July 15, 2020

Alberta Utilities Commission
Eau Claire Tower
1400, 600 Third Avenue SW
Calgary, AB T2P 0G5

Attention: Randy Lucas, Application Officer

Re: Proceeding 24116 Distribution System Inquiry

Dear Mr. Lucas,

Energy Storage Canada ("ESC") submits the following concluding remarks to the Distribution System Inquiry. We present a recommended regulatory schedule as requested by the Commission at the conclusion of the virtual meeting and present a justification for each item proposed schedule.

ESC has discussed the main points of this submission with the Community Generation Working Group and the Pembina Institute and we have found that our positions generally support each other. In particular, ESC has reviewed the filing of Pembina and agree with several points notably the development of a cost-benefit analysis for Non-Wires Alternatives(NWA), having Utilities present a standard Cost-Benefit Analysis for distributed energy resource analysis and an open procurement method for NWAs.

Thank you for the opportunity to provide our input.

Sincerely,

J Rangooni

Justin Wahid Rangooni, LL.B.
Executive Director
Energy Storage Canada

Energy Storage Canada Final Comments for the Distribution System Inquiry

Prepared by Olien Consulting and DePal Consulting Limited.

Introduction

Energy Storage Canada (“ESC”) is a non-profit, membership-based and funded trade association working to build a framework that recognizes the range of benefits that storage can offer to our current electricity systems. Our mission is to advance the energy storage industry in Canada through collaboration, education, policy advocacy and research.

Our focus has been on issues that directly impact energy storage facilities and to which we can contribute to the Commission’s understanding of the issue. We have coordinated our response with the Community Generation Working Group (“CGWG”), the Pembina Institute for Appropriate Development (“Pembina”) and others to reduce duplication on issues where there is overlap.

At this time, there are five primary specific impediments to energy storage participation in the Alberta electricity market:

- Limitations on the ability of a resource to self-supply electricity and export electricity to the grid;
- The current treatment of energy storage in the AESO and DFO tariffs;
- Lack of a process for the consideration of storage as a non-wire's alternative;
- Lack of clarity on the rules for Utilities to "own" storage as a rate base asset; and
- A lack of clarity on the ability of entities such as ESC to recover intervener costs for rates and facility proceedings until such time as significant storage resources exist on the system that can support these regulatory expenditures.

Section 1: Ideal Regulatory schedule

The expert consultants hired by Energy Storage Canada (ESC) attended the Commission webinar on June 24, 2020. At the conclusion of the webinar the Commission requested that Inquiry participants, in their final comments, provide an to answer the question: "what you think an ideal regulatory schedule would look like".[1]

ESC submits that the ideal regulatory schedule has an initial focus on energy storage and, includes:

1. An AUC-initiated proceeding to remedy the current ISO tariff treatment of energy storage.
2. An AUC-initiated proceeding to create DFO tariffs for energy storage that mirror the newly adopted ISO tariff principles and rates.
3. Creating an AUC-initiated stakeholder group to focus on evaluation of non-wires alternatives such as energy storage. The output of the group should be to provide the AESO and DFO's with a White Paper that outlines a standardized method of evaluating NWA's to reduce consumer costs.
4. An AUC initiated process to develop a common DER Roadmap structure for DFOs to ensure regulatory consistency across DFO service areas which will reduce regulatory burden for both DFOs and market participants. Areas of commonality should include definitions, technology descriptions, trigger assessment methodology (for example: what data will be evaluated) and guidelines for enabling conditions.
5. AUC ongoing direction to the AESO and DFO's in regard to system facility applications and related applications to ensure that the White paper recommendations for assessing NWA's is being properly assessed.

ESC recommends these steps take place within the context of the DER Roadmap structure as proposed by Ren Orans of Energy and Environmental Economics (E3) in its written submission on behalf of Fortis Alberta.[2]

ESC submits that certain triggers related to energy storage have already been met and therefore related enabling measures need to be put in place. If appropriate enabling conditions are not enacted, then energy storage deployment will be hindered with the

[1] AUC 24116 Vol 1 June 14, 2020, page 237, lines 2-5.
[2] Exhibit 24116-X0579.

negative consequence that several other roadmap components cannot be effectively addressed.

Section 2 of this document outlines our understanding of the relevant portions of the DER roadmap proposed by E3. Section 3 identifies the triggers related to energy storage that have already been met and details the appropriate enabling conditions that need to be implemented. Section 4 reviews the impact of delayed energy storage deployment on other roadmap triggers and enabling conditions. Section 5 contains other key issues, our conclusions and final recommendations.

Section 2: DER Roadmap Structure

To progress down the roadmap, E3 identifies three steps:[3]

Step 1: Track and report on “Triggers”. Triggers are events that identify some change to the distribution system.

Step 2: “Enabling Conditions” are conditions that must be in place to avoid negative consequences.

Step 3: Iterate

Step 1 identifies key components of the distribution system that signify change and creates triggers based on key metrics as a reliable mechanism to indicate that action is required.

Step 2 ensures that the utility and stakeholders are functionally prepared for the changes identified by the respective trigger.

Step 3 acknowledges that once one or a set of changes has been implemented, there will be more to come at another time.

For completeness, the full list of triggers and enabling conditions is replicated in Appendix A.

[3] Exhibit 24116-X0579, PDF page 20.

Section 3: Triggers and Enabling Conditions Related to Energy Storage

DFOs need to prepare for the rapid deployment of energy storage technologies on the distribution system. Specific relevant triggers for this change include:

1. The MW and significance of the growth rate of energy storage technologies being deployed in other jurisdictions.
2. A decreasing level of energy storage capital costs such that energy storage deployment would be a profitable investment opportunity in Alberta before paying for ISO or DFO tariff costs.
3. A material level of MW of energy storage projects being proposed in Alberta.
4. Energy storage resources being installed in Alberta in some configuration.

ESC proposes that all four of the above triggers have reasonably been met:

1. In 2018, energy storage interconnections in the United States have significantly increased by 45% with a 500% increase in residential storage interconnections.[4]
2. ESC and the AESO have illustrated that energy storage would be profitable however the current ISO tariff treatment forms an economic barrier.[5]
3. The July 2020 AESO project list contains six battery projects and one pumped hydro project for a combined capacity of 154 MW of STS service and 144 MW of DTS service, equivalent to 0.9% of current installed capacity[6] and 1.2% of peak load, which is material[7].
4. TransAlta began construction of a 10MW/20MWh battery storage facility on March 31, 2020.[8] The resource will charge exclusively from the Summerview II wind farm and will discharge energy to the transmission system.[9]

Therefore, the specific enabling conditions related to energy storage include:

1. Introduction of an ISO tariff for energy storage technologies that fairly charges for system costs and is not economically prohibitive to storage deployment. ESC has

[4] https://sepapower.org/resource/2019-utility-energy-storage-market-snapshot/
[5] Exhibit 24116-X0615, PDF page 9; Dispatchable Renewables and Energy Storage (AESO), PDF page 35.
[6] Based on installed capacity of 16,537 MW from AESO Current Supply Demand report on July 7, 2020.
[7] Based on peak load of 11,698 MW set on January 14, 2020 HE 18, from AESO Pool Price report for January 1 to March 31, 2020, accessed July 7, 2020.
[8] https://www.transalta.com/facilities/plants-operation/windcharger/
[9] Decision 24454-D01-2019, PDF page 6.

suggested an interruptible tariff rate that would apply to stand-alone energy storage facilities.[10]

2. Introduction of DFO tariffs for energy storage technologies that mirror the ISO interruptible tariff so that there is no market distortion between transmission and distribution connected energy storage facilities.
3. Creation of an AESO process and DFO processes to ensure consideration of Non-wires Alternatives (NWA) in the respective planning processes.

These enabling conditions will ensure that negative consequences related to a lack of energy storage deployment can be avoided.

Section 4: Roadmap Components Impacted by Limited Energy Storage Deployment

With energy storage effectively blocked from market participation, the following roadmap elements are compromised:

Triggers

Technology - Low, Medium and High DER Penetration: If energy storage is prohibited by tariff costs, a key technology category is missing from the potential for DER deployment.

Enabling Conditions

Technology – Technology Availability: Technology availability refers to having sufficient technology in place to manage the triggered level of DER penetration. Energy storage represents a category of technologies that can be used to ensure distribution system reliability which will also improve the efficiency of the energy price signal and produce value for consumers by improving reliability and lowering consumer costs. In particular, ESC has demonstrated that a financially optimal solution may be achieved by allowing a utility to contract for grid services from a private energy storage resource which is then allowed to earn competitive market income when the resource is not needed by the utility. This optimal-cost option will not be available under the current ISO tariff treatment or similar treatment by DFOs.

Financial – Customer Engagement: Customer engagement refers to customer uptake of DER technology and market participation. The current ISO and DFO tariff treatment

[10] 24116_X0555, Section 2.1, paragraph 9, PDF 6.

prohibits the energy storage technology category from consideration by DFO customers.

Financial – Cost Recovery: Cost recovery will be affected because a potentially cost-effective option will not be available for utility consideration leading to higher costs to customers.

Utility Functions

To implement the roadmap, E3 identified existing, evolving and new utility functions. For completeness, the full list of utility functions is included in Appendix B.

The lack of energy storage will impact the following evolving utility functions:

D system planning: E3 describes the evolution of system planning as: “In order to meet capacity or reliability needs, system planning will balance traditional ‘wires’ solutions with DER-based ‘non-wires alternatives.’”

An inappropriate energy storage tariff will result in an incomplete consideration of non-wires alternatives.

The lack of energy storage will impact the following new utility functions:

DER forecasting: DER forecasting will contain errors, and this could impact the Utilities ability to manage grid capability. On an hourly basis, actual demand and variable renewable generation output will differ from the forecasted values. Energy storage is a useful tool to compensate for forecast errors, reduce the need for grid expansion and minimize load or generation curtailment.

DER dispatch: The DFO performing DER dispatch will find that energy storage becomes a useful tool for matching supply to demand on the distribution system.

DER optimization: Storage contributes to DER optimization, not just to smooth natural variability or respond to unexpected events, but to manage system congestion and provide for more efficient use of the existing distribution system components.

T-D Co-optimization: Without deployment of energy storage, the coordination between transmission and distribution systems will miss solutions that may be more cost effective for consumers.

Section 5: Other issues, Conclusions and Recommendations

ESC proposes that the following items also be considered for inclusion in the regulatory schedule:

- ESC supports the efforts of the Commission to continue the process initiated by Bulletin 2019-16 to expand the ability to export and self-supply beyond the current limitation to ISDs and micro-generators. An expansion of the capability to export and self-supply to other market participants represents an opportunity to increase investment and innovation in the province, especially in the area of energy storage and provide value in the electricity market to all power consumers as an additional source of supply.
- As an alternative to DFO or other Utility owned energy storage, regulations need to allow market participants to develop commercial arrangements with DFOs or other Utilities that permit innovative developers and owners to earn a fair return while delivering electricity and associated services to consumers at the lowest cost.
- Clarity of direction from the AUC in regard to ownership of energy storage. TFO or DFO-owned energy storage should not be permitted to participate on an ongoing basis in the markets for energy or ancillary services. Instead, should a TFO or DFO wish to participate in an energy storage project, it should contract with a private storage owner for a portion of, or access to the installed energy storage resource. The contracts should be procured by the Utility through a competitive process. The cost of a competitively procured contract should be eligible for inclusion in the DFO or other Utility rate base if the storage resource offers a non- wires solution that is less costly on a full cycle basis, as compared to an efficiently costed wires solution.
- In general, the regulations for DFO and TFO ownership of an energy storage resource should be as consistent as possible to avoid favouring one type of installation over another. However, a DFO or TFO should not be allowed to compete with other forms of generation through ongoing participation in the energy and ancillary services markets.

The importance of energy storage technologies has been mentioned repeatedly in this Inquiry. At the virtual meeting, Mr. Friesen said:[11]

[11] AUC 24116 Vol 1 June 24, 2020, PDF page 24, lines 14 – 23.

> "[…] I think it's very important that we recognize the role of diversity in the design of the distribution system, and we look at ways to maximize that opportunity for the purpose of reducing capacity requirements on the grid, and we have many new technologies entering the market such as electric vehicles, such as storage, et cetera, which can be used to maximize that diversity and, therefore, decrease the fee. Those are opportunities we should explore to their fullest and we shouldn't ignore."

and Dr. Faruqui:[12]

> "[…] in those areas where there are reliability issues, the utilities might be encouraged to install storage devices. And that is already happening in places like Hawaii and New York and California and Montana"

The roadmap approach first proposed by E3 in their written submission also received support from Dr. Faruqui during the virtual meeting.[13]

ESC has shown that four triggers that indicate market readiness for the deployment of energy storage have been met. ESC has identified three enabling conditions that will prevent the negative consequences related to a lack of energy storage deployment. ESC has demonstrated the DER Roadmap triggers, enabling conditions and functions for which energy storage deployment is critical.

ESC recommends that the first step on the regulatory schedule is to remedy the ISO tariff treatment of energy storage through an AUC proceeding. This step enables further consideration of private energy storage developments in Alberta.

The second step is to require DFOs to submit tariff modifications that mirror the principles and rates established in the new ISO tariff treatment of energy storage so that there is no market distortion between transmission and distribution connected storage resources. One or more AUC proceedings will be required to complete DFO tariff changes.

In parallel to the ISO and DFO tariff processes, ESC recommends that a collaborative process be initiated between the AESO and DFOs to develop consistent evaluation techniques for the consideration of NWAs, including energy storage. This process will

[12] AUC 24116 Vol 1 June 24, 2020, PDF page 225, lines 14 – 17.
[13] AUC 24116 Vol 1 June 24, 2020, PDF page 67, lines 1-7; PDF page 167, line 22.

be completed after the new ISO and DFO tariffs have been approved. Support for the evaluation of NWAs was given during the virtual meeting by Mr. Deslauriers[14] and Dr.

Oran further suggested that an industry group be formed to set common understanding of what constitutes a non-wires alternative[15].

Once the tariff and NWA matters have been completed, ESC agrees with Dr. Orans that the Commission has a role in defining DFO roadmap characteristics and standards.[16] ESC recommends that the Commission move one step further and, as with the definition of NWAs, engage DFOs as a group to create a common roadmap structure.

The common roadmap structure needs to include triggers and enabling conditions related to changing the DFO rate structure. The exact balance between fixed, demand and variable charges should be justified by each DFO, and will change over time per each DFO's roadmap. Having a common roadmap structure will simplify and reduce the regulatory burden for DFOs and customers.

The previous four steps provide clarity on energy storage costs, consistency in consideration of NWAs and clear expectations and requirements for DER roadmaps prepared by the DFOs. Commission initiation of the proceedings described in the first four steps also sets a clear expectation that the Commission requires action on the part of the DFOs to prepare for the evolving distribution system so that the benefits can be made available to customers. It Is essential that the creation of a roadmap by a DFO does not become a license to do nothing because the triggers and enabling conditions developed by the DFO are too vague or are unreasonable. The regulatory schedule proposed by ESC clears the current barriers to energy storage deployment and sets common expectations for DFO actions on the evaluation of NWAs and preparation of their DER roadmap.

Once the first four steps have been completed, DFOs will be prepared to efficiently adjust the common roadmap structure to meet the needs of their local distribution system. ESC recommends that each DFO initiate a proceeding when they are ready to have their roadmap approved by the Commission. ESC expects the groundwork performed in the first four steps should reduce the time to prepare their specific roadmap and the time for Commission approval.

[14] AUC 24116 Vol 1 June 24, 2020, PDF page 66, lines 14-15.
[15] AUC 24116 Vol 1 June 24, 2020, PDF page 67, lines 17-22.
[16] AUC 24116 Vol 1 June 24, 2020, PDF page 204, lines 5-19.

In conclusion, Energy Storage Canada would like to thank the Commission for the opportunity to participate in the Distribution System Inquiry and is optimistic that the lessons learned through this proceeding will lead to future opportunities for the AESO, TFO's, DFOs, private developers and customers to maximize the value of the distribution systems of the future.

APPENDIX A

Detailed list of triggers and their definitions[17]

Category	Trigger	Definition
Technology	**Low DER Penetration**	Penetration of DERs remains low and limited to specific locations. Value (and cost) to the system/ratepayers is small.
	Medium DER Penetration	Increasing penetration of DERs across wide areas. Value of DER market is increasing at distribution and/or wholesale level.
	High DER Penetration	High penetration of a diverse range of DERs. Value of DER market is high at distribution and/or wholesale level.
Regulatory	**Jurisdictional Issues**	Elements of utility and/or DER operations may cross jurisdictional boundaries. Under some structures there are boundary issues between the TSO and DSO.

[17] Exhibit 24116-X0579, Table 1, PDF pages 16,17.

	Fairness/Transparency Concerns	This is a balancing act. Participating customers will want to stack value across the distribution and wholesale levels as quickly as possible, which can lead to double counting of benefits. Non-participating customers want to avoid cost shifting through efficient rate designs, making uneconomic bypass a key metric for utilities and regulators to track.
	Policy Changes	Policy changes are enacted, leading to regulatory/policy pressure to expand DER markets.
Market	**DER Ownership/ Control Issues**	Concerns arise around fairness and transparency of processes for DER ownership, control, or procurement.
	Data Ownership/ Control Issues	Customers do not have access to their own data, third parties may be unable to compete without data access.
	Business Risks Arise	Aspects of DER ownership and market operation present risk to the utility, e.g. cost recovery, ratepayer impacts, etc.

Full list of enabling conditions[18]

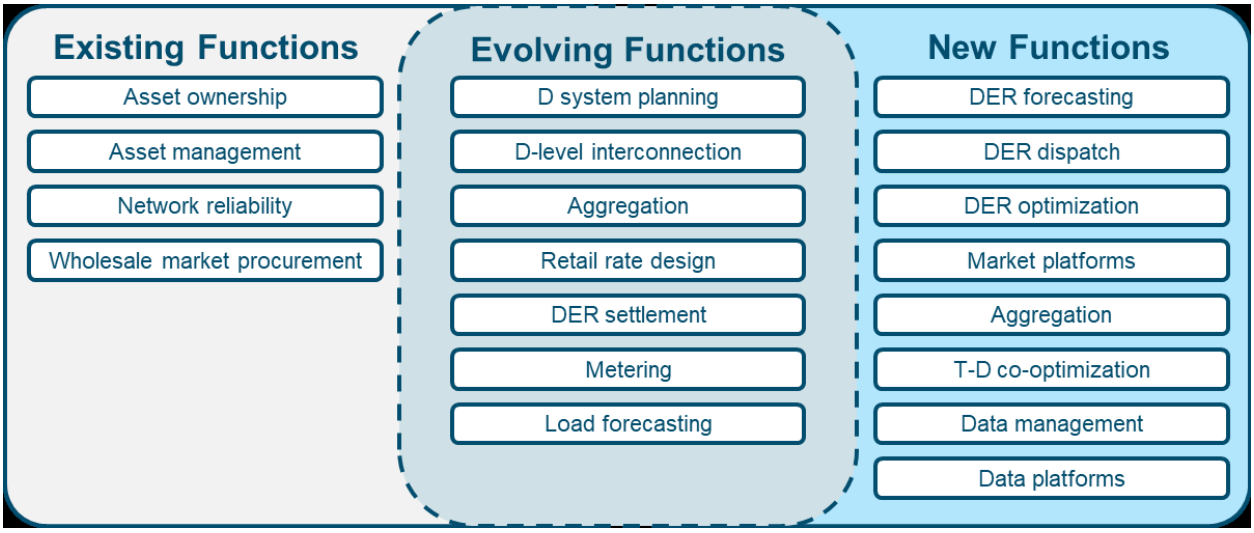
Category	Enabling condition	Definition
Technology	**Technology availability**	The necessary technology is in place to allow for the level of DER control required in this model (e.g., DER Management System, advanced network management, centralized communication network, etc.)
Regulatory	**Resolution of jurisdictional issues**	Questions around regulatory jurisdiction of distribution system assets are resolved.
	Incorporate DERs in system planning	Integrated system planning practices, with consideration of the multi-directional flow of energy that DERs bring and the value that DERs provide, are in place.
Financial	**Customer engagement**	Customers are engaged in DER uptake commensurate with the value of DERs. Customers show willingness to participate in new markets with new technologies.
	Cost recovery and incentives	Regulators provide cost recovery, and potentially incentives, to utilities for programs and technologies related to new distribution system models.
	Wholesale and distribution market prioritization hierarchy	Utilities and regulators create a prioritization hierarchy for distribution level and wholesale level programs and markets, to ensure dispatch signals do not conflict.

[18] Exhibit 24116-X0579, Table 2, PDF pages 18,19.

Operational	**Planning, interconnection, and operational standards**	Set of standards for planning, interconnection, and operations of the distribution system for higher penetrations of DER is in place. Where necessary, alignment with regional government is incorporated.
	Measurement and verification standards	Set of standards for DER measurement and verification for settlement and billing is in place. Where necessary, alignment with regulators is incorporated (where DER settlement is provided for both wholesale and distribution system).

APPENDIX B

E3 categorized the following utility functions:[19]



[19] Exhibit 24116-X0579, figure 3, PDF page 22.