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Alternative Low Carbon Fuel Use at the Lehigh Picton Cement Plant

April 7, 2022

Presentation Etiquette

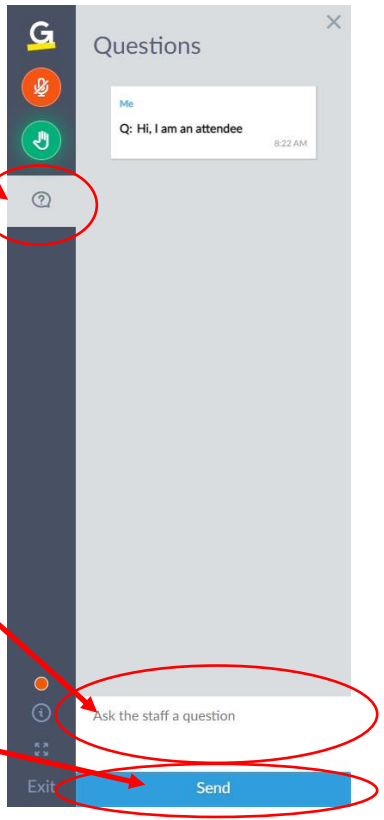
- **Be Patient** – Virtual meetings do not always run as smoothly as planned. We apologize if there are any technical difficulties.
- **Be Respectful** – Listen to and respect other points of view. Lehigh is an inclusive organization. Discriminatory, prejudicial, or hateful comments will not be tolerated.
- **Stay on Topic** – Please keep all questions and comments focused on this Project.
- **We want to hear from you** – please do not be shy!

How to use Go To Webinar Question Function

Click the “Question” function here.

Type your questions / comments to the Project Team here.

Click the “Send” button to submit your questions / comments.



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Overview of Public Meeting #1

The Lehigh Picton Cement Plant is undertaking efforts to use Alternative Low Carbon Fuels (ALCFs) to supplement fossil fuels for the production of Cement. This meeting is an important part of the ALCF permitting process in accordance with O. Reg. 79/15.

1. Picton Cement Plant Overview

- Introduction & Project Team
- Difference between Clinker, Cement and Concrete
- Picton Cement Process, CO_2 and Cement
- Picton Cement Plant Overview
- Picton Cement Plant and the Community

2. ALCF Overview & ALCFs for Picton Cement Plant

- O. Reg. 79/15 Overview
- O. Reg. 79/15 Permitting Process and Timeline
- What are ALCFs?
- Waste Hierarchy and how ALCFs fit in
- ALCF Use and Environmental Impact
- Eligible / Ineligible Fuels
- Proposed ALCFs for the Picton Cement Plant

3. Sustainability & Climate Change

- Heidelberg Cement Group Sustainability Commitments
- Picton Cement Plant Pathway to Reduce GHGs
- Carbon Dioxide Emission Intensity

4. Environmental Report & Proposed Technical Studies

- Stakeholder Engagement and Public Consultation
- Carbon Dioxide Emission Intensity Assessment
- Emission Summary and Dispersion Modelling (ESDM) Report
- Acoustic (Noise) Assessment Report (AAR)

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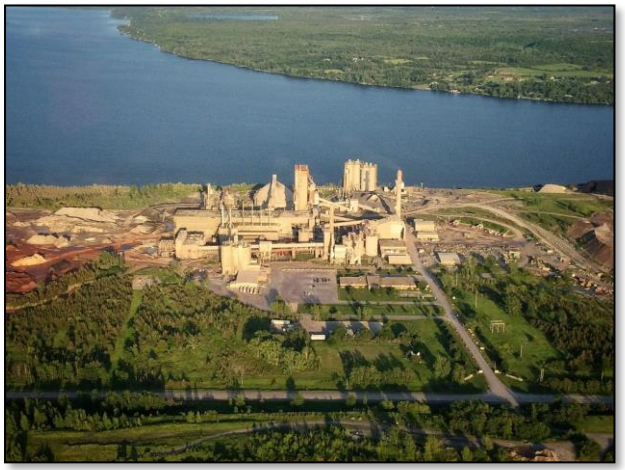
Introduction

- The Lehigh Picton Cement Plant is currently approved to operate under an Environmental Compliance Approval (ECA) using the following fuels:
  - Coal
  - Petroleum coke (Petcoke)
  - Natural Gas
- Lehigh is applying to use up to 200 tons per day of Alternative Low Carbon Fuels (ALCFs) to reduce the amount of coal and petcoke used at the Facility. ALCFs supports;
  - Lehigh Cements greenhouse gas (GHG) emissions reduction targets,
  - Canada's 2030 Emission Reduction Plan, and
  - Ontario's Plan for building a circular economy.
- Lehigh is applying for an ALCF permit in accordance with *O. Reg. 79/15 – Alternative Low Carbon Fuels*
- ALCFs are used throughout the world and are a key component of Lehigh's parent company, Heidelberg Cement's sustainability commitments.



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ALCF Permitting Project Team

Lehigh Team

Nick Papanicolaou
Project Lead
Environmental Manager
Lehigh Picton Cement Plant

Carsten Schraeder
Plant Manager
Lehigh Picton Cement Plant

Melissa Eaton
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Lehigh Picton Cement Plant

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Alternative Fuel Manager, North America Northeast & Midwest Regions

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Jamie McEvoy
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Senior Air Quality Engineer

Nadia Dabagh
Consultation Lead
Environmental Planner

Jeremiah Pariag
Consultation & Engagement
Consultation & Engagement Lead

Sean Capstick
Project Director
Senior Advisor – Climate Change Integration

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Clinker vs Cement vs Concrete

Clinker

- Manufactured in a high temperature kiln
- Made of mostly *calcined* limestone plus alumina, silica & iron oxide.

Cement

- Binding element in concrete
- Clinker is milled into a fine powder and blended with limestone, gypsum and other additives to create cement.

Concrete

- Made of cement, sand, gravel
- Sets and hardens when combined with water
- Used for building: foundations, slabs, patios and masonry

https://www.nachi.org/constituent-materials-concrete.htm

https://www.thespruce.com/types-of-concrete-joints-845022

Concrete is the second most used material in the world after water[1]

[1] https://gccassociation.org/our-story-cement-and-concrete

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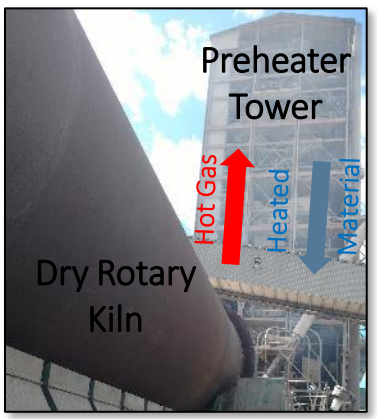
Picton Clinker & Cement Process Overview

Raw Material Processing

Limestone from Quarry is crushed and milled with other materials to form the raw meal to feed kiln.

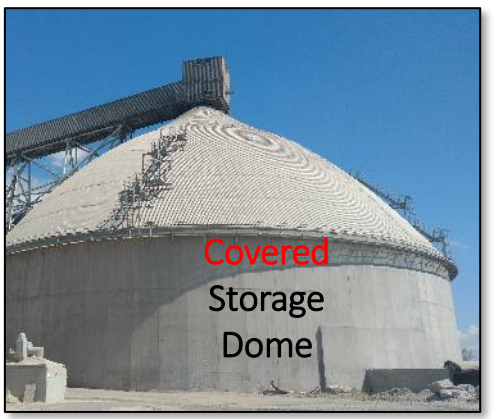
Raw Meal to Clinker Process

Raw meal is fed through the preheater tower into the rotary kiln. This design promotes energy efficiency and provides a scrubbing effect.



Clinker to Cement

The clinker is cooled and combined with gypsum and limestone in a grinding mill to make cement.



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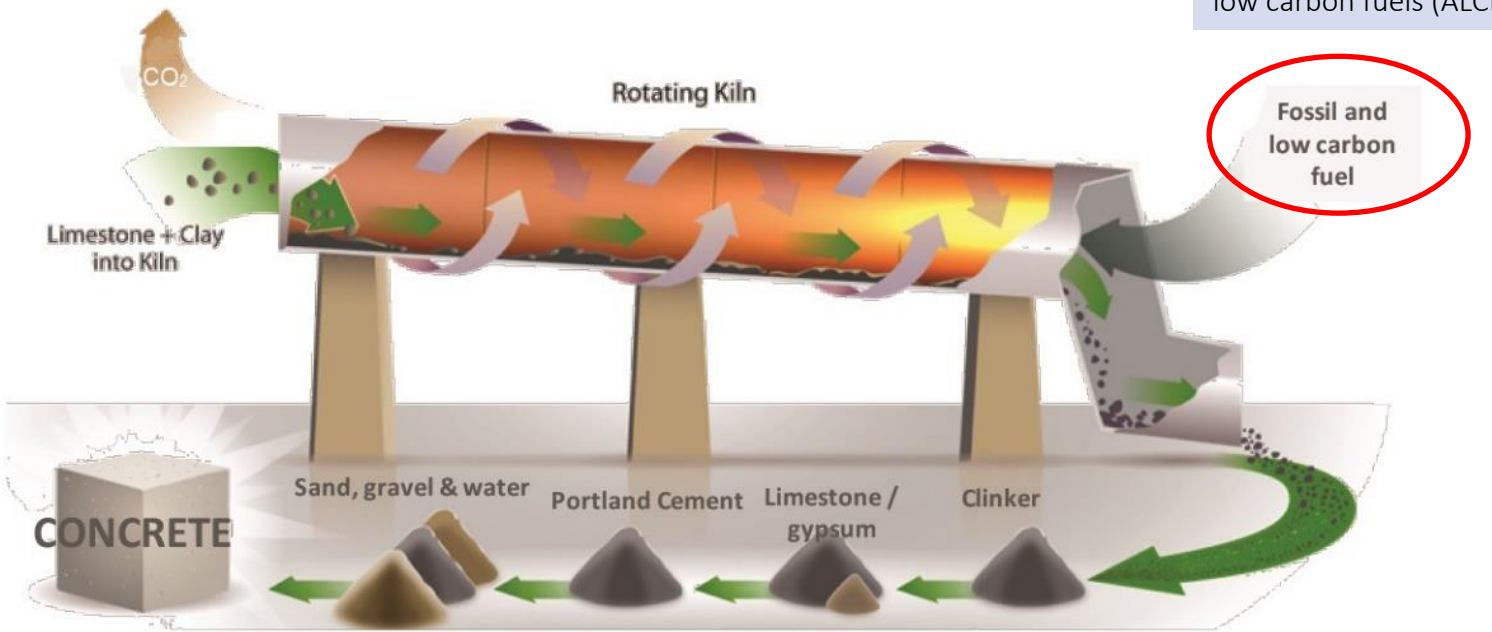
CO_2 and Cement

2/3 of CO_2 emissions result from calcination of limestone to lime: $CaCO_3$ → $CaO + CO_2$

1/3 of CO_2 emissions result from combustion of fuel and these can be reduced with alternative low carbon fuels (ALCF).



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The Picton Cement Plant: Site Overview

- Location: **1370 Hwy 49, Picton Ontario**
- The plant currently operates with ECA for air and noise, #0073-BHGQHC, issued October 31, 2019
- Produces up to 1 million tons of cement
- Includes a limestone quarry on both sides of Hwy 49
- Directly employs 130 workers, technicians, engineers & admin staff, plus local contractors & suppliers.

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The Picton Cement Plant: Site History

1958 Lake Ontario Cement commissions plant with kiln 1 & 2

1964 Kiln 3 commissioned

1976 Kiln 4 commissioned

1986 Ciments Francais/Essroc

1992 Italcimenti/Essroc

2009 Kiln 3 Idled

2017 **Heidelberg Cement/Lehigh**

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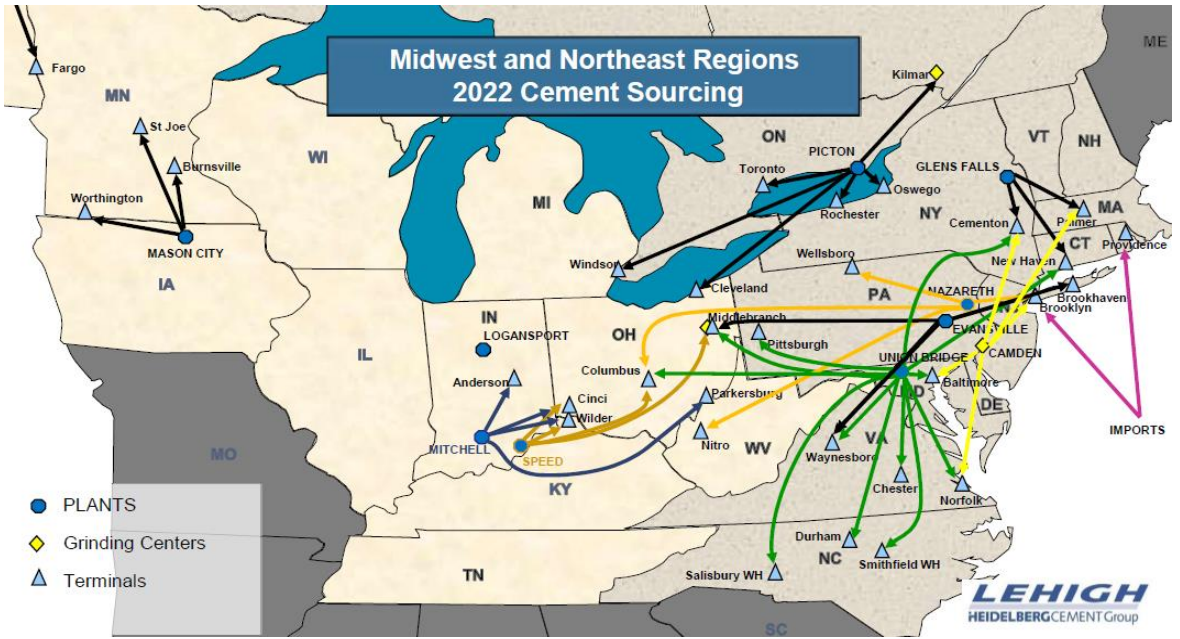
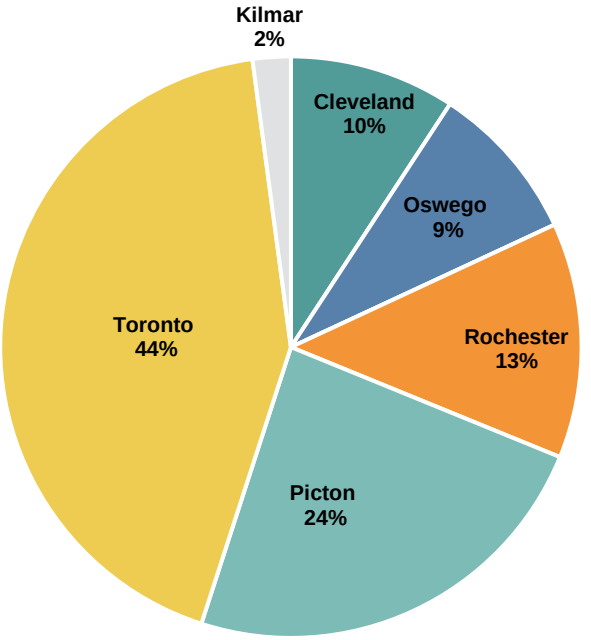
The Picton Cement Plant: Sales and Distribution





Picton Cement Market

- Embedded into North-East network.
- Picton Cement Plant serves water-based terminals in Toronto, Windsor, Cleveland, Rochester & Oswego as well as land based terminals in Ottawa and Kilmar, Quebec.

Community Involvement

Lehigh is active in the community:

- Instrumental role in supporting development of local arenas and the sponsorship of many sports teams, free skate sessions
- Sponsorship towards Salvation Army Gift Baskets during holidays, United Way, Regent Theatre, Rotary among others
- Scholarship program for student awards
- Support of local artists, sponsor artist of the year award
- Support the Quinte Conservation donating time and materials to maintain these public spaces

BREAK

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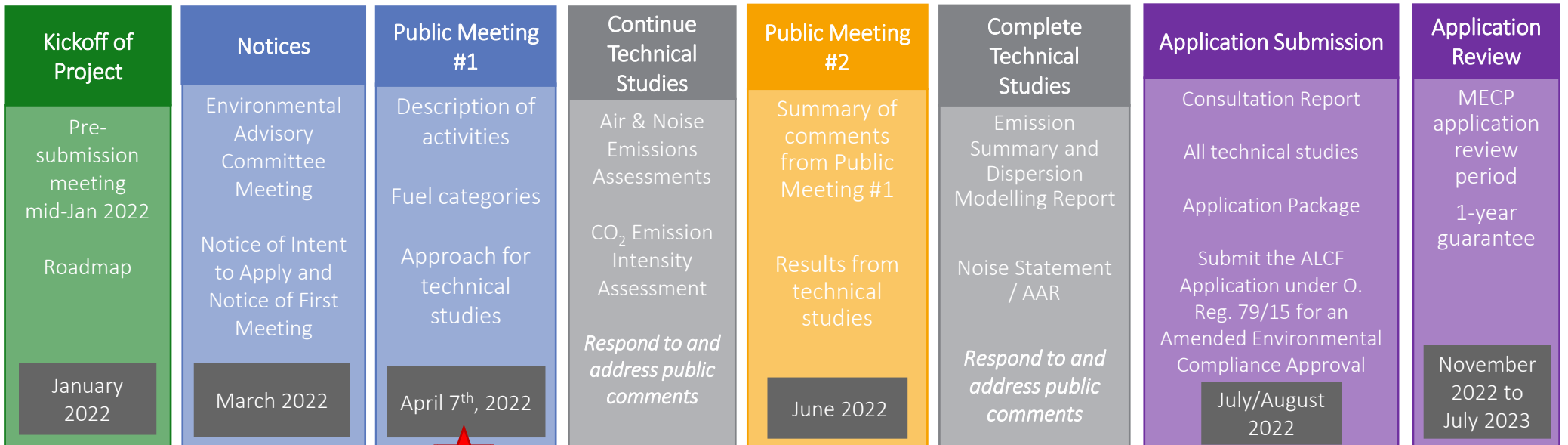
O. Reg. 79/15 Alternative Low-Carbon Fuels (ALCF)

Highlights of O. Reg. 79/15:

- The regulation defines the framework and controls for facilities that want to use the **ALCFs** in terms of types and quantity of materials that can be used;
- Preparing and distributing a **Notice of Intent to Apply** for an **Amendment ECA Application**;
- Holding at least **two meetings** for members of the public who live in the municipality in which the Site is located;
- A **consultation report** that outlines a description of all consultation activities undertaken as part of the Amendment ECA Application;
- A **Notice of Completion of the Consultation Report** and making the **Consultation Report** available on a website for public review.

- Lehigh Project Website: **www.LehighPictonALCF.ca**

O. Reg. 79/15 ALCF - Permitting Process and Timeline



Lehigh Project Website:

www.LehighPictonALCF.ca

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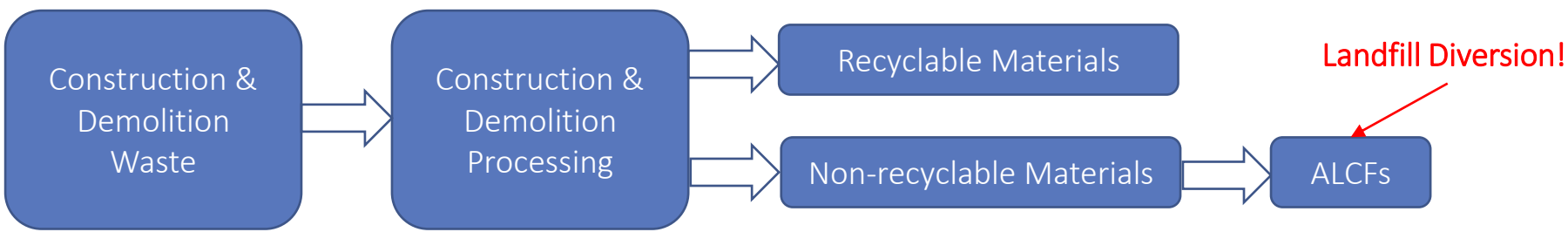
What are Alternative Low Carbon Fuels?

Fuels that have a **carbon dioxide emission intensity** less than coal or petroleum coke when combusted, and meet one of the two following descriptions:

1. The fuel
   - Is not derived from or composed of any material set out in **Schedule 1 of O. Reg. 79/15** (The schedule of ineligible fuels)
   - Is wholly derived from or composed of materials that are **biomass or municipal waste** or a combination of both
   - Has a high heat value of at least **10,000 megajoules per tonne** (unless a fuel is wholly derived from or composed of materials that are solid biomass).
2. The fuel is **wholly** derived from or composed of **organic matter**, not including peat or peat derivatives, derived from a plant or micro-organism and grown or harvested for the purpose of being used as a fuel.

Pathway of an ALCF



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The Waste Hierarchy

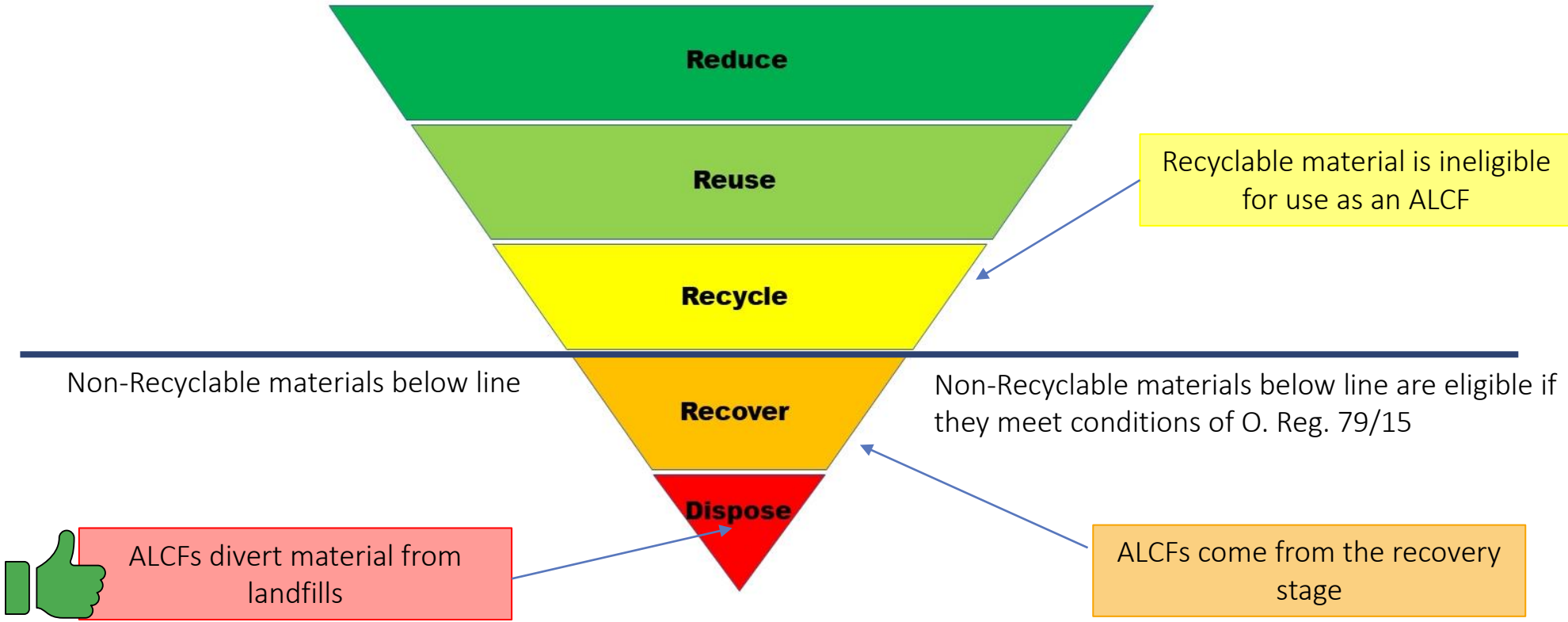

Image modified from: https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

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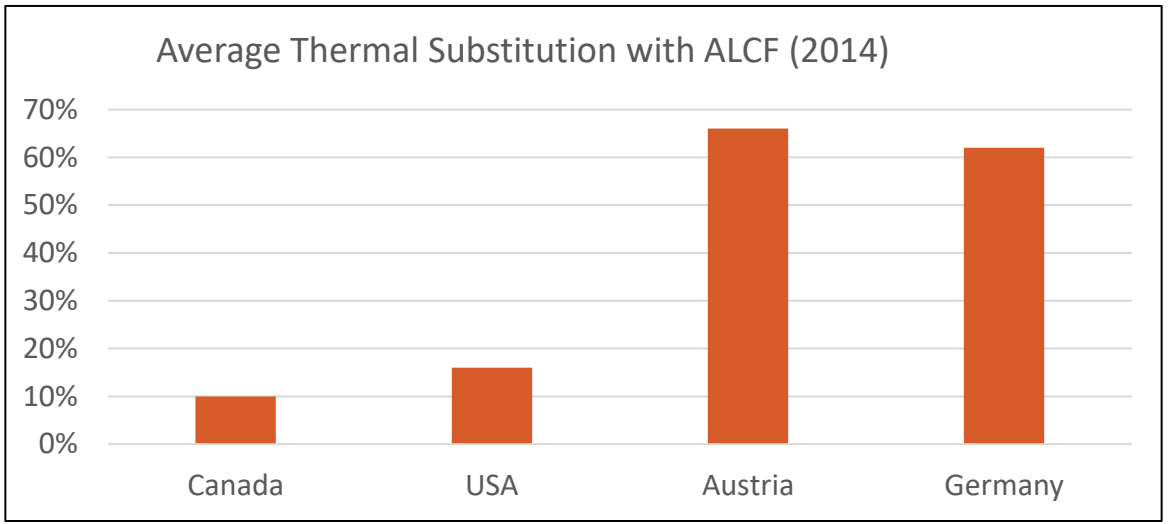
Alternative Low Carbon Fuels Use and Environmental Impact

There has been a long history of alternative fuels used in cement production around the world[1]



- The European Cement Association estimates that by 2050, 40% of kiln energy could potentially come from traditional sources (e.g., coal and petroleum coke), while 60% of kiln energy could potentially be provided by alternative fuels of which 40% could be biomass. The fuel mix would lead to an overall decrease of 27% in fuel CO_2 emissions[2]
- The December 2021 Made-In-Ontario Environment Plan highlights the need to reduce the amount of waste sent to landfill[3], The strategy for a Waste-Free Ontario highlights that three quarters of waste is currently sent to landfill and sets forth targets to improve waste diversion[4]

[1] The Pembina Institute and Environmental Defence. *Alternative Fuel Use in Cement Manufacturing. Implications, Opportunities and barriers in Ontario,* 2014.
[2] CEMBUREAU, The European Cement Association. *Alternative Fuels.* 2018. https://lowcarboneconomy.cembureau.eu/5-parallel-routes/resource-efficiency/alternative-fuels/
[3] MECP, A Made In Ontario Environment Plan. A Made-in-Ontario Environment Plan | ontario.ca
[4] The Strategy for a Waste-Free Ontario: Building the Circular Economy. Strategy for a Waste-Free Ontario: Building the Circular Economy | ontario.ca

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Sustainability and CO_2

On March 29th, 2022 Environment & Climate Change Canada (ECCC) released the 2030 Emissions Reduction Plan (ERP). The ERP is a detailed roadmap that includes modeling for reducing the country's emissions 40-45% below 2005 levels by 2030.

ECCC worked closely with the Cement, Lime, and Gypsum subsector and has modeled this sector to reduce emissions country-wide by 49% from 14 $MtCO_2e$ in 2019 to 8 Mt CO_2e in 2030.

The **key drivers** of emissions reduction according to the ECCC for heavy industry will be:

- **Carbon Capture, Utilization and Storage (CCUS) deployment**
  - Drive 12.9% of emissions reduction in the country by 2030

ALCFs

- **Uptake in clean fuel** and bioenergy
  - Drive 13.4% of emissions reduction in the country by 2030
  - Canada to develop a plan for **agricultural, forestry, and municipal waste to be used as a clean fuel**

What fuels are eligible?

Examples of Ineligible fuels

- O. Reg. 79/15 Schedule 1 defines the ineligible fuels
- Soil composting materials and leaf & yard waste
- Electrical equipment and components
- Tires except tire fluff
- Asbestos and hazardous waste

Examples of ALCFs

- Non-recyclable plastics & composites
- Construction & Demolition
- Non-recyclable Paper and wood
- Biomass fuels (e.g., sawdust, wood chips, discarded seed)
- Other (e.g., treated wood, shingles and non-recyclable rubber)

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Proposed ALCFs for Picton

- **ALCF from Construction and Demolitions (C&D) materials**: primarily wood material with minor amounts of non-recyclable paper and plastic
- **ALCF from Industrial, Commercial, and Institutional (IC&I) materials**: primarily non-recyclable paper, plastic and textiles but including wood material, and tire fibre and fluff
- **ALCF from the combustible fraction of non-recyclable household waste – Refuse Derived Fuel (RDF)**
- **Discarded treated seed**

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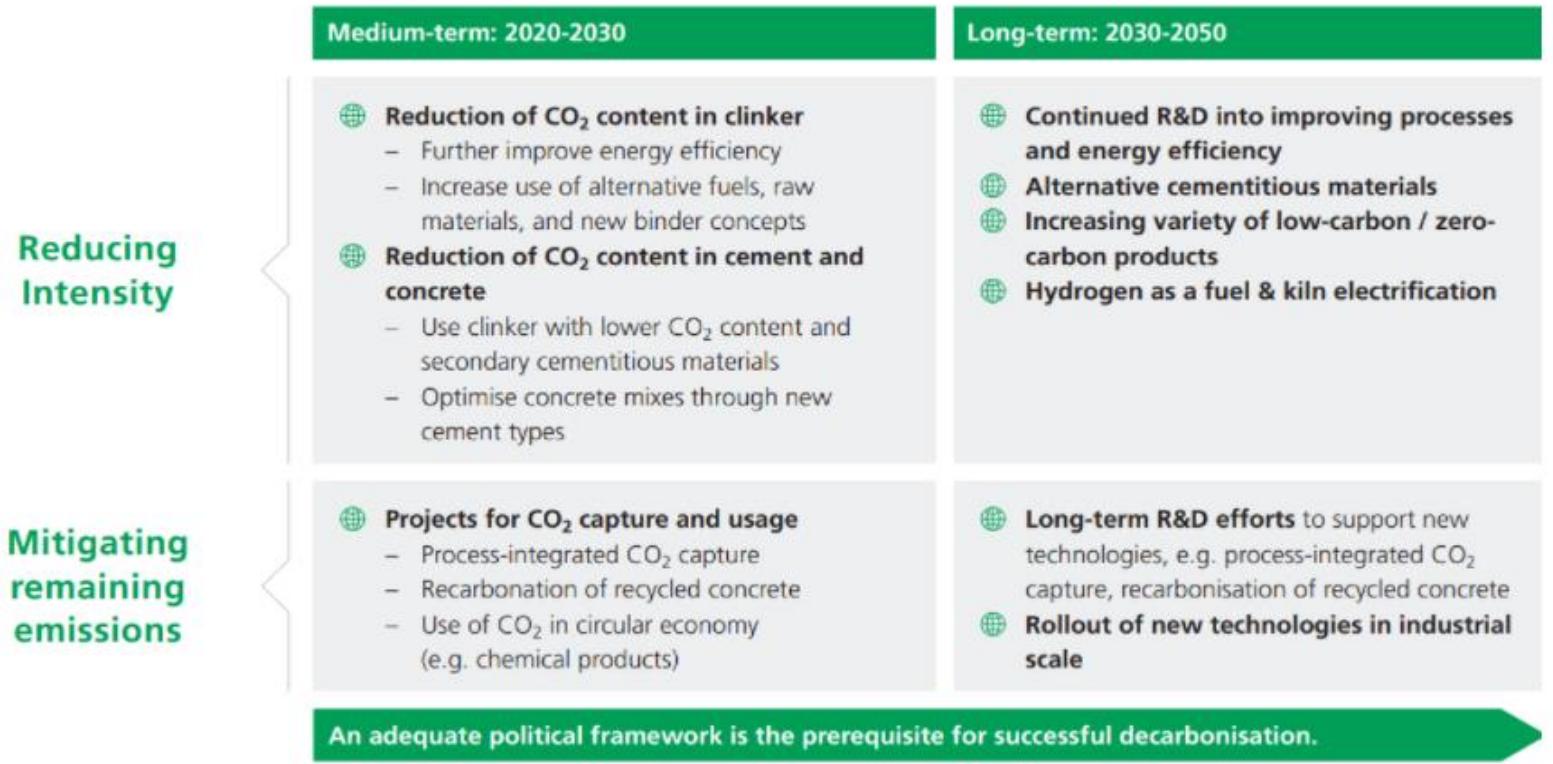
Heidelberg Cement Group Sustainability Commitments



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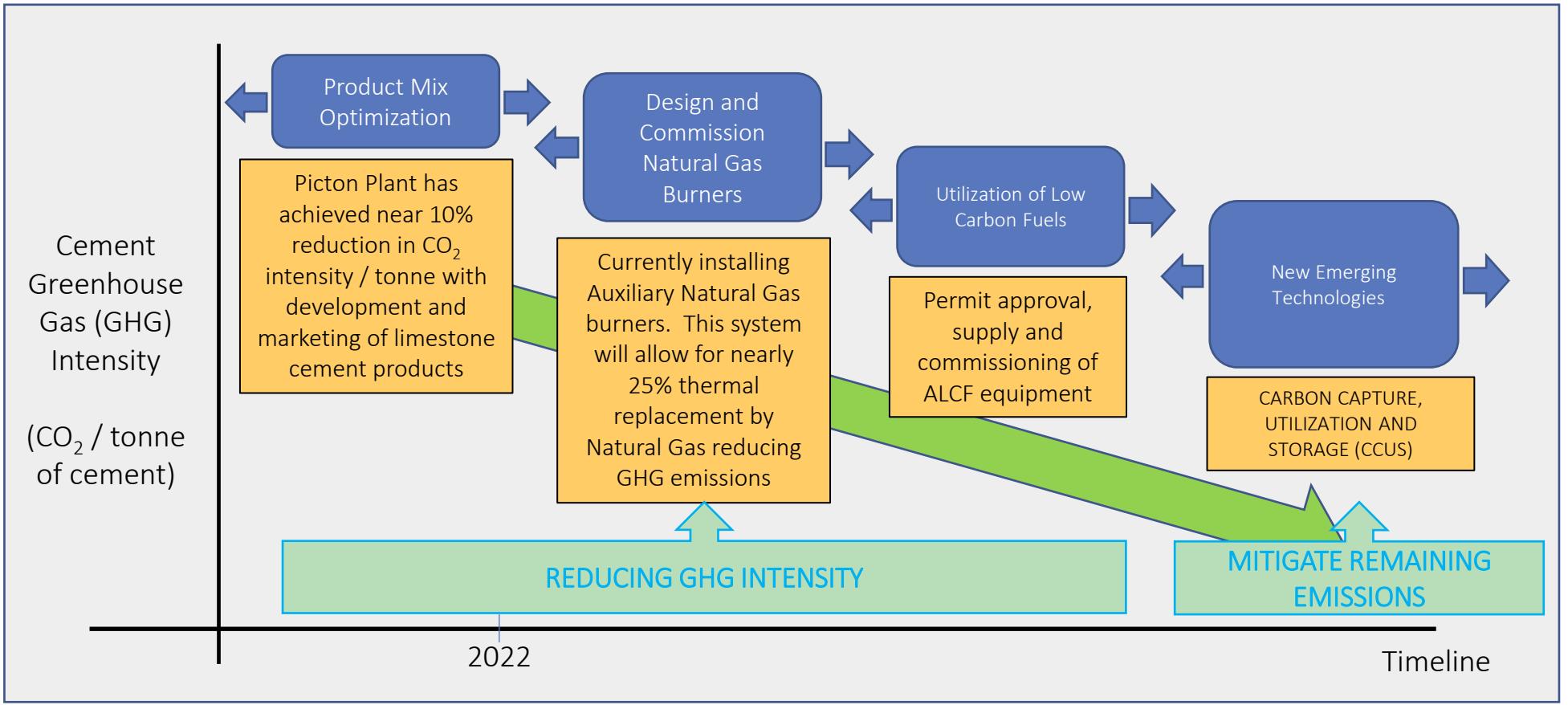
Picton CO_2 RoadMap – Pathway to Reduce GHGs



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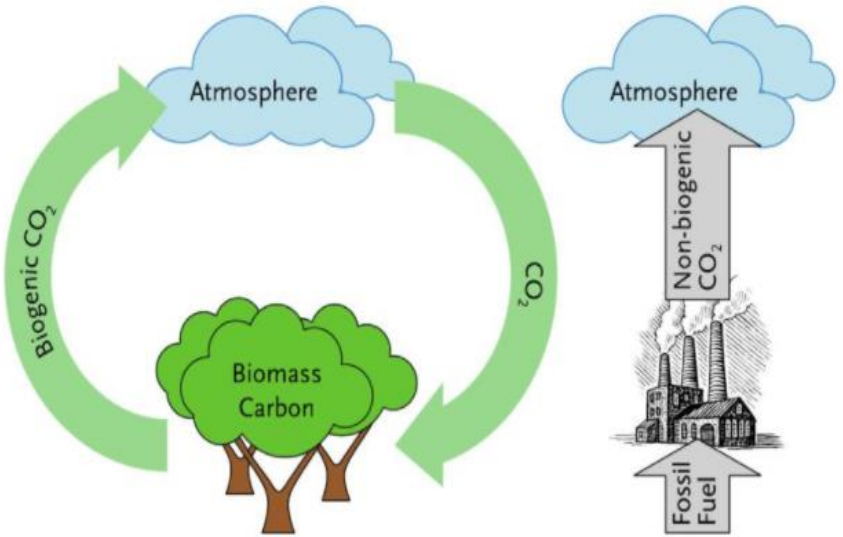
Carbon Dioxide Emission Intensity

ALCFs result in lower CO_2 emissions!



CO_2 Intensities of Typical Kiln Fuels			
	total	% carbon	non-Bio
	kg CO_2/GJ	biogenic	kg CO_2/GJ
Coal	96.0	0.0	96.0
Pet Coke	92.8	0.0	92.8
Plastics	83.5	3.0	81.0
Tire Fibre	83.9	27.8	60.6
Natural Gas	56.0	0.0	56.0
ICI RDF	96.6	47.9	50.3
MSW RDF	84.8	50.0	24.4
C&D RDF	99.9	87.3	12.7
Wood Waste	100.6	100	0.0
Seed Waste	100.0	100	0.0

- Combustion of fossil fuels releases carbon that has been locked up in the ground for millions of years,
- Combustion of biomass emits carbon that is part of the biogenic carbon cycle

- Carbon dioxide (CO_2) emission intensities allows different fuel types to be compared on their GHG emissions emitted to atmosphere
- Fuels with higher biomass content emit less non-biogenic CO_2.

Source: Fossil vs biogenic CO2 emissions |Bioenergy (ieabioenergy.com)

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Stakeholder Engagement and Public Consultation

Stakeholder Engagement and Public Consultation is a key component of ALCF.

The Project Team will engage in an array of consultation and engagement activities for this project with the objective of gathering input and feedback from Indigenous communities and stakeholders.

The consultation plan outreach includes:

- Indigenous Communities: Mohawks of the Bay of Quinte, Kawartha Nishnawbe, Alderville First Nation, Curve Lake First Nation, Hiawatha First Nation, Mississaugas of Scugog Island First Nation
- Elected Officials, Member(s) of Parliament, Provincial Parliament and Municipal and Regional Councillors of Prince Edward County and various Municipal staff members
- Provincial Agencies including Ministry of the Environment, Conservation and Parks, Indigenous Affairs, Transportation, Quinte Conservation
- Federal Agencies including Fisheries and Oceans Canada, Environment Canada, Transport Canada

Lehigh appreciates the opportunity to meet with the community. Synergies between municipalities, stakeholders, public and private sector are explored. Through this, development of the circular economy is promoted and a holistic approach to improving the environment is achieved.

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Carbon Dioxide Emission Intensity Assessment

- The carbon dioxide intensity report is a requirement of O. Reg. 79/15 and compares the CO_2 emission intensity of coal and petcoke with the proposed ALCFs

- ALCFs must meet the requirements of O. Reg. 79/15:
  - Meet the Minimum Heat Value
  - Have a lower CO_2 intensity than coal / petcoke

ALCFs result in lower CO_2 emissions!

CO_2 Intensities of Typical Kiln Fuels			
	total	% carbon	non-Bio
	kg CO_2/GJ	biogenic	kg CO_2/GJ
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Public Meeting # 2 will highlight the results of the Laboratory testing of the proposed ALCFs

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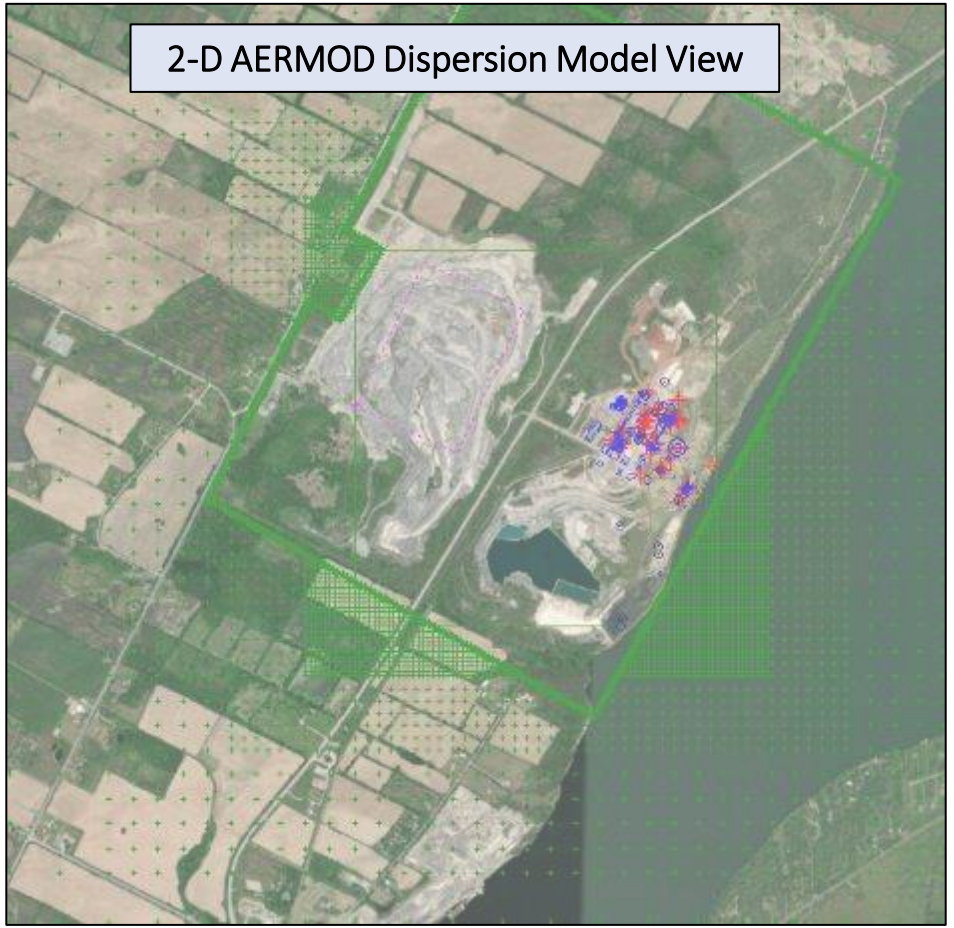
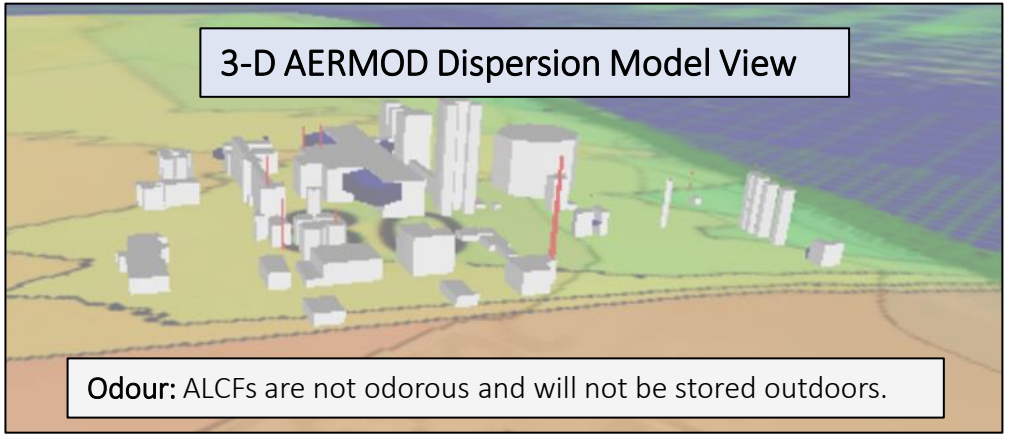
Emission Summary and Dispersion Modelling (ESDM) Report



- An ESDM is a requirement of the Lehigh Environmental Compliance Approval. O.Reg. 419/05 - Local Air Pollution, describes the modeling requirements and compliance limits.

Public Meeting # 2 will highlight the results the Lehigh Picton ESDM with ALCF



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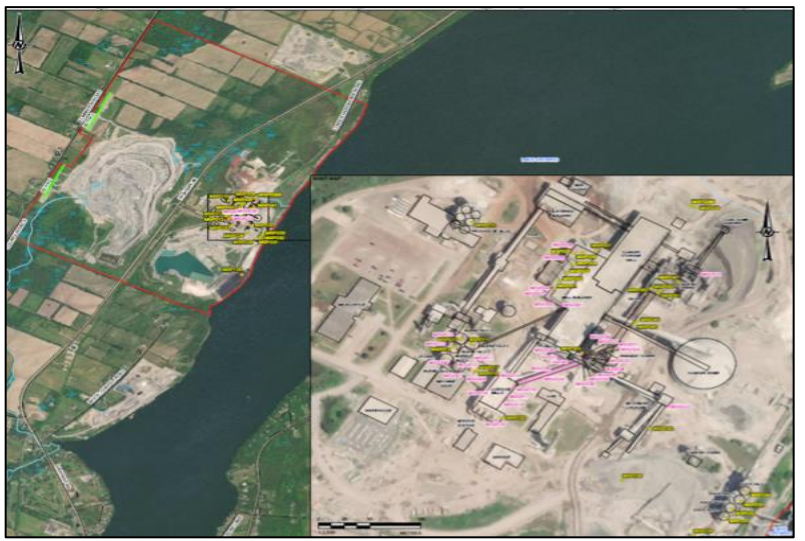
Acoustic (Noise) Assessment Report

Compliance with Ministry Noise Limits (NPC 233 and NPC 300)

- The Picton Cement Plant is required to meet the Ministry noise limits at neighbouring receptors and maintain and up-to-date Acoustic Assessment Report (AAR)
- The AAR assesses the combined noise impacts, from all activities on-site, at receptors using a 3-D noise model
- The Picton Cement Plant is currently working through a Noise Abatement Action Plan (NAAP) to reduce noise levels implementing improvements annually to existing equipment.



Public Meeting # 2 will highlight the results of the AAR including ALCF.

- Any potential noise sources from truck deliveries and ALCF conveyance equipment will be assessed and if significant added to the noise model
- Based on Lehigh's experience with other ALCF projects, sources of noise from ALCF project additions are not expected to be acoustically significant.

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We want to hear from you!

How can you participate in this project?

– Provide comments directly via email at: LehighPictonALCF@golder.com

– The Project Team is requesting comment by **May 7th, 2022.**

– Visit our website at www.LehighPictonALCF.ca where all notices and presentation materials will be made available

Nick Papanicolaou
Lehigh Hanson Materials Limited, Picton Plant Environmental Manager, Canada

Nadia Dabagh
WSP Golder
Consultation Lead, Environmental Planner

Jamie McEvoy
WSP Golder
Project Manager, Senior Air Quality Engineer

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