Executing the Clean Electricity Standard

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Agenda

• Following the funds – Deposits and Refunds
• CESA Operation & Mandate
• CESA contracting for Power
• Impact of CES in the Electricity Market and Stakeholders
• The Retailer Perspective
Clean Electricity Standard Agency - CESA

The deposits from the CES will be managed by the Clean Energy Standard Agency (CESA)

• Administering the CES system
  – Recommend standards
  – Set deposit and refund rates, upper and lower threshold
  – Collect deposits
  – Review Portfolio Intensity of Retailers
  – Issue refunds

• Revenue neutral over long term

• Under some circumstances, additional role of entering into long term contracts for low emitting generation that is below the standard
Clean Electricity Standard - Process

1. Standard Set
2. Retailer Submits Deposit
3. Retailer Reports Intensity to CESA
4. CESA Issues Refund to Compliant Retailer
5. CESA Issues RFP
6. CESA resell Clean Power to Retailers
Statements and Deposits

2. Retailer Submits Deposit

- AESO adds Clean Electricity Deposit to Monthly Bill.
- Retailers pay Deposit as per Statement.
- AESO transfers CES Deposit funds to CESA.
Retailer Contracts for Power

Retailer contract for Power Generation
Coal, Natural Gas, Cogeneration, Hydro, Wind

$$

Alternatively Retailer can purchase from the Pool.
3. Retailer Reports
Intensity to CESA

Retailers calculate Portfolio Intensity and
Retailers show CESA contracts at year-end
Production records and AESO statements provided for
confirmation
CESA confirms Portfolio Intensity
4. CESA Issues Refund to Compliant Retailer

Refund Calculation

Pool Participant Portfolio Emissions Intensity and Comparison with Standard

Retailer

CESA

CESA Refunds Participants on a monthly basis
CESA Funding

5. CESA Issues RFP

Clean electricity generation competes for contracts.

CESA secures 15-20 year contracts

6. CESA resell Clean Power to Retailers

CESA sells shorter-term electricity contracts to retailers or market

Retailer
CESA Operations

- Collect deposit from retailers, via AESO’s tariff, for every MWh of electricity purchased from the Power Pool
- Review portfolio intensity of Retailers
- Refund retailers for portfolio intensity. Measured by contracted power, production and default deemed grid intensity.
- Ensure deposit and refund are set to reduce the long term GHG intensity of electricity generation in Alberta
- Put in place rules to manage information, cash flow, working capital, credit, etc.
  - Implementation details will likely not be prescribed in legislation
CESA Mandate

• Provide recommendations to Minister based on historical and forecast mix of generation types and respective GHG intensity
• Report to industry annually on estimated future deposit and refund prices and volumes
• Monitor Retailer contracts and report to Minister on potential need for additional contracts
• Comply with FEOC and limit administrative and financial burdens on Alberta’s retailers
• If markets do not respond with adequate contracts for Retailers, procure long-term low GHG intensity generation and sell shorter-term financial contracts to retailers
Fit with Alberta Electricity Market

• Wholesale Market
  – No change, should increase transactions and liquidly

• NGX Forward Market
  – Growth opportunities

• Regulated Rate Option (RRO)
  – More supply options

• Competitive Retailers (i.e. “GreenMax”)
  – More demand for green products
Stakeholders

• Generators
  – No change, comply with SGER
  – Expect market participants will seek contracts with new and existing generators
  – Opportunity to compete for Long Term CESA contracts

• Retailers
  – Deposit and refund, financial incentive to reduce electricity portfolio emissions intensity
  – Contract for low emitting generating technology
  – May introduce more retailers
  – Minor administrative requirements

• Government – Set CES targets

• Marketers – Adapt and contract

• Consumers
  – Potential for retail to pass through some deposit/refund to consumers
  – Expect more robust retail market -> reduced costs
  – Do not expect power pool prices to be materially affected
Retailer Perspective

Steps

- Pay Deposit (Sunk Cost)
- Evaluate cost of contracting clean electricity with the refund available
- Contract low emitting generation directly from generators or through CESA
- Receive refund based on GHG intensity
- More robust retail market will provide growth opportunities
Anticipated Results

• GHG Grid Intensity Reduction in Alberta

• Increased customer choice for Alberta consumers

• Expanded wholesale electricity contracts & Retail markets
Electricity Market in Alberta – Transmission & Distribution

Generators
- Coal
- Natural Gas
- Wind
- Cogen

Marketers
- Retailers

Retailers
- Retailers
- Self Retailers
- REAs

Consumers
- Residential
- Commercial
- Government
### CES – Retailer Examples

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>CED ($/MWh)</td>
<td>$4.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CER ($/tonne)</td>
<td>$16.67</td>
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<td>Deemed Intensity (t/MWh)</td>
<td>0.90</td>
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<td>Upper Threshold (t/MWh)</td>
<td>0.89</td>
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<tr>
<td>Clean Energy Standard (t/MWh)</td>
<td>0.65</td>
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<tr>
<td>Lower Threshold (t/MWh)</td>
<td>0.40</td>
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<tr>
<td>Grid Avg. Intensity (t/MWh)</td>
<td>0.78</td>
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<table>
<thead>
<tr>
<th>Generation Intensity (tonnes/MWh)</th>
<th>Difference from Upper Threshold (tonnes/MWh)</th>
<th>Refund ($/MWh)</th>
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<tbody>
<tr>
<td>Combined Cycle</td>
<td>0.46</td>
<td>0.43</td>
</tr>
<tr>
<td>Cogeneration</td>
<td>0.40</td>
<td>0.49</td>
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<tr>
<td>Zero Emitting Generation</td>
<td>-</td>
<td>0.89</td>
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</table>

<table>
<thead>
<tr>
<th>Annual Purchases</th>
<th>CED</th>
<th>Combined Cycle Contracts</th>
<th>Cogeneration Contracts</th>
<th>Zero Emitting Generation Contracts</th>
<th>Non-Contracted Generation</th>
<th>RETAILER PORTFOLIO EMISSIONS INTENSITY</th>
<th>Refund</th>
<th>Refund</th>
<th>Net CES A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(million MWh)</td>
<td>($ million)</td>
<td>(million MWh)</td>
<td>(million MWh)</td>
<td>(million MWh)</td>
<td>($/MWh)</td>
<td>($ millions)</td>
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<td>($ millions)</td>
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<tr>
<td>Retailer A</td>
<td>26</td>
<td>$104</td>
<td>1</td>
<td></td>
<td>25</td>
<td>0.88</td>
<td>$0.12</td>
<td>-$3</td>
<td>$101</td>
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<tr>
<td>Retailer B</td>
<td>15</td>
<td>$60</td>
<td>1</td>
<td>5</td>
<td>9</td>
<td>0.70</td>
<td>$3.10</td>
<td>-$47</td>
<td>$14</td>
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<tr>
<td>Retailer C</td>
<td>10</td>
<td>$40</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>0.65</td>
<td>$4.00</td>
<td>-$40</td>
<td>$0</td>
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<tr>
<td>Retailer D</td>
<td>5</td>
<td>$20</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>-</td>
<td>$8.17</td>
<td>-$41</td>
<td>-$21</td>
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<tr>
<td><strong>Total</strong></td>
<td>56</td>
<td>$224</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>39</td>
<td>-</td>
<td>-$130</td>
<td>$94</td>
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</tbody>
</table>
# CES - Retailer Examples

Average Power Pool Price ($/MWh)  

<table>
<thead>
<tr>
<th>Retailer</th>
<th>Annual Purchases (million MWh)</th>
<th>Power Pool Payments ($ millions)</th>
<th>CED ($ million)</th>
<th>CER ($ millions)</th>
<th>Net CESA ($ millions)</th>
<th>Percent CESA of Power Pool</th>
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<tbody>
<tr>
<td>Retailer A</td>
<td>26</td>
<td>$1,690</td>
<td>$104</td>
<td>-$3</td>
<td>$101</td>
<td>6.0%</td>
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<td>Retailer B</td>
<td>15</td>
<td>$975</td>
<td>$60</td>
<td>-$47</td>
<td>$14</td>
<td>1.4%</td>
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<tr>
<td>Retailer C</td>
<td>10</td>
<td>$650</td>
<td>$40</td>
<td>-$40</td>
<td>$0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Retailer D</td>
<td>5</td>
<td>$325</td>
<td>$20</td>
<td>-$41</td>
<td>-$21</td>
<td>-6.4%</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>$3,640</td>
<td>$224</td>
<td>-$130</td>
<td>$94</td>
<td>2.6%</td>
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