



Stakeholder Consultation 10-Year Transmission System Plan 2007-2016

Bill Strongman, P. Eng.

Director, Regional System Planning

Alberta Electric System Operator

September 7, 2006

Agenda

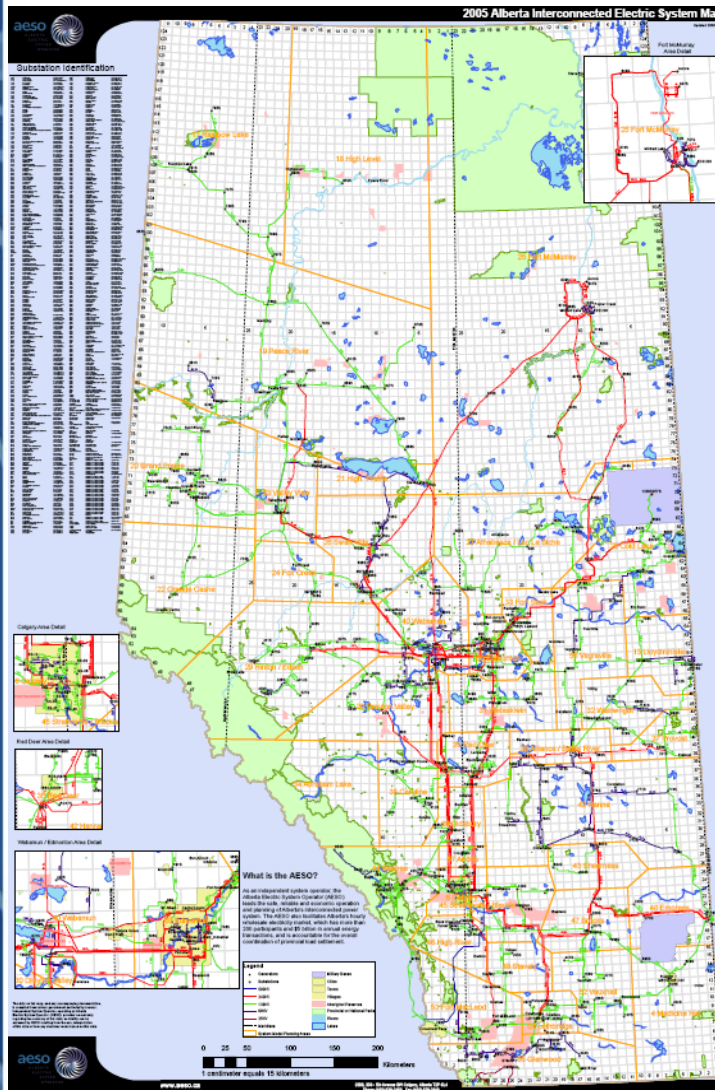
- **Opening remarks**
- **Load forecast**
- **Generation scenarios**
- **Next steps and closing remarks**



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10-Year Plan (2007-2016) - Overview



What:

- A document that identifies the transmission facilities required for the electric system to meet forecast loads and generation scenarios for next 10 years

Why:

- Provide all stakeholders with roadmap for future transmission development

Who:

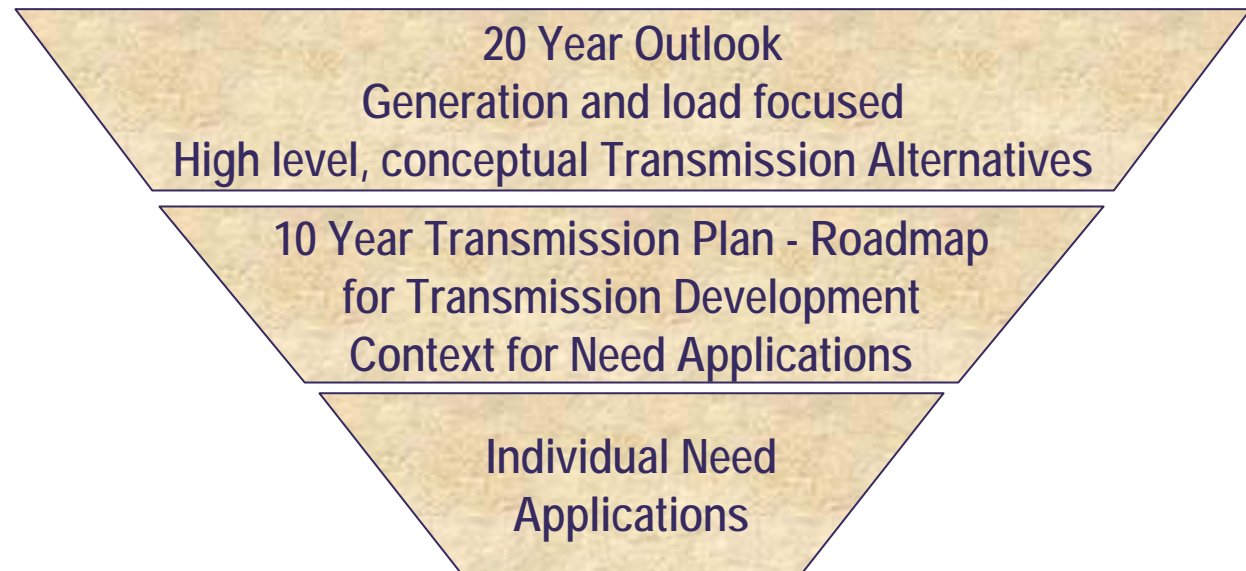
- Load Forecasting, Resource Adequacy, Transmission Planning, Stakeholders

When:

- December 31, 2006 (every 2 years)
- AESO's first 10-year plan released in December 2004



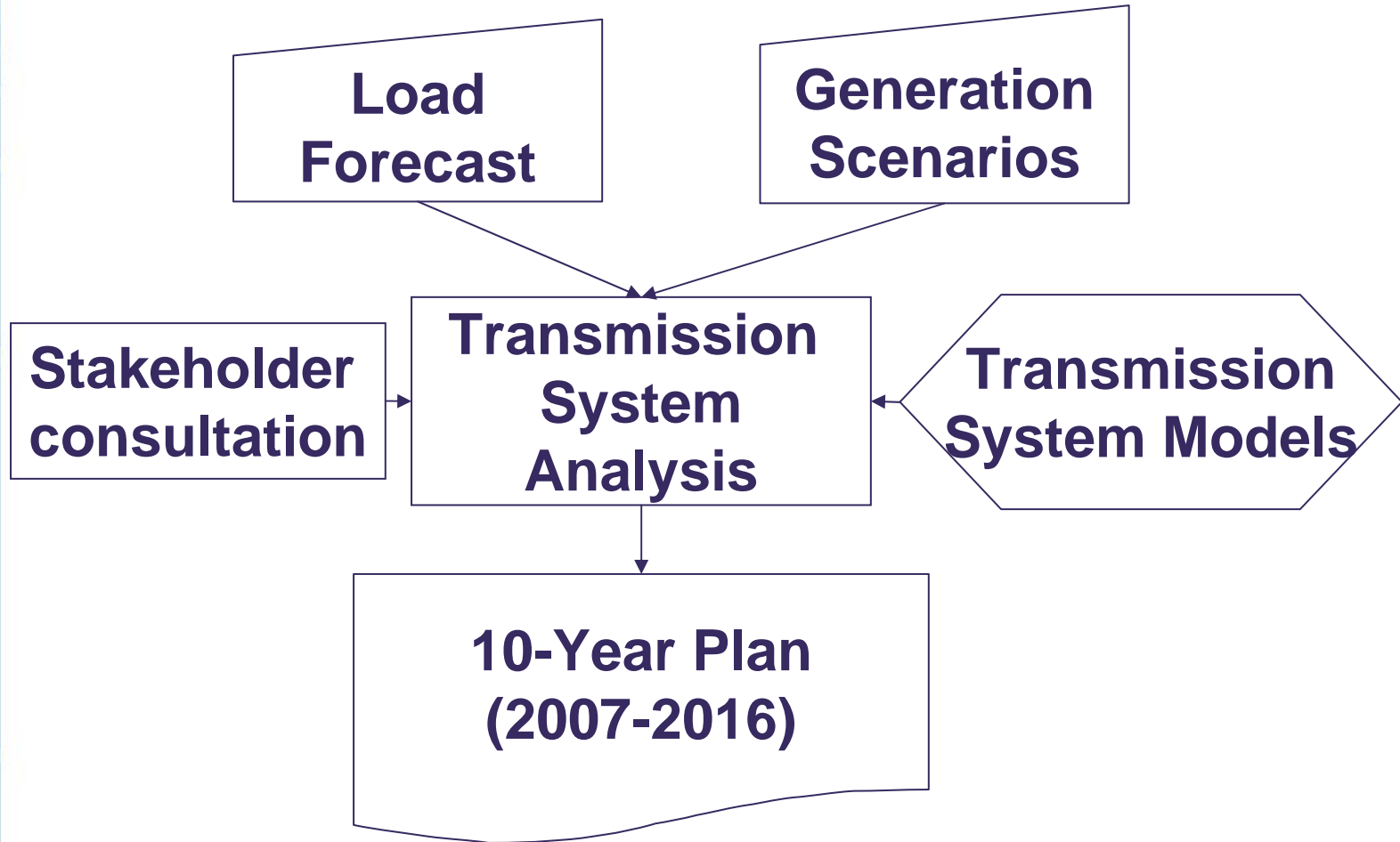
10-Year Plan – Strategic Fits



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Planning Process



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AESO's Commitment to Stakeholders

- **Transparency important**
- **Consultation plan flexibility**
- **Opportunity to participate for those who want to:**
 - know the process is underway
 - have access to information
 - have mechanism to participate
- **Respectful of everyone's time and resources**
- **AESO's stakeholder principles available online at www.aeso.ca Our company>Consultation Principles**



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10-Year Plan

- **Identify transmission reinforcements necessary to meet future load and generation**
- **Challenges include:**
 - **Oilsands development**
 - **Generation**
 - **Unique load characteristics**
 - **Interconnections and merchant transmission**



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Questions?



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Stakeholder Consultation Long-Term Load Forecast 2007-2016

LaRhonda Papworth,

Senior Forecast Analyst

Alberta Electric System Operator

September 7, 2006

Overview

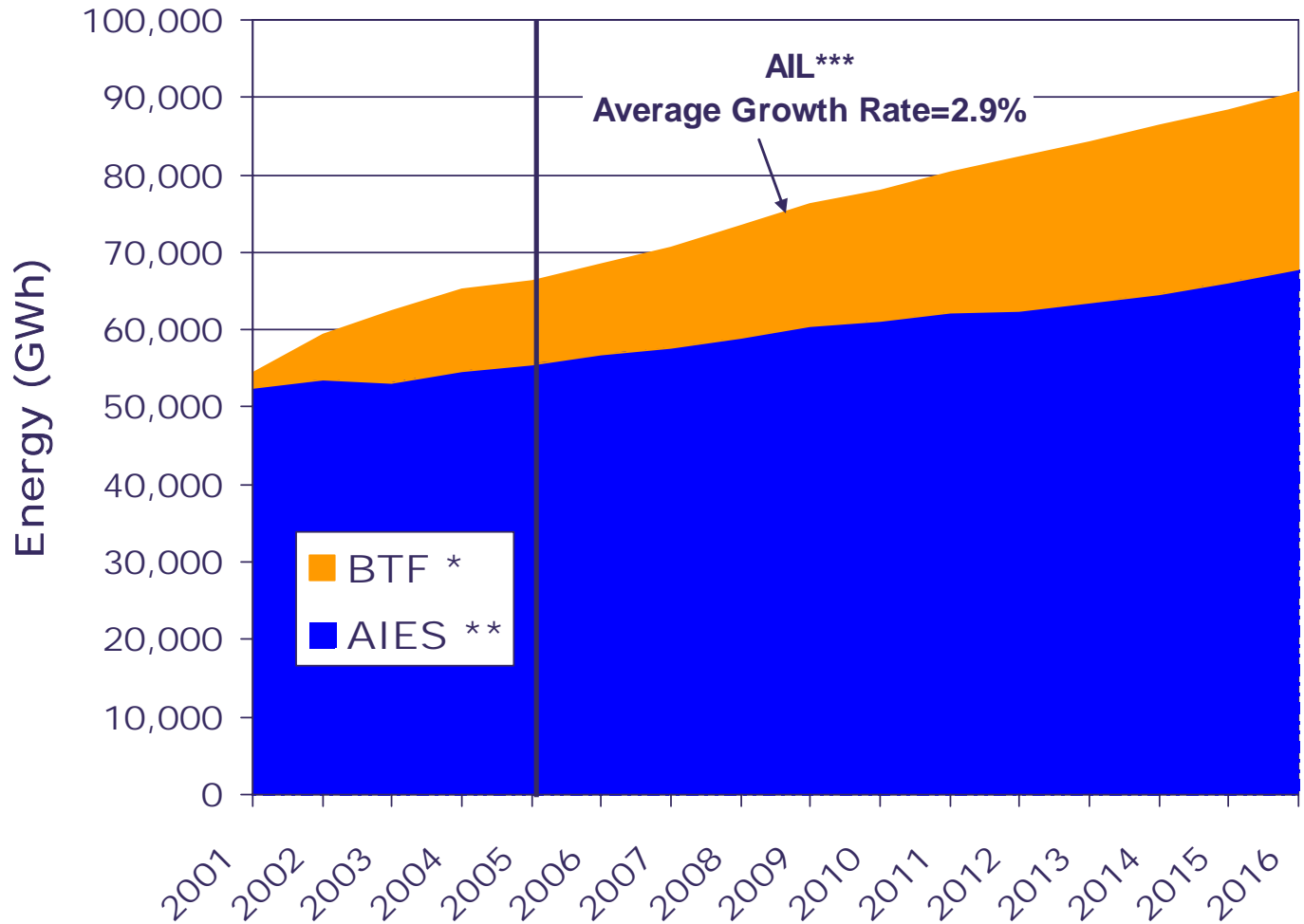
- **Summary results**
- **Forecast inputs**
- **Forecast methodology**
- **Next steps**
- **Questions**



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Energy Forecast



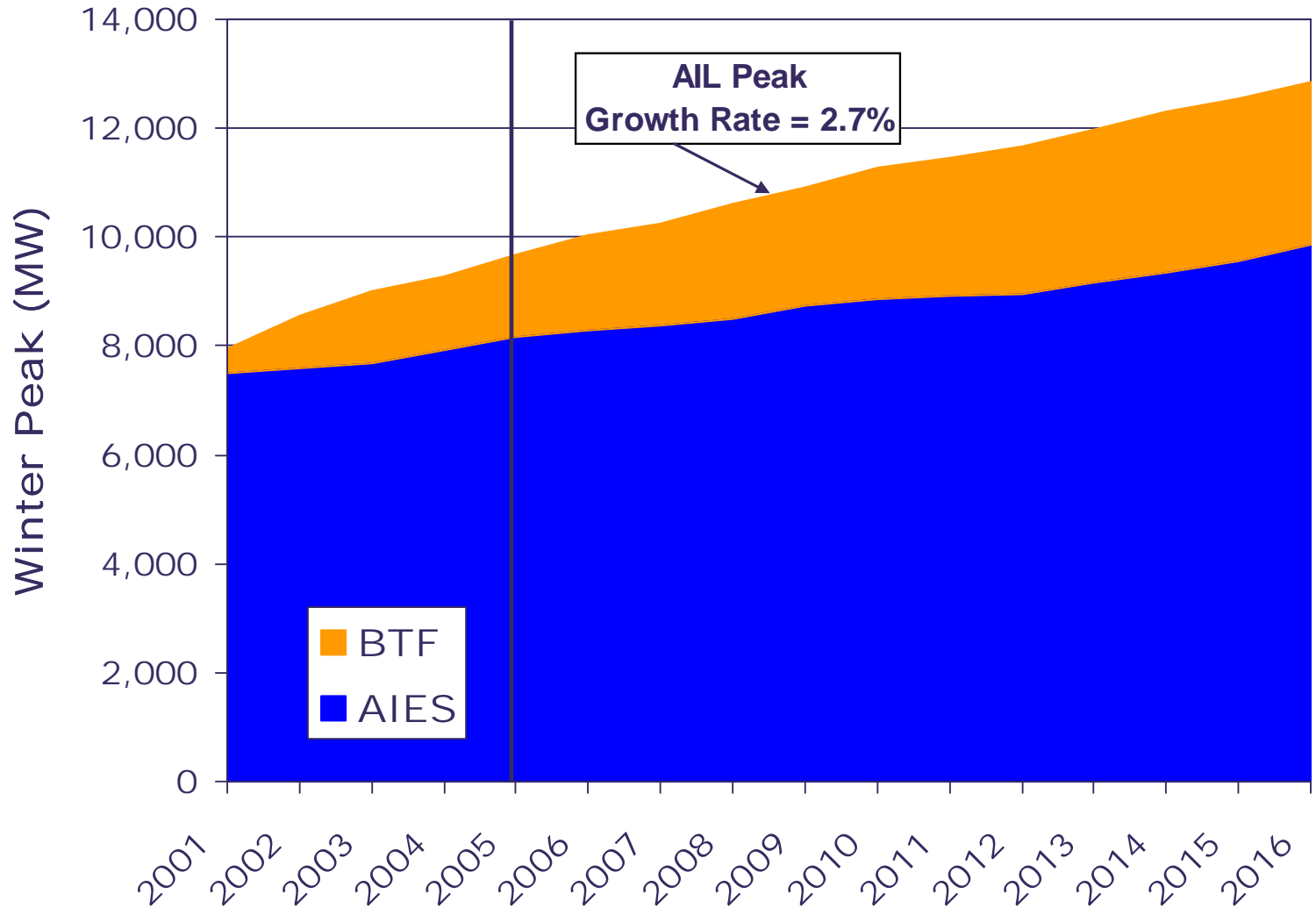
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*BTF – Behind-the-Fence

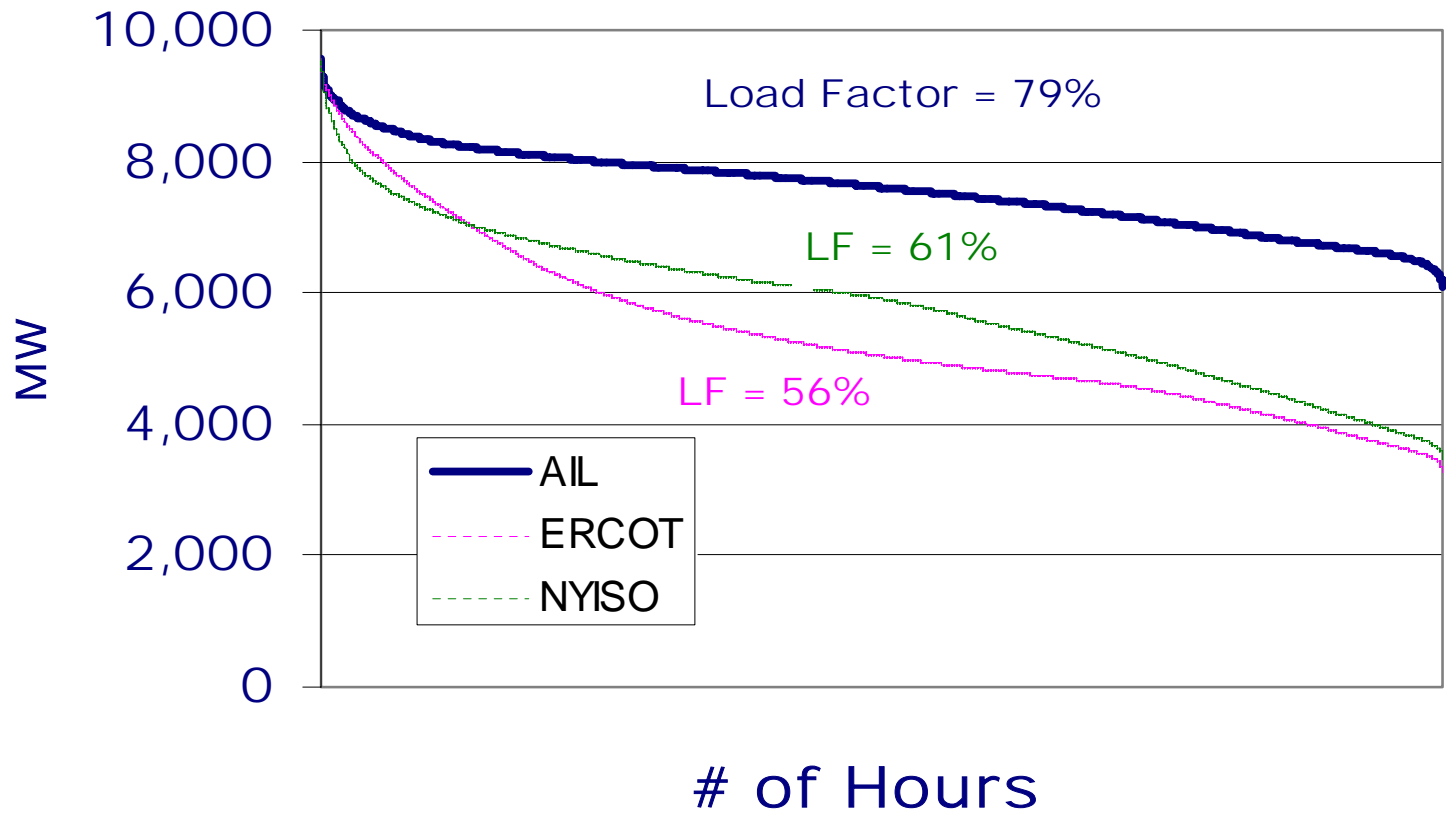
**AIES – Alberta Interconnected Electric System

***AIL – Alberta Internal Load

Winter Peak Forecast



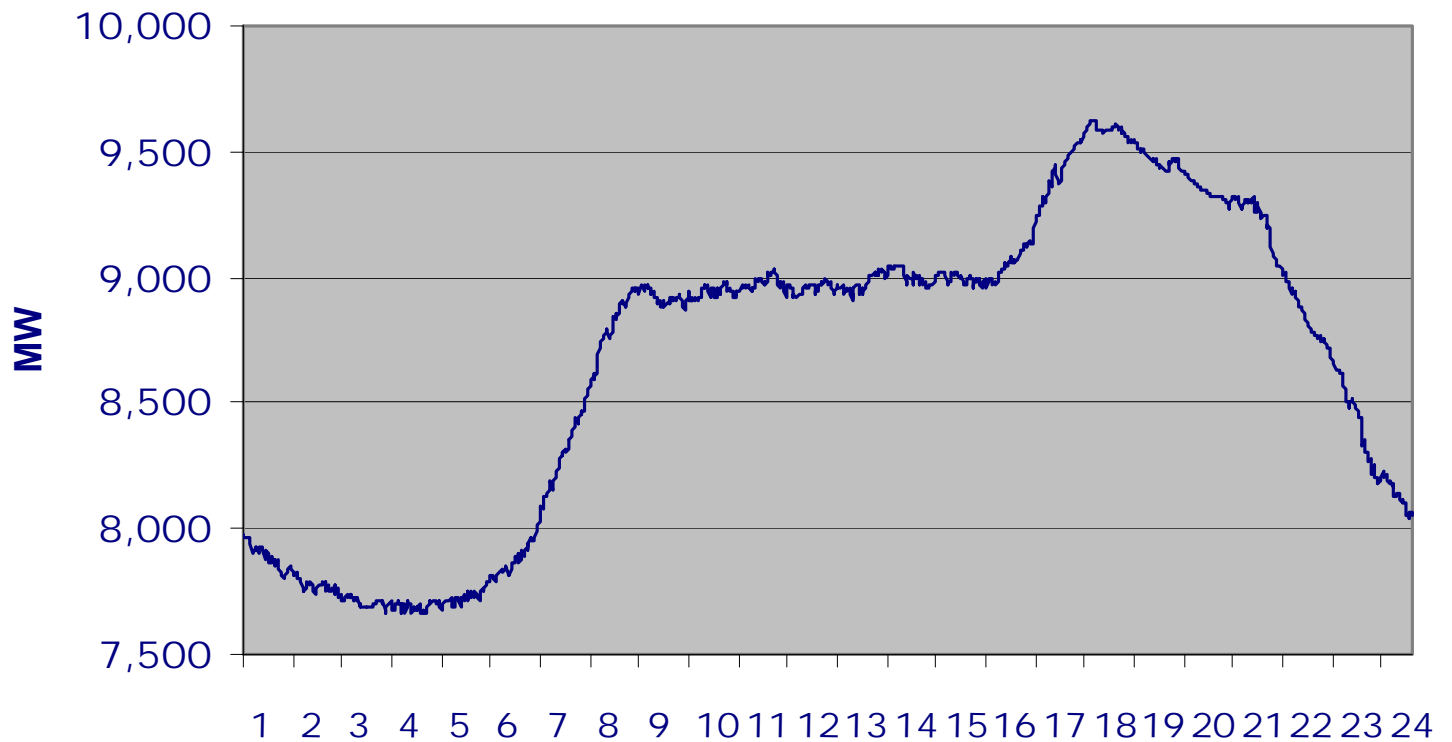
2005 AIL Load Profile



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2005 Winter Peak - Daily Load Shape



*Dec 5, 2005



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Load Forecast Inputs

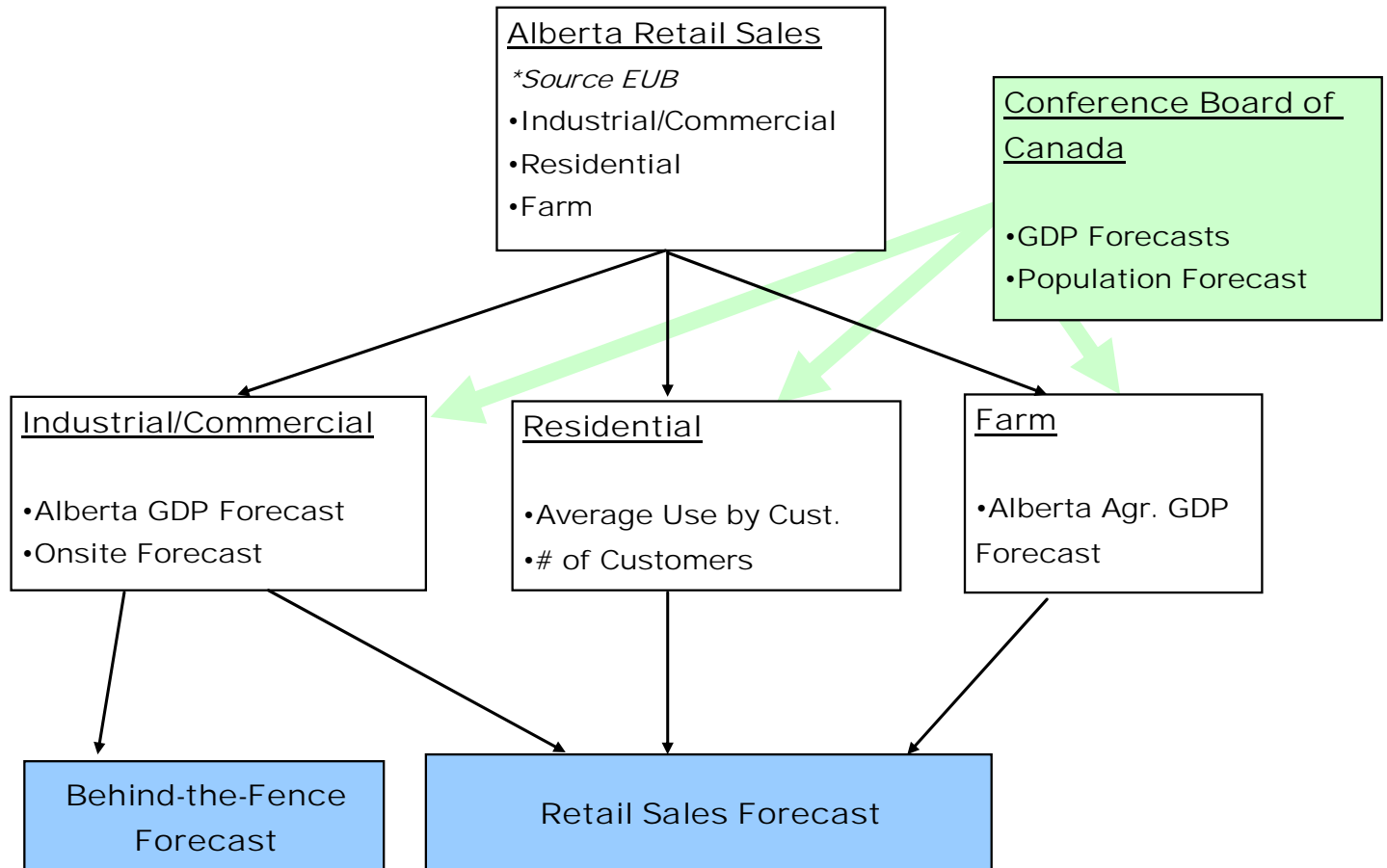
- **Conference Board of Canada's Long-term Economic Forecast – Provincial Outlook 2006**
 - Alberta GDP
 - Population
- **Large project information from AESO Engineering & Transmission Planning**
 - Latest in-service dates
 - Project size
- **Metering Point (POD) historical growth rates**
- **Metering Point load shape (past 2 years)**



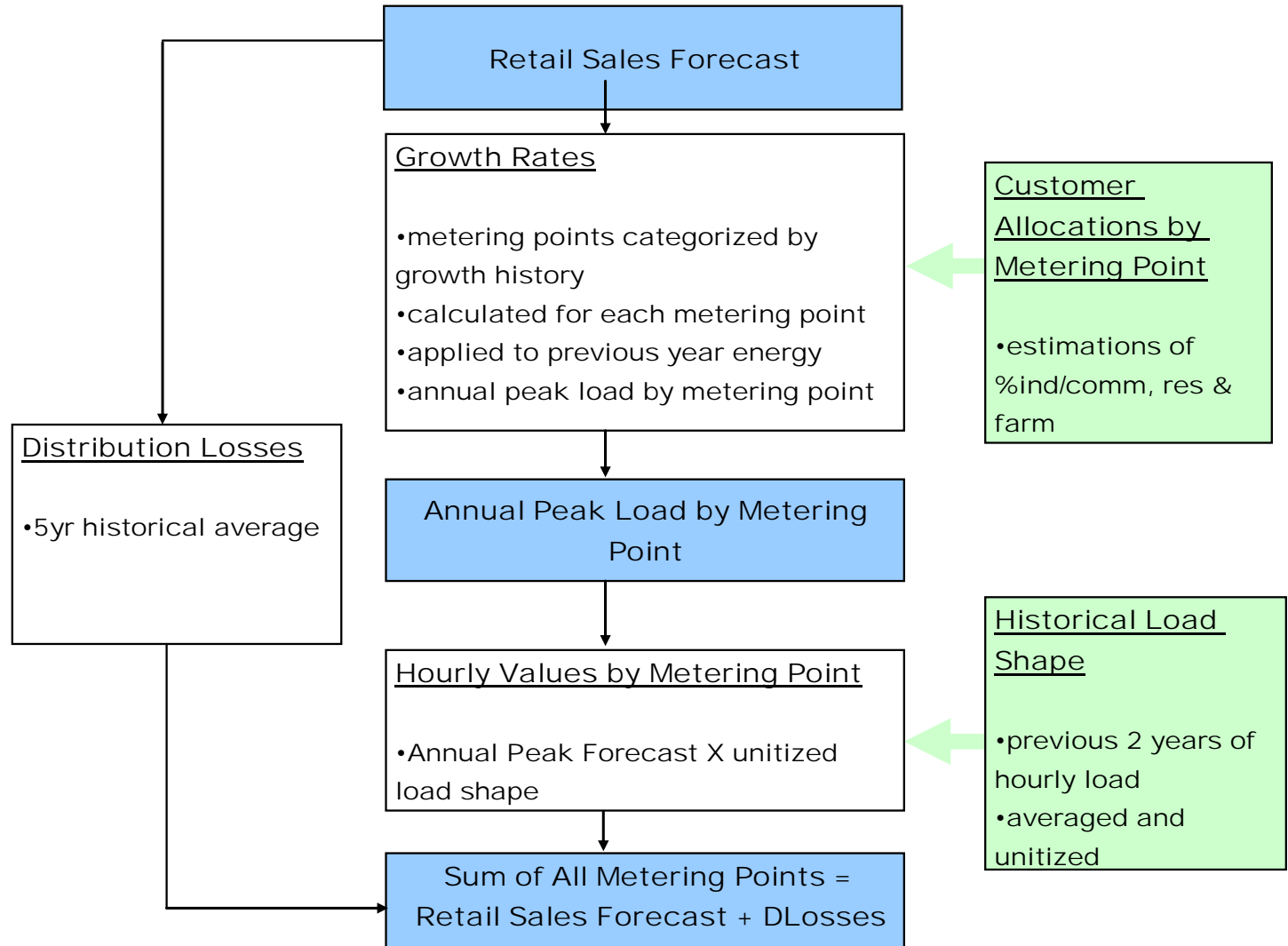
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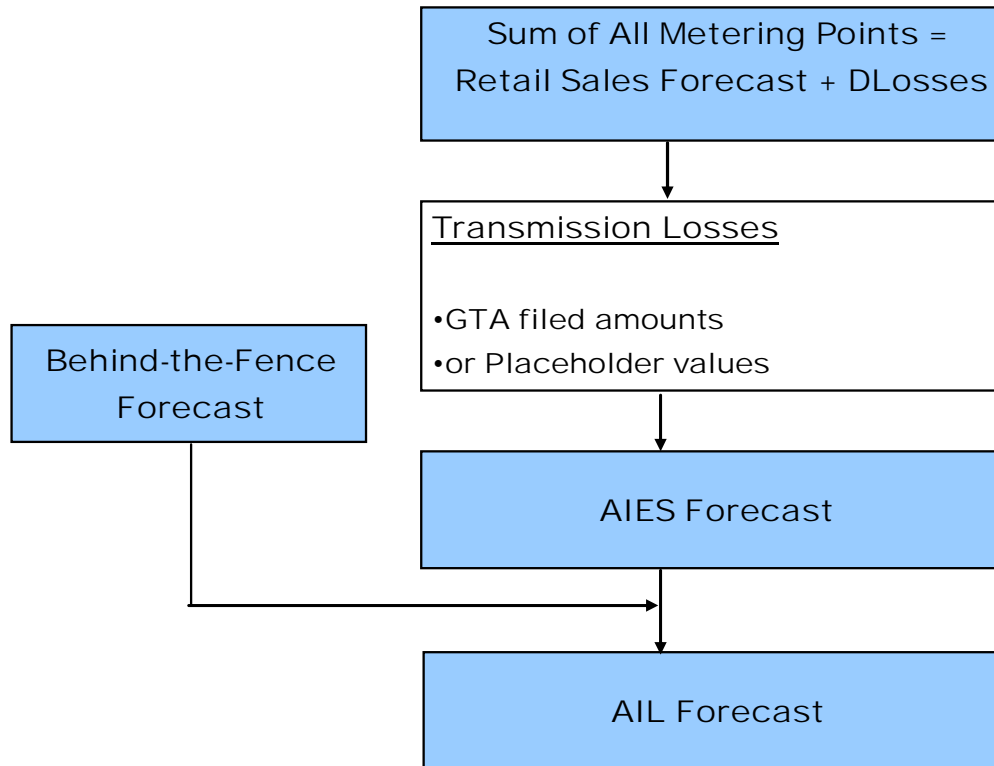
Load Forecasting Methodology



Load Forecasting Methodology (cont'd)



Load Forecasting Methodology (cont'd)



Next Steps

- **Release detailed load forecast document in September**
- **Feedback on load forecast in context of sensitivity analysis**
- **Welcome comments/questions on methodology for consideration in our next forecast**



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Stakeholder Consultation Generation Scenarios – 10-Year Transmission System Plan 2007 - 2016

Jeff Nish, P.Eng.

Director, Resource Adequacy

Alberta Electric System Operator

September 7, 2006

Overview

- **Goal:**
 - Provide reasonable generation development scenarios against which the adequacy of the transmission system can be assessed.
- **Basis:**
 - Market driven generation additions
 - No impact on transmission system from export-dedicated generation (i.e. Northern Lights)
 - Scenario approach
 - AMEC engaged to build on work done for 2005-2024 20-Year Outlook



The Challenge

- **Generation development is a non-regulated, competitive business**
 - **How much**
 - **What type**
 - **Where**
 - **When**



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Summary of Generation

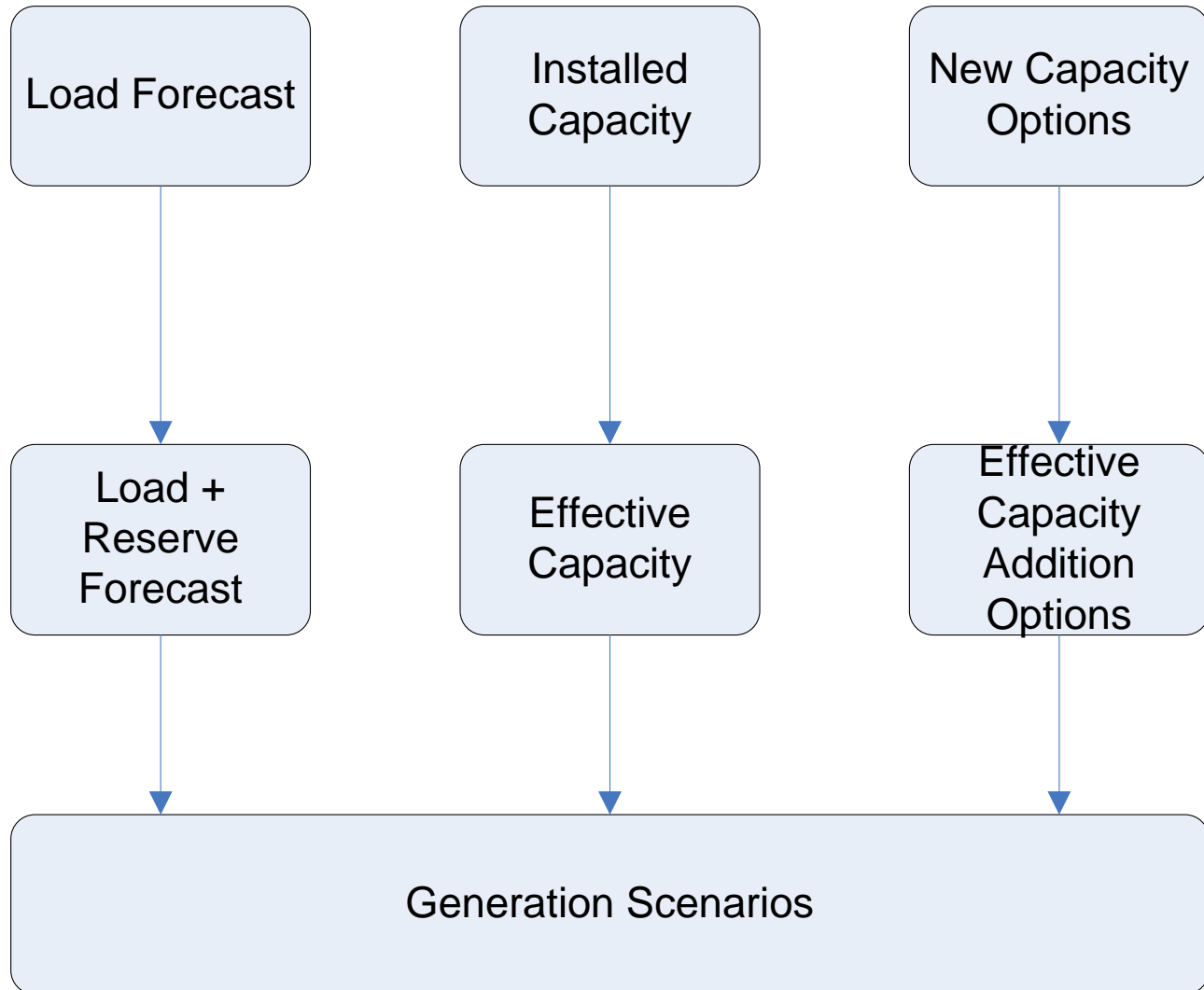
- By 2016, there could be over 3,800 MW of effective capacity (capacity available at system peak) added to the system comprised of:
 - 1,600 MW of behind-the-fence generation
 - 770 MW of other generation (wind, hydro, gas, coal unit upgrades)
 - 1,500 MW of new coal units (new or existing sites) or integrated gasification combined cycle plants



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Process



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Reserve Margin – A Simplified Market Signal

- Reserve Margin*
 - Installed Capacity plus tie lines 22%
 - Installed Capacity 13%
 - Effective Capacity 7.5%
- Effective Capacity Reserve Margin remains constant through study period while others change with resource mix

* $[(\text{Capacity} - \text{Peak Load}) / \text{Peak Load}] \times 100\%$



Load and Reserve (MW)

	2005	2011	2016
Alberta Interconnected Electric System Load	8,158	8,910	9,844
Behind the Fence Load	1,422	2,557	3,016
Alberta Internal Load	9,580	11,467	12,860
Peak Load plus 7.5% Reserve	10,299	12,327	13,825



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Effective Capacity as of December 2005 (MW)

● Installed Capacity	11,308
● Less Rossdale	- 209
● Less Small hydro derate	- 64
● Less PPA hydro derate	- 260
● Less Wind derate	<u>- 201</u>
● Effective Capacity	10,574



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Effective Capacity Base (MW)

	2005	2011	2016
Effective Capacity in 2005	10,574	10,574	10,574
Retirements	0	279	575
Base Effective Capacity net of Retirements	10,574	10,295	9,999



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New Capacity Options

- **Common to All Scenarios**
 - Behind-the-fence cogeneration
 - Wind
 - Hydro
 - Simple cycle gas generation
 - Upgrades at existing coal plants
 - Miscellaneous
- **Other Options**
 - New units at existing sites (Keephills, Genesee)
 - New coal-fired generation (Bow City)
 - Integrated gasification combined cycle (Fort Saskatchewan)
 - Additional wind



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Generation Additions (MW) – All Scenarios

	2011	2016
Base Effective Capacity net of Retirements	10,295	9,999
Behind the Fence Cogeneration	1,135	1,594
Wind	120	240
Hydro	-	50
Simple Cycle Gas	100	200
Upgrades at existing Coal Plants	80	180
Miscellaneous	50	100
Effective Capacity Common to all Scenarios	11,780	12,363



Generation to be added in Scenarios (MW)

	2011	2016
Peak Load plus 7.5% Reserve	12,327	13,825
Effective Capacity Common to all Scenarios	11,780	12,363
Additional Effective Capacity	547	1462



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Scenario 1 – Southern Generation (MW)

	2011	2016
Additional Effective Capacity	547	1462
Keephills 3	-	500
Bow City	500	1000
Cumulative Total	500	1500



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Scenario 2 – Northern Generation (MW)

	2011	2016
Additional Effective Capacity	547	1462
Keephills 3	500	500
Genesee 4	-	500
IGCC (coke) or Keephills 4	-	500
Cumulative Total	500	1500



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Scenario 3 – Northern Generation with Additional Wind (MW)

	2011	2016
Additional Effective Capacity	547	1462
Wind*	160	340
Keephills 3	500	500
Genesee 4	-	500
IGCC (coke) or Keephills 4	-	500
Cumulative Total	660	1840

* New additional capacity of 800 MW by 2011 and 1700 MW by 2016



Sensitivity Analysis

- Scenarios 1 and 2 tested under:
 - Load growth of +/- 300 MW by 2011, +/- 500 MW by 2016 (could also be due to more or less behind the fence generation)
 - Results:
 - Approximately 500 MW less capacity by 2016 under lower load growth
 - Approximately 500 MW more capacity by 2011 for higher load growth



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Summary

- By 2016, there could be over 3,800 MW of effective capacity (capacity available at system peak) added to the system comprised of:
 - 1,600 MW of behind-the-fence generation
 - 770 MW of other generation (wind, hydro, gas, coal unit upgrades)
 - 1,500 MW of new coal units (new or existing sites) or integrated gasification combined cycle plants



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Next Steps

- **AMEC draft report posted to AESO website September 7**
- **Feedback from stakeholders by September 15**
- **Response to stakeholder feedback and final AMEC report by next stakeholder session (timing dependent on nature and extent of feedback)**



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Stakeholder Consultation Closing Remarks

Bill Strongman, P.Eng.

Director, Regional System Planning

Alberta Electric System Operator

September 7, 2006

Stakeholder Feedback Process

AESO Stakeholder Presentation:

- Will be posted to the AESO website on September 7

Presentation Q&A and Comments:

- Questions recorded at the session
- Stakeholders will have further opportunity to provide feedback
 - Written feedback requested by September 15
- To be posted on AESO website by next stakeholder session:
 - Q&A/comments and AESO responses
 - Final AMEC Generation Report
- Next stakeholder session – Late October



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