

# Transmission Loss Factors Stakeholder Consultation Session June 23, 2010

Ashikur Bhuyia

Senior Loss Factor Analyst

- Loss Factor background
  - Previous consultation
  - Statutory mandate
- Need to update Loss Factor ISO Rule 9.2
- 2010 Loss Factor process
- Opportunities for stakeholder input
- Next steps

- Recover AIES transmission system losses
- Based on average impact to losses
- Create location based, long-term signals to be factored into investment decisions.
  - New generation
  - Dispatch of existing generation
  - Transmission requirement

- 50% area load
- 12 base case load flows
  - 4 seasons
  - 3 loading levels
- Base load flow loss factor equal to 50% of rate of change of losses with AIES load, as supplied by the generator/Demand Opportunity Service (DOS) load
- Imports treated as generators
- Imports and exports to recover transmission losses to point of connection in Alberta

# Loss Factors Update Considerations

- Treatment of HVDC in Loss Factor process
- Transmission Must Run discussion
- Treatment of new generators
- Treatment of new Demand Opportunity Service (DOS)

- DC scheduled flow established by System Operator
- DC power controlled to schedule within measuring tolerances
- For any given total system North-South flow, increasing DC schedules reduces AC flows
- Optimum loss operating condition

# DC System Losses at Rated Power

	1000 MW Monopole Stage	2000 MW Bipole Stage
West DC	47 MW	61 MW
East DC	63 MW	77 MW

# Average Losses at 50% Load Factor

(% of DC Losses at Rated Power)

	1000 MW Monopole Stage	2000 MW Bipole Stage
West DC	39%(18 MW)	42% (26 MW)
East DC	38% (24 MW)	40% (31 MW)

# Annual Energy Losses (Millions of \$)

(@ \$100/MW-hr)

	1000 MW Monopole Stage	2000 MW Bipole Stage
West DC	16	23
East DC	21	27
Total	37	50

## Solution – Method 1

- Existing Loss Factor software ignores HVDC losses
- Base load flow Loss Factors will not recover DC losses
- DC losses recovered through shift factor
- Reduction in location-based signal
- Correct if DC operated at fixed power level independent of individual generation

## Solution – Method 2

- Replace DC with AC circuit of identical power flow losses
- Load flow Loss Factors will recover equivalent DC losses
- Retention of some location-based signal
- Additional effort to set up base case load flows

## Solution – Method 3

- Develop specific methodology for DC
- DC likely to be operated to minimize total system losses subject to system constraints
- DC dispatch could be tied to individual generator dispatch
- Significant effort to develop methodology and software
- Could be in place for 2015 Loss Factors

# Select and Test Methodology(s)

July 30, 2010	Deadline for submission of stakeholders comments on proposed methodologies and well as any new suggestions
Start July 30, 2010	Select methodology(s) to study based on stakeholder feedback
August 3, 2010	<ul style="list-style-type: none"><li>• Set up small test system – no resemblance to AIES</li><li>• Determine loss factors with small test system for each method.</li><li>• Use MATLAB or MATHCAD</li></ul>
Finish October 1, 2010	<p>Present results of studies to stakeholders</p> <ul style="list-style-type: none"><li>• Discuss results of studies and select one methodology to apply to Loss Factors</li></ul>

# Produce Five Year Non-Binding Loss Factors

November 15 2010	Patch existing software with selected methodology
	<ul style="list-style-type: none"><li>• Re-publish non-binding 2014 Loss Factors for selected methodology</li></ul>
	<ul style="list-style-type: none"><li>• Update and test software (4 to 6 months)</li></ul>
	<ul style="list-style-type: none"><li>• Test with 2015 non-binding loss factors</li></ul>

# Update Loss Factor Software

Mid - April 2011	Update and test with new software <ul style="list-style-type: none"><li>• 2011 binding (no DC)</li></ul>
	<ul style="list-style-type: none"><li>• Test with 2015 non-binding loss factors</li></ul>
	<ul style="list-style-type: none"><li>• Start production 2016 non-binding loss factors</li></ul>

- Please note, normal loss factors can proceed with the patched software

- How should TMR changes be incorporated into Loss Factor methodology?
  - Treat as existing generator (use historical data),  
**or**
  - Treat as transmission facility (use forecasted data)

- How should generation facilities be included to more accurately determine Loss Factors?
  - Use the 1/3 or 2/3 inclusion, or
  - 0 MW for the fractional season

# Treatment of New Demand Opportunity Service (DOS)

- What capacity factor to use?
  - Customer will provide forecasted usage,
  - or**
  - Average of existing DOS loads

# 2010 Loss Factor Milestones

<b>Date</b>	<b>Milestone</b>
April-June, 2010	Extract, collect and prepare data for the 2011 Generic Stacking Order (GSO)
4 <sup>th</sup> week of July, 2010	Publish the draft 2011 GSO and request for the capacity confirmation
3 <sup>rd</sup> week of August, 2010	Publish the final 2011 GSO
2 <sup>nd</sup> week of October, 2010	Post 2011 Loss Factor base cases (PSSE, RAWD)
October 22, 2010	Review input to 2011 cases (tentative meeting date)
October 23, 2010	Post the preliminary Loss Factors for 2011
November 5, 2010	Post the final Loss Factors for 2011
March, 2011	Post the preliminary Loss Factor range for 2015, contingent on software and plans being available