

# Alberta Power Summit

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Reliable **Power**

Reliable **Markets**

Reliable **People**



# Agenda



- About the AESO
- Alberta's Demand Growth
- Transmission System Development
- Key Projects
- Operational Challenges

# What is the AESO?



- Established in 2003 through the EUA to integrate Power Pool of Alberta and Transmission Administrator
- Performs “Independent System Operator” function
- Non-profit organization independent of all other electricity market participants
- Governed by independent board appointed by the Minister of Energy
- Regulated by Alberta Utilities Commission
  - Transmission Tariff
  - Transmission Development
  - AESO Rules
- Operation of the AESO funded through Pool Trading Charge and Transmission Tariff



# Our Core Business

- **Markets:** develop and operate Alberta's real-time wholesale energy market to facilitate fair, efficient and open competition
- **Transmission System Development:** plan and develop the transmission system to ensure continued reliability and facilitate the competitive market and investment in new supply
- **Transmission System Access:** provide system access for both generation and load customers
- **System Operations:** direct the reliable operation of Alberta's power grid



## Demand

- Demand for power up 28% since 2000
- Peak demand growth is forecasted to average 3.4% over the next 20 years
- Equivalent to adding two cities the size of Red Deer each year

## Supply

- Adequate supply in the near term
- Forecast need for 5,000 MW by 2017 and 11,500 MW by 2027
- Generation investment driven by market forces
  - More than 4,400 MW of new generating capacity added since 1998
- Investors must have confidence in the market and that the transmission system is capable of taking their production to market

# Transmission Planning Approach

**20-Year Outlook**  
**Generation and Load Focused**  
**High Level, Conceptual Transmission Alternatives**

**10-Year Transmission Plan**  
**Roadmap for Transmission Development**  
**Context for Need Applications**

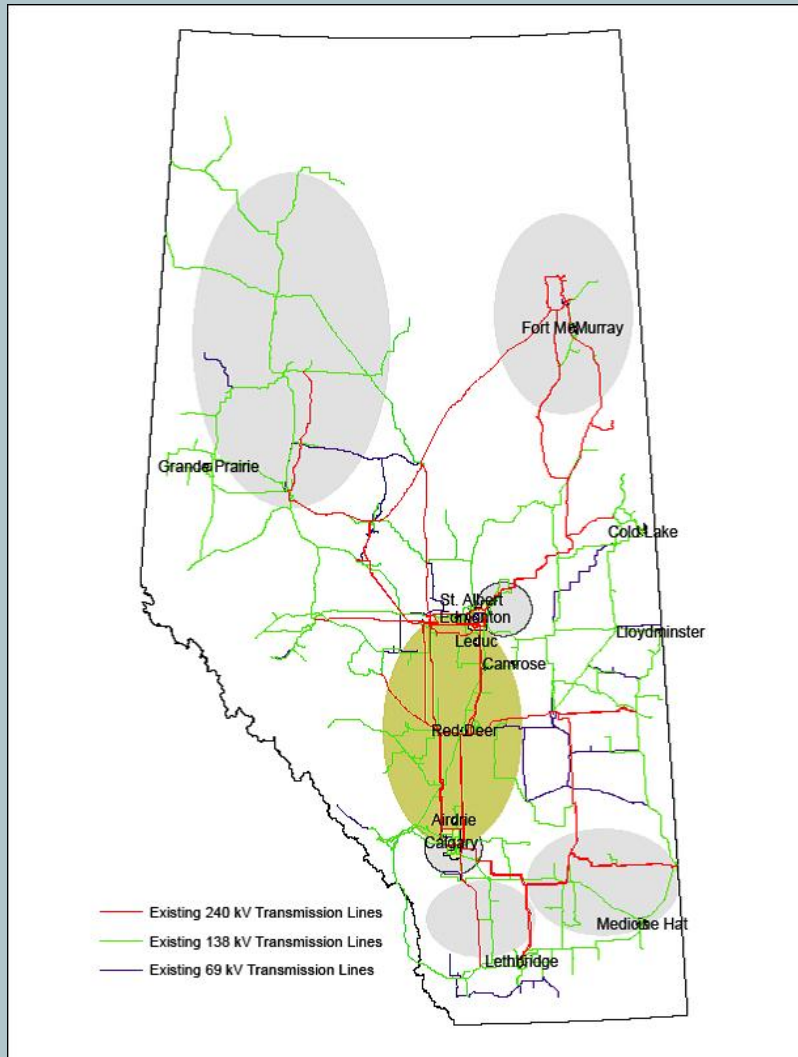
**Individual Need**  
**Applications**  
**Project Specific**

# Planning Highlights



- Alberta needs transmission
  - Ensure reliability
  - Facilitate the competitive market
  - Efficient system operation
- The 20-Year Outlook paints the longer term vision for the development of the transmission system
  - Continued focus on the system “backbone” with two major north-south transmission system reinforcements
  - An additional intertie into the Western Interconnected System
- The 10-Year Plan identifies approximately \$10 billion of investment if all elements were built

# Transmission System Development



- **NW Alberta**
- **Fort McMurray**
- **Heartland/Fort Saskatchewan**
- **Downtown Edmonton**
- **Edmonton - Calgary System Reinforcement**
- **Calgary Area**
- **Southern Alberta**

# Transmission Options

## “New to Alberta”



- High Capacity Developments
  - Maximize/optimize the use of ROW
  - Feedback from consultation
- High Voltage Direct Current (HVDC)
  - Reduced costs and other benefits make it a potential option
- High Voltage underground DC
- Series Capacitors
- High Temperature/High Capacity Conductors
  - Reuse existing ROW and potentially reuse existing structures
- Dynamic Thermal Line Rating (DTLR) – pilot project
- On the radar screen
  - Smart Grid
  - Hybrid Plug-in Electric Vehicles (HPEV)

# Edmonton-Calgary Reinforcement



- Critical infrastructure --the “backbone” of the system
- System reinforcement is required to:
  - Ensure system reliability
  - Facilitate the competitive market
  - System efficiency – reduce losses
  - Partial restoration of the intertie capacity with British Columbia
  - Resolve technical issues in the Lake Wabamun area
- AESO is preparing a Needs Identification Document
  - Evaluating alternative routes and technologies
  - Comprehensive stakeholder consultation – just announced 12 new open houses
  - Strong message during previous consultation from landowners to “build big” now in order to minimize future stakeholder disruption and land impact
- Estimated cost - \$600 million to \$1+ billion
  - depends on location and technology

# Industrial Heartland Reinforcement



- Necessary to meet the growing load in the Heartland area and as a termination point for the future reinforcement to Fort McMurray
- Concurrent Needs Identification Document and Facilities Application
  - targeted for late 2009
  - targeted to be in-service in 2013
- Two primary options are being considered:
- **East side double-circuit 500/240-kV Upgrade**
  - Double circuit 500/240-kV transmission line from Ellerslie substation to a new substation in the Industrial Heartland area
  - \$260 million (2008 estimated costs)
- **West side double-circuit 500-kV**
  - Double circuit 500-kV line from the existing 1202L circuit to a new 500-kV substation in the Industrial Heartland area
  - \$360 million (2008 estimated costs)

# Fort McMurray: 4<sup>th</sup> Circuit



- A 4<sup>th</sup> circuit to Fort McMurray will be required to meet load growth in the oil sands and potential generation development
- Heartland Reinforcement Plan takes into consideration the need for a 4<sup>th</sup> circuit
- Technical and economic analysis is in progress and the consultation process has been initiated
- HVDC and 500-kV AC alternatives are being considered
- Needs Identification Document targeted for late 2009/early 2010
- Anticipated to be in-service in the 2014 – 2015 timeframe

## **SW Reinforcement**

- Enables about 1,000 MW of wind generation
- Facilities hearing scheduled for Dec, 2008
- Cost is projected to be \$154 million

## **South System Reinforcement**

- A system development plan to accommodate about 3,200 MW of wind generation in the south has been prepared – estimated cost \$1.9 billion
- A staged development approach will be proposed based on the amount and timing of wind generation development
- Phase 1 will accommodate about 1,700 MW in the south and is estimated cost about \$750 million
- The NID is targeted for a year-end filing

# System Access Service



- Continued demand for customer interconnections
  - 87 applications for transmission service in 2007
  - 93 applications in 2008 (YTD)
- Requests for service are larger in magnitude and increasingly complex
- Created customer service team to focus on complex industrial and generator interconnections
- Our Goal: seamless interaction amongst DFOs, TFOs, AESO and the customer to ensure timely and cost effective service

# Operational Challenges

- Until the system is reinforced, we are operating the system at or near its safe operating limits more often and for longer duration
- Developing innovative ways to extract performance from a stretched system while maintaining reliability
- Enhancing operating tools for system monitoring
- Continued emphasis on policies, procedures and training for system controllers
- Continued emphasis on outage coordination and comprehensive analysis and follow-up after disturbances
- Implementing a new Energy Management System (EMS) to enhance system operations



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