



NET-ZERO INDUSTRIES

MISSION



Project Title

First-of-Its-Kind 200,000 Tonne per Year Low-Carbon Cement Substitute Plant in North America

Industry Partner

EnviCore Inc.

Industry Sector

Cement and Lime

Technology Pathway (Primary)

Alternative materials & more efficient processes

NIM Pillar

Technology Demonstration

Source

NIM Awards 2025

Description

EnviCore is developing the first-of-its-kind commercial-scale low-carbon cement substitute plant, located in Savona, British Columbia, with a production capacity of 200,000 tonnes per year. This pioneering facility will transform locally available minerals and industrial by-products into high-performance Supplementary Cementitious Materials (SCMs) using EnviCore's patented thermo-chemical activation process. Unlike Portland cement production, which requires high-temperature clinkerization (>1,400 °C) and releases CO₂ from limestone calcination, EnviCore's process operates at 600–700 °C and avoids carbonate decomposition, resulting in up to 70% lower energy intensity and ~90% lower CO₂ emissions per tonne. The project directly addresses three global challenges: (1) reducing greenhouse gas emissions from cement, the second-largest industrial emitter of CO₂; (2) diverting mineral residues and by-products from landfills into high-value construction materials; and (3) strengthening regional cement supply chains by replacing imported SCMs such as fly ash and slag, which face declining availability. Once operational in 2027, the plant will supply sustainable SCMs to cement and concrete producers across Western Canada and the U.S. Pacific Northwest, enabling cement replacement of up to 35% in concrete mixes without compromising performance. The facility is expected to reduce more than 150,000 tonnes of CO₂ emissions annually, create 41 permanent full-time jobs and over 200 construction jobs, and generate significant local economic benefits through partnerships with Indigenous communities, rail operators, and regional suppliers. By scaling this first commercial facility, EnviCore sets the stage for a global rollout of its technology, positioning Canada as a leader in clean construction materials while accelerating the decarbonization of one of the world's hardest-to-abate sectors.

Innovations Employed

Current SCMs such as fly ash and slag are limited by declining availability, while calcined clays (LC³) require kaolinite-rich sources and high temperatures (>800 °C). EnviCore's patented thermo-chemical activation process is unique in its ability to convert diverse feedstocks (low reactive clays, mining tailings, recycled concrete, bottom and landfilled fly ash, and natural minerals) into high-reactivity SCMs at 600–700 °C. The process delivers up to 35% cement replacement while ensuring consistent reactivity through tunable chemistry and advanced QC (XRD/XRF, calorimetry). This flexibility makes the technology feedstock-agnostic and globally scalable, addressing both emissions and SCM scarcity. EnviCore has already achieved continuous pilot validation with world leaders. With Siam Cement Group (Thailand), a 1 TPD pilot processed limestone quarry overburden (waste mineral), showing ~3× reactivity



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improvement and >50% amorphous content, meeting concrete performance benchmarks. Similarly, Heidelberg Materials (Belgium) completed a ~1 TPD pilot on construction and demolition waste, confirming improved reactivity and ability to successfully replace 25% cement in a concrete mix. These successes demonstrate TRL-7 readiness and materially de-risk the scale-up to the first-of-its-kind 200,000 TPA commercial plant in Canada.

Dimension of Novelty

New for the company

New in country

Canada

New on the international market

Innovation Collaboration

In-house

Canada

Intellectual Properties

EnviCore's innovation is protected through a patent family covering its thermo-chemical activation process, reactor design, and resulting SCM compositions. A PCT application has entered the national phase in Canada, the U.S., the EU, and Asia, securing protection in key markets. While patents are still pending, these filings establish strong international coverage. In addition, EnviCore protects its know-how through trade secrets and proprietary process parameters (e.g., activation profiles, mineral modifiers, QC protocols) that are not disclosed publicly. All IP is owned by EnviCore Inc. and licensed to its subsidiaries for commercial deployment. Trademarks have not yet been filed but are planned for product launch. This combined strategy—patents, trade secrets, and licensing, provides a robust IP framework and reinforces EnviCore's first-mover advantage in low-carbon SCM production.

IP Links

Timetable & Progress

Development commenced in 2022

The Savona facility will be the first commercial-scale low-carbon SCM plant at 200,000 tonnes per year capacity. To date, EnviCore has already secured offtake commitments totalling 150,000 tonnes per year with three major clients, providing strong market pull and revenue certainty well in advance of operations. The project timeline includes detailed engineering, permitting, and procurement in 2025-26, followed by site preparation and construction in 2026-27, and commissioning and start-up in Q3-2027. With demand already contracted for the majority of planned output, the Savona plant will immediately operate near full utilization, accelerating decarbonization impact and establishing a reliable regional supply of low-carbon SCMs.

Financing (Public/ Private)

Public funding

The project has already received C\$0.7M in public support through programs with Alberta Innovates and NorthX, which have funded early-stage development, validation, and scale-up planning. Building on this foundation, EnviCore has also



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applied for C\$35M in combined funding from both the provincial and federal governments of Canada to support the deployment of the technology.

Finance Links

Project Phase TRL

TRL 3 to 7

Problems to be Solved and Risks to be Managed

The project had to overcome several challenges. On the know-how side, the main issue was designing a feedstock-agnostic process capable of converting variable minerals like low reactive clays, mining waste, etc. into consistent, high-reactivity SCMs, solved through proprietary activation profiles and QC protocols. Technologically, the risk lay in scaling a novel thermo-chemical activation at 600-700 °C with stable energy efficiency and product quality, mitigated through advanced modelling and process optimization.

On the market side, the key barrier was meeting strict ASTM/CSA performance standards and ensuring customer acceptance, which was addressed by validating performance at up to 35% cement replacement and securing 150,000 TPA offtake commitments with three major clients. Together, these steps reduced technical, operational, and commercial risks, creating a robust pathway to first-of-kind deployment at the Savona plant.

Preliminary or Final Results Achieved

EnviCore's thermo-chemical activation process has been advanced to TRL 7 through continuous pilots at ~1 TPD with Siam Cement Group (Thailand) and Heidelberg Materials (Belgium). These scale-ups confirmed the ability to process varied feedstocks into high-reactivity SCMs achieving up to 35% cement replacement while meeting ASTM/CSA standards. A full life-cycle assessment (LCA) indicates up to ~90% lower CO₂ emissions compared with Portland cement, driven by reduced thermal demand (600-700 °C) and avoidance of limestone calcination. The process also demonstrates lower energy intensity and competitive costs versus imported SCMs. On the commercial side, EnviCore has already secured 150,000 TPA offtake commitments with three clients, ensuring strong market pull and de-risked operations for the first-of-its-kind 200,000 TPA Savona plant.

CO2 Emissions Reduction Potential - Implementation and Future Market

The Savona plant will be the first commercial-scale low-carbon SCM facility in Canada, producing 200,000 TPA, with 150,000 TPA already secured under offtake contracts. Domestically, it will help replace dwindling fly ash and slag supplies while enabling up to 35% cement substitution in concrete. Internationally, EnviCore is advancing a 6 TPH (~40,000 TPA) project with Siam Cement Group in Thailand to transform quarry overburden waste, and a 200,000 TPA project with CRH in Ireland to repurpose mineral residues with no current value. In South America, EnviCore is working with CSN in Brazil to deploy a project converting low-grade steel slag into high-quality SCMs. A life-cycle assessment shows ~90% lower CO₂ emissions vs. Portland cement, with the Savona plant alone cutting over 200,000 tonnes annually, and global deployments multiplying this climate impact.

Market Positioning

EnviCore is positioning its solution as a first-of-its-kind, low-carbon, feedstock-agnostic SCM platform that substitutes Portland cement and imported SCMs like fly



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ash and slag. The Savona plant, with 200,000 TPA capacity and 150,000 TPA already secured under offtake, ensures immediate high utilization and establishes EnviCore as a reliable domestic supplier in Canada. Differentiation comes from ~90% lower CO₂ emissions, lower energy intensity, and circular use of regional waste streams, delivering both cost and sustainability advantages. The company has already proven its technology in two continuous pilots: one with SCG in Thailand and another with Heidelberg Materials in Belgium, confirming performance at industrially relevant scale. International partnerships with SCG, CRH in Ireland, and CSN in Brazil further validate scalability and position EnviCore as a global leader in low-carbon cement substitutes.

Project Location

Canada

Project & Technology Links

1. SCG Scale-up.pdf, EnviCore's successful 1 tonnes per day scale-up work with Siam Cement Group.
2. EnviCore- FOAK Plant.pdf, EnviCore's Savona Plant deployment details.

Technology Links

<https://www.envicoreinc.com/>