

Notes from Energy Storage Resources: Best Practices and Key Considerations for Municipalities Webinar

October 23rd, 2024

Webinar Summary

Energy storage resources are emerging as a key component of the province's grid modernization and path to decarbonization. With changes to energy siting decisions at the provincial level, municipalities are being asked to evaluate and make decisions related to proposals for battery energy storage systems (BESS). To help municipalities assess these proposals and better understand the role these projects play in supporting the low carbon energy transition, Clean Air Partnership reached out to Energy Storage Canada to provide an overview of best practices and key considerations for the deployment of BESS installations to help municipalities assess these proposals and better understand the role these projects play in supporting the low carbon energy transition

- [Webinar Recording](#)
- [Energy Storage Best Practices presentation \(PDF\)](#)

Presenters: Leone King, Energy Storage Canada

Key Findings:

- Energy storage plays an essential role in decarbonization and addressing changing electricity supply and demand patterns because it can capture energy during high supply and low-demand times and store it for later use and to reduce peak electricity demand. Energy storage is also critical for addressing the intermittency of renewable energy.
- Energy storage supports decarbonization of the electricity grid through enabling the use of stored energy rather than fossil fuel generation to meet peak demand when supply is insufficient.
- Energy storage can provide essential reliable energy during the forecasted changes in peak demand (from summer peak to winter peak).
- Energy storage can be paired with renewable sources (e.g. wind and solar) by capturing excess energy during peak production times (e.g. windy and sunny days) and discharge it when either demand increases, or production is low.

Presentation Summary:

- Energy storage refers to any technology or process that captures energy when it is not needed, stores it for use at another time, and eventually discharges it when it is needed.
- Electricity supply in Canada is changing and our demand patterns are changing (when do we need energy and who is using it). Grid operators need tools to address these concerns. In this context, energy storage can increase the use and efficiency of existing resources.
- Energy storage can delay the need for major infrastructure investments such as transmission wires.
- Through storing excess electricity from non-emitting sources like wind and solar, energy storage can avoid the need to turn on a natural gas plant.
- Energy storage helps optimize energy distribution by storing energy that is not needed until it can be deployed when it is needed.

Battery Energy Storage Systems (BESS)

- Most BESS being installed is lithium-ion, which has a rapid response rate (when responding to fluctuation in our grid), is medium to high power and energy density, and has a mature, reliable supply chain (which means it can be commercially developed quickly).
- Principal components of BESS are:
 - Battery management systems: Monitors the condition and functions of battery cells.
 - Power conversion systems: Allows the battery to charge and discharge.
 - Energy management systems: Collects and analyzes energy data to manage the system.
 - Safety systems: Can include temperature control system, HVAC system, and fire control system.
- BESS can reduce emissions and costs by storing low cost and surplus electricity from non-emitting sources and deploying it where there is more demand and to reduce peak electricity demand
- Due to BESS rapid response rate, BESS can maintain system balance, which provides more reliability. This is critical for a grid experiencing increased demand and increases in renewable sources (e.g. wind and solar) that have fluctuating energy supply.
- BESS can also serve as a backup power source for municipal and emergency services.

- BESS fire safety concerns are perhaps the biggest concern we hear about. It is important to recognize that BESS fires are rare and getting even more rarer. We are seeing a significant increase in BESS installations and there isn't an increased rate of fires occurring. In fact, there is a decrease in the fire occurrence even with more and more installations occurring. There have been a lot of fire safety procedures and processes in place related to manufacturing of BESS systems and detection and suppression.
- Energy Storage Canada asked four leading original equipment manufacturers (OEMs) of BESS in North America about their safety procedures and mitigation strategies. Of these four, only one had encountered thermal runaway (which occurs when system's temperature increases to the point of dangerous condition). This occurred as a product was reaching end of lifecycle, and it was safely contained. The risk of thermal runaway is extremely low.
- Emergency response plans are created in consultation with local emergency response providers before assets are activated.
- Energy Storage Canada worked in collaboration with Ontario's Association of Fire Chiefs to release a handbook for firefighters ([Solar Electricity and Battery Energy Storage Systems Safety](#)).
- Energy infrastructure, including BESS, must comply with codes within Canada's Electrical Code, including:
 - 64-918, 64-1000
 - 64-1100
 - Appendix B, Section 64.
- BESS has a small geographic footprint; They are compact and do not require large borders.
- Testing within North America indicates that gases and toxins are not released during a fire at a level high enough to cause harm to people.
- Municipalities interested in hosting BESS projects can contact Energy Storage Canada or IESO to be connected with proponents and be provided information on what proponents will need to submit to get a project. This can kickstart conversations within a community regarding project parameters (e.g. location, number of installations).
- Energy Storage Canada's primary objective in recent years has been enabling and promoting energy storage at the utility scale, rather than at the distribution system level. However, Energy Storage Canada's is planning on putting an increased focus on the distribution system side (behind the meter) next year.

Additional Resources:

- [Energy Storage Canada Publications](#)
- [Let's Talk About BESS \(Battery Energy Storage Systems\)](#)

Contact information:

Please reach out to us at any time with additional information, questions, or input.

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