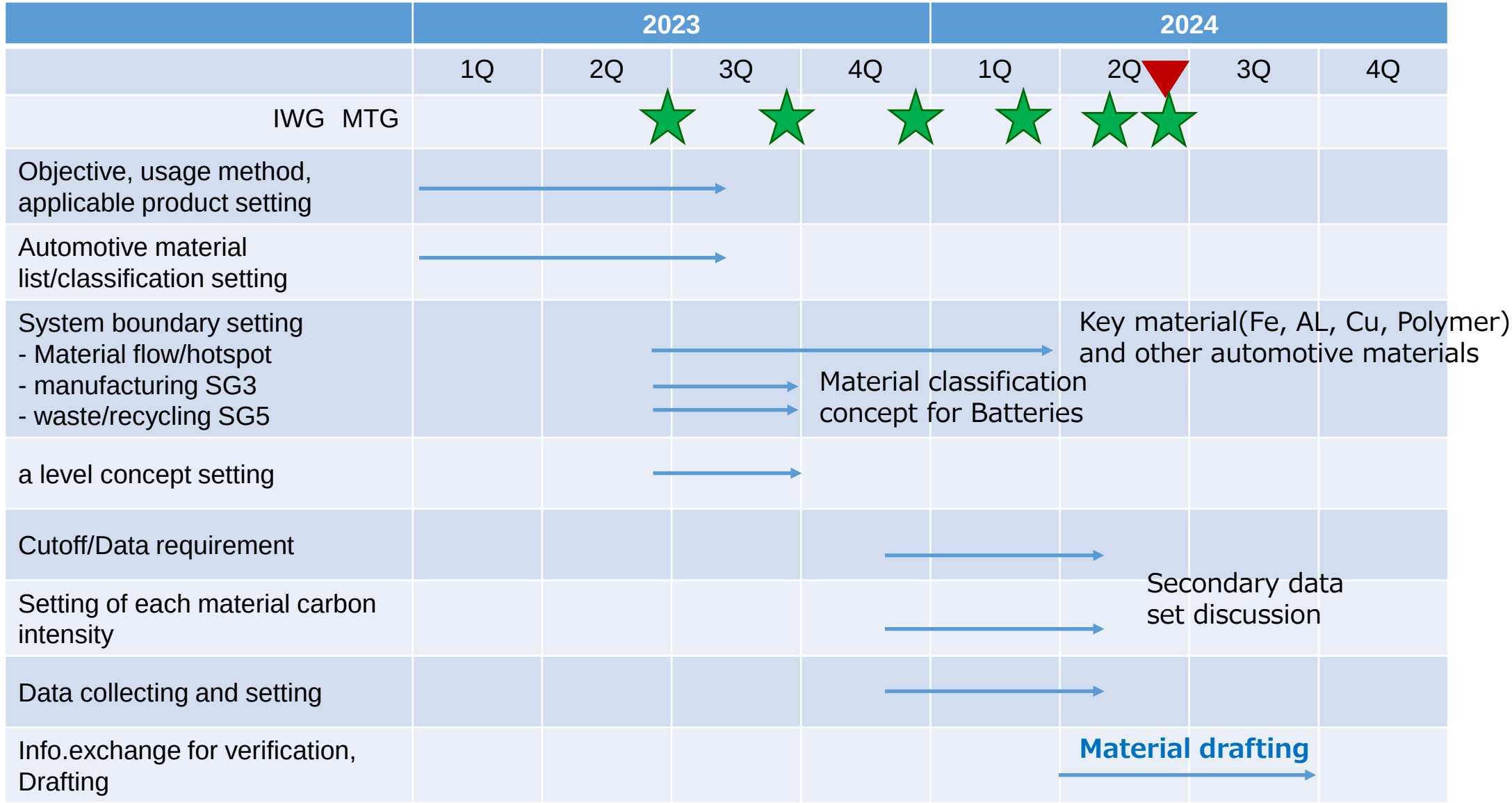
A-LCA IWG MTG

SG2　Drafting preparation

Toru Furusawa

26th Sep 2024

Overall schedule



SG2 Discussion topics

Topics	Contents
Aluminium boundary	Revise Aluminium system boundary referring to IAI,EU Aluminium institute, SG2 member comment
Leather	Add leather to material list, referring to its EPD PCR
Material calssification	How to connect the detailed, complex material nomenclature (ISO・EN・IMDS) to the proposed LCA representative material classification
Other materials	List up vehicle materials flow diagrams while referring to commercial DB(Ecoinvent, Gabi, IDEA, and China CFP)
Battery	Discuss a boundary between material and parts manufacturing in the cell production process
Allocation, mass balance	Allocation、ISO14067 、SG2-SG3
	Chain of custody, ISO22095、13662
Database	How to derive carbon intensity in commercial database
Drafting	A proposal of material drafting contents

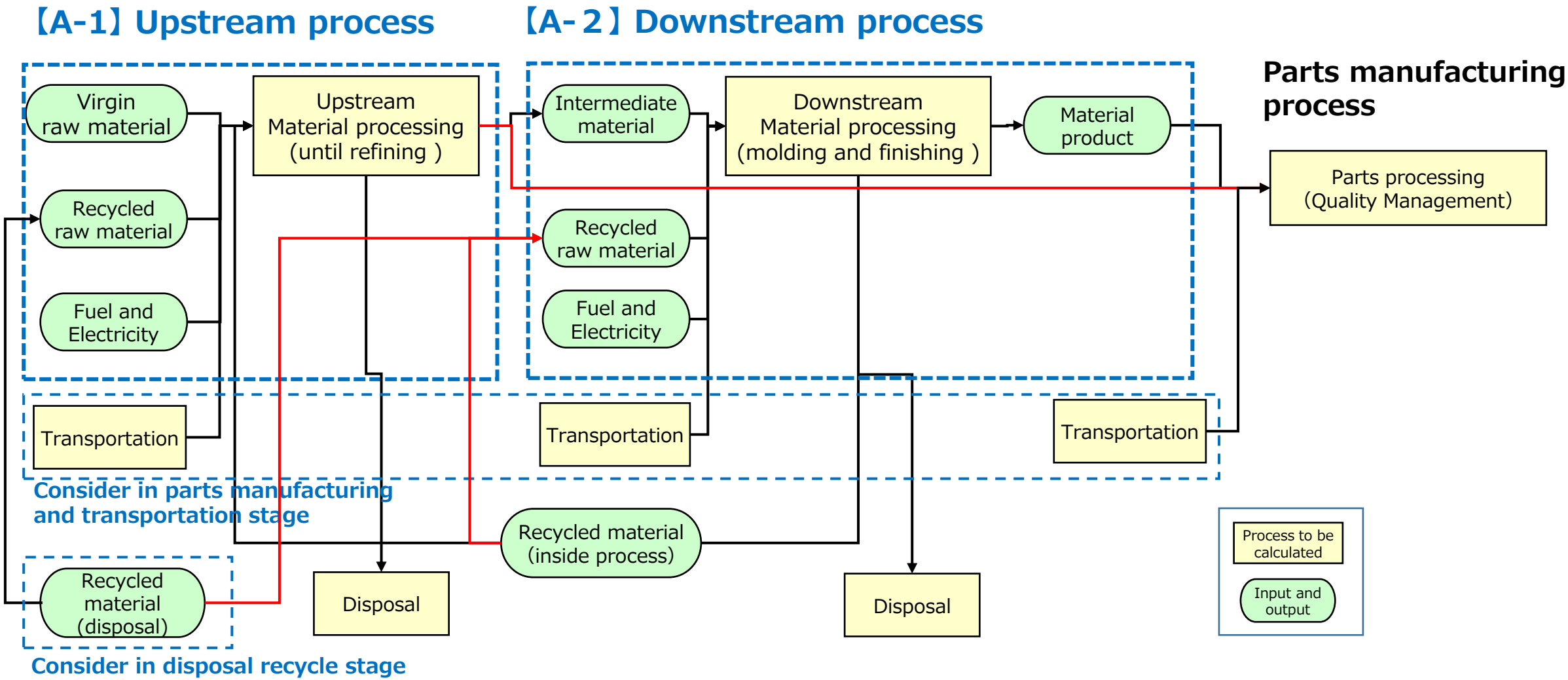
Drafting contents

- Material system boundary
- Data collection categories
- Primary data collection category
- Secondary data collection category
- Scenario
- Appendix (to be prepared)

  - materials list table (material name, GHG intensity, example of DB UUID)

  - materials system boundary (flow diagrams for automobile CFP)

Material system boundary



(- redline: added 18thSep)

Material system boundary

Material production stage is outlined below.

[A1] Processes related to material mining, refining, and impurity removal (defined as upstream processes)
[A2] Processes related to material production (defined as downstream processes)

The purpose of automobile LCA material boundary is to enable related stakeholders to reflect technical evolution of material production process towards future carbon neutrality.
From a viewpoint of a high usage weight ratio or a high CFP sensitivity in automobile composed material, system boundaries of some dominant materials (iron, aluminum, copper, and plastic) are defined, referring reports from international material institutions.
As for other materials used in an automobile, system boundaries are referred by reliable industrial LCA evaluation documents and database.

These materials production stages are roughly divided into two processes, ‘upstream process’ which has mining, refining, and impurity removal with high CO_2 sensitivity. Then, ‘downstream process’ which has from its semi-material stage to the material product stage for the parts manufacturing process in automobile OEMs.
Especially, regionality of material production and recycled material usage ratio greatly affect on GHG amounts, which should be taken dominant unit process into account.

Data collection category

Data shall be collected for the categories outlined below.

[A1] Processes related to material mining, refining, and impurity removal (defined as upstream processes)
•Types of processes defined in Appended figure X
•Material input weight and blending ratio (usage rate of recycled materials and bio-derived materials)
•When using recycled raw materials and applying the circular footprint formula (CFF), refer to the CFF parameters
•Country of origin, country/region of processing, usage amount of fuel and electricity, and rate of renewable energy
•GHG emission factors related to upstream processes

[A2] Processes related to material production (defined as downstream processes)
•Products being used defined in Appended figure X as well as the types of processes related to their production
•Material input weight and blending ratio (usage rate of recycled materials and bio-derived materials)
•When using recycled raw materials and applying the circular footprint formula (CFF), refer to the CFF parameters
Country/region of processing, usage amount of fuel and electricity, and rate of renewable energy
•GHG emission factors related to downstream processes

Primary data collection category

Primary data is preferred over secondary data to improve accuracy and to reflect material technical evolution.
In principle, material information in the International Material Data System (IMDS), which is commonly implemented across the automotive industry over the world, should be collected as primary data.

[IMDS material data]

•Material name, VDA classification, material number, applicable amount, material weight, and basic substance information

At the same time, going up the supply chain of the upstream processes in the upper reaches of a material to obtain primary data has a high CO_2 reduction effect and can reflect corporate efforts even though still being in the developmental stage.
It is therefore recommended to obtain primary data of the categories in [A1] and [A2] outlined below, and secondary data can also be used.

[A1] Processes related to material mining, refining, and impurity removal (defined as upstream processes)

•Types of processes defined in Appended figure X
•Material input weight and blending ratio (usage rate of recycled materials and bio-derived materials)
•Country of origin, country/region of processing, amount of fuel used for electricity, and rate of renewable energy

[A2] Processes related to material production (defined as downstream processes)

•Products being used defined in Appended figure 1, Appended figure X as well as the types of processes related to their production
•Material input weight and blending ratio (usage rate of recycled materials and bio-derived materials)
•Country/region of processing, amount of fuel used for electricity, and rate of renewable energy

Secondary data collection category

The categories outlined below shall be collected as secondary data.
The default values in the Appendix can be used, and data collected independently by the party carrying out the calculation can also be used.

[A1] Processes related to material mining, refining, and impurity removal (defined as upstream processes)
•Weight of each raw material and blending ratio (when using a specific scenario model for calculation)
•When using recycled materials and applying the circular footprint formula (CFF), refer to the CFF parameters
•GHG emission factors related to upstream processes

[A2] Processes related to material production (defined as downstream processes)
•Weight of each raw material and blending ratio (when using a specific scenario model for calculation)
•When using recycled materials and applying the circular footprint formula (CFF), refer to the CFF parameters
•GHG emission factors related to downstream processes

Scenario

[A1, A2] guideline and scenario related to material production

•For material classification, the material classification in Appended table X **with sensitivity of 1% or higher for per vehicle CO_2** should be used, referencing the IMDS sheet of the representative vehicle.
•Each material should be aggregated under the closest classification in Appended table X. Separate consideration should be taken if it is found that there are materials not found in Appended table X with a sensitivity of 1% or higher.
•The yield rate during material production is set as being included in material intensity. When calculating CO_2 during material production, **calculation is carried out by multiplying the material intensity by the product weight for each material and reciprocal of the yield rate during part processing.**

•For secondary data of key materials, the upstream and downstream **processes should be consistent with** Appended figure X, Appended figure X.
•For battery materials, the secondary data extracted from Greenhouse gases, Regulated Emissions, and Energy **use in commercial Inventory Database** (ex. GREET), which allows convenient use of a lot of battery material data with high reliability. The values in Appended table X can also be used as secondary data of battery materials.
•For other materials and individual materials of parts, **cite secondary data from existing databases and documents with high reliability, and state the source** in Appended table X. The values in Appended table X can also be used as secondary data of other materials and individual materials of parts.

•Processes shall have connection to the existing processes in commercial Inventory Database (ex. Ecoinvent, Gabi, IDEA etc.) , which have transparency and reliability with data process and quality information. Beside they are capable of being used with software tools. **However, as electricity locality and usage ratio of recycled materials depend on the user, companies can conduct their own modeling calculations**.

Appendix. Material list table

Material or part name		GHG intensity ($kg\text{-}CO_2e/kg$)	Source Database product code
Iron	Cast iron	X.X	Ex. 221115201pJPN, IDEA
Iron	Cast steel	X.X	Ecoinvent…
Iron	Hot-rolled steel sheet	X.X	
Iron	Cold-rolled steel sheet	X.X	
Iron	Electromagnetic steel sheet	X.X	
Iron	Hot-rolled hot-dip galvanized steel sheet	X.X	
Iron	Hot-rolled electro galvanized steel sheet	X.X	
Iron	Cold-rolled hot-dip galvanized steel sheet	X.X	
Iron	Cold-rolled electro galvanized steel sheet	X.X	
Iron	Carbon steel bar/wire rod	X.X	
Iron	Special steel bar	X.X	
Iron	Special steel wire rod/spring steel	X.X	
Iron	Stainless steel sheet/bar	X.X	
Iron	Sintered steel	X.X	
Aluminum	Cast aluminum alloy (wheels)	X.X	
Aluminum	Cast aluminum alloy (excluding wheels)	X.X	
Aluminum	Die-cast aluminum alloy (powertrain)		
. . . .	. . . .		

Example

Appendix. Material system boundary flow diagram

Aluminum