LCBA
LOW CARBON BUSINESS ACTION
CANADA

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KEY SECTOR OVERVIEW
ELECTRICITY

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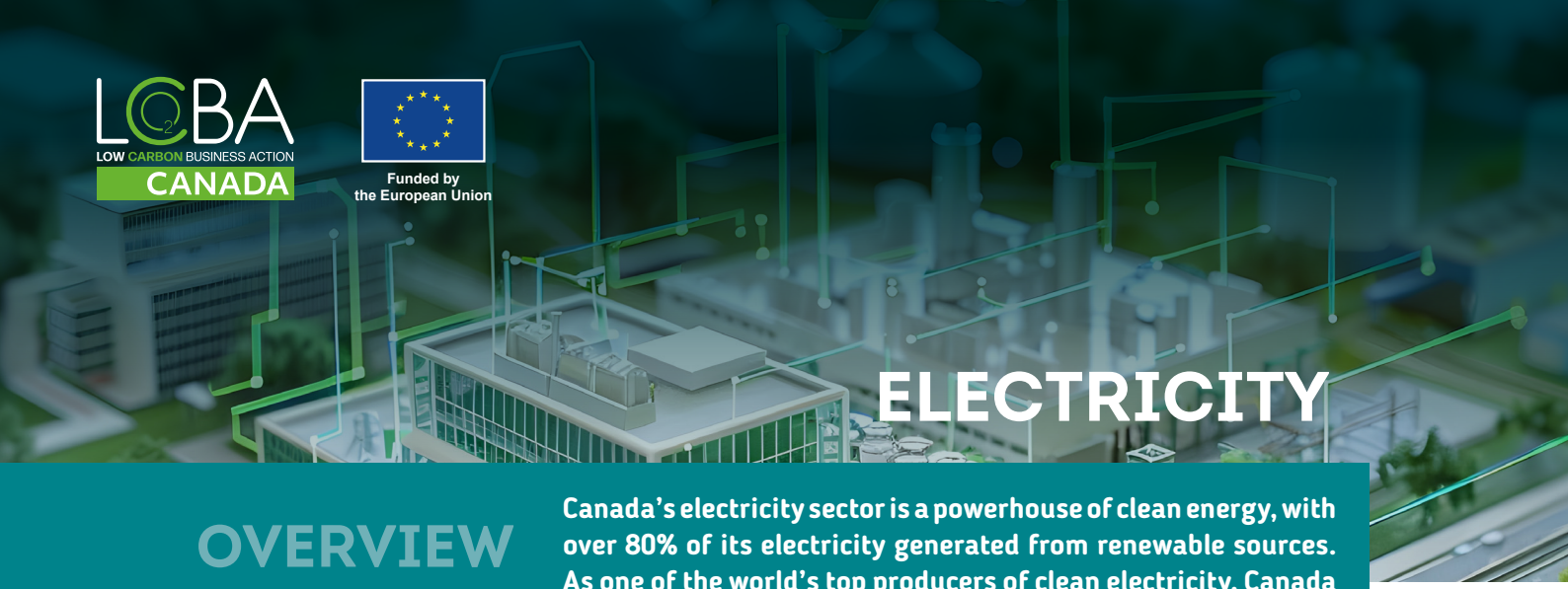


ELECTRICITY

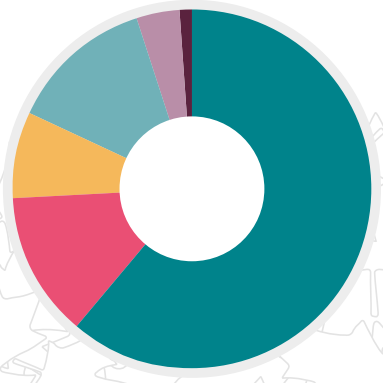
OVERVIEW

Canada's electricity sector is a powerhouse of clean energy, with over 80% of its electricity generated from renewable sources. As one of the world's top producers of clean electricity, Canada is increasingly focusing on expanding wind, solar, and energy storage while modernizing its grid infrastructure. With robust government support for clean energy initiatives and growing demand for decarbonization, Canada's electricity sector offers significant opportunities for innovation in sustainable technologies such as grid modernization, smart technologies, and energy efficiency. As Canada aims to meet ambitious emissions reduction targets, clean technology providers have a unique opportunity to shape the future of one of the world's cleanest electricity markets. The electricity sector is also a critical pillar of Canada's energy system, playing a central role in Canada's decarbonization strategy by driving emissions reductions across key sectors such as buildings, industry, and transportation. Technology providers can contribute to the development and deployment of innovative solutions that will support Canada's low-carbon future.

ELECTRICITY REPRESENTS

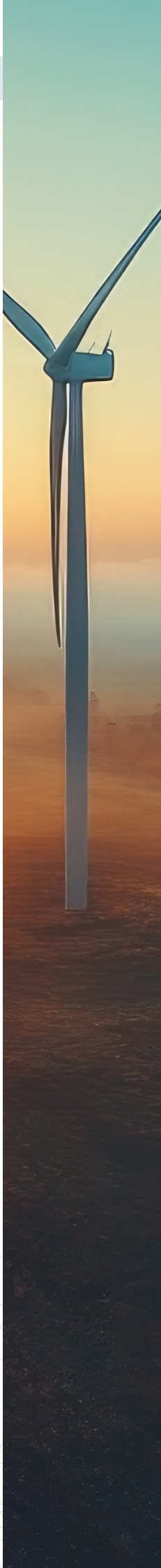
- 47 million tonnes CO_2 equivalent emitted in 2022, accounting for 6.7% of total national emissions.
  - In 2022, 82% of Canada's electricity came from non-GHG emitting sources.
  - Between 2000 and 2022, emissions from electricity production fell by 63%, largely due to Ontario's coal phase-out.
- Significant industrial water use: Thermal-electric power producers account for 83.7% of Canada's total industrial water intake.
- Significant GDP: Electricity generation, transmission, and distribution contribute 1.9% to Canada's nominal GDP, the second largest contribution from the energy sector.

Emissions from Canada's Electricity Sector



- 62% HYDRO
- 13% NUCLEAR
- 8% OTHER RENEWABLES
- 13% NATURAL GAS
- 4% COAL
- 1% PETROLEUM/OTHERS

Source: Natural Resources Canada. (2024). Energy Fact Book 2024-2025. Available online at: https://energy-information.canada.ca/en/energy-facts/clean-power-low-carbon-fuels



DRIVERS & LEADERSHIP

- Canada's electricity sector is experiencing significant shifts aimed at achieving a net-zero emissions grid by 2035.
- The federal Emissions Reduction Plan projects a 70% reduction in electricity sector emissions by 2030, necessitating innovation in generation, transmission, and storage.
- Canada's electricity generation capacity will need to increase 2.2-3.4 times to meet projected 2050 demand.
- The electricity sector has a key role to play in reducing emissions from other sectors such as buildings, industry, and transportation. These sectors require non-emitting generation to meet their emissions reduction targets.
- The Clean Electricity Regulations establish strict limits on GHG emissions from generation, requiring non-emitting technologies like renewables, SMRs, or CCUS for gas generation.
- Tax credits and dedicated funding provide financial incentives for grid modernization, non-emitting generation and grid infrastructure.
- Electricity Canada, the national association representing Canada's electricity industry, is committed to clean energy and supporting electricity to become Canada's primary energy source.

CLEANTECH CHALLENGE AREAS

Emerging non-emitting generation, such as renewable natural gas, hydrogen, CCS, offshore wind, geothermal, and SMRs.

Innovative solutions for integrating variable renewable sources like wind and solar while maintaining the reliability of energy systems.

Smart grids and advanced energy storage systems to balance supply and demand. Information and communication technologies to enable real-time monitoring and optimization to help solve the sector's demand-supply balancing challenges.

Dynamic line ratings to enhance the efficiency of existing transmission networks as well as demand-side technologies, including adaptive self-generation.

Enhancing grid resiliency through strengthening infrastructure with advanced conductors, grid-hardening materials, superconductors, and climate modeling.

Integrating renewables and other non-emitting generation for remote regions reliant on diesel.

Scalable, low-carbon nuclear solutions with innovations in fuel cycles and safety systems.

Fish protection technologies for hydropower and thermal facilities.

OPPORTUNITIES: AREA OF ALIGNMENT WITH EU STRENGTHS & SOLUTIONS PROVIDERS

Smart Grid Technology for Real-Time Monitoring, Control, and Optimization

There is a high smart grid proliferation across Europe and availability of solution providers.

Solutions for Integrating Variable Renewables (Wind & Solar)

Strong EU focus and expertise in cross-border interconnectors, battery storage, pumped hydro, hydrogen, and thermal storage for grid stability with direct applicability in Canada.

Energy Storage

Europe leads in Battery Energy Storage Systems (BESS), primarily Li-ion, with emerging alternative storage technologies of interest.

Resilient, Climate-Proof Grid Technologies

EU expertise in wildfire-prone regions includes grid-hardening and managing above-ground powerlines for resilience.

Transmission Network Efficiency

Well-developed transmission networks across multiple EU Member States enable efficient electricity flow and cross-border energy trading, with expertise that could be leveraged.

Remote Community Off-Diesel Power Generation

EU solutions providers with a focus on storage technologies for island and off-grid communities have potential applicability in Canada.

Decentralized Generation Technologies (Solar PV, Micro Hydro, Renewable Natural Gas, etc.)

High proliferation of rooftop solar PV in the EU that is supporting decentralized renewable energy.