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2025 June 26

Alberta Utilities Commission
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Subject: Rule 024 and Micro-Generation Application Process Questionnaire

1. The purpose of this document is to respond to Alberta Utilities Commission (AUC) Bulletin 2025-05 and its questionnaire.

2. This document also briefly notes some of the experience of Mr Gordon Howell and Howell Mayhew Engineering (HME) with solar PV systems in order to set the context of HME's responses to the Commission's questionnaire.

3. All paragraphs in this document are enumerated for easy reference.

1. BACKGROUND

4. The purpose of this Background section is to illustrate how far that solar photovoltaic (PV) technology, the regulations and the processes have progressed in the last 30 years in Alberta.

5. Howell Mayhew Engineering Inc. ("HME") is an Alberta-based engineering company founded in 1985 specialising in the design and development of solar photovoltaic (PV) systems. Its managing principal, Gordon Howell, is a professional electrical engineer (P.Eng., BSc, University of Alberta, 1975) and one of the solar pioneers in Canada having been working exclusively in the field of solar energy since 1977, and with solar PV since 1983.

6. Edmonton Power hired HME in1994 to install a solar PV system on Mr Howell's house (Figure 1) for the purpose of HME discovering and examining the barriers to the introduction of solar PV onto their electricity distribution system. When this 2.3 kW$_{DC}$, 3 kW$_{AC}$ system was first switched on, on 1995 July 11, 30 years ago, while Alberta's electricity grid was still fully regulated, it was the first grid-connected solar PV system of any size west of Thunder Bay, the 12th grid-connected solar PV system of any size in Canada, and the 4th grid-connected solar PV system on a house in Canada, all without knowing about any need to obtain prior permission from the Energy and Utilities Board (EUB)! This system used 24 solar PV modules of 60 W each and 10.8%-efficiency, plus 12 solar PV modules of 75 W each and 11.8%-efficiency, a 208 VAC single-phase inverter with an external transformer, and a project cost of $40 000. This generated around 2000 kW•h of electric energy per year, and exported 2/3 of it. After the

fact, HME had to retroactively pay the EUB $650 for permission to construct the PV system and $650 for an order to connect to the grid as an industrial electricity generating unit. Mr Howell was required to be an Alberta Electric System Operator (AESO) market participant at a cost of $150 per year +GST in order to sell $50 of electricity to the AESO per year.

7. Mr Howell is now in the process of converting his house to being net-zero energy with all-electric space heating and domestic water heating, using 64 solar PV modules of 445 W each and 21.6% efficiency, a 28.5 kW$_{DC}$ solar PV array capacity, and a 19 kW$_{AC}$ inverter bank capacity all fitting onto a 100 A electrical service with no need for any inverter de-rating, or panelboard or service upgrade.

8. In order to help open up the Alberta Interconnected Electric System (AIES) (colloquially known as "the grid"), since 1995 HME has had to advocate for solar PV against many barriers, regulatory processes (Electric Utilities Act, Canadian Electrical Code [CE Code]), Wires Service Providers (WSPs), regulators (EUB, Power Pool of Alberta, Petroleum Registry of Alberta, electrical inspectors, Authorities Having Jurisdiction), social and educational (now having given 500+ public presentations on solar PV), including "advocating strongly" against Edmonton Power itself, Central Alberta REA (now EQUS REA), Fortis Alberta, ATCO Electric (as per Commission Proceeding 1477), and ENMAX Power.

Photo credit: Gordon Howell, on a grey snowy day on 2002 October 19

Figure 1. View of Gordon Howell's first solar PV system from 1995 – 2.3 kW$_{DC}$, 36 solar PV modules, 6 solar PV panels, 3 kW$_{AC}$

9. Since 1990, HME has also participated in many solar PV standards development processes including the International Electrotechnical Commission's Technical Committee 82 on solar PV, the CE Code Section 50 Subcommittee (on solar PV), Alberta's Distributed Generation Technical Committee (in 2001), Alberta's Distributed Generation Policy Committee (in 2001),

and Alberta Distributed Generator Technical Subcommittee on Micro DG Systems (in 2002), Edmonton's Renewable Energy Task Force, Natural Resources Canada's (NRCan) MicroPower Connect committee, Canada's Integrated Committee on Solar Photovoltaic Energy Systems (ICPV, vice-chairman) set up by NRCan and Canadian Standards Association's (CSA), CSA's Technical Subcommittee on C22.3 No. 9 (Interconnection of Distributed Resources to Electricity Supply Systems), and was consulted by the Alberta government on the development of Alberta's *Micro-Generation Regulation* (MGR) in 2007.

10. In contrast to the details in paragraph 6, Alberta now has 35 469 solar PV systems connected as micro-generation generating units to the grid as of 2025 May 31 and a micro-generation solar PV market that is growing at upwards of 40% per year (see Figure 2, Figure 3).

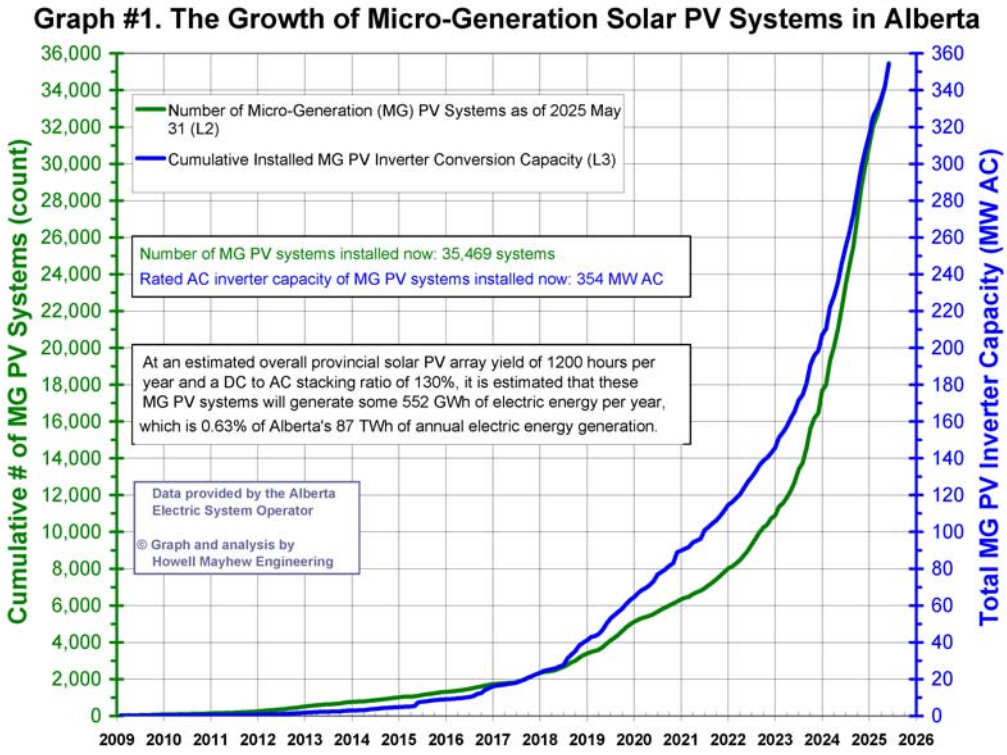

Image credit: HME, 2025 May 31

Figure 2. The Growth of Micro-Generation Solar PV Systems in Alberta since 2009

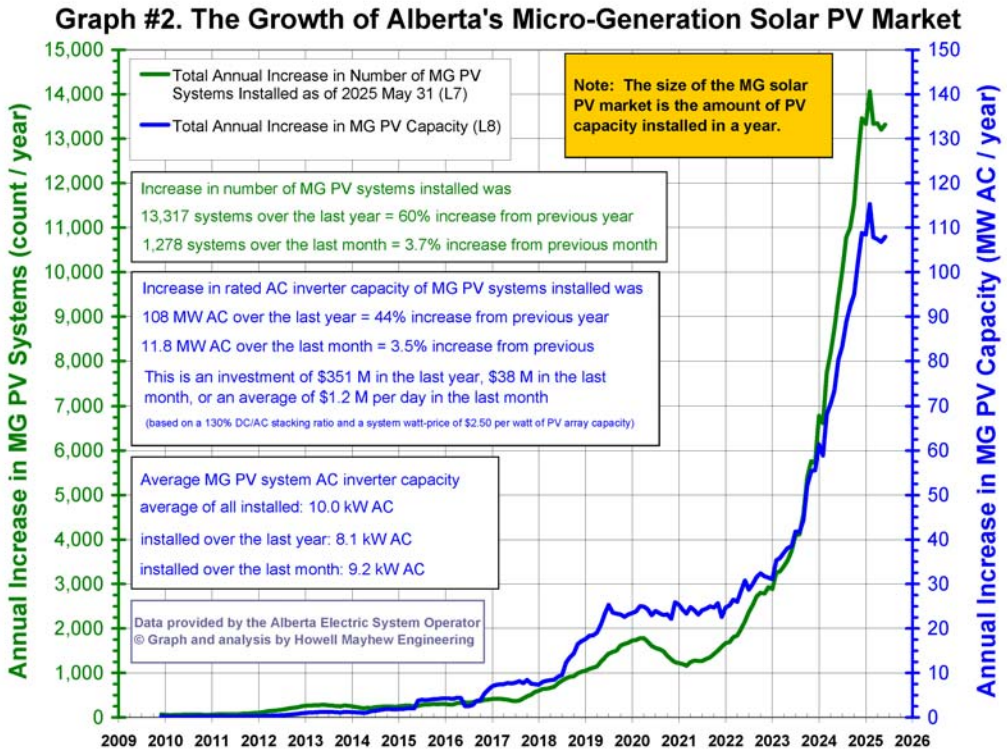

Image credit: HME, 2025 May 31

Figure 3. The Growth of Alberta's Micro-Generation Solar PV Market since 2009

2. PREAMBLE

11. It is with the paragraphs in this Preamble in mind that HME states its responses to the Commission's questionnaire.

12. HME appreciates that the Commission's questionnaire is about the Commission's Rule 024 and Micro-Generation Application Process and not necessarily about the MGR itself.

13. HME notes that the purpose of Rule 024 is to implement the MGR in a practical and functional manner, and that Rule 024 provides some guidance as to how to interpret the MGR. HME suggests that perhaps the actions that the Commission could take in response to its questionnaire could be implemented through changes to Rule 024.

14. HME notes that the MGR is a regulation under the Electric Utilities Act (EUA).

15. HME notes that the definition of "electric utility" (item "(o)") in the EUA notes that an

(o) "electric utility" means … an electric distribution system that is used …

but does not include an arrangement of conductors intended to distribute electricity solely on property of which a person is the owner or a tenant, for use solely by that person and solely on that property or a facility exempted by Commission rules made under section 117;

16. HME notes that the section in the EUA entitled "Exemptions from this Act" state:

2(1) This Act does not apply to …

(b) the portion of electric energy that is self-supply produced on a property of which a person is the owner or a tenant and that is consumed solely on that property by that owner or tenant, except in respect of a rate included in a tariff approved by the Commission having regard to the principle set out in section 122(2)(b);

17. HME also notes the extreme importance in understanding the physics of electricity and the difference between electric energy (units of kW•h) and electric power (units of kW) in order to understand solar PV systems and the MGR. Customers only import and purchase, and export and sell, electric energy (kW•h) and not at all electric power (kW). Electricity is not at all "power" and should never be referred to it as "power". Electricity is free electric charges (electrons) and those charges contain energy that society knows how to extract. Energy is the ability to move an object over a distance (units of N•m, J, kWh, BTU, calories). Power is the speed at which that energy moves (units of joules per second, W, kW, HP, BTU/h). HME carefully and judiciously always uses "energy" in its discussions and only uses "power" when speaking of the speed at which energy flows.

18. Arising from paragraphs 2 and 16, HME suggests that the MGR permits the interpretation of the EUA to not apply portions of the EUA's interconnection application and vetting process and compensation sections if the electric energy generated by the micro-generation generating unit at a site over a year is not greater than the consumption of electric energy from the grid by that site. This interpretation of the EUA thus permits the site-generated electric energy to functionally be swapped with the WSP's delivery facilities and the electricity retailer's energy supply, and the site still considered to have fully self-supplied electric energy for the purposes of the EUA. The MGR along with the Commission's Rule 021 also sets up the simple (to the MG owner) means by which the compensation is to be measured and enacted.

19. HME also notes that the WSP, the transmission grid operator and the dispatchable generators still provide all the 24-hour voltage, frequency, phase, black-start functions (and other functions), and management of the grid (dispatch, planning, maintenance, voltage and frequency stability, voltage rise, voltage drop, frequency control and many other technical factors), all of which are critical for a micro-generation generating unit to operate successfully.

20. HME notes that the original purpose of the MGR as it was being developed from 2006 to 2008 was to simplify the EUA and its grid-connected electricity-generator application process and the process for electric energy to be exported to the grid and be compensated by the AESO's electricity market, as it was applied to small non-industrial electricity generating systems.

21. HME suggests that the MGR as constituted and amended is a simple and brilliant example of regulation of a complex technology and concept, thanks to the original innovative and hard work of its writers, Mr +Bevan Laing and Mr Andrei Nikiforuk, and others from Alberta's Department of Energy under the leadership of Premier Ed Stelmach and Energy Minister Mel Knight and under the governance of Alberta's Legislative Assembly at the time.

22. HME is aware that some of the territorial and competitive issues that had to be resolved by the Alberta government in order to develop the MGR in 2006 were that the legacy generating units and Wires Service Providers basically said "no no no, we generate and deliver to customers; customers don't generate and export to the grid – that would be unfair competition to us". The compromise then was that the MGR was established to intend to limit the Micro-Generation customer's annual energy generation to their own annual energy consumption, and permit the grid to functionally be used as a real-time means of energy storage. This storage is paid for by the difference in the delivered electric energy price (which equals the energy purchase price plus energy delivery price) *vs*. the exported energy credit price.

23. HME further notes that the MGR's important use of net billing instead of net metering thereby guarantees that all the energy delivered to a site by the Wires Service Provider and as purchased from the Energy Retailer remains properly and adequately compensated as per the long-standing industry regulatory process.

24. HME helped to write the Commission's original Micro-generation Notice Submission Guideline (in 2008, without being paid for it). HME saw that the Commission had hired a writer from Calgary but with only basic Ontario experience. HME considered "oh oh, this is going to be a disaster for micro-generation here" and so requested its participation in the writing group. Mr Gary Snow from Fortis was also on this group that then numbered three. HME drew the two diagrams on pages 27 and 28 of the Guideline, and which desperately need to be updated.

25. HME notes and has many-times experienced first hand that solar PV technologies open up the grid to homeowners, building owners, electricians, electrical inspectors, sales people, door knockers, lawyers, some staff at electricity regulators, some staff at Wires Service Providers, and other demographic sectors of society that generally have a very-poor understanding of the extremely-complex physics of electricity, and the complex and necessary requirements of the CE Code and its concomitant safety and performance standards for electrical equipment (in particular for solar PV modules, racking and inverters) – the result of which continues to cause many mis-interpretations of how solar PV technologies operate and the important standards

and regulations that govern that operation of their equipment as components of a complete PV system and govern that complete system interconnected into the complex electricity grid.

26. Upon reading the on-line submissions from others to this questionnaire from the Commission, HME suggests that some of the mis-interpretations noted in paragraph 25 can be seen in some of these submissions.

27. HME notes that the MGR and Rule 024 contains boundaries, thresholds, limits and targets (*e.g.* days for decisions about Micro-Generation Notices and limits for generating capacity and annual amount of electric energy generated). HME further considers that, whenever boundaries, thresholds or limits are set anywhere in life, statements can legitimately arise that question the legitimacy of how and where these boundaries, thresholds and limits are set, notwithstanding that boundaries, thresholds and limits have to be somehow set somewhere, and that these boundaries, thresholds and limits can be gamed (usually easily).

3. RESPONSES TO THE QUESTIONNAIRE'S QUESTIONS

AUC Q1 Should there be a standardized methodology or minimum information requirements for utilities' calculation of the estimated annual consumption at a customer's existing or new site and the calculation of the micro-generation unit's output?

Response R1

28. If the Commission considers that the interpretation of the MGR is to be precisely exact in its words, then HME suggests that the answer is "yes".

29. However, since the MGR also says

> s.1(1)(h)(ii) is intended to meet all or a portion of the customer's total annual energy consumption at the customer's site or aggregated sites

then considering all the major and minor factors and variables that affect annual site consumption, it is reasonable that "intended" should be able to be reasonably interpreted by Rule 024 as being unlimited annual energy generation generated through the existing consumer service (as per the CE Code) limited only by the available solar-illuminated area of the house or building (but not the ground area of the site) and limited by the existing consumer service capacity.

30. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q1.

AUC Q1(a) Please identify and justify the best historical timespan for accurately assessing a customer's historical energy usage (for existing sites).

Response R1(a)

31. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q1(a).

32. The calculation method needs to provide for natural variations in annual electric energy consumption caused by many, many legitimate normal reasons (holidays, changes in occupancy, marital divorce, kids moving in or out, equipment breakdowns, *etc.*) and not apply red tape to micro-manage the consumption calculation. The key needs to be "what is reasonable", *vs*. "what is perfect", as per the 80% / 20% rule.

33. This calculation also needs to realise that a household's annual consumption in the context of the AIES is that an average household uses 7200 kW•h of electric energy per year (a purchase value of $720 per year at a purchase price of 10 ¢/kW•h), which is one 12-millionth of the electric energy used by the province 88 TWh per year and rising (which has had a market value of $6 to $20 billion per year over the last few years). Disputes about 10% of the annual homeowner consumption (for example) then means that the dispute per customer is about one-120 millionth of Alberta's annual market. With all the governance, economic and environmental issues these days, HME would submit that such micro-management is inordinate just to satisfy an increasingly-archaic concept from 20+ years ago that instead permits access to private micro-investment capital for this technology.

34. At one point, EPCOR D&T used to have a reasonable and functional historic timespan. Their timespan was the maximum monthly-rolling annual total over the last 3 years plus 10%. This calculation used monthly data from 4 previous years to construct 36 monthly data points (3-years worth) of annual totals, from which to design a PV system's generation. HME can easily provide further details on this upon request.

35. At one point, ENMAX Power also used to have a reasonable and functional historic timespan. Their timespan was the maximum monthly-rolling annual total over the last 10 years.

AUC Q1(b) Please identify and justify the best way for accurately projecting a customer's future energy usage (for new sites).

Response R1(b)

36. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q1(b).

37. For very legitimate reasons, EPCOR D&T permits the submission of a HOT2000 Full-House Report (FHR) as prepared by a Certified Energy Advisor using NRCan's HOT2000 software as a trackable way to reasonably estimate future electric energy consumption. Heat pumps and transitions away from the use of methane gas for heating over to electric heating can be estimated with this tool also. Though the FHR has some formatting issues, this is a very reasonable assessment tool that has had 40+ years of development and is widely available and recognised by a number of agencies such as the Canadian Home Builders' Association (CHBA), Canada Mortgage and Housing Corporation (CMHC), Alberta Municipalities, City of Edmonton, City of Calgary ++.

AUC Q1(c) Please specify and justify the minimum level of proof that utilities should accept if a customer explains that they intend to increase their electricity consumption shortly after installing a micro-generation system (such as electric vehicle proof of purchase, etc.).

Response R1(c)

38. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q1(c).

39. A reasonable minimum level of proof is a stamped engineering calculation along with proof of purchase or non-refundable deposit. Elements of trust are paramount to a well-functioning society. Such trust is embedded in this process.

AUC Q1(d) Please explain how a new micro-generation unit's yearly energy output should be calculated, including accommodation for any partial shading or coverage of a rooftop solar photovoltaic system.

Response R1(d)

40. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q1(d).

41. HME would respectfully submit that this question is getting the Commission and WSPs into areas that are not their professional expertise. Answers to this question often put PV technology into a box, and which PV can easily and legitimately jump out of.

42. Annual energy generation from a solar PV system is a complex set of calculations. Many software programmes are available to perform this to varying degrees of accuracy, such as RETScreen, Helioscope, Aurora, PVsyst, +++.

43. There are many mathematical factors that affect the outcome of this, including tilt angle, altitude angle, location, initial PV module degradation, but also many factors affect it significantly that cannot be modelled, but only reasonably estimated, such as snow cover, dust, soiling, building shading and tree shading. Building shading can easily be measured on site. Tree shading is much-more difficult. Snow cover of 5% to 14% depending on the year is at best an approximate guess [1]. Dust and soiling losses at 3% to 5% is ultimately a nominal guess. Disputes over these estimates are not worth anyone's time, as described in paragraph 33.

AUC Q2. There are currently no specified mechanisms for monitoring the compliance of micro-generation systems with the Micro-Generation Regulation (*i.e.*, the micro-generation system generates all or a part of, but not more than, the customer's yearly electricity consumption) after the system is approved.

How important is post-approval compliance monitoring to ensure micro-generators are remaining aligned with the Micro-Generation Regulation? Please provide an example.

Response R2

44. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q2.

45. As per the discussion in paragraph 33, it is **not at all** appropriate to monitor 35 000 solar PV systems (as per the latest count, and with a trajectory rising to 300 000 over the next 10 years) considering all the other important matters that life are presently on the door stoop of society. HME would request that the Commission make a clear decision against post-approval compliance monitoring.

[1] NAIT's snow study on the City of Edmonton's solar PV reference array at NAIT is not credible. Justification and discussions about this can easily be provided on request.

AUC Q2(a) Please identify and justify the best way to structure mechanisms for post-approval compliance monitoring, particularly regarding which party (or parties) should assume primary responsibility (such as the AUC, the AESO, utilities, etc.)

Response R2(a)

46. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q2(a).

47. At best, such post-approval compliance monitoring is dis-functional at a regulatory level, for many reasons, and should not be considered. HME would be pleased to offer further details and discussion on this matter upon request.

AUC Q3 What type of inverter de-rating, and associated evidence of this de-rating, would ensure that a micro-generation facility will not later increase its system capacity beyond the micro-generation system size approved by the utility? Please provide an explanation.

Response R3

48. The requirement should be that the manufacturer of such inverters provides an electronic lock that would disallow any changes by anyone but a reputable PV installer. A requirement about this should be included in the Wires Service Provider's Interconnection and Operating Agreement that the homeowner signs.

AUC Q3(a) Should micro-generators be permitted to de-rate their inverters, subject to the previously described limitation? Please provide an explanation.

Response R3(a)

49. Only the PV system installer should be permitted to de-rate the inverters that they install, at the time of installation, with the written permission of the inverter manufacturer and with notification to the Wires Service Provider and the Authority Having Jurisdiction for the CE Code.

50. Typically inverters only sometimes need to be de-rated in order to meet CE Code Rule 64-112 4) e) or f) if the PV system is being connected into an electrical panelboard, and if the next smaller inverter is too small for the design. A great example of this is a 10 kW$_{AC}$ inverter cannot be connected to a 125 A panelboard with a 100 A breaker and the next smaller inverter capacity is 7.6 kW$_{AC}$. Instead the max. inverter size for this panelboard is 9.6 kW$_{AC}$, and so 10 kW$_{AC}$ inverters from some manufacturers are permitted to be de-rated to 9.6 kW$_{AC}$ in order to meet this restriction.

AUC Q4 The City of Medicine Hat's micro-generation application process includes an initial step to determine a potential micro-generation system's maximum permissible size, which has been found to reduce the number of full applications received. Would it be useful for the micro-generation application process to include an initial sizing determination phase, where a utility first determines a customer's maximum permissible micro-generation system size before the customer makes a decision to proceed to a full application? Please provide an explanation.

Response R4

51. An MGR interpretation in Rule 024 as per paragraph 29 would eliminate the need for AUC Q4 and thus the micro-management of such generation concepts.

AUC Q5 The AUC has heard from stakeholders that inverter standards for micro-generation systems often change, creating temporary misalignment with some AUC guidance documents and contributing to some confusion among micro-generation applicants. Would it be helpful for the AUC to facilitate a working group of relevant parties that reviews technical standards (for inverters, etc.)? Please provide an explanation.

Response R5

52. The technical requirements of solar PV system components (solar PV modules, racking, inverters, disconnects, cables, design, modelling, commissioning ++) are specified by the Standards Council of Canada and by the Canadian Standards Association through its Part 1 and Part 2 Canadian Electrical Code, and which are related to the international standards that are developed by the International Electrotechnical Commission and by American agencies (IEEE, ANSI, NFPA), and which have been in existence for several decades. The Commission needs to stay away from this. See also paragraph 9.

53. For the Commission to be involved in such inverter standards guidance is a discussion about which the Commission likely has **very little** expertise or scope (stated respectfully). It is the Wires Service Providers that specify the standards that they follow and not the Commission. It is the CSA as certified by the Standards Council of Canada that specifies the standards for solar PV components and not the Commission. The CSA already has such working groups, and HME participates on them.

54. National and international inverter standards are changing rapidly now for many highly-technical reasons. The Commission should not be involved in referencing inverter standards. The text that the Commission uses should refer micro-generators to the requirements of the CE Code and the local Wires Service Provider, such as, for example:

"Do the inverters comply with the Wires Service Providers latest Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources."

55. However, solar PV needs to be mass-marketed across many jurisdictions and territories. Different rules and regulations and standards from different Wires Service Providers and different Authorities Having Jurisdiction (AHJ) should be harmonised instead. The Commission could provide a very important role in such harmonisation.

AUC Q5(a) If yes, how often should the working group meet? (e.g. monthly, quarterly, bi-annually). Please provide examples of technical requirements, other than inverters, that should be included in the discussions.

Response R5(a)

56. It may well be helpful for the Commission to set up a semi-annual meeting of WSPs and solar PV system installers and AHJs for other relationship and communication reasons and as a way to help many elements of the province prepare for solar PV to be ubiquitous throughout society, since it is now the least-cost electricity generating option for consumers and society alike. HME is very pleased that Fortis is already doing such meetings and they have been extremely productive.

57. HME notes that the Wires Service Providers communicate frequently and actively amongst themselves about standards and grid operation.

AUC Q5(b) If no, please suggest a different way that the AUC can keep abreast of changing technical standards.

Response R5(b)

58. What expertise does the Commission have regarding technical standards? There are several active CSA committees that Commission could choose to join. HME would be pleased to provide the Commission with contacts to facilitate their participation.

AUC Q6 Please identify, and provide justification and details for, any other high priority micro-generation issues that should be addressed to ensure the effective and efficient functioning of the micro-generation landscape.

59. Much thought and planning goes in to the successful implementation of a solar photovoltaic systems – planning, development, design, procurement, construction, commissioning, documentation, operation, training, performance monitoring, analysis,

evaluation, publication and outreach, and maintenance. Solar PV is being embedded into government environmental policies.

60. Some items in the MGR need to be clarified – Rule 024 could do this. Such items include clarifying the clause s.1(1)(h)(v) "is located on the customer's site or on a site owned by or leased to the customer that is adjacent to the customer's site."

61. The Commission's Micro-generation Notice Submission Guideline needs to be updated. HME would be pleased to be involved in this.

- HME drew the two diagrams on pages 27 and 28 of the Guideline, and which desperately need to be updated – in fact; in the latest version of the Guideline these diagrams are mostly illegible. HME still has the original native drawing files.
- The version number and issue date of the guideline is still the same as in 2019 even though it has been re-issued twice since. It needs a version control detail on it such as is found in Fortis' interconnection documents (DER-01 and DER-02 and others).

62. WSPs should be required to maintain an e-mail database of PV installers to whom they will pro-actively send notifications of updates to interconnection requirements and standards. As it is right now for example, Fortis puts their many interconnection documents on line, but there is no mechanism for designers and installers to find out that such documents have been changed and no way to see whether any of the documents actually are new until one goes and actually downloads them and reads them (every week?) only to find out that it has not changed since the last download !!

4. IN CLOSING

63. HME cautions that concepts such as post-approval compliance monitoring, inverter de-rating restrictions, and overly-prescriptive sizing requirements risk introducing administrative barriers that could slow adoption, frustrate consumers, erode confidence in the regulatory framework and cause the Commission much administrative burden. Instead, HME supports work to improve harmonisation and standardisation at the application and inspection stage and promote accountability through solar industry installer, Association and WSP staff education, adherence to a common code of installer conduct that has teeth in it, and clear guidelines for Wires Service Providers.

64. As per our responses, HME believes that any changes to the *Micro-Generation Regulation* must introduce and / or preserve two fundamental principles:

1) **The right to unlimited generation in self-supply and export situations**:
This principle (as per paragraph 29) is essential to protect the large investments that

consumers are making every day in the province (see Figure 3), allow for consumer choice and flexibility, and minimise unnecessary administration.

Solar PV is heading in the direction of becoming ubiquitous throughout society. The City of Edmonton is developing a net-zero-energy-ready housing requirement, which means that all new houses will need to be ready to have solar PV installed whenever the homeowner desires.

CHBA is preparing its home builders to be ready for the 2030 National Building Code and its requirement that all new homes be net-zero-energy ready.

As the penetration of solar PV rapidly increases in the province and around the world, many new ideas are being developed, such as combined agriculture and solar PV (agrivoltaics), floating solar (solar on oceans, lakes and reservoirs) and building-integrated PV (solar PV technology manufactured into building products). The MGR has an important role to play in facilitating these and unknown newer technologies.

2) **The availability of solar-specific retail products**:
As the penetration of solar PV rapidly increases in the province, new competitive retail products will likely be developed in order to serve solar consumers in new and innovative ways. The development of these products shouldn't be undermined.

65. HME urges the Commission to re-affirm its support for a regulatory environment that continues to foster innovation, customer choice, grassroots energy development and the access of solar technology to consumer capital. Alberta's leadership in distributed solar is a great model that other provinces admire. The province needs to continue to build on that momentum, and not risk undermining it.

66. HME thanks the Commission for the opportunity to contribute to this questionnaire and this important discussion that helps to maintain an open dialog with industry, stakeholders and consumers. HME looks forward to working alongside the Commission to further facilitate this amazing technology, its rapidly-growing penetration of society and the ability of consumers to directly and personally invest in Alberta's electricity generation.

Sincerely,

D. Gordon Howell, P.Eng.
Managing Principal
PV Systems Project Engineer