



Title:

**Technical briefing notes
Workshop 2**

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1 Introduction

The second eLCAR Stakeholder Workshop takes place on **October 9th in Aachen, Germany**.

In the first eLCAR Stakeholder Workshop, held in June in Zurich, Switzerland, we assessed needs and expectations of our stakeholders concerning the guidelines. The results of this workshop were of great significance and influenced the development of the draft version of the guidelines significantly. Therefore, we look forward to yet another workshop with interesting topics, fruitful discussions and constructive ideas.

Since we want you to focus on the draft guidelines, this document is to be seen only as a short guidance document meant to outline the main concepts and structure of the guidelines as well as the agenda of the workshop.

The draft versions of the guidelines and guideline chapters developed since the first workshop are the materials to be discussed in detail during the workshop.

1.1 Aim of the project

The overall objective of the ***E-Mobility Life Cycle Assessment Recommendations*** – short **eLCAR** – project is to give guidance based on the International Reference Life Cycle Data System (ILCD) Handbook to practitioners assessing battery electric vehicles (BEVs) or their components.

The new guidelines address issues such as a clear definition of system boundaries in the context of EV technology which are not specifically addressed there due to the general character of the ILCD Handbook. This leads to an improved comparability of different LCA results as a common basis for the comparison is provided. This enables not only the assessment of specific EV components, but also to put them into the context of the full vehicle and to compare their overall effect on the whole vehicle with each other.

Our aim is to support practitioners, including car and component manufacturers as well as researchers, working in the field of Life Cycle Assessment (LCA) and EV technologies in Europe. Especially - but not exclusively – we want to support the projects within the **European Green Cars Initiative (EGCI)**. The EGCI was launched in 2009 by the European Commission and the industry through projects in the 7th Framework Programme supporting research and development on technologies and infrastructures that are essential for energy efficiency and the use of renewable energy sources in road transport. The main focus is on the electrification of vehicles, yet research topics also include long-distance trucks and logistics. More than 50 collaborative research projects, one of them being the eLCAR project, have been started.

In order to adapt the guidelines as much as possible to the needs of the community, feedback of the stakeholders is a crucial part of the tailoring process. We have started the feedback process during the first eLCAR Stakeholder Workshop and will continue this close cooperation with all stakeholders until the guidelines are finished and ready to be used.

1.2 Aim of workshop 2 and agenda

The aim of the second eLCAR Stakeholder Workshop is to present intermediate results to the stakeholders. We are looking forward to show the contents and get your feedback. The guideline drafts of selected chapters will be available beforehand. The focus is laid on the chapters concerning goal definition, scope definition and LCI modelling for the production, use and end-of-life (EOL) phase. The contents of these chapters are discussed section by section in order to give you the time to make your remarks and enable in-depth discussions of open issues. Should there remain any points of dispute or questions, there will be room for this during the feedback session.

In addition to the drafts we will present concepts for testing the guidelines and give insights in learning materials addressing the guidelines.

Agenda

9.00 am Introduction

-Welcome (Coffee)-

Challenges and framework for the development of ILCD guidelines for BEVs

Main results from the first workshop and its influence on the guidelines

-Coffee Break-

11.00 am Presentation of guidelines

Goal Definition

Scope Definition and LCI modeling framework

-Lunch-

LCI modeling of the production, use and end-of-life phase

-Coffee Break-

3.00 pm Feedback session

Discussion based on specific questions from participants, open points from previous sessions etc.

-Coffee Break

4.10 pm Next steps: Introduction of concepts

Testing of the guidelines

Learning materials

Wrap up & Goodbye

5.00 pm End

2 Framework of the guidelines

2.1 Aim of the guidelines and main concepts

The eLCAR guidelines shall give guidance on LCAs of electric vehicles based on the ILCD. This shall improve the quality of LCAs by reducing ambiguities, increasing the comparability between different LCA studies and facilitate their execution for LCA practitioners. The addressed stakeholders are researchers, original equipment manufacturers and suppliers as well as public institutions and policy makers.

The guidelines mainly address LCAs of BEVs, even though some aspects concerning plug in hybrids (PHEV) are treated as well. A modular approach has been used for the concept of the guidelines, i.e. guidance is given on the assessment of the entire vehicle as well as of the single components. In both cases emphasis is put on context of the entire system in order to reveal potential problem shifting.

Having recognized the need for modelling further components of an e-car or even the entire vehicle as background processes when analysing the environmental impact of single components, the guidelines will assist practitioners whose foreground is on a specific component (and who are not familiar with the rest of the vehicle) in identifying and describing the affected other components in the vehicle. Therefore, the guidelines provide an interdependency matrix, which helps to identify interrelations of components, as well as a common parameter platform (CPP), which serves as a library of the average technical parameters of those components (see Figure 1). For example, if a supplier of battery cells for Li-ion batteries wants to develop a new product and is interested in the environmental effects of this development; the interdependency matrix supports the step of system boundary definition by giving an overview of other components in the e-vehicle which are possibly affected by this development. These proposed interactions should then carefully be checked for their relevance in the specific case under analysis. In case the battery cell supplier does not have access to information about the identified affected components he or she can have a look at the common parameter platform where average technical parameters for components of electric vehicles are given. This information will support the supplier to reasonably define the scope of the LCA study and enable him or her to choose appropriate LCI-datasets in any LCI database when it comes to the life cycle modelling. Applying the interdependency matrix as well as the CPP helps to consistently define the scope of LCA studies for components of electric vehicles and to comprehensively document assumptions and limitations.

Practitioners who want to use their own values are free to do so but should (like for any other data source) well document the origin of the data and the choice of specific parameters.

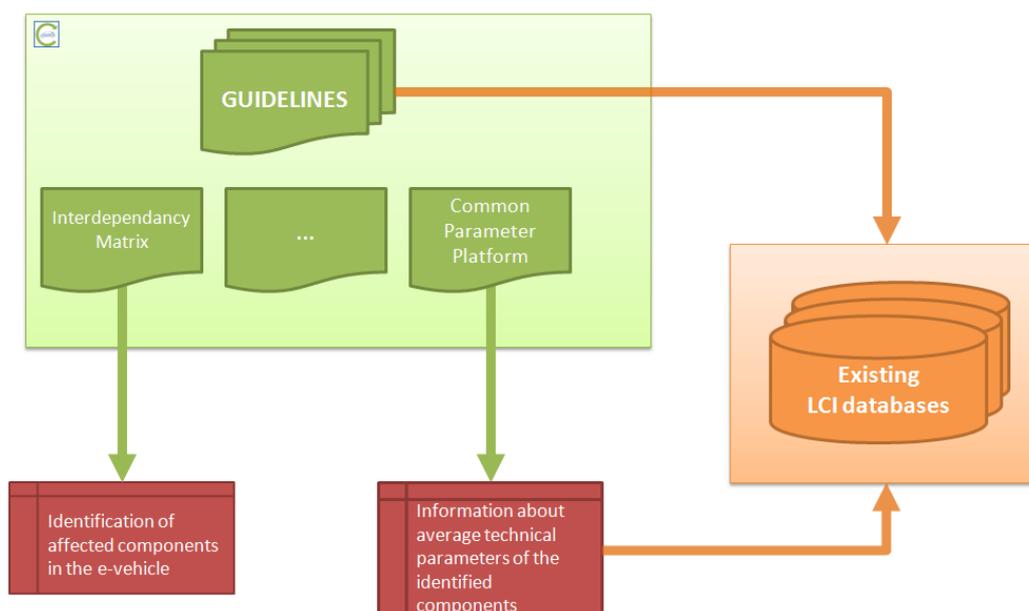


Figure 1: Application of interdependency matrix and common parameter platform (CPP)

2.2 Structure of the guidelines

The guidelines are closely aligned to the ILCD Handbook which is reflected in their general structure. All essential elements discussed in the ILCD Handbook are mirrored in the eLCAr guidelines to facilitate the comparison and ease the adaption process for stakeholders who are used to this existing framework. Therefore, general provisions from the ILCD Handbook like the system boundary and LCI modelling have been adapted to electric vehicles and their components. This structure outlines the intention to “translate” the rules and recommendations provided by the ILCD handbook into guidelines specifically designed to be used in the field of electric vehicles and to be as close as possible to the practical issues. Examples from electric vehicles and their components are given for parts from the ILCD which are of a more general nature and thus cannot be made more specific. Like in the ILCD, for each major aspect provisions are provided which sum up requirements of the respective chapter.

2.3 State of the draft version

The first draft of the guidelines focuses on the Goal definition, Scope definition and the LCI modelling - three key topics in the LCA of electric vehicles and their components. The nature of the 3 chapters is very different and these have accordingly been built in a different way. Since the first two chapters address more overarching aspects of LCAs, here the aim was set on staying very close to the structure and contents of the ILCD, in order to be sure to equip the user with all the notions which need to be included when working within the ILCD framework. At the same time it was tried to particularly focus on those concepts which LCA practitioners working in the field of electric vehicles may need in their everyday use. Whenever possible, these overarching aspects were described using examples from the area of electric mobility in order to help users in applying the concepts given in the guidelines to their specific needs. Instead, in the context of LCI modelling, the general ILCD guidance on identifying processes in a system and on data collection have been translated into practical aspects concerning the key processes which occur in the life cycle of an electric vehicle.

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In “Goal Definition”, the recommendations for an effective and meaningful goal definition within the ILCD are presented. Particular attention is given, in the context of the specific focus on electric mobility, on defining the intended application and the need to take into perspective the entire vehicle as well as on identifying the most convenient decision-context for typical studies of BEVs and their components.

In “Scope Definition” the concepts presented in “Goal Definition” are expanded so as to define the overall framework under which the study is performed. Here, topics such as the definition of functional units, the LCI modelling framework to use in the various situations or the hierarchy for addressing multifunctionality are discussed under the specific view of the potential needs of practitioners working in the field of electric vehicles.

To further summarize the concepts addressed in these two chapters, a specific showcase example is analysed at the end of “Goal Definition” and is then further developed at the end of “Scope Definition” in order to highlight how a study evolves as more and more its key elements are defined.

In “Life Cycle Inventory Analysis”, the main steps involving the compilation of an LCI are addressed. Here, the core of the chapter are the recommendations given specifically for the production, use and end-of-life phase on what processes and key issues should, respectively, be addressed and included. The guidelines cover from how to subdivide the production process, to the evaluation of the consumption of a vehicle up to the recycling of various components in the vehicle.

Some parts which will complete a final document giving guidance on the LCA of electric vehicles have yet to be added to the current version, but will be part of the final guidelines. Firstly, a short introduction of the key elements of LCA (its aims and objectives, its main steps and iterative nature, etc.) should be described so that users first starting in the field of LCA can orientate themselves. For the current version, assuming that stakeholders who are following the development of the eLCAR guidelines are familiar with LCA, only a definition of the key terminology is given at the beginning in the “Key definitions” section.

Secondly, a chapter covering the main aspects of electric vehicle technology will be added to define the technological context of the guidelines. This will describe the main components in an electric vehicle. Here, the key values of the CPP will be given, so as to allow practitioners less experienced with the overall vehicle system to start thinking more quantitatively about the model they will have to develop.

Finally, other topics treated in the general ILCD, like life cycle impact assessment, life cycle interpretation, reporting and critical review are also planned to be addressed in the final version in more detail than in the current version. For now, only the key elements concerning these topics are described which a practitioner needs for addressing the scope definition and for planning his analysis.

Overall, the draft guidelines presented in WS2 are still in a non-final status and subject of improvement. In this workshop, our primary objective is to understand how the chapters developed until now, which represent a key part of what will be the end product, can be further improved to maximize the help they can provide to LCA practitioners with their studies. As such, we are looking forward to the stakeholders’ feedback and comments.