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Rule 024 and Micro-Generation Application Processes Questionnaire

1. 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? Please provide an explanation.

Home & business energy usage changes naturally over time.

For example: a family of 5 with an EV and air conditioning may use 1000-1500 kWh per month, but when the kids grow up and move away, the empty-nester parents' usage might drop by half. Are we seriously considering requiring the empty-nester parents (who may now be seniors on a fixed income) to remove half of their solar panels to become re-compliant with the MG Regulation, five, ten, or fifteen years after their solar was installed?

Similarly, when a factory experiences a prolonged period of lower sales volume and therefore lower energy consumption on the production floor, are we going to make them pony up more capital to remove solar panels from the roof, or rewire the system? What does this accomplish?

Why is it important to ensure compliance monitoring if we aren't going to make people remove the solar panels they paid for, from their roof? Isn't it sufficient that they were compliant at one point in time?

In my opinion, this topic gets a disproportionate amount of discussion and attention for something that appears to be a trivial matter. I am unclear on who is harmed by a marginally oversized solar system, and the magnitude of that harm. Is this an appropriate use of the industries time?

Doesn't the benefit of having more solar on the system outweigh the drawbacks? If the point of the legislation is to give customers the freedom to generate their own clean electricity, what is the harm in an imperfect sizing methodology? Or if the point is to use private capital to reduce emissions to make the planet a more livable place for future generations, aren't we achieving that?

Can we instead agree that what is ‘good enough’ on Day 1 is good enough ten years down the road? What is an appropriate amount of energy and time spent to justify, and re-justify, the size of a solar array? Don’t homeowners, businesses, and WSP’s have more productive uses for their time than revisiting the output of a microgeneration solar system and how it correlates to their electricity consumption that year?

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

The limit on the size of a solar array should be driven by the customer’s budget, as well as the technical, safety, and code limitations of the customers’ equipment and service equipment.

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

Ideally, the limit on the size of a solar array should be driven by the customer’s budget, as well as the technical, safety, and code limitations of the customers’ equipment and service equipment.

Otherwise, one of the following methods:

- For new residential & commercial construction, use the Energy Model (Hot2000 report) that is being generated and reviewed by a Professional Engineer for the Building Permit submission. This report is the most accurate way to forecast energy used because it considers the actual building design and specifications, including orientation, insulation, window area, light fixture & mechanical equipment counts, etc. It also includes the intended occupancy hours, and models the energy used by fuel type for the whole building.

- For tenant improvements (when a tenant relocates from one building or shell into another), use a report prepared by a Qualified Installer or Engineer, that compares energy used in the previous facility to the expected use in a new facility, with scaling factors for energy efficient equipment and changes in usable area of the facility, or an energy model.

Absolute precision need not be the goal, nor does it add value. Accuracy of +/-25% is enough, due to reasons I have stated above.

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.).

Proof of purchase or sound engineering judgement should be sufficient.

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.

A report from a Qualified Installer using reputable industry software should suffice, for example Helioscope or comparable software such as PVSys, Aurora, PVWatts, or equal. This should be site specific, with defensible snow loss, shading, and soiling factors in the design. Partial shading analysis is usually built into the output of the modelling software.

I feel getting this exactly right can be the responsibility of a Qualified Installer. I do not think this report warrants Professional Engineer involvement. The output can be 'gut checked' by the WSP using their own software or NRCan annual irradiance data for the municipality, if the AUC determines this needs to be checked.

I think +/- 25% ought to be a sufficient level of review, because I do not believe the effort of getting this exactly matched to the load and consumption is worth the wasted manhours that the current process demands. I go back to my argument that the harm to the grid (technically speaking) or to the ratepayer (economically speaking) does not seem to be that of sufficient magnitude to justify how much effort all stakeholders and industry are putting perfectly matching consumption with generation, especially given the fact that households and business's needs, loads, and consumption changes over time.

2. 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 explanation.

Refer to my previous points.

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.).

I do not believe that post-approval compliance monitoring is desirable, nor required, nor helping Canadians and Albertans achieve their climate and energy self-sufficiency goals.

3. 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.

I don't believe that Qualified Installers are going back and changing the inverter ratings after installation – there is too much professional reputational risk involved.

Conduit, wire, breakers, and distribution bussing related to a solar system are usually designed for the derated inverter capacity to make the installation more cost effective. Therefore, changing the inverter derating would mean all of the connecting components would need to be upgraded. This is cost prohibitive and therefore unlikely to occur.

I think a letter from the Manufacturer or their Representative, perhaps with a new nameplate, is sufficient.

a. Should micro-generators be permitted to de-rate their inverters, subject to the previously described limitations? Please provide an explanation.

Absolutely. Commercial solar inverters are only available in a few standard sizes, for example 30kW, 50kW, 100kW, 125kW, 185kW, and 250kW, at specific voltages for each level. These standard sizes and voltages are not be appropriate for all situations. This means installers need to have the flexibility to derate the inverter and re-label with a new manufacturer-issued nameplate. This is incredibly helpful for commercial & industrial customers, as well as the WSP's, from a cost, safety, and reliability perspective.

4. 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.

It would be very helpful for the solar industry to have a quick and easy way to do constraint checking at the beginning of a potential commercial project and have that as part of the Microgeneration process.

For commercial and industrial MG, it would be helpful to understand exactly what the constraints are for the proposed specific site, be it: line capacity, export capacity, order of magnitude costing for line or substation upgrades, and any other pertinent details that could be project killers down the road.

It is essential that Qualified Installers, engineers, and developers can find this information up front, before customers, installers, developers, WSP employees, and the AUC get looped into wasting their time and energy on a project that has too many constraints to be economically viable.

5. 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.

Inverter standards are important. The issue is that WSP's are requiring 2 to 4 levels of redundancy on top of the inverter listings, for example: UL1741-SB rated inverters, monitored by a utility grade protection relay (such as an Schweitzer relay), SCADA, RTAC, complete with a primary and secondary automatic disconnecting device (the so-called 'breaker fail'), ON TOP of the anti-islanding and protective functions already present in the UL1741-SB listed inverter.

In addition, some WSP's want effective grounding transformers, or Live Line Recloser Blocks, or Direct Transfer Trips. These additional requirements add hundreds of thousands of dollars to a project, many months to the schedule, and the requirement for these devices is not shared with the proponent often until a DLS study is completed, which we have seen take 12-18 months after Form A submission.

The bigger issue is that there seems to be zero accountability from the WSP on these costs and the schedule implications associated with moving a large MG (< 1.0 megawatt rating) through the MG process.

Another huge issue is that FortisAB are changing their DER-02 interconnection requirements ***retroactively for projects already in construction***. No other governing body functions in this way. There should be a notice and implementation process made public to all stakeholders that allows stakeholders to see the proposed changes coming in a new revision or amendment, with time to respond, and an effective date 12-18 months in the future at which the new requirements will be enforced. WSP's need to clearly define which version of the DER requirements will be enforced for any project already in the microgeneration process connection que. They cannot be allowed to change those standards once in construction.

There is already precedent for this in how Building Codes and Electrical Codes are implemented and enforced in the province of AB – simply copy that process and hold all WSP's accountable to follow it.

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

The single biggest issue facing Large MG's is the moving goal posts for protection requirements by WSP's, and hazy & ignored timelines for approval and return of key deliverables.

Large MG customers tend to be groups like pension funds and developers that own large swathes of real estate and wish to help reduce emissions and do right by their tenants and investors. Why are WSP's allowed to erect roadblocks just because they have a monopoly on the service area? Why are WSP's not held to account for the months and years they take to do their jobs?

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

I'm wondering if we could adopt best practices such as IREC Model Interconnection Procedures 2023 Edition.

6. 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.

a) The WSP's need to be held accountable to connect both Small and Large MG in a timely fashion. We have numerous projects that have taken over 500 days, some over 700 days, to connect microgenerators that are less than 1 MW in scale. Critical path processes that could be done in parallel are done in series. WSP's revisit old decisions or don't follow their own processes. Projects go through multiple managers at the WSP's without a single log of notes, decisions, calls, discussions, and action items. Project pre-meetings to identify constraints and probable costs aren't allowed. Etc, etc.

b) There needs to be an appeal and arbitration process with third party engineering support to challenge the protection requirements of the WSP's. WSP's may use (or be using) overly burdensome protection and engineering requirements to obstruct the development of Large MG's. The ballooning duplicable protection and engineering requirements are now approaching 20-25% of overall project costs and 50-75% of complete schedule duration on Large MG projects.

c) The costs associated with additional staffing and resources for the WSP's should be recoverable, so that a key barrier to increased deployment of Large MG's is removed. WSP's should also be held accountable to perform their review and approvals in as efficient a manner as possible. This includes properly training their staff, having clear guidelines that are interpreted reasonably, and a clear record of decision making so that the same issue is not revisited repeatedly.

d) Line or substation upgrades for Large Microgeneration (MG) should be paid for by the WSP and collected from the rate base, as the upgrades benefit more customers than just the MG, and MG provides grid support, reliability benefits, and reduces congestion on the distribution system, when fully utilized.

e) The reliability of Alberta's Interconnected Electrical System (IES) continues to be an important issue, one that MGs can play a key role in supporting. UL-1741-SB listed inverters can provide an entire suite of grid support functions including propping up frequency and voltage with VAR support and Ride-Through support. There are other solutions, including BES that could be opportunities for the private sector to provide BTM reliability to the electrical system, increasing investment in Alberta and making the IES more resilient.

f) The demand for Behind-the-Meter (BTM) solar + battery storage will not slow down in the coming decades. The AUC and Government of Alberta should get ahead of this by creating a process and market design for BTM Battery Energy Storage (BES) in the MG scale (1kW-5,000 kW). As battery costs continue to drop precipitously, commercial scale BES will be of interest to customers, building owners, tenants, and businesses, and will provide real benefits to the grid in the form of voltage & frequency support, demand peak shaving, increased resilience, & reduced congestion. BTM BES will also allow more rooftop renewables to be installed, thereby reducing emissions and decentralizing generation, reducing the need for substation and wires upgrades in the face of increased electricity demand from the electrification of transportation and

increased energy use from AI & datacenters. The process to connect BTM BES should be designed to make it as simple and efficient as possible for businesses to spend their own capital to reduce their demand on the grid, to take back control of where their energy comes from. The process should also make it easy to understand the cost-benefit of installing BES with crystal clear rate structures. Adding commercial scale BES to our utility grid will function as a non-wires upgrade that is good for all grid customers.

Sincerely,

Curtis Craig, P.Eng

President

Inferno Solar Ltd.