

CRITICAL REVIEW SUMMARY

The subject of this critical review is **the development and continuous management process of key technology datasets for generic use included in the GaBi database**. As a first step towards carrying out a review of all datasets contained in the GaBi database, this critical review project focuses on key technology datasets which form the basis for many other datasets. The key technology datasets covered in this initial critical review project are the following:

Module I: (as key technologies for fossil energy and base chemical supply)

Hard coal and lignite mining; oil and gas production; electricity production; oil and gas refinery; steam cracker processes;

Module II: (as key technologies for auxiliaries and downstream systems)

Water supply and wastewater treatment; synthesis of base chemicals; end-of-life processes (e.g. landfill and thermal waste treatment);

Module III: (as key technologies for metal, mining and agri-food systems)

Steel production; agricultural production.

For this review project, **review criteria** have been developed on the basis of existing guidelines (e.g. ISO/DTS 14071; ILCD; PEF; Plastics Europe, etc.). The following criteria form the foundation for the critical review of the defined key technology processes in the GaBi database:

- **Complete and accurate meta-info** (*→ declaration of the dataset's purpose and intended application, aimed at the dataset user*);
- **Use of independent, relevant and qualified references;**
- **Demonstration of competent dataset generation through application of PE INTERNATIONAL's internal 'engineering know-how'** (*→ includes documentation aimed at internal stakeholders and reviewers*);
- **Third party reviews;**
- **Application of a consistent methodology and modelling principles;**
- **Data update and continuous improvement.**

Key strongpoints observed with regards to the review criteria are the following:

- In-depth **engineering know-how** by the relevant experts in the respective key technologies was demonstrated. To *DEKRA*, neither the described process nor the datasets investigated within this project revealed perceivable faults or shortcomings.
- The **methodology** used for the development and maintenance of key technology datasets – as described in the document 'Modelling Principles' – is thorough and can be considered state-of-the-art in terms of LCA best-practice. Unless specifically noted in the above report, adherence and consistent application of these modelling guidelines can be confirmed.
- The reviewers consider the **processes in place** for continuous improvement and data maintenance to be highly comprehensible and transparent. It can further be confirmed that they are formalised to a high degree and contain numerous quality control gates which are aimed at contributing to a high data quality as well as a reduced rate of errors and software malfunctions.

The following **critical aspects** were identified:

- In order to further decouple information on key technologies from knowhow of sector experts at *PE INTERNATIONAL* and potentially further increase the comprehensiveness of the existing dataset documentation, it is recommended to **improve** the knowledge management by internally **standardised regimes** for the key technology systems. In particular, this refers to the provision and easy access of existing decentralised **documentation** and **relevant, independent references** for *PE INTERNATIONAL* and potential reviewers. Its structure may follow the existing standard documentation of the commercially available datasets.
- Furthermore, the provision and detail of **meta-information** that describes the dataset's purpose and intended application to the dataset user could be improved.
- Available **third-party expert reviews** should be collected and made available as reference; ideally not only in the internal dataset documentation of key technologies, but also within the relevant commercially available dataset documentations. Moreover, a more thorough documentation of any (internal or external) review or plausibility check would improve the overall and visible continuous improvement of data quality. As indicated in the above report, the bottom-up expert data reviews, which ensure validity of primary data, are essential in combination with the predominantly process-orientated top-down review approach, which focuses on the functionality of quality assurance.

Further details as well as more concrete suggestions for improvements are described in the detailed review report.

As outlined in the above review report, it was not the main priority of this review project to carry out an in-depth check of all the key technology datasets and evaluate their ultimate correctness. In fact, the focus was more on the **methods and procedures in place at *PE INTERNATIONAL*** that support the appropriate generic development and maintenance of datasets. Against this background, the reviewers perceived *PE INTERNATIONAL* to be following clearly structured and very transparent processes.

In addition, *PE INTERNATIONAL* demonstrated great methodological and technology-specific know-how and expertise, which – in combination with their openness regarding data development and maintenance – increased the reviewers' confidence in *PE INTERNATIONAL*'s capability to deliver high-quality LCI datasets.

Overall, it was convincingly conveyed during the face-to-face review meetings that great focus is put on a **continuous improvement process**. As far as the reviewers can judge, the level of professionalism has grown significantly over the last two decades and has reached a mature level. In addition, the reviewers got the impression that determination and capability is present within *PE INTERNATIONAL* to further enhance their processes and increase data quality of the GaBi database.

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