

GREEN CHOICE PHILIPPINES

NELP-GCP 20250009 CEMENT

I. BACKGROUND

Cement is a common building material worldwide. It plays an integral part in urban development, infrastructure, and economic growth. As the foundation of homes, roads, hospitals, and cities, cement is integral to shaping modern society. Yet, while demand continues to rise—driven by urbanization and industrialization—its environmental impact remains a significant challenge.

From early materials like volcanic ash and lime to modern Portland and blended cements, the industry has evolved to meet market demands and sustainability goals. Despite innovations, the environmental impact remains a key challenge. As a heavy industry, cement manufacturing is energy-intensive and contributes heavily to industrial greenhouse gas (GHG) emissions, resource depletion, and waste generation.

The cement industry is the second-largest industrial CO₂ emitter accounting 25% of global industrial CO₂ emissions. From 0.86 Gt in 1990 to 2.46 Gt in 2019, emissions have surged—especially in Asia, which now contributes over 70% of global cement emissions.

To respond to these challenges, the National Ecolabelling Programme – Green Choice Philippines (NELP-GCP) is revising its ecolabelling criteria for cement. The revised criteria aim to reduce environmental impacts across the product life cycle—from raw material extraction to packaging and disposal. It also provides a strategic path to align the cement industry with sustainability and climate goals, driving market transformation and responsible production.

A. Market Overview

The global cement industry produced 4.1 billion tons in 2023, led by China, India, and Vietnam. The Philippines is also experiencing steady construction growth, recording 26,159 authorized building permits in 2024, a 2% increase from 2023.

Locally, the cement market is dominated by Portland and blended cements. The cement market includes Portland types (Type I–V, IA, IIA, IIIA) and blended cements such as Type IS (slag), IP (pozzolana), IL (limestone), and IT (ternary blend). As of 2024, the Philippines has a national cement production capacity of 53 million tons/year, far exceeding domestic demand of 34.5 million tons. However, import reliance continues to rise—cement imports grew from 30% in 2019 to 51% in early 2024, which are mainly sourced from Vietnam and Japan.

There are nine cement manufacturers in the Philippines, with Holcim, Republic Cement, Eagle Cement, and Concreat holding 80% of market share. Despite high production capacity, local production only operates at 55-60% of its installed capacity, which has increased production costs and forced temporary shutdowns of some plants.

B. Environmental Impacts

In the Philippines, cement emissions per capita stood at 0.103 tonnes in 2021. The emissions intensity of the local cement industry was 683 kgCO₂/tonne of product in 2016, above the world emissions average of 614 kgCO₂/tonne of product.

Cement production involves three major stages—**raw material preparation**, **clinker production**, and **cement preparation**—each with significant environmental impacts. Understanding these environmental hotspots is critical in addressing the industry's contribution to climate change, pollution, and resource depletion.

The clinker production stage is the most energy-intensive part of the production process, where the prepared cement composition is fed into the kiln, usually after going through a pre-heater where it is exposed to temperatures as high as 1450°C. This process creates chemical and physical changes that turn the raw material into a clinker. The estimated global average energy consumption intensity for clinker production has decreased from 4.24 GJ/ton-clinker in 1990 to 3.46 GJ/ton-clinker in 2019.

Meanwhile, there are studies that the generated waste from the packaging materials and demolition debris of cement have a significant impact on its GHG emission share. Given that in a 25 kg of cement a 111g of packaging bag is produced. The transportation emission of cement to the market for distribution of products leads to high energy consumption, traffic congestions, and air pollution emission due to the produced particulate matter.

Locally, cement production accounts for over 80% of emissions from the minerals sector and more than 50% of total industrial emissions. Meeting decarbonization targets of 50–80% by 2050 will require major technological shifts and policy interventions.

C. Environmental Initiatives

To address these impacts, the Global Cement and Concrete Association (GCCA) launched a roadmap for Net Zero Concrete by 2050. Globally, the sector has already reduced CO₂ emissions by 23% per tonne of cementitious material since 1990.

Key strategies include clinker substitution (using fly ash, slag, limestone, etc.), use of alternative fuels (e.g., pre-treated waste instead of coal), energy efficiency in kilns and production, carbon capture and storage (CCS) technologies, and concrete design improvements and recycling.

In the Philippines, leading companies are aligning with Sustainable Development Goals (SDGs). Holcim, for instance, uses co-processing technologies that convert qualified waste into alternative fuel. Its ECOPlanet cement boasts a 30% lower carbon footprint, and its

Balik-Plastic program recycles cement bags for reuse in production. Republic Cement collaborates with Pure Ocean to remove ocean plastics and use them in co-processing. Eagle Cement aligns with SDG 9 and 11, integrating sustainable production with community engagement.

II. DEFINITION OF TERMS

Blended Hydraulic Cement - A hydraulic cement consisting of two or more inorganic constituents (at least one of which is not portland cement or portland cement clinker) which separately or in combination contribute to the strengthgaining properties of the cement, (made with or without other constituents, processing additions and functional additions, by intergrinding or other blending). [ASTM C219-07a]

Cement Sustainability Initiative (CSI) Tool - For CO₂ emissions, the Cement CO₂ and Energy Protocol is a tool for cement companies worldwide that provide a harmonized methodology for calculating CO₂ emissions which addresses all direct and the main indirect sources of CO₂ emissions related to the cement manufacturing process and on-site generation. [WBCSD, 2011]

Philippine National Standards (PNS) - The standard promulgated by the Bureau of Philippine Standards (BPS) relating to product specifications, test methods, terminologies, standardization procedures, guidelines or practices. [DTI DAO 04:2008]

Portland Cement Clinker - A partially fused clinker consisting primarily of hydraulic calcium silicates. [ASTM C219-94²]

Masonry Cement - a hydraulic cement, primarily used in masonry and plastering construction, consisting of a mixture of portland or blended hydraulic cement and plasticizing materials (such as limestone, hydrated or hydraulic lime) together with other materials introduced to enhance one or more properties such as setting time, workability, water retention, and durability. [ASTM C91-05]

Net Zero CO₂ emissions - Condition in which anthropogenic carbon dioxide (CO₂) emissions are balanced by anthropogenic CO₂ removals over a specified period. [IPCC Definition]

Portland Cement - a hydraulic cement produced by pulverizing clinker, consisting essentially of crystalline hydraulic calcium silicates, and usually containing one or more of the following: water, calcium sulfate, up to 5 % limestone, and processing additions. [ASTM C219:07a]

III. SCOPE

These criteria shall apply to but not limited to Portland cement, Blended cement, and Masonry cement.

IV. GREEN CHOICE PHILIPPINES REQUIREMENTS

To carry the Green Choice Philippines Seal of Approval, a product must meet the following requirements.

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CRITERIA	VALIDATION METHOD
A. Quality Criteria	
1. The product shall comply with the latest Philippine National Standards (PNS): • PNS 07: Portland Cement - Specification • PNS 63: Blended Hydraulic Cements - Specification • PNS ASTM C91/C91M Standard Specification for Masonry Cement	The applicant shall present the Philippine Standards (PS) license from the DTI - Bureau of Philippine Standards.
2. Cement bag markings shall comply with the Philippine National Standards for Portland Cement, Blended Cement, and Masonry Cement.	The applicant shall present the Philippine Standards (PS) license from the DTI - Bureau of Philippine Standards.
B. Environmental Criteria	
1. The manufacturing, transportation and post-industrial waste disposal shall comply with the applicable social and environmental laws and regulations, including but not limited to: - PD 1586: Philippine Environmental Impact Statement System - RA 9003: Ecological Solid Waste Management Act - RA 8749: Clean Air Act - RA 9275: Clean Water Act - R.A. 6969: Toxic Substances and Hazardous and Nuclear Waste Control Act of 1990 - RA 7942: Philippine Mining Act of 1995 - RA 11898: Extended Producer Responsibility on Plastic Packaging Waste - PD No. 705: The Revised Forestry Code of the Philippines - DAO 2022-04: Enhancing Biodiversity Conservation and Protection in Mining Operations - RA 11058: Occupational Safety and Health (OSH) Law - Other equivalent or applicable local and international social and environmental laws and regulations	The applicant shall submit valid permits and clearances from DENR and other relevant agencies as proof of compliance. These may include: • Environmental Compliance Certificate (ECC) or Certificate of Non-Coverage (CNC) • Established Material Recovery Facility (MRF) • Permit to Operate for Air Pollution Source Equipment • Discharge Permit • Hazardous Waste Generator ID • DENR Compliance Monitoring Reports • OSH Compliance Certificate In addition, the applicant must submit self-monitoring reports for compliance and/or third-party certification on environmental management system (EMS), occupational health and safety (OH&S) management system, or its equivalent.

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2. The carbon dioxide emissions across the life cycle should be less than 530 kg of carbon dioxide per ton of cement (Net CO ₂).	The applicant shall submit the calculation of the CO ₂ emissions using recognized international tools, standards, and methods such as but not limited to the Cement Sustainability Initiative (CSI) Tool.
3. The product must be designed to address all the environmental aspects to minimize associated impacts throughout the lifecycle.	The applicant shall submit relevant proof of conformance such as but not limited to heavy metal test results, safety data sheet (SDS), technical data sheet (TDS), and EPR program.
4. The applicant shall have a program that is beneficial in preserving and enhancing biodiversity.	The applicant shall demonstrate initiatives on biodiversity conservation such as but not limited to biodiversity conservation plans and/or programs, and partnership programs with the localities on biodiversity conservation.

V. PERIOD OF VALIDITY

The product criteria is valid for **five (5) years** from the date of its approval unless otherwise revised or withdrawn by the NELP-GCP Board, if proven necessary at any period of time.

VI. TECHNICAL COMMITTEE MEMBERS

Institution	Technical Committee Members
Philippine Green Building Council (PhilGBC)	Engr. John Reniel Englis
Department of Environment and Natural Resources - Environmental Management Bureau (DENR-EMB)	Engr. Therese Gonzales Engr. Kim Geo Bernal
Department of Public Works and Highways - Bureau of Research and Standards (DPWH-BRS)	Engr. Mariz Tiglao Engr. Alejandro Cesar Ilano
Cement Testing Center (CTC)	Ms. Kristine Anne Linga Ms. Bella O. Ballon
Philippine GeoAnalytics Inc.	Mr. Richmon Geminiano Mr. Efreihm Jovi De Guzman

VII. REFERENCES

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