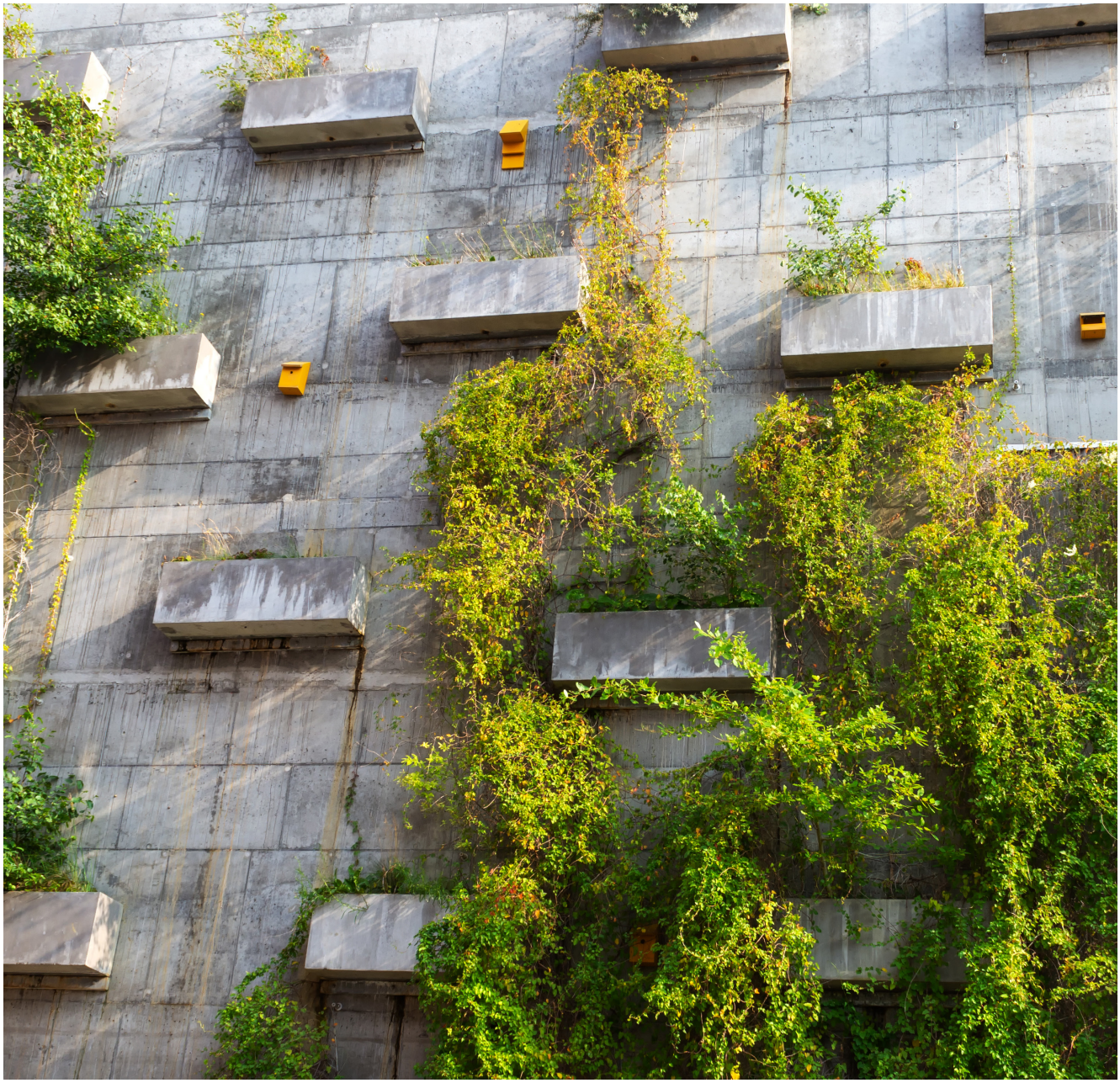
INDUSTRIAL DEEP DECARBONISATION
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION
Progress by innovation

DEFINITIONS FOR LOW-EMISSION CEMENT AND STEEL PRODUCTION

Considering definitions and thresholds for low-emission products in green public procurement policy

November 2025



Contents

About IDDI

The Clean Energy Ministerial Industrial Deep Decarbonization Initiative (IDDI), hosted by UNIDO, is a global coalition of governments and private sector organizations working to create an enabling environment for deep decarbonization of heavy industry, starting with steel, cement and concrete.

The IDDI aims to achieve this by

- Stimulating demand for low and near-zero emission materials through green public procurement commitments, and
- Harmonizing emissions accounting methodologies

Read more about the IDDI **here**.

Contact: **iddi@unido.org**.

Acknowledgements and disclaimer

This document was developed by Three Pillars Consulting (TPC) and the IDDI Secretariat in consultation with IDDI member governments and external advisors.

The contents of this document are not to be construed as endorsements by or reflective of the official positions of member governments or the contributing organizations.

IDDI government members are the Federal Government of Brazil, Government of Canada, Federal Government of Germany, Government of India, Government of Japan, Kingdom of Saudi Arabia, Federal Government of the United Arab Emirates, Government of the United Kingdom, and the United States Government.

1. Introduction

Steel, cement and concrete are the building blocks of our modern world and the backbone of our economies. But they account for just over 50 per cent of all industrial emissions.[1] Governments are among the top buyers of steel, cement and concrete for major infrastructure projects, such as new roads, bridges, housing, schools and hospitals. Together, national, regional and local government entities account for an estimated 20-30 per cent of global construction industry revenues. Estimates suggest that if even 35 per cent of the steel and 60 per cent of the cement used in public construction projects was very low emissions, it could save the world 1.25 billion tonnes of carbon emissions a year.

Through the IDDI Green Public Procurement (GPP) Pledge, governments are signaling market demand and setting commitments to procure low-emission cement, concrete and steel for infrastructure projects. Robust and transparent information about the embodied emissions of products is required to meet green public procurement (GPP) commitments, and in April 2024 the IDDI published the **Guidance for PCR Harmonization**, a technical document to create robust and interoperable Environmental Product Declarations (EPDs).

Steel, cement and concrete manufacturers are investing in decarbonization and asking for harmonized labels or definitions so they can differentiate their products and secure market opportunities. Governments, industry and other experts agree on a need for a uniform, global set of thresholds that define near-zero and low-emissions cement and steel production. In 2022 the IEA proposed such a set of definitions, and the IDDI GPP Pledge endorsed them as a robust starting point towards establishing definitions for use in GPP. This paper examines 'definitions' proposed by a range of organizations and initiatives for low and near-zero emission cement and steel production in the context of public procurement policy.

1 https://www.industrialenergyaccelerator.org/general/steel-and-cement-can-drive-the-decade-of-action-on-climate-change-this-is-how/

2. Definitions for Cement and Steel production

In 2022 the IEA published a report titled "Achieving Net Zero Heavy Industry Sectors in G7 Members",[2] within which they first proposed common definitions for cement and crude steel production. In the report, 'definitions' refer to a set of parameters for a multi-tiered rating system for near-zero emissions and low-emissions cement and steel production that would underpin policy design and allow for uniform international reporting. IEA definitions were recognized in the 2022 G7 Climate, Energy and Environment Minister's Communique, by the Climate Club and the Breakthrough Agenda. In 2022 the IDDI GPP Pledge endorsed the definitions proposed by IEA as a robust starting point towards establishing uniform definitions for use in GPP.

Similar parameters to define thresholds are in use or proposed by industry and multi-stakeholder processes including Responsible Steel, the Low Emission Steel Standard, the China Iron and Steel Association, and the Global Cement and Concrete Association. In 2024 the IEA published a subsequent report titled "Definitions for Near-Zero and Low-Emissions Steel and Cement, and Underlying Emissions Measurement Methodologies – Summary of Understandings".[3] This document takes stock of various such definitions published to date and their underlying methodologies. It recommends that stakeholders continue to work towards agreeing on a global set of definitions.

It is important to note that IEA definitions are proposed for cement and crude steel production, meaning that manufacturing plant or facility level emissions are expressed per unit of output (e.g., kg CO2e per tonne of crude steel or cement). This is methodologically different to product-level reporting which is required for procurement. Aligned with the IDDI GPP Pledge and Guidance for PCR Harmonization, the IEA recommends existing emissions measurement methodologies, and labels such as EPDs, to be used wherever possible in policies, and to evaluate progress against global definitions thresholds. The IEA also offered a set of principles to further guide creation of definitions, which have been employed for this analysis and are included in italics below. Definitions are intended to fulfill a few functions that are commented on separately below.

A global threshold band that defines near-zero emission materials that is *ambitious, stable, technology neutral, globally consistent, physical, transparent, and accessible.*

The IDDI Secretariat endorses the need for a numeric threshold band that meets these principles and defines near-zero materials. Such a definition can be used in policies to incentivize rapid deployment of breakthrough technologies to achieve accelerated decarbonization of cement and steel production, and for reporting on progress towards global targets. IDDI's GPP Pledge Level 4 encourages governments to procure a share of near-zero emission materials for signature projects by 2030, acting as a first customer for leading companies adopting transformational technologies such as carbon capture and storage and green hydrogen.

2 https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members
3 https://iea.blob.core.windows.net/assets/0910c4ff-4008-48f5-a3ec-c52996ed694d/Definitionsfornear-zeroandlow-emissionssteelandcementandunderlyingemissionsmeasurementmethodologies.pdf

A set of global threshold bands defining low-emission materials that *provides clarity on level of ambition, signal progressive improvement over time, are technology neutral, globally coherent while accounting for regional circumstances, include clear communication on chain of custody, are transparent, and accessible.*

The IDDI Secretariat endorses the need for a set of global threshold bands based on these principles, that governments can use as a reference point in policies, and for reporting on progress towards global targets.

The principle of *accounting for regional circumstances* is particularly important for procurement, where thresholds set in policy need to reflect the reality of the procurement entities' own supply chain. GPP thresholds should be aspirational and give clear market signals, but also feasible, to ensure low-emission materials are available and do not interfere with timely completion of infrastructure projects.

The IDDI Secretariat recommends governments develop thresholds for use in procurement in the context of their own supply chain, using consistent standards and data formats that can be reported against a set of global threshold bands. IDDI GPP Pledge Level 3 encourages governments to commit to purchasing low-emission concrete and steel for construction projects by 2030. See section 3 and Appendix 1 for leading examples of how governments are setting thresholds in GPP policies.

Further considerations for definitions are broken out by material type in the following sections: first cement and concrete, and then steel.

2.1 Definition thresholds for cement and concrete

The Global Cement and Concrete Association (GCCA) built on the proposed IEA definitions, for cement and for concrete, with the intention of providing an implementable rating system for use in GPP policies.[4]

The GCCA Low Carbon Rating for cement mirrors the IEA threshold bands, with a recommendation to use a national average emissions intensity value for clinker. Cement clinker is a semi-finished product formed by heating limestone and minerals at high temperatures in a kiln. It is the primary ingredient in cement, which is the primary ingredient in concrete. Due to the emissions intensive production process clinker is the source of most of the emissions in both cement and concrete; additives blended with clinker, as well as supplementary cementitious materials used in place of clinker in cement and concrete, are common ways to reduce the embodied emissions of final products.

The German Cement Association (VDZ) has developed the **Cement Carbon Class label**[5] which mirrors the GCCA rating system, making small adjustments to the threshold values to based on local carbon accounting practices.

The IDDI Secretariat recommends governments use the GCCA rating system for cement and concrete to facilitate global reporting, however in the IDDI **Guidance for PCR Harmonization** IDDI offers the following advice on the resolution of emissions intensity values:

4 https://gccassociation.org/lcr/
5 https://www.vdz-online.de/en/services/certification/co2-label-for-cement

"PCRs should set a clear preference and expectation for primary emissions data specific to the processes and supply chain for a specific product described in an EPD. Where used, secondary data should be clearly labelled, including the name of the database or source. Where primary data for material inputs and energy sources are not generally available, standard setting organizations should develop a mechanism to accelerate availability."

GCCA's rating system for concrete is most relevant to IDDI GPP Pledge commitments, because it is (ready-mix and pre-cast) concrete products that are most often procured for infrastructure projects. While the need for a set of global threshold bands for concrete is agreed on, there is not a consensus on the numeric values of the concrete thresholds proposed by GCCA, due to differing government positions. A key issue in discussions relates to how emissions from the combustion of waste in cement kilns should be accounted for.

Currently, the GCCA thresholds do not account for GHG emissions arising from the combustion of non-recyclable fossil waste e.g., flexible plastics and films. The basis of this position is guidance in the product category rules ISO 21930 and EN 15804+A2, that:

1. Cobustion (coprocessing) of waste in cement kilns is a waste processing activity and not considered combustion of secondary fuels.[6]

2. The polluter pays principle states that processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached.[7] This is interpreted to mean that combustion emissions from coprocessing waste in cement kilns should be accounted for by the manufacturer of the material that becomes waste, rather than the actor combusting the waste.

It is important to consider that not accounting for waste emissions, even where aligned with the polluter pays principle, could inadvertently encourage the burning of waste ("recovery") over recycling. This may conflict with jurisdictional waste hierarchies where they exist, for example, those put forward by the EU[8] and the US Environmental Protection Agency.[9] The GCCA rating system includes a mechanism that allows modification of the numeric values based on their preferred method for EPD calculations. For example, governments can choose to include emissions from coprocessing waste in cement kilns and adjust the threshold values accordingly. Choices can also be carried based on national norms for other emissions accounting criteria such as coproduct allocation. Adjusting the numeric definitions on a national basis maintains a globally consistent level of decarbonization ambition that is shaped to each countries decarbonization plans.

The GCCA numerical definitions are based on LCA data from ten of the largest concrete producing countries in the world (not including China, among others). This data has been used to calculate thresholds for low-emission concrete products based on cylinder strength (one measure of the strength of concrete). To assess a concrete product against the thresholds, the global warming potential (GWP) of the product should be calculated using the product category rules for construction materials EN 15804+A2. The GCCA chose the EN methodology over ISO 21930 (an equivalent standard) because it is a more rigorous

6 ISO 21930:2017, Table 1

7 ISO 21930:2017, section 7.1.1 and EN 15804:2012+A2:2019, section 6.3.5.1

8 EU Waste Framework Directive (2008), Article 4 https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en

9 United States Environmental Protection Agency, Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy. https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

assessment. Where the ISO methodology is used by an implementing organization, the thresholds must be adjusted as described in the GCCA document.

The IDDI Secretariat recommends governments use the GCCA framework as a foundation for setting numeric thresholds and make national determinations on accounting topics such as waste coprocessing. Where a government chooses to diverge from the GCCA accounting method, e.g. by requiring inclusion of emissions from the combustion of waste products, the thresholds can be adjusted to ensure that the definitions (Bands G-A, near-zero emission) represent a comparable level of decarbonization ambition. To aid global reporting and cross-border comparisons, the GCCA framework enables regional data that is based on different accounting choices to be normalized. In large countries, where domestic trade of cement is regional rather than nationwide, the same approach could be taken at a regional level.

2.2 Definition thresholds for steel

Several standards and certifications have adopted definitions for near-zero and low-emission steel that are presented as a variable set of emissions intensity threshold bands based on the percentage of scrap (recycled) steel in the product.

Steel products can be made in two ways, known as the primary and secondary production routes. In primary production, steel is made from iron ore, requiring high temperatures typically achieved using coking coal, producing steel with high embodied emissions. In secondary production, steel is made using a mix of crude steel and scrap steel in an electric arc furnace (EAF). Depending on the emissions intensity of the electricity grid and the proportion of scrap used (sometimes up to 100%) secondary steel typically has lower embodied emissions than primary steel. Whilst all new steel could theoretically be made from recycled steel, differences in scrap supply and projected growth of demand for steel mean this is not feasible.[10]

Increased demand for low-emission steel will alter international trade flows for scrap and if not properly addressed in policy, could threaten overall decarbonization of the steel sector.[11] The implied issue for procurement policy is if thresholds are set on lower and lowest emissions intensity only (not considering the scrap content), they may have negative unintended consequences for meeting global net zero targets and for the steel sector.

The **ResponsibleSteel International Production Standard** is created by a global multi-stakeholder standard and certification organization. The ResponsibleSteel standard covers the full range of sustainability issues from biodiversity and decarbonisation to labour rights and local communities. ResponsibleSteel product certification utilizes a "Progress Level" system, which assesses a steelmaking site's emissions per tonne of crude steel produced, against the proportion of scrap used in their production.[12] The ResponsibleSteel standard does not utilize EPDs as a data source for product-level emissions.

10 https://worldsteel.org/wp-content/uploads/Fact-sheet-on-scrap_2021.pdf; https://www.istructe.org/resources/the-role-of-scrap-in-steel-decarbonisation/

11 Shortfalls in Scrap Will Challenge the Steel Industry, Boston Consulting Group 2024, https://www.bcg.com/publications/2024/shortfalls-in-scrap-will-challenge-steel-industry; Low-carbon emissions steel standard, Arcelor Mittal, https://corporate.arcelormittal.com/climate-action/low-carbon-emissions-steel-standard

12 https://www.responsiblesteel.org/become-certified

The **Low Emission Steel Standard (LESS)**, is an independent standard originally developed by the German Steel Association in collaboration with the German Federal Ministry for Economic Affairs and Climate Action, builds on the IEA definitions, developing them for application with product carbon footprints or EPDs.[13] The LESS label identifies a steel product as meeting a low-emission threshold band (e.g. Band C low-emission steel) based on the embodied emissions of a product at the hot-rolled stage and the proportion of scrap used in production.[14]

The **China Iron and Steel Association standard** follows the IEA definition for crude steel. CISA standards are comparable to those of the IEA's definitions proposal: the standard is stable and technology-neutral, and it is aligned with the IEA's definition for near-zero emission steel (50 to 400 kilogrammes of CO2 per tonne of steel, with the precise value increasing according to a decreasing share of scrap use).

Taking a different approach, the **Steel Climate Standard** developed by the Global Steel Climate Council, is a technology-agnostic framework for steel product certification and corporate science-based emissions targets. Assessment is based on emissions intensity thresholds but notably does not employ a scrap-variable scale, thus using a single emissions intensity threshold at the hot-rolled stage that falls towards a near-zero emission value by 2050.[15]

In February 2025 a Joint declaration of Belgium, Italy, France, Luxembourg, Romania, Slovakia and Spain on an action plan for the European Steel Industry[16] was issued which provides an overarching analysis and set of recommendations to the EU Commission on issues related to steel decarbonization and trade. This includes a recommendation that risks to decarbonization associated with scrap steel, amongst others, should be addressed in the Carbon Border Adjustment Mechanism (CBAM) regulation currently under development. The declaration also advises to "ensure the coherence between CBAM, ecodesign requirements and other policy instruments regulating steel". Separately, the declaration also recommends EU members adopt GPP obligations for percentages of steel used in public infrastructure and construction to come from "zero-emission or low carbon technologies".

UNIDO endorses the Steel Standards Principles[17] which were launched at COP28; they aim to establish a common framework for climate-related steel standards and promote alignment on measuring steel emissions. UNIDO is one of more than 50 organizations that have endorsed the principles, including steel producers, industry associations, standard-setting bodies, international organizations, and civil society. The initiative aims to establish common emissions measurement methodologies to accelerate the transition to near-zero.

Internationally, there is significant activity to define near-zero and low-emission steel for GPP as well as for ESG reporting, through labels and certifications that have varying approaches and criteria. There is not yet a consensus on the use of scrap variable thresholds for steel in GPP, and this approach requires further analysis in the context of a procurement entities' own supply chain, trade agreement obligations and other trade policy development.

13 https://www.wvstahl.de/wp-content/uploads/20240422_concept-paper_LESS_final.pdf
14 System boundaries for EPD calculations are aligned with EN 15804:2012+A2:2019
15 https://globalsteelclimatecouncil.org/the-standard/
16 https://presse.economie.gouv.fr/sommet-sur-le-futur-de-lindustrie-siderurgique-europeenne/
17 https://www.wto.org/english/tratop_e/envir_e/steel_standards_principles_e.pdf

Governments should assess their own scrap steel market in the context of all relevant supply and demand-side policies to support rapid decarbonization of industrial sectors and avoid unintended negative consequences (see callout box for toolbox approach). This assessment should include consideration of using a scrap variable threshold band in GPP policy. Some key factors and implications for GPP policy are:

- The make-up of the scrap steel market specific to the government's supply chain for construction steel products
- Recycling, waste management and other related regulations that may impact market flow
- Compliance with procurement rules and international trade agreements
- Availability of standards and certifications for calculating and disclosing the proportion of scrap used in a product
- Availability of data on scrap steel in steel products
- Reconciling the use of scrap-variable threshold bands with project level emissions targets and net zero commitments for government operations
- Integration into existing procurement policies, procedures, and reporting systems

The IDDI Secretariat supports the agreement on a set of global threshold bands for steel production, including consideration of scrap steel content, for reference in policy and for reporting on progress towards global targets.

For GPP, governments should undertake their own analysis and determination on use of scrap steel variable thresholds in procurement policy. In its **Guidance for PCR Harmonization**, IDDI recommends including a requirement to disclose in EPDs the scrap share of the steel product , which facilitates collection of data to support policy development and reporting against global targets.

Notwithstanding the above, if existing standards, including the steel standards listed above, include the information required in a GPP policy then they should be considered in procurements. Typically, equivalencies are accommodated in procurement language, for example the IDDI GPP Pledge suggests the reporting requirement: "Type III Environmental Product Declarations (EPD), or other independently verified reports, covering the same aspects as the EPD". It is recommended that governments conduct analysis as required and be prepared to support suppliers by assessing equivalencies amongst standards during procurement.

3. Thresholds in existing GPP policies

Governments procure a vast array of goods and services to support the delivery of services to citizens. Many governments create or support development of Type I Ecolabels (Ecolabels) as a basis for their enterprise-wide green or sustainable procurement policies. Ecolabelling, standardized by ISO 14024:20181, refers to a method of certifying a product's environmental performance (and sometimes broader sustainability performance) based on the Ecolabel's requirements and specifications. Ecolabels create product categories, product environmental criteria and corresponding thresholds, which are then used as ways for assessing and demonstrating compliance to the Ecolabel. Data from Ecolabels is most often used for estimates-based reporting such as for enterprise-wide green procurement (e.g. reporting on the number of products with an Ecolabel purchased). If Ecolabels include a criterion and threshold for greenhouse gas emissions, then an estimate of emissions reductions attributed to the procurement of that product can be extrapolated.

Type III EPDs are standardized by ISO 14025:2006 but refer specifically to quantifiable environmental information that must be in accordance with ISO 14040:2006 and independently verified by a third party. EPDs include a measurement of emissions intensity using the Global Warming Potential (GWP) metric but do not include a threshold. Many governments specify the use of EPDs for construction projects, for green infrastructure, planning, and project design. EPDs will be required in upcoming EU product regulations[18] and are already core components in green building certification programs such as LEED and BREEAM. Data from EPDs is most often used for actuals-based accounting of embodied emissions of materials and products to support whole project life cycle assessment.

These two reporting systems are distinct and compatible, allowing for both top-down and bottom-up accounting of GPP. This section is about the latter approach: setting thresholds separately in policy and requiring EPDs as evidence.

A few leading governments are setting thresholds for low-emission concrete and steel in GPP policy. While there are not enough samples to show trends, it is useful to review emerging commonalities and differences.

The use of quantitative thresholds based on emissions intensity, requiring EPDs as evidence, has been the primary default methodology. Two distinctions are identified: whether thresholds are a single numerical value only, or a set of threshold bands, and whether they are static, or applied using an iterative selection process, based on emissions intensity percentiles of available materials.

Single-Threshold versus Multi-Threshold Approach

A single-threshold approach means there is either compliance or non-compliance depending on whether a product is below or above the threshold respectively. A single threshold is the least administratively burdensome approach and therefore often used in economy wide requirements, as explained in the call out box below, excerpted from IDDI's **GPP Guide on Setting Commitments**.

18 EU Construction Products Regulation

Product regulations, national standards, labels and GPP

While mandatory GPP requirements must be met by any company selling to the government, product regulations must be met by all products being offered for sale within the whole jurisdiction, including for both private sector and government procurement. National standards establish minimum requirements and best practices for regulations and may be referenced in regulations and GPP policies. Labelling schemes communicate information in standards for all consumers to rely on to make well-informed purchasing decisions.

Product regulations are advantageous to government procurement – they are a legal requirement that then doesn't have to be addressed specifically in each procurement, which reduces administrative burden for both buyers and suppliers. However, thresholds in economy-wide regulations are often necessarily less ambitious than governments may be able to achieve as a single buyer and leading governments may choose to exceed them in procurement targets.

It is recommended that governments in jurisdictions with low-emission product regulations show leadership by considering them as a minimum requirement and committing to bolder reduction targets for government procurement.

The multi-threshold approach involves the use of an upper and lower numerical value for each of a set of threshold bands. The Governments of Canada, India and the United States have all used or proposed multiple thresholds in policies for low-emission materials. Each of them is based on consultations with the entity's supply chain.

While Government of India has not published its selection process, Government of Canada's steel thresholds, and the United States Environmental Protection Agency (EPA) proposed labelling program, are based on an iterative selection process that encourages competition among low-emission material suppliers. Government of Canada's approach to steel is described to illustrate:

A set of percentile thresholds is published and endorsed by government. Accepted products would first have to be in the lowest 20% embodied emissions, if none are available in the lowest 20%, then products in the lowest 40% would be accepted, if none are available in the lowest 40%, then products lower than industry average would be accepted. This approach is responsive to the needs of the project by ensuring materials are available, and it incentivizes continuous decarbonization and supply chain development. It also requires EPDs or GWP data to be transparent and publicly available to facilitate the selection and reporting process.

See Appendix 1 for further details on Canada and India thresholds.

With consistent standards and data formats, iterative thresholds based on material availability can be mapped against a reference global set of threshold bands.

Project level thresholds

In line with IDDI's GPP Pledge Level 2 which is for governments to begin conducting whole project life cycle assessments, the IDDI encourages governments to consider thresholds on a project-level basis so that the total absolute emissions for a whole construction project including the use stage of the asset constructed.

It is recommended that consistent standards and data formats are followed to facilitate interoperable reporting, rolling up from product to project to portfolio and ultimately to be able to report progress towards a uniform global set of thresholds.

4. Conclusions

As this document highlights, the development of guidance and policies for procurement of low- and near-zero emission products is going to be inherently iterative given the evolving and complex nature of regulations that define the environmental performance of products. This effort underscores the complexity of harmonizing environmental goals across diverse regulatory, methodological, and industrial landscapes. While the discussions around definitions and thresholds outlined in this report provide a useful foundation for guiding green procurement policies, they may represent only a snapshot of the current state of knowledge and policy.

Governments could consider the IEA definitions in a broad policy context first as one of the options and choose definitions designed specifically for procurement purposes. These should be set in the context of national reporting requirements and the implementation of the most effective supply and demand-side policies needed to meet objectives and support rapid decarbonization of industrial sectors.

The **IEA Policy Toolbox for Industrial Decarbonization** is a repository of policy instruments available to assist governments as they design, develop and implement their strategies for industrial decarbonization. A robust industrial decarbonization policy strategy is likely to include multiple different instruments, as governments choose the instruments that are most suited to their individual circumstances and objectives. The report draws on comparative policy analysis to discuss the main considerations and best practices for a wide range of policy instruments, and provides examples of relevant policies applied around the world.

Public procurement policy makers should consider setting thresholds in the context of their own supply chains and existing practices. Thresholds with iterative selection processes are responsive to project needs and encourage continuous improvement. Referencing global threshold bands in overarching commitments would allow for transparent reporting against global targets. Consistent standards and data formats allow for global reporting.

They should also conduct their own analysis and seek expert advice from their suppliers and trade analysts on if or how they should apply the scrap variable scale in GPP policy, or if it is better addressed in other complimentary or supporting policies.

While IDDI acknowledges the need to adopt different accounting practices to meet regional circumstances, every effort should be made during policy development to critically address potential risks, regional and global, to prevent unintended negative environmental impacts.

Governments should work across departments, with industry, their national standard setting bodies, and internationally to continue the work towards harmonizing clear and consistent definitions for low- and near-zero emission steel, cement, and concrete, and begin to apply definitions across relevant supply and demand-side policies to greatest effect.

Given the dynamic nature of science, technology, and policy, this document serves as a foundation rather than a final word. Future developments will likely refine these methodologies, integrate new insights, and address emerging challenges. Readers should approach these findings as part of a broader, ongoing dialogue that requires revisiting, adapting, and expanding as the global commitment to sustainability matures. Collaborative efforts among stakeholders across jurisdictions will remain vital in ensuring these frameworks evolve in alignment with technological advancements and environmental imperatives.

Appendix 1

Examples of thresholds proposed or set in current GPP policies

Government of California

California's Buy Clean California Act (BCCA) of 2017 is the first known GPP policy for low-emission materials. The BCCA specifically outlines the GWP limits[19] – which are equivalent to the values provided by a PCF – and requirements for specific building materials, including structural steel, particularly for public procurement purposes.[20] The GWP requirements need to be supported by specific EPDs and Product Category Rules (PCR) for each product (e.g. steel, glass, etc.) as evidence of compliance.

Government of Canada

In 2022, the Government of Canada released the Standard on Embodied Carbon in Construction (SECC)[21], which is an appendix to the federal government's "Policy on Green Procurement"[22] and establishes the requirements for Buy Clean commitments in the Greening Government Strategy (GGS).[23] The GGS requires disclosing the embodied carbon of construction materials in major construction projects based on material carbon intensity or a life cycle assessment and reducing it using recycled and lower-carbon materials, material efficiency and performance-based design.

The SECC provides different Greenhouse Gas Reduction Requirements for ready-mixed concrete and structural and reinforcement steel.

Due to the logistics of transporting concrete, supply chains are mostly located close to where projects are completed, and cement in concrete similarly comes from nearby facilities. Government of Canada worked with their concrete suppliers to develop regional industry-wide EPDs to provide regionally-specific benchmarks for each strength class of concrete.

"The embodied greenhouse gas (GHG) emissions of procured ready-mixed concrete shall be disclosed on a project basis and be substantiated with EPDs in accordance with the Standard on Embodied Carbon in Construction. Project GHG emissions from ready-mixed concrete are the sum of GHG emissions from all mixes used, calculated using the GWPs for life cycle stage modules A1–A3 and volumes of each mix supplied. The total project GHG emissions from ready-mixed concrete shall be at least 10% less than those calculated using the GWPs of the baseline mix in the Regional Industry Average EPD for the strength class of each mix and the volume of each mix supplied."

19 https://www.dgs.ca.gov/-/media/Divisions/PD/Engineering/EPP/Buy-Clean-California-Act/BCCA-EPD-compliance-guide-final-1-23-23.pdf
20 https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act
21 https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32814
22 https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32573
23 https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/strategy.html

Because steel is a globally traded commodity, a different approach was developed in consultation with Government of Canada's structural and reinforcement steel supply chain.

"A [steel] product is eligible for procurement if the embodied GHG emissions associated with the production of its steel content are in the best performing 20% (lowest 20% in embodied GHG emissions) and is available to be reasonably sourced for a specific project. If products in the best performing 20% cannot be sourced, then a product qualifies if its embodied GHG emissions are in the best performing 40% (lowest 40% in embodied GHG emissions). If products in the best performing 40% cannot be sourced, then a product qualifies if its embodied GHG emissions is in the best performing 50% compared to the estimated industry average (lower than average embodied GHG emissions). The National tiered greenhouse gas emissions limits for steel construction products documents the method used to determine whether a product qualifies in the best 20%, the best 40% or the best 50% and provides the corresponding thresholds."

The European Union

In November of 2024, the European Commission made updates to the Construction Products Regulation (CPR) that was originally promulgated in 2011.[24] The 2011 version of the CPR originally put in place conditions for how construction products (including cement and concrete) were marketed or 'how to express the performance' of the construction product according to key characteristics of those products. These characteristics historically focused on product performance and safety such as strength, lifetime, fire-resistance, and / or other such physical and technical specifications. However, the recent 2024 update expands these specifications to explicitly include environmental performance across the product's life cycle.[25] The updated CPR regulation also provisions for GPP criteria, stating that 'contracting authorities and contracting entities should, where appropriate, be required to align their procurement with specific GPP criteria, to be set out in the delegated acts referred to in this Regulation". The updated CPR also refers to and suggests that environmental specifications should be measured in accordance with relevant European standards such as CEN 15804 or future applicable standards, which cover environmental performance from all stages of a product's life. The EU CPR currently requires the disclosure of the product's life cycle (with an EPD) and commits to setting thresholds in 2027.

Similarly, the Ecodesign for Sustainable Products Regulation (ESPR) which went into effect on July 18th, 2024 commits to setting disclosure requirements and thresholds for steel products, amongst others.[26] The ESPR is part of a package of measures that support the 2020 Circular Economy Action Plan, and its aim is to improve the sustainability of products placed in the EU market.

A cornerstone of the CPR and ESPR is the ongoing development of the Digital Product Passport (DPP), which will serve as a digital identity card for products and house information in a registry related to its environmental performance, among other key pieces of information (e.g. technical performance, origin of materials, etc.). This builds on several EU policies such as the EU Ecolabel[27,28], which is a voluntary label for environmental excellence, and more

24 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0305
25 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202403110
26 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L_202401781
27 https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel_en
28 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010R0066

specifically the Common EU GPP Criteria and Requirements[29] which are intended to be (voluntarily) incorporated into the public procurement process for selecting good and services based on their environmental performance.

While the EU Ecolabel and EU GPP Criteria and Requirements are voluntary policies, the CPR and ESPR are mandatory for all public buyers.[30]

Government of India

India is working on both a GPP policy framework for release in 2025 as well as a National Green Steel Policy.[31] In early December 2024, the Indian Ministry of Steel stated the intention to publish a 'green taxonomy' for the steel sector, which will include three levels of emission categories based on a star / grading system.

India's 'Green Taxonomy' and emission categories for steel

Rating	Value	Units
2 Star	2.0 - 2.2	tonnes CO2e / tonne crude steel
3 Star	1.6 - 2.0	tonnes CO2e / tonne crude steel
4 Star	< 1.6	tonnes CO2e / tonne crude steel

The intention is to use the star rating system from the National Green Steel Policy to inform a GPP strategy that will mandate different public entities and departments to procure various levels of 3 to 4 to 5 Star steel (per the above).

29 https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en
30 https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en#gpp-requirements-in-sectoral-legislation
31 https://www.reuters.com/markets/commodities/india-announce-green-steel-formula-by-mid-december-source-says-2024-11-18/

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Progress by innovation