



# AFR for Cement Production Business Plan

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## Executive Summary

CRH Inc. aims to improve the sustainability of cement production using the Mississauga Plant as a case study. It is proposed to investigate the feasibility of different low carbon alternative fuels to replace current fuels used at CRH Inc. Mississauga Plant based on their economic feasibility, social performance and environmental benefit. The objective of this project is to find a sustainable low carbon fuel that is able to significantly reduce CO<sub>2</sub> emissions with a reasonable investment, while providing comprehensive research to address any concerns from stakeholders over the alternative fuel.

The key driver for this project is the global climate change problem. Tackling climate change by reducing greenhouse gas (GHG) emission is an urgent global priority. Addressing climate change is also an economic opportunity because of the cap and trade program that will be introduced in Ontario. Cement manufacturing is a very emission-intensive process. Such emissions come from the chemical reaction that converts limestone into clinker and fuel used that provides sufficient energy for the chemical reaction. Approximately 40% of the emissions come from the burning of fossil fuel.

Thus, replacing traditional fuel used such as coal and petroleum coke with lower carbon alternative fuels is the most substantial short-term opportunity to reduce GHG emission. Finding a potential fuel substitute in Ontario requires research to address key regulatory barriers and community concerns. Moreover, it also needs to justify any costs associated with modifying a cement facility for the use of alternative fuels.

Top fuel substitutes include Agricultural Biomass, Carpet, Railroad ties, Municipal Solid Waste (MSW) and Sewage Sludge. After considering their local availability and ability to meet CRH's goals of profitability, environmental and social responsibility, the final recommendation is MSW.

Utilizing MSW at the cement plant will be relatively simple since processing of the fuel will be done outside the plant. MSW will be sourced from local waste facilities in the Peel region and beyond and will be delivered by truck. The receiving, conveying and feeding system will be the major investment cost, which includes a walking floor storage, belt conveyor, temporary silo storage, rotor weigh feeder, blower and piping. This new system is expected to store 4 days' supply of fuel and operate for a minimum of 20 years, with an average of 300 days of operation each year.

MSW also produces significant CO<sub>2</sub> savings as well as diverting a significant portion of waste from landfills as opposed to using up fossil fuel resources. Social impacts are also minimal since any additional truck traffic in the local area is insignificant relative to existing truck traffic.

Investment costs amount to \$3.04M CAD, which would be paid out in one year. The investment delivers a positive NPV of \$22M CAD and an IRR of 97%.

This business plan will provide detailed information regarding the top five low carbon fuel suggestions based on the triple bottom line.