



Alternative Low Carbon Fuels

St Marys Cement
April 12, 2021

Project Overview

- As part of SMC strategy to reduce greenhouse gas (GHG) emissions. SMC initiated in 2019 the process to submit an application for the use of Alternative Low Carbon Fuels (ALCF) under Ontario Regulation (O. Reg) 79/15. The MECP issued on March 31, 2021 the ECA to expand the current use of ALCF
 - Increase the daily throughput of ALCFs at the Site from 96 tonnes (wood waste) per day to 400 tonnes per day. Approximately 110,000 tonnes per year.
 - Add biomass, cellulosic, plastic materials and similar composition materials to the list of ALCFs at the Site with the intention to substitute conventional fuels. These materials:
 - Are derived from industrial and/or post-consumer sources
 - Cannot be recycled
 - Are not hazardous
 - Are not derived from animals
 - Are not derived from the processing and preparations of food,
 - Install new equipment to feed ALCFs
 - Increase alternative fuels storage using enclosed containers and buildings



Enclosed ALCF Storage Container and Building

ALCF Sourcing

- The type of fuel used in the cement production process is an important component in SMC's commitment to quality
- There are many sources of ALCFs and the preferred source will be from facilities with a predictable and long term supply
- St Marys Cement will focus on using locally sourced ALCFs, which is in the best interest of the community, St Marys Cement, and the environment
- Obtaining ALCFs is a dynamic process and is managed on an ongoing basis
- St Marys Cement's Bowmanville Plant is reviewing with Durham Region to look at prioritizing the use of materials from Durham Region



Point of Impingement (POI) Concentrations

Contaminant	POI Limit ($\mu\text{g}/\text{m}^3$)	Kiln Contribution to Max POI (%)	Maximum % of POI Limit
PM	120 (24-hour)	7%	81%
NO _x	400 (1-hour)	53%	71%
NO _x	200 (24-hour)	51%	82%
SO ₂	690 (1-hour)	94%	69%
SO ₂	275 (24-hour)	90%	77%
D&F	0.00000001 (24-hour)	100%	3.4%

- The maximum POI concentrations occur near/on the Facility's property line for all contaminants.
- Concentrations in the community are significantly lower.

New SO₂ Limit – 100 $\mu\text{g}/\text{m}^3$ (1-hour)

- SMC installed a new wet scrubber for the kiln stack in March 2021.
- The scrubber reduces SO₂ emissions by >90%, resulting in compliance with the 2023 standards.
- The scrubber also reduces emissions of PM and other acidic gases such as HCl.

Environmental Monitoring

The plant is required to have Continuous Emissions Monitoring Systems (CEM) for NO_x, SO₂ and PM.

In addition the plant is required to have Continuous Process Monitoring Systems (CPM) for Oxygen, Temperature and THC.

There are stations located around SMC that monitor dust and vibration:

- PM 10 BAM (Beta Attenuation Monitor) – used to measure particulate matter 10 micrometers or less in diameter
- Dust Fall Jar – used to collect large air particles for measurement
- PM 10 Hi Vol (High Volume) – used to measure particulate matter 10 micrometers or less in diameter
- Seismograph – used to measure ground motion or vibrations

ALTERNATIVE LOW-CARBON FUELS OPERATIONAL REQUIREMENTS

Parameter	Limits	Measurement
Total Quantity of Alternative Low-Carbon Fuels combusted in the Cement Kiln.	400 tonnes per day	Measured continuously and summed daily.
Temperature in the Cement Kiln	Greater than 1000 Deg. C at a gas residence time of more than 6 seconds in the kiln. Greater than 850 Deg. C at a gas residence time of more than 3 seconds in the calciner.	As demonstrated by the CPM System measuring the temperature of the gases at the K5 cyclone upstream of the kiln where the gas temperature reaches a minimum of 800 Deg C. As demonstrated by the CPM System Calculated as a rolling 1-hour arithmetic average measured by the CPM System.
Residual oxygen	>1% residual oxygen at the backend (raw material feed end) of the kiln. >3% residual oxygen at the calciner down comer duct (raw material feed end of the calciner)	Measured by the CPM System and calculated by volume on a dry basis in the undiluted gases leaving the kiln and calciner. Calculated as a rolling 1-hour arithmetic average measured by the CPM System.
Pressure Control	Kiln, Calciner, Preheater tower and Raw Mill must be operated under negative pressure at all times.	Measured at the top of the preheater towers and in Raw Mill by continuous monitor.
Start-Up, Shut-down and Upset Operating Conditions	No Alternative Low-Carbon Fuels shall be used.	-

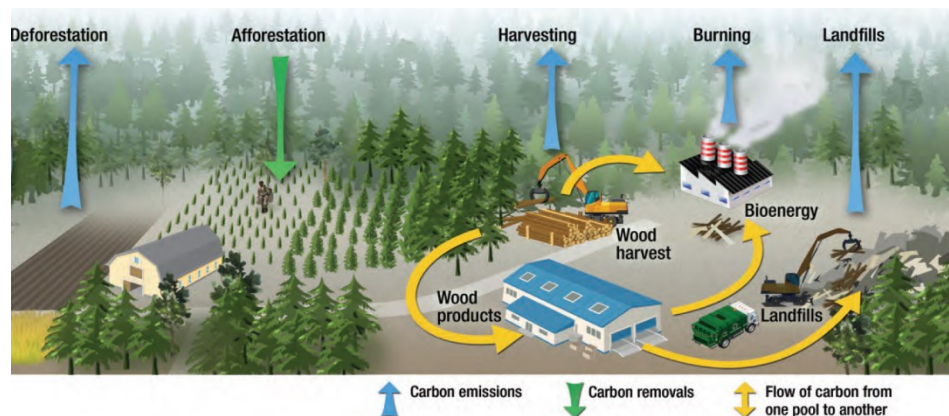
It also required to perform an exhaustive annual source testing

Outside of the Environment Certificate of Approval, SMC intends to work with the MECP and the Municipality of Clarington to review the ambient air monitoring program.

How is SMC considering the Environment?

The use of ALCFs in cement production helps reduce Greenhouse Gas Emissions in Ontario

- Long-cycle greenhouse gases, such as carbon dioxide from fossil fuels, are one of the greatest contributors to air pollution and the changing climate
- Using ALCFs in the cement production process replaces the amount of long-cycle carbon used with short-cycle carbon from plants (biomass)
- Diverting organic materials (biomass) from landfills also avoids the decomposition of organic material which results in methane release to the natural environment
 - Methane is an approximately 25% more powerful greenhouse gas than carbon dioxide

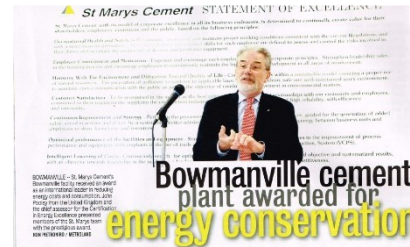


Source: National Resources Canada, 2016

St Marys Cement Bowmanville Plant

Environmental Leadership

- First Canadian Cement Plant to install lime hydrated system to reduce SO₂ emissions
- First Manufacturing Plant in North America to Obtain ISO 50001 Certification in Energy Conservation
- First Canadian Cement Plant to install water scrubber to reduce emissions.
- Winner CIPEC Leadership Award
- Certified in ISO 14001 Environment Management System since 2006
- PCA Environmental Awards
- PCA Energy Conservation Awards



"Promoting a better use of energy to counter climate change"

