



Energy Storage Canada with Power Advisory LLC Presentation to AESO Bulk & Regional Tariff Design Consultation – Session 3

November, 2020

Who is Energy Storage Canada?

Advance
Canadian
Storage Industry

- Energy Storage Canada is **THE** voice of the energy storage industry in Canada
- Established in 2014 in Ontario, expanded nationally in 2016
- Represent the industry at all levels: Grid Level, Distribution Level, and Behind the Meter

Drive Advocacy &
Strategic Initiatives

- Advocate for fair markets for energy storage across the country
- Ensure energy storage awareness at policy levels
- Engage with national government to raise profile of energy storage in climate change programs

Build Stakeholder
Engagement &
Membership

- Hold the biggest conference solely focused on energy storage in Canada
- Our membership represents all players along the energy storage value chain
- We represent some of the largest energy companies in Canada as well as some of the most innovative clean-tech organizations.

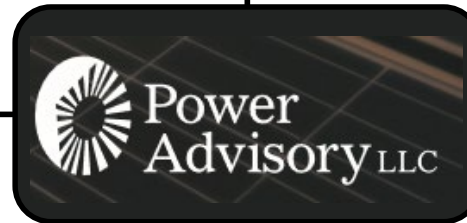
Who is Power Advisory LLC?

MANAGEMENT CONSULTING

- Market Analysis & Assessments
- Forecasts & Studies
- Project Management
- Contract Management & Negotiations

ENGINEERING & ECONOMIC

- Power System Planning
- Resource Need Justification
- Grid Connection Assessment
- Financial Modelling
- Avoided Cost Analysis



POLICY & REGULATORY

- Regulatory Support
- Market Design & Rule Development
- Consultation & Stakeholder Engagement

BUSINESS STRATEGY

- Business Development
- New Market Strategies
- Investment & Acquisition
- Asset Valuation & Due Diligence
- Feasibility Assessment

Background

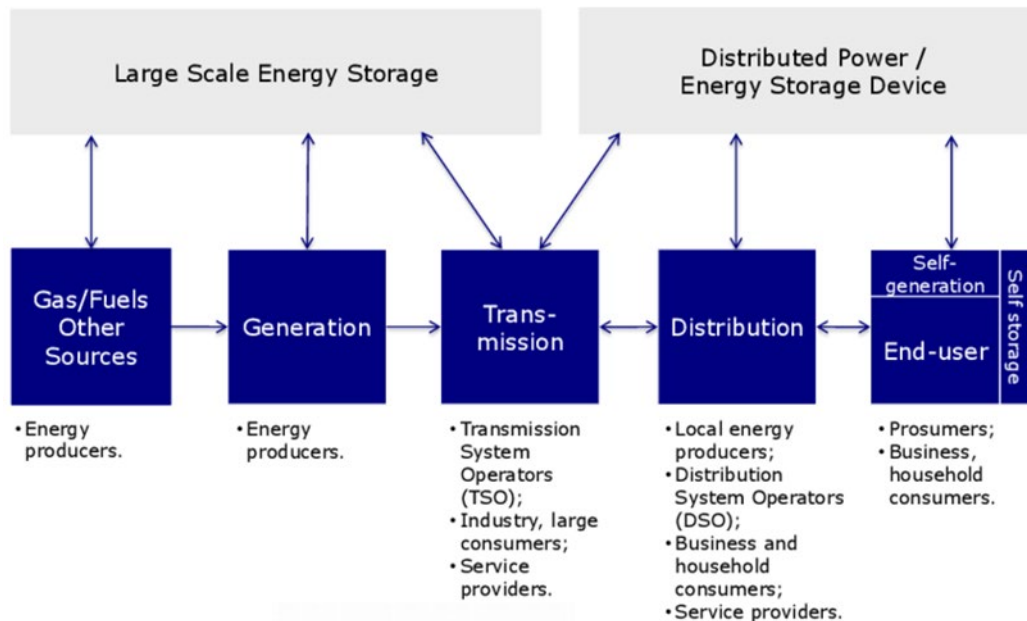
- Evolution of the tariff design for Energy Storage Resources was identified in the Alberta Electricity System Operator's (AESO's) Energy Storage Roadmap
- Changes to tariff design for Energy Storage Resources were included in broader tariff design changes under the Bulk & Regional Tariff stakeholder engagement
- The AESO has hosted two webinars to discuss potential tariff design change options along with unique treatment for Energy Storage Resources
- The objectives of Session 3 are:
 - Stakeholders to present and discuss alternative rate design options, including energy storage options and implications
 - Understand which rate design options stakeholders support and why
- This presentation provides Energy Storage Canada's high-level alternative rate design option for Energy Storage Resources

Definition of Energy Storage Resources and Intermediate Load

- As described in the AESO energy storage roadmap, energy storage resources are a unique asset that will require market design changes to integrate energy storage resources fairly and equally into the Alberta electricity market
- In the Alberta Electricity System Operator's (AESO's) energy storage roadmap, the AESO put forward a definition for energy storage
 - *Energy storage is any technology or process that is capable of using electricity as an input, storing the energy for a period of time and then discharging electricity as an output*
- While energy storage can act as a load, **energy storage is not an end-use customer** that ultimately consumes electricity produced by generators
- Energy storage is an intermediary market participant; energy consumed is re-injected for end-use consumption at a later time

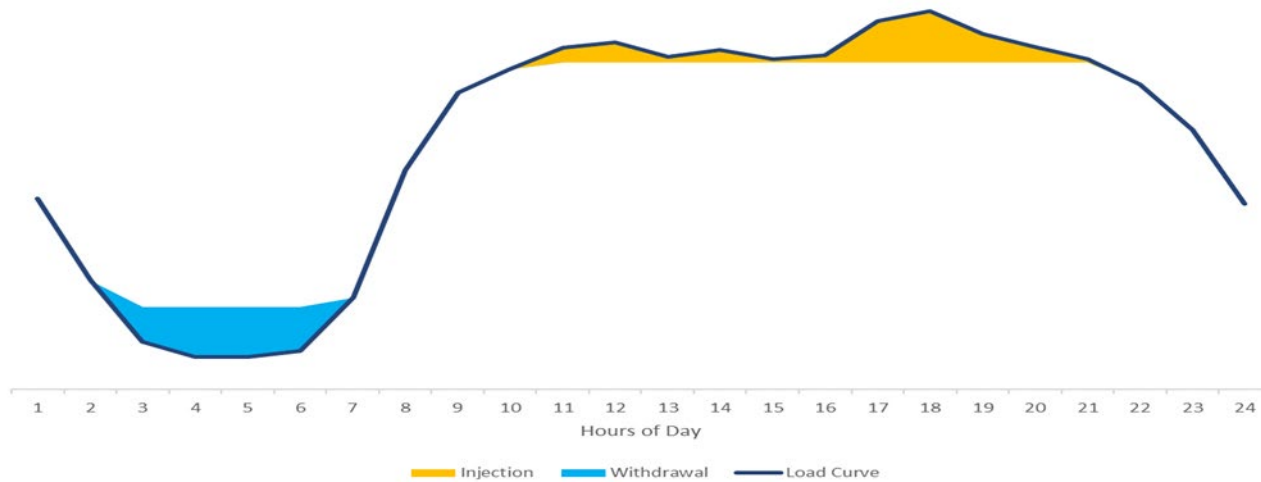
Energy Storage Resource Use Cases

- Energy storage resources are first and foremost a utilization tool to increase the efficiency and effectiveness of the electricity system
- Changes to the bulk & regional tariff should reflect the uniqueness of energy storage resources and not result in additional costs that must be borne by end-use electricity customers



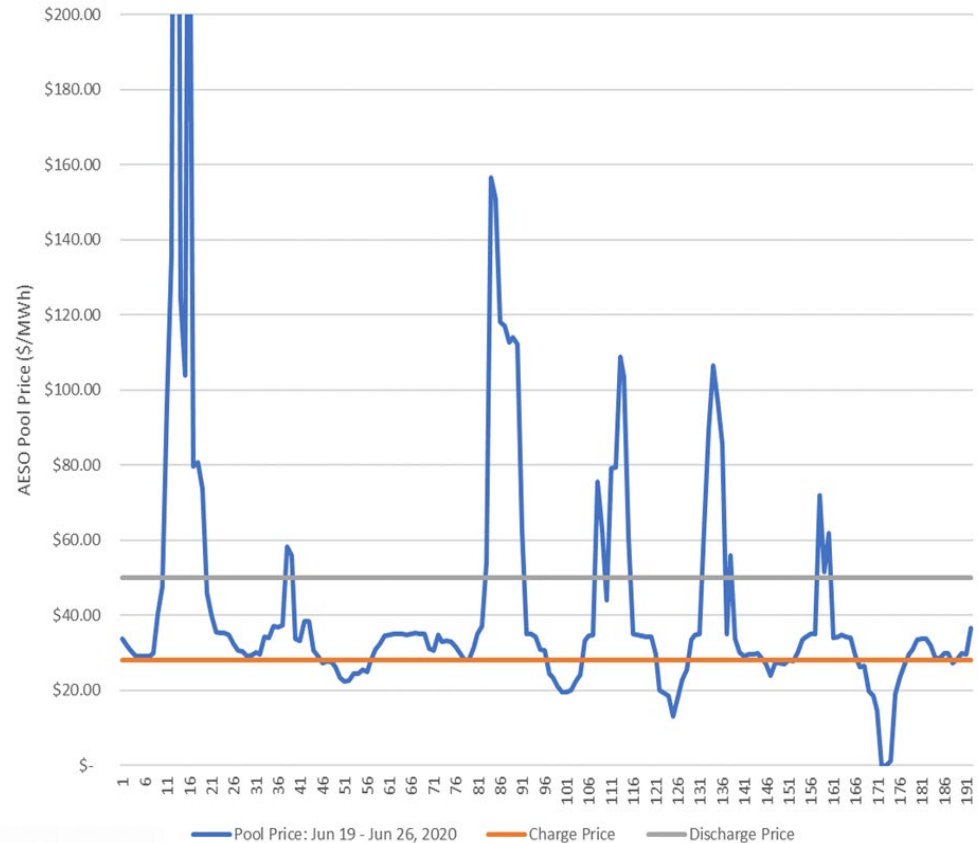
Natural Operation of Energy Storage

- The natural operation of energy storage is to consume during lower price off-peak hours and produce during higher price on-peak hours
- This operation decreases the average wholesale electricity price for customers and the strain on the existing transmission system



Pool Price Impact on Energy Storage Operation

- If transmission system constraints occur, energy storage is a curtailable resource that can cease operation if required, or potentially offer service needed to resolve the constraint
- As a market participant, the operation of energy storage resources would be governed by dispatch instructions and pool price setting
 - Would require energy storage resources to bid for energy for charging



Recommendations for Energy Storage Tariff Treatment

Recommendation	Description
Energy storage should be treated as a supply resource	<ul style="list-style-type: none">• The primary objective of energy storage is to shift energy injection to higher value hours
Energy storage should pay ISO/TFO admin fees based on the services being used	<ul style="list-style-type: none">• Energy storage can use and provide a variety of services therefore ISO/TFO admin fees should be applied based on the actions of energy storage resources• ISO/TFO admin fees include cost required to administer the market & transmission grid
Energy storage should pay, and be paid, based on wholesale electricity prices (i.e., AESO pool price).	<ul style="list-style-type: none">• Energy storage is dispatchable and able to participate in the real-time energy markets• Energy storage should pay the variable costs of the Alberta electricity system and the real-time wholesale electricity price is the most accurate

Recommendations for Energy Storage Tariff Treatment

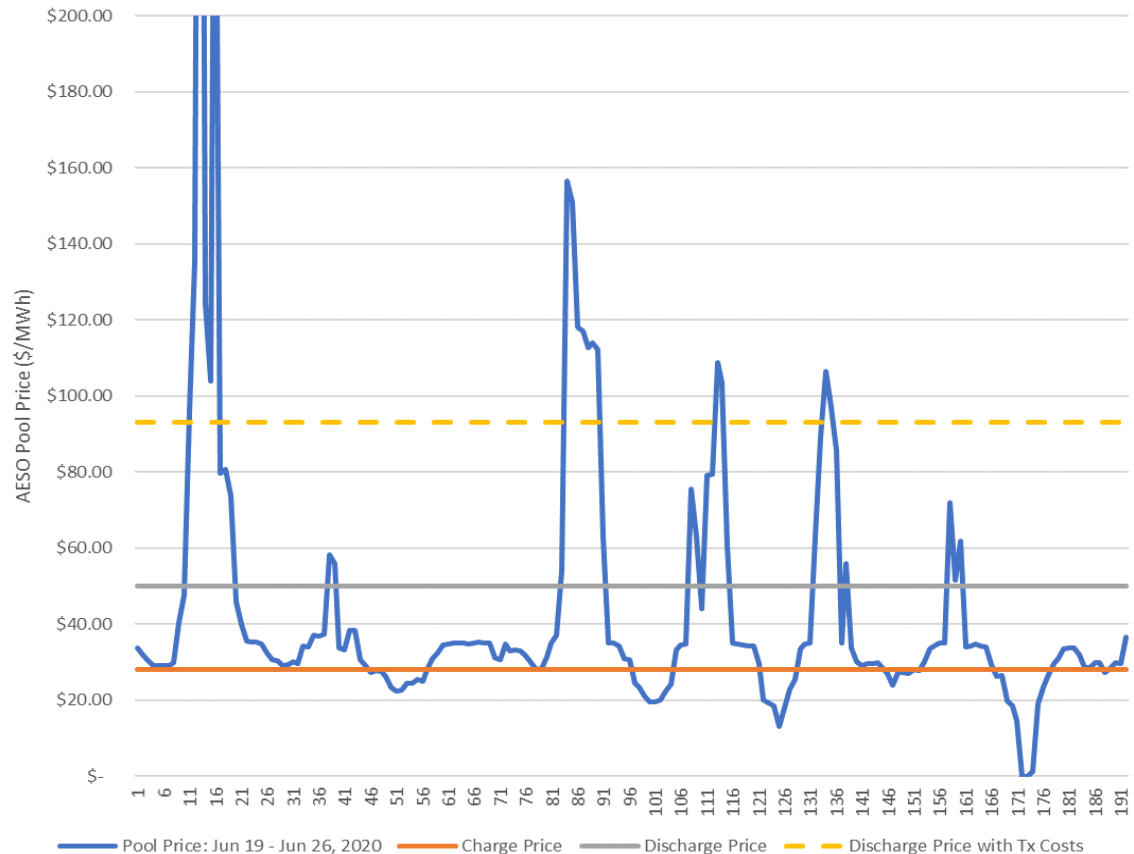
Recommendation	Description
Energy storage should not pay transmission system costs	<ul style="list-style-type: none">• The primary objective of energy storage is to shift energy injection to higher value hours• Applying transmission system costs to energy storage will increase the cost for services provided by energy storage to the detriment of end-use customers (e.g., like a fuel tax)• Unless instructed by the AESO for specific service provision (e.g., frequency response), energy storage will not consume when the transmission system is constrained; instead, energy storage will increase the utilization of the existing transmission assets, defer the need for new transmission system investments and lower the cost of electricity service for end-use customers

Pool Price Impact on Energy Storage Operation

Transmission charges for storage devices will reduce market efficiency by distorting charge/discharge decisions

Other market participants are end-use customers for separate infrastructure networks to delivery fuel (e.g., gas-fired generation), where there are no benefits passed back to the network

Since energy storage is not an end-use consumer, the costs applied to energy storage will ultimately be charged back to end-use customers, at a premium for cycling losses



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