractioning costs**, uncontrolled by project parties due to DFO flow through
- Current estimated CCD assigned to project is ~\$2,000,000 CAD, **cost not previously anticipated**

Project Details

- AESO Project: P2293
 - Completed High Level Study
 - Executing detailed study (Phase 3)
 - Requested ISD: July 1, 2021*
 - COD: November 1, 2021*
- *Pending ongoing review of commercial viability

Estimated CCD ~ Double Connection Budget
direct unplanned impact to project CAPEX for costs not driven by project requirements



Discourages investment in capital intensive DCG projects and innovation in emissions-free power generation in Alberta

Future \$???

unknown / unbounded liability for future fraction adjustments not driven by project requirements



Lacks investor certainty in budget planning and creates unfair cost assignment to DCG

Seeking relevant, directly attributable, one-time connection cost allocations for projects in Alberta
--- Cost Causation --- Simplicity ---

Break

Principles Discussion

Participant-Related Costs for DFOs

Principle Reconciliation

AESO Principles	FortisAlberta Principles	DCG Principles
<p>Overarching principle Tariff design and implementation facilitates a fair, efficient and openly competitive market (FEOC)</p> <ul style="list-style-type: none"> • Fosters competition and encourages new market entry • Efficiency • Avoidance of undue discrimination • Fairness 	<p>4. Clear, transparent and timely administration of tariff(s) to DCG</p> <p>a) While SSF has been around for 20 years, AESO has not applied to DFOs/DCG until recently</p> <ul style="list-style-type: none"> • Evolving and varying application of ISO tariff SSF/CCDs <p>b) AESO's AMP</p> <ul style="list-style-type: none"> • Mechanics of grandfathering, establishment of STS levels, etc. <p>c) In Distribution tariffs, DFOs can establish corresponding STS levels in DCG interconnection agreements that mirror system access service (SAS) Agreements with AESO</p> <p>d) AESO should develop an ID to make its CCD timing and contracting practices and rules more clear, consistent and transparent for DFOs/DCG</p>	<p>Economic principles:</p> <ul style="list-style-type: none"> A. Creates investor certainty B. Avoids unmitigable market participant risk C. Fosters competition and encourages new market entry <p>Bonbright's ratemaking principles:</p> <ul style="list-style-type: none"> 2. Efficiency 7. Fairness 8. Simplicity 9. Rate stability

Participant-Related Costs for DFOs

Principle Reconciliation

AESO Principles	FortisAlberta Principles	DCG Principles
<p>1. Parity between transmission interconnection costs calculation for transmission connected customers and distribution connected customers</p> <ul style="list-style-type: none"> • Fairness • Effective price signals 	<p>3. Open, non-discriminatory system access for both T and D connected generation</p> <ol style="list-style-type: none"> a) Level playing field and parity between T and D connected generation b) AESO's substation fraction (SSF) method and practice was designed for the allocation of DTS and STS costs to a single T-connected participant; not suited for application to DFOs/DCG in its present form c) AESO's metering Information Document (ID) raises AESO concerns with respect to same (transmission price signal to DCG, Option M) d) Adjusted Metering Practice (AMP) (as approved) requires feeder metering for DCG, different from T-connected generation 	<p>Bonbright's ratemaking principles:</p> <ol style="list-style-type: none"> 2. Efficiency 5. Avoidance of undue discrimination 6. Avoidance of cross-subsidies 7. Fairness
<p>2. Market participants should be responsible for an appropriate share of the costs of transmission facilities that are required to provide them with access to the transmission system (may include paying a contribution towards facilities paid for by other customers and refund to the customer that paid)</p> <ul style="list-style-type: none"> • Fairness • Cost causation 	<p>1. Reflect cost causation</p> <ol style="list-style-type: none"> a) Transmission interconnection costs for DCG b) STS-related costs (as determined by ISO tariff) are supply (generation) driven transmission costs which are the cost responsibility of DCG c) DCG should not be responsible for costs properly attributed to load (DTS) 	<p>Bonbright's ratemaking principles:</p> <ol style="list-style-type: none"> 1. Cost causation 2. Efficiency 3. Avoidance of intergenerational inequity 4. Avoidance of rate shock 5. Avoidance of undue discrimination 6. Avoidance of cross-subsidies 7. Fairness 9. Rate stability

Participant-Related Costs for DFOs

Principle Reconciliation

AESO Principles	FortisAlberta Principles	DCG Principles
<p>3. Costs should not be allocated to a DCG customer after the DCG has energized, if the DCG is not directly causing those costs</p> <ul style="list-style-type: none"> • Certainty of future costs • Stability 	<p>2. Provide effective and timely price signals to DCG</p> <ol style="list-style-type: none"> a) Contribution price signal can only be effective when the DCG proponent is aware of the costs it would be subject to, prior to proceeding with its project, and/or the TFO/DFOs and DCG being required to deploy of capital b) DCG should not be allocated additional STS contribution costs after connection, unless STS levels (related to their project) change at POD c) Timing of CCDs/STS Contribution(s) to DFO/DCG should be coordinated with: generating unit owner's contribution (GUOC), establishment of STS contract level, STS losses factor, T&D interconnection costs for each DCG? – to enable DCG cost certainty before DCG project proceeding 	<p>Economic principles:</p> <ol style="list-style-type: none"> A. Creates investor certainty B. Avoids unmitigable market participant risk <p>Bonbright's ratemaking principles:</p> <ol style="list-style-type: none"> 4. Avoidance of rate shock
<p>4. DFOs should be provided with reasonable certainty re: cost treatment/recovery</p> <ul style="list-style-type: none"> • Certainty of future costs • Stability 	<p>1. Reflect cost causation</p> <ol style="list-style-type: none"> d) All transmission costs are a distribution tariff flow through item <ul style="list-style-type: none"> • Must accord with Transmission Regulation – section 47(a) and approved tariffs • DFO “discretion” implies DFO interfering with AESO cost allocation signal to STS 	<p>Bonbright's ratemaking principles:</p> <ol style="list-style-type: none"> 10. Effectiveness of yielding the total revenue requirement

Breakout Discussions

- Session 1
 - Session summary to be prepared
 - Webinar recording, session summary and comment matrix requesting feedback on the session will be posted on www.aeso.ca
- Session 2
 - Date selection and proposed agenda
 - Overarching principles and guidance for proposals
 - Session 2 objectives:
 - Review high-level principles
 - Discuss and evaluate proposals for participant-related costs for DFOs (Substation Fraction) and DFO cost flow-through

Thank you

- AESO Project 1495: Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Add
- Reliability project, therefore no requested increase to Rate DTS contract capacity of 29.3 MW
 - Upgrade project not eligible for local investment because no change to Rate DTS contract capacity
 - Construction contribution is 100% of the project costs
 - Fortis paid approximately \$5M; costs ultimately borne by Fortis load customers
- ISD September 2015

CCD: No DCG at Hayer 277S (1)

Attachment A2: Contribution Determination

Participant: **FortisAlberta Inc.** Tariff: AESO 2013
 Project: **Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Add** Effective: 1 Oct 2013
 Number: 1495 Type: DTS Only To: Current
 Prepared by: Ilice Tan Date: March 8, 2016 Version: 2013.0.1

Line	Description	Reference	Amount	Section
(a)	Cost of New Facilities	Final Cost Report	\$4,998,437	8:2
(b)	Plus: Shared Cost of Existing Facilities		\$0	8:3(2)(c)
(c)	Less: System-Related Costs		\$0	8:3(3)
(d)	Participant-Related Costs	(a) + (b) – (c)	\$4,998,437	8:3(2)
(e)	Less: Facilities in Excess of Good Practice		\$0	8:4
(f)	Less: Reduction for Replaced Transformer		\$0	8:5(2)
(g)	Balance of Participant-Related Costs	(d) – (e) – (f)	\$4,998,437	8:6(1)

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$4,998,437		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$4,998,437		\$0	8:6
(k)	Substation Fractions	Other Participant NA	1.00000	0.00000	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$4,998,437	\$0	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$4,998,437	\$0	\$0	8:7
(o)	Total Construction Contribution Required		\$4,998,437			8:7
(p)	Construction Contribution Previously Paid for Project		\$6,042,411			5:2(8) or 9:2(2)
(q)	Construction Contribution to be Refunded		(\$1,043,974)			5:2 or 9:4

CCD: No DCG at Hayter 277S (2)

Attachment A3: Allocation of Costs and Substation Fractions

Participant: **FortisAlberta Inc.** Tariff: AESO 2013
 Project: **Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Ad** Effective: 1 Oct 2013
 Number: 1495 Type: DTS Only To: Current

ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Participant-Related Costs of Required Facilities \$4,998,437

Contract Stages			Incremental Contract Capacity			Incremental Substation Fractions		
No	Start Date	Duration Years	This Participant			Other Participant		
			DTS	NA	Participant	DTS	NA	Participant
(1)	Sep 2015	20.00	0.00	0.00	0.00	1.00000	0.00000	0.00000
Total		20.00	Duration-Weighted Average			1.00000	0.00000	0.00000

Allocation of Participant-Related Costs	\$4,998,437	\$0	\$0
---	-------------	-----	-----

SUBSTATION FRACTIONS FOR DETERMINATION OF MAXIMUM INVESTMENT

Contract Stages			Contract Capacity After Project			Substation Fractions After Project		
No	Start Date	Duration Years	This Participant			Other Participant		
			DTS	NA	Participant	DTS	NA	Participant
(1)	Sep 2015	20.00	29.30	0.00	0.00	1.00000	0.00000	0.00000
Total		20.00						

- Along comes DCG, 10MW STS
- The addition of a distribution connected generator, which didn't require the construction of transmission facilities, triggers a contract change in the CCD
- In this case the CCD was used to calculate the GUOC
- Construction contribution of \$0

CCD: Following Addition of DCG (1)

Attachment A3: Allocation of Costs and Substation Fractions

Participant: FortisAlberta Inc. Tariff: AESO 2013
 Project: Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Ad Effective: 1 Oct 2013
 Number: 1607/1608 from P1495 Type: DTS and STS (Dual-Use) To: Current

ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Participant-Related Costs of Required Facilities \$4,998,437

Contract Stages			Incremental Contract Capacity			Incremental Substation Fractions		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Sep 2015	0.25	0.00	0.00	0.00	1.00000	0.00000	0.00000
(2)	Dec 2015	19.75	0.00	10.00	0.00	0.00000	1.00000	0.00000
Total		20.00	Duration-Weighted Average			0.01250	0.98750	0.00000

Allocation of Participant-Related Costs \$62,480 \$4,935,957 \$0

SUBSTATION FRACTIONS FOR DETERMINATION OF MAXIMUM INVESTMENT

Contract Stages			Contract Capacity After Project			Substation Fractions After Project		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Sep 2015	0.25	29.30	0.00	0.00	1.00000	0.00000	0.00000
(2)	Dec 2015	19.75	29.30	10.00	0.00	0.74555	0.25445	0.00000
Total		20.00						

CCD: Following Addition of DCG (2)

Attachment A2: Contribution Determination

Participant: **FortisAlberta Inc.** Tariff: AESO 2013
 Project: **Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Add** Effective: 1 Oct 2013
 Number: 1607/1608 from P1495 Type: DTS and STS (Dual-Use) To: Current
 Prepared by: Ilice Tan Date: May 4, 2017 Version: 2013.0.1

Line	Description	Reference	Amount	Section
(a)	Cost of New Facilities	P1495 Final Cost Report	\$4,998,437	8:2
(b)	Plus: Shared Cost of Existing Facilities		\$0	8:3(2)(c)
(c)	Less: System-Related Costs		\$0	8:3(3)
(d)	Participant-Related Costs	(a) + (b) – (c)	\$4,998,437	8:3(2)
(e)	Less: Facilities in Excess of Good Practice		\$0	8:4
(f)	Less: Reduction for Replaced Transformer		\$0	8:5(2)
(g)	Balance of Participant-Related Costs	(d) – (e) – (f)	\$4,998,437	8:6(1)

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$4,998,437		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$4,998,437		\$0	8:6
(k)	Substation Fractions	Other Participant NA	0.01250	0.98750	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$62,480	\$4,935,957	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$62,480	\$4,935,957	\$0	8:7
(o)	Total Construction Contribution Required		\$4,998,437			8:7
(p)	Construction Contribution Previously Paid for Project		\$4,998,437			5:2(8) or 9:2(2)
(q)	Construction Contribution to be Refunded		\$0			5:2 or 9:4

Line	Description	Region/Policy	Generating Unit Owner's Contribution			Section
			STS MW	Amount/MW	Contribution	
(r)	Owner's Contribution to be Paid	Central 2014-2015	10.00	\$22,400	\$224,000	10:3
(s)	Generating Unit Owner's Contribution Previously Paid for Project				\$224,000	10:3
(t)	Generating Unit Owner's Contribution to be Refunded				\$0	10:3

- STS at Hayter is staged, adding STS in increments
- October 2017 CCD issued
- Construction contribution is \$0

Attachment A2: Contribution Determination

Participant: FortisAlberta Inc.	Tariff: AESO 2017
Project: FortisAlberta 277S Hayter Contract Change	Effective: 1 Jan 2017
Number: 1988	Type: DTS and STS (Dual-Use)
Prepared by: Ilice Tan	Date: October 16, 2017
	Version: 2017.0.1

Line	Description	Reference	Amount	Section
(a)	Cost of New Facilities	1495 Final Cost Report	\$4,998,437	8:2
(b)	Plus: Shared Cost of Existing Facilities		\$0	8:3(2)(c)
(c)	Less: System-Related Costs		\$0	8:3(3)
(d)	Participant-Related Costs	(a) + (b) – (c)	\$4,998,437	8:3(2)
(e)	Less: Facilities in Excess of Good Practice		\$0	8:4
(f)	Less: Reduction for Replaced Transformer		\$0	8:5(2)
(g)	Balance of Participant-Related Costs	(d) – (e) – (f)	\$4,998,437	8:6(1)

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$4,998,437		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$4,998,437		\$0	8:6
(k)	Substation Fractions	Other Participant NA	0.00000	1.00000	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$0	\$4,998,437	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$0	\$4,998,437	\$0	8:7
(o)	Total Construction Contribution Required		\$4,998,437			8:7
(p)	Construction Contribution Previously Paid for Project		\$4,998,437			5:2(8) or 9:2(2)
(q)	Construction Contribution to be Refunded		\$0			5:2 or 9:4

Line	Description	Region/Policy	Generating Unit Owner's Contribution			Section
			STS MW	Amount/MW	Contribution	
(r)	Owner's Contribution to be Paid	Central 2014-2015	5.30	\$22,400	\$118,720	10:3

Attachment A3: Allocation of Costs and Substation Fractions

Participant: **FortisAlberta Inc.** Tariff: AESO 2017
 Project: **FortisAlberta 277S Hayter Contract Change** Effective: 1 Jan 2017
 Number: 1988 Type: DTS and STS (Dual-Use) To: Current

ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Participant-Related Costs of Required Facilities \$4,998,437

Contract Stages			Incremental Contract Capacity			Incremental Substation Fractions		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Aug 2018	20.00	0.00	5.30	0.00	0.00000	1.00000	0.00000
Total		20.00	Duration-Weighted Average			0.00000	1.00000	0.00000

Allocation of Participant-Related Costs \$0 \$4,998,437 \$0

SUBSTATION FRACTIONS FOR DETERMINATION OF MAXIMUM INVESTMENT

Contract Stages			Contract Capacity After Project			Substation Fractions After Project		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Aug 2018	20.00	29.30	25.30	0.00	0.53663	0.46337	0.00000
Total		20.00						

- Refined demand and supply-related cost allocation
 - Time weighted
- Construction contribution is \$0

Attachment A2: Contribution Determination

Participant: **FortisAlberta Inc.** Tariff: AESO 2013
 Project: **Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Add** Effective: 1 Oct 2013
 Number: 1495/1607/1608/1921/1988 Type: DTS and STS To: Current
 Prepared by: Illice Tan Date: October 15, 2018 Version: 2013.0.1

Line	Description	Reference	Amount	Section
(a)	Cost of New Facilities	P1495 Tx and Breaker Add	\$4,998,437	8:2
(b)	Plus: Shared Cost of Existing Facilities		\$0	8:3(2)(c)
(c)	Less: System-Related Costs		\$0	8:3(3)
(d)	Participant-Related Costs	(a) + (b) – (c)	\$4,998,437	8:3(2)
(e)	Less: Facilities in Excess of Good Practice		\$0	8:4
(f)	Less: Reduction for Replaced Transformer		\$0	8:5(2)
(g)	Balance of Participant-Related Costs	(d) – (e) – (f)	\$4,998,437	8:6(1)

Line	Description	Reference	Required Facilities		In Excess of Good Practice	Section
			Demand-Related	Supply-Related		
(h)	Participant-Related Costs	From (g) and (e)	\$4,998,437		\$0	8:6(3)
(i)	Operations and Maintenance Charge	Estimated by Market Participant	NA		\$0	8:9
(j)	Total Costs Allocated to Market Participant	(h) + (i)	\$4,998,437		\$0	8:6
(k)	Allocated Ratio	Other Participant NA	0.56461	0.43539	NA	8:6(3)
(l)	Allocated Costs (j) × (k)	Other Participant NA	\$2,822,151	\$2,176,286	\$0	8:6
(m)	Less: Maximum Local Investment	Investment Term of 20 Years	\$0	NA	NA	8:8
(n)	Construction Contribution Required	(l) – (m)	\$2,822,151	\$2,176,286	\$0	8:7
(o)	Total Construction Contribution Required		\$4,998,437			8:7
(p)	Construction Contribution Previously Paid for Project		\$4,998,437			5:2(8) or 9:2(2)
(q)	Construction Contribution to be Refunded		\$0			5:2 or 9:4

Line	Description	Region/Policy	Generating Unit Owner's Contribution			Section
			STS MW	Amount/MW	Contribution	
(r)	Owner's Contribution to be Paid	Central 2014-2015	25.30	\$22,400	\$566,720	10:3
(s)	Generating Unit Owner's Contribution Previously Paid for Project				\$566,720	10:3
(t)	Generating Unit Owner's Contribution to be Refunded				\$0	10:3

Attachment A3: Allocation of Costs and Substation Fractions

Participant: **FortisAlberta Inc.** Tariff: AESO 2013
 Project: **Fortis Hayter 277S 42MVA Transformer and 25kV Breaker Ad** Effective: 1 Oct 2013
 Number: 1495/1607/1608/1921/1988 Type: DTS and STS To: Current

ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

Participant-Related Costs of Required Facilities \$4,998,437

Contract Stages			Incremental Contract Capacity			Incremental Substation Fractions		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Sep 2015	0.25	0.00	0.00	0.00	1.00000	0.00000	0.00000
(2)	Dec 2015	1.92	0.00	10.00	0.00	0.00000	1.00000	0.00000
(3)	Nov 2017	0.75	0.00	20.00	0.00	0.00000	1.00000	0.00000
(4)	Aug 2018	17.08	0.00	25.30	0.00	0.00000	1.00000	0.00000
Total		20.00	Duration-Weighted Average			0.01250	0.98750	0.00000

Allocation of Participant-Related Costs \$62,480 \$4,935,957 \$0

SUBSTATION FRACTIONS FOR DETERMINATION OF MAXIMUM INVESTMENT

Contract Stages			Contract Capacity After Project			Substation Fractions After Project		
No	Start Date	Duration Years	This Participant		Other Participant	This Participant		Other Participant
			DTS	STS		DTS	STS	
(1)	Sep 2015	0.25	29.30	0.00	0.00	1.00000	0.00000	0.00000
(2)	Dec 2015	1.92	29.30	10.00	0.00	0.74555	0.25445	0.00000
(3)	Nov 2017	0.75	29.30	20.00	0.00	0.59432	0.40568	0.00000
(4)	Aug 2018	17.08	29.30	25.30	0.00	0.53663	0.46337	0.00000
Total		20.00	Duration-Weighted Average			0.56461	0.43539	0.00000

\$2,822,151 \$2,176,286 \$0