

Alberta Electric System Operator

April 14 2009

Warren Frost
Vice-President, Operations & Reliability

Reliable **Power**

Reliable **Markets**

Reliable **People**



What is the AESO?



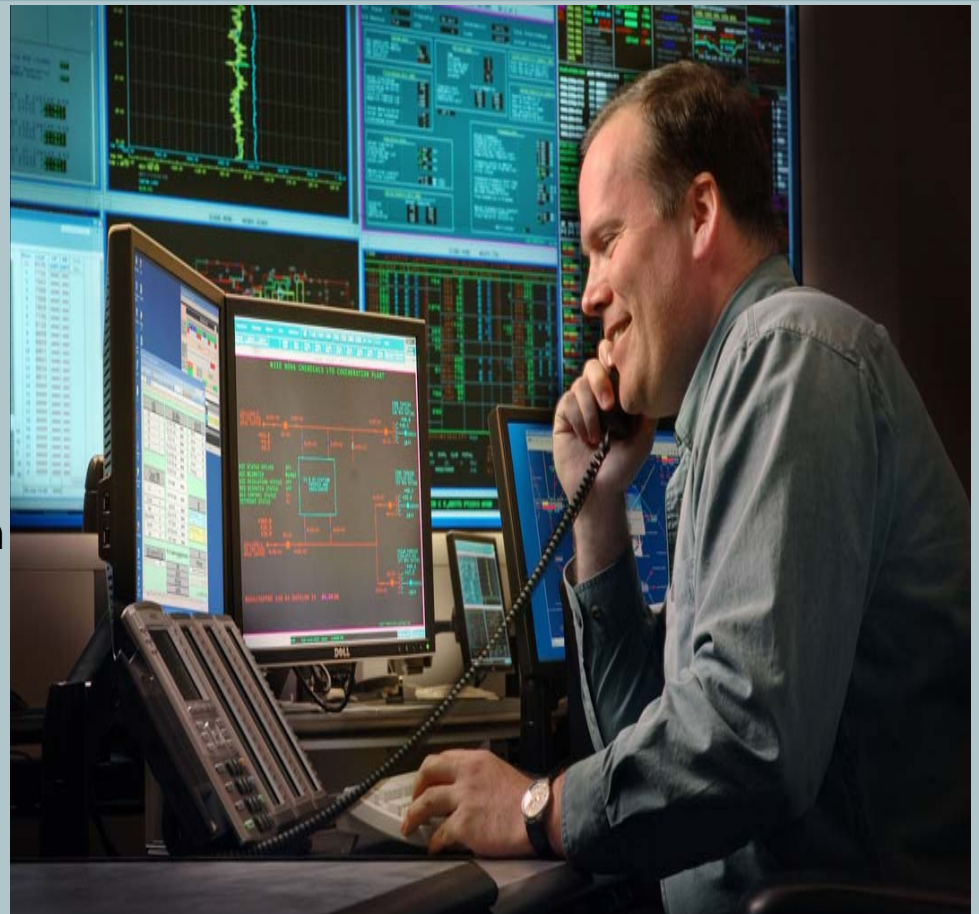
- Established in 2003 through the EUA to integrate Power Pool of Alberta and Transmission Administrator
- Performs “Independent System Operator” function
- Non-profit organization independent of all other electricity market participants
- Governed by independent board appointed by the Minister of Energy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

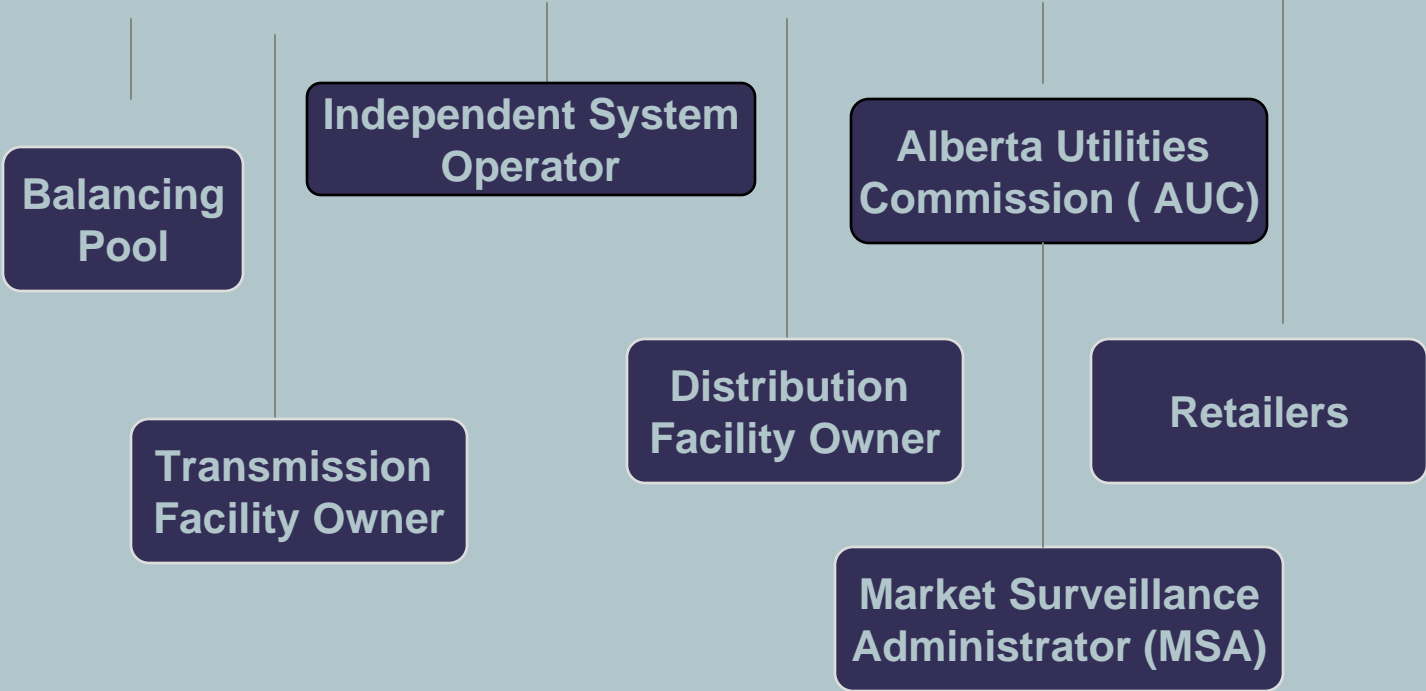


Industry Structure in Alberta

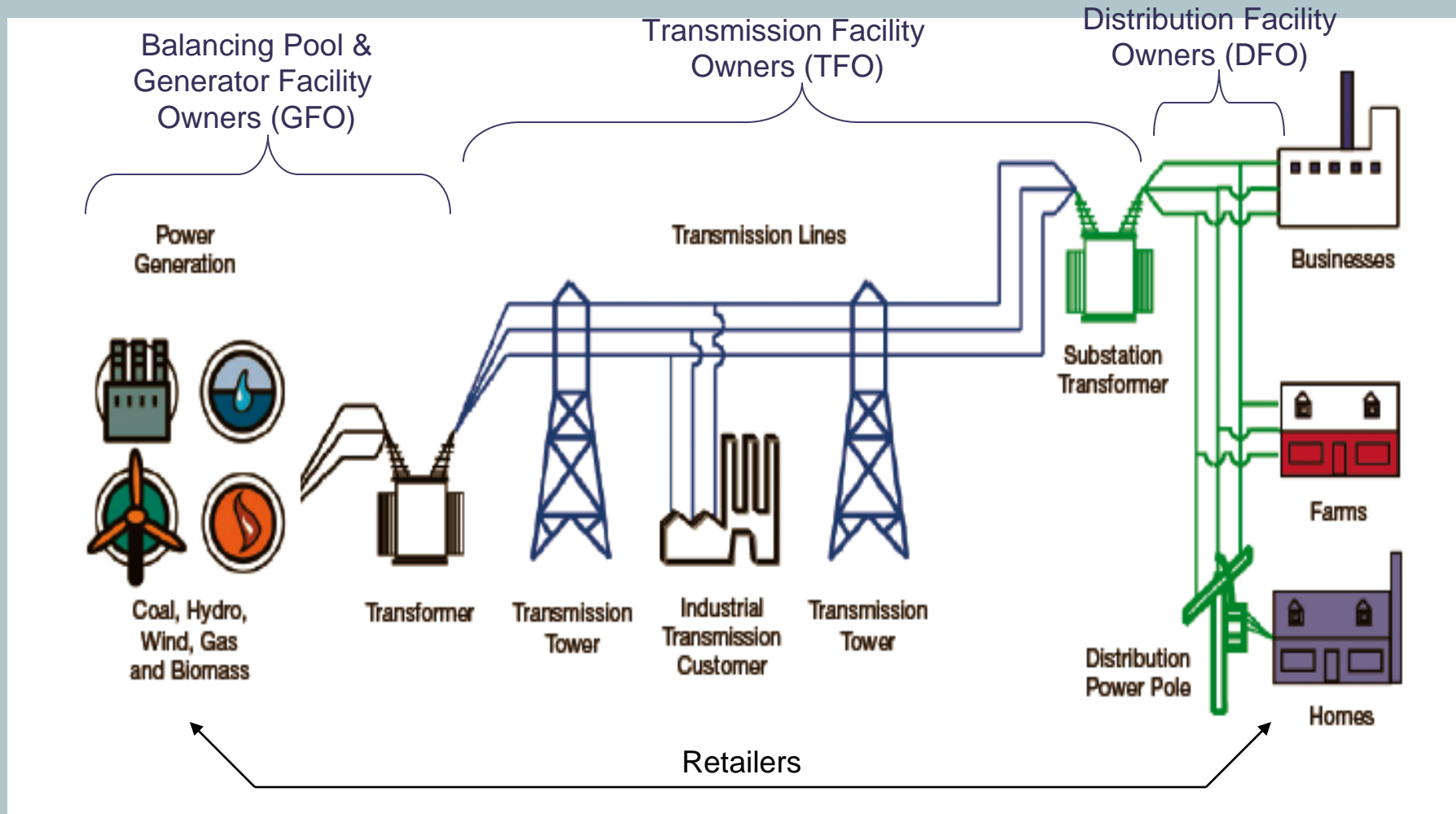


Minister of Energy
Appoints AESO Board members, MSA & AUC Chair

Electric Utilities Act



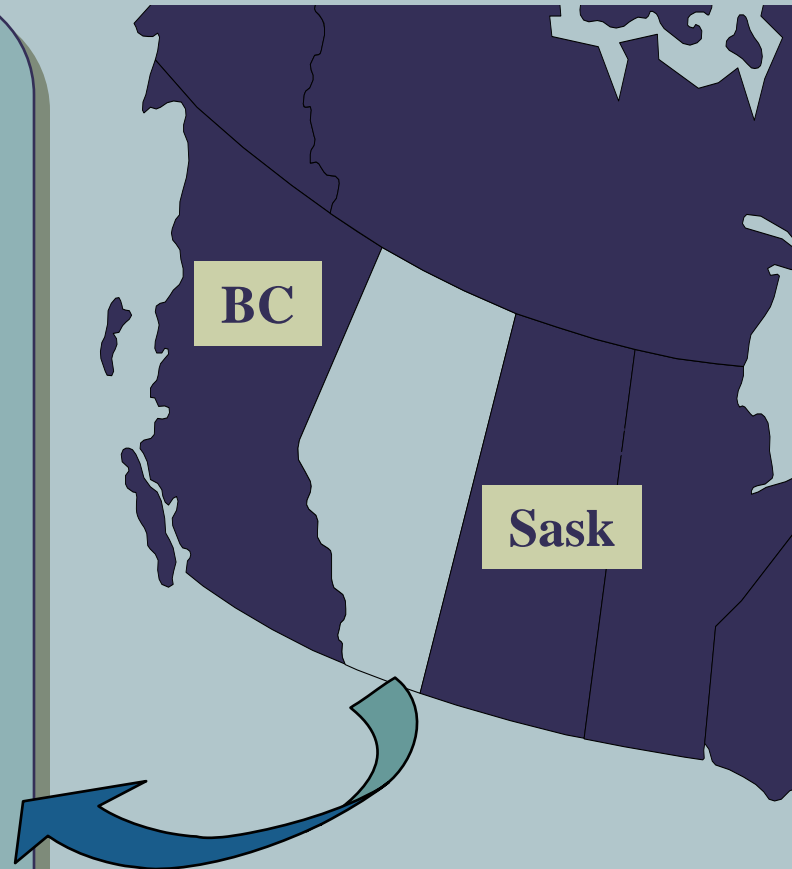
The Flow of Power



Alberta's Electric Industry



- **9,710 MW system peak demand**
- **12,161 MW total maximum generating capacity**
- **Interties B.C. (up to 780 MW) & Sask. (up to 150 MW)**
- **Over 280 generating units**
- **About 200 market participants**
- **More than 21,000 km of transmission lines**



Alberta's Demand Growth



Demand

- Demand for power up 28% since 2000
- Alberta has led North America in load growth
- Load growth is forecasted to grow by about 3% per year
- Equivalent to adding two cities the size of Red Deer each year

Supply

- Adequate supply in the near term
- Forecasted need for 5,000 MW by 2017 and 11,500 MW by 2027 (double current capacity)
- 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 system is capable of taking their production to the end use consumer



Alberta Interconnected Electric System (AIES)



Transmission System

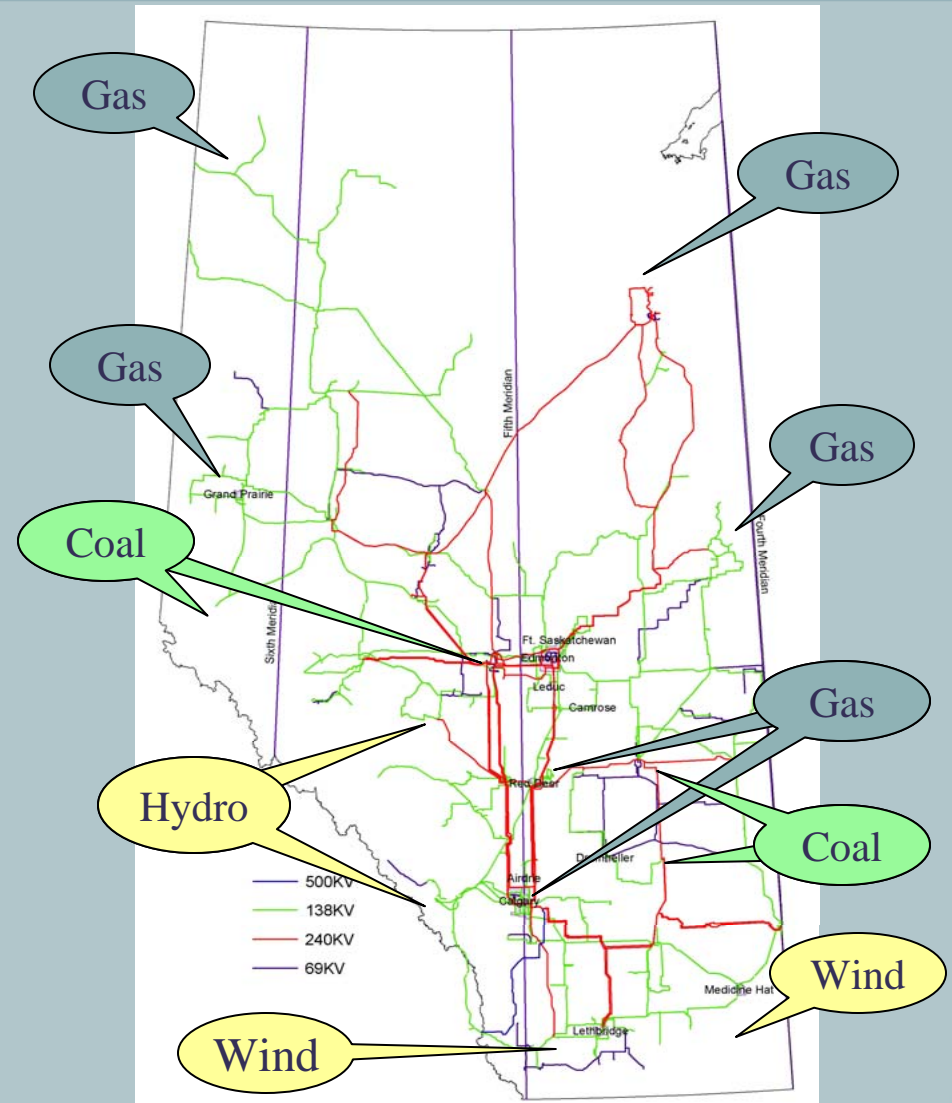
- 500 kV 319 km
- 240 kV 7,141 km
- 138/144 kV 11,767 km
- 69/72 kV 2,321 km

Interties

- 500 kV Calgary to BC
- DC link Empress to Sask.
- 240 kV Lethbridge to MN (new)

Installed Generation (2009)

- Coal: 5,893 MW
- Hydro: 869 MW
- Natural Gas: 4,688 MW
- Wind: 497 MW
- Other: 214 MW
- Total: 12161MW



The Competitive Wholesale Market



- The competitive market has been in operation since 1996
- “Energy only” market design with a single price
- We rely on the market to provide adequate supply
 - it is imperative that investors have confidence in the market structure and the price signal
- The market structure and rules have evolved over time to meet the needs of Market Participants
- AESO recently implemented a series of market enhancements to increase the visibility of available supply, stabilize merit order and improve price fidelity

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

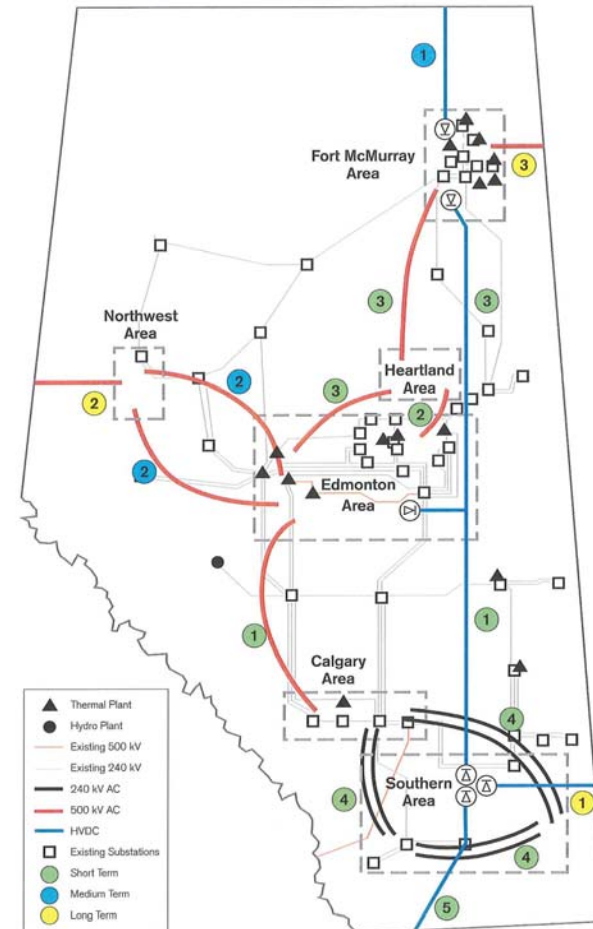
Provincial Energy Strategy



- Outcomes of the strategy:
 - Clean Energy Production
 - Wise Energy Use
 - Sustained Economic Prosperity
- Levers: tools used by government to achieve the outcomes
 - Address Environmental Footprint
 - Add Value
 - Change Energy Consumption Behaviour
 - Innovate
 - Enhance Electricity
 - Bolster Knowledge and Awareness
 - Ensure Alignment

Transmission Implications

- Energy Strategy, Page 44
 - Transmission planning – timing, sizing, technology preferences
 - Interties
 - Regulatory streamlining
 - Multi-use corridors
 - Education & awareness
 - Smart grid technologies

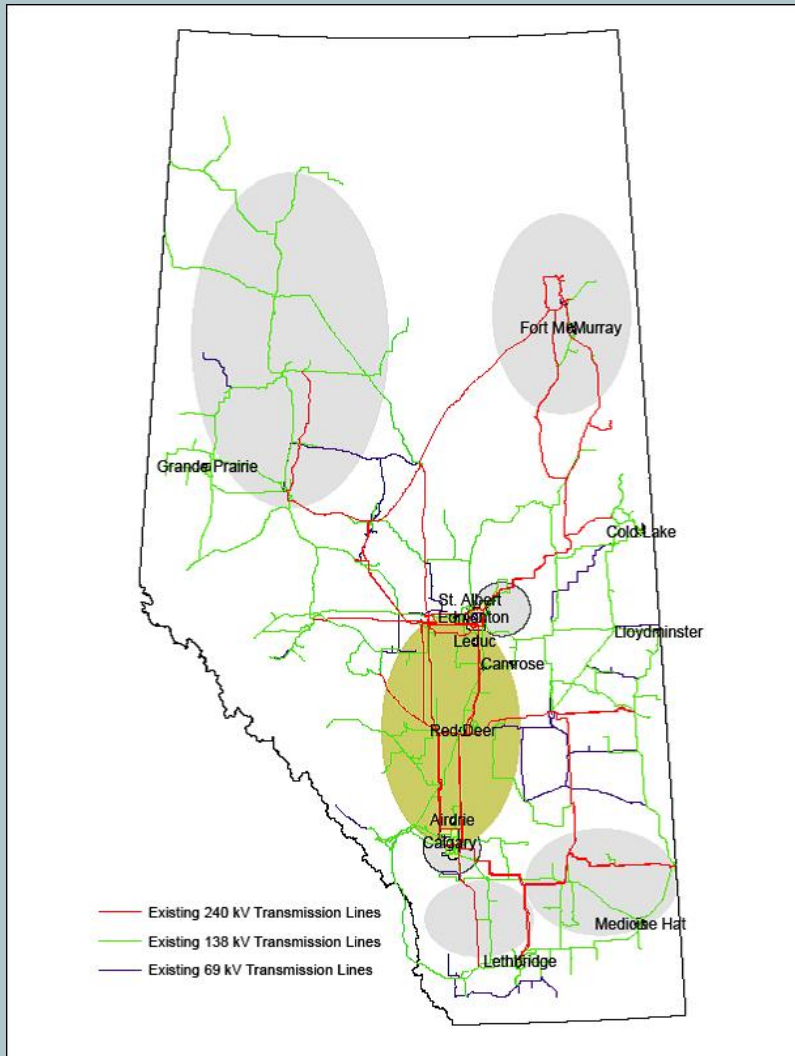


Notes:

For illustrative purposes only; does not depict actual line routes.

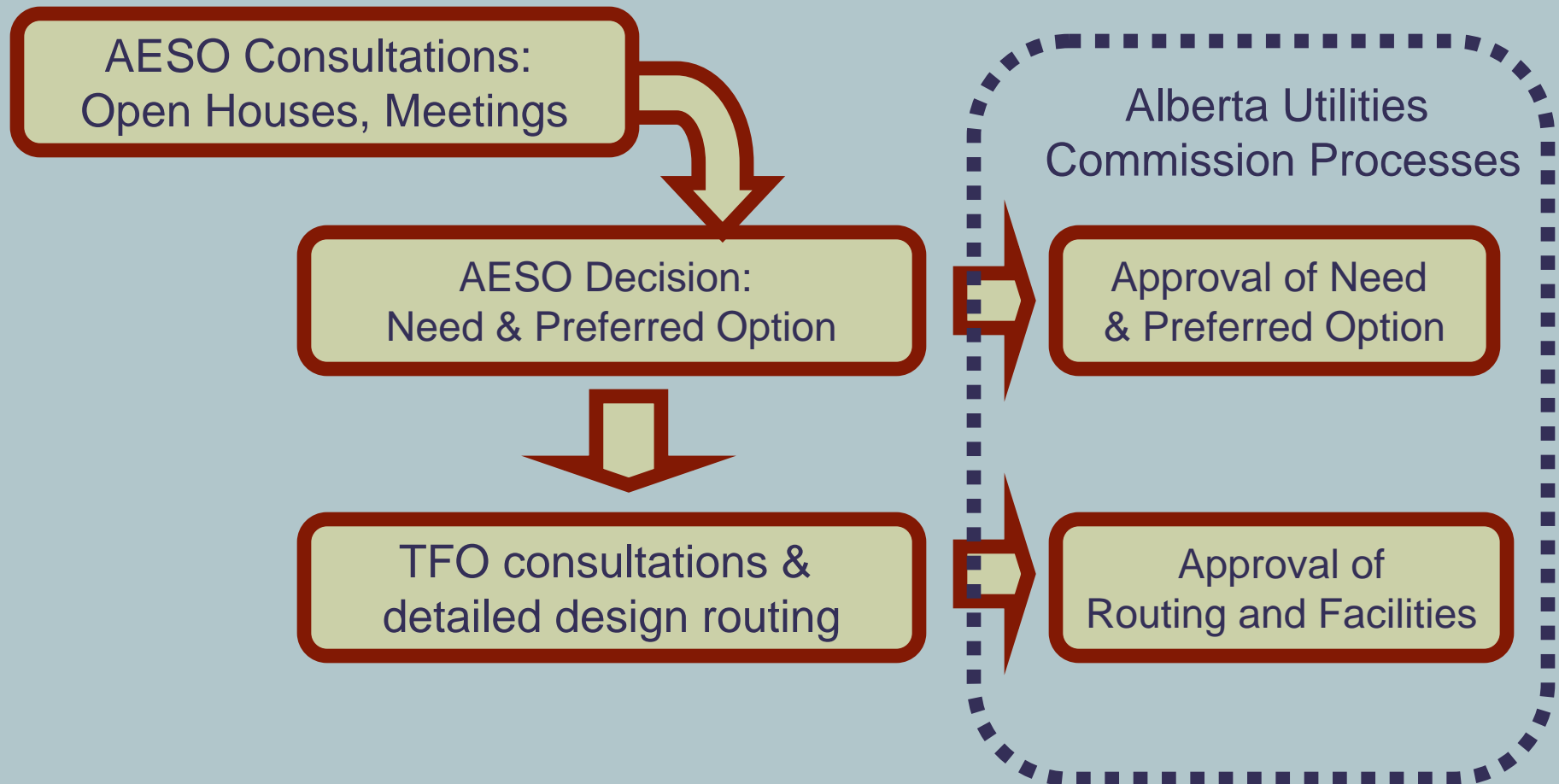
HVDC is the preferred technology choice for the Edmonton-Calgary project, however, both AC and HVDC options will be examined.

Transmission System Development



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

Consultative/Regulatory Process



Any Questions.....



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