UNECE IWG on Automotive LCA

EUROPEAN RESEARCH ON MOBILE EMISSION SOURCES

13/11/2024

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EC JRC C.4

Joint
Research
Centre

Agenda

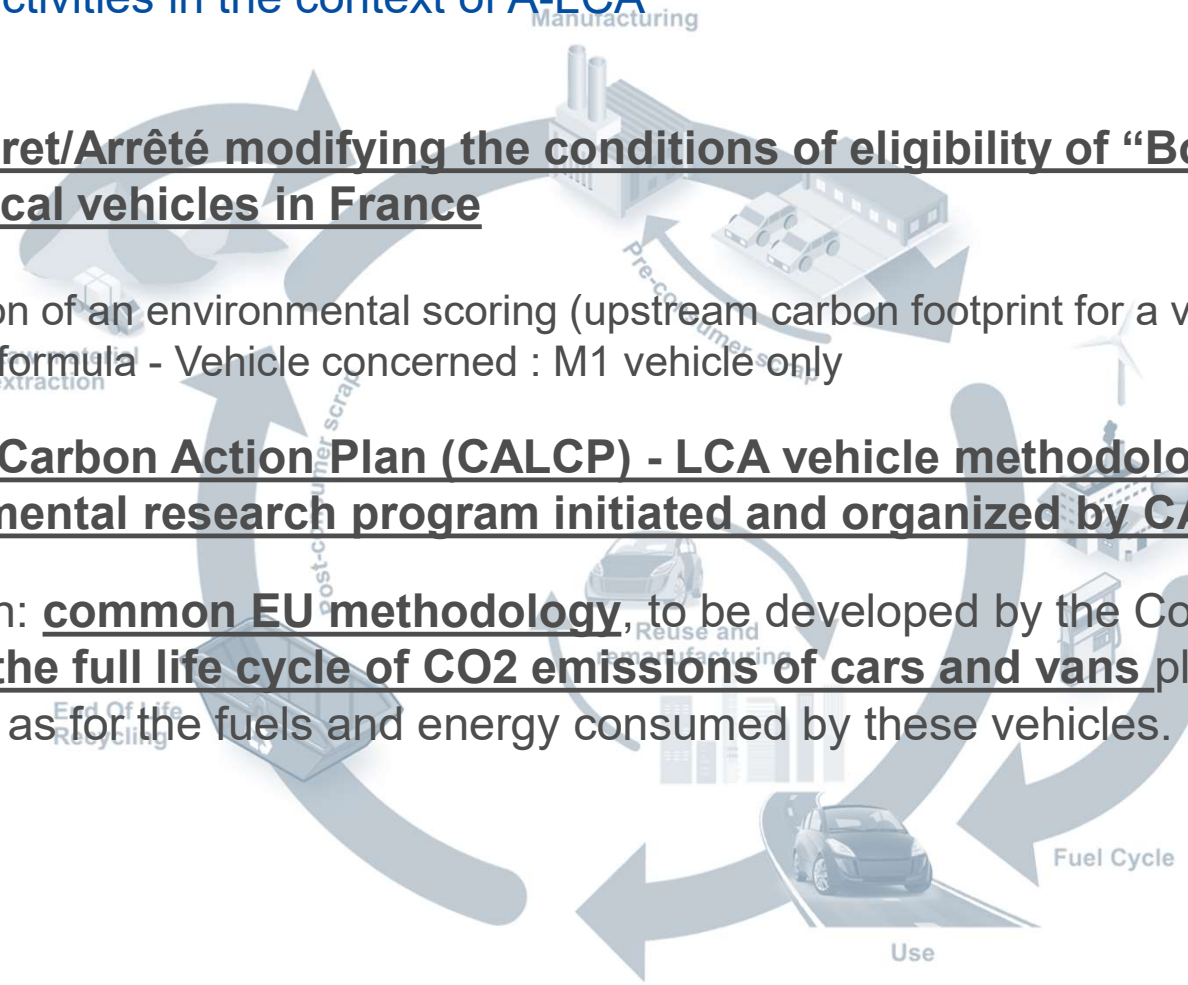
- General context
- Timeline
- IWG Organization and Status of Discussion
- Use phase – SG4 status update
- Next Steps

General Context

General Context

International activities in the context of A-LCA

- **French Décret/Arrêté modifying the conditions of eligibility of "Bonus Écologique" for new electrical vehicles in France**
  - Introduction of an environmental scoring (upstream carbon footprint for a vehicle) based on a proposed formula - Vehicle concerned : M1 vehicle only
- **China Low Carbon Action Plan (CALCP) - LCA vehicle methodology under review is a non-governmental research program initiated and organized by CATARC.**
- EC Provision: **common EU methodology**, to be developed by the Commission by 2025, for **assessing the full life cycle of CO2 emissions of cars and vans** placed on the EU market, as well as for the fuels and energy consumed by these vehicles.



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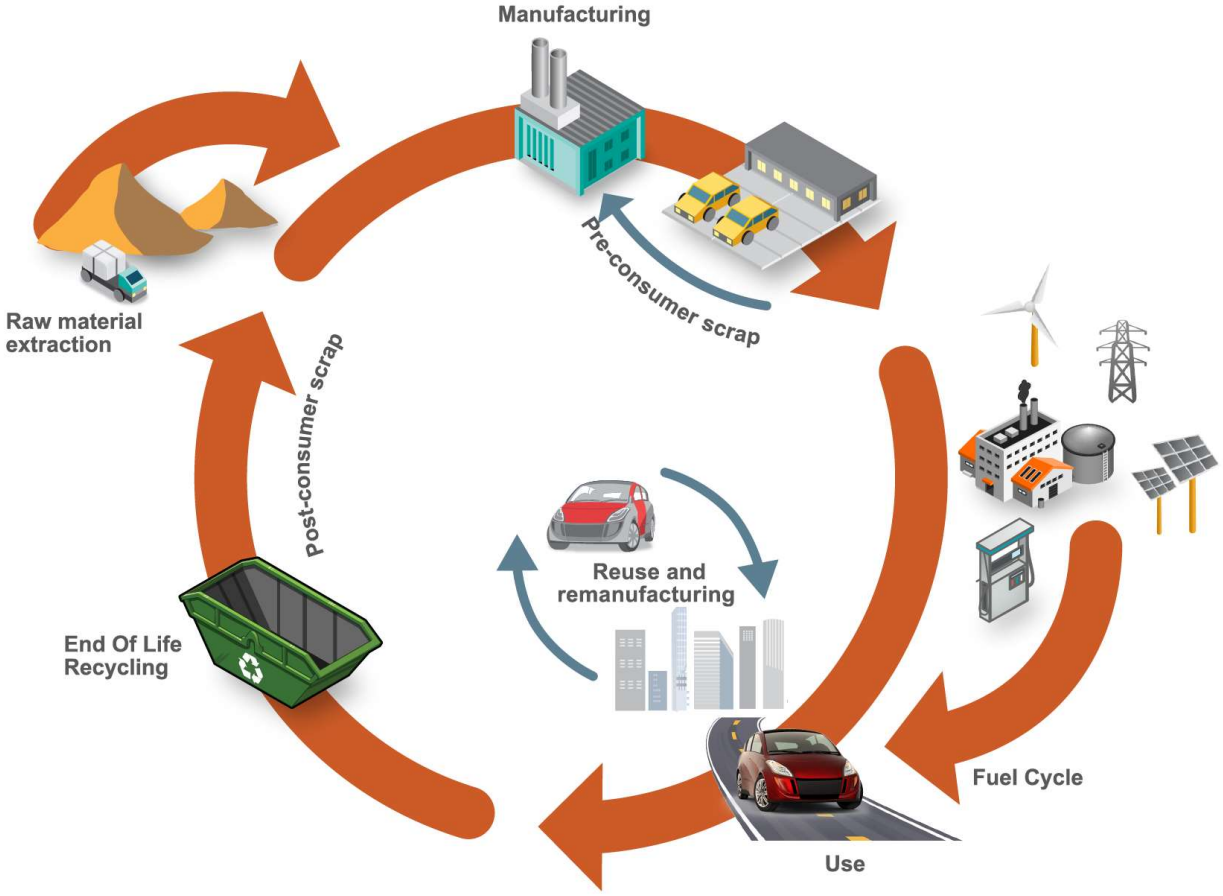
General Context

Introduction

[2022] Japan and Korea proposed to GRPE to work on the clarification of methodologies for the assessment of life-cycle GHG emissions of automotive. GRPE created a new Informal working group **A-LCA** under GRPE (ECE/TRANS/WP.29/GRPE/86/Rev.1)

Goal > **Internationally-harmonized** procedure to determine carbon footprint of different technologies, also considering energy use, from production to use and disposal. The output will be a **resolution** under the framework of WP.29.

Helping **policy makers** in leading the decarbonization process and encouraging automotive industries to **reduce carbon footprint.**



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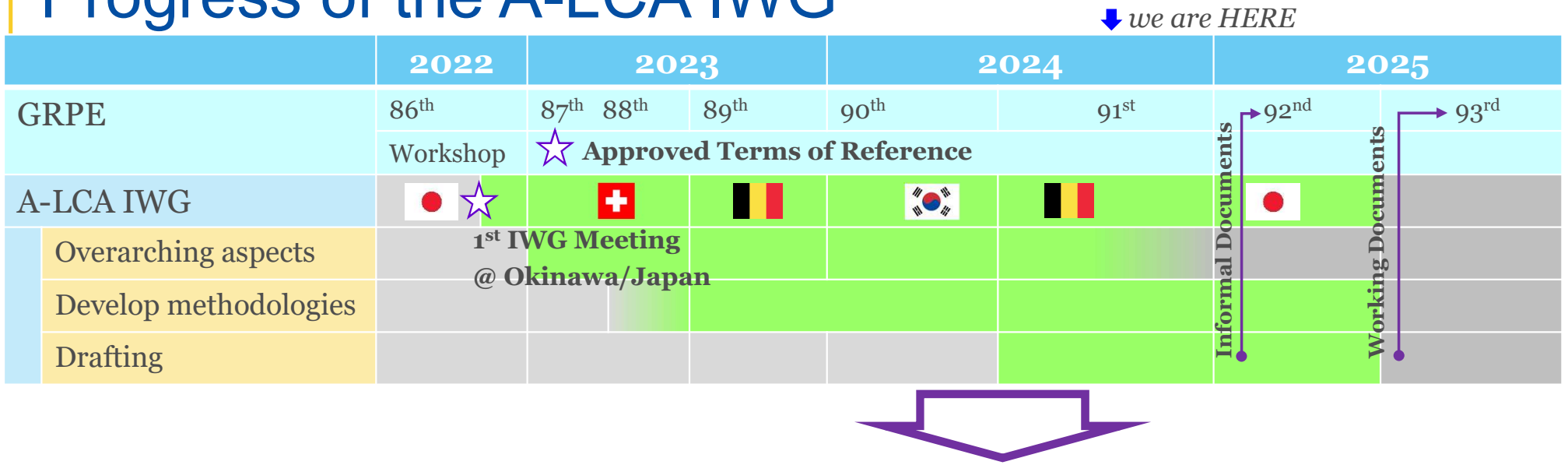
Timeline

Progress of the A-LCA IWG



<RECENT OUTCOMES>

- ✓ Successfully started drafting activities led by and OICA
- ✓ Move the subgroup activities forwards step by step with constructive contribution by members and with excellent leadership by leaders including interactive collaboration between subgroups
- ✓ Intensive discussion on “Infrastructure”, “Level Concept” and “Overarching Aspects” is on going

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IWG Organization and Status of Discussion

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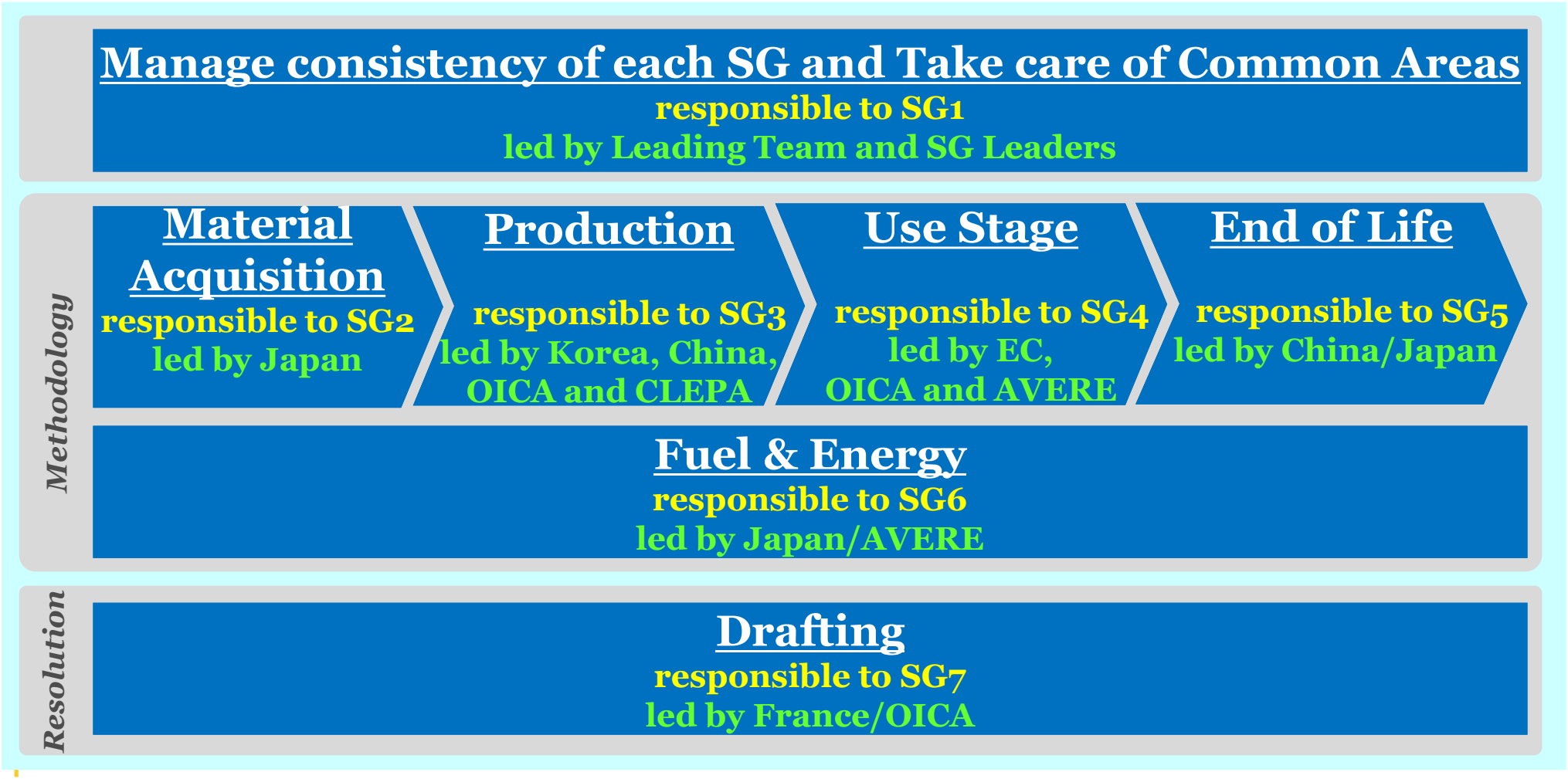
A-LCA Working Organization



Status of Discussion

IWG

Agreement

- ✓ Applicable vehicle : Category 1-1 as a first step
- ✓ Scope of greenhouse gas species : all IPCC AR6 GHG GWP 100 species

Under discussion

- ➢ Inclusion of Hydrogen
- ➢ Level concept and its definition
- ➢ How to handle "Infrastructure"
- ➢ Criteria of Secondary database
- ➢ Definition of "Representative Vehicle"

Materials

Agreement

- ✓ Objective, Material list, System Boundary, Level concept, Carbon Intensity

Under discussion

- ➢ Verification, Drafting

Production

Agreement

- ✓ Logistics, Declared unit

Under discussion

- ➢ Allocation hierarchy, Chain of custody, Data quality rating, Geography, Infrastructure, Materiality limit, Primary/Secondary data, Recycling, Representative vehicle, Waste, System boundaries, Transparency and Verification

Status of Discussion

USE

Agreement

- ✓ Functional Unit, System Boundaries, Energy Consumption, Maintenance

Under the discussion

- ➢ Service Life, Leakage Emissions Detailed Methodology to determine Energy Consumption/Maintenance

End of Life

Agreement

- ✓ Material/Parts recycling modeling, Boundary conditions, Second life parts, Exported Vehicles, Recycle process

Under the discussion

- ➢ **Logistics** (request to handle under SG1)

FUEL/ENERGY

Agreement

- ✓ Functional Unit, Emission Calculation Equations

Under the discussion

- ➢ Infrastructure, Leveling Concept, Energy modeling per stage, Renewable Energy Certificate

DRAFTING

Agreement

- ✓ Establish the Objective
- ✓ Provide the common procedure and base formatting
- ✓ Obtain "Table of Contents" and "Initial text" from each subgroup
- ➢ Working on comprehensive, clear, readable and applicable text
  - ➢ Identify "orphan" topics

Status of Discussion

▽ : target level as of October 2024

Progress level (%) / items	20	40	60	80	100	Notes
ToR					▽	COMPLETED with strong leadership by GRPE
	January 2023					
Working Organisation					▽	Established 6 subgroups (SGs)
	May 2023					
Overarching aspects				▽	February 2025	Slightly behind schedule due to its complexity, continue to discuss in parallel with SG activities
A-LCA Methodology				▽	March 2025	Progress of each SG is slightly different
Drafting		▽			July 2025	On track Drafting activities accelerate the methodology development

https://wiki.unece.org/display/trans/A-LCA+sessions

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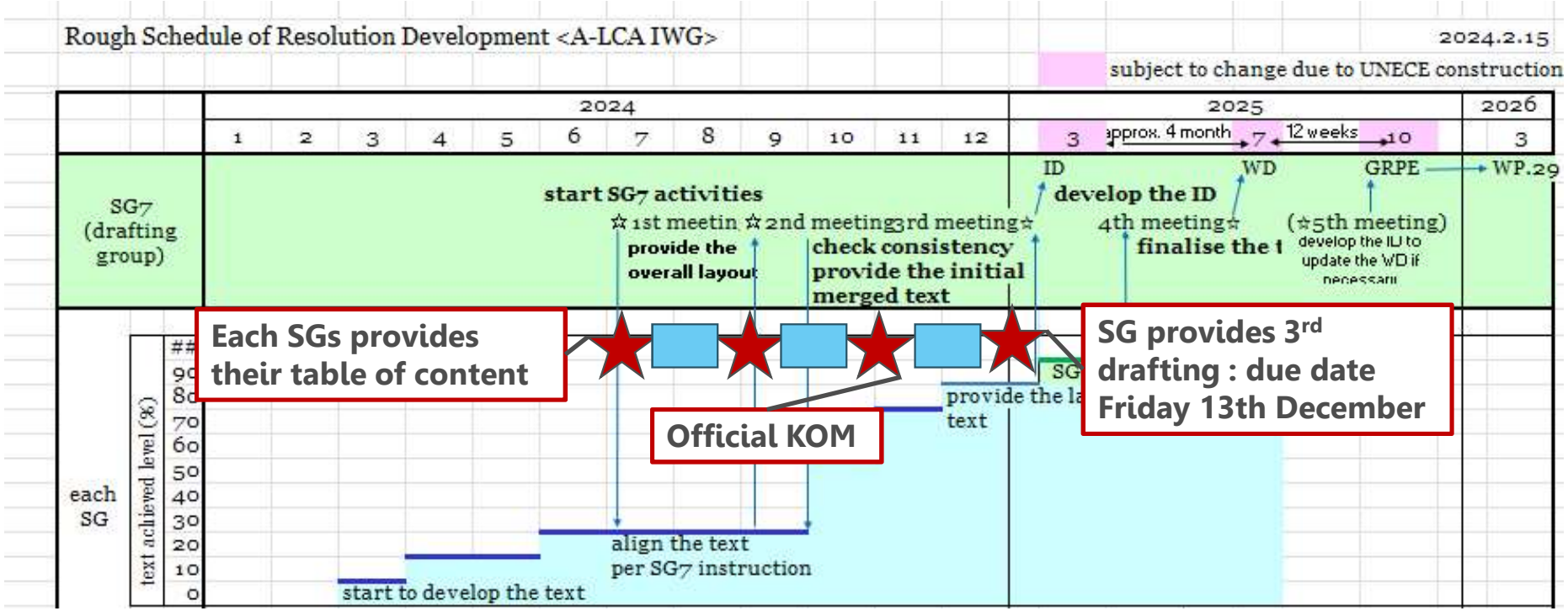
Status of Discussion



SG7 checks consistency, provides feedback and start writing

Milestones for SGs

13th of December : SGs leader provide draft
Mid December : SG7 meeting to provide feedbacks

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Use phase – SG4 status update

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Decision Status in SG4

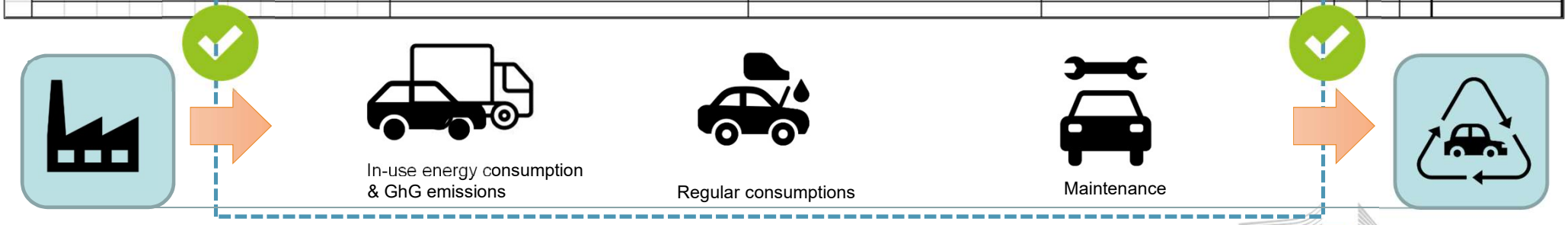
List of Topic	Status		
	Concept /Orientation	Methodology (Detailed requirement)	Draft (justification & guideline)
Functional unit	Agreed	Agreed	Under discussion
System Boundary	Agreed	Agreed	Under discussion
▪ Out of country of sale usage	Agreed	Under discussion	Under discussion
▪ Second life of parts	Exclude from scope	Under discussion	Under discussion
Energy consumption	Agreed	Under discussion	Under discussion
▪ Conversion to MJ	Under discussion	Under discussion	Under discussion
▪ Deterioration factor	Under discussion	Under discussion	Under discussion
▪ Discrepancy factor	Under discussion	Under discussion	Under discussion
Maintenance & Consumables	Agreed	Agreed (tbc fixed value)	Under discussion
▪ Fixed factor value	% of upstream emission	Under discussion	Not started
▪ Part transportation	Exclude from scope	Under discussion	Not started
Other leakage	Under discussion	Under discussion	Not started
▪ Emission of fluorocarbon	Under discussion	Under discussion	Not started
Service life	Agreed	Under discussion	Under discussion
Representative vehicle	Under discussion	Under discussion	Not started
Level concept	Under discussion	Under discussion	Not started

Functional Unit

- The primary function of a passenger car is to transport people from one location to another. Therefore, the **functional unit (FU) for 'category 1 vehicle' is defined as 1 km of distance travelled** per passenger **over the vehicle's lifetime**.
- A more conservative approach should be considered and **single passenger per vehicle should be assumed**. This will also ensure comparability between different vehicles and different regions.
- Considering the above assumption, the functional unit (FU) for 'category 1 vehicle' is defined as **the transportation of 1 passenger over 1 km of distance travelled** over the vehicle's lifetime.
- Since the actual service life and lifetime distance varies in different regions, it is appropriate to define and **use different standardized values in different regions**.
- Other categories such as trucks, buses, motorcycles, etc. will be added later.

System Boundaries

	area	SG4 Decision	rule				existing methods					Your Position
			ToR purpose	fixed or varied	primary or secondary	(any other suggestions are welcom	A	B	C	D	...	
Transportation												
mining to initial processing plants	SG2		NA		NA(secondary)	NA						
between initial processing plants	SG2		NA		NA(secondary)	NA						
deliver to part/production plants	SG2/3		NA		NA(secondary)	NA						
within the part/production plants	SG3		NA		NA(secondary)	NA						
between part/production plants	SG3		NA		NA(secondary)	NA						
deliver to customer	SG3/4		NA		NA(secondary)	✔						SG3
maintenance parts	SG4		NA		NA(secondary)	✔						ok
fuel	SG4		NA		✓(primary)	✔						SG6
electricity	SG4		NA		✓(primary)	✔						SG6
deliver to disposal plants	SG4/5		NA		NA(secondary)	NA						SG5
deliver to the parts recover plants	SG5		NA		NA(secondary)	NA						
recover plants to production plant	SG5/3		NA		NA(secondary)	NA						
...												



Covering activity from circulation to end-of-life

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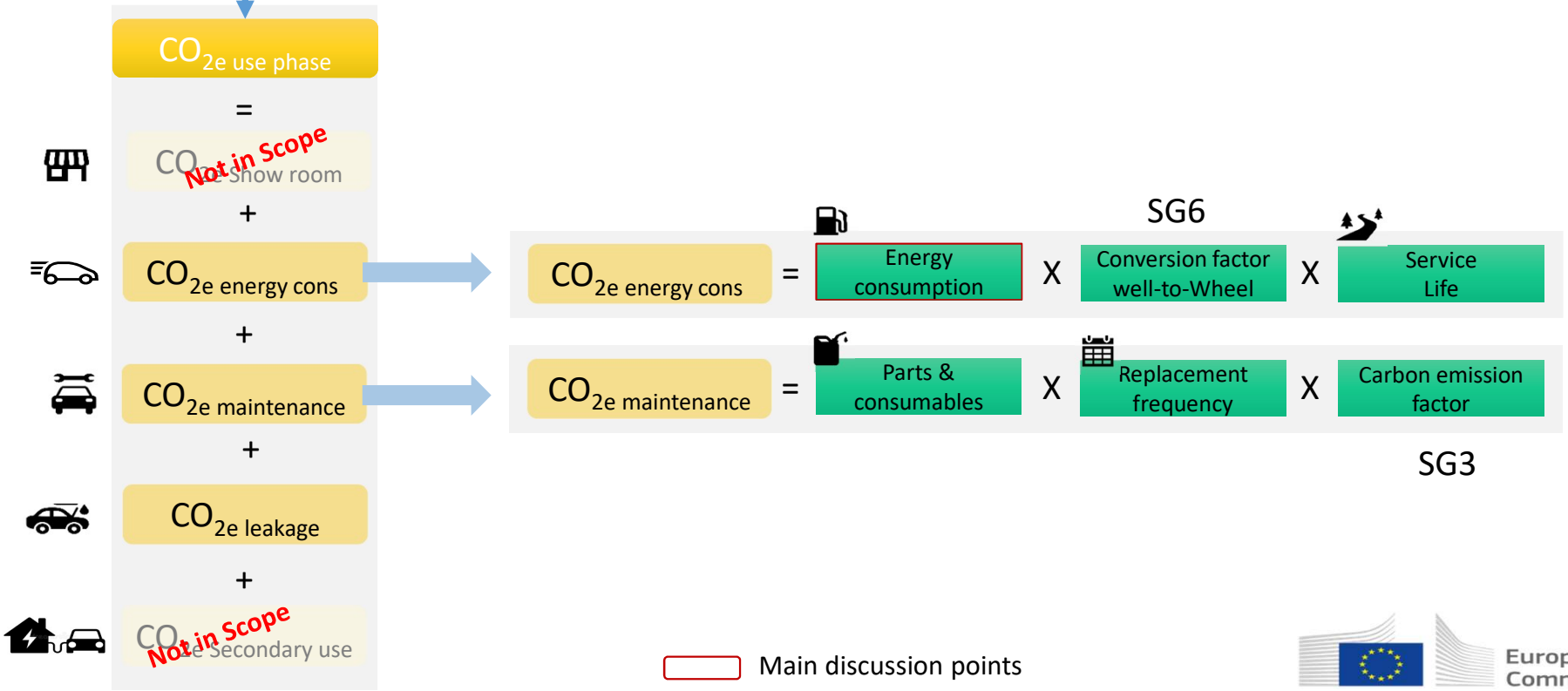
In-Use Energy Consumption

CO_{2e} =CO_{2e} Material +CO_{2e} Production +CO_{2e} Recycling + **(EC X CF X Service life) +$CO_{2e\ maintenance}$ + $CO_{2e\ leakage}$**



Main discussion points

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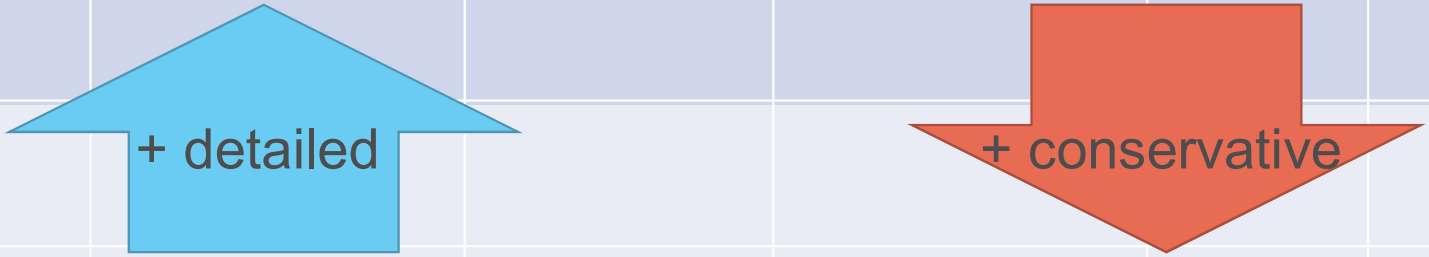
USE PHASE	Intended use	Reference Vehicle	Representativeness	In-use Consumption	Maintenance & Consumables	Vehicle Lifetime	Leakages
Level 4 (LCA family)	Labelling-monitoring/reporting-consumer information-future regulation	LCA family specific-possible inclusion of segment split under discussion	LCA family specific	LCA family certification values x RW factor (OBFCM or equivalent standardised) x deterioration factor (source TBD)	LCA Family specific	LCA family specific data-if verifiable (OBFCM)	Certified LCA family data if exist
Level 3 (OEM)							
Level 2							
Level 1 (Regional)	Stakeholders, policy makers, researchers analysts etc For future analysis and macro assessments	General concept distinguishing per powertrain tech/energy carrier/size/emission standard and use	Regional according to established methodologies-tools (EU/US/JP/KR/CN…) eg Guidebook, MOVES etc	Regional typical emission-consumption factors or other local representative realistic data (eg Official monitoring info, inventories like guidebook, MOVES)	TBD by SG4 or methodology specific	Default regional typical TBD by SG4	As per methodology followed or Powertrain specific-TBD by SG4



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Next Steps

SG4 Meeting Schedule Plan

July	August	September	October	November	December
29 – SG4 13th meeting		10 – A LCA 16th IWG			
-	-	24 – SG4 14th 3 – SG4 15th	18 – A LCA 18th IWG @Geneve	18 – SG4 167th meeting	9 – SG4 18th meeting
		26/27 – A LCA 17th IWG @Brussels	21 – SG4 16th meeting		9 – A LCA 19th IWG

Meetings until next GRPE (March 2025)

Main agenda and Expected outcomes

- ~ January 2025: a couple of virtual meeting

< discuss and reach agreement on some of overarching aspects, review SGs activities and accelerate the text development>

- 4th & 5th February: meeting @ Tokyo

<finalise overarching aspects, develop methodology and the initial resolution to be submitted to 92nd GRPE >

- 92nd GRPE week meeting @ Geneva (March 2025)

<review overall progress status, request feedbacks and/or comments from GRPE >

Each SG activities including meeting schedule are handled by each SG leader(s)

Thank you

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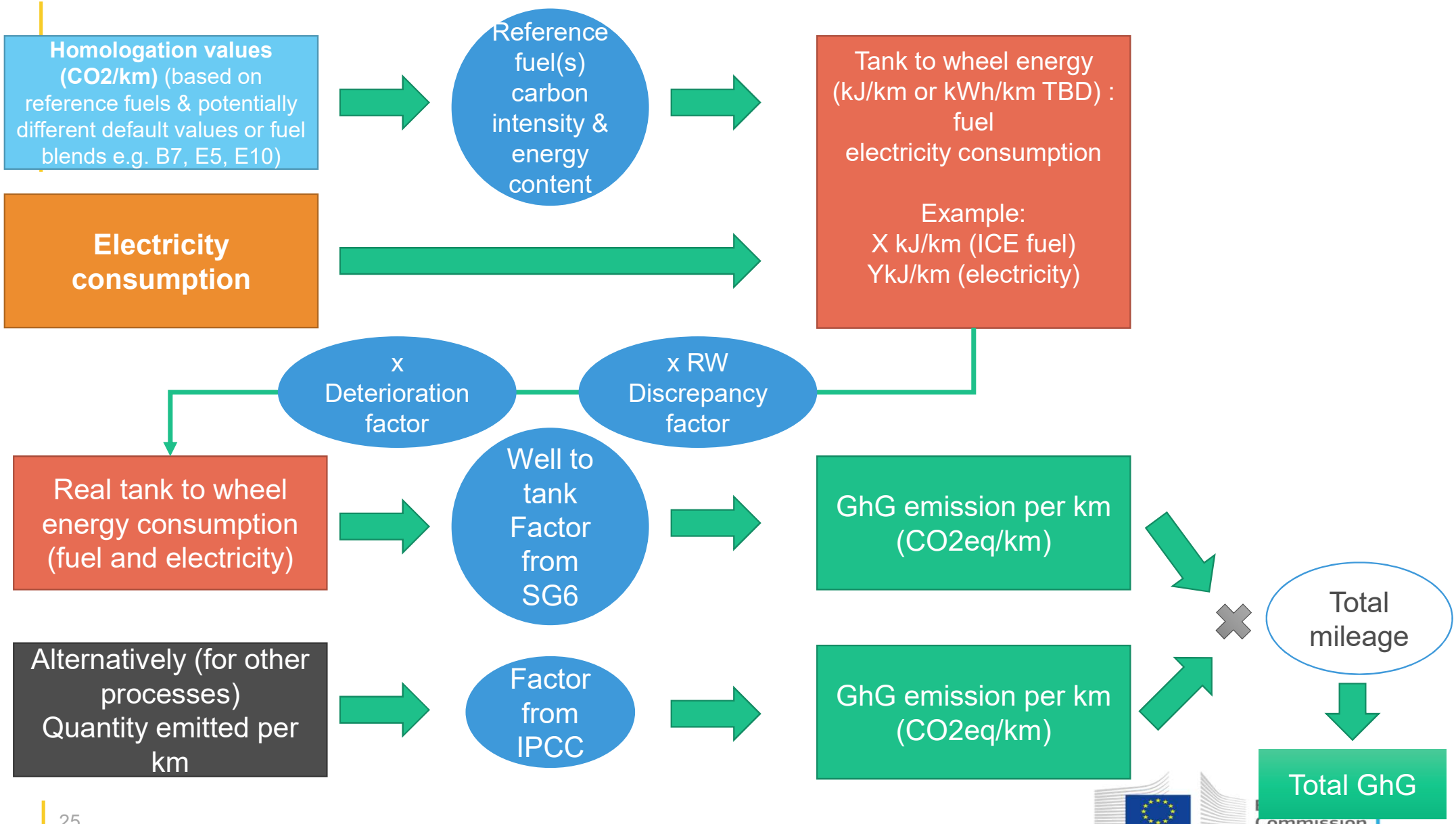
General Context

Background

Life cycle assessment (LCA) is a method to estimate the material and energy flows of a product (e.g. transportation service) to analyse environmental effects over the entire lifetime of the product ‘from cradle to grave’.

“LCA has been used in the automotive industry for more than 20 years, mainly as a mean of identifying environmental hotspots and as an aid to prioritise areas of innovation” (Warsen and Krinke, 2013).

ISO 14040 series has been in effect since 2006, but the scope of the investigation is not standardized.


Homologation values (CO2/km) (based on reference fuels & potentially different default values or fuel blends e.g. B7, E5, E10)
Reference fuel(s) carbon intensity & energy content
Tank to wheel energy (kJ/km or kWh/km TBD) : fuel
electricity consumption
Example:
X kJ/km (ICE fuel)
YkJ/km (electricity)
Electricity consumption
x Deterioration factor
x RW Discrepancy factor
Real tank to wheel energy consumption (fuel and electricity)
Well to tank Factor from SG6
GhG emission per km (CO2eq/km)
Total mileage
Alternatively (for other processes) Quantity emitted per km
Factor from IPCC
GhG emission per km (CO2eq/km)
Total GhG