



September 5, 2007

Alberta Loss Factor Stakeholder Group

Re: Summary of 2011 Loss Factor Estimates

The AESO is pleased to present a summary of 2011 Loss Factor Estimates as agreed to by stakeholders during the Loss Factor Rule development. The purpose of the fifth year non-binding estimates is to provide a simple 'what-if' forecast of loss factors to assist business planning for generator proponents. Since the new loss factor process only provides binding loss factors for one year, proponents wished to have an indication of loss factors five years out.

Attached is a summary of the loss factor estimates for 2011 (the fifth year, based on the 2007 Generic Stacking Order or GSO) for the Alberta Interconnected Electric System (AIES). New generation and the 2011 load are included in the calculation of the 2011 estimates.

In order to provide an assessment of the possible range of 2011 loss factors, the following three scenarios were evaluated:

- A. 2011, base case (system average loss: 3.85%)
- B. 2011, a reduction of approximately 500 MW of northern generation (Keephills 3 generation used as a proxy for this generation)
- C. 2011, no 500 kV line from Edmonton to Calgary and no Keephills generation (system average loss: 4.38%)

Owing to the confidential nature of the generation development, base cases will not be provided for the fifth year. The GSO for 2011 is posted on the AESO web site, and was used as the basis for dispatching generation.

The following assumptions were used to develop the loss estimates for 2011 (the 10 Year Transmission System Plan (2007-2016) was used as a basis):

- Major transmission upgrades (240 kV) were included in the southeast, southwest and northwest.
- The 500 kV KEG conversion was included
- The 500 kV Edmonton to Calgary line, except in scenarios C
- All loss factor assessments are made on raw loss factors evaluations and then normalized and compressed as necessary
- Wind Generation additions are consistent with the AESO Ten Year Plan

- Several generation projects in the 2011 timeframe have submitted cancellation notices or have made requests to modify their output since the data was compiled.
- For the non-500 kV case (C), an adjusted loss forecast was used

Conditions and Details.

Please note the information used to calculate these loss factor estimates will likely change over the next five years, specifically:

- All existing generation has been included in the 2011 cases.
- All topology in the 2011 cases is as per the best information available from the AESO 10 Year Transmission System Plan, on the AESO web site.
- All proposed generation in the 2011 GSO has not been approved by the AEUB. Generators used in the analysis have project inquiries and is based on the 10 year plan. This information was used to build the base cases.
- Major transmission enhancements in the cases following 2007, with the exception of several 240 kV connections and the 500 kV connections due in 2010, have not been approved by the AEUB. As a result, the transmission system may also change.

Please note, individual loss factors will not be presented

A background map of Alberta (Figure 1) with the 2011 Area Loss Factor estimates (tabulated in Table 1) is attached for your reference. Also, the Loss Factor Range for existing MPIDs is also attached in Table 2, for scenario (A) only. A description of the Range algorithm is provided. The 2011 GSO is provided separately.

If you have any questions contact me at lossfactor@aeso.ca or at 403 539 2614.

Yours truly,

Original signed by

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Figure 1

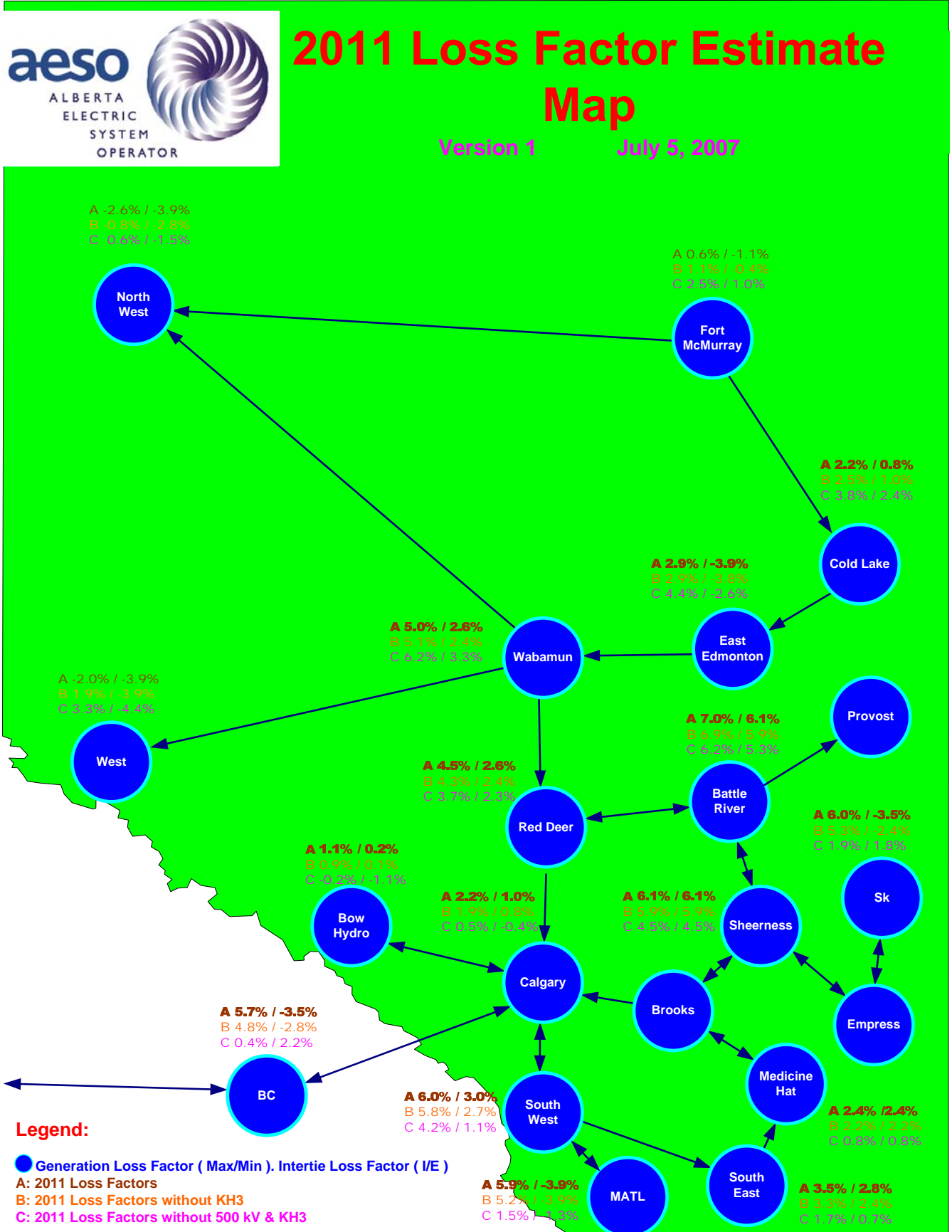


Table 1 - Location of Generation within in Areas or Area Definition

Location	Name
Northwest	RAINBOW 1, RAINBOW 2, RAINBOW 3, RAINBOW 4, RAINBOW 5, FORT NELSON
West	HR MILNER, POPLAR HILL, NORTHSTONE ELMWORTH, DIASHOWA, , BEAR CREEK G2, BEAR CREEK G1, GRANDE PRAIRIE ECOPOWER CENTRE, STURGEON 1, STURGEON 2, VALLEYVIEW, P&G WEYERHAUSER
Fort McMurray	MUSKEG, McKAY RIVER, SYNCRUDE AURORA, SUNCOR MILLENIUM, NEXEN OPTI
Cold Lake	MAHKESES, PRIMROSE, FOSTER CREEK G1
Edmonton	GENESEE 1, GENESEE 2, GENESEE 3, KEEPHILLS #1, KEEPHILLS #2, SUNDANCE #1, SUNDANCE #2, SUNDANCE #3, SUNDANCE #4, SUNDANCE #5, SUNDANCE #6, WABAMUN #4, BUCK LAKE
East Edmonton	DOW GTG, ROSSDALE 8, ROSSDALE 9, ROSSDALE 10, SHELL SCOTFORD, REDWATER, PLAMONDON
Red Deer	NOVA JOFFRE, BIGHORN, BRAZEAU
Calgary	CALPINE CTG, CALPINE STG, CARSELAND, CAVAILIER, BALZAC
Bow Hydro	BARRIER, BEARSPAW, CASCADE, GHOST, HORSESHOE, INTERLAKES, KANANASKIS, POCATERRA, RUNDLE, SPRAY, THREE SISTERS
Battle River	BATTLE RIVER #3, BATTLE RIVER #4, BATTLE RIVER #5
Sheerness	SHEERNESS 1, SHEERNESS 2
Medicine Hat	CITY OF MEDICINE HAT
South East	SUNCOR MAGRATH, TAYLOR HYDRO, TAYLOR WIND PLANT, STIRLING, SUNCOR HILLRIDGE, TABER WIND
South West	BENIGN KETTLES HILL, GW POWER SODERGLEN, SUMMERVIEW PHASE 2, McBRIDE, DRYWOOD 1, SUMMERVIEW 1, CASTLE RIVER, OLDMAN, GLENWOOD, PINCHER CREEK, SPRING COULEE, COWLEY EXPANSION 1, COWLEY EXPANSION 2, COWLEY NORTH, COWLEY RIDGE WIND POWER PHASE2, COWLEY RIDGE WIND POWER PHASE1
BC	BCH – Export, BCH – Import
SK	SPC – Export, SPC – Import

MATL	MATL – Export, MATL - Import
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Table 2

2011 Loss Factor Range - Supplement to Area Loss Factor Estimate				
			Loss Factor Range	
Location	Generator/ISD Name	MPID	Max	Min
North West	RAINBOW 1	RB1	-3.9%	-3.9%
	RAINBOW 2	RB2	-3.6%	-3.9%
	RAINBOW 3	RB3	-3.9%	-3.9%
	RAINBOW 4	RL1	-3.5%	-3.9%
	RAINBOW 5	RB5	-3.6%	-3.9%
	FORT NELSON	FNG1	-2.6%	-3.0%
West	HR MILNER	HRM	-2.2%	-2.8%
	POPLAR HILL	PH1	-3.9%	-3.9%
	NORTHSTONE ELMWORTH	NPC1	-3.9%	-3.9%
	DIASHOWA	DAI1	-3.2%	-3.9%
	BEAR CREEK G2	BCR2	-3.4%	-3.9%
	BEAR CREEK G1	BCRK	-3.4%	-3.9%
	GRANDE PRAIRIE ECOPOWER CENTRE	GPEC	-3.5%	-3.9%
	STURGEON 1	ST1	-2.2%	-2.9%
	STURGEON 2	ST2	-2.2%	-2.9%
	VALLEYVIEW	VVW1	-2.0%	-2.7%
	P&G WEYERHAUSER	WEY1	-3.6%	-3.9%
Fort McMurray	MUSKEG	MKR1	0.3%	-1.1%
	McKAY RIVER	MKRC	-0.3%	-1.1%
	SYNCRUDE AURORA	SCL1	0.6%	-1.1%
	SUNCOR MILLENIUM	SCR1	-0.6%	-1.1%
	NEXEN OPTI	NX02	0.6%	-1.1%
Cold Lake	MAHKESES	IOR1	2.2%	0.9%
	PRIMROSE	PR1	0.8%	0.8%
	FOSTER CREEK G1	EC04	2.0%	0.8%
Wabamun	GENESEE 1	GN1	5.0%	4.3%
	GENESEE 2	GN2	5.0%	4.3%
	GENESEE 3	GN3	5.0%	4.3%
	KEEPPHILLS #1	KH1	5.0%	4.2%
	KEEPPHILLS #2	KH2	5.0%	4.2%
	SUNDANCE #1	SD1	5.0%	3.8%
	SUNDANCE #2	SD2	5.0%	3.8%
	SUNDANCE #3	SD3	5.0%	3.8%
	SUNDANCE #4	SD4	5.0%	3.8%
	SUNDANCE #5	SD5	5.0%	3.8%
	SUNDANCE #6	SD6	5.0%	3.8%
	WABAMUN #4	WB4	4.7%	3.5%
	Buck LAKE	0000045411	3.2%	2.6%
East Edmonton	DOW GTG	DOWGEN1HR	2.0%	0.4%
	ROSSDALE 8	RG8	2.7%	2.7%
	ROSSDALE 9	RG9	2.7%	2.7%
	ROSSDALE 10	RG10	2.7%	2.7%
	SHELL SCOTFORD	SCTG	2.5%	1.0%
	REDWATER	TC02	2.7%	1.2%
	PLAMONDON	0000035311	-2.3%	-3.9%
Red Deer	NOVA JOFFRE	NOVAGEN15M	2.6%	2.6%
	BIGHORN	BIG	2.8%	2.6%
	BRAZEAU	BRA	3.2%	2.6%
Calgary	CALPINE CTG	CES1	2.2%	1.5%
	CALPINE STG	CES2	2.2%	1.5%
	CARSELAND	TC01	2.2%	1.9%
	CAVAILIER	EC01	2.1%	1.3%
	BALZAC	NX01	1.9%	1.3%

Bow Hydro	BARRIER	BAR	0.8%	0.6%
	BEARSPAW	BPW	0.8%	0.6%
	CASCADE	CAS	0.3%	0.2%
	GHOST	GHO	0.8%	0.6%
	HORSESHOE	HSH	0.8%	0.6%
	INTERLAKES	INT	1.1%	0.8%
	KANANASKIS	KAN	0.9%	0.6%
	POCATERRA	POC	0.7%	0.4%
	RUNDLE	RUN	0.8%	0.6%
	SPRAY	SPR	0.8%	0.6%
	THREE SISTERS	THS	1.1%	1.0%
Battle River	BATTLE RIVER #3	BR3	7.0%	7.0%
	BATTLE RIVER #4	BR4	7.0%	7.0%
	BATTLE RIVER #5	BR5	6.1%	6.1%
Sheerness	SHEERNESS 1	SH1	6.1%	6.1%
	SHEERNESS 2	SH2	6.1%	6.1%
Medicine Hat	CITY OF MEDICINE HAT	CMH1	2.4%	2.4%
South East	SUNCOR MAGRATH	SCR2	3.5%	2.8%
	TAYLOR HYDRO	TAY1	3.5%	3.1%
	TAYLOR WIND PLANT	TAY2	3.5%	3.1%
	STIRLING	000006711	3.5%	2.8%
	SUCNOR HILLRIDGE	SCR3	3.2%	2.8%
	TABER WIND	TAB1	3.1%	2.8%
South West	BENIGN KETTLES HILL	KHW1	4.7%	3.5%
	GW POWER SODERGLÉN	GWV1	4.3%	3.1%
	SUMMERVIEW PHASE 2	Project_393_2	5.8%	3.0%
	McBRIDE	AKE1	4.1%	3.0%
	DRYWOOD 1	DRW1	3.8%	3.0%
	SUMMERVIEW 1	IEW1	5.4%	4.2%
	CASTLE RIVER	CR1	4.6%	3.5%
	OLDMAN	OMRH	5.2%	4.0%
	GLENWOOD	0000022911	4.1%	3.0%
	PINCHER CREEK	0000039611	4.9%	3.8%
	SPRING COULEE	0000038511	4.2%	3.0%
	COWLEY EXPANSION 1	CRE1	5.8%	5.5%
	COWLEY EXPANSION 2	CRE2	5.8%	5.5%
	COWLEY NORTH	CRE3	5.8%	5.5%
COWLEY RIDGE WIND POWER PHASE2	CRWD	5.8%	5.5%	
COWLEY RIDGE WIND POWER PHASE1	PKNE	5.8%	5.5%	
BC	BCH - Export	BCH - Export	-3.5%	-3.5%
	BCH - Import	BCH - Import	5.7%	5.7%
SK	SPC - Export	SPC - Export	-3.5%	-3.5%
	SPC - Import	SPC - Import	6.0%	6.0%
MATL	MATL - Export	MATL - Export	-3.9%	-3.9%
	MATL - Import	MATL - Import	5.9%	5.9%

Please Note: the long term loss factor range depends on several assumptions such as the GSO and base case assumptions. In addition to these assumptions the range calculation also depends on the definition of the area. Inclusion of new generators or exclusion of decommissioned generators in an area or a re-definition of an area may impact the long term loss factor range of other generators of the area. Thus the actual loss factors may vary by significant magnitude if the assumptions are changed. Generators or other loss factors assets proposed loss factor for 2007 are not shown. The "2011 MPID Loss Factor Range" supplements the 2011 Area Loss Factor Estimates.

Long Term Loss Factor Volatility/Range

The loss factor for each MPID is expressed as a direct function of the 2007 loss factor range for each area i.e., the loss factor for each MPID can be determined equal to the min loss factor for each grouping plus the loss factor position (% of range) times the loss factor range for each group.

The "% of range" factor is calculated again for each MPID in 2011. The volatility/range factor per MPID is set equal to the change in "% of range" (not absolute) factor between 2007 and 2011. Thus if the MPID loss factor were at 60% of the range in 2007 and 60% of the range in 2011, then its own volatility/range factor would be 0%. If it changed to 50% of the range or 70% of the range in 2011, its volatility/range factor would be 10%.

The volatility/range factor for the group of MPIDs could be expressed as the average of the volatility/range factors of each MPID within the group. Now if the maximum and minimum volatility/range factors for the group are used instead of the average, the MPID can determine a range in loss factors for its unit which would be a subset of the tabulated range and know with confidence that its loss factor is within this reduced range.

If a generator with a 2007 loss factor of 3.1% knows that the range of loss factors for 2007 were say 2.6 to 5.1% then his 2007 "% of range" would be $(3.1-2.6)/(5.1-2.6)$ or 20%. If the range for 2011 were say -0.5 to 2.5% then the prorated loss factor would be exactly $-.5\% + 20\%(2.5--.5\%)$ or 0.1%. If the volatility/range index for the group were known to be 15% then the expected loss factor for the generator would be in the range of $0.1\% +/- 15\%$ (of 3%) or $-.35\%$ to $+.45\%$.

The mathematical derivation is given below:

The long term loss factor range ($Y_{xx,max}$ and $Y_{xx,min}$) has been calculated as follows:

For 2007,

$$R_{07} = \frac{Y - Min_{07}}{Max_{07} - Min_{07}}$$

For 2011,

$$Y_{11,max} = R_{07} \times (Max_{11} - Min_{11}) + Min_{11} + V_{11,max}$$

$$Y_{11,min} = R_{07} \times (Max_{11} - Min_{11}) + Min_{11} + V_{11,min}$$

where,

$$V_{11,max} = \max(R_{11} - R_{07}) \times (Max_{11} - Min_{11})$$

$$V_{11,min} = \min(R_{11} - R_{07}) \times (Max_{11} - Min_{11})$$

$$R_{11} = \frac{Y_{11} - Min_{11}}{Max_{11} - Min_{11}}$$

- R_{xx} = offset from minimum (% of range for year xx)
- Min_{xx} = minimum value for the zone for year xx
- Max_{xx} = maximum value for the zone for year xx
- Y_{xx} = loss factor in question for year xx
- V_{xx} = volatility/range for year xx
- max = maximum over the zone
- min = minimum over the zone