Transmission Tariff Working Group (TTWG) Learnings

July to October 2019

P1 – System planning report

Planning report – key findings

- Objective of transmission system planning is to ensure timely availability of transmission
- Forecast load location and level, and generation location and dispatch are main inputs used to create scenarios
  - Anticipating location and size of generation development is particularly challenging and important due to significant impact of dispatch on transmission system, and long lead time for transmission developments compared to comparatively shorter lead time for generation developments
- To plan for an unconstrained system the AESO assumes most onerous, credible conditions in planning studies
  - For example, for the entire system, simultaneous wind powered generating units' capacity factor of 0 per cent for low generation dispatch and 92 per cent for high generation dispatch with corresponding stress load condition

Planning report – key findings cont.

- A planning base case is a transmission system model representing a single snapshot in time, usually representative of a system wide condition such as summer peak, winter peak or summer light loading
- A **study case** is a transmission system model derived from the planning base case that focuses on **stress conditions for a particular study for specific area(s)** or conditions instead of a system wide condition
- Transmission planning studies are based on a wide range of **study cases** to ensure resiliency and flexibility of transmission plans

Planning report – key findings cont.

- Transmission reinforcements are needed when reliability and planning requirements exceed the capability of the existing system
  - This can occur as a result of specific combinations of conditions such as load location and level, generation location and dispatch, and credible contingencies inside and outside the study region.
  - Usually, multiple conditions drive the need for transmission reinforcement.
- The AESO currently anticipates more **localized or regional transmission developments** to address local generation and load constraints in areas, such as the Northwest and Edmonton in the next five years
- Planning for regional and sub-regional system takes into account **coincident load for the study area**

Planning report – key findings cont.

- Reduction of load in some areas of the Northwest planning region could reduce existing transmission constraints driven by lack of transmission capability to supply this load
  - However in some other parts of the system, such as Calgary region and southern Alberta, reducing load would cause further stress on the transmission system
- Load increase can consume local generation and reduce stress on outflow transmission paths
  - For example increasing load in parts of the Northeast region would better utilize existing transmission assets
- Generation additions in specific load surplus areas may defer transmission reinforcement, for example in parts of the Northwest region

F2 – Load to power flow correlation report

Correlation report – findings

- None to moderate correlation between system or regional load and line power flow
  - Varies by region
  - Varies by on-peak and off-peak
  - Varies by year
- Demand Transmission Service (DTS) load may only be one of many drivers of line flow
- Other drivers:
  - Generation dispatch
    - Wind and solar powered generation levels
  - Network topology
    - Developed over time
    - Configuration

Correlation report – findings cont.

- If a transmission asset is a “backup” for redundancy due to credible contingency concerns then it may not flow power beyond 50% of its capacity
- Some transmission assets may not flow much power in early years
  - Lumpiness: transmission assets are sized for long-term need expectations, and are in service for about 50 years
- Correlation results are quite varied and ranged
  - Do **not** indicate which loads should be decreased or increased, and when, to:
    - Decrease flow on certain line, to:
      - *Minimize future transmission system investment*
    - Achieve maximum utilization of certain line, to:
      - *Maximize use of existing transmission system*