Comments for file **EB-2019-0207**

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My DER was approved by the IESO in March 2017 to deliver up to 10 kW from 39 Photo Voltaic panels under the microFIT program. In November of 2018 my DER was IESO approved to behind the meter connect up to 10 kW Photo Voltaic panels under the Net Metering program.

Other energy hardware includes a Ground Source Heat Pump (July 2018), three Tesla Powerwall2 batteries, 12 channels of Eyedro power monitoring current transformers, several computer platforms (with custom AI software) and a control room with extensive support equipment.

Developments have been focused on 100% electrification (no fossil fuels, zero carbon footprint) and techniques to reduce the Energy Footprint for home heating/cooling, domestic hot water, home appliances and lighting and electric vehicle transportation. Focus has been on real time execution of soft survival rationing for energy conservation and identifying candidates for hard survival rationing. Much has been learned on how to manage heat and electrical energy flows and storage of both heat and electrical energy. Geothermal heat management (exploitation and storage) is not widely understood and mainly ignored. This is a major issue.

Several presentations have been delivered to interested groups including the Professional Engineers of Ontario, the Canadian Association for the Club of Rome, Green Energy Doors Open and others. Over 107 visitor facility tours have been conducted.

System Performance has been a constant upward trajectory with an overall yearly Coefficient of Performance greater than 2.0 with the longest period of being “off-grid” (other than the microFIT uninterrupted grid connection) is in excess of 30 days and is being stretched to longer times during the month of August. A lot of efficiency learning, scalable to other buildings, has lead to not only building operational procedures but development of additional efficiency extending hardware and software. Look-ahead planning for time shifting loads and weather for solar production are being coded into AI software for automatic controls. Close attention to weather WATCH and weather WARNINGS result in manual grid disconnection to prevent further equipment damage from lightning induced voltage spikes. Innovative means to improve energy efficiency are ongoing.

As a retired scientist the development of this home energy system has been financed personally using debt financing (Line of Credit and new home mortgage). Travel to Toronto for the several OEB DER meetings is cost prohibitive. However, here are some constructive stakeholder comments on the concerns of a homeowner DER leading to integrating with the local LDC.

1. Interfaces: Uncertainty exists on how command and control of PV production, Ground Source heat energy storage, Electric Vehicle storage management, Tesla home battery

storage management, and load management (including time shifting). Special attention to emergency operations, when the grid is down due to cyber attack or climate change intensity, duration and frequency events, disrupt the regular steady state operations. Who has authority to do what with the energy assets, when and for how long and under what conditions? Emergency survival operations are vital to this discussion. We can expect more frequent and longer climate driven grid outages. Policy establishment is necessary.

2. Remuneration: The costs of basic equipment, internal interfaces and management, maintenance, grid interface equipment and software and the continued development process on both sides of the meter requires sufficient incentive compared with the DER alternative to remain disconnected from the grid as long as possible with the DER full intellectual focus on grid defection. Clearly policy must address this issue or the many advantages of DERs will be missed.
3. Aggregation: Aggregation of DERs, as is common in other jurisdictions, seems to be a workable model that provides the flexibility to address local issues and integrate many DERs to a manageable size for LDC or ISO contracting. However, these details need to be clarified with clear policies.
4. New Technologies: The nature of the electrical power generation and storage technologies are constantly advancing not only in the traditional (non-fossil) PV, wind, biomass, and small hydro but in emerging technologies including Low Energy Nuclear Reactors. Resiliency, sustainability, survivability and thrivability (prosper, develop vigorously, and create new products and services) have many social and economic implications at the homeowner, community, municipality, LDC, ISO, Canadian and North American Grid levels. The scope of OEB policies must develop and include this vision of constant technical advancement. As an example, it is quite conceivable that a homeowner or small business DER could acquire the ability to constantly and reliably deliver 30 or 40 kW year round to an aggregator. Perhaps there is some threshold below the MW level where the LDC (or IESO) could or should contractually deal directly with the DER without an aggregator.
5. Barriers: To acquire the homeowner microFIT approval took almost a year as there were intentional delays, legal interference, totally unnecessary forms complexity and other means to dissuade the applicant from proceeding. This time barrier was clearly very successful as a great deal of new home construction proceeded without PV. It seems as if this barrier is still in place. Policies need to be established to remove these artificial barriers.

These are the five policy areas that standout as vital as we face the uncertain future where Climate Change will be taking a greater leading role in Canada. Time is pressing for policy and procedures to permit two way energy flows within the IESO jurisdiction.

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