A Clean Electricity Standard (CES) for Alberta

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Version 1.3

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Presentation Purpose

• The case for a Clean Electricity Standard
  – Provide information
  – Answer questions
  – Receive feedback
• Part I
  – Rationale
  – The Clean Electricity Standard
    • What is it?
    • Why is it needed?

• Part II
  – Operationalizing the Clean Electricity Standard
    • How is it implemented?
    • Who does it affect?
**What is Clean Electricity?**

- Clean Electricity refers to the greenhouse gas (GHG) intensity of the electricity.
  - Measured in Tonnes CO$_2$ equivalent/MWh
- Multiple technologies can be considered clean electricity.
  - Emissions intensity compared to a standard.

![Diagram showing different technologies and their GHG emissions intensity](image)
Is Clean Electricity More Expensive?

Alberta based generation levelized cost for new generation. Transmission costs not included. Year 2016

Alberta’s Electricity GHG Emissions have reduced since 2000

Ref: National Inventory Report 2013
Emission reductions correlate with additional clean power. Programs have been critical for development of wind power.

Alberta Wind Power Capacity (MW)

- Annual Capacity Additions
- Cumulative Capacity

WPPI – Wind Power Production Incentive
ecoENERGY – Production Incentive
SGER – Specified Gas Emitters Regulation
CPUC TRECS – California Public Utility Commission Tradable Renewable Energy Certificates
SPPA – Small Power Producers Act

Electricity Price $/MWh

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Changes in Alberta.....

• Provincial Regulations
  – Renewable Fuel Standards - existing
  – Provincial GHG Targets - may intensify
  – Alternative and Renewable Strategy – Work In Progress

• Federal Regulations
  – Coal Generation Retirements
  – Natural Gas Power Generation regulation pending
Federal regulations reduce grid emissions intensity. Hydro & Wind critical & contribute cumulative 104 Mt (2039)

- Federal Regulations drop emissions intensity as shown in AESO LTO.
- AESO LTO assumes:
  - incremental Wind and Hydro development
  - Repowering of end of life wind assets after 20 years
- Cumulative benefit of Wind and Hydro 104 MT by 2039.
  - ~ 7.5Mtonnes p.a. (2039)
  - Equivalent to 2.5 years of today’s grid emissions.
Unique Aspects of the Alberta Electricity Market

- De-regulated
- Fair Efficient Openly Competitive Regulation
- Energy Only Market
- Facility Based Emission Reduction Obligations
- Large coal generation base
- Few physical contracts
- Few long term contracts
- Transformational change pending
- ~7,000 MW of additional generation required with pending coal retirement, and demand growth
Three challenges in Alberta’s Electricity Sector

• Cleaning the grid
  – Reducing emissions from our electricity sector

• Avoiding ‘sole fuel’ dependency in the grid
  – Reliance on a single fuel adds significant risk to all industrial sectors in the Alberta economy.

• Financing the growth
  – Balance sheet/ project financing for ~7,000 MW
What is the Problem?

Lack of Long Term Power Purchase Agreement (PPA)

- Capture Rate
- Project Financing
- Credit & Risk Requirements
A Potential Solution!

A mechanism is needed that is:
- Technology neutral,
- Revenue Neutral,
- FEOC compliant,
- Fits the existing market design,
- Compliments the Specified Gas Emitters Regulation,
- Produces predictable changes in the grid intensity,
- Transparent, and
- Simple to administer and understand.

FEOC – Fair Efficient and Openly Competitive
What is CES trying to achieve?

Alberta Electricity Market Challenges

- Cleaning the grid
- Avoiding ‘sole fuel’ dependency in the grid
- Financing the growth

CES Scorecard?

- ✓
- ✓
- ✓
Clean Electricity Standard (CES)

Pool Participant Portfolio Emissions Intensity and Comparison with Standard
Clean Electricity Standard

- Clean Electricity Standard would be set by the government on a portfolio intensity basis (Tonnes CO$_2$e/MWh)
- Standard would apply to Retailers in Alberta
  - Any one who purchases power to supply load
- Intensity level decreases over time.
- Retailers choice on generation technologies as part of portfolio.
- Retailers choose to comply as much or as little as desired.

![Graph showing the Clean Electricity Standard from 2010 to 2035 with a decreasing trend in Retailer Portfolio Intensity (tonnes CO$_2$e/MWh) over time.]
Who is Regulated under CES?

- Retailers
- Self-Retailers
- Rural Electrification Associations (REAs)

- Based on settlement physical volumes with the AESO
Fit with Specified Gas Emitters Regulation (SGER)

Concurrent solution – complementary
Comparison of CES and SGER

**SGER**
- Focus on all **facility** emissions – **multi sector**
- Reduction of emissions intensity from **facility**
- Compliance through **facility** emission reductions
- Financial Compliance Alternative (CCEMC)
- Compliance funds used to stimulate **long term** emission reductions
- Tradable Units
- Offsets

**CES**
- Focus on **retailer** portfolio intensity – **single sector**
- Reduction in emissions intensity of **portfolio**
- Compliance through **contracting for cleaner portfolio**.
- Financial Compliance Alternative (Deposit)
- Compliance funds used to stimulate **shorter term** market response
- No tradable units generated
- No Offsets
Achieving Compliance

- Each retailer will be required to **pay a deposit** to a fund at a set amount ($/MWh).
- At the end of the year, retailers who meet the CES will **receive a refund** equal to their deposit.
- For retailers with portfolio intensities **less than the CES**, will receive a **greater refund**.
- For retailers with portfolio intensities **more than the CES**, will receive a **less of a refund**.
Refund Varies based on Retailer Performance

VARYING REFUND LEVEL

AT THE STANDARD, THE REFUND IS EQUAL TO THE DEPOSIT

Clean Electricity Standard with Upper and Lower Threshold

Zero Emissions 0 Tonnes/MWh

Lower Threshold

Upper Threshold

High Emissions >1 Tonnes/MWh

MAX REFUND, BELOW THRESHOLD

NO REFUND, ABOVE THRESHOLD

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A Contextual Example: Bottle Recycling in Alberta

- A deposit is paid on the purchase of a beverage container
- Albertans return 82% of containers purchased for a refund
- Benefit: 390,000 cubic metres of landfill space saved
- Managing Agency funded entirely from deposit paid on beverage container purchases
- Deposit and refund system critical to creating culture of recycling and improving environment
- Alberta’s beverage container recycling industry in best in class in North America.
Direct Benefits the CES

- Reduces grid intensity in Alberta
- Drives demand for low emitting generation
- Increases the diversity and amount of low emitting generation
- Uses market mechanisms to achieve reductions in grid intensity
- Provides long-term financing for low emitting generation
- Simple to administer

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Questions?