Feedback to material classification

23rd Nov 2023

Opinion from OICA to the material classification

- Basically, OICA agree to JASIC's steel, aluminium, copper and plastic classification.
- However, we have some opinions and a concern on this classification and calculation formula.

Opinions

1. Every material (Steel / Aluminium / Copper / Plastics) should have each flow diagrams reference.
   - Aluminum recycle input should also in lower process (melting process)
2. Each scrap (Internal, Home, External manufacturing scrap(PIR), EoL scrap(PCR)) should have flow image in flow model.
   - ✓ This subject should be discussed with SG5 (and maybe with SG3)
3. Loss rate should be yield rate on formula (But keep scrap / loss rate as the reference for another objective)
   - ✓ This subject should discuss also with SG3 and 5
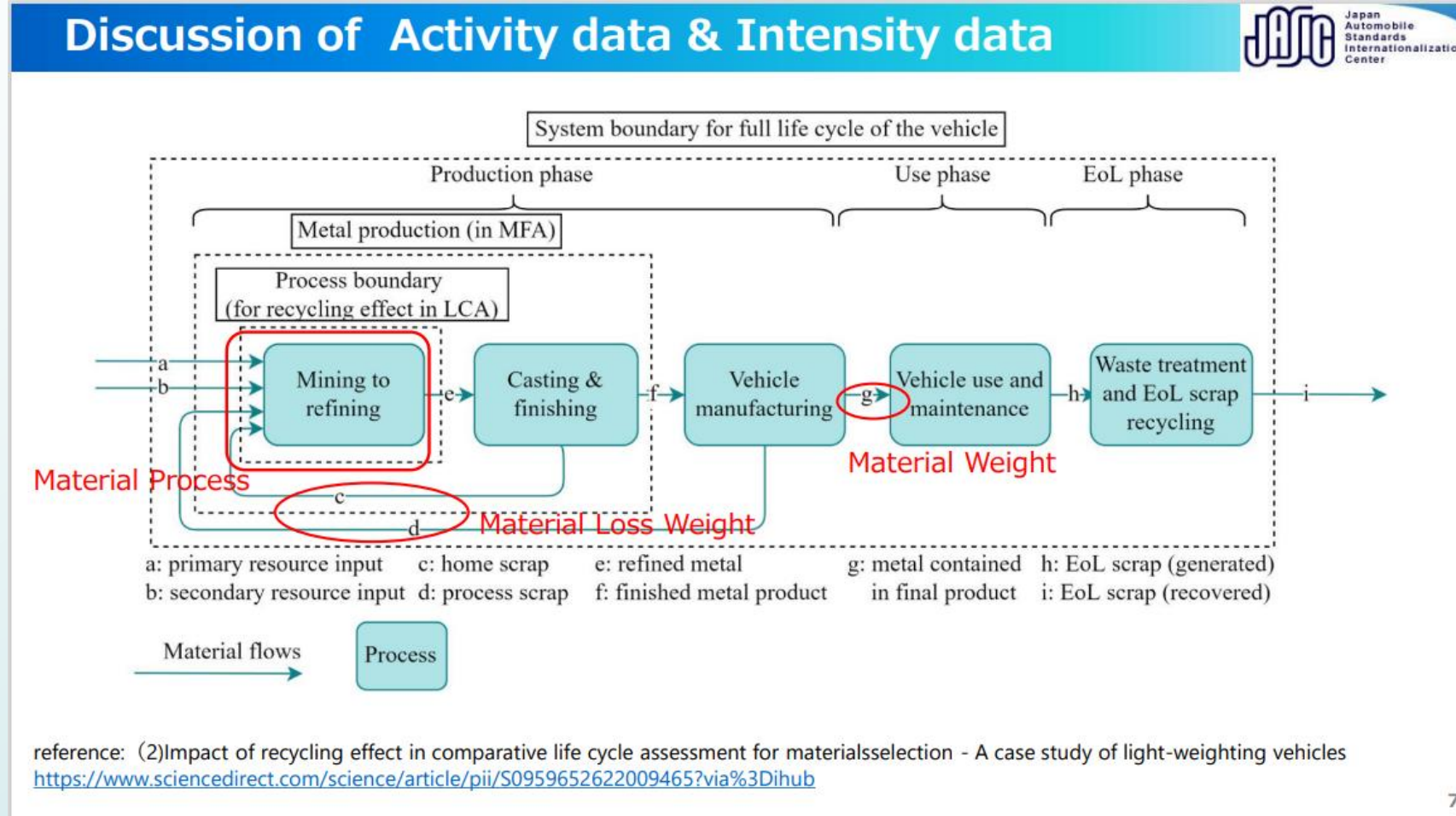4. Aluminum process 2 and 3 also should be named Electrolysis process like as 1.

Concerns

1. We don't have visibility and fairness on how to choose material classification.
   - We also think cutoff for the material classification should be clarified.
2. We are wondering what is the assumption of each upper and lower process. We would like to JASIC member to clarify each route.
   - Also, we kindly request to leading team to invite each material expert to SG2 meeting.

Opinion1.Material flow reference

✓ We propose to have a reference of process on each material.(Like as below picture)
✓ Currently we could see only for steel but should have also for other materials.

Discussion of Activity data & Intensity data

reference: (2)Impact of recycling effect in comparative life cycle assessment for materialsselection - A case study of light-weighting vehicles
https://www.sciencedirect.com/science/article/pii/S0959652622009465?via%3Dihub
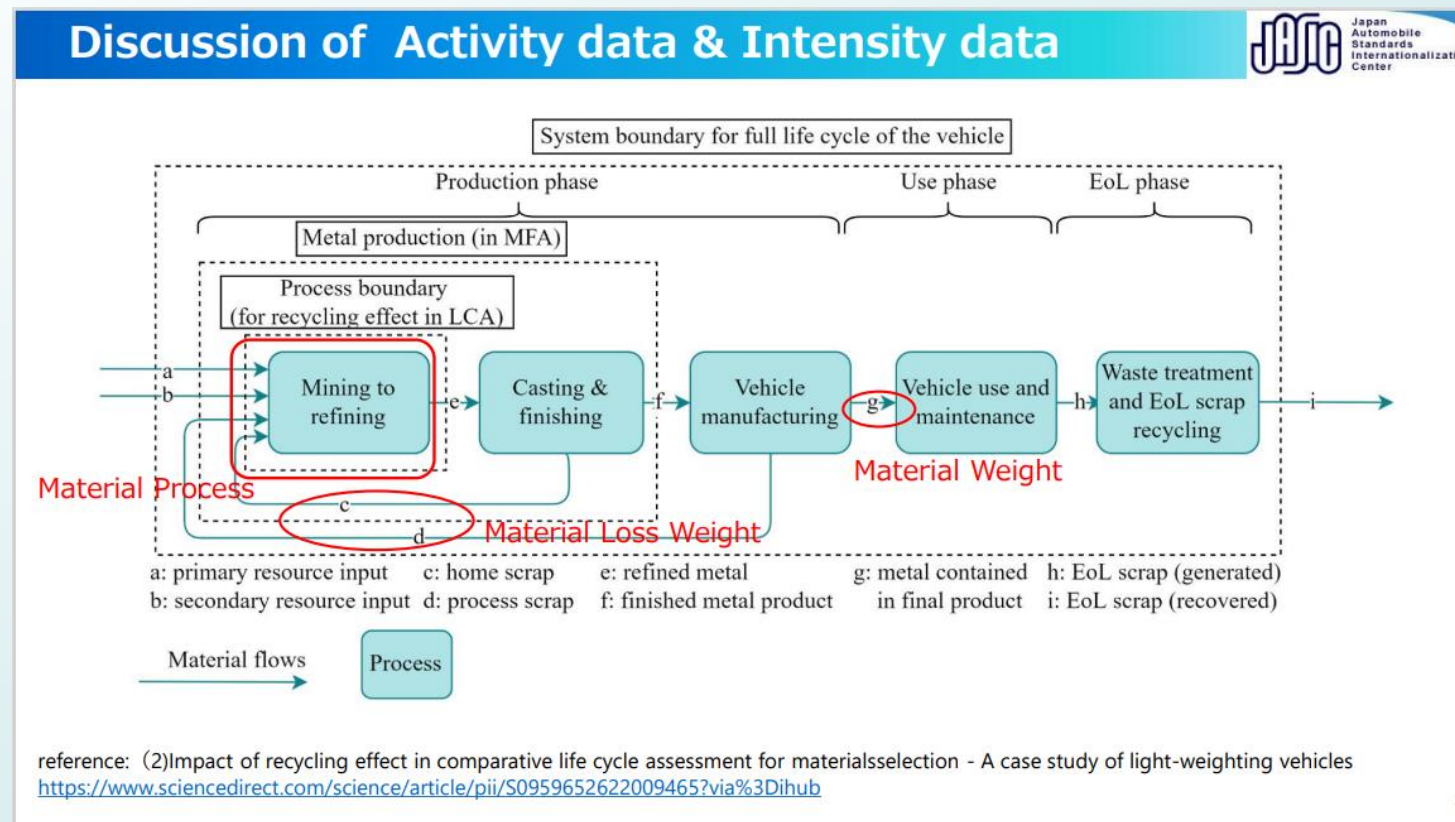
Opinion1.Material flow reference

✓ Why we are proposing this is we think Aluminum recycle input should also in lower process (melting process) (We would like to hear an opinion from Aluminum industry.)
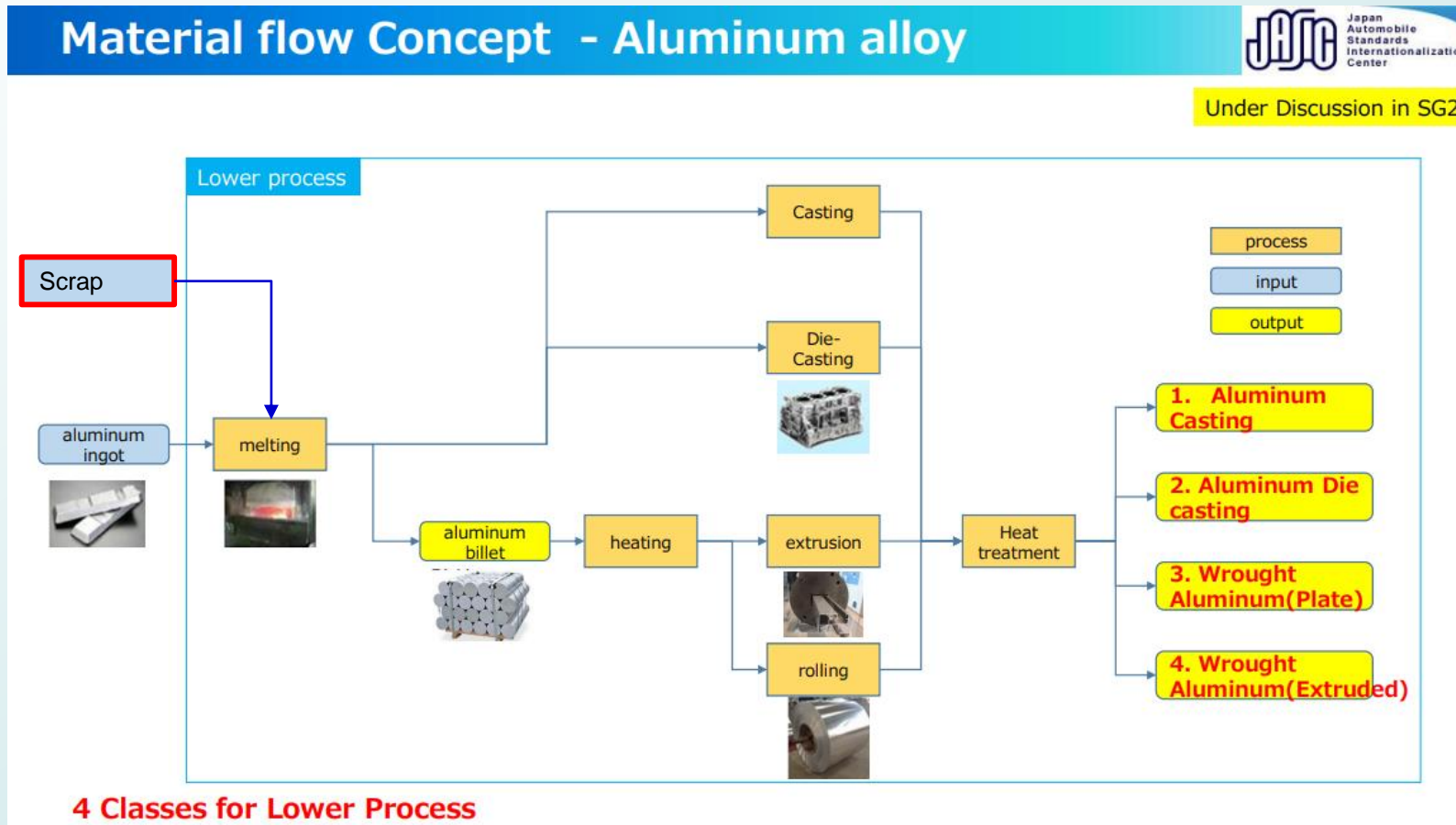
Opnion2.Scrap flow

✓ We propose to add scrap flow to the process model.
✓ However, we understand scrap flow needs to be confirmed with SG5 as boundary discussion.

- Reference model has scrap flow. We propose to add such flow definition on process model.

Opinion3. Loss rate on formula

✓ We think loss rate on the calculation method formula looks yield rate

→ Otherwise, if we use loss rate value, then M (Material mass) could be thousand times of M0 (product weight) value

✓ However, we would like to keep loss rate / scrap rate for another objective. We assume these are necessary to have discussion with SG3 and SG5.

Calculation method

Not yet Discussed SG2

$$CFPm = \Sigma(M \times I)$$

$$M = M0 \div (L1 \times L2 \times L3 \times \cdots Ln)$$

$$I = Re \times (Ir + Ier \times Ie) + (1 - Re) \times (Iv + Iev \times I \ldots)$$

<Primary data>
Lv1: none
Lv2: **M0**
Lv3: **Ln, Re, Ie**
Lv4: **Ir, Ier, Iv, Iev**

These loss rate should be yield rate. (Y1, Y2, Y3…Yn)

CFPm : Carbon FootPrint for Material Acquisition Phases [kg-CO2e]
M : Material Mass [kg]
I : Material Acquisition Carbon Intensity [kg-CO2e/kg]
M0 : Final product Material amount [kg]
Ln : Loss Rate of Production Phases [%]
Re : Recycle Rate [%]
Ie : Electricity Carbon Intensity [kg-CO2e/kWh]
Ir : Recycled Material Acquisition Phases Carbon Intensity wo Electricity effect [kg-CO2e/kg]
Iv : Virgin Material Acquisition Phases Carbon Intensity wo Electricity effect [kg-CO2e/kg]
Ier : Recycled Material Acquisition Phases Electricity Intensity [kWh/kg]
Iev : Virgin Material Acquisition Phases Electricity Intensity [kWh/kg]

8

Opinion4. Electrolysis process naming

✓ Aluminum process 2 and 3 also should be named Electrolysis process like as 1.
✓ Then, process 1 and 2 are same electrolysis process. (Both could be merged to one process.)
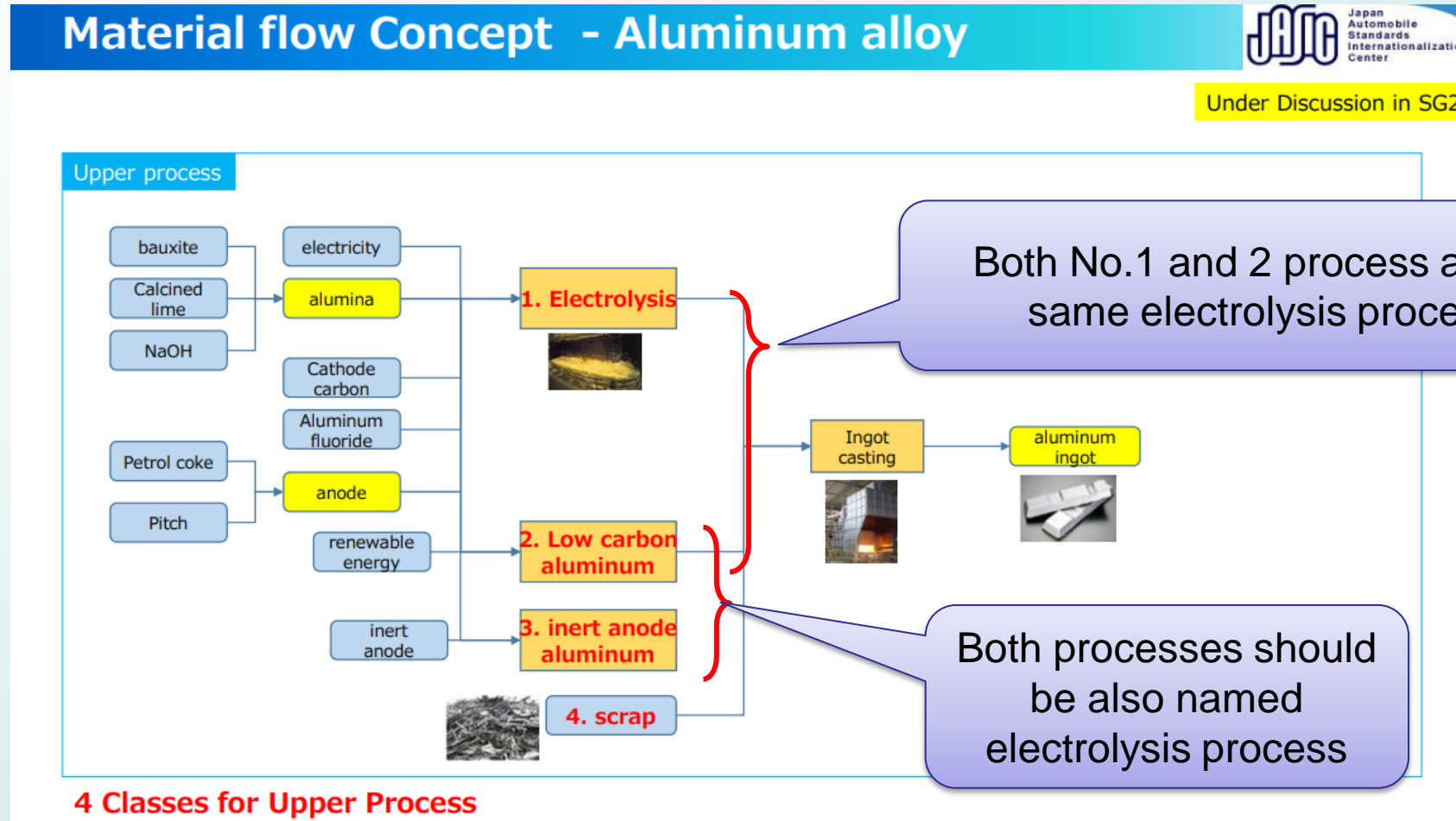
Concern1. Visibility and fairness on material selection

✓ We are wondering and concerning how we can make visibility and fairness on material classification.
✓ There is not explainable criteria or threshold on current weight and CO2e distribution evidence data.
✓ Also, we would like to discuss how we calculate cutoff material CFP.
➡If our concerns are agreed in SG2, we would like to propose 2 scenario of cutoff approach.

Steel

BEV

Material Classification	Wt(%)	CO2e(%)
Cold-rolled hot-dip plated steel sheet	22.9%	16.6%
Carbon steel bar/wire rod	13.5%	9.9%
Cold Rolled Steel Sheet	14.0%	9.0%
Special Steel Bars	7.6%	7.2%
Cast Iron	3.8%	4.1%
Hot-rolled steel plate	1.3%	0.8%
Hot-rolled hot-dip plated steel sheet	0.5%	0.3%
SUS steel sheet/bar	0.2%	0.2%
Electromagnetic steel sheet	0.0%	0.0%
Sintered steel	0.0%	0.0%

Matching tool

- ISO
- EN standards
   ↓
Material classification

Some of materials are selected even 0.0% of Wt(%) and CO2e(%)
➡OICA thinks we should agree a criteria and/or threshold in SG2.

Concern1. CutOff approach – scenario 1

	Material	% Weight in vehicle	% CO2e in vehicle	Carbon Footprint calculation / Data used	Cut Off rule
Scenario 1	Material 1	any %	10,00%	Material 1 EF*	The weight of materials [kg] is monitored and the EF [kg CO2e/kg] is defined in accordance with Levels definitions : average / secondary data or primary data
	Material 2	any %	9%	Material 2 EF	
	Material 3	any %	5%	Material 3 EF	
	Material 4	any %	2%	Material 4 EF	
	Material 5	any %	0,5%	Material 5 EF	
	Material 6	any %	0,3%	Material 6 EF	
	Material 7	any %	0,2%	Material 7 EF	
	Material 8	any %	0,15%	Materials not considered in the Carbon Footprint calculation	
	Material 9	any %	0,08%		

- **Threshold value** for cutoff approach is based on the % of Carbon Footprint / vehicle : **value 0,2% (to be confirmed)**
- **Scenario 1 Cut Off :** Below the threshold **the materials are not considered**
- **Disadvantage of the scenario : when computed the data at vehicle level, we may miss figures to calculate a consistent Vehicle Carbon Footprint**

*EF : Emission Factor kg CO2e/kg

INTERNAL

Concern1. CutOff approach – scenario 2

	Material	% Weight in vehicle	% CO2e in vehicle	Carbon Footprint calculation / Data used	Cut Off rule
Scenario 2	Material 1	any %	10,00%	Material 1 EF*	The weight of materials [kg] is monitored and the EF [kg CO2e/kg] is defined in accordance with Levels definitions : average / secondary data or primary data
	Material 2	any %	9%	Material 2 EF	
	Material 3	any %	5%	Material 3 EF	
	Material 4	any %	2%	Material 4 EF	
	Material 5	any %	0,5%	Material 5 EF	
	Material 6	any %	0,3%	Material 6 EF	
	Material 7	any %	0,2%	Material 7 EF	
	Material 8	any %	0,15%	(Material 8 + Material 9) EF average	The EF could be kept as secondary data as non prioritized perimeter
	Material 9	any %	0,08%		

- **Threshold value** for cutoff approach is based on the % of Carbon Footprint / vehicle : **value 0,2% (to be confirmed)**
- **Scenario 2 Cut Off :** the EF data of the materials below the threshold are computed all together.
- **Advantage of this scenario : the vehicle carbon footprint is complete**

Preferred scenario

*EF : Emission Factor kg CO2e/kg

Concern2. Assumption of each process

✓ Current process model image has several process in an image. Therefore, we cannot assume what is the actual assumption of each process route. We would like to JASIC member to clarify each route.
✓ After this route will be clarified, we would like to hear the opinion from each material industry expert.
✓ We kindly request to leading team to invite each material industry expert to SG2 meeting.