GUIDANCE ON ALLOCATION OF SUPPLEMENTARY CEMENTITIOUS MATERIALS

1. SUMMARY

Supplementary Cementitious Materials (SCMs) are co-products from industrial processes that are in cement and concrete products. Common SCMs include fly ash, blast furnace slag, and silica fume. Following the updated EPD International Product Category Rules (PCR) for construction products 2019:14 v2.0.1 (IEPDS 2025a) and the ECO Platform LCA Calculation Rules v2.0 (2024), the share of environmental burden for SCMs must be apportioned by economic allocation (based on the revenue of each co-product). Where available, EPDs or primary data from SCM suppliers (which use economic allocation of SCM co-products) should be used in the production of downstream EPDs, for example, for use in cement or concrete products.

Blast furnace slag and silica fume: where EPDs or primary data for SCMs are not available, it is recommended that default interim values from the AusLCI database should continue to be used (see Table 1).

Fly ash: between 50% and 90% of the fine-grade fly ash from black coal in Australia is currently disposed of in storage ponds or dams (CS Energy 2024; ADAA 2024). There is insufficient publicly available information to define fly ash as a co-product rather than a waste, due to the confidential nature of the power station revenue data. Where supplier EPDs or primary data are not available and the fly ash does not meet all end-of-waste criteria (e.g., due to high disposal rates), fly ash may continue to be treated as waste with 0% allocation; otherwise, economic allocation applies.

SCM downstream processing: It is important that all SCM downstream processing steps (after the point of allocation/end-of-waste-state), be included for all SCMs. Downstream processing steps may include drying, grinding, screening, classification, packaging, and transport (for more information, see the section Downstream processing and transport of SCMs).

EPD reporting: For transparency, it is recommended that relevant information on SCM allocation be reported in the LCA Information section of the EPD. The allocation information should include the allocation method (economic allocation), the process and database (e.g., blast furnace slag from pig iron blast furnace, AusLCI v1.45, 2025), the allocation factor (%), describe any downstream processing steps, and state the resulting GWP-GHG per tonne of SCM (kg CO_2e GWP-GHG/tonne). Where a downstream EPD uses an upstream EPD as a data source, it is also recommended to reference the upstream EPD and/or transfer the SCM allocation information from the upstream EPD to the downstream EPD.

Workshops and meetings will be held with relevant industry stakeholders in Australasia during 2026 to determine if more representative economic allocation factors can be developed for each SCM.

2. PURPOSE

This technical guidance is designed to assist cement and concrete manufacturers in complying with the economic allocation requirements for supplementary cementitious materials (SCMs) as specified in the International EPD System's Product Category Rules (PCR) 2019:14 version 2.0.1 (IEPDS 2025a) and the ECO Platform LCA Calculation Rules version 2.0 (ECO Platform 2024). These rules ensure consistent and transparent life cycle assessment (LCA) practices for Environmental Product Declarations (EPDs) in the construction sector, particularly for by-products and co-products used as SCMs in cement and concrete production.

SCMs, such as fly ash, granulated blast-furnace slag (GBFS), and silica fume, are often derived as co-products from industrial processes like coal-fired power generation, steel production, or silicon manufacturing. SCMs are increasingly being used to reduce the embodied environmental impacts of cement and concrete products. In LCA for EPDs, environmental impacts from these multi-output processes must be allocated appropriately to account for the share of environmental burdens, avoid inconsistencies, and ensure comparability across EPDs.

The updated Product Category Rules (PCR) for Construction products, PCR 2019:14 v2.0.1 (IEPDS 2025a), require the economic allocation of co-products used in cement and concrete products to align with the revised ECO Platform Standards (ECO Platform 2024). These updated rules and standards supersede the existing complementary PCRs (C-PCRs) for concrete and concrete elements, EN 16757:2022 (EN 2022a); for cement and building lime, EN 16908:2017+A1:2022 (EN 2022b); and for the core rules for the product category of construction Products, EN 15804 +A2:2019/AC:2021 (EN 2021).

EPDs or primary data from SCM producers are the best sources for downstream cement and concrete EPDs; however, for many SCMs, they have yet to be developed, and primary data is typically confidential. Economic allocation data for SCMs, therefore, can be challenging to obtain. The use of consistent economic allocation factors will further enhance the comparability of EPDs, even as EPDs for SCMs are still being developed.

The purpose of this guidance is to support the development of EPDs for cement and concrete products that contain SCMs by providing interim guidance on the prioritisation of SCM data sources to be used in the production of cement and concrete EPDs. This will improve the comparability of cement and concrete EPDs in Australasia.

3. BACKGROUND

Co-product allocation rules ensure that the environmental burden associated with the production of SCM products is accounted for (if applicable) and enhance the comparability of cement and concrete product EPDs. In business vocabulary, co-products may also be referred to as by-products, intermediate products, non-core products, or sub-products (EN 2021; IEPDS 2025a).

CONSTRUCTION PRODUCTS PCR 2019:14 V2.0.1

The Construction Product PCR v2.0.1, section 4.5.1.1, provides updated guidance specific to the allocation of co-products used in cement and concrete, aligning with the updated ECO Platform LCA Calculation rules.

The recent key change to the PCR is that economic allocation shall be used for processes producing co-products used in cement, concrete, and other construction products, even if their contribution to the overall revenue of the process is very low (below 1%). This is to understand the impact, even if small, of these co-products. Section 4.5.1.1 of Construction Product PCR v2.0.1 now states that:

> *"Economic allocation shall be used for processes producing co-products for use in cement and concrete, for example:*
>
> - *steel production and granulated blast-furnace slag or crystallised basic oxygen furnace slag,*
> - *coal-fired electricity generation, fly ash and artificial gypsum, and other processes producing artificial gypsum,*
> - *silicon metal and ferro-silicon alloys and silica fume, and*
> - *aluminium-oxide-containing sources arising from aluminium and alumina production.*
>
> *Other allocation methods, e.g., physical partitioning, system expansion or physical allocation, shall not be used for these products. This economic allocation should use market prices, averaged over a period. It is recommended to use long-term averages (≥3 years) rather than short-term averages to avoid the influence of significant annual fluctuations in price.*
>
> *When assessing the environmental burden of the high value co-products (e.g., steel, electricity, silicon), the environmental burden allocated to the low value co-products used in cement and concrete can be omitted as a conservative estimate.*[1]
>
> *Above rules are adopted from the ECO Platform standards."*

It is important to note that many of the environmental burdens assigned to SCMs using economic allocation, are highly sensitive to the factors applied.

ECO PLATFORM STANDARDS

The above rules in PCR 2019:14 v2.0.1 were adopted from the ECO Platform LCA Calculation Rules version 2.0 (ECO Platform 2024). Additional information from the ECO Platform rules that is important is:

- *"Until a consistent approach is in place in standardisation, all ECO Platform POs are required to use economic allocation for the processes producing co-products for use in cement and concrete…"*
- *"For these [listed] co-products, economic allocation shall be used even if their contribution to the overall revenue of the process is very low (below 1%), to understand the impact, even if small, connected to these co-products.*

[1] Note this sentence only relates to the high-value co-product (e.g. steel, electricity) and not the lower value co-product (e.g. slag, fly ash).

Economic allocation should use market prices, averaged over a period in time as defined in ISO 14044 Amd2:2020 (chapter D4.3)."

The use of economic allocation for co-products, even where the contribution to the overall revenue of the process is very low (less than 1%), is a stricter requirement than was previously stated in EN 15804 +A2:2019/AC:2021, which allowed contributions to the overall revenue of 1% or less to be neglected. In practice, the exact contribution to revenue can be difficult to ascertain unless the value of the main product and co-products, as well as production volumes, are known.

Note that market prices for an SCM may not be representative of the revenue paid to the upstream producer (e.g. steel mill, coalfired power station) as the market prices include the value adding processing, packaging, distribution and marketing. Market prices for SCMs therefore may not be suitable for determining the economic allocation factors.

All established ECO EPD Programme Operators should follow this ECO Platform rule.

EN 15804 +A2:2019/AC:2021

The allocation procedures in EN 15804 +A2:2019/AC:2021 for co-products used in cement and concrete are superseded by the updated guidance in PCR 2019:14 v2.0.1.

COMPLEMENTARY PCRS

The allocation procedures for co-products used in cement and concrete in the complementary c-PCRs listed below are superseded by the updated guidance in PCR 2019:14 v2.0.1. These c-PCRs are currently being updated (IEPDS 2025b).

- Concrete and Concrete Elements EN 16757:2022 (EN 2022a)
- Cement and building lime EN 16908:2017+A1:2022 (EN 2022b)

4. GUIDANCE

Following the PCR 2019:14 v2.0.1, section 4.6, data should be used in priority:

1. Primary data:
    - EPD as a data source (which uses economic allocation of co-products), or
    - Primary data from the manufacturer or supplier (including revenue data)
2. Secondary data
    - Representative data from databases
    - Representative data from literature
3. Proxy data
    - Inventory data that does not fulfil all the data quality requirements of representative secondary data

EPDs or inventory data collected from upstream manufacturers or suppliers that meet the data quality requirements outlined in PCR 2019:14 v2.0.1 should be used where possible for the production of EPDs for cement and concrete products. Economic allocation must be used to allocate environmental burdens between co-products, and relevant downstream processing stages must be included for the production of SCM products. (See further details in the sections below for each SCM.)

Where primary data are not available for SCMs, representative secondary data from databases or literature sources that meet the data quality requirements outlined in PCR 2019:14 v2.0.1 may be used. When primary or representative secondary data do not meet all data quality requirements, proxy data may be used. Economic allocation must be used to allocate environmental burdens between co-products, and relevant downstream processing stages for the production of SCM products must be included (see further details in sections below for each SCM).

Please refer to PCR 2019:14 v2.0.1, section 4.6, for definitions and further guidance on the data quality requirements.

The data sources used to represent SCMs in cement and concrete EPDs should be reported in the LCA and EPD, per the data quality reporting requirements and the documentation of allocation assumptions, to ensure transparency for EPD users.

Blast furnace slag and silica fume

Where EPDs or primary data for SCMs are not available, it is recommended that default interim values from the AusLCI database should continue to be used (see Table 1).

Fly ash

Between 50% and 90% of the fine-grade fly ash from black coal in Australia is currently disposed of in storage ponds or dams (CS Energy 2024; ADAA 2024). There is insufficient publicly available information to define fly ash as a co-product rather than a waste, due to the confidential nature of the power station revenue data. Where supplier EPDs or primary data are not available and the fly ash does not meet all end-of-waste criteria (e.g., due to high disposal rates), fly ash may continue to be treated as waste with 0% allocation; otherwise, economic allocation applies.

SCM downstream processing

It is important that all SCM downstream processing steps (after the point of allocation/end-of-waste-state), be included for all SCMs. Downstream processing steps may include drying, grinding, screening, classification, packaging, and transport (for more information, see the section Downstream processing and transport of SCMs).

INTERIM CO-PRODUCT ALLOCATION FACTORS

The interim co-product allocation factors have been included below in **Error! Reference source not found.**.

Table 1 Interim co-product allocation factors

Co-product	Production process and main product	Co-product allocation factor	Source	Comment
Fly ash (fine-grade, dry), coal-fired power generation	Coal-fired power generation, Electricity	0% economic allocation of coal-fired power generation	(CS Energy 2024; ADAA 2024).	There is currently insufficient publicly available information to define fly ash as a co-product - rather than waste - due to the confidential nature of the power station revenue data. As 50-90% of collected fly ash is disposed in storage dams or ponds, economic allocation at $0/t is applicable at point of generation. (The GWP-GHG of fly ash is thus 0 t CO_2e/t)
Blast furnace slag	Ironmaking blast furnace, Pig iron	1.3% economic allocation 1 t of slag equals the environmental impact of 0.0127 t of pig iron.	AusLCI v1.45 (AusLCI 2025)	The original data is from 2015. For information: using AusLCI data () and this allocation factor, the GWP-GHG of BFS – at point of generation – is 0.018 tCO_2e/t.
Steel slag, BOF	Steelmaking basic oxygen furnace (BOF), Steel	1.3% economic allocation 1 t of slag equals the environmental impact of 0.0127 t of BOF steel.	AusLCI v1.45 (AusLCI 2025)	The original data is from 2015. For information: using AusLCI data (Steel, converter, unalloyed, at plant/RER U/AusSD U) and this allocation factor, the GWP-GHG of BOF slag – at point of generation – is 0.020 t CO_2e/t.
Steel slag, EAF	Steelmaking electric arc furnace (EAF), Steel	1.3% economic allocation 1 t of slag equals the environmental impact of 0.0127 t of EAF steel.	AusLCI v1.45 (AusLCI 2025)	The original data is from 2015. For information: using AusLCI data (Steel, electric, un- and low-alloyed, at plant/RER U/AusSD U) and this allocation factor, the GWP-GHG of EAF slag – at point of generation – is 0.0065 t CO_2e/t.
Silica fume	Metallurgical grade silicon production, Metallurgical grade silicon	10.7% economic allocation 1 t of silica fume equals the environmental impact of 0.1067 t of metallurgical grade silicon.	AusLCI v1.45 (AusLCI 2025)	Based on Timm et al. (2019)[2] For information: using AusLCI data, the GWP-GHG of Silica Fume – at end-of-waste point – is 1.4 t CO_2e/t.

[2] Note that in the paper the mass and economic allocation ratios are tabled the wrong way. Mass allocation should be 31% and economic allocation 4.8% (for 0.45 tonnes of silica fume co-produced with 1 tonne of metallurgical grade silicon, which represents 95.2% of value).

Alternative sources of economic allocation data were considered, including those reported by the Cement Concrete & Aggregates Australia (CCAA) (Mohammadi and South 2017). However, the underlying source of revenue data (market value) used for allocation was not stated, and allocation based on price data was not divided by the amount of SCM produced, resulting in significant underestimates of the impacts per tonne of SCM produced.

DOWNSTREAM PROCESSING AND TRANSPORT OF SCMS

In addition to the environmental burden assigned to the co-products using economic allocation, it is also important that all relevant downstream processing steps, packaging and transport be included in the production of the SCMs.

Fly ash

Fly ash used in cement applications is typically a co-product from coal-fired power stations that use black coal (Australian Technical Infrastructure Committee 2025).

A distinction should be made between dry and wet handling of fly ash. Dry-handled fly ash is typically collected at the power station's baghouse and stored in storage silos. Wet-handled fly ash is typically pumped in a slurry to be stored in ash dams/ponds.

Further distinction should also be made between the raw, unprocessed fine-grade run-of-station fly ash that is collected and stored in silos and refined fly ash products (Grade 1 and 2) that have undergone further downstream processing after the co-product allocation/end-of-waste-state. For processed fly ash products, downstream processing steps that may occur after collection at the power station's baghouse/storage silos may include classification, milling/grinding, carbon reduction, screening, blending, conditioning, packaging, and transportation. For wet-storage fly ash, the relevant downstream processing steps that may be necessary include excavation/dredging/pumping, dewatering, washing, drying, classifying, milling/grinding, carbon reduction, conditioning, calcining, packaging, and transport.

Blast furnace slag

Granulated blast-furnace slag (GBFS) is produced by quenching molten iron slag (a co-product of iron and steel-making) from a blast furnace in water (Cement Australia 2025).

A distinction should be made between the steel mill co-product blast furnace slag, which is produced at the steel mill and allocated a share of the environmental burden on an economic basis, and the downstream processing and transport steps to produce granulated blast furnace slag (GBFS) and ground-granulated blast furnace slag (GGBFS). Cement and concrete companies may purchase granulated blast furnace slag (GBFS) and process it internally, or purchase finished

GGBFS products. Downstream processing of blast furnace slag can include drying, grinding, packaging and transport.

Silica fume

Silica fume (microsilica) is produced in processes that reduce quartz with carbon in the presence of other metals, producing silicon monoxide (SiO) gas, which oxidises to silica fume. It is often a co-product of the production of silicon metal and ferrosilicon alloys, but can also be produced through other pathways. Silica fume can be supplied as undensified or further processed to produce a densified product. Packaging and downstream transport should also be included where relevant.

Imported materials

The economic allocation factors for SCMs can vary by country of production. Where possible, primary data should be requested and collected from the upstream suppliers for the production of SCMs. When primary data are unavailable, the allocation factors provided in this document can be applied to imported materials. Alternatively, more conservative data should be used.

5. INFORMATION TO INCLUDE IN THE EPD

The content declaration section of the EPD should be as representative as possible of the product that is the focus of the EPD, while maintaining confidentiality and avoiding the use of standardised content declaration tables that contain broad ranges from other products produced by the same manufacturer.

Allocation information for each SCM must be transparently documented in both the background LCA and the EPD as per the PCR.

It is recommended that relevant information on SCM allocation be reported in the LCA Information section of the EPD. The allocation information should include the:

- Allocation method (economic allocation),
- Process and database (e.g. blast furnace slag from pig iron blast furnace, AusLCI v1.45, 2025),
- Allocation factor (% or price ratio between the co-product and the main product),
-
- Resulting GWP-GHG per tonne of SCM (kg CO_2e GWP-GHG/tonne) at the point of generation (i.e. prior to any processing),
- Describe any downstream processing steps, and
- GWP-GHG per tonne of SCM (kg CO_2e GWP-GHG/tonne) and stating whether the figure is before or after downstream processing.

Where a downstream EPD uses an upstream EPD as a data source, it is also recommended to reference the upstream EPD and/or transfer the SCM allocation information from the upstream EPD to the downstream EPD.

Data quality assessment must be documented in the EPD, as required by PCR sections 4.6.5 and 6.4.6 and the EN 15941 standard. The data quality assessment information should be representative of the product and not be a generic data quality assessment used for a range of products produced by the same manufacturer.

6. VERIFICATION

Verifiers must check that:

- Allocation of all materials, including SCMs, has been performed correctly as per the PCR
- Data quality reporting requirements have been met in accordance with PCR and EN 15941, and the data quality assessment is representative of the data sources used.
- Verification checks in the LCA should ensure that all downstream processing steps (e.g. granulation, drying, grinding) and transport have been included in the LCA modelling of SCMs.
- Content declaration reporting requirements have been met, and the use of generic content declarations for a range of products produced by the same manufacturer has been avoided.

7. TREATMENT OF EXISTING PUBLISHED EPDS

This guidance is not retrospective.

When valid EPDs (published by EPD International) are used in the production of downstream EPDs, it is recommended that the allocation method for SCMs be stated in the LCA information section of the downstream EPD for transparency.

This guidance does not take precedence over the General Programme Instructions, Product Category Rules or other applicable standards.

8. REFERENCES

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