



Alberta Electricity Reserve Margin Forecast 2006-2009

April 17, 2006

Draft for discussion purposes only.

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Executive Summary

The Alberta Reserve Margin Forecast (2006-2009) is an overview of the near term annual outlook for the adequacy of electricity supply to meet forecast demand. The AESO is issuing this forecast as part of its mandate, under the Electric Utilities Act (“Act”), to provide market information to participants.

The report builds upon and is consistent with the information provided in other AESO adequacy and transmission planning reports available on our website.

Alberta Total Peak Demand is the sum of the Alberta Grid Peak Demand and the Behind the Fence Demand as defined in Appendix 1. The Alberta Total Peak Demand is forecast to increase at 3.4% per annum from 2005 to 2009 while the Alberta Grid Peak Demand is forecast to increase at a somewhat lower rate of 2.3% per annum.

The Table 1 below shows the AESO Alberta Total and Grid Peak Demand outlook for 2006-2009.

Table 1:			Historical		Forecast			
	MW	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Alberta Total Peak Demand		8967	9236	9580	10069	10287	10665	10948
Alberta Grid Peak Demand		7678	7916	8158	8450	8553	8801	8939

The AESO is using the concept of firm generation for the purposes of calculating the reserve margin. As discussed further in Section 4, firm generation capacity is defined to be the generation capacity that is likely to be available to meet the winter peak load. All wind generation capacity is excluded from the firm capacity determination and only 68% of hydro generation installed capacity is considered to be available as firm capacity.

Alberta Grid Firm Capacity excluding inerties reached a historical high in 2004 with the addition of the new Genesee coal unit, and moved lower in 2005 with the announced retirements of the Cloverbar gas units. Alberta Grid Firm Capacity is expected to decline in 2006 then increase until 2009 when the Rossdale gas units are expected to be retired.

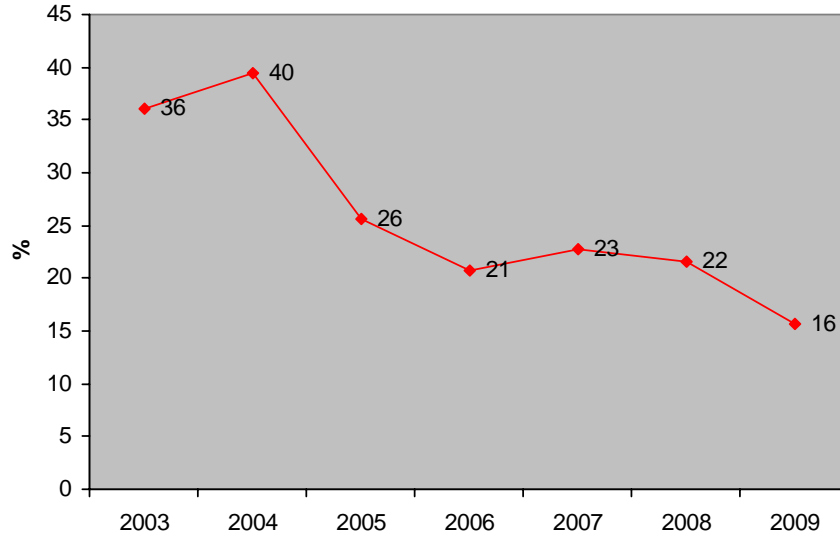
The forecast of Alberta Total and Alberta Grid Firm Capacity excluding interties is presented in Table 2 below.

Table 2:	Historical		Forecast				
	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
MW (yearend)							
Alberta Total Firm Capacity	10876	11500	10774	10956	11360	11700	11491
Alberta Grid Firm Capacity	9587	10179	9401	9336	9625	9835	9481

Alberta is currently interconnected to both British Columbia and Saskatchewan. The AESO is including intertie import capacity for the purposes of the reserve margin calculation. Intertie import capacity is projected to remain constant at today's level of 865 MW through to 2009. The proposed MATL interconnection to Montana may be in operation in 2007 but is not expected to add import capacity during the forecast period.

Reserve margins were calculated using the Alberta Grid Firm Capacity, the intertie import capacity and the Alberta Grid Peak Demand forecast described herein and are provided in Figure 1. The estimates indicate that the reserve margin reached a recent historical high of 40% in 2004, declined to 26% in 2005 and is forecast to drop to 21% in 2006. The forecast reserve margin is projected to increase in 2007 reaching 23% with new cogeneration capacity offsetting demand growth. The reserve margin declines over the next two years as demand growth begins to outpace known capacity additions.

**Figure 1:
Alberta Grid Firm Reserve Margin
including Intertie Capacity**



1 INTRODUCTION

The Alberta Reserve Margin Forecast (2006-2009) is an overview of the near term annual outlook for the adequacy of electricity supply to meet forecast demand. The AESO intends to publish a reserve margin forecast on a regular basis either on its own or as part of a broader assessment of the market currently under discussion with stakeholders.

This report is intended to provide information to market participants who are managing their electricity requirements and making investment decisions. Readers may prefer to rely on other reserve margin definitions or may envision other possible near term developments which impact the reserve margin calculation and the AESO encourages you to use your own judgment in interpreting the results.

2 BACKGROUND

The Alberta Electric System Operator (“AESO”) is a statutory corporation established by the *Electric Utilities Act* (“Act”) to lead the safe, reliable and economic planning and operation of Alberta’s interconnected power system and facilitates Alberta’s competitive hourly wholesale electricity market.

The AESO has a duty under the *Act* to collect, store and disseminate information relating to the current and future electricity needs of Alberta and the capacity of the interconnected electric system to meet those needs, and make that information available to the public. The AESO believes that an assessment of generation capacity, demand and reserve margin would be most useful to market participants if the methodology and assumptions are fully disclosed. Market participants generally acknowledge the limitations of using a reserve margin on its own to assess adequacy and will be able to judge the results appropriately using the detailed information provided in the report.

The reader should be aware that the Supply Adequacy Forecast published daily on the AESO website provides shorter term 14 day and one year adequacy assessments that progressively supersede information provided in this report.

3 ELECTRICITY PEAK DEMAND FORECAST

A forecast of Alberta’s annual reserve margin requires a forecast of annual Alberta peak demand. The peak demand forecast used in this report was developed using the same methodology as outlined in the AESO 2004 Future Demand and Energy Requirements Forecast. The forecast methodology and process used to forecast the hourly peak demand is fully described in that report. The demand definitions used are also provided in Appendix 1 and a brief summary of the process is provided in Section 3.1.

3.1 FORECAST METHODOLOGY AND DEFINITIONS

The Alberta power system has a significant number of industrial cogeneration sites which provide electricity supply to large onsite loads and, in some cases, export surplus electricity onto the grid. These sites are collectively referred to as Behind the Fence sites. Each industrial site has a unique electricity load requirement and the time of peak onsite load is frequently different than the time of peak for the rest of the province. For this reason, the AESO views Alberta electricity total peak demand as having two components, the Alberta Grid Peak Demand and Behind the Fence Demand.

Alberta Grid Peak Demand is the hourly peak total grid consumption excluding designated Behind the Fence sites plus total distribution and transmission losses. Behind the Fence Demand is the total onsite consumption for specific large Behind the Fence sites which occurs during the same hour as the Alberta Grid Peak Demand (the coincident peak).

To forecast demand, the AESO has developed a “regional” demand forecasting approach which incorporates the following steps:

- Develop an economic outlook including forecasts for economic and demographic variables
- Use historical data to identify customer consumption drivers related to electrical consumption that can be tied to the economic outlook to estimate future electricity needs by customer segment
- Use the customer segment growth rates to develop “geographical area” forecasts broken down by Metering Point Identifier (MD_ID) including any new, incremental industrial loads identified in a particular area
- Use historical data to derive typical annual load shapes by hour for all MP_ID load. Average weather peak conditions are reflected in the hourly load shapes.
- The sum of the MP_ID forecasts plus loss estimates yields the aggregate Alberta Grid Demand forecast and the Alberta Grid Peak Demand.
- Behind the Fence hourly load is also estimated based on actual historical data or, where appropriate, using the generation and load forecasts provided to the AESO by the developers of new oil sands and other cogeneration projects as per Section 4.2
- The Alberta Total Demand forecast is the sum of the forecast Alberta Grid Demand and the forecast Behind the Fence Demand.
- The Alberta Total Peak Demand forecast is the sum of the forecast Alberta Grid Peak Demand and the forecast Behind the Fence Demand for the coincident hour.

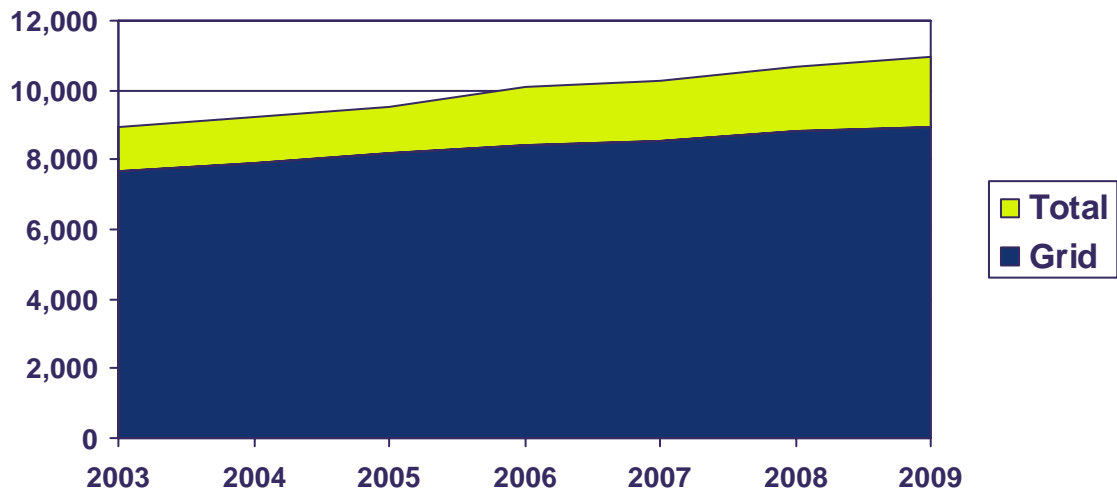
3.2 PEAK DEMAND FORECAST

Table 3 below shows the AESO Alberta Total Peak Demand and Grid Peak Demand outlook for 2006-2009.

Table 3:		Historical			Forecast		
MW	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Alberta Total Peak Demand	8967	9236	9580	10069	10287	10665	10948
Alberta Grid Peak Demand	7678	7916	8158	8450	8553	8801	8939

The Alberta Total Peak Demand is forecast to increase at 3.4% per annum from 2005 to 2009 while the Alberta Grid Peak Demand is forecast to increase at a somewhat lower rate of 2.3% per annum. In absolute terms, the Alberta Total Peak Demand increases by over 1400 MW in the 2006-2009 forecast period. Historical and forecast peak demand levels are presented in the Figure 2.

**Figure 2:
Alberta Peak Demand
MW**

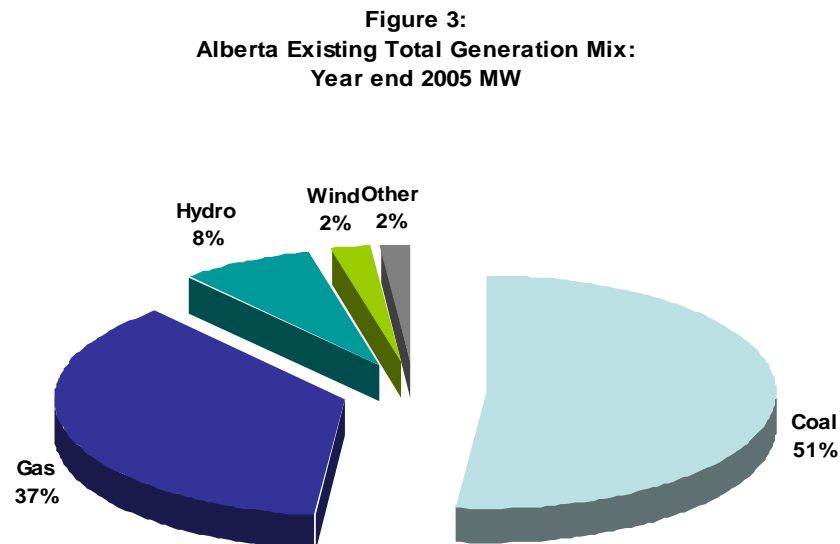


4 ELECTRICITY GENERATION CAPACITY FORECAST

The generation capacity forecast has three components: an existing installed capacity determination, an assessment of anticipated retirements and a projection of new capacity additions. The capacity forecast also separately identifies Alberta Grid and Behind the Fence generation on both a total installed basis and a firm generation basis. The firm generation capacity assessment identifies the capacity that is likely to be available to meet the winter peak load. Appendix 1 contains definitions for the different capacity concepts.

4.1 EXISTING INSTALLED CAPACITY

Alberta's total existing installed generation capacity, including Behind the Fence capacity, totaled 11302 MW at the end of 2005. The generation mix includes coal, gas, hydroelectric, wind and waste-fueled generation and is illustrated on a percentage basis in Figure 3.



A large amount of the existing generation capacity is in place to serve onsite industrial load. This type of generation is referred to as Behind the Fence generation and is expected to increase significantly over the next several years. Most Behind the Fence generation is connected to the Alberta grid and while some sites consume more electricity than they produce, most sites are capable of providing electricity to serve grid customers. Some industrial sites only require electricity from the grid for balancing and reliability purposes and have varying levels of Demand Transmission Service (DTS) contracts to ensure access to grid supply. From a day to day operations point of view, the AESO has a

responsibility to have sufficient reserves for the contracted DTS load. However, for the purpose of the Alberta Grid reserve margin calculation, aggregate Behind the Fence load is served by onsite generation at the time of system peak and the excess generation capacity available at that time is included in grid capacity available to serve grid peak demand. Historical and forecast Alberta Grid Capacity estimates are provided in Section 4.2 below.

4.2 FORECAST NEW CAPACITY AND RETIREMENTS

Generation development is non-regulated and it is not possible to definitively describe the timing and location of future generation development very far into the future with complete certainty. For the purposes of a Reserve Margin Calculation the AESO is including projects, which meet the following criteria, in its forecast of capacity additions.

- Wind projects and projects with lead times of two years or less are included if they have a signed AESO interconnection agreement.
- New coal, large gas, oil sands and heavy oil cogeneration projects which require large capital commitments and longer lead times are included if
 - The generation facility is under construction,
 - Major equipment, such as gas/steam turbines, boilers have been ordered, or
 - Significant engineering commitments (EPC contracts) have been awarded. Oil sands and heavy oil projects with cogeneration facilities would normally be eligible to be included if they meet this criterion.

Given the fact that the AESO is including only those projects which are relatively certain to be completed, actual future capacity additions are likely to be higher than the AESO's forecast. While the AESO has taken all the steps it considers reasonable to estimate the in-service date of capacity additions it must be recognized that there are many external factors that the AESO does not control or necessarily have any knowledge of that influence the actual in-service date.

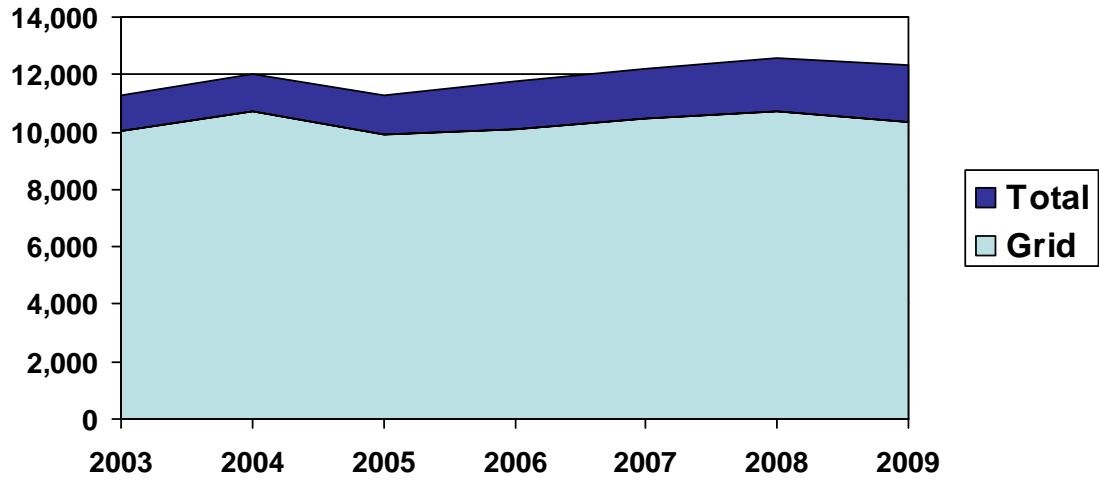
The forecast of new capacity provided in Table 4 shows the cumulative total new additions during 2006 to 2009. Individual wind projects are not identified for confidentiality reasons. The other capacity additions are all cogeneration projects by Syncrude, Suncor (Firebag), CNRL (Horizon), Nexen (Longlake) and PetroCan (MacKay River).

Table 4: Forecast (MW yearend)	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Cumulative New Wind Capacity	257	334	334	334
Cumulative New Other Capacity	182	586	926	926
Cumulative Total New Capacity	439	920	1260	1260

The generation facility retirements are estimated based on a review of public announcements and known contractual arrangements. The only retirements reflected in this forecast are the three Rossdale gas units which are all estimated to be retired in 2009 when the AESO Rossdale TMR contract expires.

The forecast Alberta Total Installed Capacity including new additions and retirements is shown in the Figure 4 below along with the estimated Alberta Grid Installed Capacity. Alberta Grid Installed Capacity is the capacity available to serve grid peak hour load after Behind the Fence coincident load has been served. Total Alberta Installed Capacity is forecast to increase by 1925 MW from 2005 to 2009 while Alberta Grid Installed Capacity is estimated to increase by close to 1300 MW by 2009.

Figure 4:
Alberta Installed Capacity
MCR MW



4.3 FORECAST FIRM GENERATION CAPACITY

The installed capacity of an individual generation unit is a measure of the sustainable output that can be achieved by that unit. Some generation units such as wind and hydro units may not be able to produce at their full capacity at the time of peak demand or may only be able to do so for a few hours. The ASEO believes that it is more meaningful to define a reserve margin using a more representative concept of firm generation capacity. Firm generation capacity is defined to be the generation capacity that is likely to be available to meet the winter peak load.

All coal and gas fired generation capacity including all Behind the Fence cogeneration is considered to be firm capacity and is included at its full rated capacity for reserve margin purposes. Although the AESO recognizes that planned and unplanned outages may occur at the time of peak load, the AESO believes that the reserve margin metric is not intended to be a probabilistic measure and the inputs should lend themselves to a simple calculation. Market participants can then make their own such assessments and adjustments using the information provided.

Firm hydro generation capacity is estimated to be 592 MW which is 68% of total installed capacity of 869 MW. Alberta's hydro plants have minimal storage capability and more limited output during winter when peak load occurs. The 68% hydro estimate is in line with recent historical winter data.

The AESO has not included any wind capacity as firm capacity for the purposes of the reserve margin calculation. Wind generation from individual wind farms is significant at times but is highly variable and for up to 30% of the year produces no electricity. When considered in aggregate, it may be reasonable to assume that a small percentage of wind generation may be providing supply to the system at the time of system peak. However, the AESO believes that given the non dispatchable nature of wind and its current regional concentration in the southwest of the province, it is more appropriate to exclude all wind capacity from the firm capacity determination.

The forecast of Alberta Total Firm Capacity and Alberta Grid Firm Capacity are presented in Table 5. Alberta Grid Firm Capacity reached a historical high in 2004 with the addition of the new Genesee coal unit and moved lower in 2005 with the announced retirements of the Cloverbar gas units. Alberta Grid Firm Capacity is expected to decline in 2006 due to Behind the Fence demand growth. Alberta Grid Firm Capacity increases beyond 2006 until 2009 when the Rossdale gas units are expected to be retired.

MW (yearend)	Table 5:		Historical Forecast				
	2003	2004	2005	2006	2007	2008	2009
Alberta Total Firm Capacity	10876	11500	10774	10956	11360	11700	11491
Alberta Grid Firm Capacity	9587	10179	9401	9336	9625	9835	9481

5 INTERTIES WITH OTHER JURISDICTIONS

Alberta is currently interconnected to both British Columbia and Saskatchewan. A third proposed interconnection to Montana may be in operation in 2007. These interties allow the exchange of energy with other markets and provide reliability benefits during supply emergency conditions.

The AESO is including the intertie import capacity for the purposes of the reserve margin calculation. The AESO recognizes that the ability to access electrical energy over the interties at the time of Alberta system peak is dependent upon system conditions in other jurisdictions. However, given that the reserve margin metric is not a probabilistic assessment, inclusion of the intertie capacity more accurately reflects supply available to meet peak load.

Currently, the available transfer capacity for imports from BC is 715MW. The Saskatchewan interconnection can provide 150MW. The MATL project proposes building a new 300 MW intertie between Montana and Alberta by 2007. Based on initial studies, the AESO cannot be certain that the new line will be able to provide incremental import capacity to the system in the next few years unless and until system enhancements are undertaken. Therefore, for reserve margin calculation purposes, the AESO has not included any MATL import capacity during the forecast period.

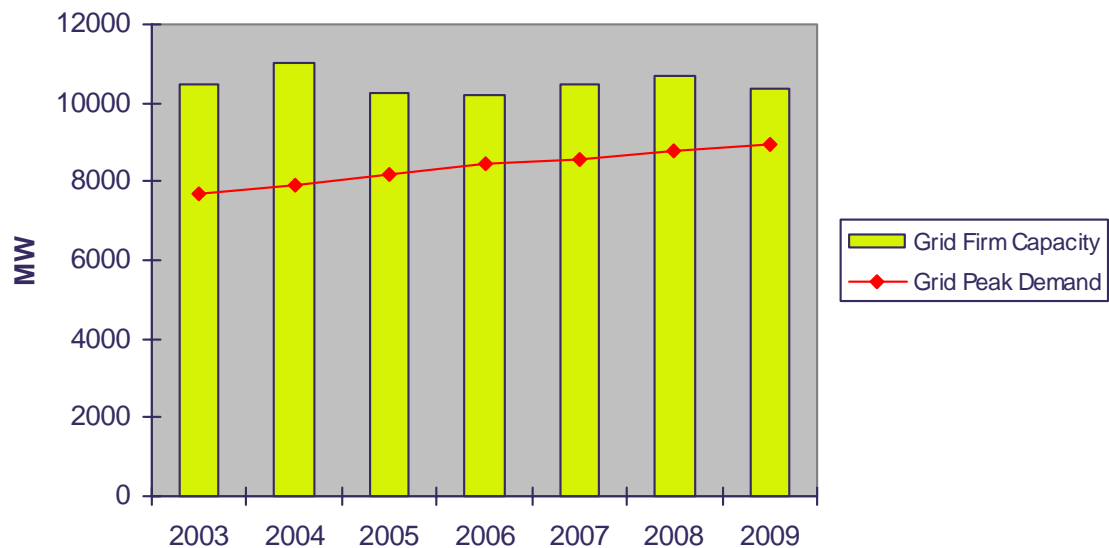
6 RESERVE MARGIN FORECAST

Alberta Grid Firm reserve margin represents the ratio of the Alberta Grid Firm Capacity, including inerties, to the Alberta Grid Peak Demand.

Reserve margin estimates do not directly measure supply adequacy and are usually used in conjunction with other probabilistic adequacy metrics such as the loss of load expectation or expected unserved energy. The AESO believes that the Alberta Grid Firm reserve margin definition will provide useful information to market participants and will provide directional relative adequacy indications over time.

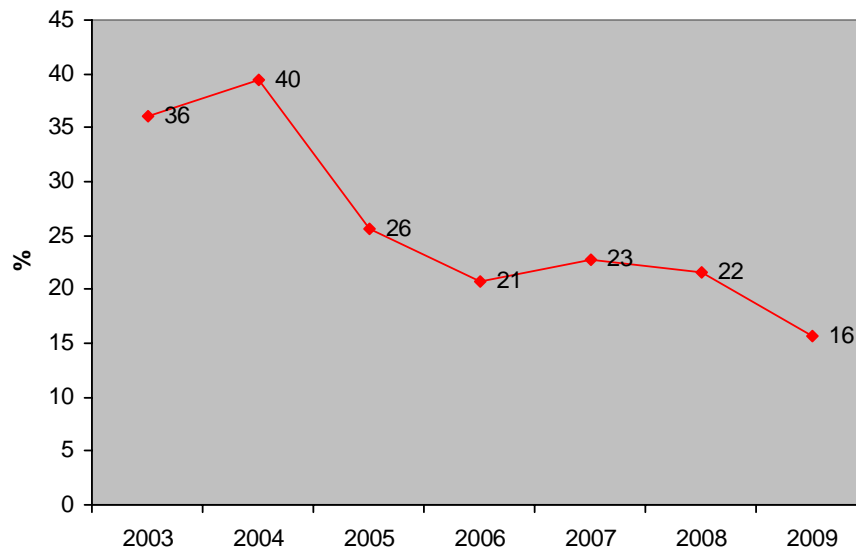
The AESO's short term forecast of Alberta Grid Firm Capacity and Alberta Grid Peak Demand are illustrated in Figure 5 below.

Figure 5:
Alberta Grid Peak Demand and Capacity
including Intertie Capacity



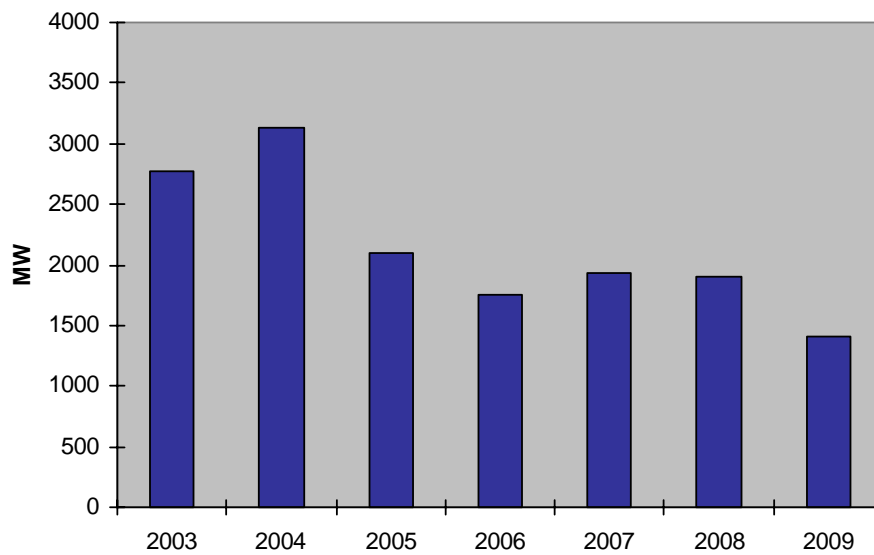
The Alberta Grid Firm reserve margin estimates are provided in Figure 6 below and indicate that the reserve margin reached a recent historical high of 40% in 2004, declined to 26% in 2005 and is forecast to drop to 21% in 2006. The forecast reserve margin is projected to increase in 2007 reaching 23% with new cogeneration capacity offsetting demand growth. The reserve margin declines over the next two years as demand growth begins to outpace known capacity additions.

**Figure 6:
Alberta Grid Firm Reserve Margin
including Intertie Capacity**



Reserve margin estimates depict the surplus of capacity over demand as a percentage. An alternative way to express the surplus capacity would be to calculate the difference in terms of megawatts (MW). The Alberta Grid Firm excess capacity forecast including intertie capacity is provided in Figure 7.

**Figure 7:
Alberta Grid Firm Excess Capacity
including Intertie Capacity**



Appendix 1: Definitions

DEMAND

“Alberta Total Peak Demand” means the sum of **Alberta Grid Peak Demand** and **Behind the Fence Demand**.

“Alberta Grid Peak Demand” means the hourly peak total grid consumption by the residential, farm, commercial and industrial customer segments excluding designated “Behind the Fence” sites plus total estimated distribution and transmission losses.

“Behind the Fence Demand” means the total onsite consumption for designated Alberta Behind the Fence sites which occurs during the same hour as the Alberta Grid Peak Demand (the coincident peak).

CAPACITY

“Alberta Total Installed Capacity” means the Maximum Continuous Rating (MCR) of all grid connected Alberta generation assets and a few specific large distribution connected generation assets. The MCR for existing generation assets is published in the AESO Current Supply Demand report on the AESO website.

“Alberta Grid Installed Capacity” means the **Alberta Total Installed Capacity** minus the **Behind the Fence Demand**.

“Alberta Grid Firm Capacity” means the **Alberta Grid Installed Capacity** minus wind installed capacity minus 35% of hydro installed capacity

Appendix 2: Generation Capacity- MCR Yearend

<u>Installed MCR Forecast</u>	<u>Year End</u>						
	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
<u>Grid Installed Coal:</u>							
Battle River #3	148	148	148	148	148	148	148
Battle River #4	148	148	148	148	148	148	148
Battle River #5	368	368	368	368	368	368	368
Genesee #1	384	384	384	384	384	384	384
Genesee #2	384	384	384	384	384	384	384
Genesee #3		450	450	450	450	450	450
H.R. Milner	143	143	143	143	143	143	143
Keephills #1	381	381	381	381	381	381	381
Keephills #2	381	381	381	381	381	381	381
Sundance #1	280	280	280	280	280	280	280
Sundance #2	280	280	280	280	280	280	280
Sundance #3	353	353	353	353	353	353	353
Sundance #4	353	353	353	353	353	353	353
Sundance #5	353	353	353	353	353	353	353
Sundance #6	399	399	399	399	399	399	399
Sheerness #1	378	378	378	378	378	378	378
Sheerness #2	378	378	378	378	378	378	378
Wabamun #4	279	279	279	279	279	279	279
Wabamun (2 units)	134	134					
Subtotal	5524	5974	5840	5840	5840	5840	5840
<u>Grid Installed Gas:</u>							
Drywood	6	6	6	6	6	6	6
Maxim #2	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Maxim #3	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Maxim #4	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Poplar Hill #1	47	47	47	47	47	47	47
Rainbow #1	26	26	26	26	26	26	26
Rainbow #2	40	40	40	40	40	40	40
Rainbow #3	21	21	21	21	21	21	21
Rainbow #5	47	47	47	47	47	47	47
Rossdale #10	71	71	71	71	71	71	0
Rossdale #8	67	67	67	67	67	67	0
Rossdale #9	71	71	71	71	71	71	0
Rainbow Lake #1	47	47	47	47	47	47	47
Sturgeon #1	10	10	10	10	10	10	10
Sturgeon #2	8	8	8	8	8	8	8
Valley View 1	45	45	45	45	45	45	45
Weldwood	50	50	50	50	50	50	50
Elmworth- Northstone Power		9	9	9	9	9	9
Talisman Edson			10.8	10.8	10.8	10.8	10.8
Gold Creek Facility	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Sait	5.725	5.725	5.725	5.725	5.725	5.725	5.725
Nexen Inc #1	120	120	120	120	120	120	120
EnCana #1	120	120	120	120	120	120	120
Bear Creek	80	80	80	80	80	80	80
Calpine Calgary Energy Centre	250	250	250	250	250	250	250
Clover Bar 1-4	628	628					
Subtotal	1788	1797	1180	1180	1180	1180	971

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
<u>Installed Gas w/ BtF demand:</u>							
BuckLake	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Carseland Cogen	80	80	80	80	80	80	80
Redwater Cogen	40	40	40	40	40	40	40
Encana Foster Creek	80	80	80	80	80	80	80
MacKay River		165	165	165	165	165	165
Air Liquide Scotford #1	80	80	80	80	80	80	80
Medicine Hat #1	205	205	205	205	205	205	205
Dow Hydrocarbon	310	310	310	310	310	310	310
Fort Nelson	47	47	47	47	47	47	47
Joffre #1	474	474	474	474	474	474	474
Primrose #1	85	85	85	85	85	85	85
Syncrude #1	345	345	345	345	345	345	345
Suncor #1	445	445	445	445	445	445	445
University of Alberta	39	39	39	39	39	39	39
Muskeg River	200	200	200	200	200	200	200
Mahkeses	180	180	180	180	180	180	180
ATCO Scotford Upgrader	184	184	184	184	184	184	184
Celanese	19.8	19.8	19.8	19.8	19.8	19.8	19.8
Subtotal Existing	2819	2984	2984	2984	2984	2984	2984
New / Expansion Projects				182	586	926	926
Subtotal Existing + New w/ BtF load		2984	2984	3166	3570	3910	3910
<u>Grid Installed Hydro:</u>							
Bighorn Hydro	120	120	120	120	120	120	120
Bow River Hydro	319	319	319	319	319	319	319
Brazeau Hydro	350	350	350	350	350	350	350
Chin Chute	11	11	11	11	11	11	11
Raymond Reservoir	18	18	18	18	18	18	18
Taylor Hydro	12	12	12	12	12	12	12
CUPC Oldman River	32	32	32	32	32	32	32
Irrican Hydro		7	7	7	7	7	7
Subtotal	862	869	869	869	869	869	869
<u>Grid Installed Other:</u>							
	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Drayton Valley	11	11	11	11	11	11	11
Whitecourt Power	25	25	25	25	25	25	25
Westlock	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Subtotal	53.5	53.5	53.5	53.5	53.5	53.5	53.5
<u>Installed Other w/ BtF demand:</u>							
APF Athabasca	99	99	99	99	99	99	99
Grande Prairie EcoPower			25	25	25	25	25
Subtotal	99	99	124	124	124	124	124

Grid Installed Wind:

Castle River #1	40	40	40	40	40	40	40
Cowley Ridge	38	38	38	38	38	38	38
Summerview		68.4	68.4	68.4	68.4	68.4	68.4
Suncor Magrath		30	30	30	30	30	30
McBride Lake Windfarm	75	75	75	75	75	75	75
Taylor Wind				3.6	3.6	3.6	3.6
Kettles Hill Wind				9	9	9	9
Kettles Hill Phase 1				63	63	63	63
Enmax Taber Wind				80	80	80	80
Kettles Hill Phase 2					77	77	77
Chin Chute Wind				30	30	30	30
Soderglen				71	71	71	71
New Wind Confidential							
Subtotal	153	251.4	251.4	508	585	585	585
Alberta Total Installed MCR	11299	12028	11302	11741	12222	12562	12353

<u>Installed MCR Summary:</u>	<u>Year End</u>						
	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Grid Installed Coal:	5524	5974	5840	5840	5840	5840	5840
Grid Installed Gas:	1788	1797	1180	1180	1180	1180	971
Installed Gas w/ BtF demand:	2819	2984	2984	3166	3570	3910	3910
Grid Installed Hydro:	862	869	869	869	869	869	869
Grid Installed Other:	54	54	54	54	54	54	54
Installed Other w/ BtF demand:	99	99	124	124	124	124	124
Grid Installed Wind:	153	251	251	508	585	585	585
Alberta Total Installed MCR	11299	12028	11302	11741	12222	12562	12353
Alberta Installed Coal:	5524	5974	5840	5840	5840	5840	5840
Alberta Total Installed Gas:	4607	4781	4164	4346	4750	5090	4881
Alberta Installed Hydro:	862	869	869	869	869	869	869
Alberta Total Installed Other:	306	404	429	686	763	763	763
Alberta Total Installed MCR	11299	12028	11302	11741	12222	12562	12353

Appendix 3: Reserve Margin Calculations

<u>Reserve Margin Forecast:</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>
Alberta Total Installed MCR	11,299	12,028	11,302	11,741	12,222	12,562	12,353
Alberta Total Peak Demand	<u>8,967</u>	<u>9,236</u>	<u>9,537</u>	<u>10,069</u>	<u>10,287</u>	<u>10,665</u>	<u>10,948</u>
Alberta Total Installed Excess Capacity	2,332	2,792	1,765	1,672	1,935	1,896	1,405
Alberta Total Installed Reserve Margin	26.0%	30.2%	18.5%	16.6%	18.8%	17.8%	12.8%
Installed MCR with BtF demand:	2,918	3,083	3,108	3,290	3,694	4,034	4,034
Total BtF Peak Demand (coincident)	<u>1,289</u>	<u>1,320</u>	<u>1,372</u>	<u>1,619</u>	<u>1,734</u>	<u>1,864</u>	<u>2,009</u>
Grid Installed MCR net of BtF demand:	1,629	1,763	1,736	1,671	1,960	2,170	2,025
Alberta Grid Installed MCR	10,010	10,708	9,930	10,122	10,488	10,698	10,344
Alberta Grid Peak Demand	<u>7,678</u>	<u>7,916</u>	<u>8,165</u>	<u>8,450</u>	<u>8,553</u>	<u>8,801</u>	<u>8,939</u>
Alberta Grid Installed Excess Capacity	2,332	2,792	1,765	1,672	1,935	1,896	1,405
Alberta Grid Installed Reserve Margin	30.4%	35.3%	21.6%	19.8%	22.6%	21.5%	15.7%
Alberta Grid Installed MCR	10,010	10,708	9,930	10,122	10,488	10,698	10,344
Hydro Adj. 1: (100% of Small Hydro MCR)	73	80	80	80	80	80	80
Hydro Adj. 2: (to 75% of Large Hydro MCR)	197	197	197	197	197	197	197
Wind Adjustment (100% of MCR)	153	251	251	508	585	585	585
Alberta Grid Firm MCR	9,587	10,179	9,401	9,336	9,625	9,835	9,481
Alberta Grid Peak Demand	7,678	7,916	8,165	8,450	8,553	8,801	8,939
Alberta Grid Firm Excess Capacity	1,909	2,264	1,237	887	1,073	1,034	542
Alberta Grid Firm Reserve Margin	24.9%	28.6%	15.1%	10.5%	12.5%	11.7%	6.1%
Alberta Grid Firm MCR	9,587	10,179	9,401	9,336	9,625	9,835	9,481
Intertie Firm Capacity	865	865	865	865	865	865	865
Alberta Grid Firm MCR plus Interties	10,452	11,044	10,266	10,201	10,490	10,700	10,346
Grid Peak Demand	7,678	7,916	8,165	8,450	8,553	8,801	8,939
Grid Firm Excess Capacity with Interties	2,774	3,129	2,102	1,752	1,938	1,899	1,407
Grid Firm Reserve Margin with Interties	36.1%	39.5%	25.7%	20.7%	22.7%	21.6%	15.7%