Ontario Federation of Agriculture

FACT SHEET

Battery Energy Storage System Recommendations

Over the next few years, the Ontario government has directed the Electricity System Operator (IESO) to complete the transition to a zero-emissions electricity system. This will require phasing out natural gas fired power stations. To replace the quick-start and system balancing attributes of gas fired plants, the IESO will rely on battery energy storage systems (BESS).

By 2050, Ontario also plans to expand the electricity grid to meet higher electrification of large energy consuming sectors, including transportation, manufacturing, water heating, and building envelope heating. All additional capacity will use renewable energy (RE) sources, including solar and wind. This intermittent RE requires a BESS element to make energy available for durations needed to become committed market participants.

BESS is any technology or process that captures energy when it is not needed and stores it for later use, eventually discharging it. Technologies include Batteries, Capacitors, Pumped Hydro, Flywheel, Compression, Gravity, and Demand Response (commercial and industrial processes).

Several types of BESS can deliver the scale of energy for the duration required by the IESO. To date, all proposals submitted for IESO consideration use Lithium-ion Phosphate batteries. Although lithium-ion batteries are considered safe technology and the risk of a fire in a utility-scale BESS is low, the degree of impact of such events is high.

There have been and will continue to be multiple proposals, presentations to local governments, and public engagements, by companies vying for various transmission system connection points. OFA developed what we view to be fair and practical considerations aimed to support affected rural and farming communities. Our hope is that agencies that procure and license these facilities adopt prudent recommendations that allow Ontario's energy regulators to accommodate Ontario's buildout of clean, reliable grid systems, while ensuring due attention is afforded to the communities that host BESS and RE facilities needed to reach 2050 electrification demand.

OFA Recommendations

Proactive Fire and Safety Risk Management

Proponents must be obligated to ensure effective fire and safety risk management is in place, to ensure fire services are trained on managing chemical fires, and to install automated fire prevention and fire suppression mechanisms. **OFA recommends:**

1. that Ontario's energy regulators contractually obligate proponents and all subsequent BESS owners to take steps to ensure that fire and other safety risks are managed effectively. This includes supporting the training of firefighters on managing chemical fires, ensuring fire services are financially prepared to control BESS events, as well as installing automated fire

prevention and fire suppression mechanisms in their BESS.
2. that Ontario's energy regulators require that proponents and all subsequent BESS owners be insured to bear the costs related to a BESS event, to reduce the burden otherwise born by local governments, such as extended fire fighting capacity or public evacuations. Event preparedness should include a fire risk assessment, a community risk assessment, maintaining fire protection documentation and an emergency response plan.

Adoption of Appropriate Codes and Standards

U.S. and Canadian Codes and Standards (Fire, Building, Product and System Design)
BESS installations in the United States must comply with Underwriters Laboratory (UL) and National Fire Prevention Association (NFPA) standards and codes, to reduce the likelihood of failure. These standards and codes ensure individual cells, batteries, battery banks, battery containers, fire prevention, and fire suppression mechanisms effectively manage failures and reduce the likelihood of thermal runaway events.

BESS products and structures are designed and manufactured outside of Canada, and NFPA and UL Canada codes are completely separate from those in the U.S. Once referenced in fire and building code regulations and legislation, codes and standards become legally enforceable.

Storage is not specifically identified in Ontario Energy Board (OEB) codes. To reduce the risk of inconsistent application of the OEB regulatory framework to storage-related proposals, the Independent Electricity System Operator (IESO) recommended the OEB review its codes to consider energy storage participation and its regulatory framework, including processes and requirements for connections. OFA recommends additional considerations; that the OEB codes cite and adopt NFPA codes related to the safety, installation, operation, materials, and emergency systems (event prevention and fire suppression) of Li-ion battery storage systems connected to Ontario's grid systems.

While some NFPA and UL codes are adopted in Canada, there are several codes and standards that should also be adopted, including UL 9540 Energy Storage Systems and Equipment, UL 9540A Test Method for Evaluating Thermal Runaway Fire Propagation in BESS, and NFPA 855 Standard for the Installation of Stationary Energy Storage Systems. **OFA recommends:**

1. that the Ontario Government recognize and adopt UL and NFPA codes and standards in applicable energy regulations;
2. that Ontario's energy regulators cite these codes and standards, and contractually require utility-scale BESS proponents and owners to comply with appropriate UL and NFPA codes and standards;
3. that, as technology advances, and codes and standards are amended, BESS proponents and owners be required to comply with current versions.

The Ontario Fire Code (OFC) regulates BESS installation related to occupancy safety. It requires that, in occupied buildings, BESS be installed in compliance with the manufacturer's instructions and certain codes and standards, such as the National Building Code of Canada (NBCC) and the Canadian Electrical Code (CEC). The OFC does not regulate utility-scale BESS installations, which will not be sited within 30.6 metres of buildings that occupy people.

Qualified Professionals, Compliant With Building and Electrical Codes

Because modular outdoor BESS may not require local building permits, once standards and codes are recognized in related legislation, regulators are able to obligate qualified person accountabilities. **OFA recommends:**

4. that project proponents and owners be required to work with qualified and experienced professionals to ensure that BESS installations meet all relevant safety codes and standards, and to regularly inspect and maintain the system to ensure ongoing safety.

Approval Mechanism for Environmental Containment and Oversight

Ontario's Guide to Environmental Approval Requirements (GEAR) for Electricity Projects lists Environmental Approval requirements based on Resource Types. Storage is not generation so BESS are non-designated Class A resource types under GEAR, and regardless of size, do not require an Environmental Assessment for approval. Although the likelihood of catastrophic failure is low, the degree of environmental impacts of such events are large. We support ensuring there is some type of environmental oversight for BESS facilities. **OFA recommends:**

5. that considering their complexity and uniqueness, utility-scale BESS require Environmental Approval, Environmental Compliance Approval, or similar approval tools. This is meant to ensure environmental containment and oversight, including ground and surface water, air quality, soil and related considerations, and ancillary structures.

Proponents and owners must be contractually obligated to restore land, in the event of a BESS failure, and at decommissioning, obligated to restore the land to its original purpose and productive capacity.

Land Use and Farmland Protection

In addition to constraints within the electricity grid, policy drivers influence the siting of procurements. The OFA is pleased that the IESO has taken direction from the Minister of Energy to assess several processes related to these procurements, including prime farm land protection, ensuring community support, and environmental and permitting approvals.

While utility-scale BESS could reach 2,500 MW by 2027, the IESO's Pathways Report envisions limited additional BESS in the transmission and distribution systems. Pathways does envision up to 69,000 MW of new and replacement grid system infrastructure to meet 2050 electrification targets.

These assets will mostly be decentralized in rural regions. **OFA recommends:**

6. that regulators and the Ministry of Energy prioritize the siting of all energy infrastructure on commercial and industrial land and not allow siting on Canada Land Class 1 through 4 or Specialty Crop Lands.

Only after alternative locations have been evaluated, and there are no reasonable alternative locations which avoid prime agricultural areas, or prime agricultural areas with lower priority

agricultural lands, should rural lands be considered. This is meant to ensure the avoidance of siting infrastructure on Ontario's finite and declining farm lands.

Minimum Set Back Distances For BESS Facilities

Hydro One transmission assets are critical infrastructure and prolonged interruption or failure could impact millions of Ontarians. Noting that the existing NFPA 855 standard of a 30.6 metres setback may risk the integrity of their transmission assets, Hydro One developed new setback requirements[1], which increase the minimum setback distance for BESS to transmission rights-of-way by five-to-sixteen times, depending on asset voltage. It would be prudent to consider increasing all setback requirements for utility-scale BESS in Ontario.

While project proponents will need to invest more capital to extend the distance from their storage facility to transmission connection points, the additional costs are minor in comparison to the decades of income project investors stand to earn. Hydro One's prudent avoidance should extend to people, livestock, and buildings, by obligating proponents to increase the minimum setback distance to reduce the severity of damage, in the case of a BESS event. **OFA Recommends:**

7. that the IESO and the OEB adopt more stringent set back requirements for all utility-scale BESS, and that proponents be required to increase the setback requirement to agricultural and residential buildings, and populations, and at least double the 30.6 metre distance from the battery containers adopted in NFPA 855, based on prudent avoidance.

The footprint that BESS will require is small, compared to the scale of electricity infrastructure Ontario prepares to build in the next twenty-five years. OFA supports the initiative that the Ministry of Energy has undertaken to prepare now for that buildout. We also support a procurement process that reduces the impacts to, and concerns of, people and businesses in rural Ontario.

While it is critical to begin the work now to prepare for higher demand, energy regulators must proceed carefully to ensure our critical food systems are not compromised to reach electrification goals. Considering the scale of new clean electricity capacity, in both the transmission and distribution systems, and with much of this infrastructure decentralized in rural areas, following codes and plans will ensure the safe, fair and reasonable buildout of Ontario energy assets.

Recommended Design Documentation

<table>
<tr><td rowspan="2">Hazard Mitigation Analysis (HMA), Including:
• Code Review
• UL 9540 Listing
• UL 9540A Test Reports
• Fault Condition Assessment</td><td>Fire Protection Design Documentation, Including:
• Passive Fire Protection Systems
• Active Fire Protection Systems</td></tr>
<tr><td>Fire Risk Assessment (FRA), Including:
• Community Risk Assessment
• Air/Gas Dispersion Study</td></tr>
<tr><td>Commissioning Plan</td><td>Emergency Response Plan</td></tr>
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Hydro One BESS Fire Protection Risk & Response Assessment Standards

Standards and codes may change over time. The intent is to apply the current version of the standards in between document revisions.

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Adopted Standards and Codes:

- National Building Code of Canada – 2020
  - NFPA 72, National Fire Alarm and Signaling Code – 2019 Edition
  - NFPA 101, Life Safety Code – 2018 Edition
- National Fire Code of Canada – 2020
  - NFPA 13, Standard for the Installation of Sprinkler Systems – 2019 Edition
  - NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems – 2017 Edition
  - NFPA 68, Standard on Explosion Protection by Deflagration Venting – 2013 Edition
  - NFPA 69, Standard on Explosion Prevention Systems – 2014 Edition
- Fire Protection and Prevention Act (FPPA) – 1997
- Ontario Fire Code, a regulation under the FPPA – April 11, 2022

Recommended Industry Applicable Standards and Codes:

- National Fire Protection Association – USA
  - NFPA 551, Guide for the Evaluation of Fire Risk Assessments 2022 Edition
  - NFPA 850, Recommended Practice for Fire Protection for electric Generating Plants and High Voltage Direct Current Converter Stations 2020 Edition
  - NFPA 855, Standard for Installation of Stationary Energy Storage Systems 2023 Edition
- Underwriters Laboratories – USA
  - UL 1973, Batteries for Stationary and Motive Auxiliary Power Applications 2022 Edition
  - UL 9540, Energy Storage Systems and Equipment 2020 2nd Edition
  - UL 9540A, Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems 2019 4th Edition
- Institute of Electrical and Electronics Engineers – USA
  - IEEE 979, Guide for Substation Fire Protection 2012 Edition
  - IEEE 2030.2.1, Guide for the Design, Operation, and Maintenance of Battery Energy Storage Systems, both Stationary and Mobile, and Application Integrated with Electric Power Systems 2019 Edition

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