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Maria Baitoiu
Lead Application Officer, Market Oversight and Enforcement
Uploaded electronically to the Alberta Utilities Commission (AUC) eFiling System

May 30, 2017

Dear Ms Baitoiu,

**RE: Evidence Submission (4/4) on "Wires & Wires Owners" to AUC DCG Review (22534)**

The Canadian Solar Industries Association (CanSIA) is the national trade association that represents the solar energy industry throughout Canada. We applaud the Government of Alberta's decision to undertake a review of Distribution Connected Generation (DCG) in Alberta and welcome the opportunity to participate as an Intervenor therein.

Our vision for electricity in Alberta in 2030 is one with the following four characteristics: i) more energy efficiency, demand-side management and local electricity generation; ii) delivered by a cleaner and smarter grid; with iii) greater choice for consumers; and iv) more resilience to the impacts of climate change.

This Evidence Submission provides our response to the questions posed by the Alberta Utilities Commission (AUC) to registered participants in the Distribution Generation Review (Proceeding 22534) in Appendix B of the Process Letter relevant to the "Wires & Wires Owners" of Solar Distribution Connected Generation (SDCG) in the province.

Answers are provided in the context that Alberta's electricity market is changing rapidly and that many policies, regulations and rules are inter-dependent. CanSIA appreciates the opportunity to continue to participate as a stakeholder in the on-going consultations as decisions are made and directions evolve.

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The questions responded to herein are listed as follows in the order that they are answered:

***7. What do you consider to be the enablers and barriers in Alberta's electric distribution systems to developing SDCG? Please provide us with your suggestions or solutions regarding how potential barriers could be addressed.***

***8. What investments may be required to accommodate a greater penetration SDCG? When and to what extent should these investments be required (i.e.,across all distribution systems in advance of any demand for SDCG connections or in response to demand for SDCG connections)?***

***26. Do the technical standards for connections and operations of all distributors, retailers and RRO providers that address the development of SDCG need to be standardized to remove barriers to enable alternative and renewable SDCG? Please explain.***

***31. Please describe the method that should be used to analyze the cost and benefits of infrastructure investments that may enable and facilitate broader deployment of SDCG and efficient energy use. Please describe and justify all of the elements that should be included in this analysis.***

***32. What current and potential regulatory approaches (including the withdrawal of regulatory barriers) regarding SDCG should be considered when planning the development of distribution networks?***

***35. What processes or information would you require from distribution utilities to be able to plan and connect SDCG in a more timely and feasible manner?***

Evidence Submissions detailing our responses to the questions relevant to Status & Outlook (1/4), Community Solar (2/4), Retail & Rate Design (3/4) have also been submitted in parallel.

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***7. What do you consider to be the enablers and barriers in Alberta's electric distribution systems to developing SDCG? Please provide us with your suggestions or solutions regarding how potential barriers could be addressed.***

There are several barriers restricting the development of SDCG in Alberta's electric distribution system.

Visibility of real-time energy flow on distribution systems limits the capability of Distribution Facility Owners (DFO) to accurately determine the potential impact and benefit of SDCG. Visibility includes real-time energy consumption by load customers, equipment limits and operating condition, along with outage management systems. Without detailed visibility, conservative assumptions are required to determine the potential impact of new SDCG connection requests and this limits the operational benefits DCG can offer DFO. A potential solution would be to increase the use of interval meters for customer loads and to install monitoring of feeders and sub-major equipment. The increased visibility of their distribution network would give DFO a more accurate understanding of the impact of installed DCG and should offer the opportunity to increase the penetration with minimum new investments.

The lack of visibility into the DFO distribution system restricts the ability to increase the understanding of SDCG developers on the connection capability of an area of a distribution system. It is difficult for SDCG developers to determine where there is cost-effective connection capability without assistance from the DFO. Further, there is limited information provided on where the installation of SDCG would be beneficial to the distribution network and in effect rate-payers. More information on system conditions, existing constraints and beneficial power system attributes should be shared with stakeholders so that they can efficiently assess and prudently develop SDCG that is cost-effective and valuable to the distribution system. The connection capability and system benefit information could be provided through annual planning reports or as part of rate-filing.

The annual planning reports could also offer an opportunity for the DFO to consider what investments may be required to accommodate an increased penetration of SDCG within their distribution system. Planning for SDCG in a similar approach to how DFO's plan for load growth would provide many benefits. The planned expansion of the distribution system would ensure investments are prudent and that network adjustments during the connection process fit a

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broader plan for the system. As part of the planning process the DFO would need to consider where SDCG growth would occur and anticipate how best to grow the distribution system including what assets to invest in to enable the increased penetration of SDCG within their system.

SDCG can offer flexibility (e.g., curtailing energy or offering reactive power support and voltage control) to assist in maintaining the stability and reliability of the distribution systems in Alberta. The current roles and responsibility for controlling SDCG within a distribution system restrict the ability for SDCG to offer its full value to the DFO. The capabilities of SDCG are not fully utilized because the generator is restricted on the amount of dynamic actions it can take to counter disturbances on the distribution system. To provide the full value, the DFO should consider agreements to control or dispatch solar generation to provide certain electricity products to the distribution system.

***8. What investments may be required to accommodate a greater penetration SDCG? When and to what extent should these investments be required (i.e., across all distribution systems in advance of any demand for SDCG connections or in response to demand for SDCG connections)?***

The first step to determine if any investments made to accommodate greater penetration of SDCG should be the development of a system plan that assesses the potential for SDCG uptake and how best to evolve the existing distribution system. The system plan should outline the expected impacts of increased SDCG on the distribution system and the options available to resolve any constraints that may restrict DCG development. The plan would provide information on how the DFO intends to phase in the expansions and what milestones would be needed to move to the next phase of investments. Phased development would hopefully ensure that investments are prudent and move in step with the uptake of DCG development. This approach would ensure that investments are not reactionary but instead based on thoughtful analysis.

The investments identified in the system plan could include the following:

- Investments to increase the visibility of real-time customer demand and the condition of equipment to provide DFOs with detailed knowledge of the status and capability of the distribution system under a variety of operating conditions;

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- Re-enforcement or expansion of primary feeder lines to improve transfer capability from areas of high renewable DCG installations to load centers;
- Dynamic compensation to maintain voltage control;
- Energy storage to assist in balancing energy flows on the system through regulating reserve or other ancillary services products;
- Improved communication protocols and equipment for Protection and Control (P&C); and
- Control capability for potential dispatch of DCG for distribution system reliability and stability.

***26. Do the technical standards for connections and operations of all distributors, retailers and RRO providers that address the development of SDCG need to be standardized to remove barriers to enable SDCG? Please explain.***

There already exists a high amount of standardization for SDCG connection and operation based on experience in Alberta and across a wide range of other jurisdictions. Further standardization to provide a common connection assessment process and connection requirements specific to Alberta would be beneficial. This could include a pre-connection assessment process to provide connection capability details to SDCG under development. If DFOs begin to dispatch or control DCG for system reliability and stability, standardization will be required to ensure consistency in application for all SDCG.

***31. Please describe the method that should be used to analyze the cost and benefits of infrastructure investments that may enable and facilitate broader deployment of SDCG and efficient energy use. Please describe and justify all of the elements that should be included in this analysis.***

Cost and benefit analysis should be based on multiple year system plans to determine what investments are required to accommodate different scenarios for demand and SDCG growth. The planning process should start by considering future system states (i.e., load forecasts and asset renewal) without new DCG. The next step would be for the DFO to estimate the potential interest in DCG for different zones of their system. The DFO would then assess whether the SDCG uptake would be beneficial and/or require investments to accommodate the interest. Benefits to the distribution system could include:

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- Reducing peak demand within constrained areas;
- Utilizing existing infrastructure; and
- Combining DCG investments with other planned investments related to system expansions or asset renewal.

Where the area of a system experiences a positive impact from SDCG adoption, the DFO should consider incentives to encourage SDCG development so rate-payers can recognize the benefits. The cost and benefit analysis for investments that enable higher uptake of DCG could be justified based on the amount of DCG that can be accommodated (i.e., $/MW)

***32. What current and potential regulatory approaches (including the withdrawal of regulatory barriers) regarding SDCG should be considered when planning the development of distribution networks?***

The existing distribution system was designed and built with the primary purpose to serve load customers. SDCG use the distribution systems to transfer their output to consumers and should be viewed by DFO as a new and growing customer class. The location and requirement for renewable SDCG does not align with the requirements of load customers and therefore a significant amount of adjustment and investment is required to accommodate higher penetration of SDCG. DFOs should be provide the opportunity to pursue multiple year investment plans to increase the potential for SDCG. The benefit of providing revenue certainty for longer term investment planning means that the distribution system grows prudently to minimize the cost to customers. The planning of longer-term investments can provide SDCG developments an opportunity to provide feedback to DFOs and information on where the best opportunities for development are within a DFO's service territory.

To incent longer-term planning to support SDCG development, the regulatory approach should consider encourage DFO's to estimate the level of interest in DCG within their service territory and the location. Plans produced by DFO's should be scalable to allow flexibility if SDCG uptake is higher or lower than expected. Investments in to improve communications and visibility should be encouraged to evolve the distribution network in anticipation for higher DCG penetration.

***35. What processes or information would you require from distribution utilities to be able to plan and connect alternative and renewable DCG in a more timely and feasible manner?***

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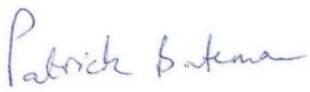
Information on the connection capability of different areas of the distribution is a starting point for the development of SDCG development. Without clear indication of where cost-effective connection capability exists, SDCG development must spend time and effort trying to determine where generation is best suited within a DFO's service territory. The status of the distribution system is best understood by the DFO and that information should be shared to increase the efficiency of SDCG development and connection. System plans for expansion or locations where SDCG uptake would have the greatest support for the distribution system would be beneficial.

We look forward to participating in the oral proceedings and to responding to additional questions that you may have throughout this process. Thank you for your consideration.

Best regards,



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