Motion 2018

Competition in Alberta's Electricity Market

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Outline

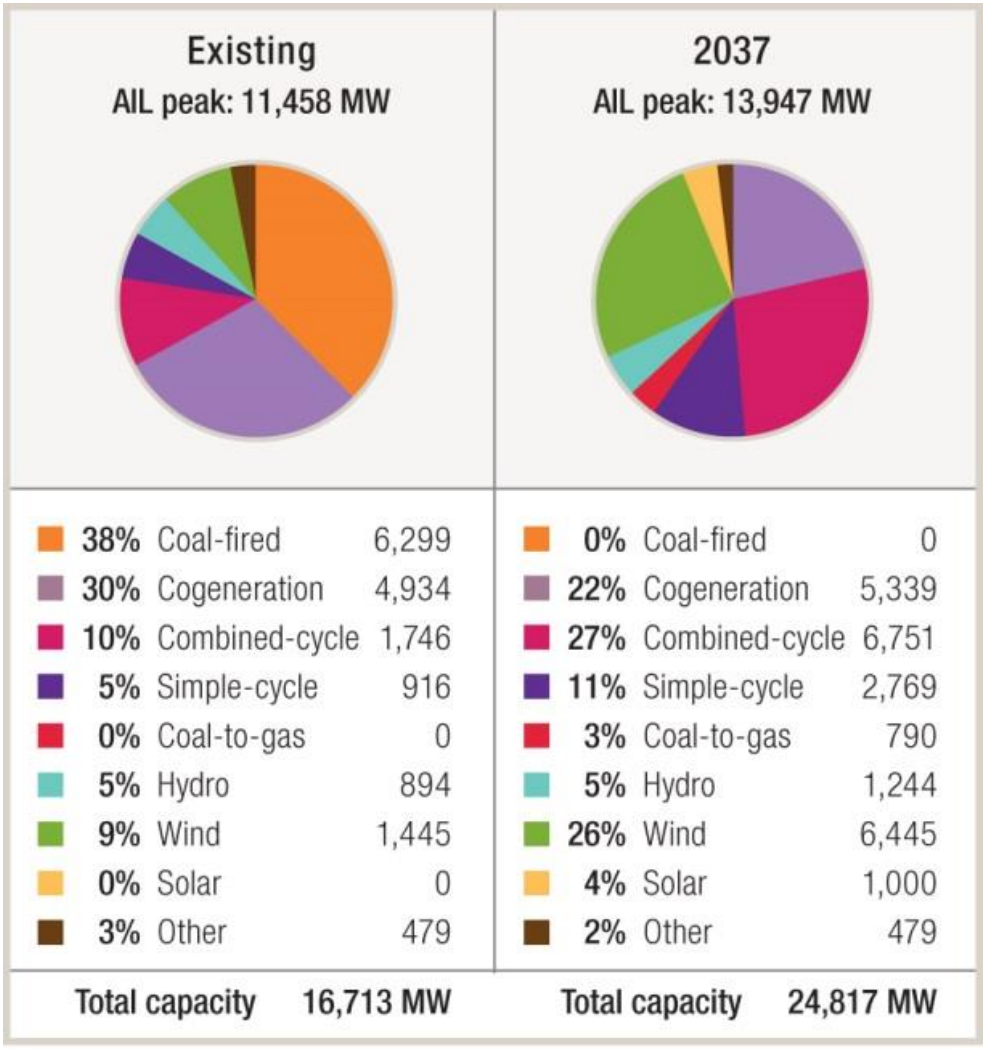
- Evolution of electricity in Alberta
- About the AESO
- Competition in the electricity framework
  - Competition design features and principles
- AESO's application of competitive processes
  - Fort McMurray West 500 kV Transmission Project
  - Renewable Electricity Program
- Market transition
- Looking forward

Evolution of Electricity in Alberta

Evolution of Alberta's electricity industry

- Alberta's electricity system is transforming, and so is the AESO's mandate

Alberta's evolving generation mix



Existing (AIL peak: 11,458 MW)			2037 (AIL peak: 13,947 MW)		
38%	Coal-fired	6,299	0%	Coal-fired	0
30%	Cogeneration	4,934	22%	Cogeneration	5,339
10%	Combined-cycle	1,746	27%	Combined-cycle	6,751
5%	Simple-cycle	916	11%	Simple-cycle	2,769
0%	Coal-to-gas	0	3%	Coal-to-gas	790
5%	Hydro	894	5%	Hydro	1,244
9%	Wind	1,445	26%	Wind	6,445
0%	Solar	0	4%	Solar	1,000
3%	Other	479	2%	Other	479
Total capacity		16,713 MW	Total capacity		24,817 MW

Source: AESO 2017 Long-term Outlook

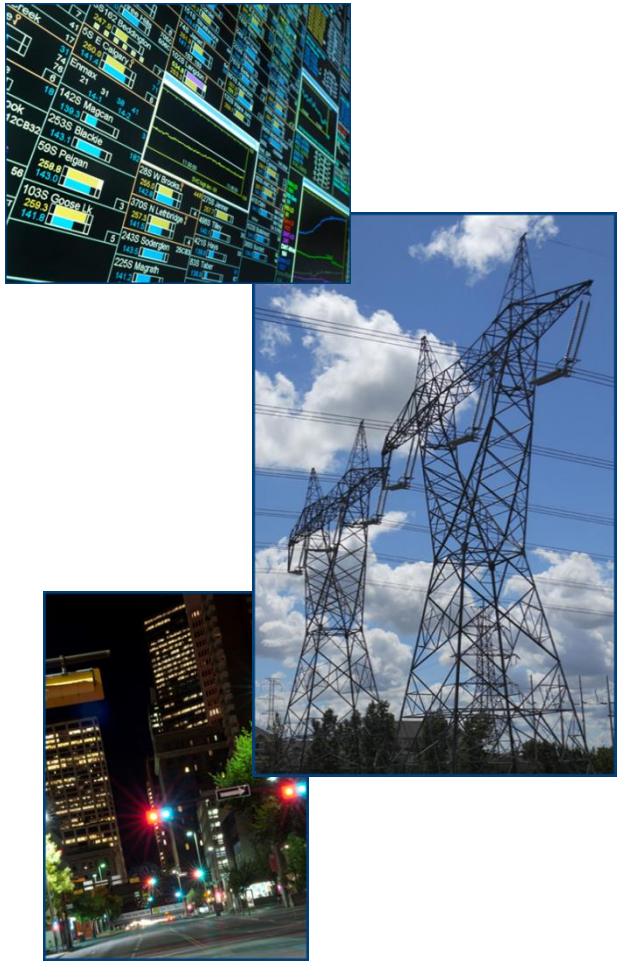
By 2037:

- Coal ↓ 6,299 MW
- Cogen ↑ 405 MW
- Gas-fired ↑ 6,658 MW
- Coal-to-gas ↑ 790 MW
- Renewables ↑ 6,350 MW

About the AESO

Role of the AESO

- Direct reliable 24/7 operation of the power grid
- Operate wholesale energy market to facilitate open, fair, efficient competition
- Plan and develop transmission system to provide reliability, a competitive market and investment in new supply
- Provide system access to connect new generation and load
- Design and implement Renewable Electricity Program to achieve ‘30 by 30’ green energy goal



AESO Governance

- The AESO is a statutory, not-for-profit corporation; independent of government and industry
- Governed by independent board appointed by the Minister of Energy
- Must operate in the public interest
- No government funding
- Costs are recovered from ratepayers and competitors in REP
- Credit rating of AA- (S&P)

Competition in the Electricity Framework

Introducing competition in Alberta

- The AESO has developed and implemented world-class competitive processes to attract investment in certain asset classes
  - Competitive process first applied to the Fort McMurray West 500 kV Transmission Project in 2010
  - Applied to the procurement of ancillary services (e.g. Black Start services)
  - Used to attract renewables investment through the Renewable Electricity Program in 2017
  - Will be applied to future capacity market auctions to incent development of non-renewable generation

Competition design features and principles

- Straightforward, transparent, fair and open process
- Remove entry barriers so competition can ensue
- Attract greater and more diverse pools of capital
- Encourage innovation across lifecycle of the project
- Allocate risk to those best able to manage and mitigate it
- Ensure performance and reliability standards are met
- Put downward pressure on price to benefit of all Albertans

Three-stage approach

REOI

- Request for Expressions of Interest
- Discretionary stage that gauges level of interest
- No obligation

RFQ

- Request for Qualifications
- Determines bidders qualified to proceed to RFP stage

RFP

- Request for Proposals
- Only qualified RFQ bidders may participate in this stage
- RFP may be single or multi-staged (e.g. transmission competition had 6 stage gates)
- Bidders submit final offers

Measuring success: fair, open process

- Integrity of competitive process is maintained throughout
  - Adherence to legislative requirements and AUC Decisions
  - Clear, concise and transparent tendering documents
  - Submission deadlines clear and firm
  - AESO focus on fairness throughout with strong AESO governance mechanisms
  - Overseen by Fairness Advisor
  - Evaluations by independent expert panels
  - Relationship review committee oversees all conflict issues
- Dedicated AESO team effort
  - One organization responsible for development and delivery
  - AESO retains external legal, financial and technical advisors, including Norton Rose Fulbright

Fort McMurray West 500 kV Transmission Project

Public

Direction to develop a competitive process

2010

- Legislation required the AESO to develop and implement a fair and open competition for certain bulk transmission projects
- AUC required to approve the process

2010 – 2014

- AESO designed a competitive process that drove the selection of a successful bidder who assumed responsibility for designing, constructing, financing, owning, operating and maintaining the Fort McMurray West 500 kV Transmission Project

Transmission competition results

ASSET CLASS	Electric Transmission
PROJECT SPONSOR	Alberta Electric System Operator (AESO)
PROJECT NAME	Fort McMurray West 500 kV Transmission Project
Scope	500 kV transmission line (500 km) with two substations
Winning bidder	Alberta PowerLine (APL)
Term of agreements	Approximately 40 years
Procurement delivery option	DDBFOOM*
Winning bid price (net present cost)	$1.43 billion (2019$)**
AESO LTP estimate	$1.8 billion (2013$)***
Payment mechanism	Monthly payments (capital and operation and maintenance costs) based on availability

* *Develop, design, build, finance, own, operate, maintain*

** *All project costs*

*** *The AESO long term planning estimate for this project was $1.8 billion +/- 50% and included construction costs only*

Unique aspects of the competition

- First jurisdiction to competitively procure transmission facilities with an undefined route
  - Lands were not secured and permits/licenses were not in place at time of bid
  - AESO identified point-to-point requirements
  - Post award, winning bidder selected route, consulted with stakeholders, obtained permits and regulatory approvals, and secured land rights
  - Adjustments made to fixed bid price post regulatory approval of route to reflect inflation and routing refinements ordered by regulator

Unique aspects of the competition

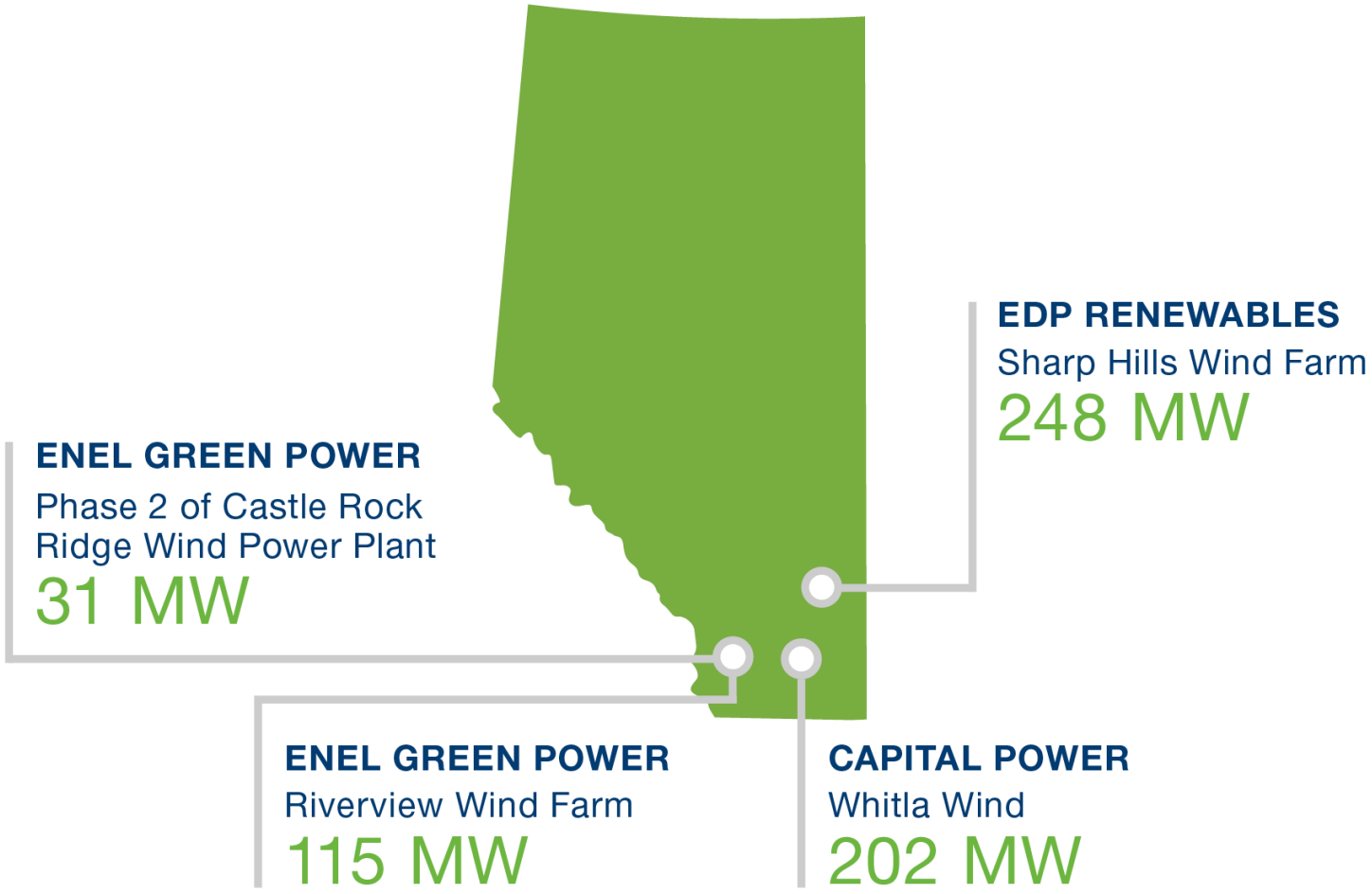
- Delayed financial close
  - All regulatory approvals must be in place and bid price adjustments made prior to financial close
  - APL debt funding competition undertaken by APL with AESO oversight in 2017 – financial close in October 2017
  - Largest debt funding competition for first A-rated project of its kind in Canada, resulting in 100% funding coming from the private sector (no government funding)
  - Won 2017 PFI Award for P3 Deal of the Year

Renewable Electricity Program (REP)

REP Overview

- January 2016 to March 2017: GoA directed AESO to develop and implement a program to bring on new renewable generation capacity to meet the “30 x 30” target through a competitive process
  - May 2016: AESO submitted our recommendations for a program and key features of REP Round 1 to GoA
  - November 2016: GoA approved program and key features of REP Round 1
  - March 2017: *Renewable Electricity Act* was passed
- March to December 2017: AESO conducted REP Round 1 using a 3-stage competitive process verified by a Fairness Advisor
  - November 2017: Minister of Energy approved quantity of winning projects
  - December 2017: Winning bidders awarded

Successful projects



Highly competitive bids

- REP Round 1 successfully procured 600 MW of wind generation from local and international companies
- Pricing was globally competitive and record-setting in Canada
  - The range of winning bids was $30.90 to $43.30/MWh
  - Weighted average pricing is approximately $37/MWh

- For comparison, weighted average pricing in Ontario's Large Renewable Procurement (LRP) in 2016 was $85/MWh

Key features of REP Round 1

- Procure a target of 400 MW of renewable generation projects that are:
  - New or expanded projects located in Alberta
  - Utility scale 5 – 400 MW
  - Utilizing a renewable fuel
  - Able to connect to existing transmission or distribution system
  - Able to achieve commercial operation no later than Dec. 1, 2019
- Payment mechanism used was an indexed renewable energy credit (i.e. a contract for difference)

How an indexed REC works

Scenario 1

The pool price is low, so the government payment to generators (red) is needed to meet the bid price.

Scenario 2

The pool price is equivalent to the bid price, so the government would issue no payment to the generator.

Scenario 3

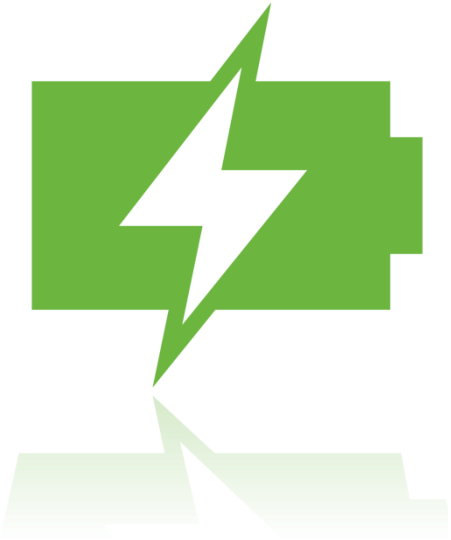
The pool price is higher than the bid price, so the generator would be paying that amount (shown in green) back to the government.

Strong interest in REP Round 1

- 80+ national and international expressions of interest received in the REOI stage
- 12 bidders representing 26 projects and 3,600 MW of capacity participated in the RFP stage
  - Procurement target of 400 MW was oversubscribed by nearly 10 times
- Various fuel types and project sizes were represented
- Success of Round 1 is a positive indication of interest for future REP rounds

What's next for renewables?

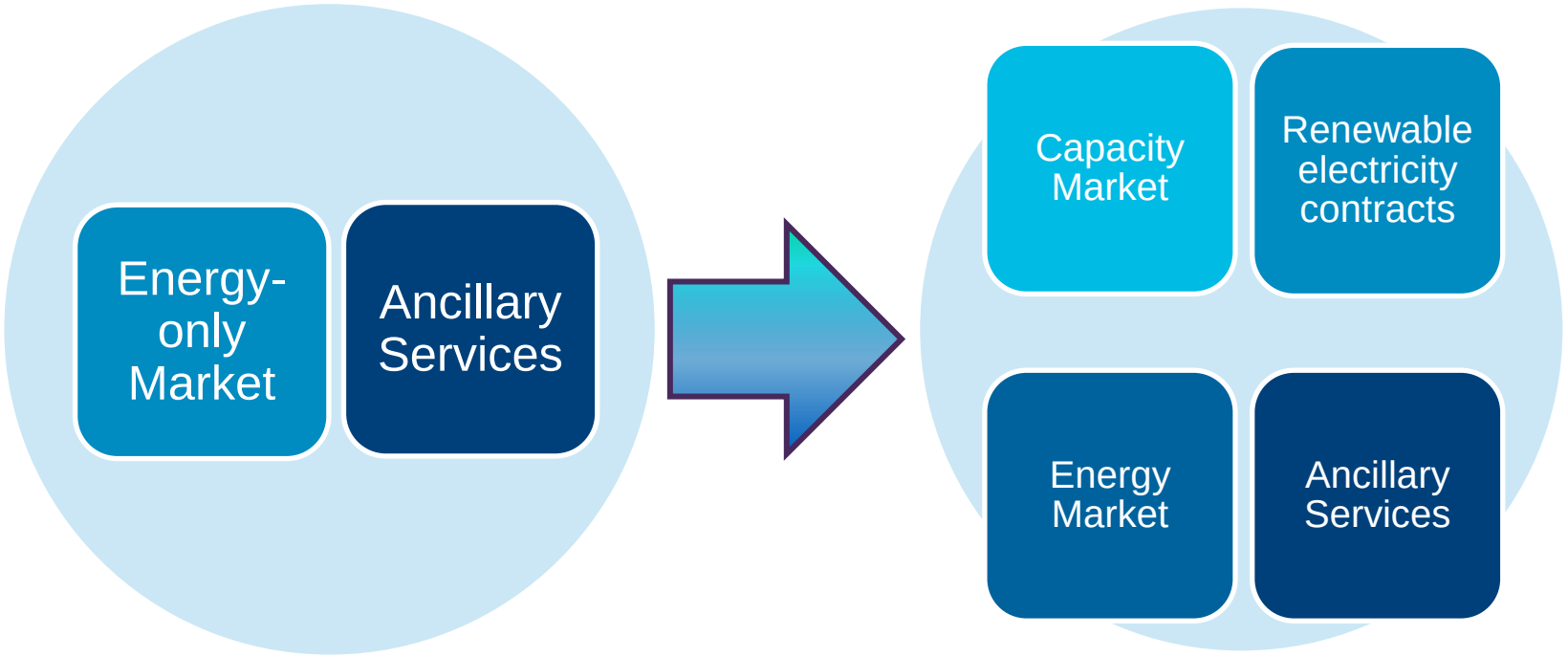
- Government direction on future REP rounds is expected in early 2018
- GoA has directed AESO to study dispatchable renewables and electricity storage
  - AESO will assess how these resources could benefit the grid as Alberta moves toward the "30 x 30" target



Market Transition

Market transition

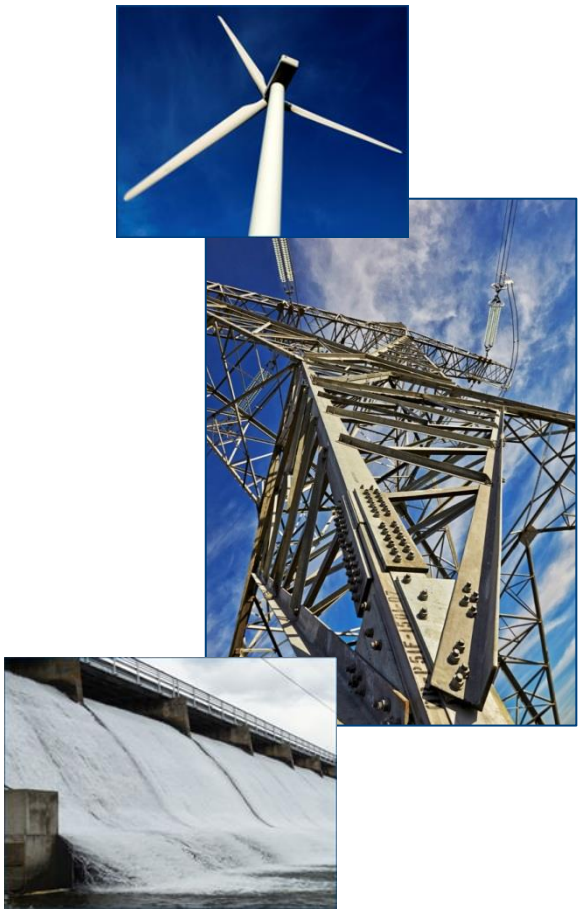
- In November 2016, GoA endorsed AESO's recommendation to transition from an energy-only market to a new framework that includes both an energy market and a capacity market



Current state **Future state**

Looking forward

- AESO's primary task is to ensure Alberta's transmission system remains safe and reliable
- AESO will continue to advance integration of renewables and transition to a capacity market
- Numerous emerging challenges and opportunities still ahead, including:
  - Incenting generation development
  - Integrating renewables
  - Assessing impacts of storage and distribution-connected resources



Thank you
Questions?