

BRIEFING NOTE

Behind-the-Meter Energy Storage

ISSUE:

- There are scenarios where grid-connected energy storage is charged Global Adjustment (GA) for power that it re-injects back onto the grid, which is then consumed by another user that is also charged GA. This double-counting issue does not occur when the energy storage system is connected behind-the-meter. Therefore, the recent changes to the GA regulation focus only on grid-connected storage.

KEY INFORMATION:

- Recent amendments to O. Reg. 429/04 under the *Electricity Act, 1998*, aim to facilitate the “netting” of GA for Class B energy storage facilities. These facilities are required to be stand-alone, in-front-of-the-meter (IFM).
- These amendments do not apply to behind-the-meter (BTM) energy storage facilities, including those connected to a load customer, a generator, or both.
 - Load-connected BTM energy storage that does not include any generation would be used as load offsetting devices. There is no mechanism to inject power onto the grid and receive compensation. Thus, GA netting would not apply.
 - Generator-connected BTM energy storage could potentially earn a credit for GA for energy they did not withdraw from the grid, which would amount to a subsidy for this application of storage.
 - When coupled with a renewable resource, load-connected BTM energy storage can participate in Ontario’s net metering program.
- Recent changes to the Industrial Conservation Initiative (ICI) have created new opportunities for cost-competitive BTM energy storage for commercial and industrial customers as a means to avoid GA billing for Class A customers (among other benefits, including improved reliability and power quality). As such, it does not appear necessary to further incentivize BTM energy storage.
- The Long-Term Energy Plan seeks to address several regulatory barriers that inhibit more widespread use of energy storage as a grid asset. These measures should help distributors and other sector participants to capture more of the benefits that energy storage can provide.

BACKGROUND:

Regulatory Amendments:

- Under certain scenarios, energy storage providers would pay GA for the power used to charge the storage system, and that end-users would also pay GA for the power when it is injected back into the grid.
- As such, the storage system is only an intermediary for that power, yet is still being charged as if the power was consumed. This results in double-counting of GA. The Ministry has deemed this treatment unfair to certain energy storage providers that are connected to the grid.
- The proposed regulatory changes focus on these storage providers – those that are Class B and are connected to the IESO grid or a distribution system.
 - Class A facilities are not addressed since they can reduce their GA exposure to zero by not consuming electricity during the five provincial peaks.
 - Any Class A facility can opt to be a Class B facility. Accordingly, these amendments offer choice for energy storage facilities to pursue the designation that best services their business model.

Energy Storage Types:

- IFM energy storage facilities are defined as Type 1 facilities – they reinject back to the grid to provide system services to the IESO or local distribution grid, or arbitrage price differentials on a merchant basis.
- In contrast, BTM energy storage is Type 2, used for offsetting future electricity need. This is used for load reduction – decreasing a load facility's draw (such as a factory) during daily and/or provincial peaks, or providing power quality services to the connected load. It is a load indistinguishable from any other load customer and generally not used for reinjection or supporting the provincial grid.

Challenges with GA Netting Behind-the-Meter:

- There are several scenarios where energy storage exists behind-the meter:
 - BTM with a generator, without net metering: Connecting energy storage with a generator BTM would allow for these customers to store energy they produce for later injection. Since this electricity did not come from the grid, customers would earn a GA credit for energy on which they did not pay GA. This would amount to a subsidy for generating electricity. To ensure that a BTM storage facility with a generator connected was only rebated on GA it withdrew from the grid, it would need to be separately metered from the rest of the facility. This would effectively make the storage unit a stand-alone facility, which would be covered by the amendments.

- BTM with a generator, with net metering: Ontario's net metering framework allows for energy storage to be coupled with a renewable energy resource. These are treated like a single unit: the energy storage facility discharges energy generated from the renewable resource into the grid. In these cases, the net metered customer recoups the entire commodity cost – including GA – that is discharged back into the grid.
- BTM without a generator: these energy storage facilities are purely for load displacement, not for discharge back into the grid.
- The Ministry would have trouble determining the presence of a generator connected to an energy storage facility. A facility could conceal a generator BTM, and use energy storage to earn a GA rebate on energy that they did not draw from the grid – and did not pay GA on in the first place.
- Extending the netting of GA could potentially reduce uptake of net metering since it allows energy storage facilities to bypass the requirement to couple with a renewable energy resource. It could encourage coupling energy storage facility with a non-renewable resources, such as natural gas.

2017 LTEP, Industrial Conservation Initiative, and Energy Storage:

- Class A facilities with BTM energy storage can still use energy storage facilities to reduce their GA exposure to zero by not consuming electricity during the five provincial peaks.
- Recent changes to the ICI have made it easier for more commercial, industrial, and institutional consumers to avoid their GA exposure using energy storage. These customers pay their portion of GA based on their power demand during the five peak demand periods in the year. As these peaks are predictable, energy storage can be used to reduce or eliminate demand at these periods, significantly increasing the economic incentives for BTM energy storage.
 - The 2017 Essex Energy report on energy storage found that these applications of BTM energy storage is economically competitive with other forms of BTM generation, creating new market opportunities for storage providers in Ontario.
- The Ministry does not have access to data on the uptake of BTM storage in Ontario. However, it is aware of recent initiatives indicating the growth of this market.
 - Of note, NRStor just announced signing a \$120M financing facility with Swiss based SUSI Energy Storage Fund (SESF), to facilitate rolling out behind-the-meter (BTM) energy storage solutions at commercial, industrial, and institutional customers. The Essex Energy report on energy

storage on distribution networks also noted that “without intervention, it appears that behind the meter applications will outpace the growth of all other applications.”

- The Long-Term Energy Plan has a number of provisions that will support energy storage BTM, including allowing utilities to partner with their customers to use both IFM and BTM energy storage facilities to address system needs. The goal is utilities to have clarity on the OEB regulatory treatment of energy storage when it makes economic and technological sense as an alternative to non-wires solutions.