

Vietnam Sustainable Construction Materials Market Analysis

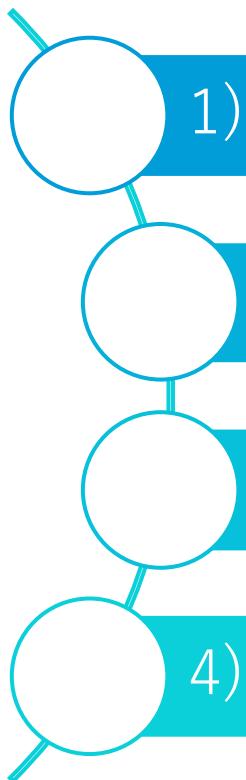
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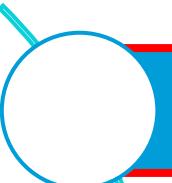
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1.1 Objective

1. **Market survey** to understand the availability of “greener” products, how they compare with standard products, what share of the market they hold and how many potential suppliers exist, and pricing compared to standard products
2. To **identify opportunities** where “greener” products exist in the market but are not being utilised to their full potential in government procurement, the reasons why they are not being used to their full potential, and the applicable usage cases / sectors where their use could be further promoted
3. To examine current usage of **certification systems** and their suitability for use in government procurement in promoting increased use of “greener” products for cement, concrete, rebar, asphalt in infrastructure construction and a path to net zero

1.2 Scope

1. Focus on the **key materials** used in civil engineering (or building) construction
 - a. **Cement**
 - b. **Steel (rebar)**
 - c. **Asphalt**
 - d. **Concrete**
2. Reason is that existing green label systems mainly focus on consumer products, with little or no coverage of these products despite the high environmental impact of their production

1.3 Background

1. The study is financed by the Asian Development Bank (**ADB**) Climate Change and Sustainable Development division, working with its procurement team
 2. ADB wishes to pilot **sustainable public procurement** in the projects it finances, hence this study aims to identify potential opportunities
- 3. MOC and VIBM** acted as counterparts for the study

Disclaimer:

This consultant's report does not necessarily reflect the views of ADB, or the Government of Vietnam. The survey was carried out with limited duration in July – August 2024 using best efforts and is not an exhaustive survey of the market

Data was obtained from a variety of sources and in some cases was estimated.

Price data was mainly taken from published quotations from provincial Departments of Construction.

1.4 How to identify “opportunities to improve resource efficiency”?

- a) a greener alternative is **used internationally** but less so in the country
- b) suppliers already have environmental product declarations (**EPD**) due to customer demand (e.g. export, or private sector)
- c) greener alternatives exist and are used by the private sector on green buildings (such as **LEED**) but not on government projects
- d) both normal and greener alternatives exist but due to **pricing** the greener alternatives still have limited market share.
- e) greener alternatives exist but there seems to be a **barrier** to their wider application e.g. design standards, cost norms, industry practice, regulatory framework

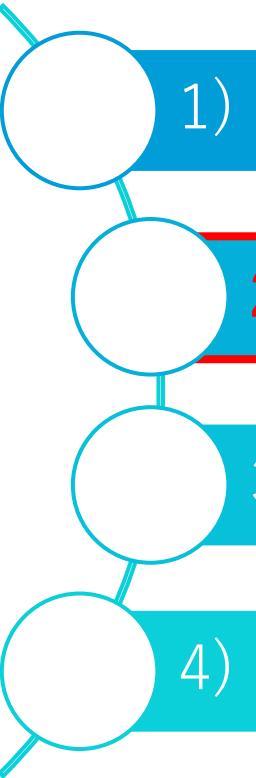
1.5 What opportunities are suitable or unsuitable?

Examples of suitable opportunities

- Greener product **available** but higher price limits adoption
- Greener product exists but perception by clients/ designers limits adoption
- Greener product exists but bid documents do not distinguish it from the conventional product

Examples of unsuitable opportunities

- Products still under **research**
- Products **not yet available** on the market in the country
- Products whose long-term **durability** is not yet proven



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2.1 Methodology – data challenges

- 1) Obtaining company or product data from industry associations to determine “**greenness**” and its market overview was unsuccessful. Association rules require the association to maintain confidentiality of data and it can only be disclosed with permission of the data owner.
- 2) Obtaining unpublished company or product data from companies was surprisingly unsuccessful. Many of the firms are stock market listed firms and follow strict **disclosure rules**. Accordingly, staff are instructed not to provide any information beyond that shown in the published marketing, technical data, or investor relations reports.
- 3) Countries whose associations and firms are not members of the Global Cement and Concrete Association (**GCCA**) such as Vietnam have more limited information available, since they do not participate in GCCA’s standardized data reporting system. This standardized data reporting system also forms the basis for preparation of EPDs.
- 4) Government **agencies** and industry **associations** provided occasional advice or opinion of value, but it was time consuming to obtain appointments, typically only a single meeting would be held, and they generally lacked statistical data or were unable to disclose it.
- 5) Most firms are highly **secretive regarding the “recipe”** for their products. Only **a small subset of firms is progressive** and has acted on market trends for information disclosure as required for clients constructing green buildings, or for export markets that require EPDs.
- 6) Manufacturers staff often do not respond well to general price requests, but insist to know who you are, what is the project, and want their provincial distributors to handle.

2.2 Methodology – example responses

- a. what are the CO2 emissions/ton achieved by your PCB40 cement? **We do not disclose this value externally.**
- b. what is the approximate "gap" in CO2 emissions between your product, and normal "non green" cements in Vietnam? (this is so we can quantify the CO2 benefit of the product) **We cannot answer that question as it would reveal the composition of our product.**
- c. is there a price premium for your "green cement" product, or is it naturally price competitive due to the efficiency of its production / blend? - **Our products are manufactured using advanced technology from [xxx country] under the supervision of [xxx nationality] staff, and are of high quality and stability. Our PCB commands a premium price not because it has been green-certified, but because it maintains the high quality inherited from [xxx country].**

2.3 Methodology – data successes

- 1) EPDs published in the **EPD library** <https://www.environdec.com/library> were the most valuable data source, since they show CO₂ emissions at a product level, and may also show percentage blend for cement products.
- 2) Company sustainability reports, or ESG reports were somewhat useful as they helped identify firms with a progressive approach. Although they typically only give data at a company level rather than a product level.
- 3) **Government published material price data** as part of the cost norm system was useful for providing a uniform price database.
- 4) **Materials engineers** undertaking construction supervision assignments, and engineers from contractors were the most useful respondents regarding actual practice, technical, regulatory, and practical issues, and for discussing potential opportunities for improved resource efficiency and possible constraints to their adoption.
- 5) Vietnamese sector **roadmaps**, or **presentations made by industry associations** to international forums provided useful overviews of roadmaps for GHG emissions reduction and the timeline of planned adoption of technologies and targets.
- 6) **International references** such as company brochures, global association roadmaps, and research publications were of particular use in identifying and understanding details of the potential opportunities that could be applied in the country context.

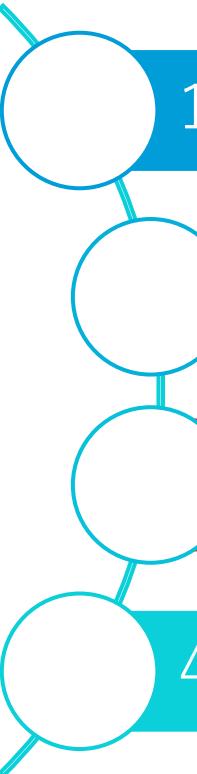
2.4 Example EPD data (Insee cements)

No	Name	Standards (EN 197-1)	% Recycled Content (Slag , Flyash, Pozzolan, Limestone, Calcium sulfate usage at least)	% OPC
Bag Segment				
1	INSEE Da Dung Power-S INSEE Power Fast ECO Da Dung	CEM IV/B	44	56
2	INSEE Wall Pro	CEM II/B-M	60	40
3	Lavilla Extra CC40	CEM V/A	60	40
4	INSEE Power Cast	CEM II/A-S	13	87
Bulk Segment				
5	INSEE Easy Flow INSEE Quick Cast	CEM II/A-S	28	72
Slag Cement				
6	INSEE Mass Pour	CEM III/B	70	30
7	INSEE Extra Durable	CEM III/B	70	30
8	INSEE Stable Soil	CEM III/B	70	30
9	INSEE Compact Rock	CEM III/B	70	30

2.4.2 For Cement product: Impact categories considered, as per the PCR 1000 kg average INSEE Power S, Eco Da Dung, Insee Power Fast

a. Produced at Hon Chong Plant

No	Core environmental impact indicators		
	Indicator	A1-A3 (Total)	Unit
1	Global Warming Potential total	582	kg CO ₂ eq.



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3.1 Findings on opportunities (1)

- 1) **Rebar has highest potential** for improved resource efficiency since a standard product (steel produced from iron ore) and a substantially greener alternative (**steel produced from scrap**) are both available on the market with roughly equal market shares and currently competing on price based on the same technical specifications. Production capacity of the greener alternative is sufficient to meet market demand and replace the standard product. **CO2 reduction of the alternative is 50 to 70%, with no price premium (0% increase)**.

Limitations are that scrap is mostly imported and price is based on auction. A future price premium should be anticipated

- 2) **Asphalt currently has moderate potential** for improved resource efficiency, since greener products (**warm asphalt, and use of recycled asphalt planings - RAP**) are not yet available on the market due to **absence of demand**, however use of RAP is anticipated shortly and one firm has a stockpile in readiness. **CO2 reduction of the alternative is estimated at 16% compared to hot mix asphalt if applying 20% RAP content**.

Limitations are that consistent planings are required, current planings are mostly from urban areas and lack consistency

3.2 Findings on opportunities (2)

1) **Cement has intermediate potential** for improved resource efficiency. Vietnam currently has extensive supply of PFA and BFS from its coal fired power stations and steel making industry, although in future this will decline as part of decarbonization efforts. Blended cements (PCB) have already displaced standard products (PC) based on their lower price. Continued improved resource efficiency improvement can continue through:

- a. optimization of cement usage, and
- b. selection of solutions based on CO2 emissions as well as price.

Limitations are a) transparency as current PCB standard permits from 5 – 50% blend without subcategories, and only 3 firms have EPDs, and b) PFA quality management

2) **Concrete has relatively good potential** for improved resource efficiency since there are:

- a. A product available on the market (CMC). **CO2 reduction of the alternative is 7.5%, with small price premium (2% increase)**
- b. A product available on the market based on partial replacement of PCB with PCB_{BFS}. **CO2 reduction of the alternative is 30% or more, with small price premium (3-5% increase)**

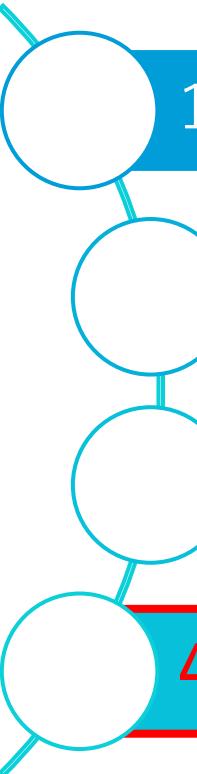
Limitations are a) CMC system only in HCMC so far; b) slag availability leads to a high price and PFA quality management needs work.

3.3 Notable firms / products

Cement	Rebar	Asphalt	Concrete
SCCG / Insee Vietnam (EPD)	Tung Ho (EPD)	BMT Construction Investment JSC (did pilot, has large stock of RAP)	FiCO PanU (CMC)
Long Son Cement (EPD)	VAS Nghi Son (EPD)		FiCO PanU (Low Carbon Concrete)
Quang Ninh cement and construction / Lam Thach (EPD)	<i>Viet Duc (Vietnam Germany Steel Pipe JSC)</i>		
	<i>Viet Nhat (Vina Kyoei Steel)</i>		
	<i>Viet Y (Vietnam Italy Steel)</i>		
	<i>Mien Nam (Southern Steel Co.)</i>		
	<i>Viet Uc (Vinausteel Co. Ltd.)</i>		
	<i>Viet Sing (NatSteel/Vina)</i>		

3.4 Next steps planned by ADB

- 1) Verify with clients / design teams technical suitability on a project basis
- 2) Discuss with stakeholders the most appropriate mechanism to promote each opportunity e.g.
 - a). regulation mandating a particular design or construction approach
 - b). price preference in procurement
 - c). the cap-and-trade mechanism commencing in 2027 in Vietnam
- 3) Caution will be required to ensure that price preferences are not duplicated, e.g. by applying a cap-and-trade mechanism to the industry overall, and at the same time applying a preference system in procurement.



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4.1 Certification schemes

- Building schemes



- Product certifications



4.2 Product certification types

Environmental Label standard

ISO 14024: Environmental Labels and Declarations – Type I Environmental Labelling – Principles and Procedures

ISO 14021: Environmental Labels and Declarations –Self-declared Environmental Claims (Type II Environmental Labelling)

ISO 14025: Environmental Labels and Declaration –Type III Environmental Product Declarations

Type I (ISO14024)



GEN Member

ISCC Certified GHG Protocol

EU Ecolabel

LEADER ENRGE

Better Biomass

RSB

RED cert

BETTER BIOMASS

CERTIFIED SUSTAINABLE PALM OIL

RSPO

BONSUCRO

TRRS

- Life cycle consideration
- Multiple criteria
- 3rd party verification

Type II (ISO14021)

- Single aspects
- Self declaration
- 1st or 3rd party lab test report

Type III (ISO14025)



working with the Carbon Trust

100g CO2

EMAS

Responsible

FSC

cradle to cradle

FAIRTRADE

PEFC

- Life cycle consideration
- Single/multiple aspects
- Impact data information
- 3rd party verification

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4.3 Certification scheme findings

- 1) The **green buildings systems** have a clear objective and substantially meet that objective.
- 2) However, **materials and their embodied carbon only account for around 13% of the rating score** (majority is for energy efficiency, location and transportation, indoor environment etc.), so they are not appropriate for use on civil engineering works.
- 3) For civil engineering works, disclosure of CO2 emissions, and cement composition is fundamental to compare alternative designs or bids, hence **EPD seem essential**.
- 4) Singapore and Vietnam Green Building Councils current **product certification systems lack quantitative data** for cements and would not contribute in the case of civil works (although one firm's steel is identified as being produced from recycled materials).
- 5) Fortunately, moves by LEED and Green mark to give credits for use of **whole life carbon** assessment and for submission of EPDs seems to be **rapidly driving** moves towards more widespread use of EPDs, for cement in particular.
- 6) The objective of the VIBM green cement certificate seems unclear since it does not state an ISO methodology, or a protocol for the CO2 calculation. Product differentiation capability is limited as the CO2 criteria is not demanding, with a single set of criteria whether for clinker, PC, PCB or different cement strength grades. It is unclear whether VIBM would be eligible or interested to enter the market as an EPD program operator.
- 7) The Hong Kong model for **EPDs for concrete** seems a useful reference, since it **presents both the CO2 emissions result, as well as the proportion of SCM in the mix and the strength / purpose**.

4.4 Certification for Vietnam

- 1) Green building systems serve their purpose, continue to evolve, and could be adopted for government procurement of buildings
- 2) For civil works EPDs seem essential. There are many cases to consider, such as
 - for civil engineering in a major city, and
 - for civil engineering outside a city.
- 3) The Hong Kong example of EPDs for concrete is successful in a dense city environment where readymix is virtually always used.
- 4) But to obtain an EPD requires data analysis of input materials and energy etc. for a defined period of production, typically 1 year. For a cement plant that might be feasible, but for a readymix plant producing a very wide range of mixes it might not be so easy to separate out the data for each particular mix with sufficient rigor to withstand audit. Then, for custom concrete mixes e.g. for a metro project, the readymix firm might need to create EPDs just for those mixes which would take time.
- 5) Use of cement EPDs avoids many of these issues, hence cement EPDs also seem to be a vital tool particularly for projects outside of the major cities.
- 6) Use of EPDs for reinforcing steel is likely to be the way forward, although noting that provided the steel is certified as produced from scrap, major CO₂ reduction is automatically obtained so recourse to an EPD might not be required during early years of adoption.

Thank you for listening!