

ENSPiRE SESSION 7

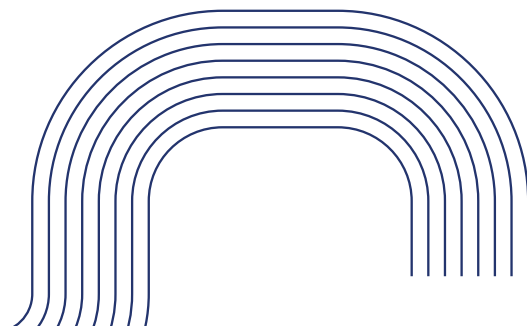
Operating sustainably
beyond energy
efficiency

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Engineering You To Save

This session moves beyond traditional energy efficiency and focuses on other opportunities to improve operational sustainability in commercial buildings including: Renewable Energy Systems, Carbon Offsets & Renewable Energy Credits, EV Charging, Energy Storage, Carbon Capture and Utilization and

Renewable Energy Systems

Many renewable energy systems have seen significant technological advancements alongside dramatic cost reductions in recent years. When evaluating renewable energy systems for your commercial building, consider the high level strategies in the table at the top of the next page.



Technology	Application	Installation or Operation Considerations
Solar Photovoltaics	On-site electricity generation	<ul style="list-style-type: none"> Maximize solar exposure through orientation, tilt, and minimizing shading Plan installation timing carefully, given the long lifespan of PV systems Optimize panel angle (~40–50° in Canada) and evaluate fixed versus tracking systems
Solar Thermal Energy	Buildings with high hot-water and space-heating demand (Liquid Solar Thermal) or make-up air requirements (Solar Air Heaters)	<ul style="list-style-type: none"> Solar Air Heaters are most viable Solar Thermal Energy in Canadian climates and tend to overcome challenges faced by liquid solar thermal systems because they use air as the heat transfer medium.
Geo-Exchange (AKA, Ground Source Heat Pump)	Building heating and cooling	<ul style="list-style-type: none"> Can be installed almost anywhere and are not impacted by seasonal conditions due to their reliance on the steady state temperatures of the ground, making it a flexible energy system compared to others.

Alternative Fuels

The replacement of fossil fuels like natural gas and diesel with lower carbon renewable fuels like renewable natural gas and renewable diesel is one means of further reducing emissions. Ideally the use of these fuels is limited to buildings that cannot electrify immediately due to on-site or local electrical capacity constraints or to the small proportion of fossil fuel consumption that remains once systems have been optimized and energy efficiency upgrades have been implemented.

- **Renewable Natural Gas:** A low-carbon substitute for fossil natural gas made from organic waste sources and added into the fossil natural gas supply, typically delivering a blend of fossil natural gas and renewable natural gas. Typical uses in commercial buildings include space and water heating through existing fossil natural gas infrastructure and for transportation fuels (compressed or liquified).
- **Renewable Diesel:** A biofuel that is a low-emissions, drop-in replacement for fossil diesel, produced from renewable sources. Typical uses in commercial buildings include substituting fossil diesel for back-up generators and emergency supply.

Carbon Offsets and Renewable Electricity Credits (RECs)

Carbon offsets support external projects that reduce emissions elsewhere, indirectly offsetting emissions (Scope 1,2, or 3) for the building. On the other hand, RECs support renewable electricity generation projects that feed clean electricity into the grid (locally or elsewhere), indirectly offsetting emissions for the building's electricity consumption.

EV Charging

EV charging can reduce transportation emissions, create new revenue streams, and is a building amenity increasingly expected by tenants and occupants. To be EV-ready, buildings should be evaluated for electrical upgrade needs; load management systems may need to be implemented or adjusted to manage electrical demand; and space planning and design should be considered to accommodate current and future charging demand.

Energy Storage

Energy storage can support energy cost savings (peak shaving or time shifting), electrification, and resilience. Battery Energy Storage (BES) is best suited for buildings that need to manage new electrical loads (through added capacity), lower peak demand costs, maintain power during outages, or for enhanced grid resiliency. Thermal Energy Storage (TES) is best used for heating and cooling and when there are needs for peak load reduction, reduced energy costs, and for facilities that have heat pumps.

Carbon Capture and Utilization

Carbon Capture and Storage is best used in cases where on-site emissions cannot be eliminated through electrification, energy efficient equipment upgrades, fuel switching, or optimization. When evaluating, ensure there is enough mechanical space available for capture equipment.

Green Infrastructure

Green infrastructure, such as green walls, green roofs, and blue roofs can be incorporated into buildings and offer opportunities to enhance building performance, occupant comfort, and climate resilience. Green walls help naturally ventilate indoor space and improve air quality. Both green and blue roofs can help passively manage heating and cooling demands and manage stormwater. Green roofs specifically can help extend roofing lifespan, reduce local emissions, and mitigate the urban heat island effect, while blue roofs can help reduce potable water use.



Sustainable Procurement

Sustainable procurement is a way to influence the market through purchasing choices. Embedding sustainability in procurement can help your organization be ready for regulatory changes, generate cost savings and improve end-user and building occupant health and wellbeing. When evaluating products and services, intentionally select local partners and suppliers committed to environmental and social responsibility and chose options that are more energy efficient, contain recycled content or are made of low carbon materials, and consider if and how the items can be recycled or disposed of at end of life.

Sustainable Waste Management

Sustainable waste management involves reducing, reusing, and recycling materials to minimize waste sent to landfill, improve resource efficiency, and lower environmental impacts through practices like waste sorting, composting, and circular material use.

Access Resources and the session tool kit [here](#):

Access the Session recording [here](#):

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Session summary provided for use by: