



# eLCAr

## Challenges and main concepts in the development of LCA guidelines for electric vehicles

Second eLCAr Workshop

Aachen 9.10.2012

A. Del Duce, T. Dettmer, P. Egede, G. Öhlschläger, H.-J. Althaus



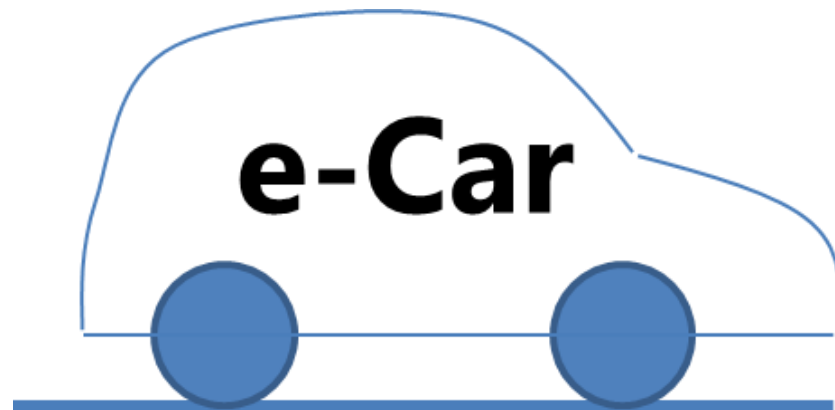
## Outline

- The aim of the project
- The ILCD framework
- Identifying the challenges
- Stakeholder interaction
- The eLCAR guidelines framework
- The first draft
- Results and feedback

## Sustainable transport systems

European Environment Agency<sup>1</sup>:

- >25% GHG emissions from transport sector
- absorbs ~1/3 of all final energy consumption
- Responsible for a large share of urban pollution



<sup>1</sup> <http://www.eea.europa.eu/themes/transport>

# LCA of vehicles

**Problem-shifting**



**Electricity production**



**Car disposal**

**Materials production**

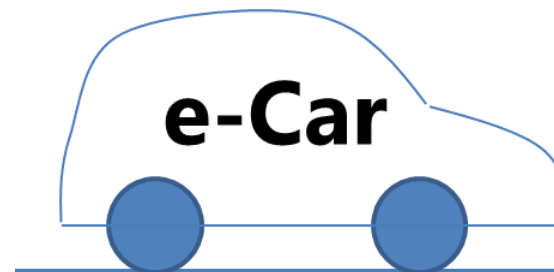


**Mining**



## Project aims

ILCD handbook



**Comparability**

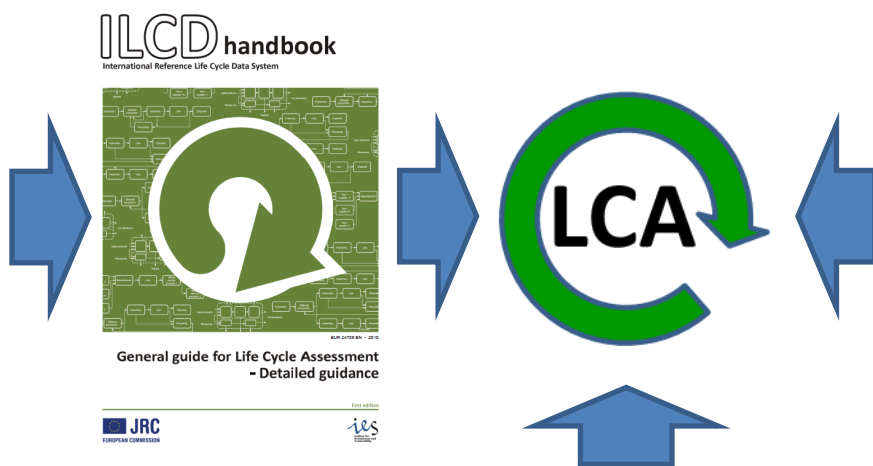
**Transparency**



## The ILCD framework

- International Reference Life Cycle Data System (ILCD)
- European Commission – Joint Research Centre (JRC)

ISO  
14040  
14044



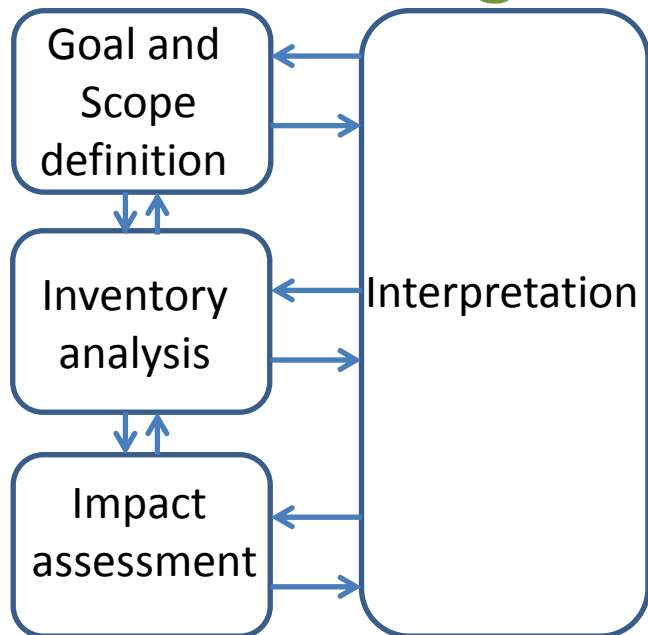
Further documentation:

- LCIA
- Review schemes
- ...

ILCD Data Network

<http://lct.jrc.ec.europa.eu/assessment>

# The general ILCD Handbook



- Goal definition
- Scope definition
- Life Cycle Inventory Analysis
- Life Cycle Impact Assessment
- Life Cycle Interpretation
- Reporting
- Critical Review

## Provisions

- SHALL
- SHOULD
- MAY

Situation A  
micro-level  
decision support

Situation B  
meso/ macro-level  
decision support

Situation C  
Accounting

## The challenges

- How to relate to the ILCD Handbook?
  - Integrate? Extend?
  - Change of perspective (Situation A,B,C vs. general LCA theory)
- Components vs. vehicles?
- Scope of the guidelines?
  - Detail?
  - Flexibility?
  - Audience?
- LCA of electric vehicles:
  - New topic: lack of accepted best practices
  - Future technology



## Key concepts: stakeholder interaction

Research  
Groups

Industry

Institutions

eL<sup>C</sup>Ar

WS1  
Stakeholder Needs

WS2  
Intermediate Results Feedback

Website <http://www.elcar-project.eu/>  
Discussion Forum

## Key concepts: ILCD

ILCD handbook  
International Reference Life Cycle Data System



Overarching aspects

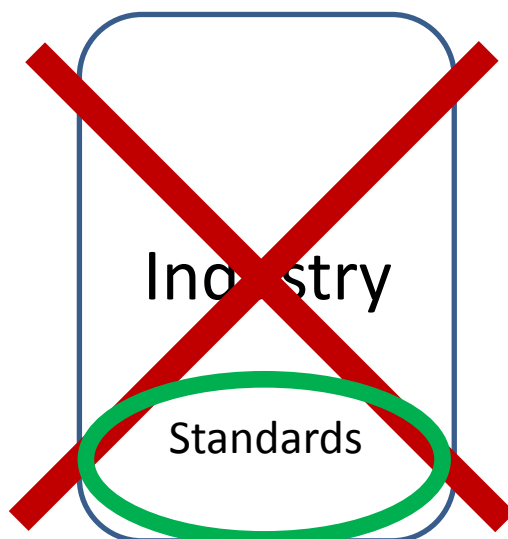
- ILCD structure
- Examples from e-mobility

LCI modelling

- Translation of general ILCD guidelines into specific indications for e-vehicles

Compact, easy to use Handbook for Situation A and B

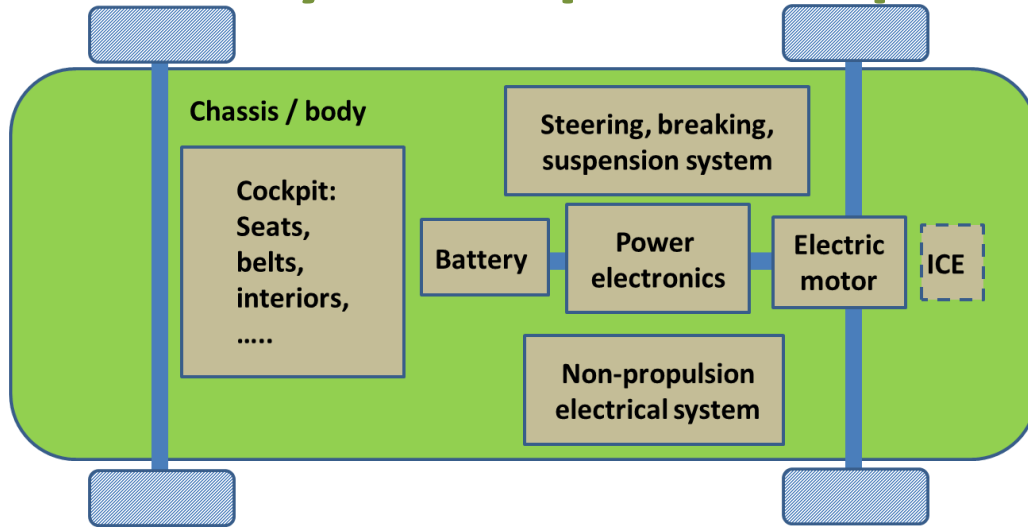
## Key concepts: Scope and audience needs



### **ILCD**

Framework including all 3 groups  
Transparency and documentation

# Key concepts: Components and vehicles



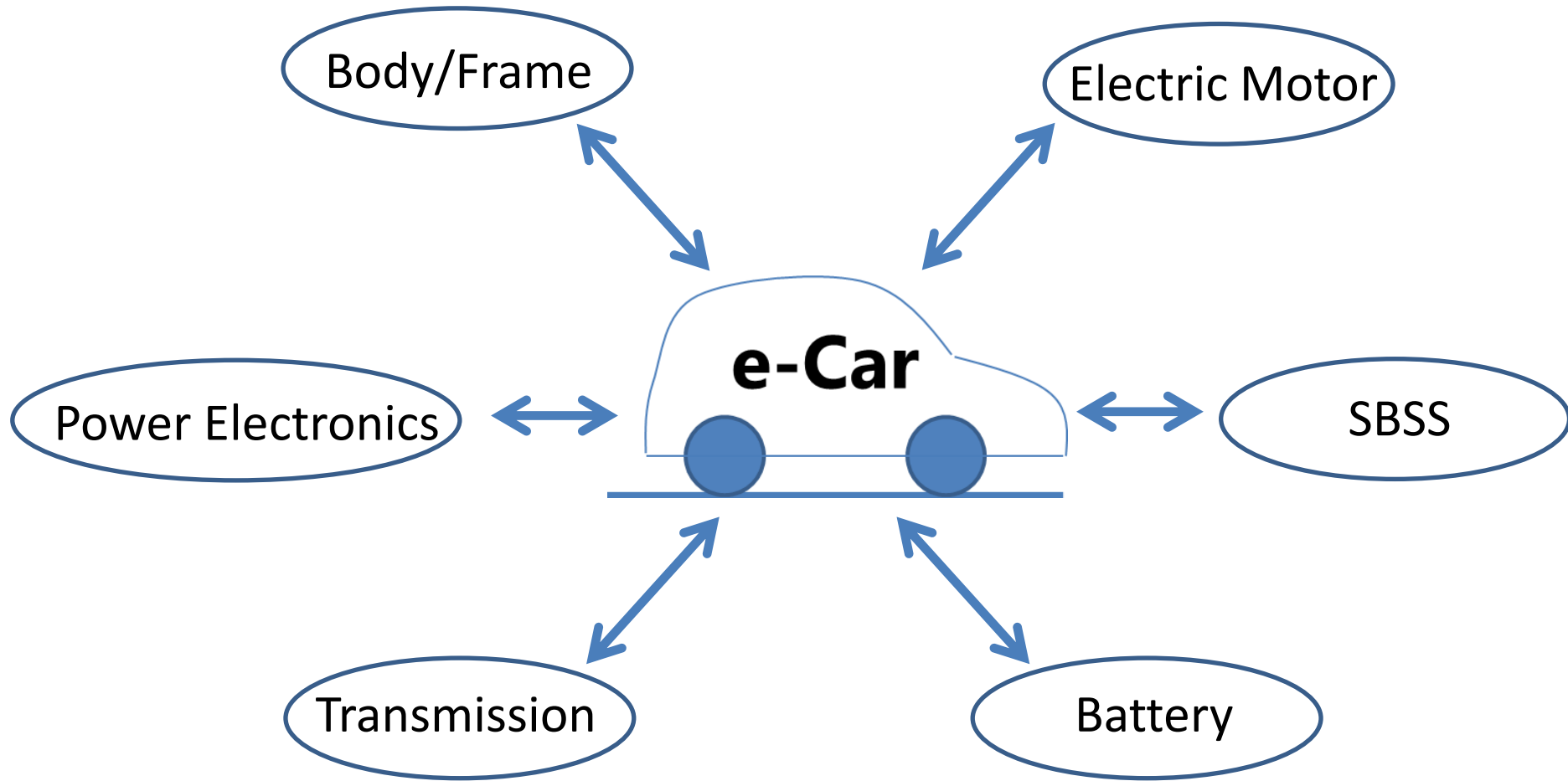
ILCD: “part-system” interactions

Interdependency  
Matrix

Common  
Parameter  
Platform

Vehicle  
Consumption  
Framework

## Interdependency Matrix

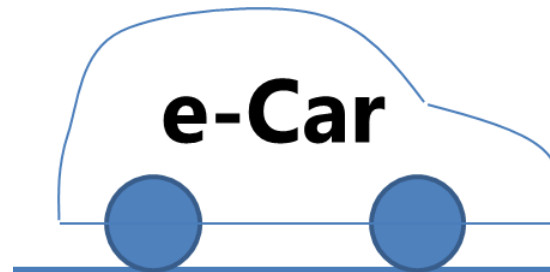


## Common parameter platform

Vehicle classes

Average component performance

Vehicle masses



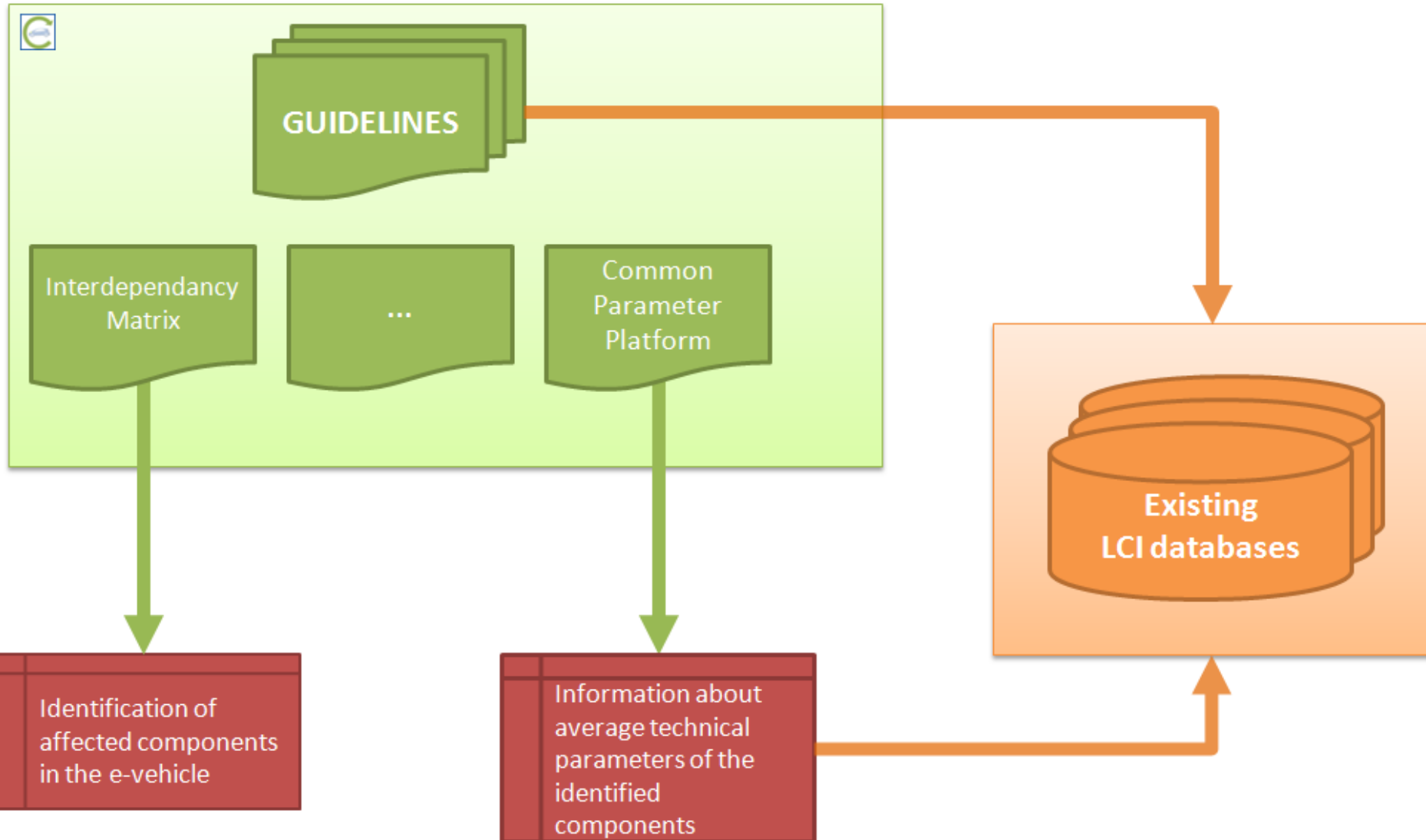
Typical life-times

Typical component masses

Non-mandatory reference values for system dimensioning



# The guidelines framework



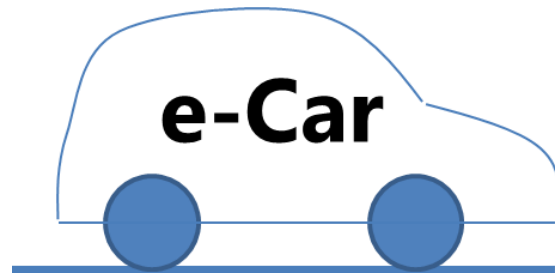
# Consumption calculation framework

Vehicle parameters

Goal and scope  
dependent trajectory

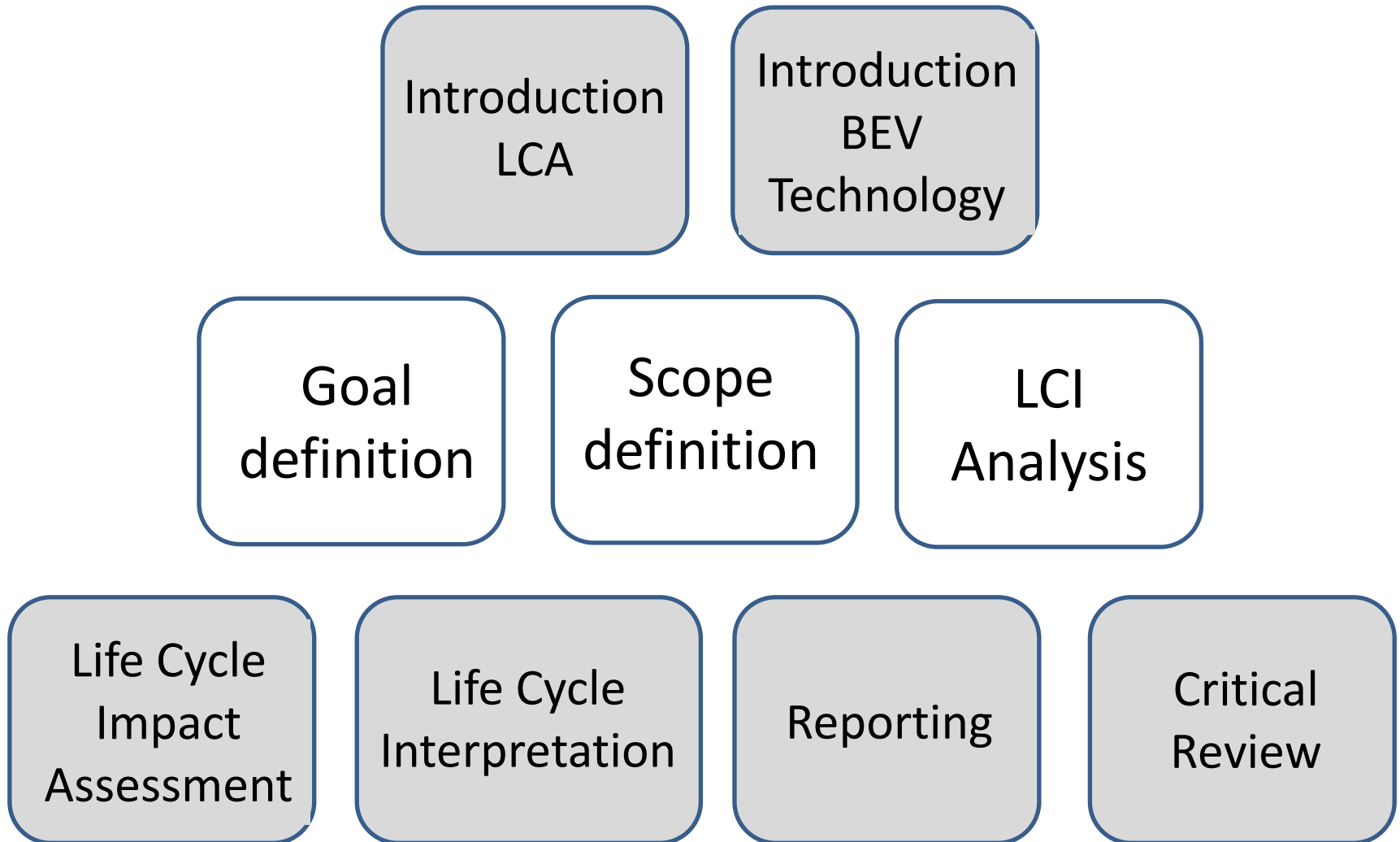
Climatic conditions

Lighting, Radio, Navigation,...



$\frac{\text{kWh}}{\text{km}}$

## The draft and the planned final version



## Feedback at the workshop

- Technical presentations on draft guidelines:
  - Goal
  - Scope and LCI modelling framework
  - LCI Production phase
  - LCI Use phase
  - LCI End of life
- Feedback session:
  - Specific questions on the text
  - Points left open from previous discussions
  - ...

## Conclusions

- Aim: give support in the LCA of electric vehicles within the ILCD framework.
- Focus on methodological framework for transparency
- Compact, easy to use Handbook
- Guidelines: Support for stakeholders and should be tailored for their needs. Gives us your feedback!

The logo for eLCAr features the letters 'eLCAr' in a dark blue, sans-serif font. The letter 'C' is replaced by a green circular icon containing a white silhouette of a car. The background of the top of the slide shows a blue sky with light clouds and a green field with a road curving into the distance.

eLCAr

Questions?



## Further documentation in ILCD

ILCD handbook  
International Reference Life Cycle Data System



LCIA

- ILCD general Handbook – Detailed guidance
- ILCD general Handbook – Provisions
- Recommendations for Life Cycle Impact Assessment in the European context
- Framework and requirements for the Life Cycle Impact Assessment models and indicators

Review

- Review schemes for Life Cycle Assessment
- Reviewer qualification