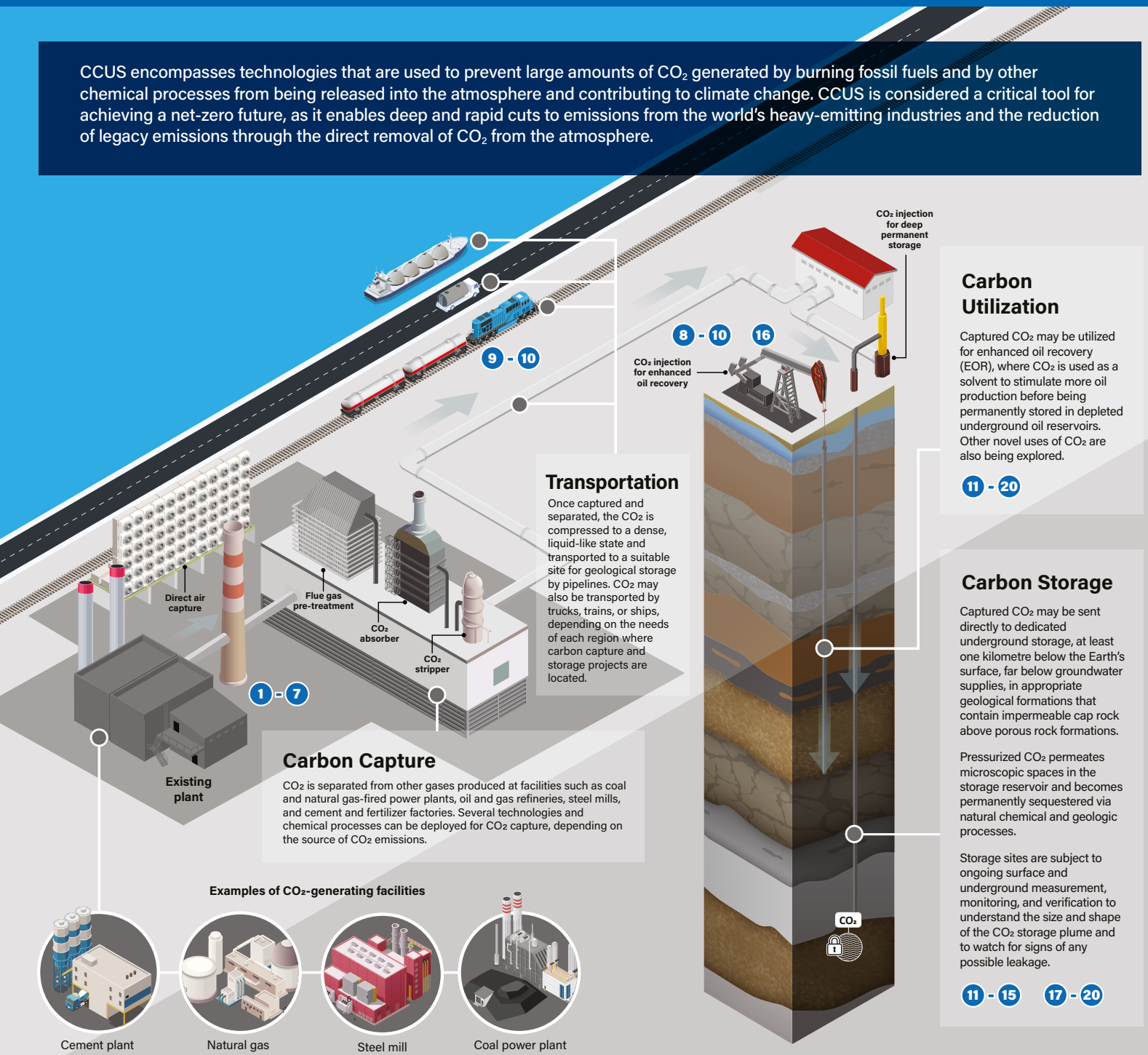
Standards and guidelines for carbon capture, utilization and storage

As a leader in research and standards development, CSA Group is engaged in multiple initiatives facilitating the safe and efficient development of large-scale carbon capture, utilization, and storage (CCUS) infrastructure.

CSA Group's research and standards-based solutions address various key aspects of CCUS in the North American context and include adoptions of some of the ISO standards to help reduce carbon dioxide (CO_2) emissions and support Canada in reaching its greenhouse gas (GHG) reduction and net-zero targets.

CCUS encompasses technologies that are used to prevent large amounts of CO_2 generated by burning fossil fuels and by other chemical processes from being released into the atmosphere and contributing to climate change. CCUS is considered a critical tool for achieving a net-zero future, as it enables deep and rapid cuts to emissions from the world's heavy-emitting industries and the reduction of legacy emissions through the direct removal of CO_2 from the atmosphere.



Transportation

Once captured and separated, the CO_2 is compressed to a dense, liquid-like state and transported to a suitable site for geological storage by pipelines. CO_2 may also be transported by trucks, trains, or ships, depending on the needs of each region where carbon capture and storage projects are located.

Carbon Capture

CO_2 is separated from other gases produced at facilities such as coal and natural gas-fired power plants, oil and gas refineries, steel mills, and cement and fertilizer factories. Several technologies and chemical processes can be deployed for CO_2 capture, depending on the source of CO_2 emissions.

Carbon Utilization

Captured CO_2 may be utilized for enhanced oil recovery (EOR), where CO_2 is used as a solvent to stimulate more oil production before being permanently stored in depleted underground oil reservoirs. Other novel uses of CO_2 are also being explored.

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Carbon Storage

Captured CO_2 may be sent directly to dedicated underground storage, at least one kilometre below the Earth's surface, far below groundwater supplies, in appropriate geological formations that contain impermeable cap rock above porous rock formations.

Pressurized CO_2 permeates microscopic spaces in the storage reservoir and becomes permanently sequestered via natural chemical and geologic processes.

Storage sites are subject to ongoing surface and underground measurement, monitoring, and verification to understand the size and shape of the CO_2 storage plume and to watch for signs of any possible leakage.

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Standards and research publications

For over a decade, CSA Group has been managing the secretariat to the International Organization for Standardization Technical Committee ISO/TC 265 — Carbon dioxide capture, transportation, and geological storage, putting Canada at the forefront of international standardization efforts in this field. ISO/TC 265 has spearheaded the development of more than 12 international standards for CCUS.

CSA Group and ISO standards address key areas of the CCUS value chain, from the capture of CO_2 at industrial sources to the transportation of high-pressure CO_2 to designated storage sites, and permanent underground storage in deep geologic formations.

Carbon Capture

1 - **ISO/TR 27912**, *Carbon dioxide capture — Carbon dioxide capture systems, technologies, and processes*

2 - **ISO 27919-1**, *Carbon dioxide capture — Part 1: Performance evaluation methods for post-combustion CO_2 capture integrated with a power plant*

3 - **ISO 27919-2**, *Carbon dioxide capture — Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO_2 capture plant integrated with a power plant*

4 - **ISO/TR 27921**, *Carbon dioxide capture, transportation, and geological storage — Cross Cutting Issues — CO_2 stream composition*

5 - **ISO/TR 27922**, *Carbon dioxide capture — Overview of carbon dioxide capture technologies in the cement industry*

6 - **CSA/ANSI R118**, *CarbonStar®: Concrete carbon intensity quantification and verification*

7 - Carbon Capture and Geological Storage Technologies in Hydrogen Production (research report)

Transportation

8 - **CSA Z662**, *Oil and gas pipeline systems*

9 - **CSA Z767**, *Process safety management*

10 - **ISO 27913**, *Carbon dioxide capture, transportation, and geological storage — Pipeline transportation systems*

Utilization and Storage

11 - **CSA Z624**, *Well integrity management for petroleum and natural gas industry systems*

12 - **CSA Z625**, *Well design for petroleum and natural gas industry systems*

13 - **CSA Z741**, *Geological storage of carbon dioxide*

14 - **ISO 27914**, *Carbon dioxide capture, transportation, and geological storage — Geological storage*

15 - **ISO/TR 27915**, *Carbon dioxide capture, transportation, and geological storage — Quantification and verification*

16 - **ISO 27916**, *Carbon dioxide capture, transportation, and geological storage — Carbon dioxide storage using enhanced oil recovery (CO_2-EOR)*

17 - **ISO/TR 27923**, *Carbon dioxide capture, transportation, and geological storage — Injection operations, infrastructure, and monitoring*

18 - **ISO 27917**, *Carbon dioxide capture, transportation, and geological storage — Vocabulary — Cross cutting terms*

19 - **ISO/TR 27918**, *Lifecycle risk management for integrated CCS projects*

20 - **CSA TS-226**, *Geological storage of carbon dioxide - Measurement, monitoring, and verification plans*

Learn more about research and standards for carbon capture, utilization, and storage

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