

Proposal of level concept of Vehicle cycle for A-LCA evaluation approach

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Proposal of level concept for Vehicle cycle

▪ Proposal

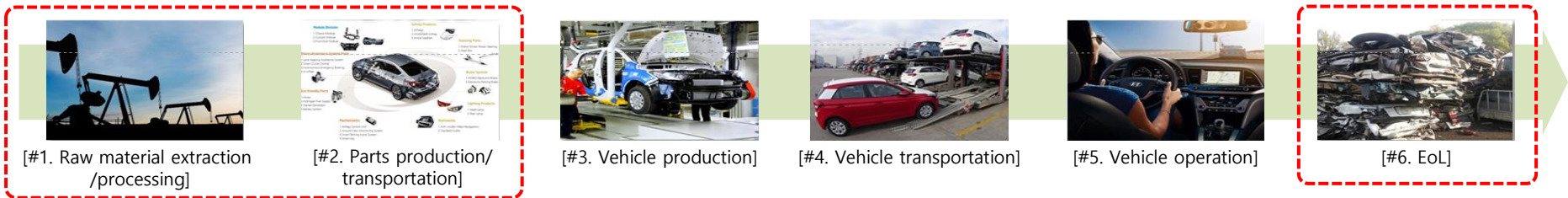
We propose that A-LCA IWG can establish **the guideline for several levels of carbon footprint (CFP) evaluation methodology ("level concept")**, where each level is suited for certain application as well as can be performed depending on the availability of data. They can be all compliant with the guideline but just in different level

▪ Background of the proposal

1. Limitation of Simplified LCA : Excluding supply chains and using mainly secondary data makes it difficult to verify a company's carbon reduction efforts

2. Challenges of immediate application of full LCA

• Challenges in evaluating carbon footprint beyond the direct control of automotive OEMs : The carbon emissions from the stages of raw material extraction/processing, parts production/transportation, and end-of-life (EoL) are reliant on external data sources



• Difficulty in setting system boundaries due to the complexity of the supply chain : Due to inherent complexity of automobiles and multitude of supply chains involved, it is not possible to track carbon emissions for the entire supply chain

• Difficulty in establishing data quality : Significant disparity in preparedness of countries and companies for not only establishing methods for verifying temporal, spatial, and technological reliability of data, but also real-time data management systems

• Lack of standards or guidelines for assessing carbon footprint of parts : While some automobile parts such as tires and batteries have established or planned standards for calculating their CFP (e.g. PCR), the majority of automobile parts lack such standards

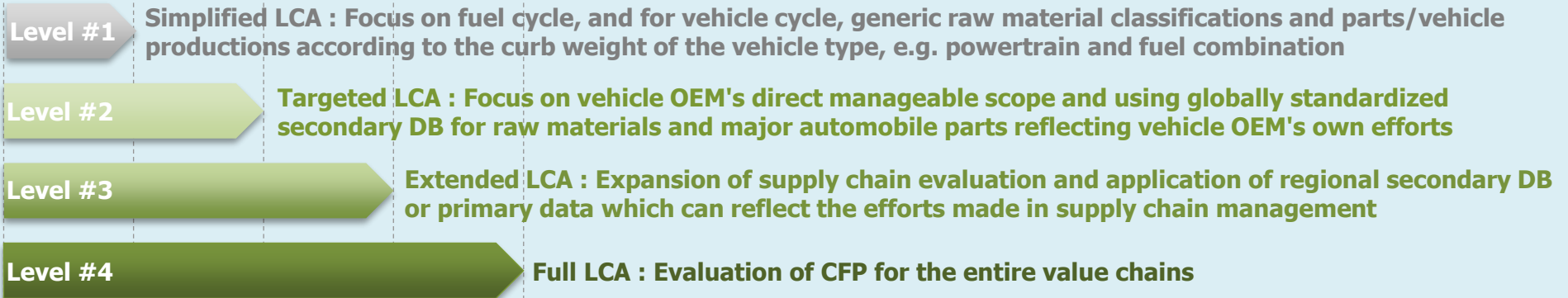
Proposal of level concept for Vehicle cycle

▪ General ideas of level concept

1. Provision of FOUR levels of carbon footprint evaluation for automobiles

- Evaluation of CFP related to vehicle OEM's manageable scope/supply chains **classified into levels** based on boundaries and data quality, encouraging stakeholders to choose level that is appropriate for their individual circumstances

❖ (Example) Level concept



2. Report of CFP results

- When disclosing assessment results of CFP following the A-LCA guideline, the level should be reported simultaneously
- The goal is to encourage both vehicle OEMs and supply chains to refine CFP evaluation system as well as to reduce environmental impact, but at an affordable manner

3. Expected effect

- CFP management systems of automotive industry are expected to be gradually promoted to enable higher levels of CFP evaluation

Level concept of vehicle cycle in detail

- **From practical and/or regulatory point of view, different levels can be selected for proper applications with different intentions**
- ✓ **Level#1 (Simplified LCA)** : Focusing on evaluating GHG emissions from a fuel cycle and a generic model vehicle
- ✓ **Level#2 (Targeted LCA)** : Focusing on precise evaluation of GHG emissions within vehicle OEM's manageable scope to incorporate the OEM's own efforts to reduce carbon emissions on a specific vehicle
- ✓ **Level#3 (Extended LCA)** : By extending the assessment of GHG emissions to supply chains, vehicle OEM's initiatives to reduce GHG emissions beyond its management scope could be demonstrated
- ✓ **Level#4 (Full LCA)** : Assessment of GHG emissions for the entire value chains

Level	Assessment Methods			Note
	Raw material	Parts production	Vehicle production	
Lv.1	<ul style="list-style-type: none"> • Proportional evaluation based on curb weight of vehicle • (Or) generic (relatively simpler) material composition and globally standardized secondary DB for raw material and parts/vehicle production 			<ul style="list-style-type: none"> ✓ Easily evaluated based on information that is publicly available ✓ Possible to provide consumers with information on GHG emissions during operation in terms of comparing vehicle fuels and powertrains
Lv.2	<ul style="list-style-type: none"> • Comprehensive material analysis based on IMDS • Material classification criteria and globally standardized secondary DB 	<ul style="list-style-type: none"> • Specific parts such as batteries • Application of globally standardized secondary DB 	Primary data	<ul style="list-style-type: none"> ✓ Promoting widespread adoption of A-LCA through implementing globally harmonized secondary DB ✓ Vehicle OEM's efforts to reduce GHG emissions (Scope 1 & 2) at the workplace could be reflected
Lv.3	<ul style="list-style-type: none"> • Comprehensive material analysis using the IMDS • Application of regional secondary DB or primary data/LCA results from raw material suppliers 	<ul style="list-style-type: none"> • Specific parts which have product category rule(PCR) • Taking into account LCA results of parts 	Primary data	<ul style="list-style-type: none"> ✓ Level3 would be the most realistic and practical methodology until bottom-up approach is put in place ✓ Reflecting both efforts of vehicle OEMs and supply chains for reducing GHG emissions <ul style="list-style-type: none"> - OEMs : Being acknowledged for the use of environmentally-friendly materials, high-cost and low-carbon materials - Supply chains : Being acknowledged for the improvement of manufacturing processes for parts and other related efforts
Lv.4	<ul style="list-style-type: none"> • Incorporation of LCA results of raw material suppliers 	<ul style="list-style-type: none"> • The entire supply chains • Taking into account LCA results of parts 	Primary data	<ul style="list-style-type: none"> ✓ The most ideal approach for evaluating GHG emissions produced by automobiles * This requires not only establishment of a real-time GHG emissions management system but also participation of global supply chains

Thank you!!

Appendix

▪ Regarding stage of raw material extraction and processing

✓ Establishing classification criteria for raw materials and gradually refining the carbon emission factors for each material

* It is being considered that primary data could be available in the near future, as product LCAs are being rapidly conducted due to the fact that most raw material suppliers are global companies

01

✓ Minimizing evaluation of pre-manufacturing stages of vehicles

- e.g. Calculation based on the generic vehicle and material composition with certain type of fuel/powertrains and the CFP proportional to the vehicle curb weight

▼ + Analysis of raw materials

02

✓ Establishment of criteria for classifying raw materials and determination of carbon intensities for each raw material (classification for raw materials: IMDS)

- e.g. PCR Draft Appendix I of Japan(A-LCA-03-04_PCR_draft)

▼ + Regional-based secondary DB and primary data partially

03

✓ Use of regional GHG emissions of raw materials + recognition of primary data

- Use of secondary DB of raw materials by country and region is given priority
- Use of primary data accepted if supporting documentation is provided

▼ + Mainly based on primary data

04

✓ Primary data has priority over other data sources

- Public disclosure of usage rate between primary data and secondary DB
(e.g. 49% usage of secondary DB)

Appendix

▪ Regarding parts manufacturing stage

- ✓ Starting with reflecting high-carbon emitting parts to establish vehicle parts LCA system and then expanding to cover all parts for a full bottom-up approach
- * In order to facilitate the coverage expansion, support for development of vehicle parts LCA calculation/database system might be necessary

01

✓ Minimizing evaluation of pre-manufacturing stages of vehicles

- e.g. Calculation based on the generic vehicle and parts production with certain type of fuel/powertrains and the CFP proportional to the vehicle curb weight

▼ + Incorporation of major parts in the assessment

02

✓ Select parts with high carbon intensities in the production stage and use of secondary DB for reflecting their GHG emissions

- e.g. PCR Draft Appendix I of Japan(A-LCA-03-04_PCR_draft)

▼ + Expanding the scope of parts application vertically

03

✓ Including carbon intensities of parts that have PCR or LCA regulations

- CFP of the parts determined by cradle-to-gate LCA results based on relevant regulations
- Other parts are following level 2 approach

▼ + Applying to all parts using bottom-up approach

04

✓ Applying total GHG emissions of all parts using bottom-up approach

(Raw material suppliers → Tier-n → Tier 2 → Tier 1)

- Incorporating cradle-to-gate GHG emissions based on LCA for all parts into the vehicle