

A TRANSPORT SPECIFIC LIFE-CYCLE ASSESSMENT

THE EUROPEAN SUPPORT ACTION TRANSENSUS LCA

Final Event

The TranSensus LCA Approach

Gladys Moréac-Njeim, RENAULT-AMPERE

Anh-Linh Bui Van, CEA

on behalf of the TranSensus LCA Consortium



June 24, 2025

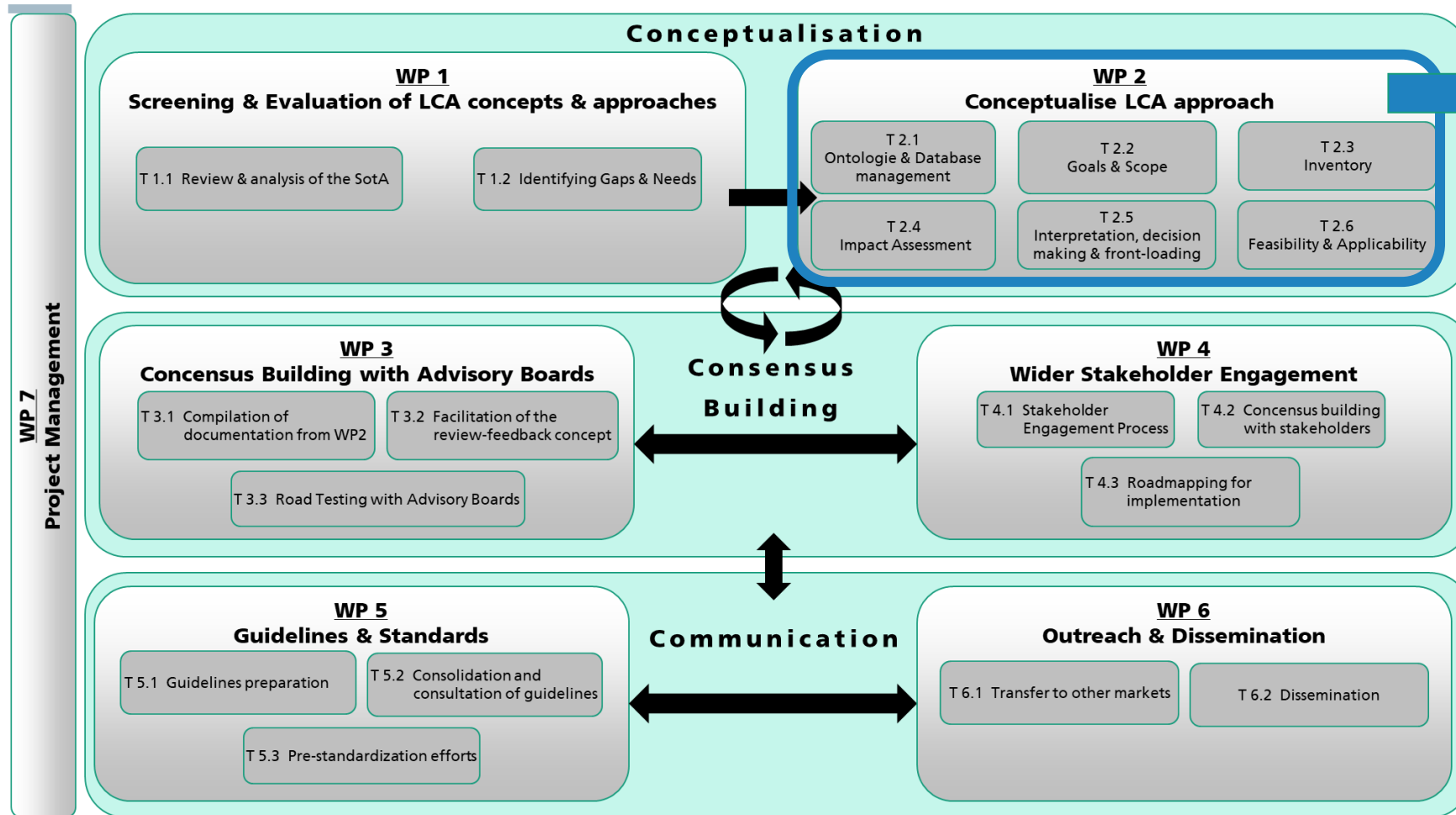


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GA # 101056715

- **Goal and process**
- **TSLCA ('TranSensus LCA') methodology results**
 - **Overview**
 - **E-LCA**
 - **Goal and scope requirements** *(Ex: Functional unit for passenger cars)*
 - **LCI requirements** *(Ex: Electricity modelling for production)*
 - **LCIA requirements** *(Ex: List of impacts)*
 - **Interpretation** *(Ex: List of parameters)*
 - **S-LCA**
- **Feasibility and applicability**
- **Conclusion**

Goal and process



WP2 = conceptualize an harmonized LCA approach for zero emission road transport (E-LCA + S-LCA)

WP2 results further used by:

- WP3 = road testing
- WP5 = guidelines

Goal and process

WP2: Tasks activities



Task 2.1

Ontology LCI database

- TLCAO files
- Decomposition tree

Task 2.2

Goal & Scope

- LCA typologies
- Technology coverage
- System boundary
- Functional unit
- Mission profiles
- Default values
- OEM fleet LCA

Task 2.3

Inventory

- Data collection
- Multifunctionality
- I^{ry} vs II^{ry} data
- Electricity modelling
- Multifunctionality
- Fleet level and prospective LCA
- Data quality, etc.

Task 2.4

Impact assessment

- Set of IC
- Restrictive set of IC
- Normalisation & weighting
- Dissipation
- Testing of software
- Fleet and Propectives LCIA

Extra S-LCA task

- G&S: UNEP guidelines
- Multifunctionality
- Pedigree matrix
- Ref scale approach
- Data collection
- Interpretation S-LCA

T2.5 Interpretation



Fraunhofer

LBF

Uncertainty, sensitivity & scenario analysis – parameters list

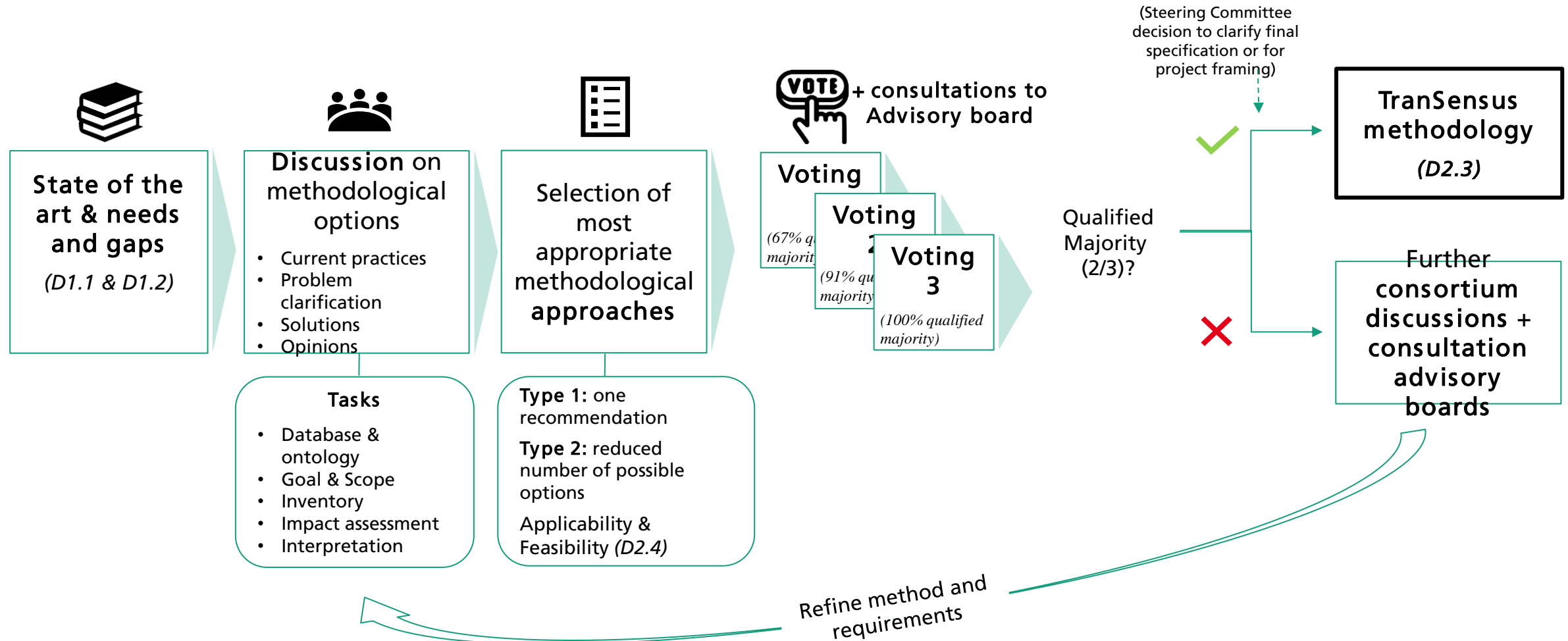
T2.6. Viability



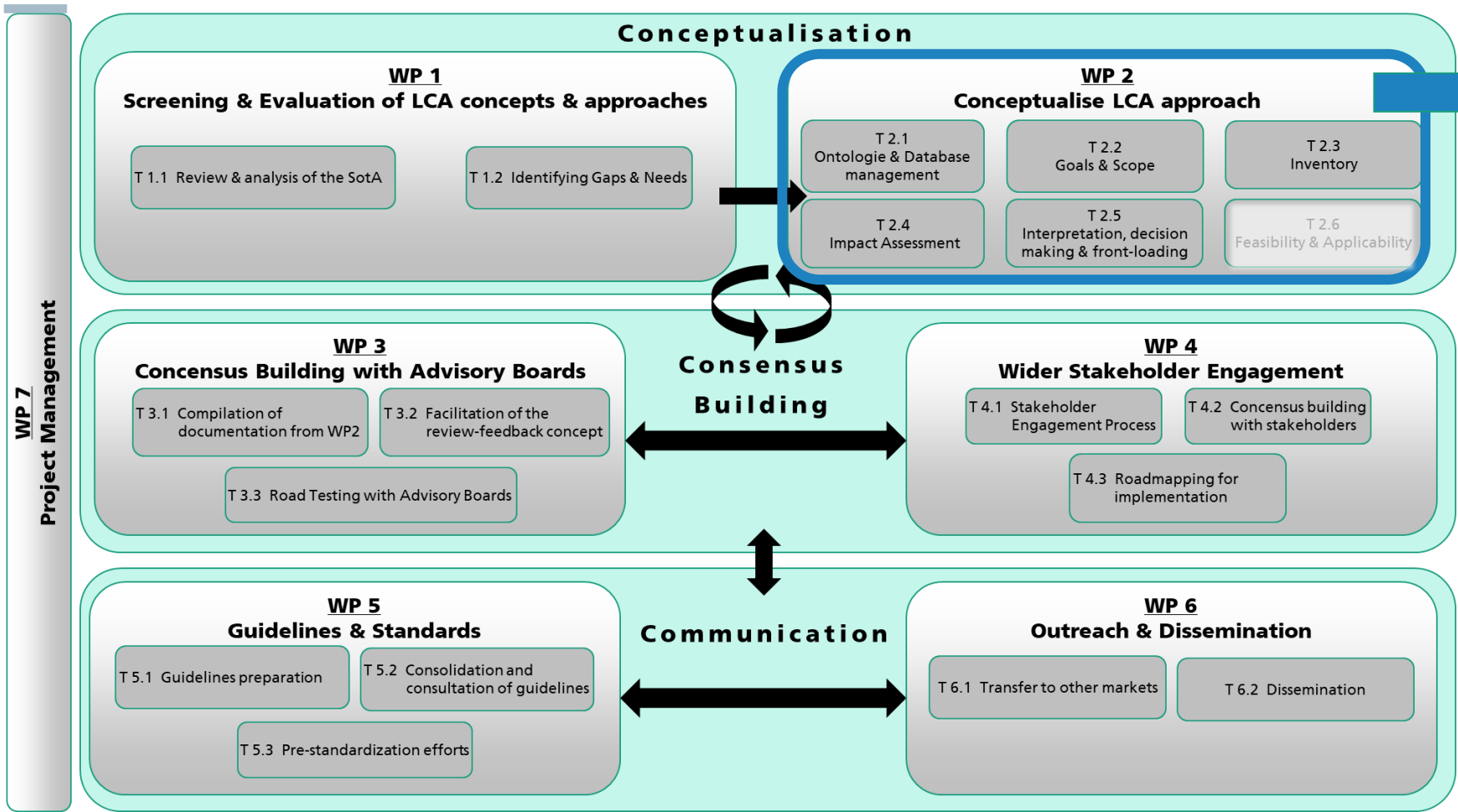
Feasibility (POC with OEM and real data)

Goal and process

How we proceed for both **scientific & accepted** shared building blocks and requirements



TSLCA methodology results – D2.3



D2.3

Towards a European-wide harmonised transport-specific LCA Approach

TranSensus LCA

Coordinated and Support Action (CSA)
Grant Agreement Number 101056715
Start date of the project: July 1st, 2022, Duration: 30 months

Deliverable D 2.3

TranSensus-LCA final harmonised approach

Status: Draft version 1.0

Lead contractor for this document: **RENAULT / AMPERE**

Due date: **31.12.2024**
Actual submission date: **17.01.2025**

Coordinator:

Thilo Bein & Felipe Cerdas
Fraunhofer LBF & IST
Barningerstr. 47 – 64289 Darmstadt - Germany
Phone +49 6151 705 463 | +49 151 74416873
E-mail thilo.bein@lbf.fraunhofer.de | felipe.cerdas@ist.fraunhofer.de

Project co-funded by the European Commission within Horizon Europe (2021-2027)		
Dissemination Level		
PU	Public, fully open	s
SEN	Sensitive, limited under the conditions of the Grant Agreement	
R-UE/EU-R	Classified: EU RESTRICTED under the Commission Decision No2013/444	
C-UE/EU-C	Classified: EU CONFIDENTIAL under the Commission Decision No2013/444	
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Filename: D2.3 TSLCA Methodology
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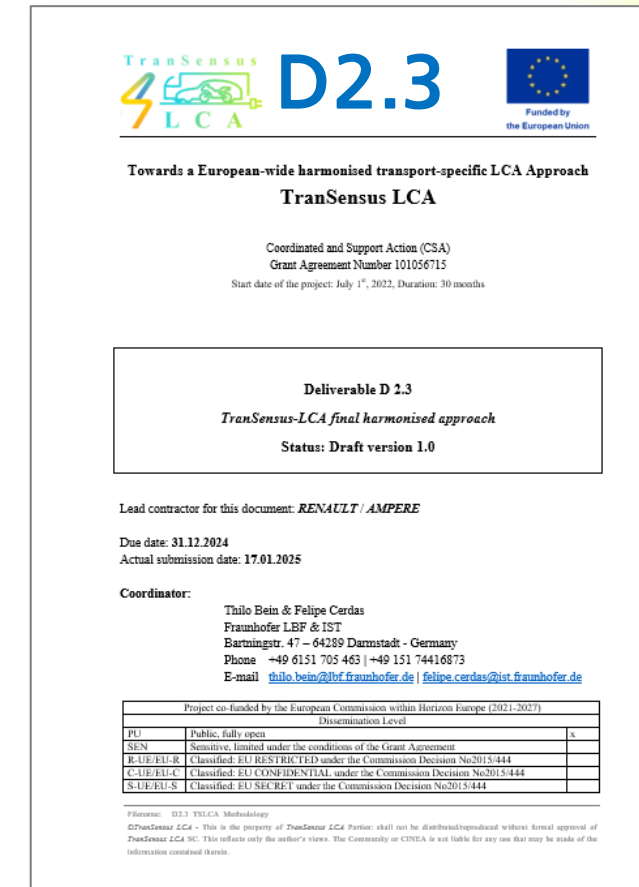
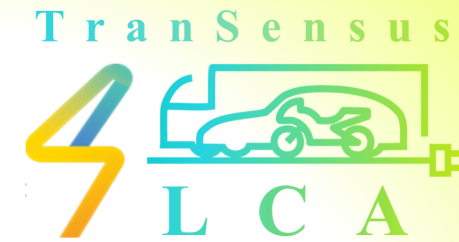
TSLCA methodology results – D2.3

■ MAIN BODY focuses on “What to do” and “How to do it”

- Part A = **E-LCA** requirements: 58 (/143) are mandatory
- Part B = **S-LCA** requirements: 15 (/51) are mandatory
- Requirements are : **Mandatory** or **Recommended** or **Optional**
- Requirements are detailed for **product-LCA**, then deviations for **prospective-LCA** or **fleet-LCA** are given in textbox.
- **Justifications** for verification also defined in the requirements
- Tables:
 - Summary of all E-LCA requirements = table IV-8
 - List of reporting requirements = table IV-6
 - Summary of all S-LCA requirements = table VIII-2

■ ANNEX focuses on "How we came to this requirement"

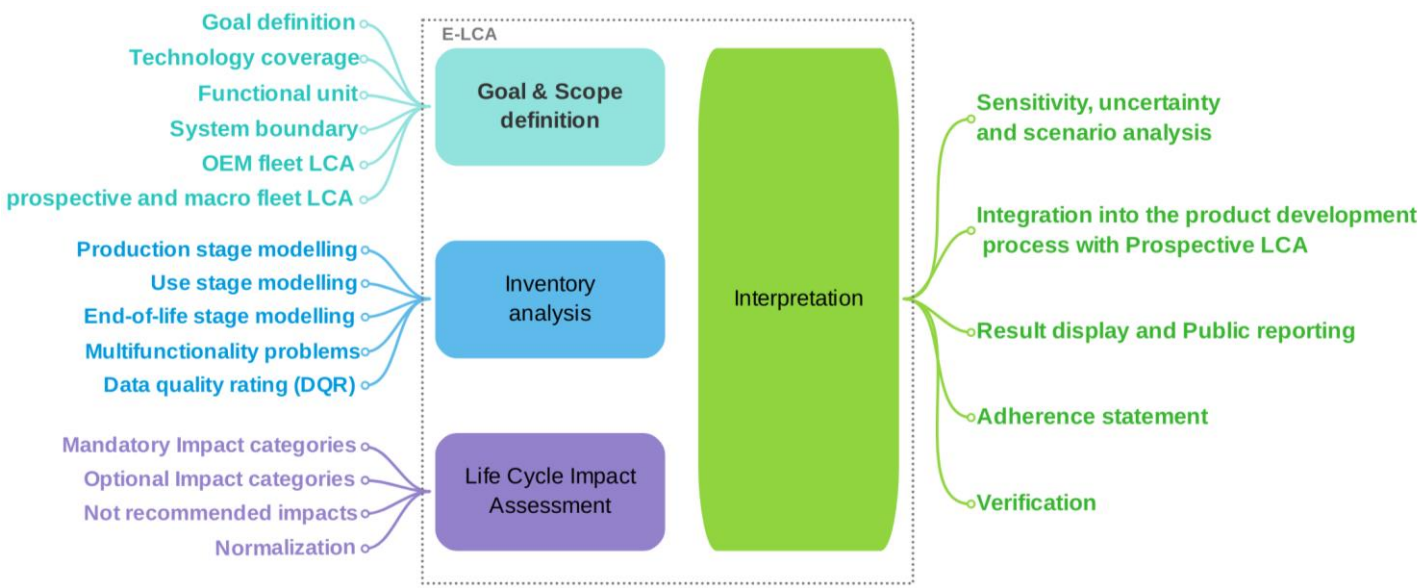
- Scientific background
- Consensus building
- Future work perspectives



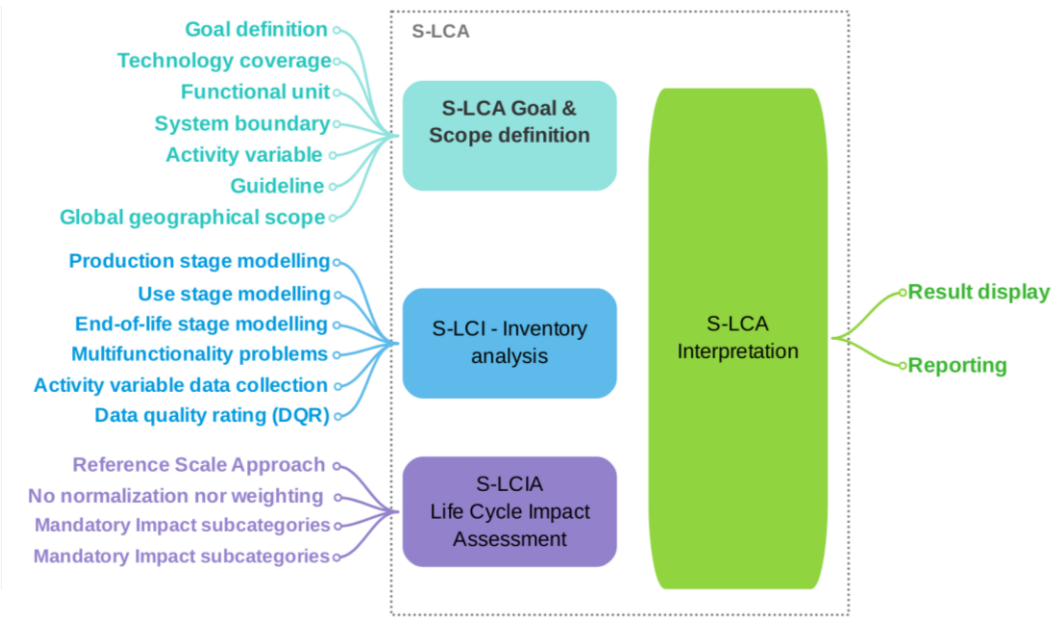
TSLCA results - Overview



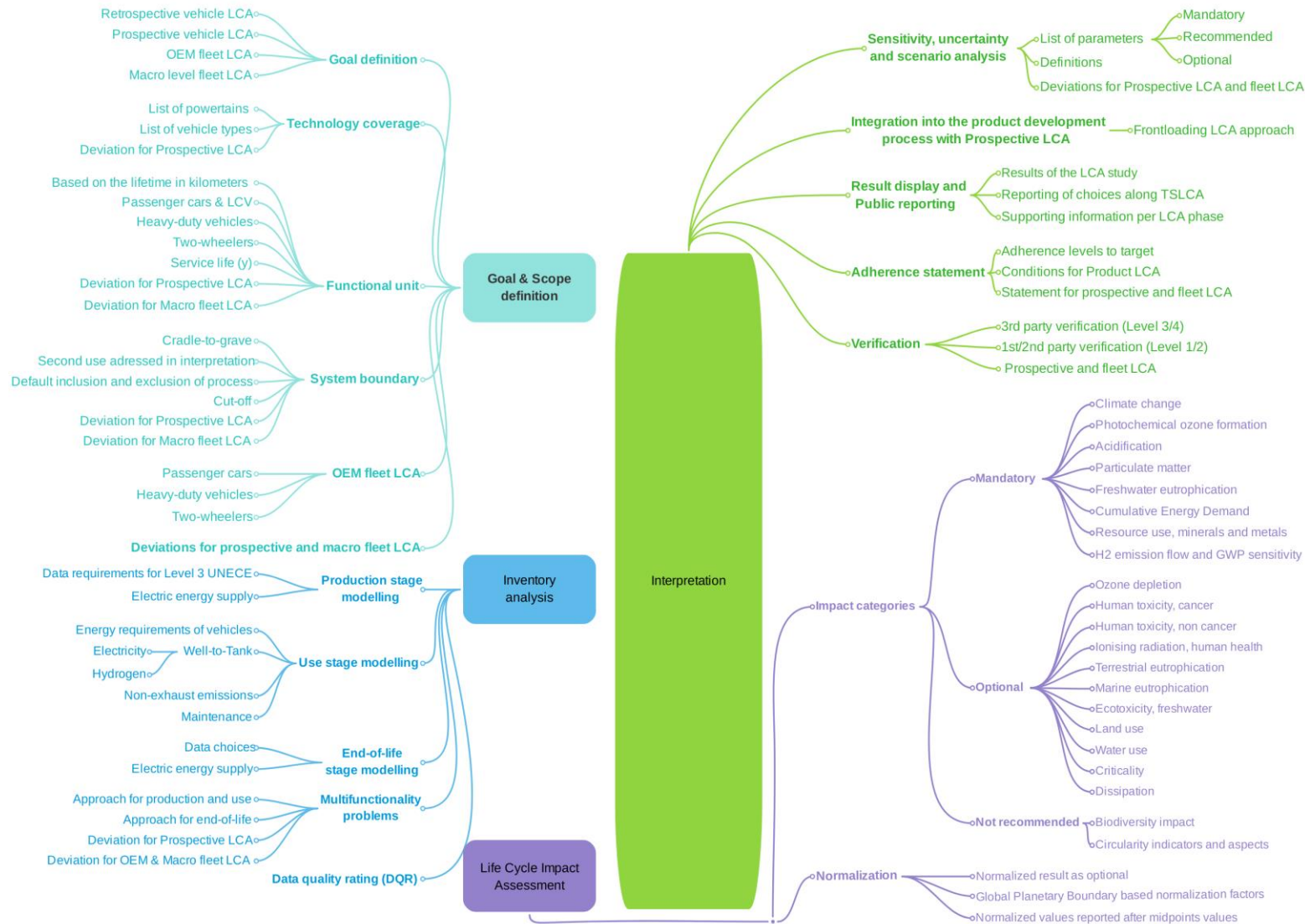
E-LCA



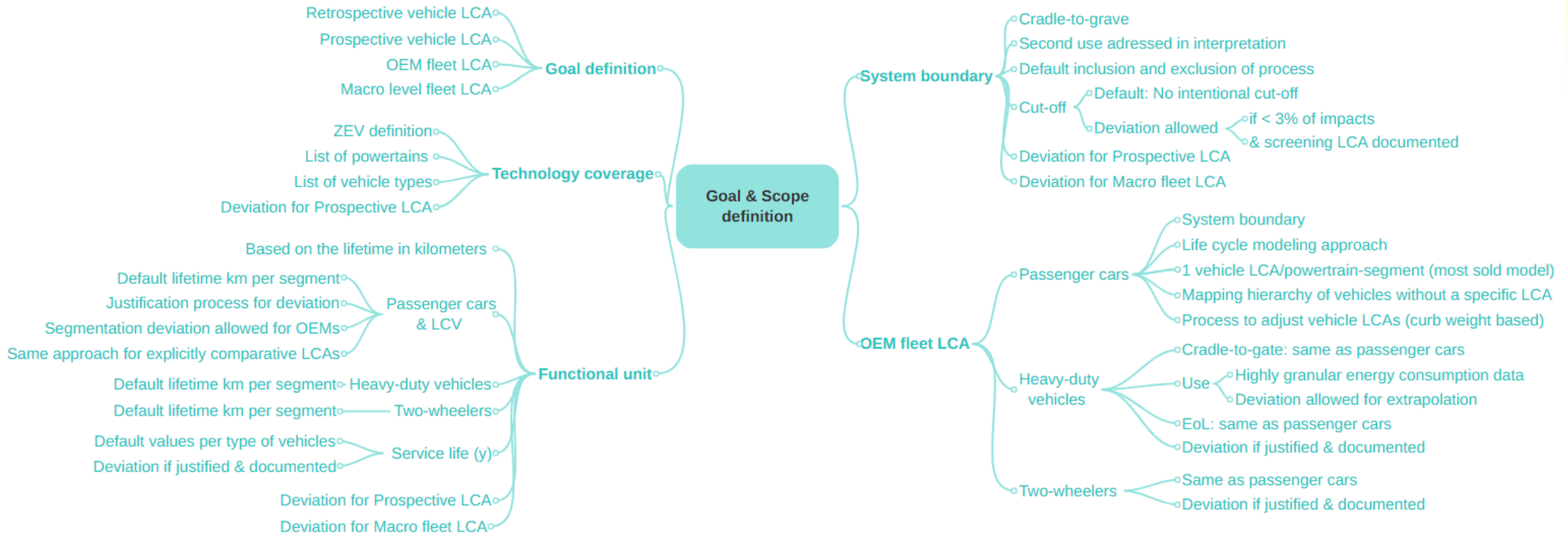
S-LCA



TSLCA results - Overview of E-LCA requirements



TSLCA results - E-LCA - Goal and Scope requirements



TSLCA results - E-LCA - Ex: Functional unit

■ Ex: Passenger cars

➤ **Passenger-km** (= vehicle-km for 1 passenger)

➤ Lifetime-km

1- Default values per segment*

2- Deviation allowed if sufficiently justified and documented (ageing model, fleet monitoring,...); process to justify deviation is specified.

3- Deviation allowed with 200 000 km generic lifetime (legal constraints)

+ Same approach to be used for comparisons

➤ Lifetime in years

1- Default values

2- Other values allowed if sufficiently documented and justified

➤ Distribution of driven distance per year proposed

	Passenger car				
	Small (A/B)	Lower medium (C)	Upper medium (D)	Large (Others)	All*
All powertrains	190 000	200 000	200 000	200 000	200 000

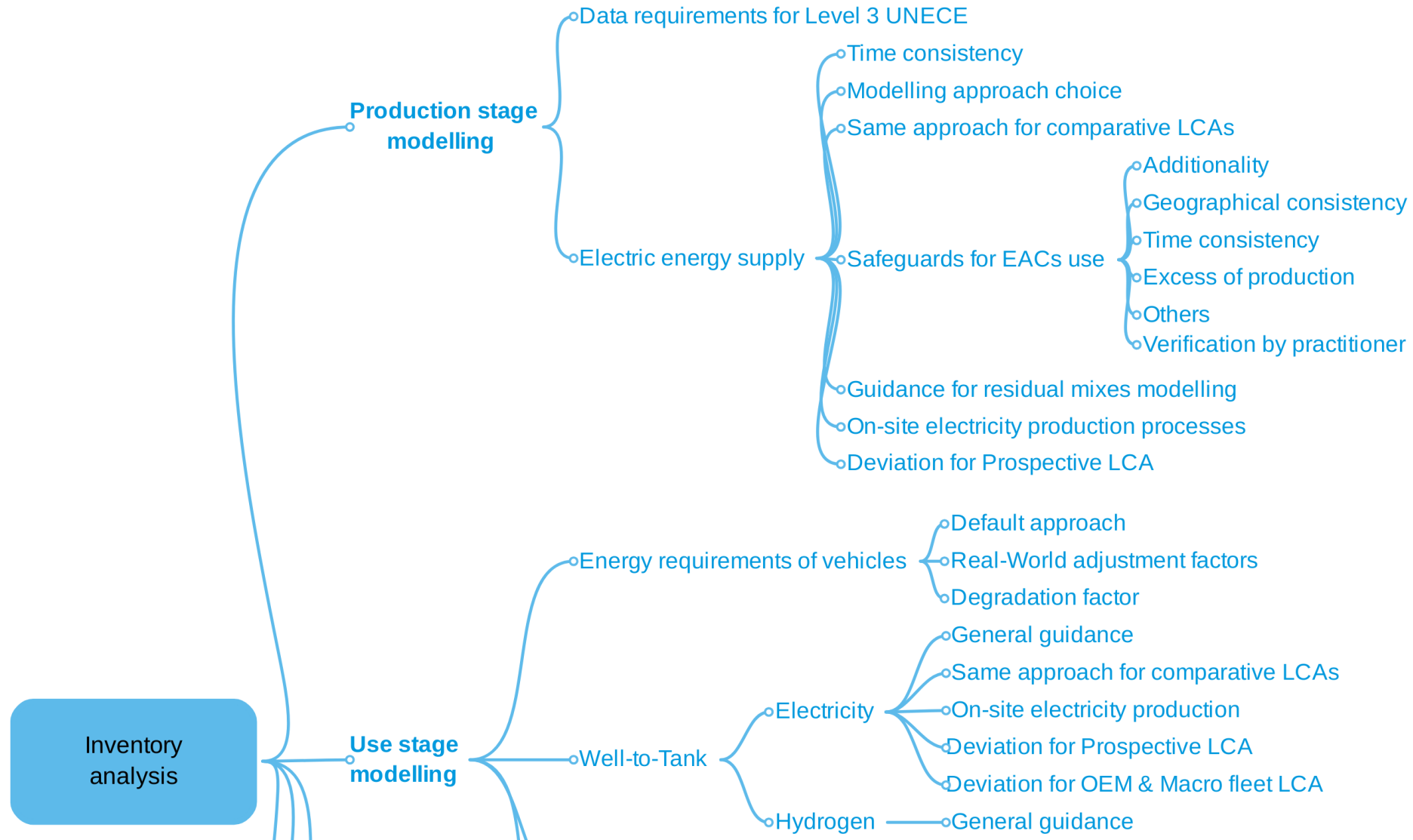
Passenger cars
Default values for lifetime in years
15

Year	Passenger car
1	10%
2	9%
3	9%
4	8%
5	8%
6	7%
7	7%
8	6%
9	6%
10	6%
11	5%
12	5%
13	5%
14	4%
15	4%

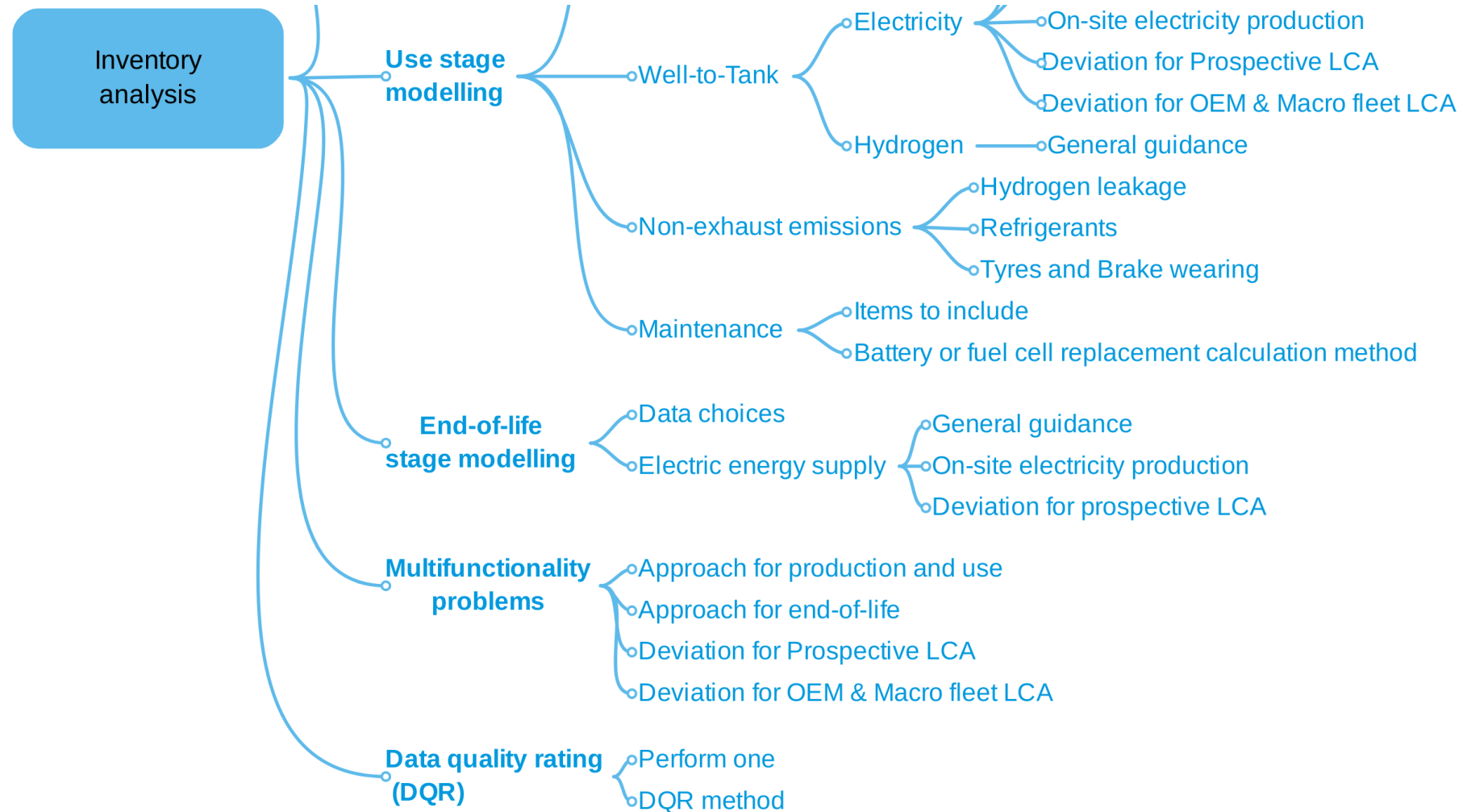
Distribution of driven distance per year

(*) after WP3 feedback => 200 000 km to be used until 'segment' definitions are officialized

TSLCA results - E-LCA - LCI requirements (1/2)



TSLCA results - E-LCA - LCI requirements (2/2)



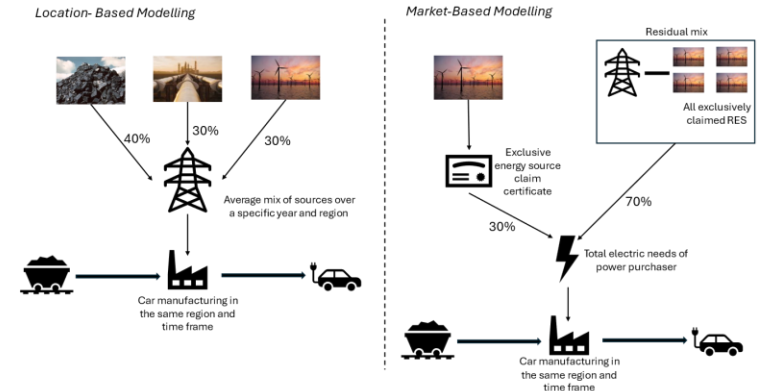
TSLCA results - E-LCA – Ex: Electricity modelling

■ Electricity supply in the manufacturing stage for product-LCA

■ Hierarchy

- 1- **Location-based** modelling **shall be used by default** (exception below)
- 2- In the presence of EACs for industries, a **100% market-based** modelling **should be used** in which only Residual mixes are used in the absence of EACs for any process (in the entire value chain)
- 3- Lastly, TSLCA acknowledged the challenges in applying a 100% market-based modelling → a **mixed approach** may be used, with a clear acknowledgment of the inevitable risk of double counting, hence encouraging working towards the above two options instead

+ Same approach to be used for comparisons



With Safeguards:

- Additionality
 - Geographical consistency
 - Time consistency
 - Excess of production
 - EACs infos
- + Guidance on residual mix modelling

TSLCA results - E-LCA - LCIA requirements



TSLCA results - E-LCA - Ex: List of impacts

■ Criterias to score impact categories:

Science based criteria		Other criteria		
Robustness	Relation to planetary boundaries	Importance for ZEVs	Easy to use	Data availability

Mandatory impact categories

- Climate change, total
- Photochemical ozone formation, human health
- Acidification
- Particulate matter
- Eutrophication, freshwater
- Ressource use, minerals and metals
- Cumulative Energy Demand
- H₂ emission flow with sensitivity analysis

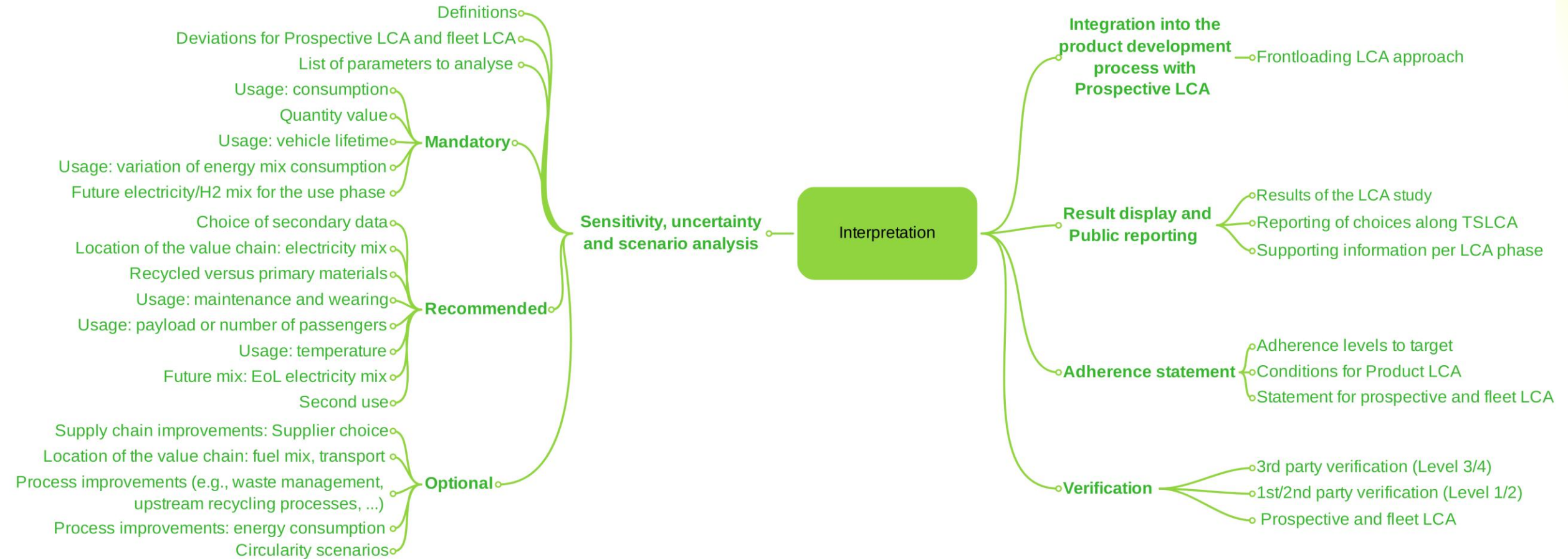
Optional impact categories

- Ozone depletion
- Human toxicity, cancer
- Human toxicity, non-cancer
- Ionising radiation, human health
- Eutrophication, terrestrial
- Eutrophication, marine
- Ecotoxicity, freshwater
- Land use
- Water use
- Criticality
- Dissipation

Not recommended (but to be included when robust indicator is available)

- Biodiversity
- Circularity

TSLCA results - E-LCA - Interpretation requirements



TSLCA results - E-LCA – Ex: List of parameters

Mandatory parameters

- Usage: consumption
- Quantity value
- Usage: vehicle lifetime
- Usage: geographical variation of energy mix consumption
- Future mix: use phase electricity/H2 mix

Recommended parameters

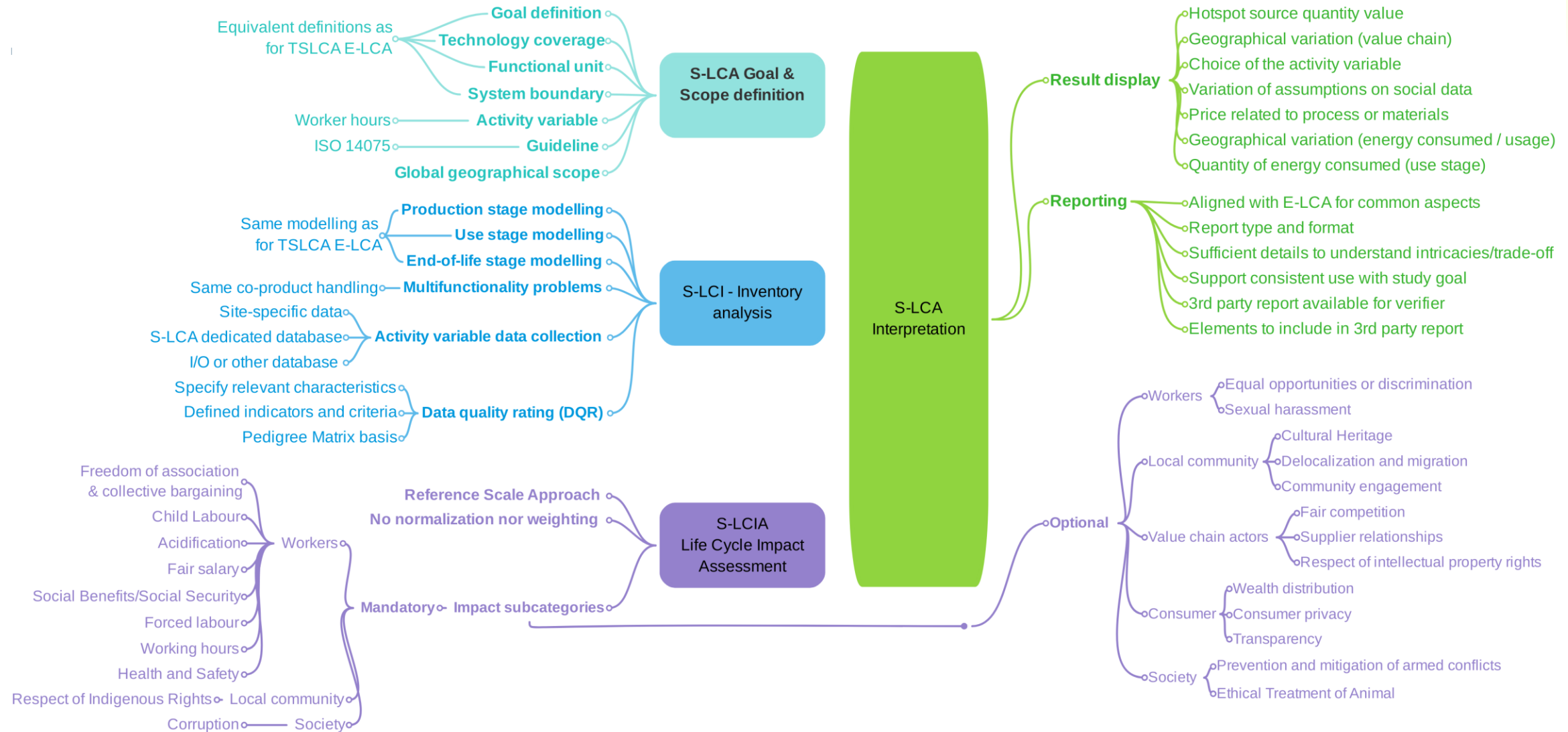
- Choice of secondary data
- Location of the value chain: electricity mix
- Supply chain improvements: recycled vs. primary materials
- Usage: maintenance & wearing
- Usage: payload/nb of passengers
- Usage: temperature
- Future mix: EoL electricity/H2 mix
- Second use

Optional parameters

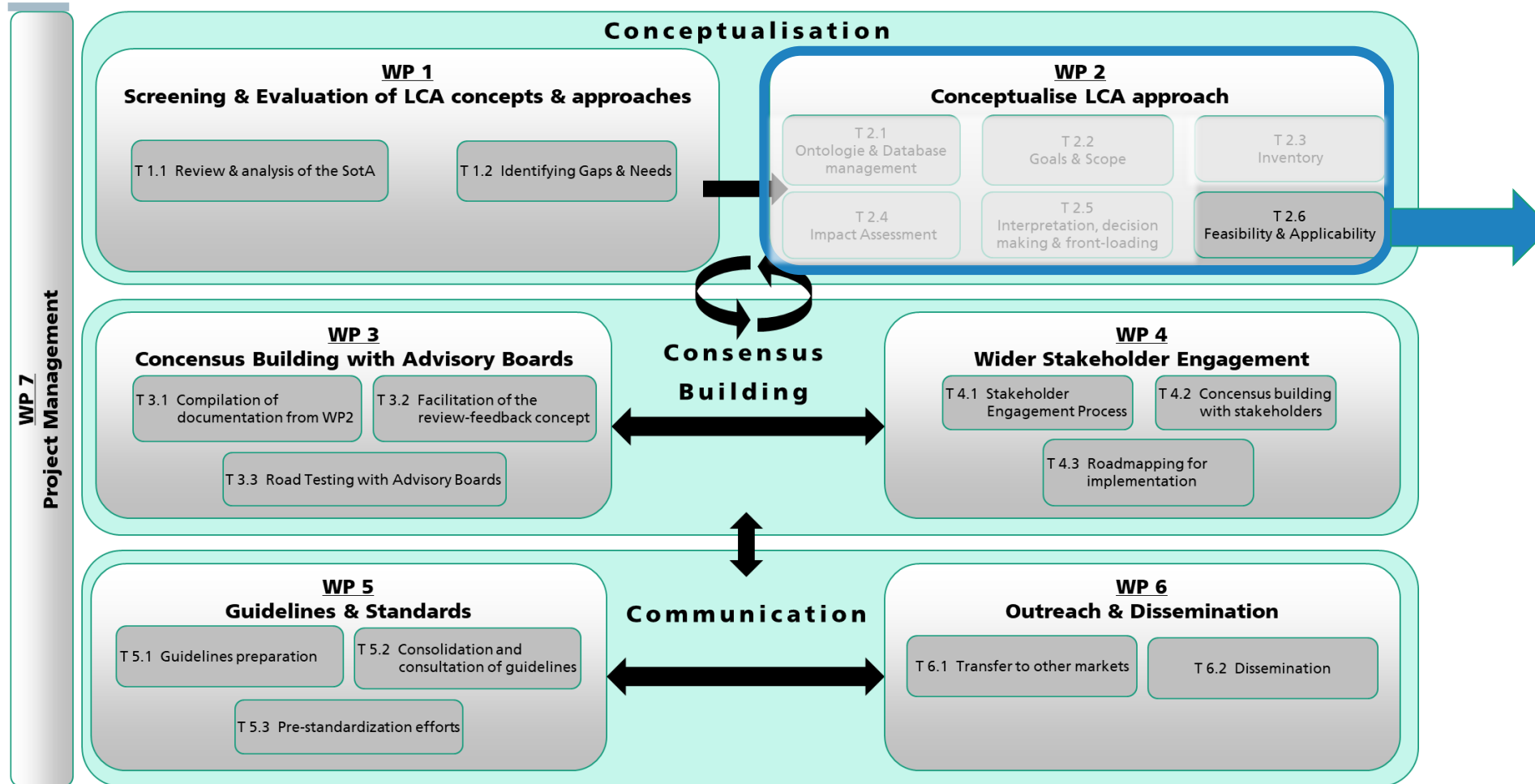
- Supply chain improvements: supplier choice
- Location of the value chain: fuel mix, transport distance & means
- Process improvements (waste management, upstream recycling processes, packaging...)
- Process improvements: energy consumption
- Circularity scenarios (e.g., car sharing, vehicle-to-grid, reuse, recycling, and second-life applications).

Mandatory parameters analyses have been tested within D3.3

TSLCA results - S-LCA requirements

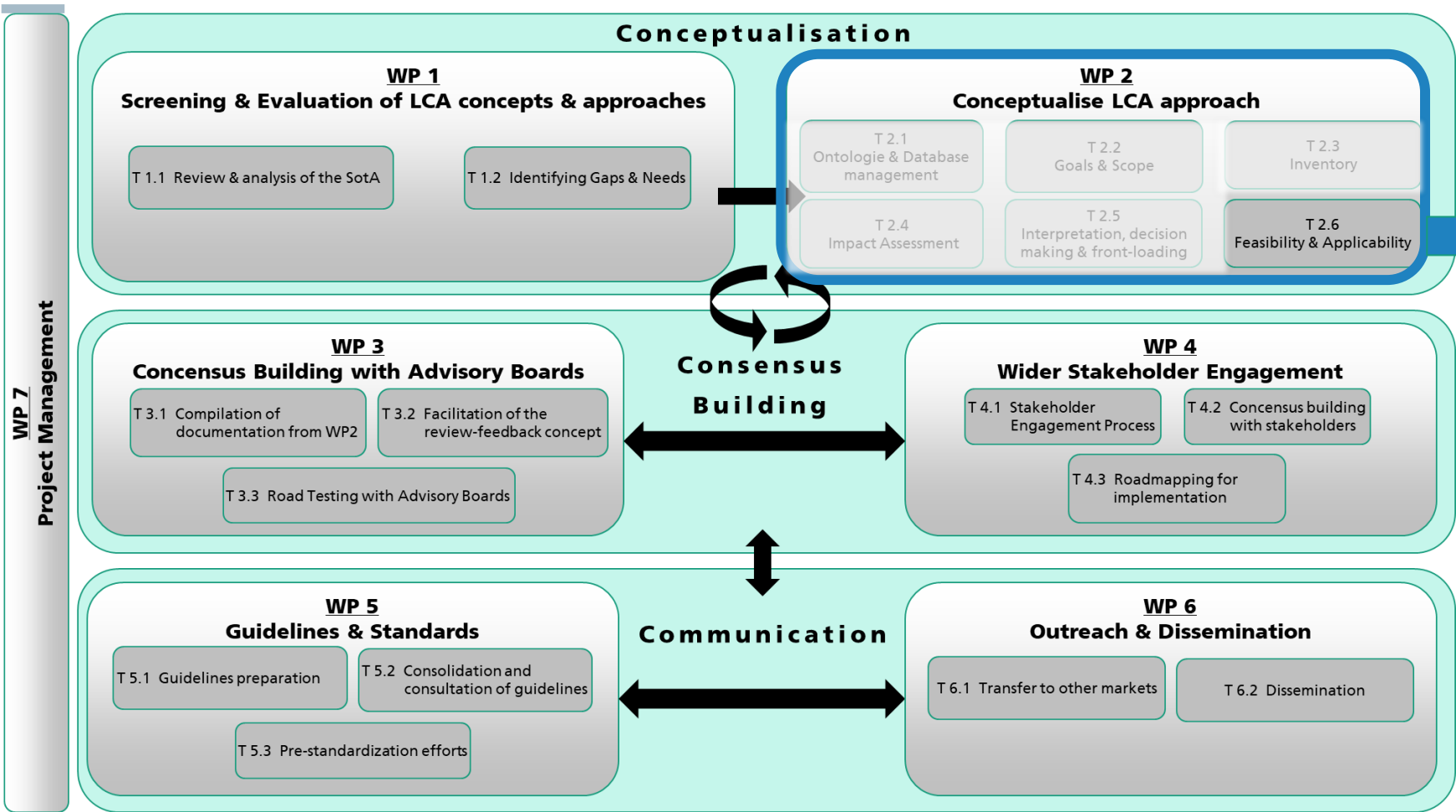



Feasibility and applicability - T2.6 D2.4



Goal:
Proof of
Concept by
T2.6

Feasibility and applicability - T2.6 D2.4



TranSensus LCA **D2.4** 
Funded by the European Union

Towards a European-wide harmonised transport-specific LCA Approach

TranSensus LCA

Coordinated and Support Action (CSA)
Grant Agreement Number 101056715
Start date of the project: July 1st, 2022, Duration: 30 months

Deliverable D 2.4
Feasibility and Applicability Testing
Status: Revision 1

Lead contractor for this deliverable: BMW

Due date of deliverable: 30.04.2025
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Coordinator:
Thilo Bein & Felipe Cerdas
Fraunhofer LBF & IST
Bachstraße 47 – 64289 Darmstadt - Germany
Phone +49 6151 705 463 | +49 151 74416573
E-mail thilo.bein@lbf.fraunhofer.de | felipe.cerdas@ist.fraunhofer.de

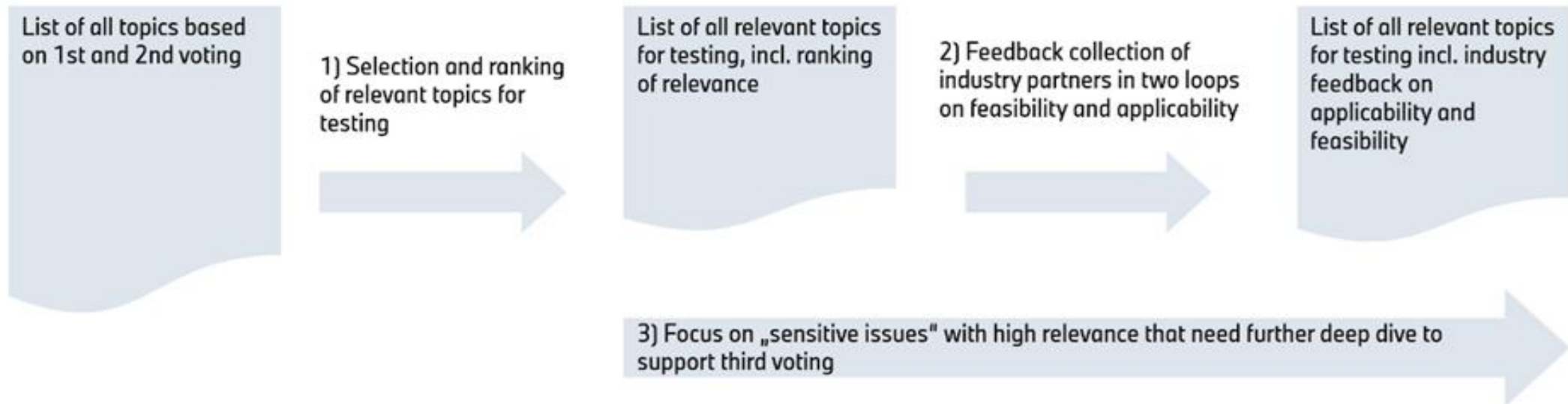
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Feasibility and applicability - T2.6 D2.4

■ Process for feasibility and applicability along project to support the votings preparation

(Task 2.6, D2.4)



Feasibility and applicability - T2.6 D2.4

■ Criteria

Criteria	Score	Definition
Data availability	3	Access to supplier specific data
	2	Access to data from databases
	1	No access to data from supplier/databases, however data can be collected from other sources with reasonable time effort
	0	No information available and/or too time intensive collection phase
Time effort for implementation	3	No additional time effort for implementation
	2	Minimal additional time effort for implementation
	1	Substantial additional time effort for implementation
	0	Too time intensive for implementation

Feasibility and applicability - T2.6 D2.4

- Summary of main results after ranking and evaluation of requirements along project

Topic	Comment	Compiled / Changed for D2.3	Add Guidance	Transition period needed
Cut-off criteria	Changed from reference mass/energy to environmental significance	x		
Minimum data requirements for Level 3 LCA	Transition period needed			x
Non-exhaust emissions (hydrogen leakage)	Guidance needed		x	
Electricity modelling - Location-based vs. Market-based	100% marked-based approach not feasible (missing data). 100% location based not possible (no accounting for decarbonisation effects). Mixed approach as widely applied in industry is recommended	x		
LCIA - Cumulative H2 Emissions	How to calculate and integrate the flow?		x	
Global Planetary Boundary based normalization factors	Is it possible to do normalization acc. to TranSensus LCA within existing software?		x	
Public reporting	Feedback condensed as "minimum info for public reporting"	x		

Conclusions

- Methodology described
- Requirements defined for E-LCA and S-LCA
- D2.3 & D2.4 used by WP3 (test) and WP5 (guideline).



**Congratulations to all WP2
partners and thank you!**

A pair of hands is shown holding a small, realistic-looking globe of the Earth. The globe is positioned in the center of the frame, showing the Americas. The hands are cupped around the globe, with fingers pointing outwards. The background is a soft-focus green, suggesting foliage or grass. The lighting is bright and even.

Thank you very much for your attention!

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LCA types considered in TranSensus LCA

Type	Definition
Retrospective vehicle LCA	Evaluation of impacts slightly before or after the start of production A nearly finalised bill of materials of all parts is available to the OEM
Prospective vehicle LCA	Conducted in the development stage and aims to estimate impacts before the start of production (several years) The TRL is low (TRL < 6) and the BOM is not completely defined.
Manufacturer fleet LCA	Aims to evaluate the weighted impact of a series of different products introduced by a single manufacturer Typically it is based on a extrapolation of vehicle LCAs
Macro level fleet LCA	Conducted at the sub, national or international level to support economy scale strategies Fleet is typically generic, i.e. representative of a variety of manufacturers