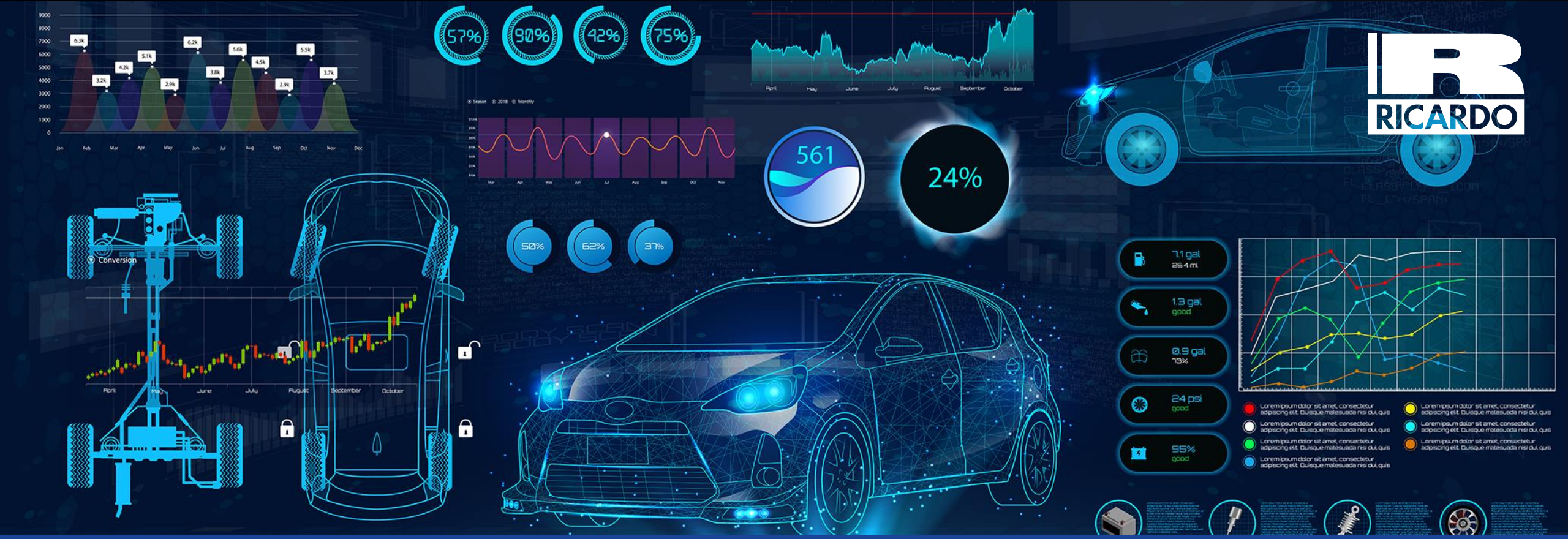

Ricardo – Potential application of LCA Levels concept to other lifecycle phases

Informal Working Group on Automotive LCA, 7th Meeting,
WEBEX, 23 May 2023

Background to the presentation of options for discussion on extending the ‘Level concept’

- Korea previously presented a ‘level concept’ for automotive LCA at previous IWG meetings covering the production phase (raw material, parts production, vehicle production):
  - Others were invited to help further develop ideas for how the concept might be applied to other phases
- Ricardo have considered ideas for how the concept might be extended to other lifecycle phases; **please note**:
  - These are conceptual / for discussion, not fully developed or final
  - Considering the use phase, fuel/electricity production and EoL phase necessitates moving *beyond* foreground data from the OEM perspective, and consideration of mainly background data/methodologies
    - HOWEVER, some of these aspects are fundamental/in some cases the **most important** in determining overall lifecycle impacts of the vehicle. Therefore it is appropriate to prioritise/set minimum criteria even for Level 1 for key elements (data and methodologies) that have a major impact.
  - The ‘Levels concept’ is considered also for wider use including internal reporting/strategy and policy analysis, not only discrete reporting (e.g. for regulatory compliance or to customer as ‘single value’ results)
- **Further discussion is needed** within the IWG and SGs to explore/expand on the details, which level different elements might best be placed, and what aspects might work *or* not be practicable for the guidelines

Thoughts on vehicle specification and possibly extending specific LCA to different vehicle configurations/variants

Colour key:
OEM foreground
Vehicle variant specific reporting
Informing internal strategy or policy analysis

- For all LCA applications it is necessary to define the product; this might be a generic example (e.g. LCA oriented at simple, policy or fleet-level analysis) or a specific product in a 'typical' configuration, but:
  - Results can be highly influenced by the specific vehicle configuration, e.g. battery size, energy cons./CO_2
  - Consumers (and potentially regulators) may want results tailored to their specific vehicle configuration
- Might the 'Levels concept' be also extended to this dimension, or does this best sit separately?
  - For discussion, possible ideas below on how it might be applied to provide more specific results:

Level	Potential assessment methods / items for development by SG
Lv.1	• Generic /average product or simplified model
Lv.2	• Specific 'typical' variant for model: define how the 'typical' vehicle model configuration should be chosen

Lv.3	• Adds specific accounting for model variants /options [Foreground, Specific]:
	  • Define methodology/basis for accounting for variations for vehicle model variants/different configurations for production and EoL phases (e.g. simple blocks/extrapolations)
	  • Model-specific accounting for use-phase (e.g. regulatory values for energy consumption/CO_2)

Lv.4	• Adds more sophisticated accounting for model variants /options [Foreground, Specific]

?

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Potential options to apply the levels concept to the Use Phase

Level	Potential assessment methods / items for development by SG
Lv.1	• Define default operational cycles to be considered (also for relevant regions), e.g. vehicle specific energy consumption and CO_2 on driving cycles, e.g. WLTP or VECTO • Develop guideline for basis and coverage of emission components, and operation/maintenance aspects; e.g. for non-CO_2 GHG from exhaust or fugitive emissions (e.g. CH_4, N_2O, H_2), generic definition of default fluids and parts consumed/replaced, intervals, etc. • Define key sensitivities that should be considered (for policy/internal use), including accounting for real-world effects on energy consumption/CO_2
Lv.2	• Develop an approach for model-specific maintenance, part replacements and consumables • Define also approaches for alternative regional use cases and/or sensitivities
Lv.3	• Add manufacturer-specific accounting for real-world performance (i.e. from monitoring of products)? • Extend detailed LCA to provide specific accounting for model variants/configurations *[also production]* • Add sensitivities for other considerations e.g. battery 2nd life, V2G (or other consequential aspects)
Lv.4	• Develop guidelines for accounting for higher-resolution manufacturer-specific real-world performance accounting (i.e. from monitoring of similar existing products)

?

Potential options to apply the levels concept to the Fuel/Electricity Cycle

Colour key:
OEM foreground
Vehicle variant specific reporting
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Level	Potential assessment methods / items for development by SG
Lv.1	• Develop guideline for default generic datasets: ○ Simple regional energy mix for production, EoL ○ Simple **projections for changes in use-phase energy mix** (i.e. based on current policy)
Lv.2	• Develop expansion of approach to improve resolution and approach to regional mixes and sensitivities/scenarios (e.g. specific modelling of electricity generation mix / projections) • Alternative scenarios for energy mix
Lv.3	• Develop improved resolution/coverage of energy mix, projections and temporal accounting, etc. ○ Adds increased resolution for production energy mix/sources? ○ Adds more sophisticated modelling and/or customised energy projections for use-phase? ○ Adds temporal accounting for end-of-life energy mix?
Lv.4	• Develop guidelines for dynamic updates to modelling based on change in production and operational energy mix for specific year/period, etc.

Colour key:
OEM foreground
Vehicle variant specific reporting
Informing internal strategy or policy analysis

Potential options to apply the levels concept to the EoL Phase

Level	Potential assessment methods / items for development by SG
Lv.1	• Generic assumptions based on average current practice (or future expectations for forward-looking analysis)
Lv.2	• Develop scenarios for alternative EoL treatment scenarios (e.g. also accounting for second life/consequential aspects)? • Other?
Lv.3	• Adds more detail for some important parts (e.g. EV batteries)?
Lv.4	• EoL tailored to OEM-specific arrangements/plans • Link EoL treatment of specific vehicle/parts to Level 4 parts/material production • Sensitivities/analyses on future EoL treatment technologies /expectations factoring OEM design and integrated value chains

Thank you

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