Verification of Environmental Product Declarations (EPDs) – how strict should it be?

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Abstract. The verification of Environmental product declarations (EPDs) is often performed by an expert, who walks through pre-made standard checklists. As verification is not strictly defined by the EN 15804 standard, it can be performed in a number of different ways. This paper presents some emerging discussions from the Norwegian context on how strict EPD verification should be. Highlighted issues include how to verify computer-generated EPDs and user input to software in general, the possible scope of the responsibility of the EPD verifier, and more. Recommendations include the addition of an environmental completeness check module to the verification of EPDs, and harmonisation with EPD verification with the CE system, which allows a tiered system in which more environmentally significant products such as for instance concrete, can be assigned more scrutiny.

1. Introduction

1.1 Environmental Product Declarations (EPDs)

An Environmental product declaration, or EPD, is a document that succinctly presents results from a Life cycle assessment (LCA) studies for a product, in conjunction with selected inputs and assumptions to the LCA study as well as general information about the product. There is currently a large number of standards and guidelines that EPDs need to conform to. For construction products, EPDs conform to EN 15804 [1], and as this product group forms a large part of published EPDs, EN 15804 is sometimes regarded as the de facto standard for all EPDs regardless of product group. At present, a new version of the standard (+A2:2019) is being phased in.

EN 15804 is further based on ISO 14025 [2] on environmental labels and declarations of type III (i.e., for products). The development of the LCA study is further supported by the common LCA standards ISO 14040 [3] and ISO 14044 [4]. For the LCA practitioner, a substantial number of additional technical standards can be employed for different issues in the modelling (see, e.g., [5]).

The EPD system is based on guidelines and product category rules (PCRs) published by national programme operators. The development of product category rules conforms to the

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standard ISO 21930:2017, but apart from this the national programme operators have some degree of freedom. This can be observed in the use of different templates and to some extent different content in EPDs from different national programme operators. There might also be different national practices when it comes to technical issues and accepted practice, but the extent of such differences is not always completely known. In the following, this paper will primarily take into account the Norwegian case.

1.2 Verification of EPDs

The term «verification» in the context of environmental declarations was originally defined with basis in ISO 9000:2005 [6], as pointed out by ISO 14025:2006, clause 3.9. The definition provided in the latter is: «confirmation, through the provisions of objective evidence, that specified requirements have been fulfilled». For the Norwegian EPD system, such requirements are to some extent summarised by guidelines, but more prominently in verification checklists that conform to the requirements of the relevant standards. In addition, the applicable PCR needs to be consulted during verification.

In practice, the verifier thus needs to take properly into account at least the verification checklist, the PCR document, the applicable EPD and the EPD background report with appendices. In addition, knowledge about EN 15804, ISO 14040, ISO 14044 and ISO 21930 [7] is required. Optimally, the verifier should also know typically emerging issues in LCA modelling, and how these relate both to hypothetical environmental hotspots in the relevant value chain and, in turn, their link to all environmental impact categories and the life cycle impact assessment methods, both at the overarching methodological level and with regard to individual characterisation factors. The verifier thus ought to have some previous knowledge about known environmental issues in the value chain of the product in question.

ISO/TS 14071:2014 [8] on critical review in LCA is also relevant, as pointed out by ISO 21930:2017 ch. 11; however, EPD verification should probably not be regarded as an exact equivalent to the critical review process in LCA, and the critical review concept will thus not be further discussed here. As for the issue of verification in EN 15804+A2:2019, it is only superficially described in clause 8.4 and ch. 9, and leaves many emerging questions open to further interpretation.

At a more fundamental level, reasons for the establishment of the verification system can be that it is hard to spot own LCA modelling errors, it may lower the risk of sloppy work or cheating, and it may improve fair competition. In sum, verification is a process to support the EPD developer with the often very complex LCA model and report and to ensure high quality and a comparable level of EPDs for adequate further use of the environmental information.

1.3 Aim of study

As the EPD verifier cannot be omniscient about all potentially and actually relevant issues in the verification process, this begs the question of when verification is good enough in practical terms, or how strict it should be. For this purpose, other product certification schemes were reviewed in order to find potential good practice for efficient verification. A workshop was then conducted in 2021 which included representatives of other product certificates, EPD stakeholders and the construction industry. The workshop focused on glue laminated timber as the work was within the context of the research project *RENTRE* (for more information on the project see Acknowledges below). The aim of the workshop was not to find consensus or best practice; it was to map the issues and potential solutions for more efficient verification.

In the following chapter, we present six current emerging issues in EPD verification that were identified on the basis of these discussions. What we consider the key lessons learnt and our recommendations for improvements of the EPD system, are summarised in chapter 3.

2 Current emerging issues in EPD verification

2.1 Software-generated EPDs

Over the last few years an important development has been an increase in publication of software-generated EPDs. These have at the time of writing to some extent replaced manual EPDs. The structure of the verification of these generated EPDs has been a matter of some controversy in the Norwegian system.

As a point of inception, the implementation of a software tool for a particular product group has had to be approved by an independent verifier, with the help of one example EPD and a background report.

A practical problem in this regard was that the verifier of the tool was hired for a smaller, time-limited project, whereas potential quality issues with generated EPDs remained a continuous problem also after this verification was finished. This prompted several questions:

- whether each individual generated EPD from this tool could be claimed to be verified in the regular sense by the verifier of the generic tool,
- whether the verification of the tool (and therefore pre-verification of generated EPDs) was sufficient in practice to detect and avoid future potential errors,
- which actor had the key responsibility to ensure the quality of the individually generated EPDs (e.g., business, software developer, programme operator),
- overall, whether generated EPDs actually were of sufficient quality.

The verification of generated EPDs is at the time of writing being restructured into a more systematic approach in the Norwegian system, where these emerging issues are taken more into account.

2.2 Errors

Informal reviews have suggested that many EPDs, whether manual or generated, have at least minor error in the results, particularly for the less emphasised environmental impact categories. Should the verifier actively watch out for errors that become clear even after publication of the EPD, or does publication end all responsibility?

EPD verification is a relatively short project with a low cost frame from the context of a researcher or consultancy. The extension of the time frame of the responsibility would be impractical for the verifier, and it would also be difficult to estimate the actual costs in advance. Moreover, errors that have already avoided the eye of both the verifier and the developer would by nature be hard to detect in anything but an accidental manner. It would thus be difficult to know which concrete error-seeking tasks the verifier should perform in a system of protracted verifier responsibility.

For computer generated EPDs, it has been found that in comparison to manual EPD, the responsibility of the verification has become spilt between three actors instead of one, which further complicates the issue.

2.3 Keyboard input to LCA software

Another issue relating to software is that inventory tables in the LCA report may differ from the actual number and formulae input to the LCA software. The software model implementation of the inventory data may be flawed or inconsistent with the tables in a number of ways, and thus introduce errors in the results. A question is therefore whether the verifier should be mandated to check the implementation of numbers and formulae as typed into the software, or only the more generic inventory data tables as typically stated in the LCA report.

A detailed check of every number and every formula can be both difficult and time-consuming. It may become perceived as tedious and nitpicky to the verifier, and it might also require an expanded verification cost frame. In present verification practice, this task is perhaps unlikely to be given full priority, although it is possible that this can vary between different verifiers.

2.4 Consequential modelling

Published EPDs in Norway are almost exclusively based on attributional modelling. Some instances of consequential modelling have been seen, however, which can introduce difficulties in comparison between individual EPDs. This issue can possibly be easily resolved at the PCR development level, but due to the difficulty of interpolating between these methodologies, the problem seems to simply be avoided at times.

2.5 Narrow checklist walkthrough or holistic environmental assessment?

Another emerging issue concerns the practical role of the EPD verifier. The most succinct way of describing the verification process is that it involves going through a checklist, at the best of the ability of the verifier. As indicated by [9], LCA/EPD may be expected to conform pragmatically to the different guidelines and standards, but not to comply with them in a strong sense. Furthermore, the verifier cannot know definitely which potential environmental issues are important and which are not, as, for instance, the valuation/weighting problem in LCA is unresolved and to a substantial extent contingent on perspective [10].

In EPD practice, experience may have shown that the competence of individual LCA practitioners often seems to be sufficient with regard to the modelling of the technosphere, but somewhat lacking with regard to complete knowledge of environmental impacts and impact assessment methods. Additional environmental issues not addressed by the regular impact indicators are rarely if ever included in EPDs. With the expansion of the scope of impact assessment in the A2:2019 version of EN 15804 more issues can be assessed, but at the same time one must then logically expect practitioners and verifiers to have an even less complete grasp of all the methods and implications.

Although EN 15804 delimits regular EPD development to a selection of impact categories (ref., e.g., clause 6.5 in the A1:2013 version), a prudent question is whether ISO 14025 clause 5.3 applies. It states that for Type III environmental declarations, «all relevant environmental aspects throughout its life cycle shall be taken into consideration and become part of the declaration», and that «relevant environmental aspects that have not been covered by LCA shall be addressed using other appropriate methods».

The demand for completeness with regard to documentation of environmental damage from the product as found in ISO 14025 can in fact be strongly contrasted with the more narrow checklist logic of the EPD world, particularly as the checklists also primarily regard purely technical issues. How to approach the environmental completeness referred to in ISO

14025 appears to be a pressing issue. An «environmental completeness check» could possibly be formalised as a vital extra task within EPD verification in a future system.

2.6 Potential harmonisation between verification in the EPD and CE systems

When something goes wrong within a very rigid and rule-based system, the intuitive response will often be to make the system even more rigid, with even more points to check. The philosophy of verificationism can historically be linked to logical positivism and modernism in general, which, however, were never very concerned with the environment – in fact, quite the contrary. EPD verification can perhaps become too formalistic, so that the interest in the actual area of protection, i.e., the environment, would easily be underestimated.

In short, thinking correctly about the environment probably requires an open mind, which is not always encouraged by excessive standardisation and verification. In the context of «industrial ecology», it seems clear that the EPD system is quite «industrial», and could perhaps gain from being more about «ecology». And thus it can perhaps be recommended to work smarter, not stricter when it comes to EPDs?

In the CE system, the Assessment and Verification of Constancy of Performance, AVCP is divided into five categories [11, 12] as shown in Table 1. The scope of verification aspects varies from where the manufacturer has all responsibility to where a third party notified body has continuous assessment of samples and production control.

Table 1. AVCP categories and scope of verification aspects.

AVCP	**1+**	**1**	**2+**	**3**	**4**
Factory production control (FPC)	Manufacturer	Manufacturer	Manufacturer	Manufacturer	Manufacturer
Further testing of samples taken by the manufacturer	Manufacturer	Manufacturer	Manufacturer		
Assessment of the performance	Notified body	Notified body	Manufacturer	Notified body	Manufacturer
Initial inspection (plant and FPC)	Notified body	Notified body	Notified body		
Continuous surveillance, assessment and evaluation of FPC	Notified body	Notified body	Notified body		
Audit – testing of samples taken by the Notified Body	Notified body				

CE assessment verification can thus be more strict for more important construction materials such as concrete and glued laminated timber, and less strict for less important materials such as mouldings.

This tiered approach can be relevant also for EPDs: Could there be a more thorough verification procedure for building materials that carry more impact?

3 Discussion and concluding remarks

In practice, the verifier cannot and does not have perfect knowledge about every issue in each standard, nor about the value chain, nor about every impact assessment methods, nor about all the links that can be drawn between these. If appropriately designed, an applicable checklist can help with acknowledging that most relevant issues have been covered by a verification. Nevertheless, there will still be a very large room for subjective evaluation, which remains contingent on the theoretical knowledge and practical experience of the verifier. Eventually, due to the overwhelming potential scope of «perfect» EPD verification the practical and epistemic limitation of each verifier has to be respected, which means that no absolutes should be placed on what is «good enough» verification. It needs to be acknowledged that existing EPDs are imperfect, while constructively paving the way towards continuous improvement – for the sake of the environment.

This paper has presented a few tentative suggestions for EPD verification, the most important being:

- particularly considering the verification of computer-generated EPDs,
- adding an environmental completeness check to EPD verification in accordance with ISO 14025, and
- introducing a tiered approach such as that found in the CE system, which may move required scrutiny from unimportant products to products that have a substantial environmental impact. The tiered approach can also provide stricter requirements on some issues within product categories that are found to be important.

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