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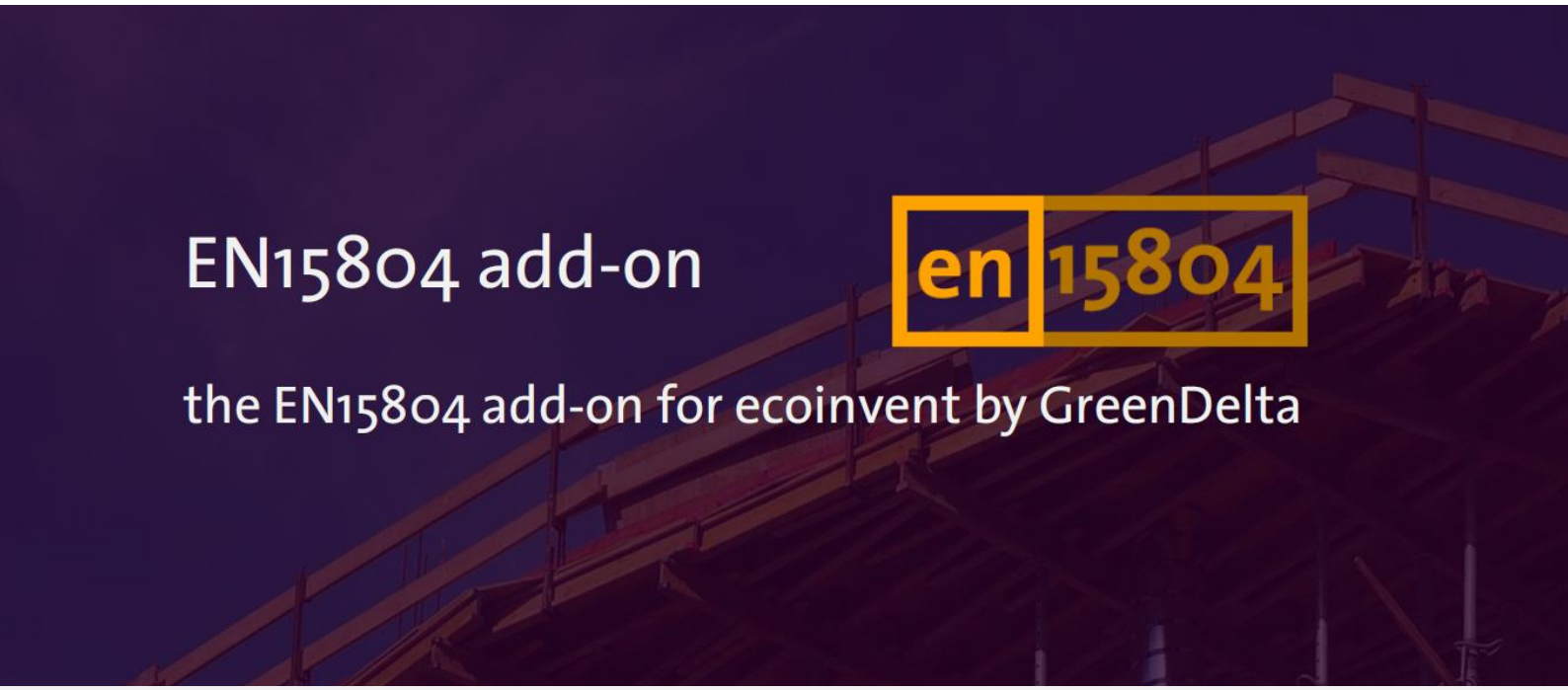

openLCA

EN 15804 Add-on for ecoinvent in openLCA

Review Report

October 2022

Add-on development	GreenDelta GmbH Kaiserdamm 13 14057 Berlin Germany Andreas Ciroth Add-on version v3 from 29.09.2022 openLCA software version 1.11 ecoinvent version 3.8 – cut-off system model database Report version 1.3
Reviewer	Therese Daxner Daxner & Merl GmbH (D&M) Schleifmühlgasse 13 / 24 1040 Vienna Austria
References	ISO 14044 DIN EN ISO 14044:2006-10. Environmental management - Life cycle assessment - Requirements and guidelines. EN 15804+A2 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; German version EN 15804:2012+A2:2019 + AC:2021 ISO 14071 DIN CEN ISO/TS Environmental management - Life cycle assessment - Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006 (ISO/TS 14071:2014).

1. Subject & scope of the critical review

The subject of this critical review is the **EN 15804 add-on for ecoinvent** developed by GreenDelta including its documentation in the complementary report.
The developed add-on aims to support the creation of EPDs according to EN 15804. It directly builds upon the ecoinvent 3.8 – cut-off system model database.
The original database does not provide evaluation possibilities for the resources, waste and output indicators required according to EN 15804. Therefore, the add-on provides this possibility. It does not change the ecoinvent inventory data. As a result, the environmental indicators supported by the ecoinvent original database are not touched by the add-on. This also includes all methodological choices in the ecoinvent-database.

The subject of the review represents a software add-on. ISO 14044 defines requirements and guidelines for life cycle assessment (LCA) studies. EN 15804 outlines core rules for the development of environmental product declarations (EPDs) for construction products. As the add-on does not represent a classical LCA study nor EPD, the review process including the review criteria were adapted to the scope of the review accordingly.

The critical review thus ensures that

- the applied methodologies and systematic choices the normative requirements outlined in ISO 14044 and EN 15804 (as applicable),
- the applied methodologies are scientifically appropriate,
- the developed add-on follows correct calculation routines and delivers plausible results,
- the report documents the add-on-development transparently and consistently.

The concurrent review covered a timeframe from 07.03. to 11.10.2022. Der finalized versions of the add-on and the report were submitted on 29.09.2022.

The verification of the ecoinvent-database including its background data and methodological choices is not part of this review.

2. Review process

The concurrent review included the following phases:

- Review preparation including the development of the review plan
- Start-meeting on 23.03.2022
- Gap Assessment of the add-on and the report
- Iterative review-meetings on 12.04., 06.05. & 15.09.2022
- Submission of finalized documents
- Review report

The review process was specifically adapted for the scope of the add-on. The choice of reviewer was based on expertise and methodological competence.

The review started with a start-meeting followed by a gap assessment of the submitted documents (add-on in ZOLCA-format + report). Therefore, the reviewer had full access to the developed add-on in openLCA. Questions and comments resulting from the testing of the add-on were subsequently collected and communicated to GreenDelta. Based on the findings of the gap assessment, the add-on was revised in several loops. Open questions were discussed profoundly including deep dives into the methodological premises of EN 15804.

The submission of the finalized documents was done on 29th of September 2022:

- openLCA-file in ZOLCA-format: “ecoinvent_38_en15804gd_v3_after_review”
- report: “EN15804 add on in openLCA_1.3_final”

Based on the final check of the submitted files the review was complete, and this review report was issued.

The critical review was performed orienting towards ISO 14071.

3. General evaluation & limitations

The EN 15804 add-on developed by GreenDelta represents an easy-to-use software solution implemented in openLCA. It is transparently documented in a complementary report, which was part of this review. A user “how-to-use”-handbook to further simplify the use of the add-on is planned in future but was not in the scope of this review.

The following functionalities were reviewed based on spot checks:

- Methodological compliance with the guidelines of EN 15804
- Correct implementation of calculation routines
- Implementation and mapping of auxiliary flows
- Consideration of net calorific values in the calculations
- Plausibility of results for chosen examples
- No modifications of ecoinvent inventories (exceptions documented in report)

The developed add-on offers support for LCA practitioners seeking to develop LCA studies in compliance with ISO 14044 and EN 15804.
It therefore offers additional functionalities to assess the following indicators required in EN 15804:

- Resources: Total use of non-renewable primary energy resources
- Resources: Use of non-renewable primary energy resources used as raw materials
- Resources: Use of non-renewable energy excluding primary energy resources used as raw materials
- Resources: Total use of renewable primary energy resources
- Resources: Use of renewable primary energy resources used as raw materials
- Resources: Use of renewable energy excluding primary energy resources used as raw materials
- Resources: Net use of fresh water[1]
- Resources: Use of secondary material
- Resources: Use of non-renewable secondary fuels
- Resources: Use of renewable secondary fuels
- Waste: Hazardous waste disposed
- Waste: Non-hazardous waste disposed
- Waste: Radioactive waste disposed
- Output: Material for recycling

[1] Limited applicability of ecoinvent background data for this indicator: As water flows are not always comprehensibly covered in ecoinvent, this indicator must be interpreted with caution.

- Output: Components for reuse
- Output: Exported energy
- Output: Materials for energy recovery

The add-on successfully facilitates the evaluation of the indicators listed above and required for EN 15804 studies.
The core environmental impact indicators including the optional environmental impact indicators required according to EN 15804+A2 are covered in the standard ecoinvent database version and not touched by the add-on.

It should be noted that the correct application of the add-on to ensure EN 15804 compliance always remains in the responsibility of the LCA practitioner. This includes the representative choice of background datasets, the collection and implementation of robust foreground data and the correct setup of the openLCA modelling to calculate resource, waste and output indicators compliant to EN 15804. This is also valid for the correct alignment of input and output flows to the modular structure of EN 15804, which must always be adapted in the LCA-specific context.
As a result, the conformity of the use of the add-on in any study-specific context is not part of the review scope and cannot be confirmed.

Limitations - primary energy for material and energetic use
The developed add-on seeks to consistently differentiate between primary energy used as material and energy used excluding energy used as material. To do so, the developer followed a structured logic outlined in chapter 5.2.1 in the complementary report. The classification of the life-cycle-related final destiny of primary energy use builds on the ecoinvent-logic and includes some uncertainties caused by the existing ecoinvent inventories. It thus represents a best-guess approximation with some limitations.

The correct classification of primary energy use according to the EN 15804-rationale thus was intensively discussed during the review process. To fully ensure the correct differentiation of primary energy use in the add-on, a precise definition of the EN 15804-rationale would be required. EN 15804 does not further define the correct differentiation except for the following note:

"In order to identify the input part of renewable/non-renewable primary energy used as an energy carrier and not used as raw materials, the indicator "use of renewable/non-renewable primary energy excluding renewable/non-renewable primary energy resources used as raw materials" is considered and can be calculated as the difference between the total input of primary energy and the input of energy resources used as raw materials."

The described approach can be considered as fall-back solution representing an alternative to the default-calculation currently implemented in the add-on.

In addition, various EPD program operators have defined further rules for the declaration of energy related indicators. E.g. Institut Bauen und Umwelt e.V. applies an input-output-accounting approach of primary energy used as material, which is not considered in the standard ecoinvent-database.

Limitations - secondary material

The developed add-on calculates the quantity of used secondary material based on the respective ecoinvent inventories. In some cases, the correct classification as secondary material (e.g. in case of internal looped materials) includes some uncertainty. The mapping of secondary material flows is transparently documented in the complementary report.

General note: "Use of secondary material" according to EN 15804 does not equal "recycled content" according to ISO 14021.

Limitations - waste flows

The developed add-on facilitates the analysis of waste output flows for the user. It therefore builds on the information provided in the ecoinvent unit processes. However, the ecoinvent database also includes system processes representing aggregated datasets (e.g. PlasticsEurope datasets). Waste flows associated to these datasets are not known and not accounted for in the results of the add-on. As a result, it lies again in the responsibility of the user to show the limitations of the waste indicators if system processes are to be expected a major contributor in the respective LCA context.

The review of the add-on waste indicator results showed systematically large contributions from waste from coal and lignite mining. As the add-on directly applies the referring ecoinvent-datasets building upon comparably old inventories (tracing back to the 1970s), the representativity of the results is to be questioned.

4. Conclusions

The EN 15804 add-on developed by GreenDelta represents an easy-to-use tool which is suitable to provide additional support for practitioners performing LCA studies according to EN 15804. The developed solution and the complementary documentation are of high quality. Comprehensive testing of the calculation routines did not reveal any perceivable errors in the finalized version and identified plausible results. Its background is reported comprehensively. The report includes the transparent documentation of the add-on, its scope and methodological basis.

The add-on successfully facilitates the evaluation of additional resource, waste and output indicators required for EN 15804 studies.
It should be noted that the correct and EN 15804-compliant application of the add-on in a product-specific context always remains in the responsibility of the LCA practitioner and is not part of the scope of the review

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