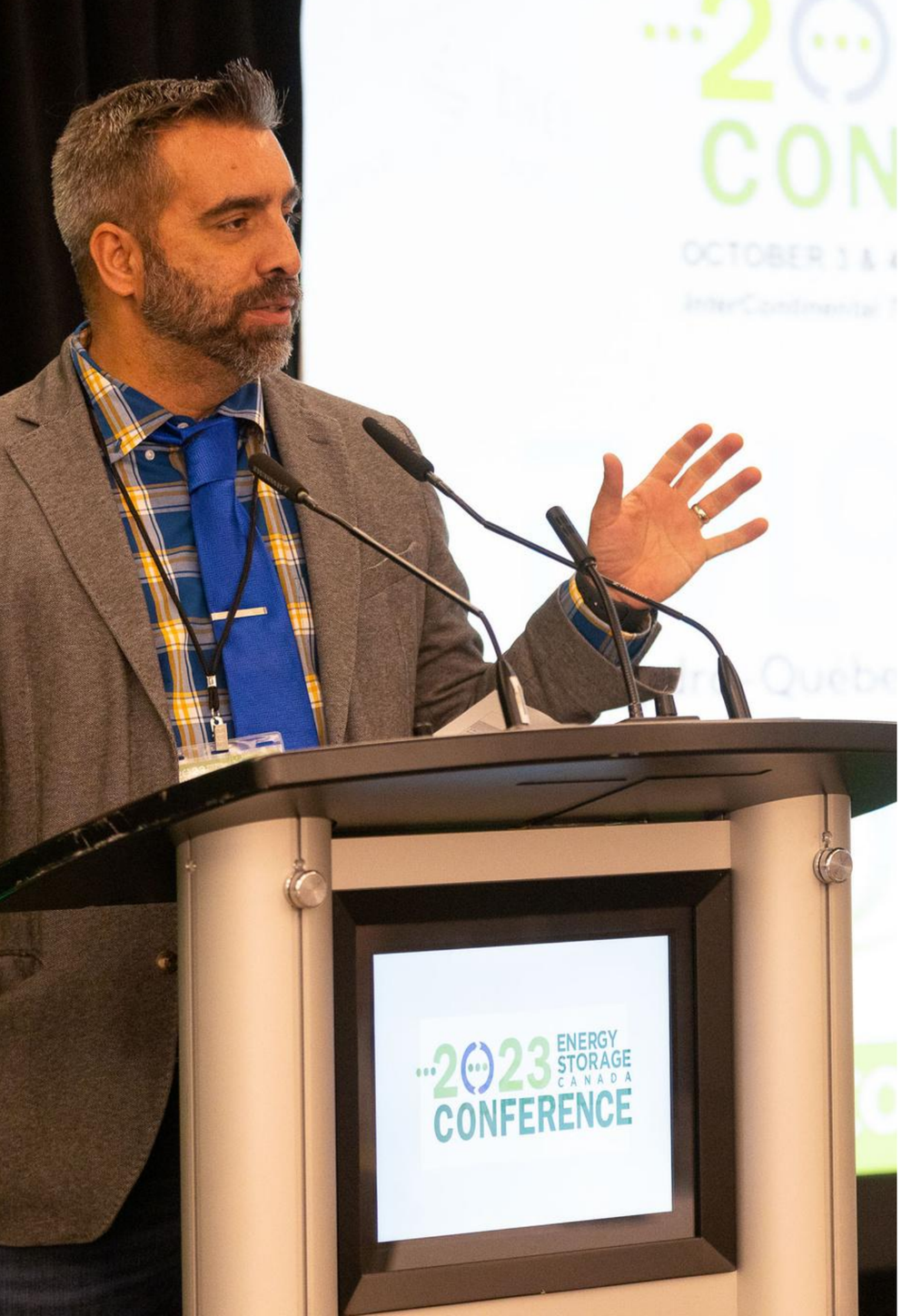
ENERGY STORAGE CANADA

Energy Storage Best Practices

Energy Storage Canada

Visit our Website

energystoragecanada.org



About Energy Storage Canada

- Canada's national trade association for energy storage
- Non-profit organization. Founded 2016
- More than 100 Members from the east coast to the west coast
- Technology agnostic - short & long duration, all types, end-to-end supply/value-chain

ENERGY STORAGE CANADA

ADVOCACY

Policy, Regulatory & Government Relations

Advocate for policy & regulatory environments favorable to the development of all energy storage technologies.

STRATEGIC PARTNERSHIPS

Networks, Stakeholders, & Community Engagement

Engage stakeholders, municipalities & Indigenous communities to develop strategic partnerships.

THOUGHT LEADERSHIP

Research, Education & Development of Information of Resources

Identify organizations with common goals to collaborate on points of intersection.

What is Energy Storage?

Energy Storage is any technology or process that captures energy when it is not needed and stores it for later use, eventually discharging it.

Chemical

Batteries (lithium-ion, zinc, sodium, etc)
Power-to-Clean Fuels (1-way power flow)

Mechanical

Pumped Hydro
Compressed Air / Liquids / Gases (CAES, LAES, CO2 etc)
Flywheel
Gravity

Thermal

Steady State Materials (1-way power flow)
Phase Change Materials (1-way power flow)

Electrical

Capacitors / Supercapacitors

Industrial Process

Demand response enable by storage of commercial/industrial manufacturing and product fabrication processes. (1-way power flow)

Why Energy Storage?

Electricity supply is changing

Demand Patterns are changing

Grid operators need additional resources & tools

ESRs can increase the utility & efficiency of existing resources

ESRs offer versatility, sustainability, reliability & affordability

ESRs can help support net-zero goals & decarbonization efforts

Battery Energy Storage Systems (BESS)

- BESS is one class of energy storage technology, based at a fundamental level, on the same technology as the battery for the phone in your pocket or your laptop.
- It's classified as a type of chemical storage
- Currently, lithium-ion is the most popular battery chemistry
  - medium-to-high energy and power density
  - its rapid response
  - mature supply chain = fast commercial deployment.
- However, other battery chemistries are being developed using Zinc or Vanadium (flow batteries) for example.

Benefits of BESS

BESS stores surplus electricity from non-emitting sources to be available when energy production is low or demand is high

Lower Emissions

Optimizes electricity generated, delays high-cost infrastructure, & store low-cost energy.

Reduce Costs

Fast responses to fluctuations in supply & demand. Maintains system balance.

More Reliability

Providing backup power ensures continuity of critical services.

Backup Power

BESS Fire Safety

- The safety concerns related to BESS are often as diverse as the communities where the assets are installed.
- Fire safety is one that we hear a lot but:
  - Incidents of fire (or thermal runaway) are rare & becoming rarer.
  - There are safety standards for BESS specifically related to fire detection & suppression.
  - There are numerous passive & active fire systems in each BESS installation.
  - Each installation develops an emergency response plan with local first responders.

Examples of preventative measures/systems:

Battery Management Systems (BMS) | Saprkers | Thermal Images
Electrical Protection | Ventilation | Fire Suppression Systems
Thermal Management Systems (TMS) | Remote Monitoring
Site Design | Detection Devices | Deflagration Panels
Non-Walk-in Designs | Case Clearance | Emergency Plan

What About in Canada?

Battery Energy Storage: Thermal Runaway & Fire Risk
Prepared by BBA – July 2023

Asked four of the leading original equipment manufacturers (OEMs) of BESS working in Canada & North America re: safety procedures & mitigation strategies)

Asked to provide any incidents of thermal runaway/fire.

- Of the four, only one had encountered an incident of thermal runaway, related to an old product. No incidents for their current product.
- All four described the risk of thermal runaway as extremely low.
- Low risk in combination with the additional mitigation measures to prevent thermal runaway from becoming a fire ensures the benefits to communities far outweigh the risks.

Emergency Response Providers

- BESS owners, in addition to the previously mentioned suppression systems, must have a detailed emergency response plan for each site.
- These plans are shared with, and often developed in consultation with, emergency response providers, in a locality.
- Our communications with first responders indicate many feel well-equipped to manage an emergency response at a BESS site.
  - This includes Ontario's Association of Fire Chiefs, which last September, released a handbook for firefighters for "Solar Electricity & Battery Energy Storage Systems Safety.

Code Requirements

Captured in the Broader Canada Electrical Code

Most recent Revision – March 2024

- As with all energy infrastructure in Canada, BESS installations must comply with Canadian codes
  - 64-918, 64-1000 (ESS broadly, utility scale)
  - 64-1100 (residential installations)
  - Appendix B, Section 64 (field-assembled/self-contained)
- While Canada does not have specific regulatory standards such as the UL codes in the US, **the above sections of the Canada Electrical Code are based on the UL standards.**
- For Ontario specifically:
  - OESC most recently updated 2021
  - Relevant codes - Rules 2-010 (plans), 2-022 (use of electrical equipment).

Environmental Concerns

- BESS have a comparably small geographic footprint for non-emitting assets.
- They can be installed with minimal impact on the soil, housed on skids, that can be removed at the end of the asset's life cycle.
- Toxicity/toxic gases
  - Gases released in the event of a fire are not present at a significant enough level to harm.
  - Water table - safety authorities recommend not using water for BESS fires.
- Mineral waste - Recycling companies are already operating, R&D is being done, and repurposing happening.

Experts, manufacturers, and Owner/Operators **ALL** emphasize environmental risks can be minimized if not eliminated with proper planning, environmental assessments, & stakeholder engagements.

How you Engage Matters

Community engagement can be categorized in various ways, depending on the goals, strategies, and stakeholders involved. However, some main types of community engagement generally recognized in the field are:

Informative Engagement

- This is a one-way form of engagement where organizations or government bodies share information with community members. The aim is often to inform the public about plans, changes, or events that might impact them. Tools used might include newsletters, press releases, and informational websites.

Consultative Engagement

- In consultative engagement, organizations seek the community's feedback on specific issues or plans. This could be through public meetings, surveys, or focus groups. While more interactive than informative engagement, the final decision-making power still usually resides with the organization doing the consultation.

Involved Engagement

- Here, community members are involved in the decision-making process, generally through ongoing participation in advisory panels, working groups, or regular meetings. While the organization may still make the final decisions, those decisions are informed by sustained community input.

Collaborative Engagement

- In this model, community members and organizations share decision-making power. This often involves partnership agreements or memorandums of understanding that outline the roles, responsibilities, and power dynamics. The community is involved in both planning and implementation stages of projects or initiatives.

Empowering Engagement

- The most participatory form of engagement, empowering engagement puts decision-making into the hands of the community. Organizations act as facilitators rather than leaders, providing the resources, training, or support needed for the community to take the lead.

Key Principles of Community Engagement in Energy

1. Engage with local communities from the outset of project development. Transparently communicate project objectives, potential impacts, and benefits, fostering trust and building a foundation for collaboration.
2. Involve community members, local businesses, and other stakeholders in project planning and decision-making processes. Solicit feedback, address concerns, and incorporate community input into project design to enhance its social acceptability.
3. Empower communities with knowledge about sustainable energy technologies, project implementation processes, and potential economic opportunities. Offer training programs, workshops, and educational resources to build local capacity and support.
4. Forge partnerships with local organizations, community groups, and indigenous communities to leverage local knowledge, resources, and networks. Collaborative approaches enhance project resilience, promote social acceptance, and foster mutually beneficial relationships.
5. Ensure that sustainable energy projects deliver tangible benefits to local communities. This may include job creation, infrastructure development, community investment funds, or revenue-sharing arrangements that directly benefit local residents.
6. Maintain ongoing dialogue and engagement with local communities throughout the project lifecycle. Establish mechanisms for regular communication, feedback, and monitoring to address evolving community needs and concerns.

Key Values in Community Engagement

1. Build authentic connections
2. Give your community a place just for them
3. Be responsive
4. Build trust

The Role of the Municipality

- Communities can't grow without more electricity, and they also need to have a voice in how their energy needs will be met. The IESO's procurement enables municipalities to engage with developers on their terms to ensure that safety and environmental impacts are understood and explore additional project benefits for the community.

- Proponents must obtain a municipal support resolution at the time of proposal submission for all projects that are in a municipality including projects on Crown land within an organized municipality.

- **What is a Municipal Support Resolution? Municipalities are responsible for deciding whether to host a project or projects within their jurisdiction in the IESO's long term procurements. A municipality can demonstrate their willingness to host these projects through a municipal support resolution. The resolution is a mandatory requirement in the IESO's procurement and must be provided at the time of bid submission for proposed LT2 RFP (if the necessary approvals are obtained). A municipal support resolution indicates that the municipality would support the development, construction and operation of a project, should it be selected under the procurement, and provided it can obtain all necessary permits and approvals.**

- Once a contract has been awarded under the proposed LT2 RFP and before a project is constructed, municipalities would be involved in approving zoning by-law amendments (where required), issuing building permits, and agricultural impact assessments if required. What are the zoning requirements for potential electricity generation projects?
- Zoning by-laws vary from municipality to municipality across the province. Developers need to work with the municipality to ensure that they obtain any necessary zoning by-law amendments or other permissions required under the Planning Act such as site plan approvals.

Tools for Municipalities

Community Benefit Agreements

What is a Community Benefit Agreement (CBA)?

- A community benefit agreement is a contract negotiated and signed by a municipality and a developer that requires the developer to provide specific funding, amenities and/or mitigations to the local community or neighbourhood.
- The municipality can stipulate that a CBA be a requirement for a municipal support resolution. Examples of provisions of CBAs could include, but are not limited to, lump sum payments, output-based payments, support for training and other municipal costs like firefighting equipment. Is a CBA required? No, developers are not required to sign a CBA in order to be eligible for the proposed LT2 RFP.
- However, municipalities and developers are encouraged to seek to negotiate and conclude a CBA to address priorities and opportunities in a potential host community. Municipalities may choose to require a CBA as a condition in passing a municipal support resolution

Other Key Considerations

- While communities have a number of key roles in approving new electricity infrastructure that aligns with their goals for growth and electrification, other government organizations will also play an oversight role to ensure projects are safe and appropriately sited.

- **Environmental Assessments**
  - **The Ontario Ministry of the Environment, Conservation and Parks** may conduct a Renewable Energy Approval (REA) assessment for some wind, solar and bioenergy projects. Visit their contact page here.

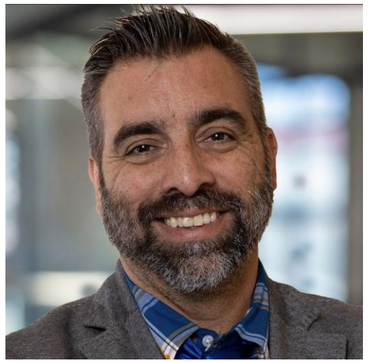
- **Land Use and Municipal Requirements**
  - **The Ontario Ministry of Municipal Affairs and Housing** provides guidance on legal and regulatory requirements related to land use, such as zoning and buffer zones for specific types of generation. Visit their contact page here.

- **Agricultural Land**
  - **The Ontario Ministry of Agriculture, Food and Agribusiness** provides guidance on zoning requirements and other regulatory restrictions. Visit their contact page here.

- **Crown Land**
  - **The Ontario Ministry of Natural Resources** provides guidance on the use of crown lands, including approvals, rules for access, and the role of municipalities. Visit their contact page here.

- **Fire and Safety**
  - Third parties such as the **Electrical Safety Authority**, and the **Technical Standards and Safety Authority** ensure that project proposals and development comply with all applicable laws and regulations.

Key Contacts



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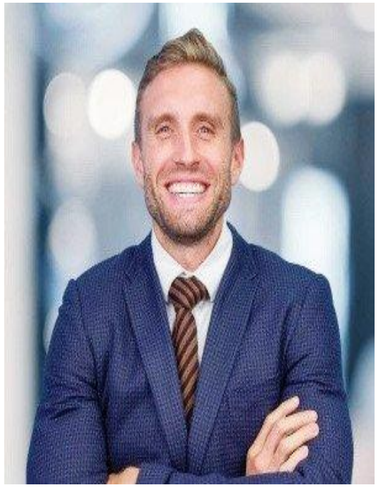

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Questions??

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