# Toronto concrete sector pioneers large-scale carbon capture and water recycling innovations



At a recent educational conference held at the Toronto Reference Library, industry leaders from across the concrete sector—including contractors, manufacturers, and consultants—gathered to share insights on sustainability initiatives, products, and technologies shaping the future of concrete production.

Representing Dufferin Concrete, product specialist Derek Lapierre highlighted the company’s deep integration of sustainability principles into its operations. Central to Dufferin’s approach is the strategic sourcing of raw materials, such as cement and aggregates, from locations close to their market. This proximity supports a network of accessible ready-mix concrete plants in the Toronto area, which helps mitigate logistical challenges associated with transporting materials in and out of the city.

A significant portion of Lapierre’s presentation focussed on Dufferin’s water recycling efforts. Out of 31 operational sites, 26 are equipped to utilise recycled water, which replaces the total mix water used during concrete production. In 2024 alone, Dufferin consumed 37 million litres of recycled water. “We want to preserve our water,” Lapierre said, emphasising the company’s commitment to conserving vital resources.

Lapierre also highlighted an innovative technology developed internally by Dufferin called CarbonJect. This technology mineralises carbon dioxide within concrete by converting CO2 into a solid form. A notable application of this technology was at an airport project, where 6,600 square metres of taxiway pavement at Pearson International Airport utilised CarbonJect, demonstrating its practical viability.

Another major topic was the upcoming launch of North America’s first large-scale Carbon Capture Utilization and Storage (CCUS) plant dedicated to cement. Shane Mulligan, Canadian sustainability and technical marketing manager for Heidelberg Materials, announced that by 2029, this pioneering facility will begin operations at Heidelberg’s Edmonton cement plant. The plant is projected to reduce annual CO2 emissions by one million tonnes.

Mulligan explained that the CCUS plant will capture emissions from both the cement plant’s flue gas and a planned combined heat and power facility using an amine solution to isolate carbon dioxide. The CO2 will then be compressed and transported via pipeline approximately 25 to 30 kilometres to a dedicated storage hub. From there, it will be injected two kilometres underground into a porous geological formation known as a saline reservoir, where it will be permanently and safely stored. “Why Edmonton? Cost and geology,” Mulligan remarked, noting the suitability of Alberta’s subsurface formations for such storage.

He also shared the current status of the project’s engineering phase, revealing that two competitive front-end engineering and design (FEED) proposals have been received—from MHI-LCSC with Kiewit, and Technip with PCL. These are under review alongside a financial due diligence process.

Mulligan’s presentation on “Accelerating to Net Zero Concrete” reviewed a range of Heidelberg’s initiatives aimed at reducing emissions, including innovative recycling processes. These involve processing and returning demolition concrete to construction cycles through recycling aggregates, crushing and sorting waste materials, and separating cement stone from sand and gravel.

While optimistic about achieving net-zero emissions, Mulligan acknowledged challenges in adopting low carbon concrete technologies. These include industry reluctance to move away from traditional materials, potential impacts on construction schedules due to differences in setting times and strength development, and concerns about durability. Furthermore, existing building codes may not yet fully accommodate or recognise low carbon concrete, presenting regulatory hurdles and requiring additional testing and certification that could increase both time and costs.

The symposium also addressed broader supply chain safeguards, with speakers such as Charles Nmai, concrete sustainability director at Master Builders Solutions, discussing the rise of blended cements like Portland Limestone Cement (PLC), particularly in the United States. Portland limestone cement incorporates finely ground limestone into traditional Portland cement, reducing the clinker component and thus lowering CO2 emissions. Nmai noted that while PLC has been gaining attention, it also presents challenges such as increased water demand and slower setting times, advising that performance testing is crucial to ensure quality and consistency.

Additional topics explored at the conference included the use of fibre reinforcements to reduce carbon footprints and the potential of harvested coal ash in producing low carbon cements.

Organised by Concrete Ontario and the Carbon Coalition, the day-long Lower Carbon Concrete Symposium in Toronto provided a comprehensive platform for stakeholders to discuss the evolving landscape of sustainable concrete technologies and practices. The event underscored the concrete industry’s ongoing efforts to balance performance and environmental responsibility through innovation and collaboration.

Source: [Noah Wire Services](https://www.noahwire.com)

## References

* <https://www.heidelbergmaterials.com/en/first-global-net-zero-carbon-capture-and-storage-facility-in-the-cement-industry-heidelberg-materials-partners-with-the-govern-ment-of-canada> - This article discusses Heidelberg Materials' partnership with the Government of Canada to develop the first full-scale carbon capture and storage facility in the cement industry, aligning with the claim about the upcoming launch of North America's first large-scale CCUS plant dedicated to cement.
* <https://www.heidelbergmaterials.com/en/sustainability/we-decarbonize-the-construction-industry/ccus> - This page provides an overview of Heidelberg Materials' global CCUS projects, including the Edmonton facility, supporting the information about the Edmonton CCUS project and its capacity to capture over one million tonnes of CO₂ annually.
* <https://www.heidelbergmaterials.com/en/edmonton-ccus> - This page details the Edmonton CCUS project, including its capacity to capture over one million tonnes of CO₂ annually, corroborating the claim about the Edmonton facility's CO₂ capture capacity.
* <https://www.heidelbergmaterials.com/en/first-global-net-zero-carbon-capture-and-storage-facility-in-the-cement-industry-heidelberg-materials-partners-with-the-govern-ment-of-canada> - This article discusses Heidelberg Materials' partnership with the Government of Canada to develop the first full-scale carbon capture and storage facility in the cement industry, aligning with the claim about the upcoming launch of North America's first large-scale CCUS plant dedicated to cement.
* <https://www.heidelbergmaterials.com/en/edmonton-ccus> - This page details the Edmonton CCUS project, including its capacity to capture over one million tonnes of CO₂ annually, corroborating the claim about the Edmonton facility's CO₂ capture capacity.
* <https://www.heidelbergmaterials.com/en/first-global-net-zero-carbon-capture-and-storage-facility-in-the-cement-industry-heidelberg-materials-partners-with-the-govern-ment-of-canada> - This article discusses Heidelberg Materials' partnership with the Government of Canada to develop the first full-scale carbon capture and storage facility in the cement industry, aligning with the claim about the upcoming launch of North America's first large-scale CCUS plant dedicated to cement.
* <https://news.google.com/rss/articles/CBMizAFBVV95cUxOUHNSWTRYZ3VDc3puSVpaVUhKSFBwdEdYQ0VuMXBBaVJOUnZpWmNwblUyUzQzWXdpellYUnFBTFNxbURZblNXTk9QaWFBQTlwUkdpM24yT0xDNmFPcnVCaTJNbE9XeUc4TGlsaXhJUzlQeldrQU8xZTVQaUJDSGR0MGRobV9tOEZWQVdQaVl6YmczNE5xYXhNUkJhdmFDZ0JKWGUyeFQzaUVrT1V6RktteG9ZdTZhX1pmTTBwM0VxanZLenJTeDBzbkFOLWI?oc=5&hl=en-US&gl=US&ceid=US:en> - Please view link - unable to able to access data