

# What could the future role of solar and storage assets be in Alberta?

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# The AESO's Core Functions

## System Operations

Direct the reliable 24/7 operation of Alberta's power grid

## Transmission System Development

Plan and develop the transmission system to provide continued reliability and facilitate the competitive market and investment in new supply

## Transmission System Access

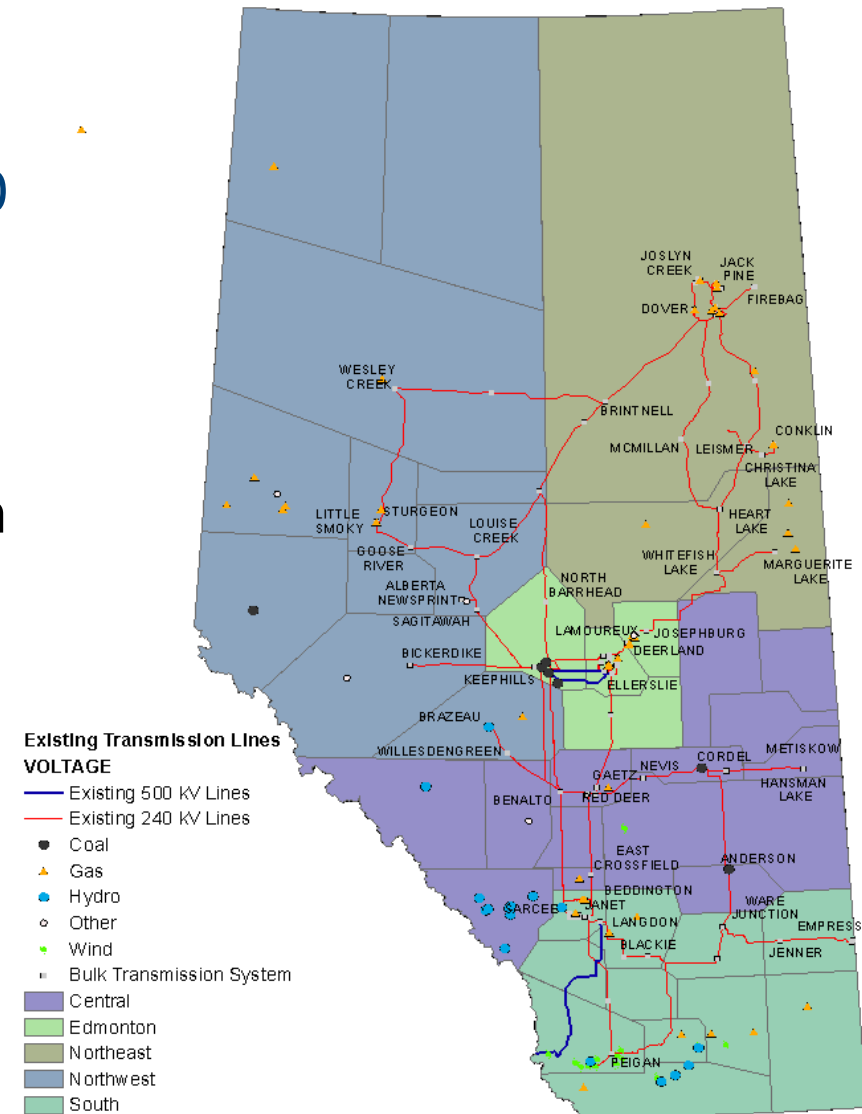
Provide access for both electricity generators and large industrial customers

## Market Services

Develop and operate Alberta's real-time wholesale energy market to facilitate fair, efficient and open competition

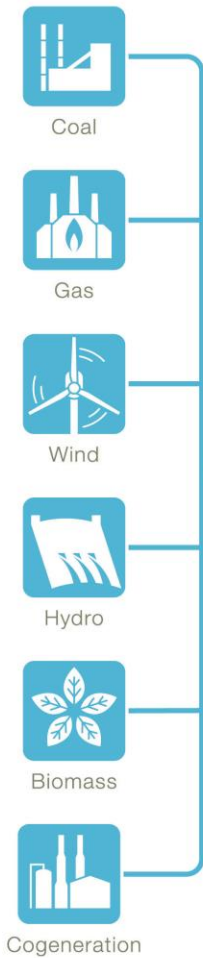
# Snapshot of Alberta's Power System

- 26,000 km of transmission lines
- 11,229 MW peak demand
  - 2.7% annual growth since 2010
- 16,237 MW installed capacity
  - Predominantly coal & gas
  - 10% renewable capacity
- 200+ active projects, including both system and customer connections
  - Over 90 new energizations in 2014
- 3 interconnections with BC, Saskatchewan and Montana
- Wholesale Prices
  - \$67/MWh 2005-2014 average
  - \$38/MWh 2015 YTD average

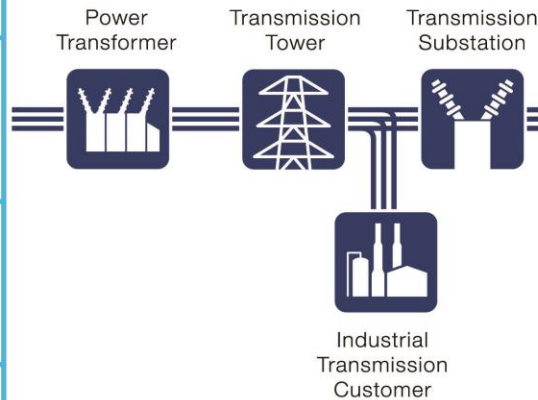


# Alberta's Power System and the AESO

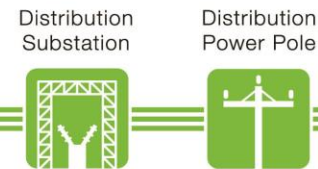
## Generation



## Transmission



## Distribution

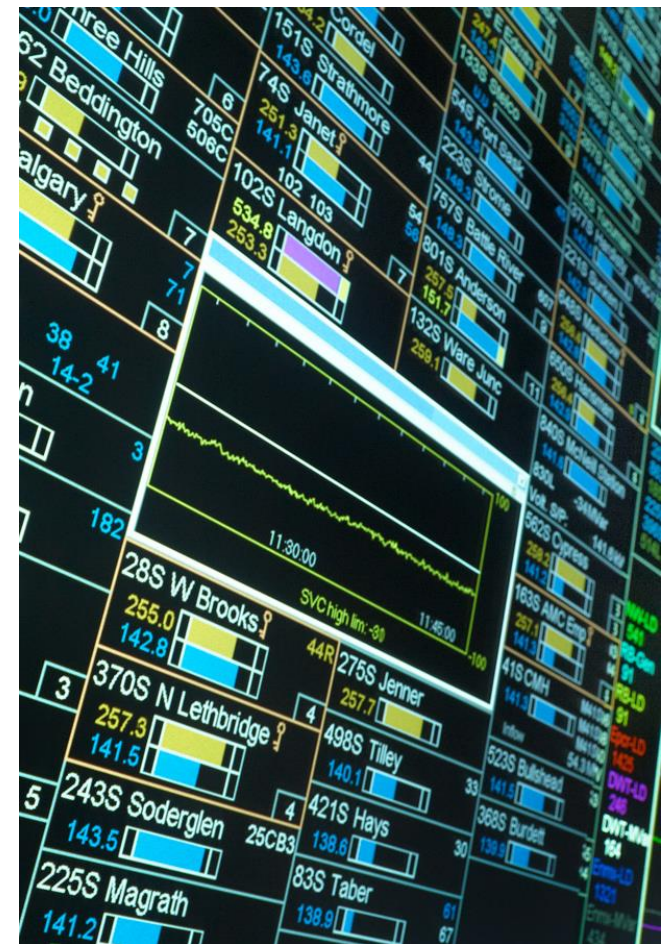


## Retail



# Alberta Energy Market Overview

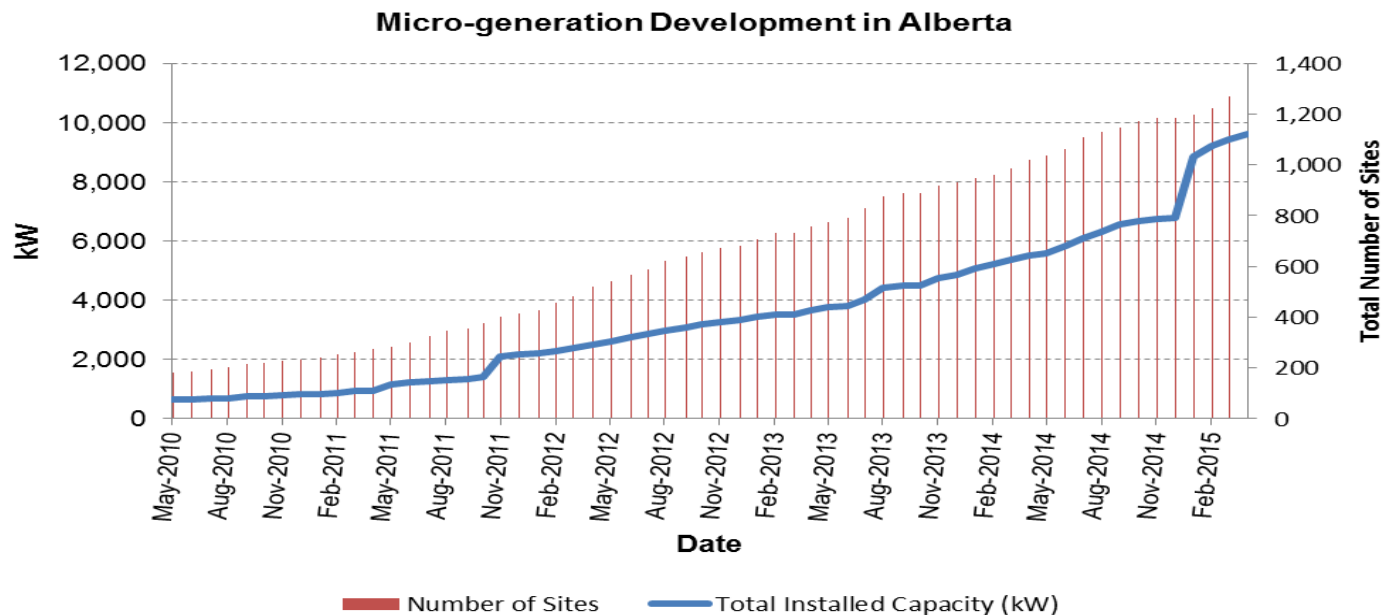
- Energy-only market design
  - All revenues from sale of electricity in wholesale energy market
  - \$999.99/MWh price cap and \$0/MWh price floor
  - No mandated reserve margin or capacity requirements
- Founded on the premise of a congestion-free transmission system
- ISO Rules govern market activity
- Generator participation is mandatory
  - “Must offer, must comply”



# Development of Solar & Storage in Alberta

- Solar

- 8 MW solar capacity, 90% of total micro-gen capacity
- Strong growth over past 5 years
- Additional projects (distribution & utility) under consideration



- Storage

- Various projects under consideration in Alberta by developers



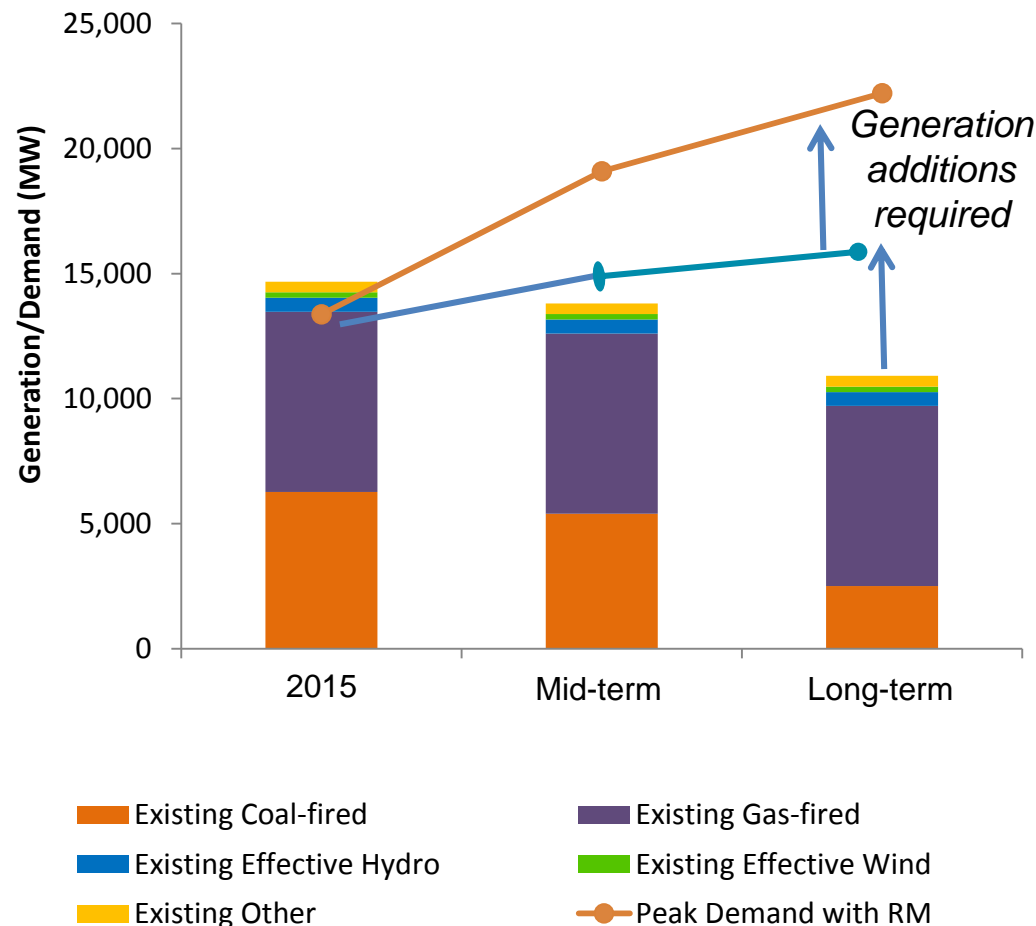
# Long-term: New Generation Needed to Meet Load Growth and Retirements

## Mid-term (10+ years):

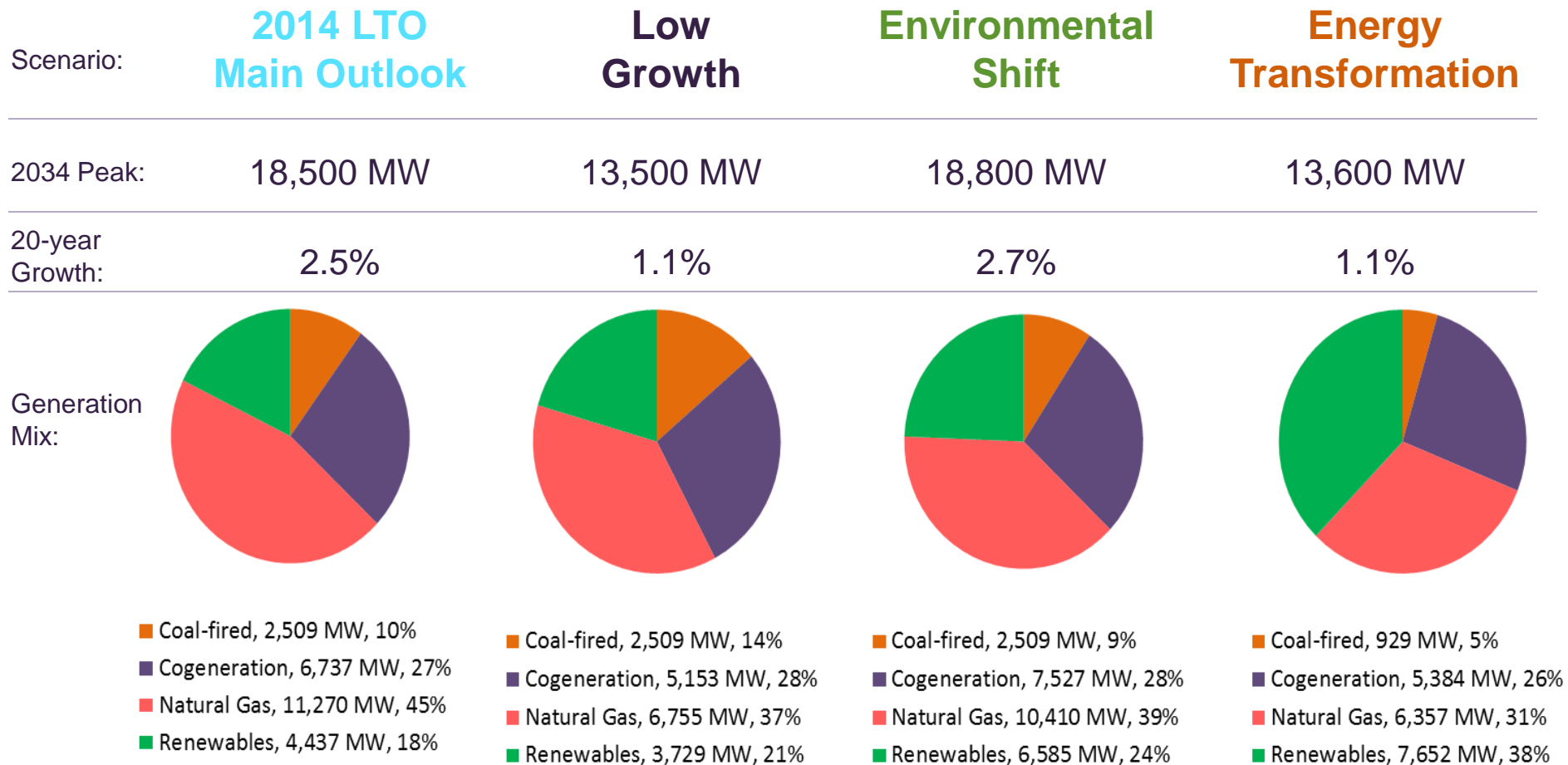
- 1,500 MW to 5,000 MW of load growth
- 1,000 MW of retirements
- 2,500 to 6,000 MW of additions with reserve margin

## Long-term (20+ years):

- 2,500 MW to 7,500 MW of load growth
- 4,000 MW of retirements
- 6,500 to 11,500 MW of additions with reserve margin



# Long-term Supply & Demand Outlook – 2034





## Power System Reliability: Grid Reliability

- Reliable grid operation dependent on:
  - Robust transmission system: redundancy to manage contingencies
  - Adequate system response: ancillary products to manage system fluctuations
  - Procedures & standards: processes to deal with real-time situations

## Availability of Supply: Supply Adequacy

- Market developed adequate electricity supply for growing demand
- Electricity market currently oversupplied
- AESO monitors future supply adequacy to 2020
  - Use a range of methods, from simplistic Reserve Margins and Supply Cushion to more sophisticated Probability of Supply Adequacy Shortfall

# Looking Forward

- New policy will guide evolution of the industry
- Generation mix shifting to lower emission sources
- Generation build required with upcoming coal retirements
- Long-term economic growth and sustained demand for power expected
- AESO remains focused on maintaining reliability and supply adequacy



**Thank you**