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# Project Report

## Review of EPD Programmes and EPD Databases

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# Project Report

## Review of EPD Programmes and EPD Databases

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|---|---|
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| Approved by | **Martin Blumberg** |
| Description | **Review of EPD Programmes and Databases and recommendations for a National Irish Database** |

## Glossary of terms

| | |
|---|---|
| EPD | Environmental Product Declaration. A standardized document that communicates transparent and comparable information about the life-cycle environmental impact of products. |
| GWP | Global Warming Potential. A measure of how much heat a greenhouse gas traps in the atmosphere up to a specific time horizon relative to carbon dioxide |
| LCA | Life Cycle Assessment. A method for evaluating the environmental impacts of a product or system through all stages of its life cycle. |
| ILCD+EPD | A format for environmental product declarations within the framework of the International Reference Life Cycle Data System (ILCD). |
| LULUC | Land Use and Land-Use Change. Refers to changes in the land-use category and captures the impacts of such changes on global warming potential |
| PCR | Product Category Rules. Rules that establish the procedures and parameters for the environmental assessment of products within a specific category. |
| Embodied carbon | Total of all the greenhouse gas emissions and removals associated with the production and life cycle of a product, excluding its operation |
| Generic data | Data not associated with any particular manufacturer, for example, a trade association EPD, a national default dataset or LCI data from a commercial database |
| Specific dataset | Manufacturer/manufacturing company-specific dataset for a specific product of one factory |
| Average dataset | Average datasets provided by industrial associations, several companies, several works or several products (i. e. on the basis of data on the industrial production of companies |
| Representative dataset | Data that is representative for a country/region |
| Irish State Agency | An Irish Public Body that will be designated certain responsibilities in relation to the Irish National Database of Generic Building Materials |
| Digital data format | A digital data format refers to the structure or organization of digital data, which is information represented in a binary format (0s and 1s) that can be processed, stored, and transmitted by electronic devices. Digital data formats define how data is encoded, stored, and interpreted by machines, ensuring compatibility and usability across systems. XML and JSON are digital data formats used for storing, transmitting, and exchanging structured data. The ILCD+EPD format supports both XML and JSON representations for exchanging EPD datasets. It is widely used by platforms like ECO Platform and Ökobau.dat to store and expose EPDs via APIs, allowing users to search and download EPD data in XML or JSON formats. |

# Contents

# 1. Background & introduction

A revised version of the Energy Performance of Buildings Directive (EPBD) entered into force in all EU countries on the 28th of May 2024. Buildings are the largest consumer of energy in Europe and the building sector is therefore considered crucial in achieving the EU's energy and climate goals. The EPBD aims at achieving a fully decarbonised building stock in the EU by 2050, as well as increasing the rate of building renovation, particularly for the worst performing buildings in each country. The directive will contribute to reduce Green House Gas (GHG) emissions by at least 60% in the building sector by 2030 compared to 2015.

With the revised version of the EPBD comes an enhanced expectation for new buildings to be net-zero and a requirement to calculate and disclose lifecycle GHG emissions for all new buildings. Additionally, all EU countries will have to adopt national roadmaps and set targets to reduce lifecycle emissions for their buildings.

These new rules related to whole lifecycle GHG calculations in the revised version of the EPBD increases the urgency among Member States to be able to carry out life cycle assessments (LCA) of new buildings. Access to geographically and temporally representative data on building materials is a crucial part of carrying out an accurate life cycle assessment of a building.

The purpose of this report is to review and provide detailed guidance on the best approach for the development and maintenance of a centralised national database for all common building materials and their embodied carbon emissions pending phased implementation of the revised Construction Products Regulation (CPR).

# 2. Project approach

The project was carried out in three steps with three project milestones, as shown in Figure 1.

The first step of the project was reviewing existing databases of EPDs and generic or average data for use in building LCA. The objective of the review was twofold. It should 1) reveal possible databases where the Irish national database can source its data from and 2) provide insights into how other databases are structured to inform the recommendations aimed at an Irish national database.

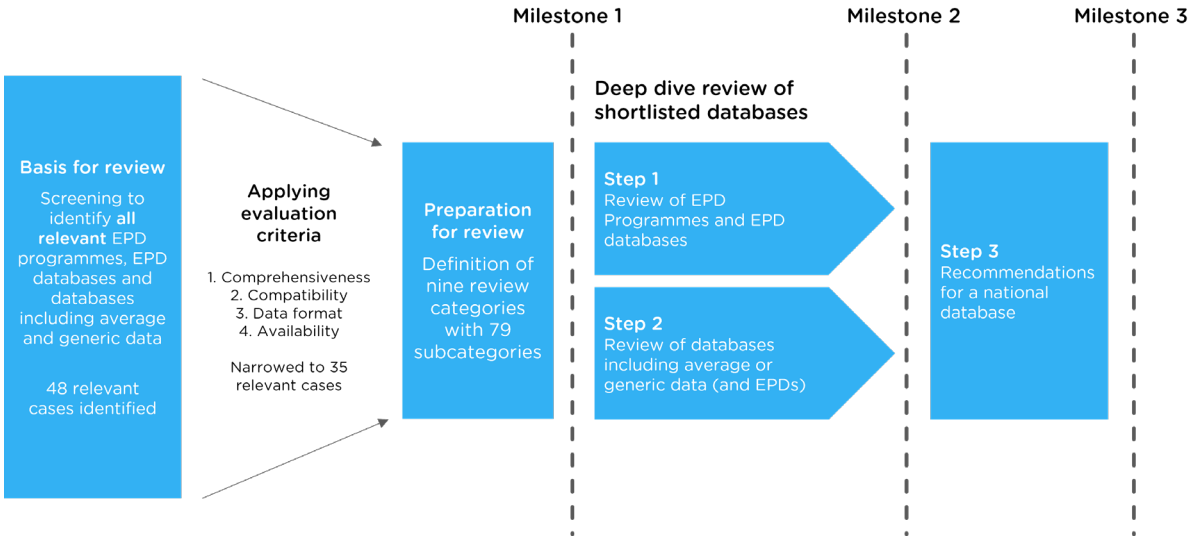


Figure 1 – Project approach including steps and milestones.

## 2.1 Milestone 1 – Establishing the basis for the review

To establish the basis for the review carried out in Step 1 and Step 2, a screening was performed to identify all EPD programmes, EPD databases, and databases including average or generic data relevant for detailed analysis. A total of 48 databases and EPD programmes were identified.

Four evaluation criteria were applied to identify the databases and EPD programmes that align with the two objectives of the review. These four evaluation criteria are described in detail in Chapter 3. 35 databases were selected for the deep dive review in Step 1 and Step 2.

As part of establishing the basis for the review, nine review categories were defined including 79 subcategories. The 35 selected databases were evaluated on these 80 subcategories in Milestone 2. The nine overall categories include database information, database operation, governance, database context, database content, scope of data, formal LCA related requirements, technical requirements and data output and exchange. The scope of the nine categories and 80 subcategories are presented in Chapter 4.

## 2.2 Milestone 2 – Deep dive review into shortlisted databases

In Step 1 and 2 the shortlisted databases were evaluated over nine categories (presented in Chapter 4) to inform the recommendations formulated in Step 3.

In Step 1, the review of EPD programmes and databases has supported formulation of recommendations on how PCRs should be developed for construction products including data sources, modelling of electricity, and scenario development. Additionally, the review has supported recommendations regarding the structure, accessibility and special features of the national database.

In Step 2, the review considered databases that include average or generic data, to support the formulation of recommendations on how generic or average data could be managed within the National Database, how potential data gaps can be handled, the structure of the database, categorisation, digitalization and API as well as the role of PCR and harmonised standards in relation to the National Database.

## 2.3 Milestone 3 – Recommendations for a national database

In Step 3, the findings of the reviews supported the development of recommendations for a national database for Ireland.

# 3. Establishing the basis for review

As described in Chapter 2, the review of the databases was intended to support the identification of possible data sources for an Irish national database as well as possible sources of inspiration regarding database structure. Based on the four criteria below, databases are selected for the deep dive review in Milestone 2.

1. Comprehensiveness (yes/no)
   Does the database cover multiple materials or construction products categories?

2. Data compatibility (yes/no)
   Is the database compatible with EN15804+A2 EPD standard? This ensures that data is comparable and developed consistently.

3. Data format[1] (native/compatible/not compatible)
   Is the database native to, or compatible with the ILCD + EPD data format?

4. Availability (yes/no)
   Is the database publicly available? The database should be publicly available, and not require a license to use. Therefore, commercial databases are excluded.

Box 1 – Data and methodology standards

**Data and methodology standards**

*EN15804+A1* is a European standard which provides the core product category rules (PCRs) for environmental product declarations (EPDs) for construction products.

EN15804+A1 was replaced by *EN15804+A2* in 2019. The update expanded the number of environmental indicators covered from seven to 10 core environmental impact indicators, and an additional six optional indicators. Furthermore, the update distinguishes between different types of GWP: fossil, biogenic and luluc (land use and land use change).

*TRACI*, the Tool for the Reduction and Assessment of Chemical and other environmental Impacts, is a method developed by the U.S. Environmental Protection Agency for evaluating potential environmental impacts associated with industrial processes and products. It assesses a range of environmental effects, providing a systematic approach to quantify and compare relative impacts of different activities on human health and ecosystems.

*EN ISO 14040/44* are international standards providing principles and guidelines for conducting LCAs, including goal and scope definition, inventory analysis, impact assessments and interpretation.

The criteria were applied to the 48 databases and EPD programmes identified, and based on their rating across the four criteria, 35 databases and EPD programmes were selected for further review in Step 1 and 2. The shortlisted databases may be a relevant source of data or a source of inspiration, or potentially both. The shortlisted databased are presented in Table **1**.

[1] Native means that the database uses the ILCD-EPD format as it is and compatible means that the database has fields that are compatible, but the format is not native ILCD+EPD.

Table 1 – Shortlisted databases based on review of evaluation criteria

| Database name | No. | 1. Comprehensive-ness | 2. Data compatibility | 3. Type of data | 4. Availability |
|---|---|---|---|---|---|
| **Established EPD programmes audited by ECO Platform** | | | | | |
| ECO Portal from ECO Platform | 1 | Yes | Yes | Native | Yes |
| IBU | 2 | Yes | Yes | Native | Yes |
| Internationla EPD/ENVIRONDEC | 3 | Yes | Yes | Native | Yes |
| EPD Norway/ILCD+EPD/ISO 22057 | 4 | Yes | Yes | Native | Yes |
| BRE 15804 EPD programme | 5 | Yes | Yes | Native | Yes |
| EPD Danmark | 6 | Yes | Yes | Native | Yes |
| EPD Italy | 7 | Yes | Yes | Native | Yes |
| Global EPD | 8 | Yes | Yes | Native | Yes |
| ITB EPD Program | 9 | Yes | Yes | Native | Yes |
| Kiwa-Ecobility Experts | 10 | Yes | Yes | Native | Yes |
| RTS EPD | 11 | Yes | Yes | Native | Yes |
| Milieu Relevante Producte Index (MRPI) | 12 | Yes | Yes | Native | Yes |
| Bau EPD | 13 | Yes | Yes | Native | Yes |
| DAPconstruccion | 14 | Yes | Yes | Native | Yes |
| DAPhabitat | 15 | Yes | Yes | Native | Yes |
| EPD Ireland | 16 | Yes | Yes | Native | Yes |
| Ift Rosenheim | 17 | Yes | Yes | Native | Yes |
| ZAG EPD | 18 | Yes | Yes | Native | Yes |
| **Other EPD programmes and EPD providers not audited by ECO Platform** | | | | | |
| EPD Belge, Belgian Federal EPD Database | 19 | Yes | Yes | Compatible | Yes |
| Euroepan Aluminium EPD Programme | 20 | No | Yes | Not compatible | Yes |
| Tata Steel EPD Programme | 21 | No | Yes | Not compatible | Yes |
| EPD Hub | 22 | Yes | Yes | Compatible | Yes |
| Cement Manufacturers Ireland (CMI) | 23 | No | Yes | Compatible | Yes |
| **Mixed databases with EPD and generic data** | | | | | |
| Oekobaudat (Ökobaudat) | 24 | Yes | Yes | Native | Yes |
| INIES database | 25 | Yes | Yes | Compatible | Yes |
| Danish National Database BR18, appendix 2 | 26 | Yes | No | Not compatible | Yes |
| EC3 Database | 27 | Yes | Yes | Compatible | Yes |
| UL Environment | 28 | Yes | Yes | Not compatible | Yes |
| Built Environment Carbon Database (BECD) | 29 | Yes | Yes | Not compatible | Yes |
| TDUK Generic Database | 30 | No | Yes | Not compatible | Yes |
| **Generic databases** | | | | | |
| ODCi Database | 31 | Yes | Yes | Compatible | Yes |
| Inventory of Carbon and Energy (ICE) Database v3 | 32 | Yes | No | Not compatible | Yes |
| Life Level(s) Generic Data for Ireland | 33 | Yes | No | Not compatible | Yes |
| Boverkets Klimatdeklaration Database | 34 | Yes | No | Not compatible | Yes |
| CO2data.fi | 35 | Yes | No | Not compatible | Yes |

The full list of reviewed databases and programmes can be seen in Appendix 1.

# 4. Deep-dive review of databases and EPD programmes

## 4.1 Introduction to the nine review categories

The nine review categories are presented in Table 2.

Table 2 – Overview of review categories. The 80 subcategories are available in Table A2 in the appendix.

| Review categories | Description | Subcategories (Available in appendix) |
|---|---|---|
| Category 1<br>Database information | *Covers information on the main geographical coverage of the database and provides links to webpages, database, instructions etc.* | 7 |
| Category 2<br>Governance | *Covers information on the database owner and operator, funding, and external stakeholders involved in maintenance and enhancement of the database. External stakeholders can be EPD providers, generic data providers, building certification systems and LCA experts and practitioners.* | 9 |
| Category 3<br>Database operation | *Covers information on the approach to creating generic data, how PCRs are developed for sub-categories, strategies for updating the database, how data gaps are addressed and how the database is verified and peer reviewed.* | 9 |
| Category 4<br>Database context | *Covers information on how the database is anchored in the national context, whether it is mandatory to use the database as a result of national regulation or a voluntary scheme, how the database is anchored in an international context and how the database relates to the ECO Platform.* | 9 |
| Category 5<br>Content of database | *Covers information the database content, i.e. EPDs, generic data, unverified specific data, and data from Irish manufacturers.* | 10 |
| Category 6<br>Scope of data | *Covers information on which environmental impacts are included, which LCA modules included, the geographical scope and the product scope.* | 6 |
| Category 7<br>Formal LCA related requirements for data | *Covers information on the rules for EPD data, requirements regarding EPD verification, restrictions for the background database, if location- or market-based energy is used, the allocation approach for waste management, how biogenic carbon is treated, requirements regarding scenarios and other formal LCA requirements.* | 14 |
| Category 8<br>Technical requirements | *Covers information on types of datasets included in the database, description of how data is delivered to the database and how data is validated, the format of the data, if the data is digitised and highlights the rules used for including different types of datasets in the database including the source, verification, and compensation factors.* | 6 |
| Category 9<br>Data output and exchange | *Covers information on database accessibility, interfaces, whether the database is available in ECO Portal, the format of EPDs, language of the database, search facilities as well as information on how datasets are organized in the database.* | 9 |

## 4.2 Review findings

### 4.2.1 Database information

Of the 35 databases reviewed seven have global geographical coverage and two are limited to Europe. In total, 17 different countries are covered.

All databases provide an English version of their main webpage (for 16 of the databases the main webpage is in another language than English). For most of the databases it has been possible to find a webpage/link directly leading to the principles for the database.

### 4.2.2 Governance

For most of the databases the owner and operator of the database is the same party. Exceptions include the Finnish national database CO2data.fi. Here, the Ministry of the Environment Finland is the owner, and the Finnish Environment Institute is the operator.

Information regarding the funding of the databases is not available for more than half of the databases. For the remaining databases, six are publicly funded, three are privately funded, two are funded through membership fees, one is funded through philanthropic funds. The ICE Database was initially funded by the UK government but is now funded by private companies and public client bodies in the UK. For the national databases that has been reviewed all are publicly funded (Germany, Denmark, Sweden and Finland).

For the EPD Programme databases listed under the ECO Platform's ECO Portal the EPD Programmes are either targeted globally or primarily at manufacturers inside within the national context, for example BRE and EPD Norway have data from manufacturers globally, whilst EPD Italy primarily has EPDs from Italian manufacturers.

Most EPD Programmes cover all construction product sector, but for the European Aluminium EPD Programme the providers are manufacturers within the aluminium sector.

For the databases that both contain generic data and EPDs there are three distinct examples:

1) The Danish National Database where only industry EPDs from a single national EPD Programme, EPD Denmark, are included (which covers primarily Danish manufacturers).

2) The German National Database, Oekobaudat where EPDs are provided from several different EPD programmes which meet acceptance criteria (IBU, Bau-EPD GmbH, ift Rosenheim GbmH, Kiwa-Ecobility Experts and European Aluminium EPD Programme)

3) The Swedish National Database, Boverket Klimatdeklaration database, and the Finnish, CO2data.fi, where the national database does not include manufacturer specific EPD data, and allow any EPD to be used in building assessment

The provision of generic data is described in more detail in section 4.2.3.

Information is generally lacking regarding the involvement of external stakeholders in the maintenance and enhancement of the databases. For four of the databases, it has been possible to identify the involvement of an LCA tool developer and only two of the databases have a building certification system involved in the database maintenance. However, 11 of the databases have LCA experts and practitioners involved. See examples of involvement in Box 2 below.

Box 2 – Involvement of experts and practitioners involved in databases

Involvements of experts and practitioners

Example 1: Danish National Database BR18
*Involvement of both tool developer and LCA experts.* Aalborg University (BUILD) are continuously involved in the maintenance and enhancement of the Danish national database. They are also an LCA tool developer (LCAbyg, an LCA tool publicly available intended for building LCAs). The BUILD research group at Aalborg University are mainly LCA experts and researchers within LCA on buildings.

Example 2: Oekobaudat
*Involvement of LCA experts.* Sphera and Thunen Institute are involved in the development of the generic datasets in Oekobaudat.

### 4.2.3 Database operation

10 of the databases reviewed include generic data. Table 3 provides an overview of the different approaches to generic data generation, examples of application and strengths and weaknesses to each approach.

The simplest approach is to average all available EPDs for a product group. This approach is low cost and time efficient, but the derived generic data may not be geographically and technically representative. Furthermore, the data may be skewed by one manufacturer. The ICE database has used this approach for glass and aluminium products for example. A more advanced version of this approach is to average available and geographically relevant EPDs. It is still an approach with relatively low cost, but it can be more time consuming and data availability may be an issue. The TDUK database and the Swedish Klimatdeklaration database have used this approach with the TDUK database weighting EPD by volume of imports or production from each country, and the ICE database has used this approach for cement and timber.

If they are available, using national sector average EPDs can be a useful approach as both the geographical and technical representativeness will be good, particularly if the product is mostly produced in the country. An important drawback of this approach is that imports are not represented however. INIES allows the use of national Sector EPD whenever they have been produced, and ICE applies this approach to some of their data, for example brick.

Another approach is to use industry LCA data, for example for a wider region, but this may often have methodological differences from EPD. For example, the ICE database has used regional industry LCA data for steel products from WorldSteel.

Another type of approach is to make use of a national LCA database. Examples include the Swiss national database, KBOB, which is based on ecoinvent which was originally an LCA database developed for Switzerland generally with government funding) and German national database's generic datasets in Oekobaudat which are based on GaBi data, again originally developed as a LCA database for Germany generally). This allows a good representation of national production but does not necessarily represent imports and it is a very expensive approach both in terms of production and maintenance. At present however, ecoinvent and GaBi are the only two LCA databases relevant to the construction sector, and although they both have datasets appropriate to Europe, neither provide data specific to Ireland, and both have heavy licencing requirements to use the data as provided – for example we believe the German Government has paid a very substantial fee to ensure that the generic datasets base on GaBi are made available free of charge to users.

Denmark has opted for a version of this approach where they have adopted the national database of another country, i.e. the German Oekobaudat. This is a low-cost option for Denmark, but there may be issues, e.g. regarding licenses or permission to use data, and furthermore geographical or technical representation may be an issue. Another version of this approach is to adapt an LCA database, for example BRE's IMPACT database has taken ecoinvent data for Europe and adapted aspects such as the electricity impacts for the UK, but this approach has meant that the BRE database cannot be made available free of charge to users.

The French INIES database uses data from the Swiss ecoinvent database when there are no sector EPD to use, nor sufficient manufacturer EPD available to average, but applies a 30% compensation factor. This can be a useful approach where there is no other option, but there again may be issues with geographical and technical representativeness. Lastly, INIES closes any remaining generic data gaps if there is a single manufacturer specific EPD by applying a 100% compensation factor to adjust for the lack of data representability of the proxy dataset.

A final approach can be bottom-up modelling, which is the case for the ODCi database and new datasets in Oekobaudat. This approach can yield data of high quality in terms of representativeness if sufficient information is available for production and the supply chain, but is highly time consuming, and can lack representativeness if industry data is hard to obtain.

It can be observed that both INIES and the ICE database take a hierarchical approach to ensure the highest data quality in their generic data based on the data available. They use the approach which generates the most accurate data when possible, and then apply the second-best and so forth.

Most of the databases are updated continuously when new EPDs are available, but without any specific timeframe for when an update must occur. Continuously updating the databases ensures that the latest relevant data is included. Only a few databases describe whether outdated data is removed, e.g. Oekobaudat. When the Oekobaudat operators identify data which is outdated, they notify their data provider who updates the relevant data. Generally, the generic data is not updated regularly, but on specific request.

To ensure verification and quality of the data, all the EPD programmes audited by ECO Platform use a common verification check list defined by ECO Platform. Additionally, two of the databases that are not audited by ECO Platform verify data outside normal EPD verification. TDUK verifies generic datasets according to CEN/TR 15941 and the ODCi will use a verification approach for its generic data that has been developed by ECO Platform.

Most of the databases do not express explicit strategies on how to manage data gaps. A few databases describe how they address data gaps, see examples in Box 3.

Box 3 – Examples of how data gaps are managed in different databases

Managing data gaps

Example 1: CO2data.fi
Uses a bottom-up approach to model generic data for HVAC related products since there is a lack of EPDs for this specific material category.

Example 2: Danish National Database (BR18)
Raw material production can be used to describe installation products where no generic or EPD data is available.

Example 3: INIES database
Uses manufacturer specific data with 100% compensation factor, i.e. value is multiplied by 2 and the impact is increased by 100%, as a proxy where no data is available.

Example 4: Enterprise Ireland
Enterprise Ireland provide funding to Irish manufacturers to produce EPDs to increase the availability of EPDs in the Irish context. The funding covers the LCA, and monitoring of environmental improvements. EPDs should be verified through the EPD Ireland programme and the LCA undertaken by an approved provider from the directory of green service providers.

Table 3 – Approaches to generic data generation

| Approach | Examples | Advantages | Disadvantages |
|---|---|---|---|
| 1. Averaging available EPDs | • ICE (for glass, aluminium, etc.) | • Low cost<br>• Time efficient (Less time to select EPDs) | • Data availability<br>• Potentially not geographically or technically representative<br>• Potential bias if results are skewed by one manufacturer |
| 2. Averaging available and geographically relevant EPDs | • TDUK<br>• ICE (for cement and timber)<br>• Sweden national database | • Low cost<br>• Potentially geographically and technically representative | • Data availability (national production volumes are not always available, and it can be hard to find EPDs)<br>• Time consuming |
| 3. Using national sector average EPDs | • INIES when available<br>• ICE | • Good geographical and technical representativeness | • Does not represent imports<br>• Trade association may not cover all national production |
| 4. Using wider regional industry data | • ICE (for steel) | • Good representation for some sectors | • Potentially not geographically or technically representative for smaller countries<br>• Potential methodological inconsistencies<br>• Data availability (not available for many sectors) |
| 5. Use national LCA database | • Swiss national database (ecoinvent)<br>• German national database (GaBi DE) | • Science-based<br>• Good representation of national production | • Does not represent imports<br>• Expensive to produce and maintain |
| 6. Use national database from another country | • Danish national database (uses Oekobaudat) | • Low cost<br>• Can be good option of no national data | • Potentially requires permission<br>• Potentially not geographically and technically representative<br>• Ignores national data (e.g. available sector EPDs) |
| 7. Wider regional LCA database with 30% compensation factor | • INIES (uses ecoinvent) when not enough EPDs | • Low cost<br>• Can be good option if no national data | • Ignores national data (e.g. available sector EPDs)<br>• Potentially not geographically or technically representative for smaller countries |
| 8. Using manufacturer specific data as proxy w/compensation factor | • INIES when only one EPD and no other | • Useful where no other option | • Not science based<br>• Not geographically or technically representativeness |
| 9. Adapted data from wider regional LCA database | • BRE Impact | • Simple approach<br>• Potentially geographically and technically representative (depends on the level of adaptation) | • Requires license<br>• Availability of data for production and imports<br>• Adaptation may impact different sectors differently |
| 10. Bottom-up modelling | • ODCi<br>• Oekobaudat (new datasets) | • Potentially science-based<br>• Potentially geographically and technically representative | • Time consuming<br>• Data availability |

### 4.2.4 Database context

In six of the countries where it is mandatory to carry out building LCA's – Denmark, Finland, France, Germany, the Netherlands, and Sweden – it is also mandatory to use the given country's national database. There are a few examples of databases where a voluntary scheme requires use of a specific database, e.g. DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) certification in Germany which requires the use of Oekobaudat in LCA assessments of buildings, BREEAM which only includes BRE EPD in its BRE IMPACT database which is used for optional building LCA credits, and the Belgian system TOTEM which uses EPDs from EPD Belge for its building LCA and generates a score similar to a sustainability rating.

28 of the databases cooperate across Europe or on a global level. Many of the platforms take part in international cooperation through their membership of ECO Platform. Additionally, some platforms develop datasets across a few countries, such as Life Level(s) Generic Data for Ireland, which had parallel development of generic datasets for Italy, Croatia, and Spain as part of the LifeLevel(s) project, or the Swedish Boverkets Klimatdeklaration Database, which collaborates with the Finnish CO2data.fi database.

23 of the databases are members of ECO Platform out of which 19 EPD Programmes have been audited by ECO Platform. Additionally, one platform has ECO Platform as an involved stakeholder. Eight of the databases are members of InData which collaborate on the ILCD+EPD digital format for EPD. For all databases, it remains unclear whether they are audited by any body other than ECO Platform. 22 databases have mutual recognition with other EPD programmes, examples include the European Aluminium EPD Programme who are recognized by Oekobaudat and mutual recognition between INIES database and IBU.

Information on shared (sub-category) PCR between programmes is generally not available. However, a few examples were found including IBU who share with UL Environment and shared (sub-category) PCR between EPD International, EPD Italy and EPD Norway.

### 4.2.5 Content of database

29 of the databases contain EPD data. Figure 2 provides an overview of the number of EPDs from single manufacturers and sector EPDs across the databases. For many the databases the EPD type cannot be applied as a filter. It is therefore not possible to extract how many of each EPD type the database contains without opening every single EPD, and for those that do classify them, the classification is often not 100% accurate. None of the reviewed databases contain project specific EPDs unless they have been registered and published as EPD. Nine databases contain generic data. Figure 2 also shows the databases that contain generic data. EPD from Irish manufacturing have been found in nine of the reviewed databases. Figure 3 shows the databases containing data from Irish manufacturing and the number of datasets.

It should be noted that there are overlaps between the content of the reviewed databases. Some datasets occur in multiple databases (such as the EPD repositories). Figure 2 and 3 can therefore not give an indication of the cumulative number of datasets available worldwide.

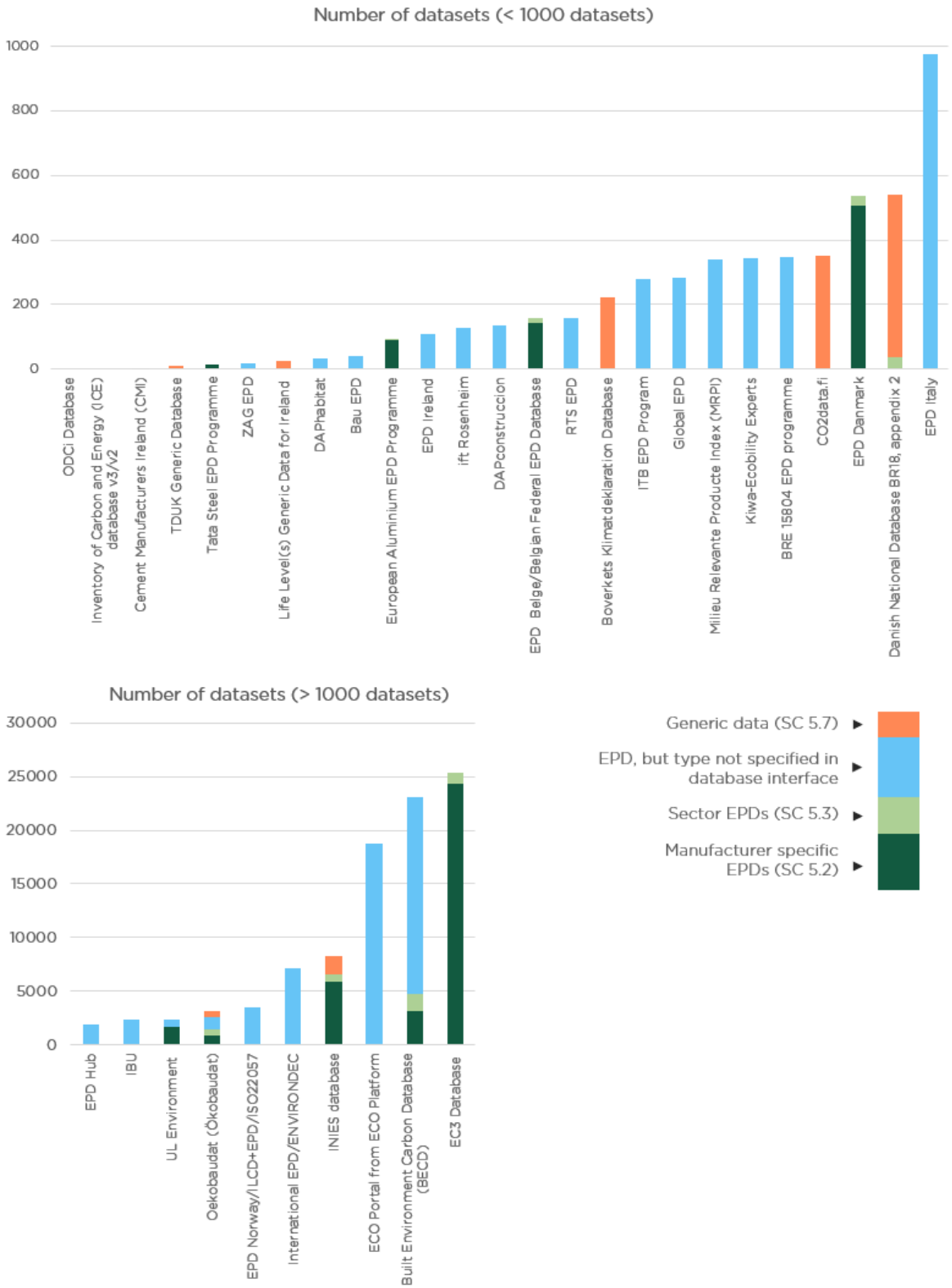


Figure 2 – Number of generic datasets and EPDs across databases. Top: databases with less than 1000 datasets. Bottom: Databases with more than 1000 datasets.

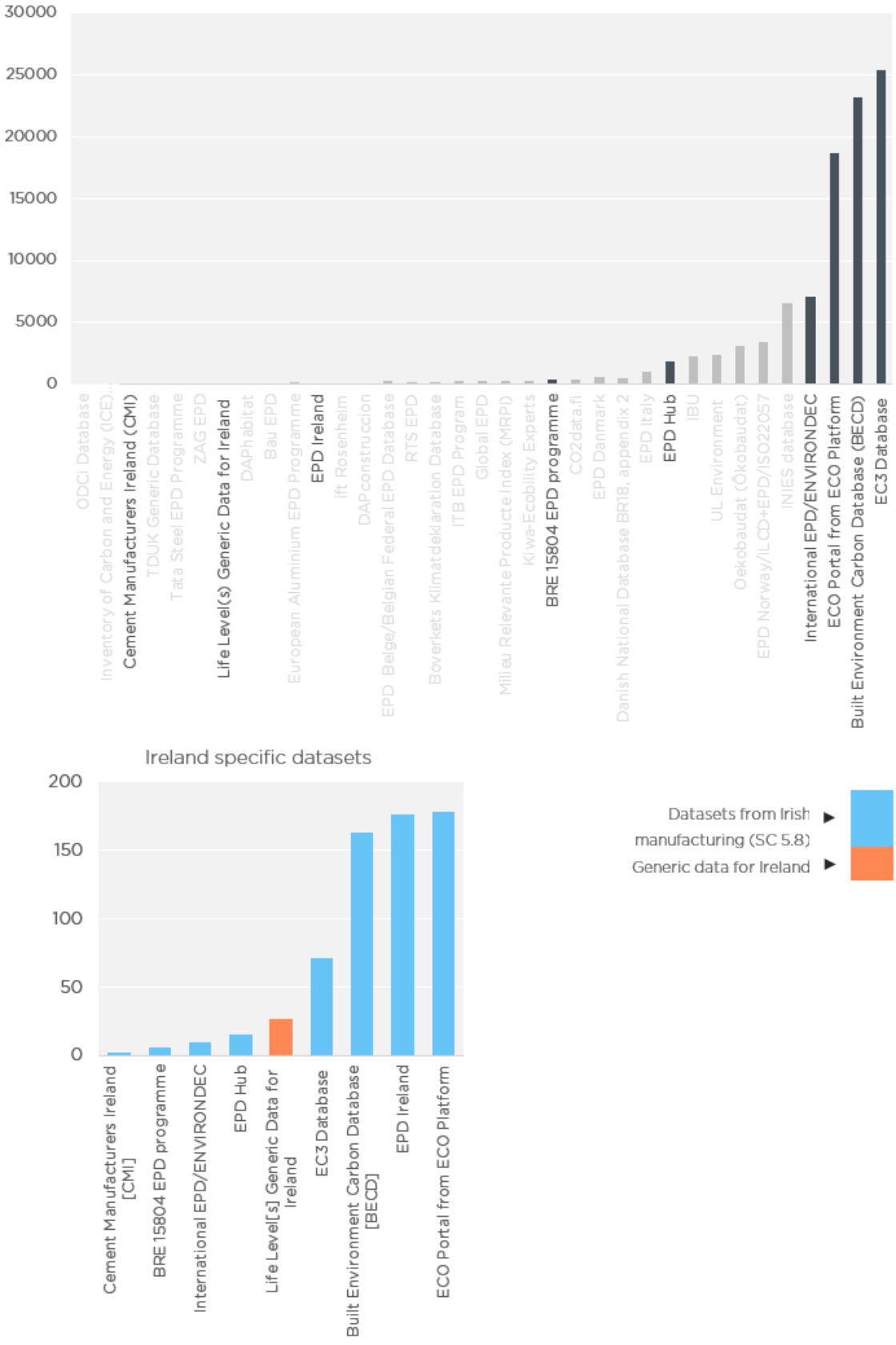


Figure 3 – Top: databases including datasets from Irish manufacturing. Bottom: Number of Ireland specific datasets in each of those databases.

### 4.2.6 Scope of data

27 of the 35 reviewed databases contain a full set of environmental impact indicators (i.e. beyond global warming potential (GWP)). These are primarily the EPD databases under ECO Platform and the other pure EPD databases. Of the databases that contain generic data only Oekobaudat, INIES and the ODCI provide indicators beyond GWP. Among the databases that only report on GWP, five provide only the total GWP impact (Boverkets Klimatdeklaration Database, Life Level(s), ICE, BECD, and the Danish National Database), while one differentiates between GWP fossil and GWP biogenic (CO2data.fi), and one differentiates between GWP fossil, GWP biogenic and GWP luluc (TDUK generic data). This differentiation in GWP impact is a characteristic of the update to EN15804 from +A1 to +A2.

Box 4 – Beyond GWP or not?

Beyond GWP or not?

A full set of environmental impact indicators ensures that all environmental concerns are highlighted and reduces the risk of environmental burden shifting. Furthermore, it requires no additional effort to quantify the environmental impact across multiple indicators (this might not be the case for generic data generation). However, there are arguments to focusing only on GWP:

1) Global warming is a major environmental crisis that humanity is faced with, and it is highly important that it is addressed

2) The building sector is known to be a significant contributor to global warming (Buildings are responsible for 39% of global GHG emissions according to the World Green Building Council). Another major environmental concern is the emission of nitrogen and phosphorous into freshwater and marine environments, but the building sector's contribution globally to this issue is typically marginal compared to e.g. the contribution of the agricultural sector. Marine and freshwater eutrophication, because of nitrogen and phosphorous emissions, are thus – although important – less critical to assess when considering the environmental impact of a building.

3) Global warming is a publicly well-known issue and the focus of many politicians and other decision makers.

4) Current passed legislation at EU level for building assessment only concerns global warming potential.

5) The revised CPR will require all construction products initially to only provide GWP indicators, but eventually to provide all environmental indicators (potentially 2040).

Two databases contain only EN15804+A1 indicators, both of these are national databases (Sweden and Denmark). It should be noted that the Danish National Database will be updated as of July 2025 to include +A2 for some of the data. All of the EPD programmes under ECO Platform covers the EN15804+A2 indicators and in addition to these, the datasets from Cement Manufacturers Ireland (which are sector EPD provided within EPD Ireland) and TDUK also cover the EN15804+A2 indicators. 10 databases have some datasets that follow EN15804+A1 and others that are newer and follow EN15804+A2. It is possible that the datasets (EPDs) that follow EN15804+A1 will expire and be updated to follow EN15804+A2.Two databases contain data that covers TRACI indicators. Very few databases require additional indicators. INIES requires reporting of release of dangerous substances into indoor air, soil, and water during the use stage.

Table 4 shows the LCA modules covered by each of the databases. Covering the cradle to gate (A1-A3) impact are observed to be a minimum. For the national databases, the required LCA modules in the database are harmonised with

the national LCA methodology used for buildings, for example the scope of Sweden's Boverkert Klimatdeklaration database aligns with the Klimatedeklaration scope of A1-A5 (cradle through construction) .

Table 4 - LCA modules covered by each database. EPD programs under ECO Platform are presented altogether since they all cover the same LCA modules. Solid blue indicates modules that are mandatory to include, stripes indicate optional modules.

| Database | A1 | A2 | A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Oekobaudat | ■ | ■ | ■ | | | | ■ | ■ | ■ | ■ | ■ |
| INIES database | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Danish National Database BR18 | ■ | ■ | ■ | | | | | | ■ | ■ | ■ |
| Built Environment Carbon Database (BECD) | ▨ | ▨ | ▨ | | | | | | | | |
| TDUK Generic Database | ■ | ■ | ■ | ■ | | | | | | | |
| OCDi Database | ■ | ■ | ■ | | | | | | | | |
| ICE Database v3/v2 | ■ | ■ | ■ | | | | | | | | |
| Life Level[s] Generic Data for Ireland | ■ | ■ | ■ | | | | | | | | |
| Boverkets Klimatdeklaration Database | ■ | ■ | ■ | ■ | ■ | | | | | | |
| CO2data.fi | ■ | ■ | ■ | | | | | | ■ | | ■ |
| EPD programs under ECO Platform | ■ | ■ | ■ | | | | ■ | ■ | ■ | ■ | ■ |
| EPD Belge | ■ | ■ | ■ | ■ | | | | ■ | ■ | ■ | ■ |
| European Aluminium EPD Programme | ■ | ■ | ■ | | | | ■ | ■ | ■ | ■ | ■ |
| Tata Steel EPD Programme | ■ | ■ | ■ | | | ■ | ■ | ■ | ■ | ■ | ■ |
| EPD Hub | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | ■ |
| Cement Manufacturers Ireland [CMI] | ■ | ■ | ■ | | | | | | | | |
| EC3 Database | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| UL Environment | ▨ | ▨ | ▨ | | | | | | | | |

Of the databases that contain generic data, four provide data for Module B6 for an EN15978 building LCA, including the Finnish national database (CO2data.fi), the Swedish national database (Boverket Klimatdeklaration database), the French national database (INIES) and the German national database (Oekobaudat). The Danish database (BR18) provides emission factors for district heating, electricity and gas in a separate sheet, but a separate energy frame calculation for the specific building project needs to be carried out. In the UK, the government provides a database of GHG emissions to be used for GHG reporting at company level, which can potentially also be used for modelling of impacts from transportation, energy use and water use[2].

There are a few databases that only cover a certain type of products, namely the European Aluminium EPD Programme (which only covers aluminium products), Tata Steel EPD Programme (which only covers steel products), the two datasets from Cement Manufacturers Ireland (which only covers cement products) and TDUK Generic Database (which only covers timber products). The remaining databases covers a full range of construction products and do not specifically exclude any type of products.

### 4.2.7 Formal LCA related requirements and data

27 of the databases require external verification of all EPDs. Most of the databases do not state requirements regarding EPDs being either manufacturer specific or sector specific, and most databases do not set limitations on EPD programmes, with a few exceptions such as ECO Portal from ECO Platform, which limits EPD programmes to those audited by ECO Platform, and BRE Impact which only allows BRE EPD based on ecoinvent.

[2] https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting

In fact, seven of the databases have background database restriction, and only allow the use of ecoinvent or GaBi, e.g. IBU and Oekobaudat only allow GaBi data, MRPI andthe Dutch national data base (NMD) only allow ecoinvent data. 12 of the databases have no limitations.

Most of the generic databases do not specify explicit requirements on whether location or market-based energy modelling should be used. Most ECO Platform EPD Programmes allow the use of market based energy modelling [Guarantee of Origin (GoO) are allowed where there is a registry and tracking, but if GoO is not available residual mix should be used] but also allow location based modelling to be reported as additional information, whilst two (BRE and BauEPD in Austria) only allow the use of location based approaches and do not allow GOs to be used at all.

Regarding byproduct allocation, most of the databases use economic allocation with all audited ECO Platform EPD programmes having to use this for slag and PFA since 2023. Some databases state that the allocation is to be made according to the EPD programme, or that it is dependent on the PCR.

All of the EPD Programmes under ECO Platform have to report biogenic carbon separately. For the mixed and generic databases, it varies how the biogenic carbon is handled: seven databases report biogenic carbon separately (Oekobaudat, INIES, TDUK, ODCi, ICE, Life Level(s), and CO2data.fi). The Danish national database includes biogenic carbon in the results, whereas the Swedish Boverkets Klimatdeklaration Database excludes biogenic carbon from the results reported. The Swedish Klimatdeklaration does not include the end of life modules where biogenic removals in A1-A3 are normally balanced by emissions in C3 and C4, which explains the omission of biogenic carbon in the Boverkets Klimatdeklaration Database.

Some databases provide default data for specific processes such as transport and End-of-Life. An example is CO2data.fi, which provides impact data for the default End-of-Life scenarios for all materials based on the national methodology, including share of reuse, recycling, energy recovery, final disposal, and hazardous waste, or the ODCi database, which includes minimum, typical and maximum manufacturing scenarios for manufacturing data variation as a default.

#### 4.2.8 Technical requirements

The databases include a range of different types of data, e.g. differentiation between specific, average, generic, representative and template datasets. All EPD programmes audited by ECO Platform use the notation on dataset types from ILCD+EPD. The databases which mixed EPD and generic data, all differentiate between different types of data. By doing so, the data becomes more transparent for the user of the database. EPD Hub does not allow differentiation between dataset types, which challenges the useability of the database. For databases only including one type of data (i.e. the databases only containing generic data), the differentiation is not relevant.

Across all databases there is a lack of information on specific rules for the different dataset types. An exception is the European Aluminium EPD Programme which has specified that for complex products with many variants available (e.g. windows) it is allowed to calculate the EPD results just for one reference variant of the product. However, they specify that the EPD results may only be considered representative of all the variants if:

1) The mass of the declared unit of the variants is comprised between 80% and 100% of the mass of the declared unit of the reference product, with 100% being the mass of the declared unit of the reference product for which the EPD is calculated.
2) The mass of the aluminium in the declared unit of the variants is always lower or equal compared to the mass of aluminium of the declared unit of the reference product.

Four databases apply compensation/penalty/uplift factors to generic data, some to address uncertainty of the data, others to encourage the provision of EPD - examples are given in Box 5. It is important to note that the use of factors can affect the results for building level assessments and needs to be considered when comparing results across countries or different methodologies.

Box 5 – Examples of factors used on generic data. For exhaustive list, see Review table.

Factors used on generic data

Example 1: INIES database
A 30% uncertainty factor is added to any generic data, excluding sector EPDs.
This is done in order to reflect the lower quality of ecoinvent or ILCD datasets.
For proxy EPDs, a 100% factor is used.

Example 2: Boverkets Klimatdeklaration Database
Add a factor of 25% to generic datasets, excluding sector EPDs,
to stimulate the provision of specific data.

Example 3: ICE
ICE does not apply any factors but provides a data quality assessmentfor each dataset based on the source data.

ECO Portal retrieve data from connected nodes to other database systems. For the databases with only generic data, the data is typically imported or generated directly by the database operator. For the ICE database, Circular Ecology imports data from ECO Platform and EC3 for example to obtain the source EPD to generate ICE datasets, and for Boverkets Klimatdeklaration Database the Swedish Environmental Institute imports data. For the ODCi Database a scripting system (ODCI Smartlink) has been developed to process generated datase for use in the database.

Most of the databases do not specify an explicit approach to data validation (beyond the verification process described in 4.2.3) before data is uploaded into the database. However, an example is Oekobaudat who validate incoming data based on e.g. the EPD validity.

All of the databases under ECO Platform provide data in ILCD+EPD format. Only a few of the databases outside the ECO Platform umbrella use the ILCD+EPD format (exceptions include Oekobaudat and the ODCi database). The remaining databases use another digital format not equivalent to ILCD+EPD, some only provide PDFs (e.g. Tata Steel), and some only provide an Excel-table (e.g. ICE database).
The databases under ECO Platform provide both the results and metadata in a digitised format. Several of the databases not under ECO Platform also provides both results and metadata in a digitised format (EC3, Oekobaudat, BECD, ODCi). For

the INIES database in addition to digitised results and metadata, they also provide digitised information on several goal and scope parameters such as functional unit and service life.

#### 4.2.9 Data output and exchange

All of the databases reviewed can be accessed free of charge. Six requires a registered user to access, the remaining can be accessed freely.

All the EPD databases under ECO Platform's ECO Portal allow data export and download in PDF-format, XML, CSV and through an API access. For the databases not under ECO Platform's ECO Portal, the most common form of download is through single download of PDF-files. The Swedish national database Boverket Klimatdeklaration Database and the Finnish national database CO2data.fi have set up a joint system where they share the same data structure and allows download in JSON and Excel-format through an API.

For the INIES database, all the data is available free of charge, but the API requires a paid license. Furthermore, there are requirements for the tools that use the INIES database.

It is a common finding that EPDs in PDF have a fixed format provided by the EPD Programme, though they vary considerable between programmes. Exceptions include the International EPD Programme [although they provide an optional EPD Template], the European Aluminium EPD Programme and Oekobaudat. As for most of the databases that have generic data, the EPD are now available for download as PDF in individual sets. All generic datasets within the databases are available in English (in addition to other languages) but many EPD are only available in the native language of the EPD Programme although all EPD Programmes will accept EPD in English.

Most of the databases contain a search field with several parameters that can be applied (More than 30 distinct search parameters has been identified across the databases). It is common to allow a search for a (EPD) product name, the country or region of the data (the UL Environment database distinguishes between the region sold and the region manufactured but most do not make this distinction which is significant), the period of validity (valid from and/or to), the EPD owner, the EPD type, EPD programme operator, the PCR or standard followed and the EPD number. EPD Belge furthermore also allows filtering by the LCA scope (i.e. which modules from A-D are included) and the product type. The EC3 database includes functionality to search for EPD for products with certain performance characteristics, for example by 28 day compressive strength for concrete or by recycled content for steel. Nine databases do not have a search facility.

### 4.3 Summary

With the deep dive under Milestone 2 we have reviewed 87% of the database information and believe that we have gathered enough insights to provide recommendations on both structure and data sources for a National Irish Database.

# 5. Recommendations for a National Irish Database

In this chapter, we provide our recommendations for an Irish national database. We have structured the chapter in seven sections each concerned with a different theme.

The first section (5.1) provides the most important and overall recommendations to the Irish national database.

The second section (5.2) contains recommendations on the generation of generic data.

The third section (5.3) contains recommendations concerning EPDs as data sources.

The fourth (5.4), fifth (5.5) and sixth (5.6) section provide recommendations on the technical aspects of database structure, database maintenance and management, and database formalities, respectively.

It should be noted that our recommendations are interdependent. The first question in Section 5.1 is fundamental to the recommendations given to most of the following questions. In that sense, our recommendations are consistent in the way they relate to each other. As such, if, for the implementation of the database, if a decision is made different to our recommendation, the Irish State Agency should pay attention to the recommendations made to other questions.

## 5.1 Overall recommendations to the Irish National Database

This section covers the following nine questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 1 (SC 5.1) - Should the Irish national database include EPDs?

Question 2 (SC 5.6) - Should the Irish national database include generic datasets?

Question 3 (SC 1.1 and SC 6.6) - What should the main geographical coverage of the Irish national database be?

Question 4 (SC 6.1 and SC 6.3) - Should the Irish national database cover LCA indicators beyond global warming potential (GWP)?

Question 5 (SC 6.2) - Which methodology standard should the Irish national database follow?

Question 6 (SC 6.4) - Which LCA modules should the Irish national database cover?

Question 7 (SC 6.5) - Should the Irish national database include data on Module B6 for a EN15789 building LCA?

Question 8 (SC 7.15) - Should the database provide rules or default data for scenarios?

Question 9 (SC 6.7) - Should the Irish national database be limited to certain products, or should certain products be excluded?

## Summary of recommendations on Question 1-9

- The Irish national database should not include EPDs, but only generic data. We believe this is the best solution, as it avoids setting up a database with duplicated EPDs and avoids maintaining another party's data. For EPDs, it is proposed to refer to third-party data sources instead, as a cost-efficient approach to a national database.
- The generic data should be generated specifically to the Irish context, i.e. representing products used and marketed in Ireland covering any Irish production, and imports.
- The Irish national database should follow the EN15804+A2 standard.
- The Irish national database should be able to contain results on all indicators in EN15804+A2, but the GWP-total is the most relevant indicator to be provided for generic data now.
- The Irish national database should cover the life cycle modules A1-A3 as well as C and D.
- The Irish national database should provide default scenario data for the end-of-life of construction products and emission factors for transportation and operational energy.
- The Irish national database should generally cover all categories of construction products.

## Detailed recommendations on Question 1-9

| Question 1: | Should the Irish national database include EPDs? (SC 5.1) |
|---|---|
| Options: | 1. Don't include any EPDs, only include generic datasets. The same approach that has been used in Sweden and Finland. Any EPD needed for building level assessment can be found via EPD programmes or ECO Portal. Irish State Agency could provide a "How to find EPD" guidance sheet which would also describe any minimum qualification criteria or point to an existing guide (e.g. from ASBP, though it would need update). It is not clear whether once manufacturers start producing EPD data via CE Marking whether they will be able to provide this data outside of the Digital Product Passport website.<br><br>2. Include ALL potential EPDs, e.g. make use of the API of ECO Platform, EPD Hub, European Aluminium, Tata Steel, UL Environment. This option is similar to the BECD. There would be no selection of data relevant to Ireland, and users would have to navigate through the thousands of EPDs when looking for data. Developing a useful search facility that works with the wide range of data and different formats would be complex as many digitised EPD are not currently required to provide useful data for classification.<br><br>3. Include relevant EPDs. With this solution, manufacturers and users could suggest an EPD to be included in the database. This will involve much more work as the database will need to check that the EPDs are still valid and have not been revised or updated. Users may be frustrated that so many EPD they need are not included if the process of adding them takes time for them to use. |
| Our recommendation: | We recommend Option 1. |

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| Why: | Our recommendation on this matter is based on the following arguments:<br><br>• Many construction products used in Ireland are imported [e.g. all steel, aluminium and glass], and many of these products already have EPD in various different programmes. Additionally, although the majority of EPDs for Irish construction products are registered in EPD Ireland, there are significant numbers in other EPD Programmes. Requiring the use of a single EPD Programme, or limiting the use of EPD programmes based on criteria would restrict the use of already published EPD for products used in Ireland. Additionally, many EPD Programmes outside of Ireland will require the provision of scenario data which is not relevant or useable in the context of Ireland.<br><br>• To avoid maintenance of another party's data. Both Option 2 and 3 would require that the database operator ensures that the EPD data in the database is always up to date and correct.<br><br>• Option 2 would potentially affect the representability of the database as the content would be vast and not specific to the Irish context. With this approach it would be challenging to implement criteria that limits which EPDs are acceptable to use in Irish building LCAs, as all available EPDs would be present in the database. This might affect the quality and consistency of the results derived using the data in the database.<br><br>• Option 3 will require a significant amount of continuous work and maintenance from the database operator to identify whether EPD may be relevant. Furthermore, users may not have access to the newest available EPDs as there would inherently be processing time before new EPDs could be available in the Irish national database.<br><br>• Over time with the revised CPR, many EPDs will be superseded by the digital environmental data for every product covered by CE Marking creating massive amounts of product data which must always legally be up to date. It is unlikely that any national database is going to be able to deal with this amount of data to link to data for every construction product that may be marketed in Ireland.<br><br>Thus, we believe that Option 1 is the most pragmatic approach in terms of ensuring that the content of the database is relevant to the Irish context and without requiring immense resources in database management and maintenance. We still see EPDs as a valuable data source, and based on the review conducted in Milestone 2, we recommend criteria that EPDs used in building LCAs should adhere to (see Section 5.3). |
| Question 2: | Should the Irish national database include generic datasets? (SC 5.6) |
| Options: | 1. Include generic datasets generated specific to Ireland<br><br>2. Rely on a single third party generic database<br><br>3. Allow users to choose their own source of generic data |
| Our recommendation: | We recommend Option 1. |

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| Why: | Option 1 will ensure the highest degree of representability for the Irish context, especially if generated generic data is based on Irish consumption. This will improve the availability and consistency of data for use in buildings' early design stages where choices on products are not finalised. |

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| Question 3: | What should the main geographical coverage of the Irish national database be? (SC 1.1 and SC 6.6) |
| Options: | 1. Cover building products consumed in Ireland, i.e. providing generic data for products used and marketed in Ireland - the "consumption mix", covering any Irish production, and imports, less exports. If Irish Sector EPD are available, they would be the first choice to represent Irish production in developing the "consumption mix".<br>2. Consider and include all data irrespective of geography or market. |
| Our recommendation: | We recommend Option 1. |
| Why: | Option 1 will ensure better representability of the Irish building industry. Furthermore, using the "consumption mix" will be useful when exact products have not been specified – i.e. during early design phases before tender and specification. |

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| Question 4: | Should the Irish national database cover LCA indicators beyond global warming potential (GWP)? (SC 6.1 and SC 6.3) |
| Options: | 1. Include results on GWP-total<br>2. Include results on GWP-total, GWP-fossil, GWP-biogenic, GWP-luluc, but no other indicators.<br>3. Include results on all indicators from EN15804+A1 and +A2<br>4. Set up database structure to contain results on all indicators in EN15804+A2, but only GWP-total and GWP-biogenic are mandatory for now.<br>5. Include all indicators from EN15804+A1 and +A2 and other optional indicators on e.g. toxicity |
| Our recommendation: | We recommend Option 4. |

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| Why: | Option 4 will ensure that the database is able to include Sector EPDs or generic LCA datasets where they are available and relevant, but it will not be mandatory to provide all LCA indicators for generic datasets which means there is more flexibility in the available methods to generate generic datasets depending on available data. It will also future-proof the database for the potential introduction of mandatory building LCA in future.<br><br>GWP-biogenic can be used to consider upfront carbon covering modules A1-A5, but excluding the benefit of carbon removals which will be balanced at the end of life. |

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| Question 5: | Which methodology standard should the data in the Irish national database follow? (SC 6.2) |
| Options: | 1. Follow only EN15804+A1<br>2. Follow only EN15804+A2<br>3. Support both EN15804+A1 and +A2<br>4. Support both EN15804+A1, +A2 and TRACI |
| Our recommendation: | We recommend Option 3. |
| Why: | GWP (CO2e) from any of these to be allowed, but the standard must be specified (also use of EF 3.0 or EF 3.1). The variation between these methods is less than 5% (possibly more for TRACI for the US, though this will be updated soon to be more or less equivalent to EN 15804+A2 EF3.1) |

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| Question 6: | Which LCA modules should the Irish national database cover? (SC 6.4) |
| Options: | 1. A1-A3 (cradle to gate)<br>2. A-D (cradle to grave)<br>3. A1-A3 + C + D (other modules optional) |
| Our recommendation: | We recommend option 1, i.e. that generic datasets for products provide data for A1-A3.<br><br>We furthermore recommend that data for A5 should be provided based on default wastage and disposal of packaging scenarios set out in the National Building Methodology, or using the default scenarios provided in the EPD Ireland PCR. Products should then be grouped so that scenario data for Module A4 and Modules C and D can be provided for wider product groups, e.g. plastics, masonry, wood based products etc, based on default scenarios set out in the National Building Methodology, or using the default scenarios provided in the EPD Ireland PCR. Datasets for transport per tonne.km, energy use per MJ or per kWh and water use per |

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| | m3 should also be provided so that more specific scenarios can be generated for A4, A5, B6 and B7.<br><br>We recommend that the Irish State Agency provide all the default scenario data in their methodology, to ensure that they have the data even if EPD Ireland is no longer in existence at a future point in time. |
| Why: | This will provide consistent and representative generic data for use in Ireland, both in the early design stages when exact products are not known, and in later stages, or as built assessments, when the scenarios within specific EPD are not appropriate to the Irish context or the default scenarios specified in the National Building Methodology It will enable the assessment of the whole life cycle of buildings, ensuring trade-offs between different life cycle stages are considered. |

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| Question 7: | Should the Irish national database include data on Module B6 for a EN15789 building LCA? (SC 6.5) |
| Options: | 1. Yes<br>2. No |
| Our recommendation: | We recommend option 1. The Irish State Agency could provide Module B6 for a EN15978 building LCA. |
| Why: | The Irish State Agency provide National emissions factors for fuels and electricity. IEA provides emission factors for upstream (WTT) impacts of fuels and upstream and transmission and distribution impacts for electricity for countries including Ireland[3]. These can be used with the Irish State Agency emission factors to give GWP emissions for energy used in B6 which cover the same scope as an EN 15804 EPD for energy (which is what is required in EN 15978). |

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| Question 8: | Should the database provide rules, standard values or default data for scenarios? (SC 7.15) |
| Options: | 1. Provide rules, standards or default data for scenarios for building materials e.g. EOL-scenarios, transportation etc.<br><br>2. Do not provide rules, standard values or default data for scenarios. |
| Our recommendation: | We recommend option 1. |
| Why: | We recommend to provide default EOL-scenarios and data for generic datasets but this is to be determined by the building LCA methodology. However, existing EPDs are unlikely to provide data using default scenarios unless they are Irish products. Generic data for scenarios should be provided for broad product groups so that generic data can be used if specific EPD do not follow the defaults. |

[3] https://www.iea.org/data-and-statistics/data-product/life-cycle-upstream-emissions-factors-subscription

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| Question 9: | Should the Irish national database be limited to certain products or should certain products be excluded? (SC 6.7) |
| Options: | 1. Generate generic data on all construction products used in Ireland (in a prioritized list)<br><br>2. Only generate generic data for construction products produced in Ireland and rely on EPDs for imports |
| Our recommendation: | We recommend Option 1. |
| Why: | Providing generic data for all construction products will ensure the data consistency in building LCAs. Furthermore, Ireland relies heavily on imports of construction products, thus, good generic data is particularly relevant for imported products. Option 2 could potentially introduce a bias in the market where Irish produced products are more or less favourable.<br><br>Reviewing other national generic databases, approximately 250-350 generic datasets would appear to provide sufficient data for products to allow building assessment though many more detailed generic datasets can be provided if required, and this will depend on the detailed scope of the National Building Methodology – for example Sweden initially only requires the building structure and envelope to be assessed meaning the requirement for datasets is lower. |

## 5.2 Recommendations on generic data in the Irish national database

This section covers the following five questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 10 (SC 3.1) - How should generic data be created for the Irish national database?

Question 11 (SC 3.7) - How should potential data gaps be addressed in the generation of generic data?

Question 12 (SC 8.1 and SC 3.9) - Which rules should apply in the generation of generic data? Including data source, verification requirements, and compensation factors.

Question 13 (SC 8.11) - How much should a possible compensation factor be?

Question 14 (SC 8.13 and 8.14) - How should the generated generic data be validated before it is uploaded into the database?

### Summary of recommendations on Question 10-14

- We recommend a hierarchical approach to generic data generation based on providing data for products consumed in Ireland.
- We recommend that data gaps are handled by using data from less representative sources with an applied adjustment factor to encourage provision of data.
- We recommend that the Irish State Agency develops a scheme for the application adjustment factors.
- We recommend that the developed generic dataset is peer reviewed.
- We recommend that the generated generic data fulfils the minimum qualification criteria introduced in Section 5.3.

### Detailed recommendations on Question 10-14

| Question 10: | How should generic data be created for the Irish national database? (SC 3.1) |
|---|---|
| Options<br>(see Table 3 for further explanation on the options): | 1. Single source approach (e.g. Denmark using only Oekobaudat)<br>2. Hierarchical approach (e.g. INIES)<br>3. Bottom-up modelling approach (e.g. ODCi)<br>4. Averaging available EPD data (e.g. ICE)<br>5. Averaging available EPD and weighting to adjust for imports (e.g. Life Level(s) and TDUK) |
| Our recommendation: | We recommend Option 2 |

Why:

We recommend a hierarchical approach to generic data generation based on providing data for products consumed in Ireland (Irish production + imports – exports). Use existing Irish sector EPD if available, and averaged EPD for Irish producers if they sufficiently represent Irish production and sector EPD or generic datasets from other countries where available, weighted by imports if possible as shown in Figure 4. If data is not available, other approaches such as bottom up modelling or averaging of available EPD see Box 6 for data at early design stage. Other relevant sector EPD can be added.

This approach uses existing EPD and generic datasets where available, reducing the work required to generate generic data, whilst ensuring reasonably representative datasets in terms of geography and technology.

However, it should be noted that the hierarchy outlined in Figure 4 includes bottom-up modelling which will require the use of background data from sources such as Ecoinvent or GaBi. The Irish State Agency needs to investigate the need for licenses to use background data from these two databases.

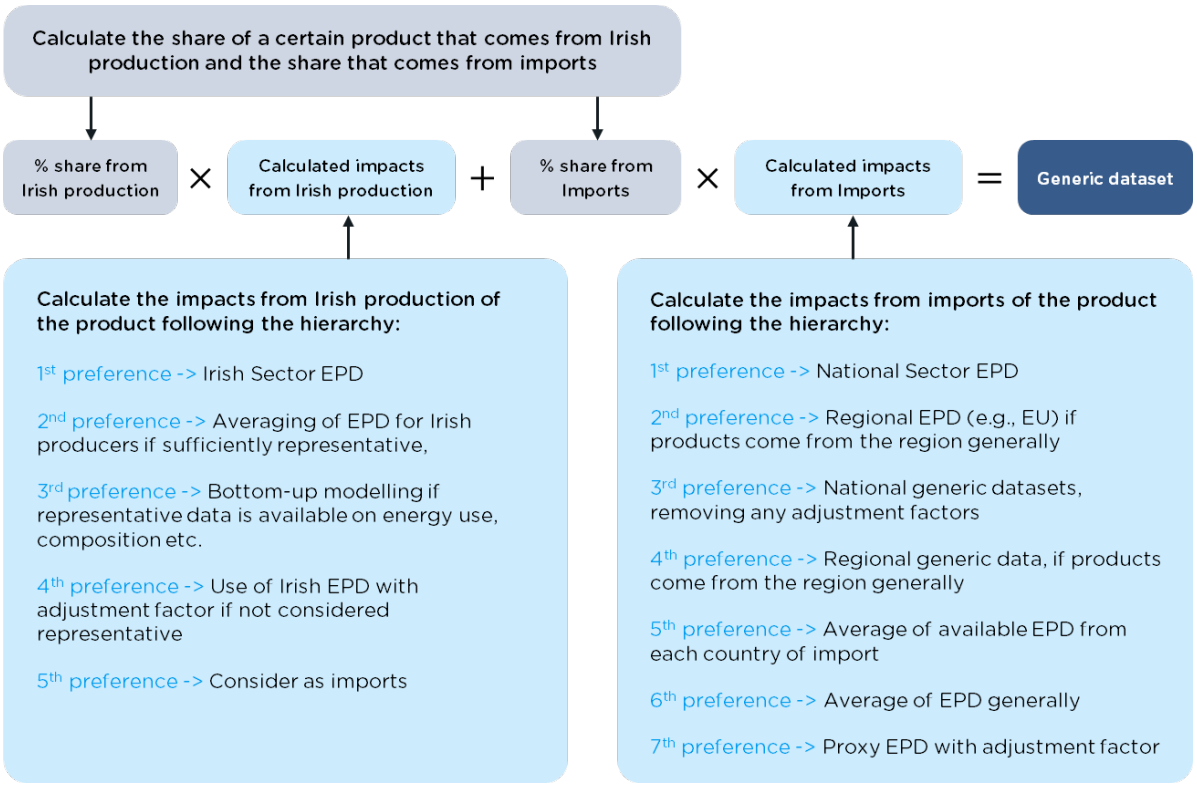


Figure 4 – Recommended process and hierarchy for generic data generation.

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| Question 11: | How should potential data gaps be addressed in the generation of generic data? (SC 3.7) |
| Options: | 1. Provide funding for the creation of a sector EPD if Irish produced products are not available<br>2. Use data from less representative sources<br>3. Use data from less representative sources with penalty factor to encourage provision of more representative data |
| Our recommendation: | We recommend Option 3. |
| Why: | Option 1 may be seen to be unfair to sectors which have already produced sector EPD and sectors where EPD have already been widely adopted.<br>Option 2 would not provide any differentiation data which considered to be clearly less representative.<br>Option 3 is commonly adopted in other national databases and would be an incentive for the sector to provide both manufacturer and sector EPD. |

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| Question 12: | Which rules should apply in the generation of generic data? Including data source, verification requirements, and compensation factors (SC 8.1 and SC 3.9) |
| Options: | Various options. |
| Our recommendation: | These are generally subject to wider national policys.<br><br>Compensation factors could be applied based on the representative-ness of the data to reflect their uncertainty, or could be applied generally to all generic data including Sector EPD to encourage the provision of manufacturer specific EPD as in Finland. We recommend that the Irish State Agency develops a scheme for the application adjustment factors. Irish State Agency should consider getting generic dataset provision peer reviewed. |
| Why: | There is not a right or wrong answer to this question, it depends on the motivation of the database and the building assessment methodology. Is it to provide assessments which are as accurate as possible, based on manufacturer specific data where possible? Is it wider national policy to have Irish Sector EPD for construction products manufactured in Ireland?<br><br>Scientifically, the range of results will vary for different products, as can be seen from the Life Level[s] project report and the histograms provided by the ICE Database v3. if the aim is just to stimulate the provision of data then the value is arbitrary in a sense, compensation factors of 20-30% has been used in other countries. |

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| Question 13: | How much should a possible compensation factor be? (SC 8.11) |
| Options: | - |

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| Our recommendation: | Subject to wider national policy – We recommend to go for 20% to 30% which is common in other databases. |
| Why: | It is a subject to wider national policy to decide how much generic data should be skewed to compensate for uncertainty and provide incentives for manufacturers to create EPDs. |

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| Question 14: | How should the generated generic data be validated before it is uploaded into the database? (SC 8.13 and 8.14) |
| Options: | 1. Check minimum qualification criteria<br>2. Check minimum qualification criteria and digital format |
| Our recommendation: | We recommend Option 2 |
| Why: | In Section 5.3 we provide recommendations to minimum qualification criteria to inclusion of EPDs in Irish building LCAs. If these are applied, then the generic data should follow the same criteria (see Section 5.3) and should be checked to ensure it is compliant.<br>The following criteria for the use of generic data in Irish building LCA should be applied:<br>➢ Generic data should be verified following ISO 14025.<br>➢ Generic data should follow EN15804+A1/A2.<br>➢ Generic data should not allow mass balancing to avoid the risk of green washing.<br>It is also important to ensure that the digital format of the dataset and its documentation is correct. |

### 5.3 Recommendations on how to account for EPDs as data sources for building LCAs

Our recommendation to Question 1 is to not include EPDs in the Irish national database, i.e. like the Swedish and Finnish national databases. We do however recommend that it is possible to use EPDs as a data source in Irish building LCAs. To ensure the robustness and quality of the data used in LCAs, we recommend that the Irish State Agency defines a set of criteria that EPDs should fulfil to be used in building LCAs. In this section we provide our recommendation to what these criteria could be. These are based on our findings in the Milestone 2 review. As such, all the questions presented in this section concern what criteria EPDs should fulfil to be acceptable for use in Irish building LCAs.

An option not explored in Question 1, could be to adopt an approach like Denmark's, whose national database consists of generic data and sector EPDs. However, currently, there are no Irish sector EPDs for construction products other than the Irish Cement EPDs, and thus this option is not (yet) relevant to Ireland. If, in the future, Irish manufacturers produce sector EPDs, these could be included in the Irish national database, as a more representative generic dataset if an Irish product without an EPD has been used. In this potential future case, we recommend that Sector EPDs also adhere to the recommended criteria we provide in this section.

This section covers the following 14 questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 5 (in Section 5.1) and Question 15-17 below are key to defining the minimum qualification criteria for the use of EPDs in Irish building LCAs. We consider questions 18-28 as nuances and aspects to consider when using EPDs in building LCAs. However, we do not consider the choice on these specific topics detrimental to ensuring the quality and consistency in data use.

Question 15 (SC 7.19) - Should EPDs used in building LCAs be externally verified?

Question 16 (SC 3.8) – How should EPDs be verified in terms of verifier competence?

Question 17 (SC 7.12) - Which approach to mass balancing should be used?

Question 18 (SC 4.5) - Should the EPD programme be a member of ECO Platform?

Question 19 (SC 4.6) - Should the EPD programme be audited by ECO Platform?

Question 20 (SC 7.2) - Should EPD data be limited to a list of approved programmes?

Question 21 (SC 7.3) - Should EPD data where Guarantees of Origin (GoOs) has been used be allowed?

Question 22 (SC 7.9) - What type of energy data should be used (location or market based)?

Question 23 (SC 7.10) - Which approach to allocation to low value co-products like PFA or slag should be used?

Question 24 (SC 7.11) - Which approach to manufacturing waste allocation should be used?

Question 25 (SC 7.13) - How should biogenic carbon be reported?

Question 26 (SC 7.4) - Should EPD data from from pre-verified tools be allowed?

Question 27 (7.5 and 7.6) - What requirements should be met for pre-verification of EPD Tools and EPD from tools?

Question 28 (SC 9.7) - Should EPDs in other languages than English be used?

## Summary of recommendations on Question 15-28

We recommend that EPDs can be used as independent data sources if they comply with the minimum qualification criteria summarized in point 1-3 below. These criteria have been derived based on the recommendations from Question 15-28.

- EPDs should be verified through a EPD Programme following ISO 14025. This will ensure consistency and quality of data used in Irish building LCAs.
- EPDs should be from an EPD Programme that follows EN15804+A1/A2. This will ensure consistency and robustness in the data used in Irish building LCAs.
- EPDs should be from an EPD Programme that does not allow mass balancing to avoid the risk of green washing.

## Detailed recommendations on Question 15-28

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| Question 15: | Should the EPDs be externally verified? (SC 7.1) |
| Options: | 1. Independent verification of EPD to ISO 14025 [only required for B2B]<br>2. Third party independent verification to ISO 14025 [only required for B2C] |
| Our recommendation: | We recommend option 1. ISO 14025 only requires independent verification of EPD used for B2B communication and this should be ensured for any EPD used within the Irish Building Methodology. |
| Why: | Independent verification is essential to ensure that the EPD has complied with EN 15804 and is robust and consistent. External verification by a 3rd party is only required for B2C communication. Most programmes ensure verifiers are external to the manufacturer and LCA practitioner, but BRE verify EPDs with BRE LCA practitioners and tools although they follow the requirements for notified bodies in addressing independence of verification. |

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| Question 16: | How should the EPDs be verified in terms of verifier competence? (SC 3.8) |
| Options: | 1. Follow the requirements in ISO 14025<br>2. Set more exacting requirements than ISO 14025 |
| Our recommendation: | We recommend option 1. Use EPD which have been verified using ISO 14025 which requires the EPD Programme to address EPD Verifier competence. |
| Why: | EPD Programmes are required to ensure that their Verifiers are competent according to ISO 14025 and this should be sufficient to ensure robust EPD. |

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| Question 17: | Which approach to the mass balance credit approach should be used? (SC 7.12) |
| Options: | 1. Do not allow use of the mass balance credit approach as it does not reflect the physical flows.<br>2. Allow the mass balance credit approach and virtual allocation of impacts which does not reflect the physical flows. |
| Our recommendation: | We recommend option 1.This is subject to wider national policy however, but we do not recommend use of the mass balance credit approach. |
| Why: | The mass balance credit approach does not reflect the physical flows, nor the physical reality of processes and product impacts, which are intended within EN 15804. Its use is highly contentious within the construction section. Risk of greenwashing. E.g. ECO Platform does not allow mass balancing. |

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| Question 18: | Should the EPD programme be a member of ECO Platform? (SC 4.5) |
| Options: | 1. Allow only EPDs to be used if the EPD programme is a member of ECO Platform.<br>2. Allow EPDs from EPD Programmes within and outside ECO Platform to be used. |
| Our recommendation: | We recommend Option 2 though this could be reviewed if ECO Platform becomes more international. |
| Why: | ECO Platform is also still a predominantly European organisation, and it is less relevant for EPD Programmes in North America for example. As Ireland imports construction products from North America, it is probably more appropriate to ensure that EPD for all products imported into Ireland can be used. The benefit of ECO Platform in terms of EPD is that ECO EPD from audited Programmes have been demonstrated to follow the requirements of ISO 14025 and the ECO Platform standards. |

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| Question 19: | Should the EPD programme be audited by ECO Platform? (SC 4.6) |
| Options: | 1. Allow only EPDs to be used if the EPD programme is audited by ECO Platform. |

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| | 2. Allow EPDs from EPD Programmes without ECO Platform audit to be used but apply a penalty factor to these EPDs.<br><br>3. Allow EPDs from EPD Programmes without ECO Platform audit to be used with no penalty factor. |
| Our recommendation: | We recommend Option 3. |
| Why: | ECO Platform audits ensure that EPD Programmes have implemented the requirements of ISO 14025 in terms of verification and follow the more detailed methodology requirements of the ECO Platform standards.<br><br>However new EPD Programmes are not able to be audited immediately, and ECO Platform does not allow sector specific and manufacturer specific EPD Programmes to become audited members. It is therefore not appropriate to restrict EPD to just those from audited ECO Platform members.<br><br>Sector specific and manufacturer specific EPD Programmes can join ECO Platform but this does not provide any guarantee they are following the ECO Platform rules without audit.<br><br>Irish State Agency could provide a "penalty factor" for EPD which are not from ECO Platform auditi=ed programmes, but this would penalise EPD from sector EPD Programmes [e.g. European Aluminium], manufacturer specific EPD Programmes [e.g. Tata Steel], all North American EPD Programmes, and newly established EPD programmes which have not yet been audited. |

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| Question 20: | Should EPD data be limited to a list of approved programmes? (SC 7.2) |
| Options: | 1. Yes, based on minimum qualification criteria.<br>2. No |
| Our recommendation: | We recommend Option 1. |
| Why: | See recommended minimum qualification criteria under the summary for section 5.3. |

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| Question 21: | Should EPD data based on market based energy [where Guarantees of Origin (GoOs) or otherwise residual mix have to be used] be allowed? (SC 7.3) |
| Options: | 1. GoOs are acceptable.<br>2. GoOs are not acceptable. |
| Our recommendation: | We recommend Option 1. |
| Why: | Even though it can be problematic to allow for GoOs (risk of greenwashing) we recommend allowing them since there otherwise would be a limited amount of data available. |

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| Question 22: | What type of energy data should be used (location or market based)? (SC 7.9) |
| Options: | 1. Location-based<br>2. Market-based |
| Our recommendation: | No specific recommendation. |
| Why: | It is subject to wider national policy. Environmental data within CE Marking is likely to be restricted to use the market-based approach with PPA or residual mix, GoO alone will likely not be allowed. |

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| Question 23: | Which approach to allocation to low value co-products like PFA or slag should be used? (SC 7.10) |
| Options: | Various options. |
| Our recommendation: | We recommend using economic allocation for generic data but for EPDs we recommend following the accepted Programme Operators take on it. |
| Why: | To ensure data availability. |

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| Question 24: | Which approach to manufacturing waste allocation should be used? (SC 7.11) |
| Options: | 1. Require coproduct allocation but accept preconsumer waste is considered to have no impact entering the system.<br>2. Require cut-off approach to align with ISO 21930 and align with assumption pre-consumer waste has no impact entering the system.<br>3. Not specify an approach. |
| Our recommendation: | We recommend Option 3. |
| Why: | There is a conflict between approach in ISO 21930 [cut-off] and EN 15804 [economic co-products or other approach if justified], but normally recovered outputs from manufacturing are small and this is not significant in terms of different impacts. It can be significant for processes causing large amounts of scrap for recovery however. Metals cPCR will require cut-off. |

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| Question 25: | Which approach to the mass balance credit approach should be used? (SC 7.12) |
| Options: | 1. Do not allow use of the mass balance credit approach as it does not reflect the physical flows<br>2. Allow the mass balance credit approach and virtual allocation of impacts which does not reflect the physical flows. |

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| Our recommendation: | We recommend Option 1. However, this is subject to wider national policy, but we do not recommend use of the mass balance credit approach. |
| Why: | The mass balance credit approach does not reflect the physical flows, nor the physical reality of processes and product impacts, which are intended within EN 15804. Its use is highly contentious within the construction section. Risk of greenwashing. E.g. ECO Platform does not allow mass balancing. |

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| Question 26: | How should biogenic carbon be reported in EPDs? (SC 7.13) |
| Options: | Various options. |
| Our recommendation: | We recommend biogenic carbon to be reported as per EN 15804 and EN 16485. This means that the biogenic carbon (in kgC) within the product and packaging should be based on the composition and the stoichiometry of the biobased inputs.<br><br>EN 16449 provides a default calculation for timber based on 50% of the dry mass of timber being biogenic carbon and biogenic CO2 in kgCO2e = 44/12 * Biogenic carbon in kgC. The GWP Biogenic in A1-A3 should be equal to the total biogenic CO2 for the product and packaging as calculated above, but negative as it is removed into the product. |
| Why: | - |

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| Question 27: | Should EPD data from pre-verified tools be allowed (7.4)? |
| Options: | 1. Yes<br>2. No |
| Our recommendation: | We recommend Option 1. |
| Why: | This is essential, but it will be important to ensure that EPD tools have been pre-verified and EPD are produced with the verification of the EPD programme. |

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| Question 28: | What requirements should be met for pre-verification of EPD Tools and EPD from tools? (7.5 and 7.6) |
| Options: | All EPD should be able to demonstrate that all requirements of EN 15804 have been met. |
| Our recommendation: | Yes, this is essential to enable the provision of EPD at scale, but it will be important to ensure that EPD tools have been pre-verified and verified EPD are produced with the approval of the EPD programme. |
| Why: | |

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| Question 29: | Should EPDs in other languages than English be used? (SC 9.7) |
| Options: | 1. Use only EPDs in English<br>2. Allow EPDs that are not in English<br>3. Use English language EPD if available, but allow EPD in other languages if relevant |
| Our recommendation: | We recommend Option 3. |
| Why: | AI translation is sufficiently good now. |

### 5.4 Recommendations on technical aspects of database structure

This section covers the following seven questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 31 (SC 9.9) - Should it be possible to search the database, and if yes, what parameters should be searchable?

Question 32 (SC 9.8) - How should the data be organized in the database? What classification system should be used?

Question 33 (SC 8.12) - How should the data be delivered into the database?

Question 34 (SC 9.3) - In what ways should the data from the database be exported/downloaded from the database?

Question 35 (SC 8.15) - What should the database format be?

Question 36 (SC 8.16) - Should the database be digitised and machine-readable?

Question 37 (SC 9.6) - Should the dataset be available in PDF with a fixed format?

Summary of recommendations on Question 31-37

- We recommend that the database is searchable on specific parameters such as dataset name and classification of products.
- We recommend using a building material classification system that systematically organizes and categorizes building materials based on their properties grouped into distinct categories such as concrete, bricks, metals, plastics, wood, and more. Each category may include subcategories based on specific material types (e.g., lightweight concrete, aerated concrete blocks) or applications (e.g., thermal insulation materials).
- We recommend that the database is manually updated at first, and more automatic approaches can be explored later.
- We recommend to create a database system that can deliver machine-readable data in CSV, JSON, XML or a standardized Excel format as a minimum
- We recommend implementing the ILCD+EPD format as the core database format.
- We recommend ensuring that all data is digitised and optimised for machine-readability.

Detailed recommendations on Question 31-37

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| Question 29: | Should it be possible to search the database, and if yes, what parameters should be searchable? (SC 9.9) |
| Options: | 1. Database is searchable on all parameters.<br>2. Database is searchable only on specific parameters.<br>3. Database is not searchable |

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| Our recommendation: | We recommend Option 2. Our recommendation is to make the database searchable on specific parameters like dataset name and classification of products while allowing filtering of other important parameters. |
| Why: | It is beneficial to be able to search and filter the database when a database has many datasets. There is a need for a systematic approach to classification of the datasets and products before a search function can have value (see question 30). See the EPD Belgium or EC3 websites for some of the better implementations of a search and filtering function for an EPD database. |

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| Question 30: | How should the data be organized in the database? What classification system should be used? (SC 9.8) |
| Options: | 1. Classify datasets according to existing Irish standards like ICMS.<br>2. Classify datasets according to other classification systems.<br>3. Do not classify datasets |
| Our recommendation: | We recommend Option 2. |
| Why: | ICMS is not used to classify materials such as concrete, steel etc but rather classifies locations within buildings such as columns, foundation etc. In the construction industry various classification systems are used to organize construction elements, processes and products. In addition to ICMS, there are for example UniFormat, MasterFomrat, OmniClass, CSI MasterFormat, etc. These systems differ in their structure, application and geographical distribution. Should the ICMS prove unsuitable for classifying building materials in the generic database, possible alternatives are available. |

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| Question 31: | How should the data be delivered into the database (if EPDs are included)? (SC 8.12) |
| Options: | 1. Manual input/upload to database<br>2. Automatic import functionality with templates<br>3. Direct import from other sources through API |
| Our recommendation: | We recommend Option 1. We suggest manually updating the database as a first step. More automatic solutions can be explored if necessary to update the database often. |
| Why: | Our recommendation is to create a database of generic datasets and thus manual update of the database on a regular basis is enough for efficient operation of the database. There is no need to create an automatic import system through templates or API when data is updated by Irish State Agency – this would only be necessary if the database contains manufacturer specific EPD datasets that need to be added individually on a more frequent basis. |

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| Question 32: | In what ways should the data from the database be exported/downloaded from the database? (SC 9.3) |
| Options: | 1. Download PDF document<br>2. Export to CSV, JSON, XML, Excel or similar |

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| | 3. API access for dynamic connection to the database |
| Our recommendation: | We recommend Option 2. Our recommendation is to create a database system that can deliver machine-readable data in CSV, JSON, XML or a standardized Excel format as a minimum (Option 2). Furthermore, if there is a wish to enable more modern data exchange workflows, we recommend implementing an API that advanced users and developers can access. |
| Why: | Creating an export function to a CSV, JSON, XML or an Excel file is a cheap and easy solution to implement that most users will be able to benefit from. Creating an API that users can access will mean that tools can access the database programmatically and ensure the possibility to update data on the user side automatically. This is especially useful for developers that want to fetch data from the source automatically to power their tools. An example of this approach is the ECO Portal from ECO Platform which offers free API access to its database nodes through the Soda4LCA API with a limited set of API calls. Another example is the Inies database which charges for tool access, but is free for users of the online database. |

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| Question 33: | What should the database format be? (SC 8.15) |
| Options: | 1. ILCD+EPD<br>2. Open EPD<br>3. Excel<br>4. PDF |
| Our recommendation: | We recommend Option 1. We recommend implementing the ILCD+EPD format as the core database format. |
| Why: | The ILCD+EPD format is a comprehensive data format for storing machine-readable EPD data implemented by many of the biggest EPD Programme operators in Europe. By implementing a national database in the ILCD+EPD format, it will be easier to use EPDs from these sources to generate compatible generic data. The North American EPDs use Open EPD which is also a comprehensive data format while some programmes will also use EN ISO 22057 [as might the CPR CE Marking environmental data], but we see no issues here since all can provide key data into the ILCD+EPD format. Thus, we recommend implementing a data format that is either native to or compatible ILCD+EPD. |

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| Question 34: | Should the database be digitised and machine-readable? (SC 8.16) |
| Options: | 1. Yes, data should be digitised and machine-readable.<br>2. No, data does not need to be machine-readable. |
| Our recommendation: | We recommend Option 1. |
| Why: | It is crucial to make the data digitised and machine-readable to ensure efficient operation of the database as well as publishing data that can be interpreted |

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| | programmatically. A database is machine-readable by definition, but we want to emphasise that data should be structured using modern database technologies and not be a repository for static PDF documents. We recommend creating a database with an implementation of SQL or the like than can provide data to end users through the export/download of files or by API using a standardised data format. We also recommend publishing data in a human readable format like the ILCD+EPD based websites that can be seen on ECO Portal and its database nodes to make sure users can explore the data without the use of third-party tools. |

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| Question 35: | Should the dataset be available in PDF with a fixed format? (SC 9.6) |
| Options: | 1. Yes<br>2. No |
| Our recommendation: | We recommend Option 2. |
| Why: | While having a PDF format can be beneficial to share datasets in a document format, it is not necessary to do so if data is freely available online through e.g. the ILCD+EPD web view. For the sake of transparency, we do recommend publishing the generic datasets and the method for creating them in a public report. |

### 5.5 Recommendations on database maintenance and management

This section covers the following six questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 36 (SC 3.6) - How often should the database be updated?

Question 37 (SC 3.10) - Should the database methodology be externally peer reviewed?

Question 38 (SC 9.1) - How should users be able to access the individual datasets?

Question 39 (SC 9.2) - Should the database be free to access?

Question 40 (SC 4.8) - Should the Irish State Agency join InData?

Question 41 (SC 2.5-2.9) - Should external stakeholders be involved into the maintenance and enhancement of the database?

It should be noted that some of these questions are subject to wider national policy. We have no specific recommendation on these questions, but provide some nuances to the question, to support the Irish State Agency in making the right decision.

Summary of recommendations on Question 36-41

- We recommend an annual review of generic datasets to evaluate the need for updates.
- We recommend having the generic data generation peer reviewed.
- We recommend allying with the developers of the ILCD+EPD database systems and Soda4LCA API.

Detailed recommendations on Question 36-41

| Question 36: | How often should the database be updated? (SC 3.6) |
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| Options: | 1. The database is updated regularly on an annual basis.<br>2. The database is updated on a more frequent basis.<br>3. The database does not have planned updates. |
| Our recommendation: | We recommend Option 1. |
| Why: | There is no need to update the database more often than annually since we do not recommend hosting manufacturer specific EPDs in the national database. |

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| Question 37: | Should the database methodology be externally peer reviewed? (SC 3.10) |
| Options: | 1. No external peer review, but transparent documentation of the approach to generic data generation.<br>2. External peer review of the generic data generation. |
| Our recommendation: | We recommend Option 2. |
| Why: | External peer verified will increase credibility and ensure the robustness of the data. |

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| Question 38: | How should users be able to access the individual datasets? (SC 9.1) |
| Options: | 1. Users can freely access data without registering.<br>2. Users need to register an account to access data |
| Our recommendation: | No specific recommendation |
| Why: | Subject to wider national policy, registration means you know who and how many people are using it, and how often. In general API access is often developed with a requirement for registration to control requests and minimize strain on the system. |

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| Question 39: | Should the database be free to access? (SC 9.2) |
| Options: | 1. The database is completely free<br>2. Some database functions (e.g. API access) have a fee<br>3. All database functions have a fee |
| Our recommendation: | No specific recommendation |
| Why: | Subject to wider national policy. Almost all databases (except those adapting ecoinvent data) are free. |

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| Question 40: | Should the Irish State Agency join InData? (SC 4.8) |
| Options: | 1. Join InData<br>2. Don’t join InData |
| Our recommendation: | No specific recommendation |
| Why: | Subject to wider national policy. Irish State Agencycould join InData to gain from their collective knowledge about the provision of digitised EPD and generic data. |

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| Question 41: | Should external stakeholders be involved into the maintenance and enhancement of the database? (SC 2.5-2.9) |
| Options: | 1. EPD providers<br>2. Generic data providers |

3. Building LCA tool developer
4. Building certification system
5. LCA expert and practitioners
6. Developers of the ILCD+EPD database systems and Soda4LCA API

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| Our recommendation: | We recommend Option 6, allying with the developers of the ILCD+EPD database systems and Soda4LCA API. |
| Why: | This is a somewhat subject to wider national policy, but there is knowledge to be gained and potentially reduced costs by learning from existing database developments of EPD Programme operators. Irish State Agency could also benefit from involving external stakeholders to maintain and develop the generic data for the database. |

### 5.6 Recommendations on database formalities

This section covers the following six questions. The corresponding subcategory topic from the Milestone 2 review is shown in parentheses after each question.

Question 42 (SC 1.2 and 1.3) - In what language should the webpage for the database be?

Question 43 (SC 2.1) - Who should own the database?

Question 44 (SC 2.2) - Who should operate the database?

Question 45 (SC 2.4) - Who should fund the database development and maintenance?

Question 46 (SC 4.1-4.3) - How should the database be anchored in the national context?

Question 47 (SC 4.4) - How should the database be anchored in the international context?

It should be noted that some of these questions are subject to wider national policy. We have no specific recommendation on these questions, but provide some nuances to the question, to support the Irish State Agency in making the right decision.

Summary of recommendations on Question 42-47

- We recommend Irish State Agency own the database and the database structure, but not necessarily the data.
- We recommend that the Irish State Agency fund the development and maintenance of the database to avoid conflict of interests with private companies.
- In terms of database operation we recommend having a long-term solution in place where tasks do not change hands too frequently to avoid cost inefficiencies.
- We recommend mandating the use of a hierarchy of data in the Irish national methodology, where it is mandatory to use the generic data in the database if there are no sources of data available higher up in the hierarchy.

Detailed recommendations on Question 42-47

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| Question 42: | In what language should the webpage for the database be? (SC 1.2 and 1.3) |
| Options: | 1. English<br>2. Other language |
| Our recommendation: | We recommend Option 1. |
| Why: | Webpage and database operation should be in English, data sources used for creating generic data can be in other languages if relevant. If the product is being marketed in Ireland the EPD data will normally be available in English. |

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| Question 43: | Who should own the database? (SC 2.1) |
| Options: | 1. Irish State Agency owns the database and the data.<br>2. Irish State Agency owns the database structure but not the data<br>3. Irish State Agency does not have ownership of the database. |
| Our recommendation: | We recommend Option 2. Irish State Agency owns the database and the database structure, but not necessarily the data. |
| Why: | The level of ownership over the generic data will depend on the approach to generic data generation. If generic data is created by averaging EPDs or by bottom-up modelling the data can be owned by Irish State Agency. If data is linked to GaBi or Ecoinvent, Irish State Agency cannot own the data (as it will be tied to the background data) |

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|---|---|
| Question 44: | Who should operate the database? (SC 2.2) |
| Options: | 1. Irish State Agency operates the database internally to full extent.<br>2. Irish State Agency outsources some of the tasks for database maintenance and operation.<br>3. Irish State Agency completely outsources the operation and maintenance of the database. |
| Our recommendation: | No specific recommendation |
| Why: | It is up to Irish State Agency to decide how to operate the database, but we recommend having a long-term solution in place where tasks do not change hands too frequently to avoid cost inefficiencies. |

| | |
|---|---|
| Question 45: | Who should fund the database development and maintenance? (SC 2.4) |
| Options: | 1. Public funding<br>2. Private funding |
| Our recommendation: | We recommend option 1. |
| Why: | We recommend that Irish State Agency funds the database (publicly funded/tax payer money) to avoid conflicts of interest with private stakeholders. There could be fees for providing API access to the database. We recommend the database is free to users. |

| | |
|---|---|
| Question 46: | How should the database be anchored in the national context? (SC 4.1-4.3) |
| Options: | 1. Mandatory in building LCAs<br>2. Voluntary in building LCAs<br>3. Hierarchical approach |
| Our recommendation: | We recommend Option 3, mandating the use of a hierarchy of data in the Irish national methodology, where it is mandatory to use the generic data in the database if there are no sources of data available higher up in the hierarchy. |
| Why: | We recommend a hierarchical approach so that other more specific sources of data can be used alongside the national generic database, thus achieving more representative building LCAs. |

### 5.7 The CPR and c-PCRs and how it may affect the Irish national database

The Construction Products Regulation (CPR) defines harmonized rules for the marketing of construction products. It is a system that works across EU member states with different national construction codes. It supports the free movement of products (via CE marking) and defines a common technical language in term of functionality, safety and environment.

The final CPR Revision text is not yet publicly available. It will likely be available in the end of 2024 or early 2025. The core elements of LCA integration into the EU CPR is:

- LCA-declarations very similar to EPDs will become mandatory for the CE-marking of building products
- Environmental indicators calculated with LCA will become Essential Characteristics for building products; in total, 39 essential characteristics on environmental sustainability will be defined
- A regulated mechanism is being introduced, building on EN 15804, using complementary Product Category Rules (c-PCR) to implement the specific calculation rules for the different product groups
- At first, only Climate Change (Global Warming Potential, GWP) will have to be reported, subsequently complemented with all indicators defined in EN 15804
- A validation process is being introduced (similar to the verification of EPDs) that is run by national Notified Bodies
- The CPR Revision introduces a Digital Product Passport (DPP) that will also carry the essential characteristics on environmental sustainability. Details on database-/network-structure, formats, roles and responsibilities are open to-date.

For the declarations coming from the revised CPR, it will be advisable for Ireland to facilitate that requests for standardization from the European Commission, and the resulting product c-PCR as hEN (harmonized European Standards) which are produced by each Technical Committee, will provide scenario data which is useful and relevant to the Irish context, as manufacturers covered by hEN will not be able to provide any additional information (e.g. a scenario relevant to Ireland) outside of CE Marking.

**The role of PCRs in relation to the Irish national database**

The Product Category Rules (PCRs) provide the rules, requirements and guidelines for developing an EPD for a specific product category. They ensure that functionally similar products are assessed in the same way, thus ensuring that their LCA results are comparable. PCRs are a key part of EPD Programs as defined in ISO 14025 as they ensure transparency and comparability between EPDs.
Based on the recommendations outlined in Section 5.1-5.6 it is recommended that the Irish State Agency align their overall methodology for generic data generation with existing PCRs for construction products and with our recommendations on how to handle mass balancing (Question 17), Guarantees of origin (Question 21) and allocation (Question 23). Given our recommendation on the overall content of the database, the Irish State Agency does not need to develop a PCR for Ireland. Once c-PCRs will become available, we recommend to review whether the Irish national database comes into conflict with any or some of the c-PCRs, and to adjust the database subsequently as deemed necessary.

Appendix 1

# Review of Databases

Table A1 – Full list of databases and review of evaluation criteria

| Database name | No. | Evaluation criteria | | | | Included based on review? |
|---|---|---|---|---|---|---|
| | | 1. Comprehensiveness | 2. Data compatibility | 3. Type of data | 4. Availability | |
| **Established EPD programmes audited by ECO Platform** | | | | | | |
| ECO Portal from ECO Platform | 1 | Yes | Yes | Native | Yes | Yes |
| IBU | 2 | Yes | Yes | Native | Yes | Yes |
| PEP ecopassport | 3 | Yes | Yes | Not compatible | Yes | No |
| International EPD/ENVIRONDEC | 4 | Yes | Yes | Native | Yes | Yes |
| EPD Norway/ILCD+EPD/ISO22057 | 5 | Yes | Yes | Native | Yes | Yes |
| BRE 15804 EPD programme | 6 | Yes | Yes | Native | Yes | Yes |
| EPD Danmark | 7 | Yes | Yes | Native | Yes | Yes |
| EPD Italy | 8 | Yes | Yes | Native | Yes | Yes |
| Global EPD | 9 | Yes | Yes | Native | Yes | Yes |
| ITB EPD Program | 10 | Yes | Yes | Native | Yes | Yes |
| Kiwa-Ecobility Experts | 11 | Yes | Yes | Native | Yes | Yes |
| RTS EPD | 12 | Yes | Yes | Native | Yes | Yes |
| Milieu Relevante Producte Index [MRPI] | 13 | Yes | Yes | Native | Yes | Yes |
| Bau EPD | 14 | Yes | Yes | Native | Yes | Yes |
| DAPconstruccion | 15 | Yes | Yes | Native | Yes | Yes |
| DAPhabitat | 16 | Yes | Yes | Native | Yes | Yes |
| EPD Ireland | 17 | Yes | Yes | Native | Yes | Yes |
| Global GreenTag International EPD Program | 18 | Yes | Yes | Compatible | Yes | No |
| ift Rosenheim | 19 | Yes | Yes | Native | Yes | Yes |
| SÜGB | 20 | Yes | Yes | Native | Yes | No |
| ZAG EPD | 21 | Yes | Yes | Native | Yes | Yes |
| EPD China | 22 | Yes | n/a | n/a | Yes | No |
| **Other EPD programmes and EPD providers not audited by ECO Platform** | | | | | | |
| EPD Belge/Belgian Federal EPD Database | 23 | Yes | Yes | compatible | Yes | Yes |
| European Aluminium EPD Programme | 24 | No | Yes | Not compatible | Yes | Yes |
| Tata Steel EPD Programme | 25 | No | Yes | Not compatible | Yes | Yes |
| EPD Hub | 26 | Yes | Yes | Compatible | Yes | Yes |
| BRE IMPACT | 27 | Yes | Yes | Compatible | No | No |
| Cement Manufacturers Ireland [CMI] | 28 | No | Yes | Compatible | Yes | Yes |
| **Mixed databases with EPD and generic data** | | | | | | |
| Oekobaudat [Ökobaudat] | 29 | Yes | Yes | Native | Yes | Yes |
| INIES database | 30 | Yes | Yes | Compatible | Yes | Yes |
| Danish National Database BR18, appendix 2 | 31 | Yes | No | Not compatible | Yes | Yes |
| EC3 Database | 32 | Yes | Yes | Compatible | Yes | Yes |
| TOTEM Database | 33 | Yes | No | Not compatible | Yes | No |
| UL Environment | 34 | Yes | Yes | Not compatible | Yes | Yes |
| Built Environment Carbon Database [BECD] | 35 | Yes | Yes | Not compatible | Yes | Yes |
| Plastics Europe EcoProfiles | 36 | No | No | Not compatible | Yes | No |
| worldsteel eco-profiles 2022/worldsteel LCI datasets | 37 | No | No | Not compatible | Yes | No |
| TDUK Generic Database | 38 | No | Yes | Not compatible | Yes | Yes |
| **Generic databases** | | | | | | |
| Ecoinvent - European Construction Materials | 39 | Yes | No | Not compatible | No | No |
| GaBi Construction Database | 40 | Yes | No | Not compatible | No | No |
| ODCi Database | 41 | Yes | Yes | Compatible | Yes | Yes |
| Inventory of Carbon and Energy [ICE] Database v3/v2 | 42 | Yes | No | Not compatible | Yes | Yes |
| Life Level[s] Generic Data for Ireland | 43 | Yes | No | Not compatible | Yes | Yes |
| Global Cement and Concrete Association [GCCA] Getting the Numbers Right [GNR] Database | 44 | No | No | Not compatible | Yes | No |
| Nationale Milieu Database | 45 | Yes | No | Not compatible | No | No |
| Boverkets Klimatdeklaration Database | 46 | Yes | No | Not compatible | Yes | Yes |
| CO2data.fi | 47 | Yes | No | Not compatible | Yes | Yes |
| KBOB/ecobau/IPB v5 | 48 | Yes | No | Not compatible | Yes | No |

Table A2 – Review categories and subcategories

| DATABASE INFORMATION | |
|---|---|
| **Main geographical coverage of the database** | Country/region for the database if regional |
| Links | Main webpage in original language than in English |
| | Main webpage in English |
| | Actual database link |
| | Link to principles for database (e.g. methodology, acceptance principles etc.) |
| | General programme instructions |
| | Other links |

| **GOVERNANCE** | |
|---|---|
| **Owner** | Who owns the database |
| Operator | Who is operating the database (if different from the owner) |
| Location of Operator | Where is the operator located [country] |
| Funding | Who funds the database development and maintenance (public vs. private funding, user fees? |
| External Stakeholders: Are external stakeholders involved into the maintenance, enhancement of the database | EPD provider(s) |
| | Generic data providers |
| | Building LCA tool developer [input to database, not output to tool] |
| | Building certification systems |
| | LCA experts and practitioners |

| **DATABASE OPERATION** | |
|---|---|
| Approach used to create generic data | If generic data is produced for the database, how is it created? |
| PCR development approach | How are PCR for construction product sub-categories developed |
| What PCR for sub-categories have been developed? | |
| Do the sub-category PCR provide additional methodological guidelines? | |
| Update strategy | When was the database last updated? How regularly is it updated? How often is new data added? Is data withdrawn? |
| Approach to address data gaps? | Are there any ways in which data gaps are dealt with? |
| Requirements for verifiers | |
| Any verification of data outside normal EPD verification? | |
| Peer review of verification of database generally | External peer review or verification of database or methodology? |

| DATABASE CONTEXT | |
|---|---|
| National Context | How is the database anchored in the national context (e.g. mandatory vs. voluntary database for building LCA, use in national GPP legislation etc.) |
| Mandatory use of database in a national regulation | Mandatory to use database in the national regulation in any way Y/N/Unspecified |
| Voluntary scheme nationally requires use of the database | Mandatory to use database in a voluntary national context in any way Y/N/Unspecified (e.g. DGNB is voluntary but requires use of Oekobaudat) |
| International Cooperation | How is the database anchored in the international context? |
| Is the database operator/EPD programme a member of ECO Platform? | |
| Has the EPD programme been audited by ECO Platform? | |
| Audited by a body other than ECO Platform? | |
| Are they members of InData? | |
| Do they have mutual recognition with other EPD programmes? | Y/N/unspecified |
| | If yes, which programmes have mutual recognition |
| Do they share PCR with other programmes? | |

| CONTENT OF DATABASE | |
|---|---|
| EPD Included | Does it include EPD, yes or no |
| Number of Manufacturer specific EPD 2024 | Number of EPD from single manufacturers |
| Number of Sector EPD 2024 | Number of EPD From trade associations or more than one manufacturer |
| Total Number of EPD 2024 | Number of all EPD |
| Project Specific EPD | |
| Generic Data Included | Does it include Generic datasets |
| Number of Generic Datasets | Excluding Sector EPD |
| Number of datasets from Irish Manufacturing | if possible to find out, how many datasets are from Irish manufacturing? |

| SCOPE OF DATA | |
|---|---|
| LCIA or GWP | CO2, CO2e (GWP only), or LCA indicators |
| Indicators | EN 15804+A2 or EN15804+A1 or TRACI |
| Additional indicators required | E.g. optional EN 15804 LCIA indicators etc. |
| Module Scope | A1-A3 or cradle to gate + options or cradle to grave |
| | Inclusion of Module B6 data for EN15978 building LCA |
| **Geographical scope** | Is the database limited to a certain region, e.g. UK, EU, global? |
| **Product Scope** | Is the database limited to certain products? Are certain products excluded? |

| FORMAL LCA RELATED REQUIREMENTS FOR DATA | |
|---|---|
| **External verification of EPD required?** | Y/N |
| Rules for EPD Data | Limited to EPD programmes (please list) |
| | Rules for EPD Data [manufacturer specific and sector EPD] |
| EPD from pre-verified tools allowed | Y/N |
| Requirements for pre-verification of EPD Tools and EPD from tools | Y/N |
| Are there requirements for tool verification | Link |
| Background Database restrictions | Limited to background database |
| | If other database, please specify: |
| Location/Market Based Energy | E.g. Guarantee of Origin allowed or residual mix, consumption mix required for grid electricity, dual reporting etc. |
| Byproduct/Co-product allocation | Allocation to low value co-products like PFA or slag |
| Manufacturing waste allocation approach | How are output flows of recovered waste from manufacturing considered? |
| Database approach to mass balancing | |
| Treatment of biogenic carbon | Is there any particular treatment of biogenic carbon in A1-A3? |
| Limits on variation for average or representative product EPD | |
| Requirements for Scenarios | Does the database provide rules or default data for scenarios? |
| Other formal submission criteria | Are there other normative compliance or data quality requirements and what kind of approval/quality assurance processes and tools are in place? |
| Other requirements for modelling and calculation of indicators for LCI/LCIA? | Any special modelling rules in place (going beyond general normative references) |

| TECHNICAL REQUIREMENTS | |
|---|---|
| **Dataset Types** | How does the database differentiate between dataset types in order to express the representativity of life cycle assessments (e.g. specific datasets, average dataset, generic dataset, representative dataset, template dataset). |
| What kind of rules are defined for the different dataset types? Include source, verification, any compensation factors etc | Generic dataset rules: |
| | Representative dataset rules |
| | Average dataset rules |
| | Specific dataset rules |
| | Template datasets (worst case EPD) |
| | Other |
| | Are compensation/penalty/uplift factors used? |
| | What justification is given for use of compensation/penalty/uplift factors |
| | What datasets receive compensation/penalty/uplift factors |
| | How much is the compensation/penalty/uplift factor? |
| Data delivery to the database | How are the data delivered into the database (e.g. direct import from other software systems, own import tool of the database provider) |
| Data Validation | Is there a data validation process in place before the data are uploaded into the database? |
| | What are the main elements of the Data validation process? |
| Data Format | ILCD+EPD, Open EPD, other? |
| Database digitisation | Is the database digitised, if so what data is digitised |

| DATA OUTPUT AND EXCHANGE | |
|---|---|
| **How can individual datasets be accessed** | By anyone, by registered users only, via registered tools only |
| Is there a cost to access datasets | Free / cost per dataset / cost for access to the database |
| Database interfaces | How can the data been exported/downloaded from the database (e.g. via APIs, single vs. bulk download)? |
| Are the datasets available in ECO Platform ECO Portal | |
| Do the EPD as pdf have a fixed format | y/n/not relevant |
| Do the generic datasets as pdf have a fixed format | y/n/not relevant |
| Language | In which language are the datasets published? |
| Product categories/ classification System | How are the datasets organized in the database? What classification system is used (to allow the user a structured dataset search). |
| Search facility | In what ways can the database be searched? List the parameters |