



Generation Diversity in Alberta's Market

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The AESO's Role

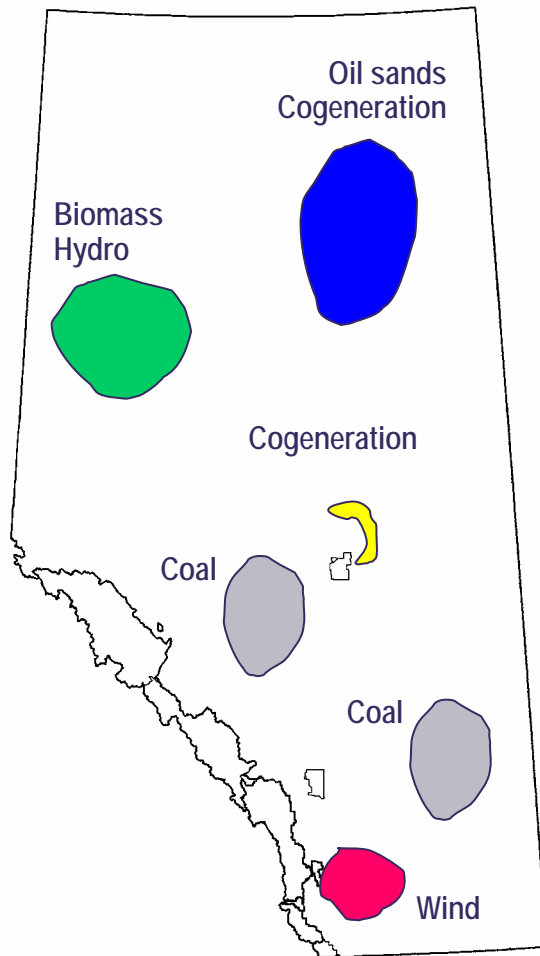
- **Safe, reliable and economic planning and operation of the Alberta Interconnected Electric System**
- **Long-term planning of the interconnected transmission system**
- **Interconnecting customers to the transmission system**
- **Real-time operation of Alberta's power system to ensure ongoing reliable electricity supply**
- **Facilitating a fair, openly competitive and efficient market for electricity**



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Planning and Building for the Future



- **Transmission planning must lead load growth and generation development**
 - Expand the grid to support forecast load growth and into regions where generation is likely to develop.
 - AESO prepares and publishes long-term plans (10 year and 20 year plans) for transmission.
 - AESO to restore inter-ties to design capability
 - Minimize and eliminate transmission must-run (TMR) and other temporary measures
 - Create framework to integrate merchant transmission into AIES

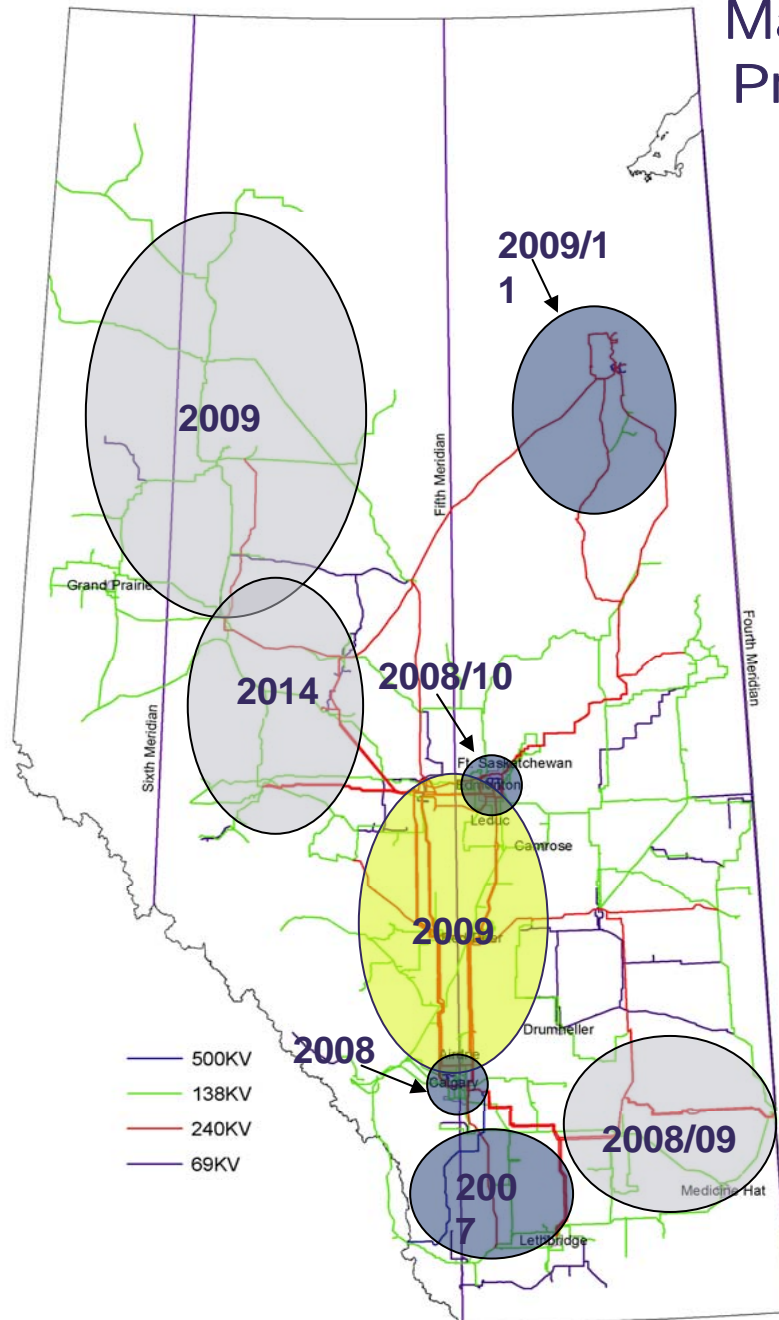


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Major Transmission System Projects being advanced in 2006

(approximate timing of reinforcement)



2007 Southwest system reinforcement (approved)

2008 City of Calgary reinforcement

2008/2010 City of Edmonton reinforcement (approved)

2009 Edmonton-Calgary 500 kV Reinforcement (approved)

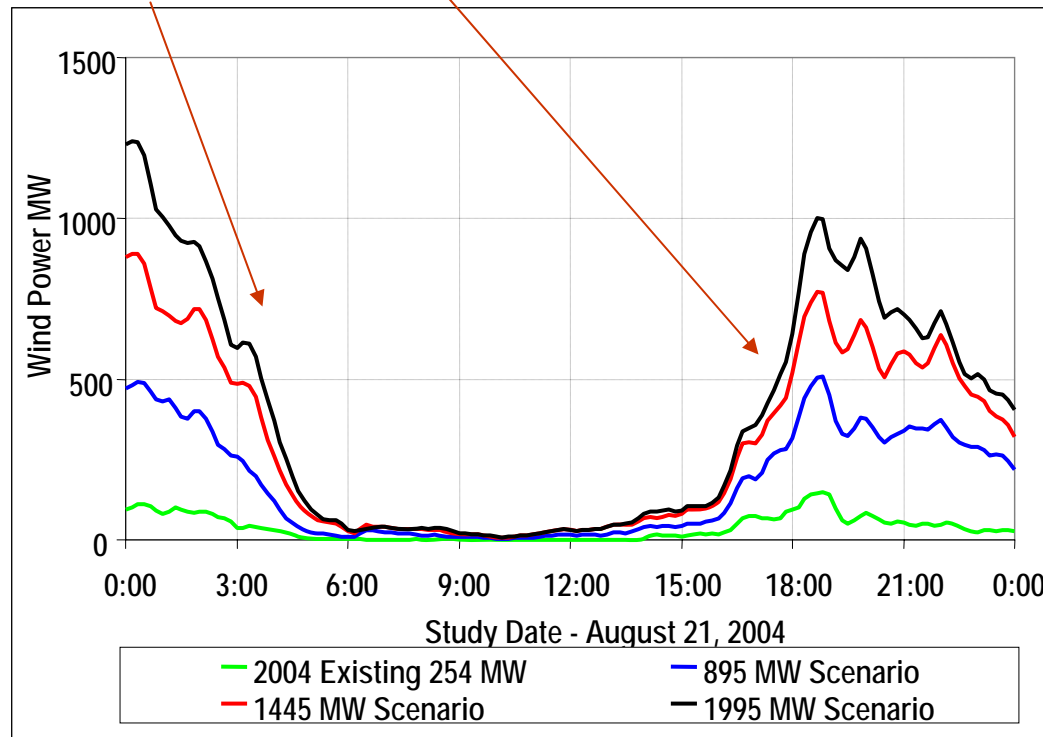
Regional plans:

2009/11 Northwest, Northeast & Southeast



Wind - Current Situation

- Dramatic increase in wind power since 1998
- 330 MW on AIES and in excess of 3,000 MW in various stages of development
- Wind variability creates uncertainty in real time operation and affects system performance – wind disappears and appears



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Wind - Key Findings and Next Steps



- **Increased wind power development will increase wind power variability and operational uncertainty**
- **AESO continues to work with industry to assess the effectiveness, cost and implications of various measures to integrate wind including:**
 - **Improving wind power forecasting techniques**
 - **Increasing the amount of regulating reserves on the AIES**
 - **Limiting ramp-rates of wind power facilities**
 - **There are limits to the amount of wind that can be added to the AIES**



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Import/Export Capacity



- **Inter-ties are critical to the success of Alberta's competitive electricity market**
 - Supports reliability (i.e. import)
 - Means to shed energy surplus
 - Assists long-term adequacy
- **The transmission system is *stretched***
- **Exports are primarily limited due to internal constraints (no pressure in the pipe)**



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Import/Export Capacity



- **Interim measures required to partially restore export capacity:**
 - Exports working group investigating available options to increase export capacity
 - Real-time assessment of export capacity to consider impact of southern generation
 - Challenged and modified the operating criteria
 - Advancement of Calgary area capacitor additions
- **The 500 kV N-S reinforcement will significantly restore export capacity of the AB-BC inter-tie**
- **The second 500 kV N-S transmission line will completely restore the capability**



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Integrating Generation Technologies

Wind

- **Primarily in southern part of the province – need transmission reinforcements**
- **Operating aspects – non-dispatchable, impact on operating reserves, ramp rates, forecasting and limits to integration on the AIES**
- **Technical issues – voltage control at wind farms and stability during fault conditions**



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Integrating Generation Technologies

Cogeneration

- **Focus on northern Alberta's oil sands area and Ft. Sask area**
- **Product is steam – electricity is a by product (non-dispatchable)**
- **Cogeneration provides process reliability but transmission system must provide back up for loss of on site generation**



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Integrating Generation Technologies

Coal bed Methane

- **Distributed development will drive growth on distribution system where coal bed methane is produced**



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