IWG A-LCA SG4 Use Phase

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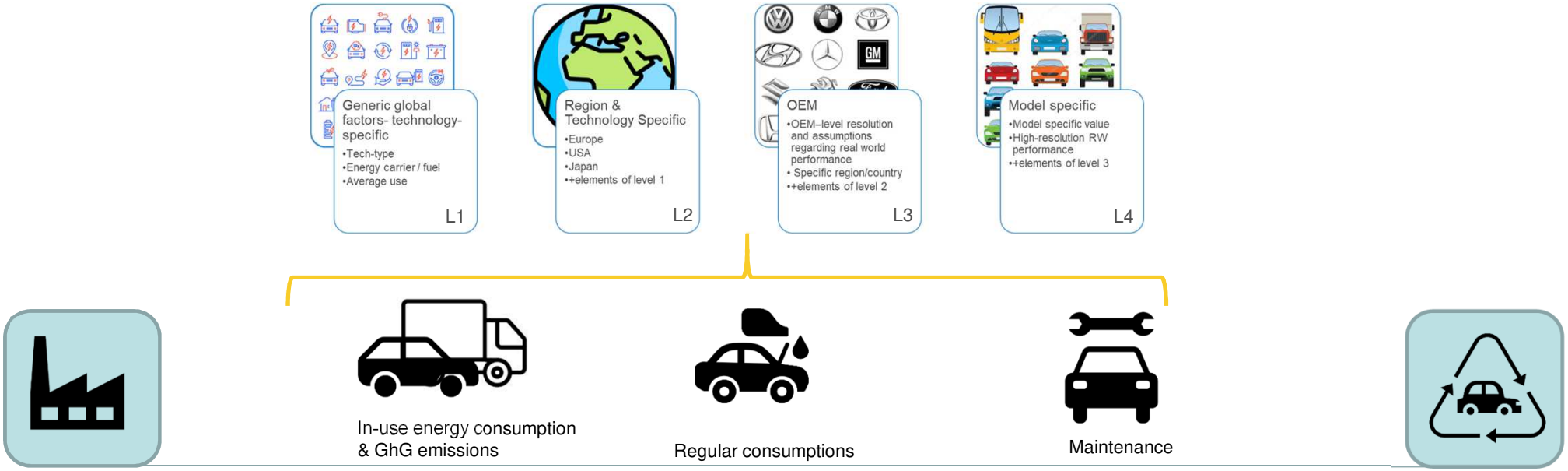
Discussion items for SG4

- Scope definition
- Boundaries definition
- Level Concepts for SG4
  - Discussion on elements to be considered (eg charging/refueling/driving/maintenance/other)
  - Possible datasets – Primary Data concept
  - Boundaries include the system but also the vehicle types
- SG4 Meeting Schedule plan

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

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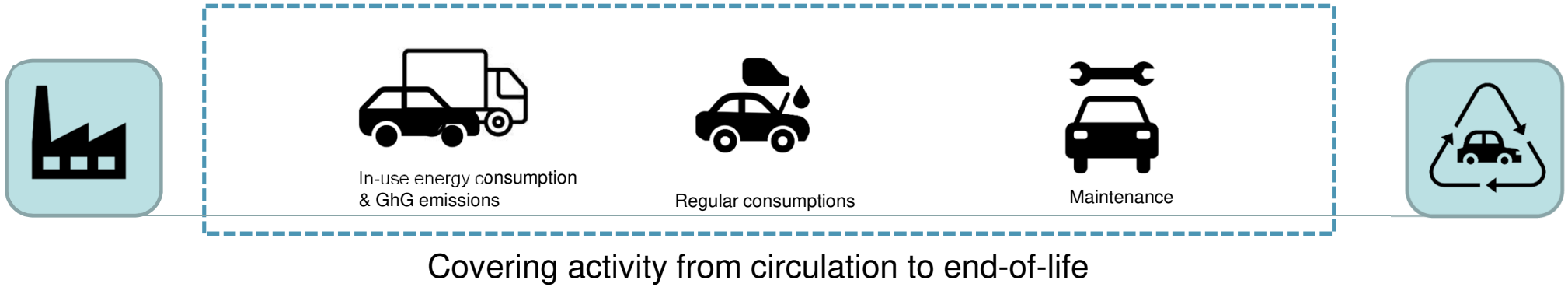
SG4 Boundaries

- Agree on vehicle types type/powertrains to be included
- Define service life (OEM or Default)
- Agree on databases – acceptable data sources - standards
- Define maintenance frequency

Proposed boundaries



Covering activity from circulation to end-of-life

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SG4 Scope & Boundaries Definition

- Ricardo proposes to use real driving values
- UTAC proposes that for Europe the existing OBFCM data can be used.

Use Phase Values

- JRC suggests to enlarge the scope and consider the charging efficiency
- ICCT propose to discuss energy efficiency topic also with SG6, and define lifetime use (duration and not only distance). Take into account the lifetime in the registration country but should also take into account lifetime outside the registration country.
- Green NCAP shares the same view of ICCT

Lifetime usage

- Japan suggested that the use phase parameters should be region specific and contracting parties should decide. Also lifetime and distance should be for the CPs to consider.

SG4 Scope & Boundaries Definition

Other Emissions

- RICARDO wants to include: (1) GHG emissions not directly related to fuel consumption - i.e. fugitive emissions/leakage (storage only), or from emissions aftertreatment (e.g. N2O); (2) emissions resulting from use of Urea in SCR systems (direct emissions, plus production of Urea); (3) other aspects besides remaining parts (i.e. consumed fluids, etc.).
- Green NCAP proposes to use dependent factors such as lubrication/oil consumption or other consumption. The lack of these factors and battery durability can negatively affect the methodology.

Other

Draft CO_2eq Calculation (JRC)**

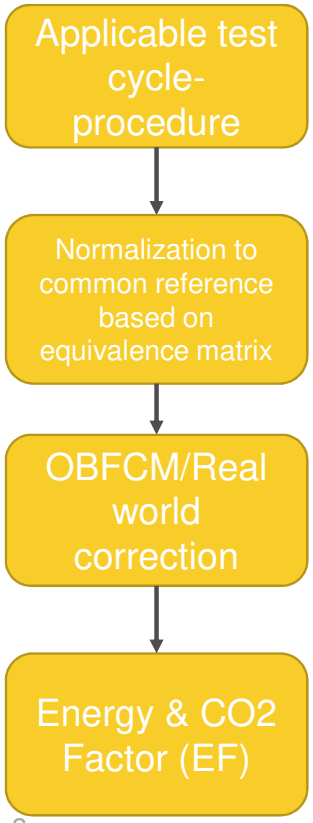
Lifetime GhG [CO2eq] = GhG [CO2eq] * total average distance [km] + Maintainance * occurrences + waste (total)

GhG [CO2eq.] (g/km) = Energy consumption (MJ/km) * Factor SG6 + Fuel Energy Consumption (g/km) * 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 (?)

** Important to define levelling concept [lvl1, lvl2, lvl 3,lvl 4] and the data sources

Fuel Consumption/Efficiency



Equivalence matrix (for positive energy demand & mean efficiency)

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

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

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?
- If yes, then lower levels should have more conservative values to encourage measurement/data provision
- Other boundaries to be included?

SG4 Meeting Schedule Plan

June	July	August	September	October	November
26th – SG4 1st meeting	-	Summer Break	-	10th – SG4 4th meeting	7th – SG4 4th meeting
	10th – A LCA 9th IWG		7th – A LCA 10th IWG	17/18th – A LCA 11th IWG @BRU	
	11th – SG4 2nd meeting		21st – SG4 3rd meeting	-	

Appendix

Levels concept of Use Phase

+Flexibility need for conservative estimates

Generic global factors- technology-specific

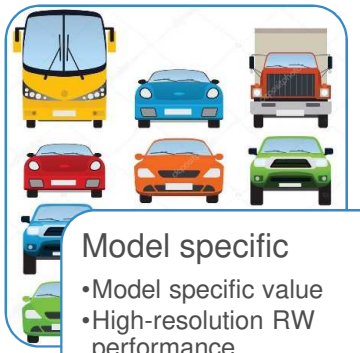
- Tech-type
- Energy carrier / fuel
- Average use

Region & Technology Specific

- Europe
- USA
- Japan
- +elements of level 1

OEM

- OEM–level resolution and assumptions regarding real world performance
- Specific region/country
- +elements of level 2



Model specific

- Model specific value
- High-resolution RW performance
- +elements of level 3

Standard approaches in existing LCA tools

+ Precision case-specific, data intensive

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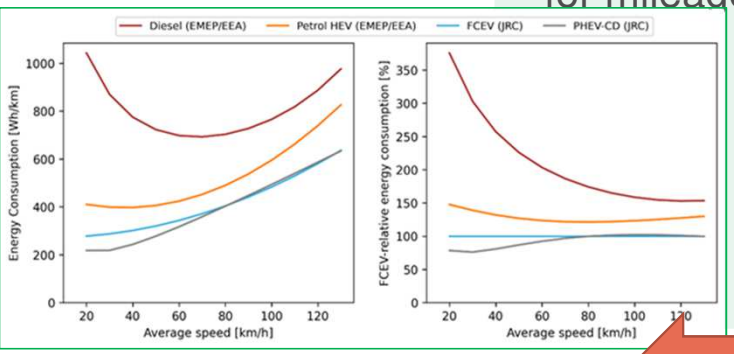
Level Concept for SG4

EF* Global	EF* Region / Country	OEM-specific	Vehicle Specific
Average Consumption / Efficiency Generic assumptions for mileage	EU guidebook US Moves / CARB JP? →need for normalization to allow comparisons	Certification Cycles based → normalized to common reference • RW corrected at OEM level • Real world window • Correlation factors between different regions	As OEM specific but on vehicle model level • Validated?



Source: EC JRC

+Simpler more conservative

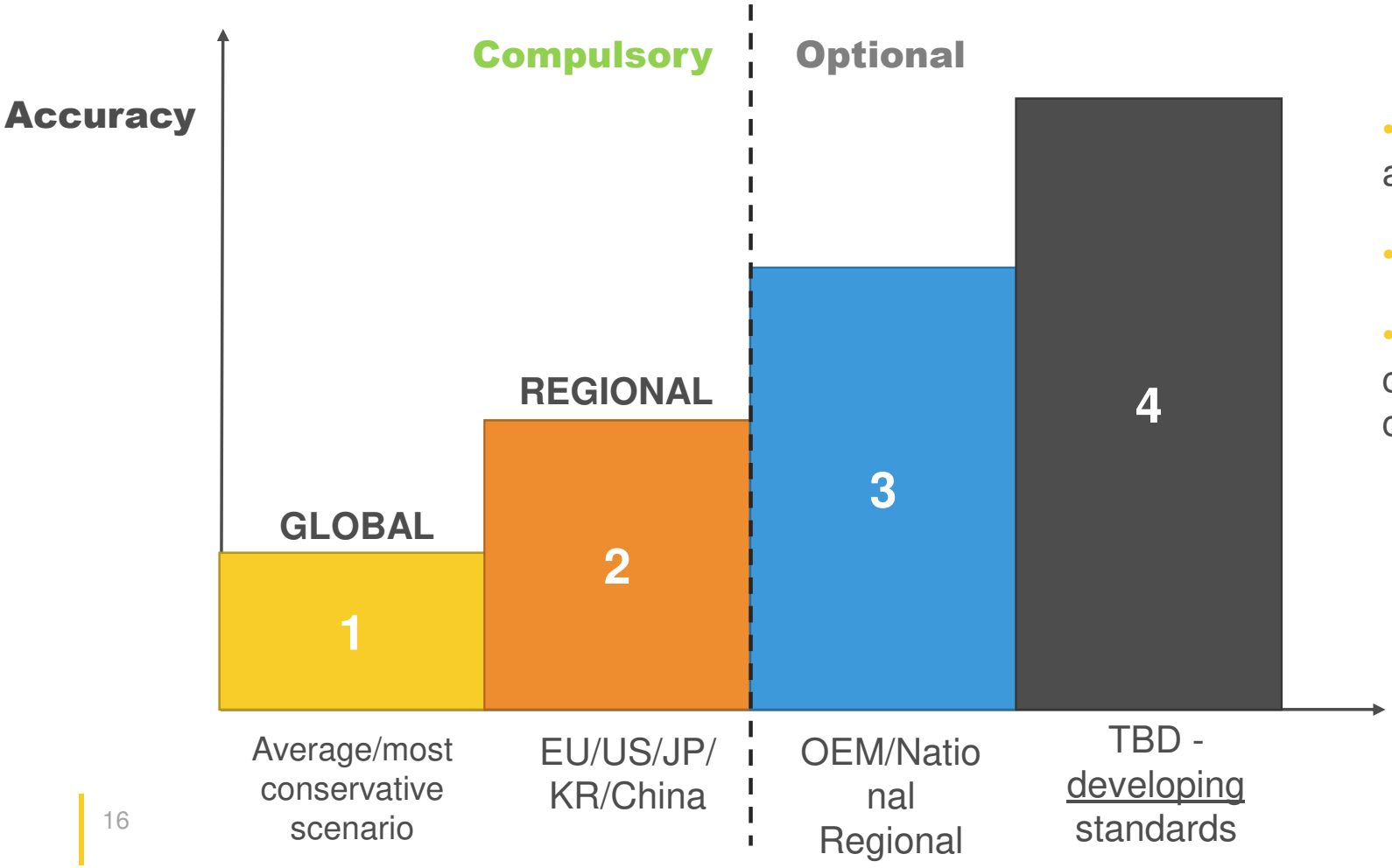
+ Detailed more representative

*EF = Emission Factor / Energy consumption Factor

SG4 Members' Comments

- For Ricardo, ICCT, Green NCAP cross comparison of different level is an issue and the proposed level concept from Korea does not allow cross comparability or mixing of different criteria from two different levels. Comparing means having one methodology with different levels of resolution.
- ICCT wants powertrain discrepancy at all levels.

Levels concept of Use Phase



- Decide what is compulsory and what not
- Chose a methodology (how)
- Work in parallel to develop a compulsory minimum conservative approach

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Open questions

- Definition of boundaries eg pump to wheel, charger to wheel etc
- Definition of exact scope
- Data availability (EU: certification data per vehicle version, and real world performance will be available)
- Other in use parameters to be covered eg mileage, maintenance
- Default/Generic methodologies in different regions/countries?

Key Points

- Methodology can be built on existing standard approaches at simple level and allow for more precise estimates using available data
- Generic approach must encourage the use of more detailed approaches
- Need to agree on a common reference (WLTP?) for use phase emission evaluation
- Real-world figures based on validated/proven data
- Correlation matrix to standardize initial values for official real-world data
- Consider comparing efficiency instead of emissions due to higher share of Evs