IWG A-LCA
SG4 Use Phase
Status Update

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Discussion items for SG4

❑Boundaries definition

❑Level Concepts for SG4

❑SG4 interactions

SG4 status

❑Agreement reached

- SG4 Scope, Boundaries (only GhG), maintance + regular consumption
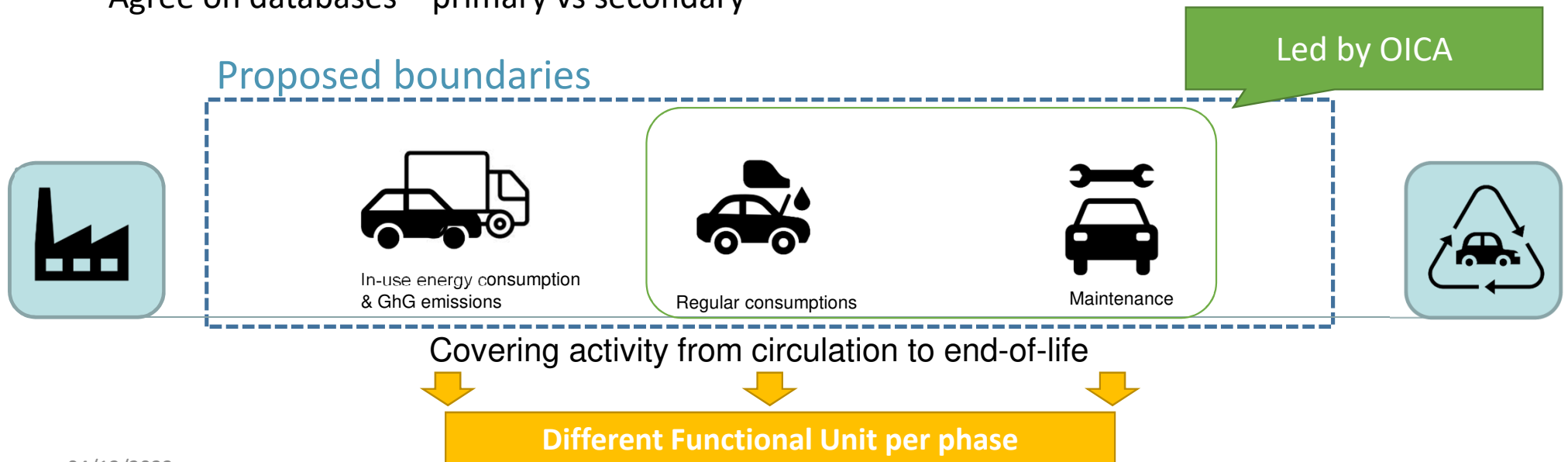- Created a dedicated team for maintenace and consumables topics

❑Still TBD

- CO2eq calculation [Functional units tbd]
- Level concept implementation
- Service life duration/milage definition
- In-use data to reflect realistic conditions: TA+Correction coefficient/OBFCM or local inventory
- Interactions with SGs
  - Which GhG to be considered? CO2, CH4 and N20 + others due to leakages, mainteinance etc?
  - Charging and infrastructures: define cut-off criteria for upstream emissions
  - Reparability: where is the boundary with other SGs?

SG4 Boundaries

- Define service life (OEM or Default) - official db? Need to collect data and produce first table of standards/datasets

- Define maintenance frequency and consumables impact

- Agree on databases – primary vs secondary

Proposed boundaries

Led by OICA

In-use energy consumption & GhG emissions

Regular consumptions

Maintenance

Covering activity from circulation to end-of-life

Different Functional Unit per phase

CO$_2$eq Calculation/Functional Unit

Lifetime GhG$_{use}$ [CO2eq] = GhG [CO2eq/km] * total average distance [km] + Maintainance * occurrences + waste (total)

gCO2eq/km > LDV
gCO2eq/tkm > HDV
gCO2eq/pkm > HDV

⚠️ GhG [CO2eq/km] = Energy consumption (MJ/km) * **Conversion Factor SG6** + Fuel Energy Consumption (g/km) * **Conversion Factor SG6** + fugitive emissions + other emissions (TBD from the guidebook)

Energy consumption OR Fuel energy consumption = TA Value (or equivalent) * RW correction factor [lvl1, lvl2, lvl3, lvl4] * degradation factor [lvl1, lvl2, lvl 3,lvl 4] other factors (?)

⚠️ **FUNCTIONAL UNIT TBD**

❑ [Energy and/or fuel mass] per [km – tkm – passenger km] for **in-use consumption**

❑ CO2 per spare part for **consumables**?

❑ CO2 per **maintenance** event?

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Level Concept for SG4 - JRC

USE PHASE	Reference Vehicle	Representative ness	Energy consumption		Maintenance	Service Life
			In-use	Charging		
~~Level 1~~	~~General concept per powertrain tech /energy carrier~~	~~Global average~~	~~Average homologation value normalized to WLTP corrected for RW (global)~~	~~Generic charging eff(?)~~	~~Generic~~	~~Generic/Global~~
Level 2	General concept per powertrain tech/energy carrier	Regional (EU/US/JP/KR/CN...)	Regional typical of vehicle type representative or Real World (RW)	Regional typical charging eff value (at vehicle level)	Generic/regional	Regional typical service life for each vehicle type
~~Level 3~~	~~Representative vehicle for each OEM/powertrain/energy carrier (need to define criteria)~~	~~OEM/National~~	~~OEM resolution and assumptions for RW performance~~	~~OEM average efficiency (standardised?)~~	~~OEM Specific~~	~~Regional with option to declared higher life~~
Level 4	Specific OEM's vehicle model	OEM's specific vehicle model	Homologation value corrected based on RW characteristic value (based on OBFCM or similar data provided by operators)	Vehicle specific charging eff (at vehicle level)	Model-region specific	OEM/Model specific average data

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Level Concept for SG4 - JRC

USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life
			In-use	Charging		
~~Level 0~~	~~General concept per powertrain tech./energy carrier~~	~~Global average~~	~~Average homologation value normalized to WLTP corrected for RW (global)~~	~~Generic charging eff(?)~~	~~Generic~~	~~Generic/Global~~
Level 3	Specific OEM's **complete** vehicle model – as delivered	Specific vehicle	Homologation value corrected based on RW characteristic value (based on OBFCM or similar data provided by operators or adjustment factor)	Vehicle specific charging eff (at vehicle level, which standard?)	Model specific	OEM/Model specific average data
Level 2	Vehicle variants (same manufacturer/company, same essential body parts, body type, powertrain tech/energy carrier, same axles/class). Can be **incomplete**.	OEM/Model Variant	OEM-resolution and assumptions for RW performance corrected per adjustment factor	OEM average efficiency (standardised?)	OEM Specific	Regional with option to declared higher life
Level 1	General concept distinguishing per powertrain tech/energy carrier/size/emission standard and use.	Regional (EU/US/JP/KR/CN…) eg Guidebook, MOVES etc	Regional typical inventory or other local representative realistic data	Regional typical charging eff value	Generic/regional	Regional typical service life for each vehicle type

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Level Implementation Flowchart

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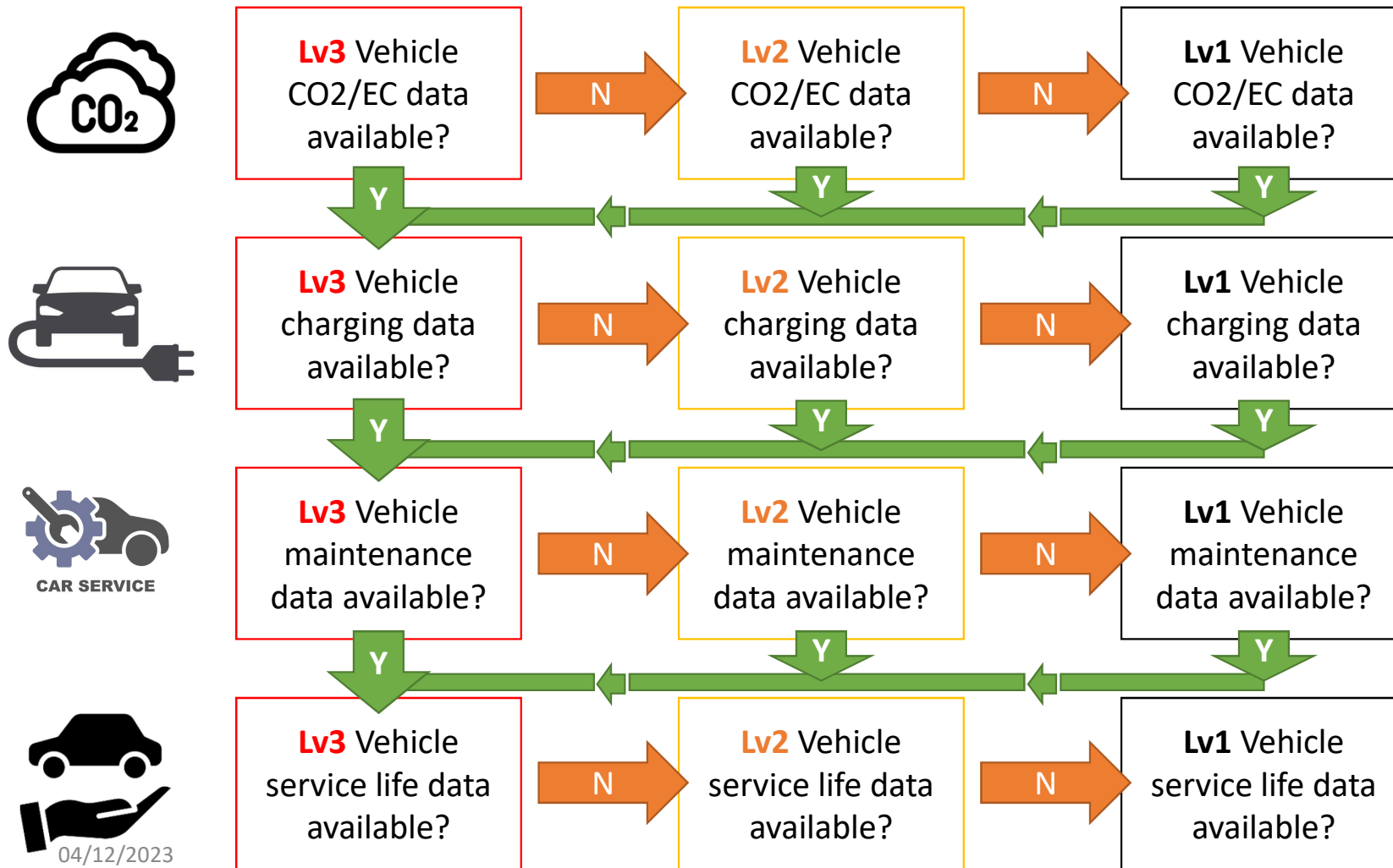
Next steps

❑Schedule meeting w SG6 for
   ❑Fuel/Energy Conversion factors
   ❑Define boundaries and cut-off criteria

❑Define CO_{2eq} calculation formula and functional units

❑Finalize Level Matrix

❑Include Maintenance and Consumables in our discussion

❑SG4 meeting on 12/12

SG4 Meeting Schedule Plan

| September	October	November	December	January	February
-	10th – SG4 4th meeting	5th – SG4 4th meeting	4th – A LCA 12th IWG	8/9th – A LCA 13th IWG @Geneva	
7th – A LCA 10th IWG	17/18th – A LCA 11th IWG @BRU		12th – SG4 6th meeting	16th – SG4 7th meeting	8th – SG4 8th workshop

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Thank you

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Appendix

SG4 Scope

- Provide a comprehensive methodology for calculating **realistic** GhG emissions and energy consumption over vehicle use-phase at various levels of detail and considering the availability of different information and datasets

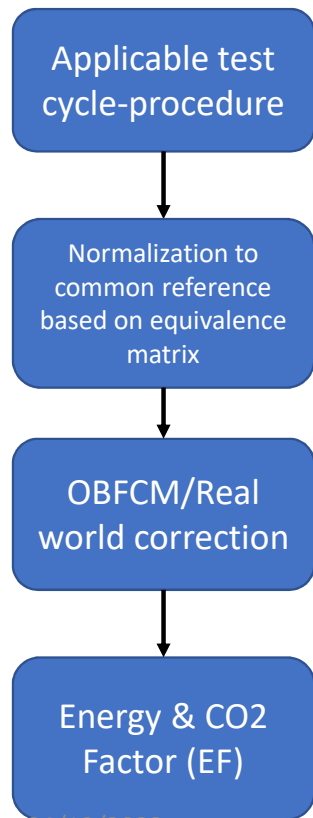In – Use GhG emissions and energy consumption
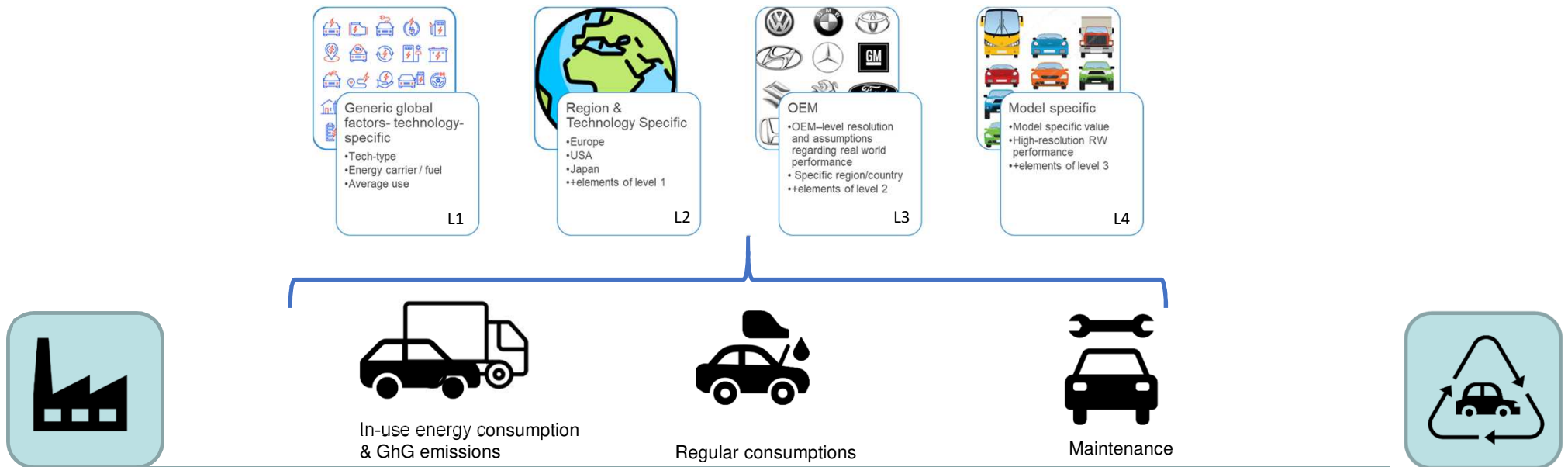
Methodological question

- What happens if the user selects values from different levels because of data availability eg 4/6 values are level 4 one value is level 3 and one is level 2?
  - Is that acceptable? We use the guidebook method developed by UN ECE assessed every year and it is as realistic as possible (NOT ALL countries)
- If yes, then lower levels should have more conservative values to encourage measurement/data provision
- Other boundaries to be included?

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(JPN) Request to other SGs and Request from other SGs

items	to which SG	from which SG	notes
1. OEM showroom	NA	SG3	Accept the request
2. Provide the consumed energy for maintenance parts (please refer SG4-03-JPN02 for detail)	SG3/SG5	NA	unit should be J, not GHG
3. Provide GHG factors for each fuel (please refer SG4-03-JPN02 for detail)	SG6	NA	unit should be GHG/L or kg
4. Provide GHG factors for each energy source (please refer SG4-03-JPN02 for detail)	SG6	NA	unit should be GHG/J
5. tbd			

Fuel Consumption/Efficiency

Equivalence matrix (for positive energy demand & mean efficiency)

Applicable test cycle-procedure

↓

Normalization to common reference based on equivalence matrix

↓

OBFCM/Real world correction

↓

Energy & CO2 Factor (EF)

ratio	WLTP	NEDC	US06	FTP	JC08	….	other
WLTP							
NEDC							
US06							
FTP							
JC08							
…..							
other							

Level Concept for SG4 - OICA

Not clear what representativeness is. OICA position after clarification

SG6 topic (out of vehicle) AC charging: efficiency is not required due to on-board charger

Need further discussion in OICA

USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life	Other
			In-use	Charging			
Level 1	General concept per powertrain tech /energy carrier	Global average	~~Average~~ homologation value ~~normalized to WLTP corrected for RW (global)~~	Generic charging efficiency (?)	Generic	Generic/Global	
Level 2	Same as Lv 1	Regional (EU/US/JP/KR/CN…)	Regional RW correction	Regional charging efficiency value (standardised)	Generic/regional	Regional / Unique service life	
Level 3	Representative vehicle for each OEM/powertrain/energy carrier (need to define criteria)	OEM/National	OEM-resolution and assumptions for RW performance	OEM average efficiency (standardised?)	OEM Specific	Regional with option to declared higher life	
Level 4	Specific OEM's vehicle model	OEM's specific vehicle model	High-resolution RW value (based on OBFCM or similar data)	Vehicle specific charging efficiency (standardised?)	Model specific	OEM/Model specific average data	

Readily available

Readily available reflecting regional use

Readily available from OEM

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Japan Positions on Level Concept

JPN sees that no levelling concept is necessary for SG4
→ set only "Level 4" to take care of all potential items (expect SG4 member to update them in excel file), then SG4 makes a decision of the applicable items under the current ToR time scale (~2025).

Level Concept for SG4

USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life
			In-use	Charging		
Level 1	General concept per powertrain tech /energy carrier	Global average	~~Average~~ homologation value ~~normalized to WLTP corrected for RW (global)~~	Generic charging efficiency (?)	Generic	Generic/Global
Level 2	Same as Lv 1	Regional (EU/US/JP/KR/CN…)	Regional RW correction	Regional charging efficiency value (standardised)	Generic/regional	Regional / Unique service life
Level 3	Representative vehicle for each OEM/powertrain/energy carrier (need to define criteria)	OEM/National	OEM-resolution and assumptions for RW performance	OEM average efficiency (standardised?)	OEM Specific	Regional with option to declared higher life
Level 4	Specific OEM's vehicle model	OEM's specific vehicle model	High-resolution RW value (based on OBFCM or similar data)	Vehicle specific charging efficiency (standardised?)	Model specific	OEM/Model specific average data

<example>
PEV : X yrs/x km
HEV : Y yrs/y km
FCHV : Z yrs/z km
Others : XY yrs/xy km

[ ] : JPN pursues under the SG4 activities (some of items are still under the discussion)

Level Concept for SG4 – UN F. Cuenot

Time of application	USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life	Other
				In-use	Charging			
Pre vehicle sale	Level 1	General concept per powertrain tech /energy carrier	Global average	Average homologation value normalized to WLTP corrected for RW (global)	Generic charging efficiency (?)	Generic	Generic/Global	
Pre vehicle sale	Level 2	Same as Lv 1	Regional (EU/US/JP/KR/CN…)	Regional RW correction	Regional charging efficiency value (standardised)	Generic/regional	Regional / Unique service life	
~~Pre vehicle sale~~	~~Level 3~~	~~Representative vehicle for each OEM/powertrain/energy carrier (need to define criteria)~~	~~OEM/National~~	~~OEM-resolution and assumptions for RW performance~~	~~OEM average efficiency (standardised?)~~	~~OEM Specific~~	~~Regional with option to declared higher life~~	
Pre vehicle sale	Level 4	Specific OEM's vehicle model	OEM's specific vehicle model	High-resolution RW value (based on OBFCM or similar data)	Vehicle specific charging efficiency (standardised?)	Model specific	OEM/Model specific average data	
Post vehicle sale	Level 5	Same Model/powertrain	Individual vehicle VIN specific	OBFCM or equivalent on-board device	Proper values	Real maintenance	Real vehicle mileage /age	

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Level Concept for SG4 – Ricardo feedback on potential revisions 10/10/23

Up to the relevant CP/ region to decide what is needed/used or not.

USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life	Other
			In-use	**Charging**			
Level 1 (Generic)	General concept per powertrain tech /energy carrier	Global average	Average regional homologation value (*ideally* normalized to WLTP) corrected for RW (e.g. basic global SBTI value of 1.1)	Generic charging efficiency (unless already included in homologation)	Generic by powertrain	Generic/Global	Projected energy mix use (current policy); Default factors fugitive emissions + degradation
Level 2	Same as Lv 1	Regional (EU/US/JP/KR/CN…)	+Regional RW correction (can be =Lv1 if required by specific CP)	+Regional charging efficiency value (standardised)	As for Level 1	Regional / Unique service life	As previous level, plus specific sensitivities?
Level 3 (OEM)	*Representative* vehicle model variant for each OEM /powertrain /energy carrier (need to define criteria)	OEM's specific vehicle model	OEM model variant, regional RW corr. *or optional* OEM specific alternative assumptions for RW performance	OEM model efficiency (standardised)	OEM model-specific (for the representative configuration) by powertrain	Regional with *option* for OEM to declared higher life with evidence	As previous level
Level 4 (OEM+)	**None:** OEM specific vehicle model and variant /configuration (i.e. engine, battery size, other options, etc)	OEM's specific vehicle model and variant	Specific model/variant EC, plus High-resolution RW value (based on OBFCM or similar data)	As for Level 3, but also by specific model variant (if different)	As for Level 3, but also by specific model variant (if different)	As for Level 3	OEM model-specific fugitive emissions + degradation factors

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Level Concept for SG4 – Ricardo simplified alternative 10/10/23

Up to the relevant CP/ region to decide what is needed/used or not.

USE PHASE	Reference Vehicle	Representativeness	Energy consumption		Maintenance	Service Life	Other
			In-use	**Charging**			
Level 1 (Generic)	General concept per powertrain tech /energy carrier	Global or regional average (EU/US/JP/KR/CN…)	Average global or regional homologation value (*ideally* normalized to WLTP) corrected for RW (global, e.g. SBTI value of 1.1, or regional RW if required by CP)	Generic global or regional charging efficiency (unless already included in homologation)	Generic by powertrain type	Generic global or regional	Projected energy mix use (current policy); Default factors fugitive emissions + degradation factors
Level 2							
Level 3 (OEM)	*Representative* vehicle model variant for each OEM /powertrain /energy carrier (need to define criteria)	OEM's specific vehicle model	OEM model variant + regional RW corr. *or optional* OEM specific alternative assumptions for RW performance	OEM model efficiency (standardised)	OEM model-specific (for the representative configuration) by powertrain	Regional with *option* for OEM to declared higher life with evidence	As previous level, plus specific sensitivities (*to be agreed*)
Level 4 (OEM optimal)	**None:** OEM specific vehicle model and variant /configuration (i.e. engine, battery size, other options)	OEM's specific vehicle model and variant	Specific model/variant EC, plus high-resolution RW value (based on OBFCM or similar data)	As for Level 3, but also by specific model variant (if different)	As for Level 3, but also by specific model variant (if different)	As for Level 3	+OEM model-specific fugitive emissions + degradation factors