AESO 2018 Tariff Decision Substation Fractioning Overview

Miles Stroh & Kevin Noble
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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)
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
Example #1 – DCG Connects After Upgrade Project

1. DFO High Level Study – STS Calculated
2. DFO submits SA5R to the AESO
3. BTF Project is initiated
4. AESO Issues CCD at Stage 2
5. TFO invoices DFO for any additional required Customer Contributions
6. DFO invoices DCG customer for any CCD Supply Related costs
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

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Reference</th>
<th>Demand-Related</th>
<th>Supply-Related</th>
<th>In Excess of Good Practice</th>
<th>Section</th>
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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
Example #1 – DCG Connects After Upgrade Project

**Sub Fraction:**
- **DTS**
  - Before: 100%
  - After: 61%
- **STS**
  - Before: 0%
  - After: 39%

**Total Project Cost**
- **DTS Only**
  - June-2019: $7.5M
  - June-2021: $7.5M
- **DTS & STS**
  - June-2039

**Equations**
- **DTS**
  \[ \frac{20MW}{20MW + 0MW} \times 2Yr + \frac{20MW}{20MW + 15MW} \times 18Yr = 61.4\% \]
- **STS**
  \[ \frac{0MW}{20MW + 0MW} \times 2Yr + \frac{15MW}{20MW + 15MW} \times 18Yr = 38.6\% \]
Example #2 – Upgrade Project After DCG Connects

1. DFO identifies need for transmission system upgrade
2. DFO submits SASR to the AESO
3. Connection Project is initiated
4. AESO Issues CCD at Stage 3
5. DFO invoices DCG customer for any CCD Supply Related costs
6. DFO tunes-up Supply Related costs with DCG customer based on TFO final costs.
Example #2 – Upgrade Project After DCG Connects

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

<table>
<thead>
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<th>PRIOR</th>
<th>AFTER</th>
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<tr>
<td>DTS</td>
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<tr>
<td>STS</td>
<td>15 MW</td>
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- 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

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Example #2 – Upgrade Project After DCG Connects

DCG Connects  Yr 0

DTS & STS

Yr 20

2010   June-2019

June-2039

Sub Fraction:

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<th></th>
<th>DTS</th>
<th>STS</th>
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<tr>
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<td>57.1%</td>
<td>42.9%</td>
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Total Project Cost

Total Project Cost

TFO Local Investment $3.6M

Fortis Contributions $0.7M

DCG Contributions $3.2M

\[
\frac{20\text{MW}}{15\text{MW} + 20\text{MW}} \times 20\text{Yr} = 57.1\%
\]

\[
\frac{15\text{MW}}{15\text{MW} + 20\text{MW}} \times 20\text{Yr} = 42.9\%
\]
## Example of Evolving Substation Fraction Methodology – Hayter Substation

<table>
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<tr>
<th>Example Project #</th>
<th>CCD Date</th>
<th>DTS</th>
<th>STS</th>
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