



Request for Information (RFI) XXXX

On consideration of proposed requirements related to procurement of low-carbon cement and concrete for Government of Canada building and infrastructure projects.

This RFI seeks feedback from both designers (architects and engineers) and cement and concrete suppliers, and all interested parties.

1.0 Context

The Government of Canada's (GC) **Greening Government Strategy** includes the following commitments:

- The government will reduce the environmental impact of building materials using life-cycle assessment techniques to minimize embodied carbon and the use of harmful materials in construction and renovation.
- The government will aid the transition to a low-carbon economy through green procurement that includes life-cycle assessment principles and the adoption of clean technologies and green products and services by including criteria that address carbon reduction, sustainable plastics and broader environmental benefits into procurements by departments for goods and services that have a high environmental impact.

The Government of Canada is considering setting mandatory minimum requirements for the procurement of low carbon concrete. This RFI seeks feedback to assist in the development of requirements designed to achieve environmental objectives and support a competitive and resilient marketplace.

Anticipated applicability

Requirements are only under consideration for Government of Canada public procurements at this time. In the event that requirements are set, it is anticipated that they will be implemented incrementally across GC regions, building and infrastructure project types and contract value thresholds, and phasing in to allow for market readiness.

About cement and concrete

Concrete is a composite material comprised of various fine and course aggregates which are bound together with cement. Concrete is durable and versatile, and is used extensively worldwide for the construction of buildings and infrastructure such as roads and bridges.

Cement acts as a binder in concrete. Cement is a fine grey powder that is mixed with gravel, sand, and water to form concrete. “.. cement is a major contributor to climate change. The chemical and thermal combustion processes involved in the production of cement are a large source of carbon dioxide (CO₂) emissions. Each year, more than 4 billion tonnes of cement are produced, accounting for around 8 per cent of global CO₂ emissions.”¹

¹ Making Concrete Change - Innovation in Low-carbon Cement and Concrete, Chatham House Report, June 2018

Portland-limestone cement (PLC) is generally understood to have a lower carbon footprint than ordinary Portland cement. The Athena Sustainable Materials Institute performed a life cycle assessment of PLC: “The study demonstrates that Portland-limestone cement has lower impacts in all indicators and is about 10% better in greenhouse gas emissions.”² According to the Cement Association of Canada: “If Portland-limestone cement were to replace all cement consumed in Canada, it would save almost 1MT of GHG emissions per year”³.

The carbon footprint of concrete can also be lowered by adding Supplementary Cementitious Materials. SCMs are industrial by-products with cementitious properties. Integrating SCMs into concrete reduces cement content and therefore reduces embodied carbon of concrete; reductions of 10-40% are common, with up to 70% possible in some applications.

The Government of Canada is considering setting mandatory requirements for the procurement of low carbon concrete, beginning with establishing a ~10% lower-carbon baseline for cement. Requirements under consideration are:

- Starting 2021, and phasing in over 12 months to support market readiness, all general use cement specified by GC will be Portland Limestone Cement (PLC) or equivalent⁴

From this 10% lower-carbon baseline, GC designers will be required to reduce further emissions by specifying low-carbon concrete:

- Starting [Month, Year] all concrete specified by GC will require product-and-facility-specific Type III Environmental Product Declarations (EPDs) or equivalent.
- Starting [Month, Year] GC will publish maximum carbon intensity⁵ values for concrete specified on a range of project types which will set mandatory lower-carbon benchmarks for concrete purchased by GC. (The GC intends to collaborate with the architects and engineers, and cement and concrete, sectors to set benchmarks.)

To assist the GC in considering these requirements interested parties are invited to answer the following questions and provide feedback.

Questions are broken down by discipline:

- ANNEX 1 Questions for architects, engineers and associated interested parties
- ANNEX 2 Questions for cement and concrete suppliers and associated interested parties

Respondents may respond to either or both Annexes.

² An Environmental Life Cycle Assessment of Portland-Limestone and Ordinary Portland Cements in Concrete, Athena Institute, January 2014

³ Cement Association of Canada

⁴ E.g. Third-party certified EPD for 10% reduced carbon-intensity general use cement.

⁵ Carbon intensity refers to the life cycle greenhouse gas emissions emitted due to the production of a cubic meter of concrete and from a cradle-to-construction site perspective (i.e. Modules A1 to A4).

ANNEX 1 - RFI Questions for architects, engineers and associated interested parties.

Optional – please provide information about your company:

Company Name:			
Primary place of business:		Number of employees:	

Respondent - Please indicate your discipline:

Architect	Civil Engineer
Architectural technologist	Civil technologist
Structural Engineer	Marine Engineer
Structural technologist	Marine technologist
Geotechnical engineer	Other – please list
Geotechnical technologist	

Question 1.1:

Proposed requirement: Starting 2021, and phasing in over 12 months to support market readiness, all general use cement specified by GC will be Portland Limestone Cement (PLC) or equivalent⁶

a) Do you currently specify Portland Limestone Cement (PLC) in place of general use cement? If no, what are the barriers that prevent you from doing so? (For example, concerns related to the performance of the product, cost-effectiveness, impacts to construction practices.)

b) If you have specified PLC, please describe the largest project you have specified it for, and if there were any implications to the project as a result.

c) Would there be an impact on your business/practice if PLC or equivalent was exclusively required in place of general use cement, for GC projects starting late 2020 or over 2021? If yes, please describe.

⁶ E.g. Third-party certified EPD for 10% reduced carbon-intensity general use cement.

Question 1.2:

Proposed requirement: Starting [Month, Year] all concrete specified by GC will require product-and-facility-specific Type III Environmental Product Declarations (EPDs) or equivalent.

GC has been advised that there is a need for infrastructure to develop timely and cost effective EPDs (or equivalent), while protecting suppliers' proprietary data and competitiveness.

a) Do you currently ask for EPDs (or equivalent) for concrete mixes?

b) If no, please list any barriers you face to specifying them, including any feedback on required infrastructure?

c) Can you suggest actions that could reduce barriers?

Question 1.3:

Proposed requirement: Starting [Month, Year] GC intends to **publish maximum Global Warming Potentials (GWPs) for concrete specified on a range of project types which will set mandatory carbon intensity⁷ benchmarks for concrete purchased by the GC.** The GC intends to collaborate with the architects and engineers, cement and concrete sectors to set benchmarks.

When project-specific benchmarks are set, designers will be required to calculate and specify cement and concrete products to meet a maximum carbon intensity benchmark for a project (measured in Global Warming Potential [GWP] i.e. kg CO₂eq per m³ concrete). It is anticipated that designers will rely on product/facility-specific EPDs (or equivalent) for their calculations, and cement and concrete suppliers will be required to provide product/facility-specific EPDs (or equivalent) as evidence of compliance.

a) What prior knowledge would you require to be compliant with this requirement?

b) Will the requirement typically affect a project schedule? If so, please describe, and offer any suggestions on ways to improve the process.

⁷ Carbon intensity refers to the life cycle greenhouse gas emissions emitted due to the production of a cubic meter of concrete and from a cradle-to-construction site perspective (i.e. Modules A1 to A4).

c) Will the requirement typically affect a project budget? If so, please describe, and offer any suggestions on ways to minimize costs.

d) Will the requirement typically affect the design and/or construction of the structure? If so, please describe and offer any suggestions on how to incorporate into design and construction considerations.

e) Please identify any other risks or barriers you see to meeting this requirement, and any solutions you can think of to overcome barriers.

Question 1.4: Do you have any other comments, suggestions or feedback on specification of low carbon concrete that you would like to share?

The Government of Canada would like to thank you in advance for your participation!

ANNEX 2 - Questions for cement and concrete suppliers and associated interested parties.

Optional – please provide information about your company:

Company Name:	Canadian Concrete Masonry Producers Association (CCMPA)		
Primary place of business:	Canada	Number of employees:	35 Businesses- Block Producers / Suppliers

Respondent - Please indicate your discipline:

<input type="checkbox"/>	Cement supplier	<input type="checkbox"/>	Concrete supplier
<input type="checkbox"/>	Industry representative (cement)	<input type="checkbox"/>	Concrete installer
<input checked="" type="checkbox"/>	Industry representative (concrete)	<input checked="" type="checkbox"/>	Non-governmental organization
<input type="checkbox"/>	Industry representative (additive)	<input type="checkbox"/>	Academic institution
<input type="checkbox"/>	Project owner (government)	<input type="checkbox"/>	Project owner (private sector)
<input type="checkbox"/>	Other government official (please specify)	<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>	

Question 2.1:

Proposed requirement: Starting 2021, and phasing in over 12 months to support market readiness, general use cement specified by GC will be Portland Limestone Cement (PLC) or equivalent⁸

a) Do you currently offer Portland Limestone Cement (PLC)? If no, what are the barriers that prevent you from doing so?

80% of the block produced by our members uses PLC. However, there are logistical challenges in the Windsor / Essex Corridor, Alberta, Manitoba, and Atlantic provinces. There is very little (if any) PLC produced locally, and therefore cost prohibitive to use in block at this time.

b) What would be the impact on your business if PLC was exclusively specified in place of general use cement, for GC projects starting late 2020 or over 2021?

Most members would have no impact. Again, the regions included above would struggle to supply federal jobs, as there is no PLC in their markets. This would impact smaller local block producers, while the larger entities would be able to leverage buying power / logistics to transport block into surrounding markets. This would create an unfair advantage / disadvantage in the smaller markets without locally produced PLC.

⁸ E.g. Third-party certified EPD for 10% reduced carbon-intensity general use cement.

c) The GC has been advised that within Canada PLC is priced the same or better than Portland, or general use, cement. Are you able to produce/purchase PLC at the same or better price than Portland cement?
We confirmed that our suppliers charge the same for PLC as GUL.
d) If not, what is the approximate % price premium you pay?
None.
e) What is the reason stated for a price premium?
NA
f) Do you currently offer other low carbon cement that would be an equivalent of PLC? If yes, please describe including information about EPD or equivalent third-party certified carbon footprint report.
Yes – there can be Supplementary Cementitious Materials (SCM) such as fly ash or slag which offer a similar reduction in carbon. Our industry wide EPD can be found here: https://ccmpa.ca/wp-content/uploads/2016/12/CCMPA_EP_D_2016-08-24.pdf

<p>Question 2.2: Proposed requirement: Starting [Month, Year] concrete specified by GC for a range of project types will require product/facility-specific Type III Environmental Product Declarations (EPDs).</p> <p>GC has been advised that there is a need for infrastructure to develop timely and cost effective EPDs (or equivalent), while protecting suppliers' proprietary data and competitiveness.</p>
a) Do you currently offer product/facility-specific EPDs (or equivalent) for your concrete mixes?
Yes, we offer a singular EPD available for all of our Block producers (Found here: https://ccmpa.ca/wp-content/uploads/2016/12/CCMPA_EP_D_2016-08-24.pdf)
b) If no, please describe any barriers you face to offering them, including any feedback on required infrastructure?
There is a significant cost attached, as well as long lead time, when acquiring an EPD. Given this, CCMPA used resources to invest in and produce a singular EPD for our industry to save our individual members money.
c) Can you suggest actions that could reduce barriers?
Find a way to reduce consultant fees around EPD creation. Estimated cost of our 2016 EPD by Athena was \$40K CAD.

d) Will the requirement typically affect a project schedule? If so, please describe, and offer any suggestions on ways to improve the process.
The lead time is generally 12-18months. If there is allowance for this, then it should not impact project scheduling.
e) Will the requirement typically affect a project budget? If so, please describe, and offer any suggestions on ways to minimize costs.
An EPD should not impact project budget, but it would impact a company's overall budget if they were mandated to acquire individual EPD's. Again, the approximate cost for each EPD is \$40K CAD.
f) What do you think is an appropriate lead time to allow your business to offer product/facility-specific EPDs?
12-18months at a minimum.
g) What do you think is a reasonable cost range (ideal to acceptable) for developing a product/facility-specific EPD? (Please consider a facility-specific EPD as a third party verified report that covers ALL concrete mix designs produced at a single facility.)
At the current market rate (\$40K CAD) per EPD every 5 years, that is an average cost per year of \$8K CAD to a business. This expense is large and unnecessary in an economy that is already struggling. It is the opinion of CCMPA that Facility / Business specific EPD's should not be a requirement. Instead, an industry wide EPD covering all relevant and related materials should be sufficient, and alleviate financial pressure on individual businesses.

Question 2.3:

Proposed requirement: Starting [Month, Year] GC intends to **publish maximum carbon intensity⁹ values for concrete specified on a range of project types which will set mandatory carbon intensity benchmarks for concrete purchased by the GC.** The GC intends to collaborate with the architects and engineers, cement and concrete sectors to set benchmarks.

When project-specific benchmarks are set, designers will be required to calculate and specify cement and concrete products to meet a maximum carbon intensity target for a project (measured in Global Warming Potential [GWP], i.e. kg CO₂eq per m³ concrete). It is anticipated that designers will rely on product/facility-specific EPDs for their calculations, and cement and concrete suppliers will be required to provide product/facility-specific EPDs as evidence of compliance.

a) What prior knowledge would you require to be compliant with this requirement?

EPD consultants (Athena) would need to advise of the scope of information required for creation.

⁹ Carbon intensity refers to the life cycle greenhouse gas emissions emitted due to the production of a cubic meter of concrete and from a cradle-to-construction site perspective (i.e. Modules A1 to A4).

b) What lead time would you require to be compliant with this requirement?
12-18months
c) Will the requirement typically affect a project schedule? If so, please describe, and offer any suggestions on ways to improve the process.
NA
d) Will the requirement typically affect a project budget? If so, please describe, and offer any suggestions on ways to minimize costs.
NA
e) Please identify any risks or barriers you see to meeting this requirement, and any solutions you can think of to overcome barriers.
The barrier would be cost of creation for the EPD, as well as the bandwidth of the industry consultant who is creating the EPD.

Question 2.4: Do you have any other comments, suggestions or feedback on low carbon cement and concrete that you would like to share?
From the CCMPA membership: 1) There needs to be wider access to PLC before implementing this requirement for Federal projects. Currently, there is not equal access across Canada, or respective producers. 2) There should be a level of accreditation for alternative carbon sequestering products 3) An Industry wide EPD should suffice to meet the requirements – saving cost and resources while ensuring consistency and accuracy of information

The Government of Canada would like to thank you in advance for your participation!