AESO 2018 Tariff Decision
Substation Fractioning Overview

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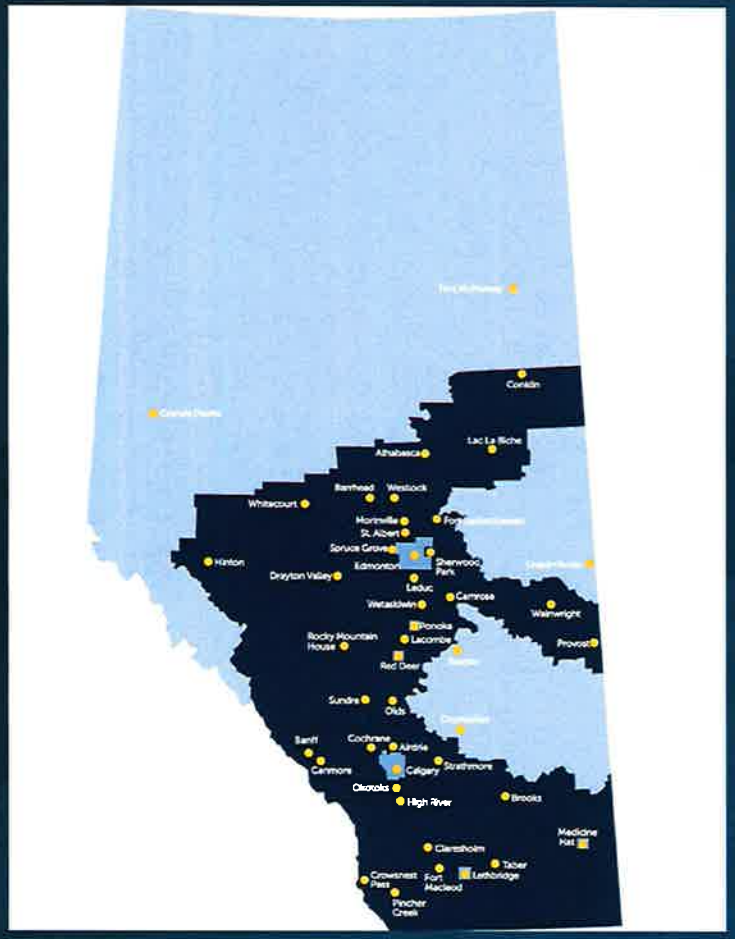

Electricity Delivery for Albertans, by Albertans

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)

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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)					
			Contracted After Project			Contracted Prior to Project		
			This Participant		Other	This Participant		Other
No	Start Date	Duration Months	DTS	STS	Participant	DTS	STS	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
Project: Substation Fraction Presentation - Project after DG
Number: Project Number Type: DTS and STS
Tariff: AESO 2019
Effective: 1 Jan 2019
To: Current

INCREMENTAL ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

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

Contract Stages			Incremental Contract Capacity			Incremental Substation Fractions		
			This Participant		Other	This Participant		Other
No	Start Date	Duration Years	DTS NA	STS NA	Participant	DTS NA	STS NA	Participant
(1)	Jun 2019	20.00	12.00	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						$7,500,000	$0	$0

Incremental Capacities

CONTRACT AND TIME ALLOCATION OF COSTS TO SERVICES AT SUBSTATION

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

Total Capacities

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Example #1 – DCG Connects After Upgrade Project

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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

			Required Facilities		In Excess of Good Practice	
Line	Description	Reference	Demand-Related	Supply-Related		Section
(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

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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 #1 – DCG Connects After Upgrade Project

Sub Fraction:	Before	After
DTS	100%	61%
STS	0%	39%
Total Project Cost	$7.5M	$7.5M
TFO Local Investment	$4.5M	$3.7M
Fortis Contributions	$3.0M	$0.9M
DCG Contributions	$0M	$2.9M

$$\text{DTS} \quad \frac{\frac{20MW}{20MW+0MW}*2Yr + \frac{20MW}{20MW+15MW}*18Yr}{20Yr} = 61.4\%$$

$$\text{STS} \quad \frac{\frac{0MW}{20MW+0MW}*2Yr + \frac{15MW}{20MW+15MW}*18Yr}{20Yr} = 38.6\%$$

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Example #2 – Upgrade Project After DCG Connects

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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

			Required Facilities		In Excess of Good Practice	
Line	Description	Reference	Demand-Related	Supply-Related		Section
(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

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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

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

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

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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