

Lafarge Canada Inc.

Brookfield, NS

The technology

Reduced-carbon cement production.

Traditionally, the production of cement involves grinding, mixing, and sintering raw materials at high heat, cooling, then adding a setting material (e.g., gypsum) and grinding to a given specific surface.

The resulting finely ground powder is Portland cement, which contains a minimum percentage of calcium silicates, the active ingredients in setting and hardening concrete. The conventional process involves creating these silicates by sintering ground sources of calcium, such as limestone, and silicon, such as clay or shale. Sintering requires lots of heat (provided by burning coal or other fuels) and releases substantial amounts of CO₂ in the process. The resulting material is called clinker. Ground clinker makes up in the order of 85–95 percent of the final product.

The reduced-carbon process will reduce the percentage of clinker required, thus reducing the need for fuel and consequently the production of CO₂. The process replaces a portion of the clinker with inter-ground limestone and suitable industrial by-products.

The new technology involves a blend of feed-stocks that when combined and ground have similar chemical bonding characteristics to ground clinker, thereby reducing the requirement for sintering. Sintering accounts for by far the largest percentage of energy use in cement production.

The project incorporates designing, fabricating, and installing new equipment, as well as expanding Lafarge's applied research and demonstration program.

Specifications

- Reduced carbon cements will meet or exceed the strength and durability specifications for regular Portland cements.

Environmental Benefits

Conventional technology releases approximately 750 kg of CO₂ per tonne of Portland cement produced. The new method is expected to reduce GHG and other pollutant emissions by as much as 24 percent. This would result in emissions reduction of approximately 75 000 t/a of CO₂.

Uses

The product will be suitable for any application where Portland cement is normally used. The technology will be adaptable to any cement manufacturing plant where suitable feedstocks are available.

Advantages

Reduced reliance on fossil fuels; lower pollutant emissions; reduced costs; potential for carbon credits

This technology is being piloted and developed in Nova Scotia and will create exportable expertise.

Partners

Carbon Sense Solutions

University of New Brunswick