APPENDIX B

RED DEER SYSTEM PLANNING STUDY

LOAD and GENERATION FORECASTS

1 Introduction

1.1 The AESO's responsibilities with respect to forecasting the need for transmission in Alberta are described in Section 33(1) of the *Electric Utilities Act* and Section 8 of the *Transmission Regulation*. System Planning studies contained in the *Red Deer Region Transmission Development System Planning Study Report* (Red Deer Study) use the load and generation forecasts described by this document. The load and generation forecasts chosen for this system study were chosen in accordance with the AESO Transmission Reliability Criteria principle that requires the design of the system to meet or exceed Reliability Criteria under credible worst-case loading and generation conditions.[1]

1.2 Load and generation forecasts in this document are a subset of the forecasts published separately by the AESO. The corporate load forecasts are found in *Future Demand and Energy Outlook (2007-2027)* and *Future Demand and Energy Outlook (2009-2029),* also referred to as FC2007 and FC2009. These forecasts are available online on the AESO Forecasting page found at: http://www.aeso.ca/transmission/8638.html

The corporate generation forecast is found in *2009 AESO Long-Term Transmission System Plan*. This forecast is available online at:

http://www.aeso.ca/downloads/AESO_LTTSP_Final_July_2009.pdf

Since the inception of the Red Deer System Planning Study, new generation scenarios have been developed for use in the *2011 AESO Long-Term Transmission System Plan*. These are discussed in section 4.4.

1.3 The Study Area chosen for the Red Deer Study includes AESO planning area 35 (Red Deer) and Area 39 (Didsbury). Forecasts for each planning area, and combined forecasts for the Study Area, are described in this report. The two planning areas reside in the AESO's South and Central planning regions as

[1] AESO Transmission Reliability Criteria, Part II System Planning. March 11, 2005. Section 2.0

described in more detail in Appendices C and K of the *2009 AESO Long-Term Transmission System Plan*.

2 Historical Load

2.1 Table 2.1 summarizes historic winter load levels for the Red Deer and Didsbury planning areas, for the Study Area, and for the Alberta system, at the time the planning areas reached peak demand.

Table 2-1: Historical Winter Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2005 HX	479	101	580	9,192
2006 HX	500	105	607	9,322
2007 HX	498	102	607	9,312
2008 HX	484	101	587	9,396
2009 HX	487	101	592	9,370
2010 HX	493	105	597	9,797

HX = Historical

2.2 Table 2.2 summarizes summer load levels at the time the planning areas reached peak demand.

Table 2-2: Historical Summer Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2005 HX	437	82	525	7,896
2006 HX	451	96	559	8,662
2007 HX	470	90	573	8,723
2008 HX	456	87	545	9,146
2009 HX	455	90	554	8,663
2010 HX	446	100	545	8,675

HX = Historical

3 Load Forecast

3.1 Recent load growth in the Study Area has been driven by industrial and general economic growth. Load growth is expected to continue, consistent with forecasts for continued strong Alberta economic growth. The AESO's forecasts have considered information from the legal owners of the distribution facilities (DFO) in the area, and comparisons between AESO and DFO forecasts indicate alignment in long-term growth expectations.

3.2 Load forecasts used in the Red Deer planning studies are based on the AESO annual forecast, referred to as the *Future Demand and Energy Outlook (2007-2027)* (FC2007), published in January 2008. As part of its planning responsibilities, the AESO routinely verifies and updates its corporately approved load forecasts to ensure they reflect the latest economic projections and factors. Since the publication of the FC2007, the AESO has published *Future Demand and Energy Outlook (2009-2029)* containing the approved FC2009. This is the AESO's latest corporate forecasts.

3.3 The following sections provide FC2007 forecasts, followed by FC2009 forecasts, followed by a comparison between FC2007 and FC2009 forecasts for study years 2012 and 2017.

3.4 Table 3-1 summarizes FC2007 winter load levels used in the study for the Red Deer and Didsbury AESO planning areas, for the combined loads for the Study Area, and for the Alberta system, at the time the planning areas are expected to reach peak demand.

Table 3-1: FC2007
Winter Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2012 F	581	109	690	11,973
2017 F	653	114	767	14,116
2018 F	685	115	800	14,533

F = Forecast

3.5 Table 3-2 summarizes FC2007 summer load levels used in the study for the Red Deer and Didsbury AESO planning areas, for the combined load for the Study Area, and for the Alberta system, at the time the planning areas are expected to reach peak demand.

Table 3-2: FC2007
Summer Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2012 F	539	96	635	10,735
2017 F	593	100	693	13,144
2018 F	603	101	704	13,588

F = Forecast

The average annual load growth rates for the Red Deer and Didsbury areas for the period from 2008 historical to 2018 forecast based on FC2007 are 3.5% and 1.7% respectively

3.6 Table 3-3 below summarizes FC2009 winter load levels at the time the planning areas are expected to reach peak demand.

Table 3-3: FC2009
Winter Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2011 F	517	108	626	10,445
2012 F	550	113	663	11,019
2013 F	577	118	694	11,559
2014 F	607	123	730	12,091
2015 F	629	128	757	12,699

2016 F	659	133	792	13,197
2017 F	690	136	826	13,745
2018 F	712	140	852	14,310
2019 F	728	143	871	14,589
2020 F	737	146	883	15,162

The average annual load growth rates for the Red Deer and Didsbury areas are 4.1% and 3.4%, respectively, over the study period. These growth rates are consistent with economic and other load assumptions detailed in the FC2009 report.

3.7 Table 3-4 summarizes FC2009 summer load levels at the time the planning areas reached peak demand.

Table 3-4: FC2009
Summer Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area	System Load
2011 F	461	92	553	9,143
2012 F	482	95	576	9,586
2013 F	508	99	607	10,031
2014 F	533	103	636	10,542
2015 F	562	108	669	11,024
2016 F	591	112	704	11,530
2017 F	619	117	736	11,987
2018 F	636	119	755	12,389
2019 F	656	122	778	13,654
2020 F	671	125	796	14,045

3.8 Tables 3-5 and 3-6 below, summarize the change from the AESO's FC2007 to FC2009 for the Study Area.

Table 3-5: Change from FC2007 to FC2009
Winter Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area
2012 F	-31	+4	-28
2017 F	+37	+21	+58

Table 3-6: Change from FC2007 to FC2009 Summer Load at Planning Area Peak (MW)

Year	Area 35 Red Deer	Area 39 Didsbury	Total Study Area
2012 F	-58	-1	-58
2017 F	+44	+16	+60

3.9 In summary, a comparison between FC2007 and FC2009 indicates that while load growth in the short term is expected to be in the order of 30-60 MW lower than forecast in FC2007 for year 2012, in the long term, higher than previously forecast load growth rates contribute to FC2009 forecasts that are 60MW higher by year 2017. The implications of these relatively modest changes in load forecasts are addressed in the Red Deer Study.

4 Generation Forecast

4.1 Current generation capacity in the Study Area consists of the generation capacity from the Nova-Joffre unit consisting of two gas turbines and a steam turbine totalling 510 MW, and generation capacity at the Dickson dam consisting of three small hydro units with a combined capacity of 17 MW.[2]

4.2 No generation development is forecasted in Red Deer Study Area in the next 10 years. Currently there are no generation projects requesting connection to the transmission system in the Study Area, previously three wind projects had requested connection but all have since withdrawn their requests. There is the potential for development of wind, biomass, and small scale distributed generation to be sited in the Study Area at any time.

4.3 Generation forecast assumptions are based on the generation scenarios presented in the *2009 AESO Long-term Transmission System Plan (the Plan),*

[2] It is noted that the Dickson Dam Hydro units are connected to the distribution system. As such, generator output is netted from area load rather than explicitly being modeled as a generator connected to the transmission system. This treatment is appropriate and does not affect study results.

Appendices E, F and G. Table 4.0-3 on page 267 of the Plan presents scenarios representing a reasonable range of future generation expansions for system planning purposes. The technical analysis of the Red Deer area contained in Appendix K of the Plan assumes generation scenario B3. Scenario B3 provides the credible worst-case generation conditions on the regional transmission system as required by the applicable AESO System Planning Criteria.[3] Scenario B3 assumes the addition of generation in the Northern part of the province and anticipates that there will be no substantial generation additions in the Red Deer area prior to 2017.

4.4 Since the inception of the Red Deer Study, new generation scenarios have been developed for use in the *2011 Long-Term Transmission System Plan.* These generation scenarios use more recent information and contain differences from those generation scenarios used in the Red Deer Study. A comparison between the generation scenario used in the study (B3) and the latest comparable generation scenario (Northern Baseline) shows little change in generation additions forecasted for the Red Deer study region. The Northern Baseline generation forecast has an additional 30 MW of conceptual biomass capacity in the area by the 2017 timeframe. This small amount of capacity is conceptual and not material enough to be considered in the study results or as a sensitivity.

[3] AESO Transmission Reliability Criteria Part II System Planning. March 11, 2005. Section 2.0