GRPE A-LCA IWG
SG5(EoL) Meeting 009

26th Mar. 2024

GRPE A-LCA IWG SG5
Leader ; Shoji Aoki (JASIC/JAMA),
Co leader; Zhang Tongzhu (CATARC)

Agenda

1. SG5 008 minutes & 009 agenda confirmation
2. EoL LCA discussion
   1) Material/Parts recycling modeling discussion
      -Each CPs and NGOs position
      -OICA CFF/RCM Pros/Cons study
      -CFF or RCM application condition
      Remark) Module D is under study in SG5 small meeting
   2) Other controversial topics discussion
      including EoL process modeling harmonization
3. Next action

Minutes of GRPE A-LCA IWG SG5 meeting #8

Date and time :Tuesday, February 22, 2024, 12:00–14:09 (CET)
Location : Online (Teams)
Attendees : See attendee list

Agenda:
1. SG5 007 minutes & 008 agenda confirmation
2. GRPE A-LCA IWG on 20th Feb. cascading
3. EoL LCA discussion
   1) EoL system boundaries and processes with activity data & Intensity data
      -US regional information sharing-
   2) Material/Parts recycling modeling discussion #5
   3) Other controversial topics discussion
4. Next action

Notes:

1. SG5 007 minutes & 008 agenda confirmation

•The minutes and agenda were approved unanimously.

2. GRPE A-LCA IWG on 20th Feb. cascading

•Mr. Aoki (JP/JASIC) reviewed what he had explained at the February IWG meeting: there was a lot of discussion about the proposal on the timing of LCA. Dr. Niikuni, the Chair, asked SG4, SG5, and SG6 to agree on a definition of LCA timing. These three SGs will meet together in the future. The main questions and answers, and comments were as follows:
o Aoki (JP/JASIC): I believe that all SG5 members have come to a consensus to apply this line of thinking that the timing of LCA should be in the pre-use phase. If I am right, I will propose this diagram to SG4 and SG6.
o Martineau (CLEPA): I need to check again with CLEPA members. CLEPA agrees in principle with this diagram but has not yet taken an official position.

o Goy (OICA): I have a question about secondary data for EoL. Since there is no traceability and only secondary data for EoL, does this mean we have to use CFF? We should try to ensure the traceability of recycled parts.
o Aoki (JP/JASIC): Are you saying LCA should only be implemented after EoL?
o Goy (OICA): China said that the most accurate LCA results can be obtained by applying CFF after disassembly. So, if LCA is recalculated at the EoL, then it would be the best and most accurate tool.
o Aoki (JP/JASIC): Please do not confuse recycling modeling with LCA timing.
o Goy (OICA): I also think the point is to do the LCA before the product is used. And I agree with the blue line. However, we have a mix of primary and secondary data and are not trying to move to primary data.
o Aoki (JP/JASIC): We will discuss recycling modeling separately. Note that this slide focuses on LCA timing.
o Meyer (US/EPA): I don't quite understand what you mean by putting a line there as a time to do a life cycle assessment. Because, strictly in the LCA sense, that would mean doing a cradle-to-gate study. In this case, the situation only changes at the manufacturing stage. If this is the case, why do we have SG4 and SG5? So, maybe I don't understand the term. But in my experience, to draw such a line is to draw the line at the factory gate. This means that we are not interested in end-of-life products. Typically, when we set targets, we want to ensure that we have the same level of data throughout the lifecycle. If we can't do that, we need to find out why. So, I was wondering if anybody could tell me what the thought process is regarding the timing of LCA.
o Aoki (JP/JASIC): I don't understand why SG4 wants to cover the time after EoL. So, I will also contact SG4 and SG6.
o Meyer (US/EPA): I will need to talk to some colleagues and get a consensus in the US on what we think about where to draw these timing boundaries.
o Yamamoto (JP/JASIC): Note that the recycling paths in the diagram are only examples. Scrap could be used in other industries.

o Cuenot (UN): I don't think the informal working group has been able to fully answer that dotted line yet. The dotted line is a possibility. At the dealership, you might want to show the potential carbon footprint of the vehicle. At the point of sale, you have primary data, mainly from upstream processes, i.e., vehicle manufacturing and everything below the dotted line. But then you would have to make assumptions and maybe use secondary data. Because we don't know at the point of sale what's happening at the point of EoL. So, it could be difficult. How we want to use LCA is one possibility. I think the US has made it clear that they want everything to be included. So, I think this EoL modeling is still beneficial. And if one of the possible applications is at the point of sale of a vehicle, think about how that could be done.

3. EoL LCA discussion

1) EoL system boundaries and processes with activity data & Intensity data

-US regional information sharing-

•Dr. Mayer (US/EPA) described the situation regarding EoL in the US as follows:

o Today, I do not have any data or slides to share. I do not even have a qualitative chart showing a typical EoL situation in the US. Others and I are struggling with this question. This is because the way end-of-life vehicles are handled in the US varies significantly from place to place.

o If you look up the American Automotive Recyclers Association, you will find most of the information we need to get secondary parts. This is the junkyard. It is called U-Pull and Save in the US, and cars that have been scrapped or are no longer in use are purchased and laid out in a large field. The average home mechanic can walk through this field with his tools and take any part out of the car and use it. Finally, the cleaned-out scrapped vehicles would be put into a compactor and may be sent to a shredder. This is the best we can come up with at this time. There is no clear reporting of emissions.

o If I were to take this on as a new data collection project from my work at the EPA, this process would take enormous time; a formal research project at the EPA could take up to 6 months to a year. Therefore, we are looking for ways to prevent this from becoming a formal research project within EPA. If you know anyone in the US automotive industry or have colleagues or friends who are familiar with the automotive industry, please share your contact information with me. Because, again, there is no central database. This makes it very difficult to report on such short notice.

o I have talked to Dr. Jarod Kelly, who oversees GREET, and I am trying to get Argonne National Laboratory to work with us. But they work for the US Department of Energy. The people who work there are contractors. So, they need billable hours to participate in the project. So, I am working on a mechanism to get billable hours so that key people at Argonne can work with me.
o But what he told me they did with the GREET model was they looked up secondary sources and old journal articles. They created the secondary data to cover the EoL. And in the last few years, they have not spent much time on it. They haven't updated it as things have changed, and different types of vehicles have reached the end of their life. And even if GREET has some intensity data, that doesn't mean the numbers are representative of the US. Even the GREET team says this model needs attention.
o I was talking to a colleague yesterday who knew of a group that used to work on EoL for automotive LCA. It was an informal working group sponsored by the three major US manufacturers. The study was done some time ago. I will try to track them down and find out who they were, who they talked to, and what organizations they belonged to in the US. Various industry associations, such as the Aluminum Association or the Iron and Steel Institute, might have that knowledge. Then, I could find a consulting firm here in the US. They have looked into auto shredding and the post-shredding process and agreed to help me. We had our first meeting this week. They told me to call them back in two weeks because it would take a little while to get the information together. They are trying to see if there is anything they can do to help me put together at least a qualitative chart.
• As requested by the IWG Chair, SG5 will tentatively begin drafting in April without US data. The US data will be reflected in the draft as soon as it is available.
• Since Dr. Nucci (European Aluminium) is in monthly contact with the American Aluminum Association, she offered to arrange for Dr. Mayer to contact them.

2) Material/Parts recycling modeling discussion #5

•The US agreed to keep both cut-off and CFF options available, depending on the purpose and scope of the study. Discussions within OICA are nearing completion, and OICA will present its official position at the next meeting. The main questions and answers, and comments were as follows:

o Goy (OICA): After conducting the LCA, we have a third party validate the data and the report. They responded that mixing CFF and cut-off in one LCA report is not possible, or at least not recommended. If both methods are to be mixed in one LCA report, a strong argument must be presented to justify it.
o Nucci (European Aluminium): I agree that the two should not be mixed. However, one can report two results for the same calculation using two different methodologies. The key is not to use one model and the other for the same number and the same calculation.
o Meyer (US/EPA): Same thing for the US; we're not saying we're going to use both methods in one report and one study. If they want to use the cut-off method and it fits the purpose and scope, then it should be acceptable, and the same goes for CFF.
o Goy (OICA): This is one independent agency's opinion. The same question should be asked of other independent agencies. That way, the discussion can be deepened.
o Yamamoto (JP/JASIC): Whether some kind of blending is acceptable should also be considered from the perspective of ISO 14000. The purpose for which the A-LCA guidelines will be used could also be a point of discussion. However, the use case for A-LCA should not be discussed.
o Goy (OICA): The question now is whether it is possible to mix both methods in the reporting of a product. In other words, is it compatible with the ISO standard to use cut-off for one material in one product and CFF for another material in the same product?
o Nucci (European Aluminium): It might be interesting to ask the European Commission such a question. CFF has an adjustable factor A. So, depending on the material, it might be possible to change the factor A. Of course, it could also be changed in the direction of the cut-off. To the best of my recollection, I don't recall this particular issue being addressed in the Recommendation on the Environmental Footprint.
o Meyer (US/EPA): If we apply the cut-off to one thing and the CFF to another, the question would arise as to whether that would be inconsistent with the ISO standard. We need to be clear on the intent of the ISO standard.
o Aoki (JP/JASIC): This point is very important. So, the leading team will prepare a draft discussion paper on the conditions for using these methods.
o Yamamoto (JP/JASIC): As recommended by Dr. Nucci, I would like the JRC to study these issues. CFF has parameters that are set for each material. Therefore, if we select factor A at once, we can select cut-off or CFF. I would like to know the results of the JRC study.

o Patrone (EU/JRC): Of course, the closer factor A is to 1, the closer the method is to a cut-off approach. We plan to ask an expert in product environmental footprint to verify whether a particular component or material has low greenhouse gas emissions. We can use a pure cut-off approach or some kind of mixed approach.

• Mr. Martineau (CLEPA) explained an example of a method similar to CFF, i.e., the modular method of EPD applied to tires. Dr. Nucci gave an additional explanation of the modular method. Since this is a very technical topic, it was decided to have a small meeting with limited participants (both leaders, OICA, CLEPA, European Aluminium, and JRC) later. The main questions and answers, and comments were as follows:

o Martineau (CLEPA): Michelin has been reporting CFP for tires in the EPD since 2017. Tire recycling is reported based on a modular calculation, including Module D specified in EN 15804. This information is available on the EPD portal website.

o Goy (OICA): We have been trying to find another methodology that would combine the strengths of both CFF and cut-off and be acceptable to all. We are not trying to develop a completely new methodology. This methodology, even if it comes from the construction industry, is already consistent with the Environmental Footprint. The portal website that Mr. Martineau presented has already been applied to the automotive industry.

o Nucci (European Aluminium): EN 15804 and ISO 21930 are in the building sector. These specify how to calculate EPDs for building products. The EN standard has all the modules, including Module D, which requires reporting. The Michelin tire example above does not comply with EN 15804 and ISO 21930. This is because it is not a construction product. The Michelin EPD complies with the PCR for this product published in Envirodeck. I think the approach for construction products specified in EN 15804 is somewhere between cut-off and CFF.

o Yamamoto (JP/JASIC): Can the modular method replace the CFF as it is applied to cars?

o Nucci (European Aluminium): If you put all the Modules A, B, C, and D of the EPD together, you get something very similar to the CFF. The CFF is not a modular structure; everything is already built in. In other words, if all the modules are calculated correctly, you can create a concept very similar to the CFF. Module A is the production of raw materials and products, Module B is the use, Module C is the processing of used products, and Module D is the net credit and burden from EoL recycling materials.

o Yamamoto (JP/JASIC): Why doesn't the construction industry use the CFF instead of the modular method?
o Nucci (European Aluminium): EN 15804 was published in 2012, long before the PEF appeared. It was revised in 2019, bringing it closer to the PEF.
o Martineau (CLEPA): I understand that CFF approaches all three aspects, but we cannot separate them when doing CFF calculations.
o Nucci (European Aluminium): As I understand it, you are right. CFF cannot be separated according to the way of production. On the other hand, with EN 15804, we can separate the way because they are clearly calculated by module. At least in the steel industry, we used to do that about ten years ago when we calculated the impact of automotive applications. We also used an approach very similar to the EPD for aluminum used in vehicles.
o Yamamoto (JP/JASIC): The CFF is not separable but consists of three parts. Such a structure is very similar to Modules ABCD. The only major difference is that Module ABCD can calculate the carbon footprint; Module D cannot be integrated into the carbon footprint of Module ABC. However, CFF can be integrated into such a module.
o Nucci (European Aluminium): As I understand it, there are a few areas where Module D and CFF do not exactly match. But overall, I think what you just said is correct.
o Yamamoto (JP/JASIC): Both methods are very similar. So, if we want to check the sum of the benefits of Module D, we can also use CFF. What would be the next approach or phase in terms of considering a new methodology?
o Martineau (CLEPA): There are no plans at this stage. As we have discussed since the last meeting, there are different views on the hybrid approach of cut-off and CFF. This means that this discussion may generate ideas for a consensus somewhere down the road.
o Goy (OICA): However, when applied as such, Module D based on secondary data will only result in additional credits for the CFF. It does not solve the problem of not representing the decarbonization effort itself. In particular, this is not a differentiator if it is based on secondary data and the EoL benefits are averaged for all. It will not drive OEMs to make further efforts to recycle. But here's the point. We are not saying this is the best way to do it. We are saying it is a known method. It has not been fully applied to the automotive industry. This may be an appropriate time to take a closer look at adapting it to the automotive industry rather than leaving it as it is.

o Nucci (European Aluminium): This has been said several times but is worth repeating. The two standards we refer to, EN 15804 and ISO 21930, are limited to the building sector. So, they cannot be directly applied to products outside the building sector. So, if we were to consider replicating these approaches in the automotive sector, we would first have to rewrite these methodologies.
• Mr. Yamamoto (JP/JASIC) explained the first draft of the flowchart on the conditions for applying CFF and cut-off. Dr Nucci (European Aluminium) pointed out that some flows in the diagram were not appropriate. The leading team asked all participants to contact them with any further corrective comments. The main questions and answers, and comments were as follows:
o Nucci (European Aluminium): The flowchart allows two system boundaries to be changed: Cradle to Grave and Cradle to Gate. However, the system must be modeled while maintaining the system boundaries. Therefore, I do not agree with the left-to-right arrow.
o Nucci (European Aluminium): Even if the recycling process is not established, we may have an idea of what the recycling process should look like. Because data can be obtained from pilot plants. Therefore, CFF is applicable in such cases.
o Goy (OICA): If the system boundary cannot be changed, does this mean that CFF and cut-off cannot be mixed in the same product calculation?
O Yamamoto (JP/JASIC): System boundaries cannot be mixed, but methods can be mixed.

3) Other controversial topics discussion

[1. Boundary conditions]

• OICA, whose position had previously been unclear, agreed to Option 1 (Agree), but not to a final decision. The other parties did not change their positions. That is, they were in favor of Option 1. However, the position of the US, EU, and CLEPA, as well as that of OICA, was not final.

[3. Second life parts]

• China, Japan, and CLEPA maintained their positions in favor of Option 1 (Include if traceability of second-life parts is confirmed). The US was leaning towards Option 1. OICA agreed in principle with Option 1 but did not make a final decision. European Aluminium did not have a clear position. JRC was under discussion.

• Mr. Yamamoto (JP/JASIC) explained the table with three cases of the intended use of parts (i.e., remanufacturing, reuse, and repurposing) and two cases of recycling models (CFF and RCM) and asked for feedback before the next meeting.

[4. Logistics]

• China and Japan maintained their position in favor of Option 3 (Other). The US, OICA, and CLEPA were in favor of Option 1 (Include). JRC stated that at the last IWG meeting, SG3 and SG4 said they would include logistics, resulting in Option 3 and Option 1 being the same.
• Since some parties stated that the definition of Option 3 was unclear, the leading team will clarify it by the next SG5 meeting.

[Other three items]
• The remaining three issues
will be discussed at the next SG5 meeting.

4. Next action
• The next SG5 meeting will be held online
on Tuesday, March 26, from 12:00 to 14:00 CET.
• Mr. Aoki (JP/JASIC) proposed to hold
the April SG5 meeting in Japan around the time
of the next IWG meeting in Seoul.
However, due to budgetary and other constraints,
it appeared that most members would not be able
to attend. He asked them to contact him
if any members would be able to attend
the in-person meeting.

Appendix 1: Attendee list

Agenda

1. SG5 008 minutes & 009 agenda confirmation
2. EoL LCA discussion
   1) Material/Parts recycling modeling discussion
      -Each CPs and NGOs position
      -OICA CFF/RCM Pros/Cons study
      -CFF or RCM application condition
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Material/Parts recycling modeling
Internal discussion summary of Cutoff and CFF

As of 22nd Feb

		Result	Remarks
Leading Team	**China (CATARC)**	**・Both Cutoff and CFF methods should be included in the standard**	① CFF method： for the purpose of comparing different technical route without considering responsibilities ; ② CUT-OFF method：for the purpose of comparing different individual products with same technical route。 ・Detailed boundary and principle of these two methods presemted in SG5 006
	Japan (JASIC)	**・Support CATARC proposal**	・Specific use case description on Cutoff or CFF to be discussed respecting ToR of A-LCA
Main Participants	**France**	**・Both Cutoff and CFF methods could be acceptable, CFF is favorable**	・No strong position. A final official position will be taken at the next SG5 meeting.
	US(EPA)	**・Both Cutoff and CFF methods are preferable**	
	OICA	・OICA sees the potential of the CATARC proposal. However, it is needed to wait for CLEPA to present their proposal too, and to get more detailed information on the CATARC proposal. ・Secondly, To request of a clear definition/condition when to use which method	Status from OICA?
	CLEPA	**・Cradle-to-Gate, step 1 (level 3&4 ‚reporting'): Support Cutoff ・Cradle-to-Grave, step 2 (level 1&2 ‚technology comparison'): Support CFF for selected parts and associated Materials**	
	European Aluminum	**・Only CFF, need to study Scenario, but having both methodologies in A-LCA could be acceptable**	
Observers	**JRC**	**・CFF approach is favorable. Considering both methodologies in the discussion according to the scope could be acceptable**	European Commission Recommendation (EU) 2021/2279 on the use of the environmental footprint methods to measure and communicate the life cycle environmental performance of products and organisations, in which Annex 1 e 2 refer to PEF (Product Environmental Footprint) while Annex 3 e 4 to OEF (Organisation Environmental Footprint).

CFF or Cutoff application condition study –SG5 leading team proposal draft#2–

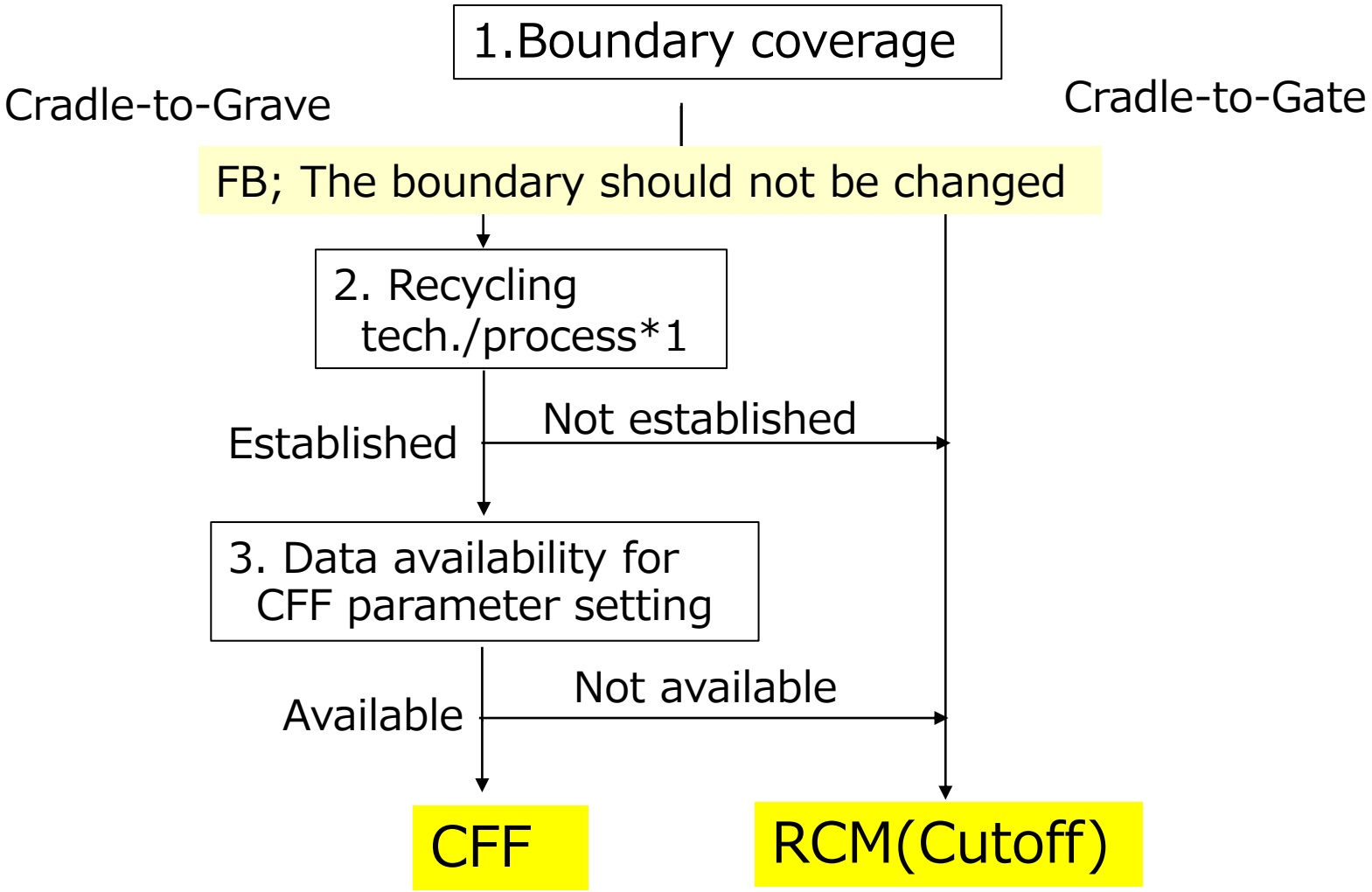
–Original-

	CFF	Cutoff	
1.Boundary coverage	-Cradle-to-Grave	-Cradle-to-Grave	-Cradle-to-Gate
2. Recycling tech./process	–Established *1	-Not established	-N/A
3. Data availability for CFF parameter setting	-Available	-Not available	-N/A

*1 The criteria for establishment to be added

Remarks; LCA use case should not be included in the condition because LCA owner should decide considering Pros/Cons of CFF and Cutoff following A-LCA ground rule.

CFF or RCM(Cutoff) application guideline (1st Draft)



*1 The criteria for establishment to be added

Remarks; LCA use case should not be included in the condition because LCA owner should decide considering Pros/Cons of CFF and Cutoff following A-LCA ground rule.

<2nd draft >

CFF or RCM(Cutoff) application guideline

- Circular Footprint Formula (CFF) or Recycled Content Method (RCM) should be applied to the evaluation of material/parts recycling.

- In cases where obtaining appropriate data for CFF parameter setting is difficult, Recycled Content Method (RCM) should be applied with the effort to develop CFF parameter

- LCA owner should decide CFF or RCM application based on Use case taking Pros/Cons of each methodology into account.

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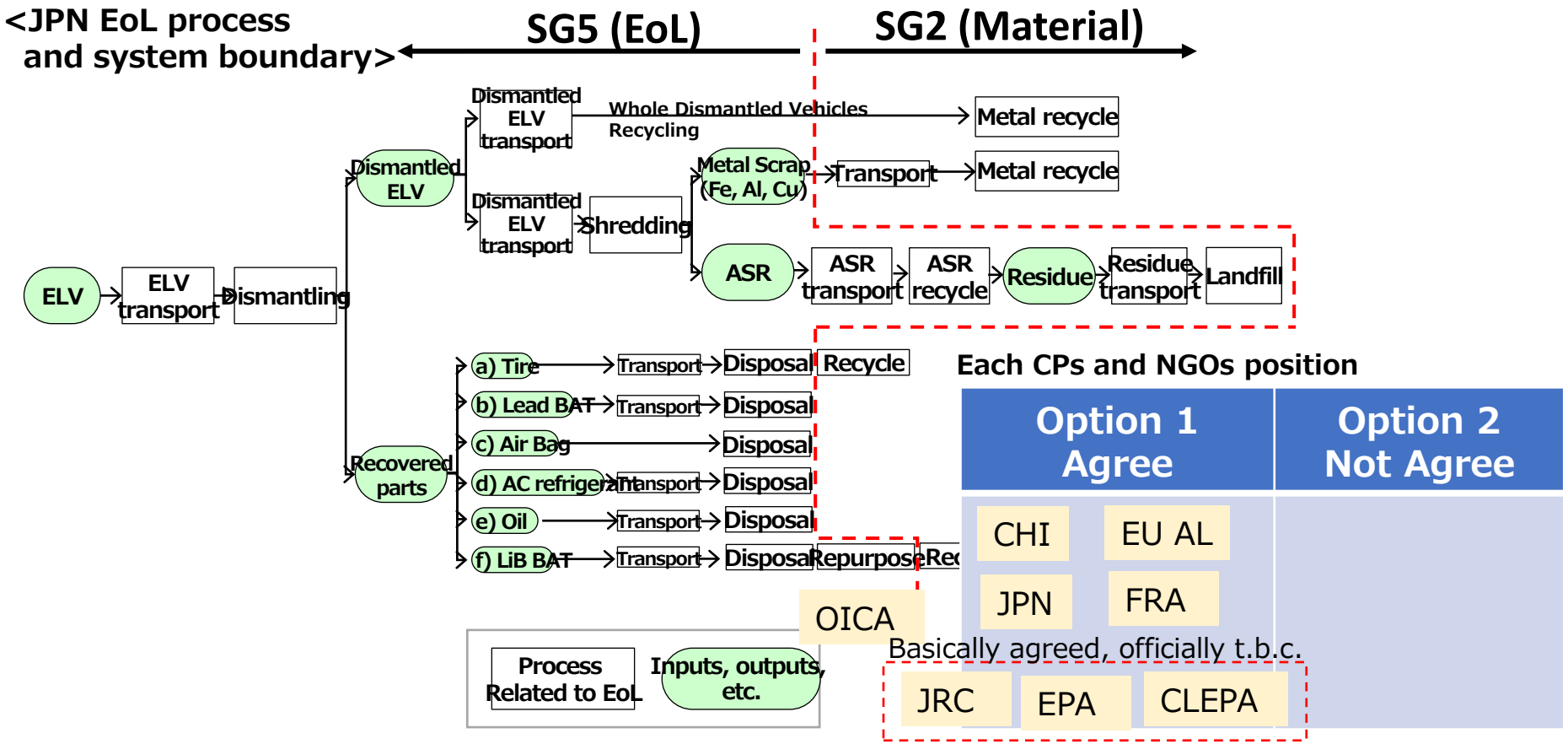
SG5 Controversial topics list

Topic	Option 1	Option 2	Option 3
0.Material/Parts recycling modeling ☆ to be concluded today	Recycled content method (Cutoff)	Closed Loop Approximation Method (CLAM)	Circular Footprint Formula (CFF)
1.Boundary conditions ☆	SG 5	SG 2	
2.Secondary data	Global harmonised	Region by region	Country by Country
3.Second life parts ☆	Include	Exclude	-
4.Logistics ☆	Include	Exclude	-
5.ELV management out of sale region	Take into account process of country of sale	Take into account global average	Take into account process of country of EoL
6.Recycle process	Current process	Future process	-

1. SG5 system boundary including SG2 boundary

1) From ELV transport to Disposal (e.g. Incineration or Landfill)
2) Material recycling
   -SG5(EoL) ; to Scrap generation
   -SG2(Material) ; From Material recycling
3) Parts reuse/repurpose
   -SG5(EoL) ; to reuse/repurpose parts generation



3. Second life parts

T.B.C. FRA JRC

Option 1	Option 2
Include with below condition	Exclude

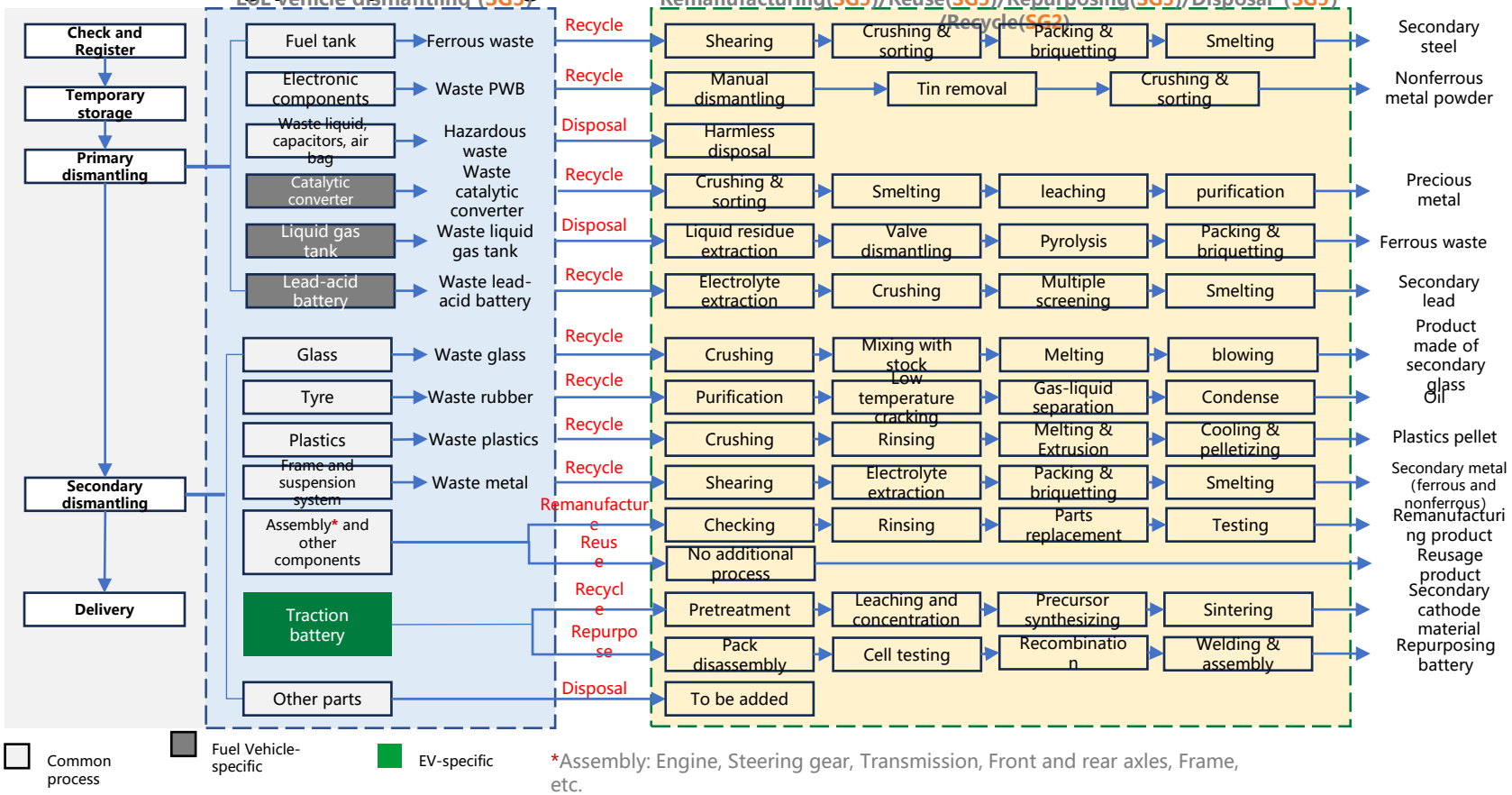
Each CPs and NGOs position

CHI JPN CLEPA EPA OICA EU AL

Basically agreed, officially t.b.c.

- Include in case that Second life parts traceability confirmed

<China Dismantling parts processing of EoL vehicle>



*Assembly: Engine, Steering gear, Transmission, Front and rear axles, Frame, etc.

3. Second life parts - Parts recycling modeling study -

- 1. Remanufacturing and 2. Reuse can be evaluated by either CFF or RCM with same recycling credit in 1st and 2nd Automotive-product

- 3. Repurposing can be evaluated only by CFF with some recycling credit in 1st Automotive-product

	CFF	RCM
1. Remanufacturing (e.g. ELV BAT⇒New vechicle) High quality recycled BAT required	○ In case of A=0.5 1st A-product;50%credit 2nd A-product;50%credit	○ 1st A-product ; 0%credit 2nd A-product ; 100%credit
2. Reuse (e.g. ELV BAT⇒Repair parts) Middle-High quality recycled BAT required	○ In case of A=0.5 1st A-product;50%credit 2nd A-product;50%credit	○ 1st A-product ; 0%credit 2nd A-product ; 100%credit
3. Repurposing (e.g. ELV BAT⇒other industry) Low-Middle quality recycled BAT required	○ In case of A=0.5 1st A-product;50%credit (2nd other industry product ;50%credit)	× 1st A-product ; 0%credit (2nd other industry product ;100%credit)

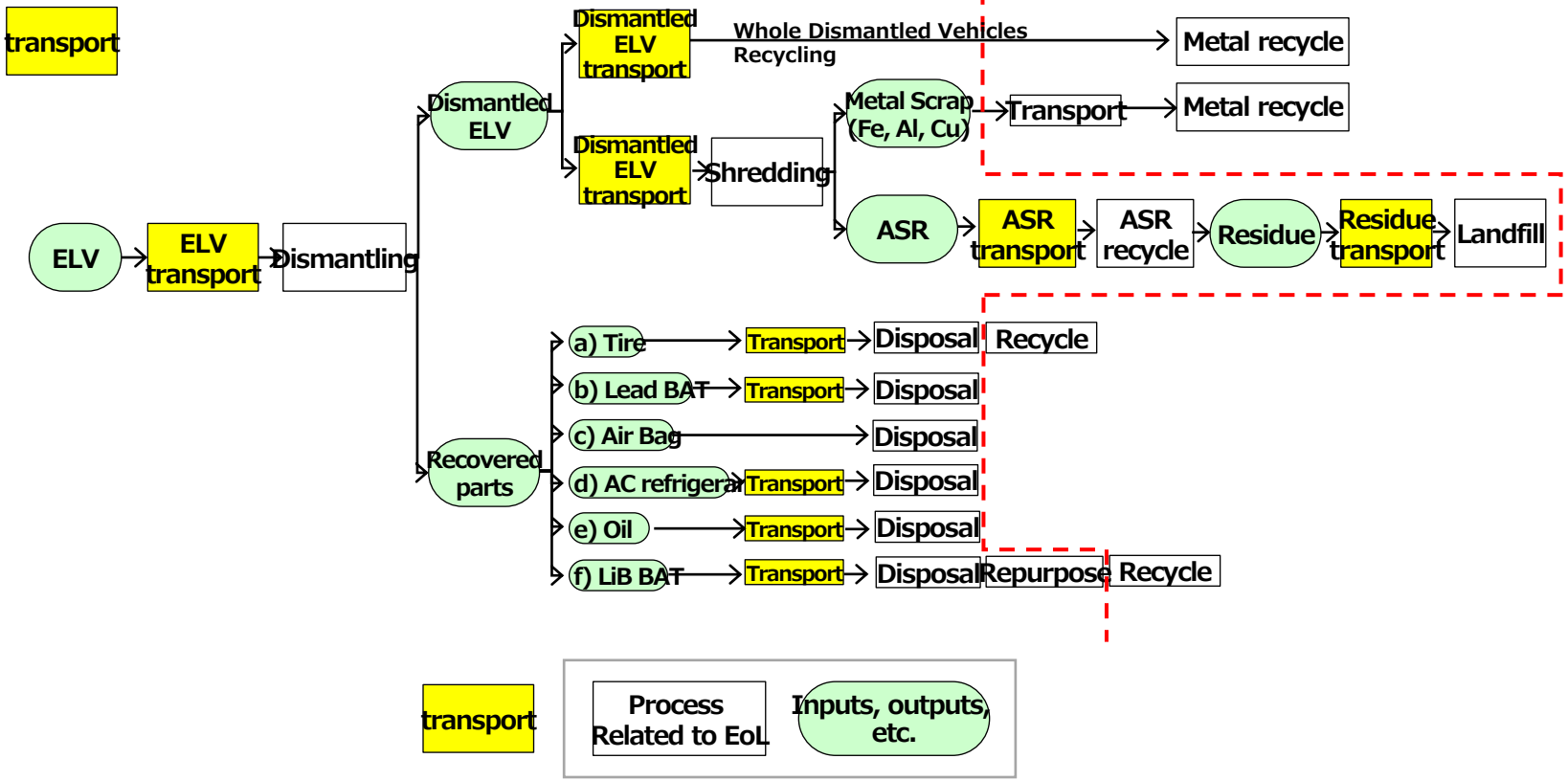
4. Logistics

T.B.C. FRA

Option 1	Option 2	Option 3
Include	Exclude	other
EPA OICA CLEPA EU AL		CHI JPN JRC

・Confirm Cutoff criteria in A-LCA first

<JPN EoL process and system boundary>



SG5 Controversial topics list

Topic	Option 1	Option 2	Option 3
0.Material/Parts recycling modeling ☆ **To be discussed today**	Recycled content method (Cutoff)	Closed Loop Approximation Method (CLAM)	Circular Footprint Formula (CFF)
1.Boundary conditions	SG 5	SG 2	
2.Secondary data ☆	**Global harmonised**	**Region by region**	**Country by Country**
3.Second life parts	Include	Exclude	-
4.Logistics	Include	Exclude	-
5.ELV management out of sale region ☆	**Take into account process of country of sale**	**Take into account global average**	**Take into account process of country of EoL**
6.Recycle process ☆	**Current process**	**Future process**	-

2. Secondary data

Topic	Option 1 <Level2>	Option 2 <Level3>	Option 3 <Level3>
Secondary data	Global harmonised	Region by region	Country by Country

- Need to confirm Secondary data of each process and CFF parameter in each country or region
- Please check them by Feb. SG5

			l unit														
									Level 4								
									Primary								
									US	PRC	FRA	GR	KR	IND	JPN		
									***	***	***	***	***	***	***		
treatment	Dismantling		ELV weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
	Dismantled ELV transport		Dismantled ELV weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
	Shredding		Dismantled ELV weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
Recovered parts treatment	1. Tire	Disposal/Recycle	Parts weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	2. Lead BAT	Disposal	Parts weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	3. Air Bag	Disposal	Parts weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	4. Lubricant	Disposal	Parts weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	5. AC refrigerant	Disposal	Parts weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	6. LiB BAT	Repurpose/Recycle/Disposal	Parts weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
	7. Other Parts	Disposal/Recycle	Parts weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
		transport	Parts weight [kg]							***	***	***	***	***	***	***	
ASR trearment	ASR transport		ASR weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
	ASR Recycle		ASR weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	
	Residue transport		Residue weight [kg]		**	**	**	**	**	***	***	***	***	***	***	***	
	Landfill		Residue weight [kg]	*	**	**	**	**	**	***	***	***	***	***	***	***	

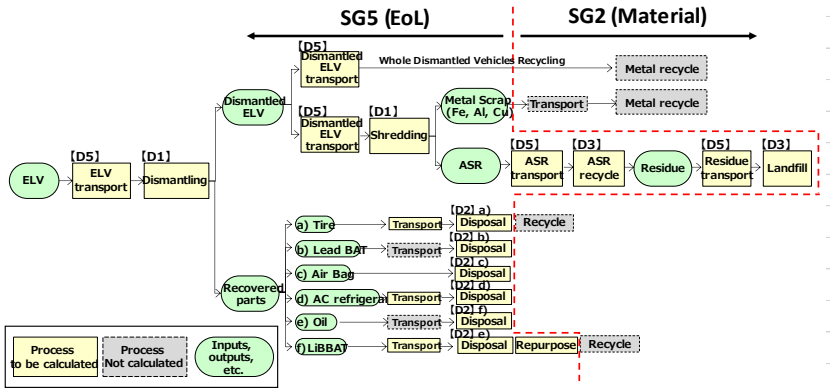
2. Secondary data availability –EoL process-

Region or Country;

For detai EoL process confirmation, please refer to Sept SG5 material in Wiki

EoL process			Activity data (Primary data)	Intensity data		
				Secondary data availability	Secondary data set information	Remarks
【D1】ELV treatment	Dismantling		ELV weight [kg]			
	Shredding		Dismantled ELV weight [kg]			
【D2】 Recovered parts treatment	a)Tire	Disposal	Parts weight [kg]			
	b)Lead BAT	Disposal	Parts weight [kg]			
	c)Air Bag	Disposal	Parts weight [kg]			
	d)AC refrigerant	Disposal	Parts weight [kg]			
	e)Oil	Disposal	Parts weight [kg]			
	f) LiB BAT	Parts Remanufactuaring	Parts weight [kg]			
		Parts Reuse	Parts weight [kg]			
		Parts Repurpose	Parts weight [kg]			
		Disposal	Parts weight [kg]			
	Other Parts	Disposal/Recycle	Parts weight [kg]			
【D3】ASR trearment	ASR Recycle (Thermal recovery)		ASR weight [kg]			
	ASR Residue landfill		Residue weight [kg]			

EoL system boundary
- Vehicle EoL CO2 emission-



Vehicle EoL CO2 emission=Σ(Process to be calculated CO2 emission)

Process to be calculated CO2 emission=Activity data×Intensity data

<legend symbol>

✓ ; Available

－ ; Not available

＊ ; Other. e.g. Primary data is available or possible to make secondary data

2. Secondary data availability –CFF parameter-

Region or Country;

CFF parameter		Data set availability	Data set information	Remarks	Reference; JPN case: Data set availability	Data set information	Remarks
Material/Parts recycling	A				✓	PEFCR	
	R1				✓	JAMA LCA guideline data set	Steel, Al, Cu only
	R2				✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Qsin/Qp				✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Qsout/Qp				✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Ev				✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	E*v				✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	Erecycled				✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	ErecyclingEoL				✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
Energy (ASR thermal recovery etc)	EER				✓	JAMA LCA guideline data set	
	LHV				✓	General JPN industrial database	
	XER,heat				✓	General JPN industrial database	
	ESE, heat				✓	General JPN industrial database	
	XER,elec				✓	General JPN industrial database	
	ESE, elec				✓	General JPN General database	

For detail CFF and CFF parameter confirmation, please refer to the European Commission Recommendation (EU) 2021/2279 through below link

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021H2279&from=EN

material $(1-R_1)E_V + R_1 \times \left(AE_{recycled} + (1-A)E_V \times \frac{Q_{Sin}}{Q_P}\right) + (1-A)R_2 \times \left(E_{recyclingEoL} - E^*_V \times \frac{Q_{Sout}}{Q_P}\right)$

energy $(1-B)R_3 \times \left(E_{ER} - LHV \times X_{ER,heat} \times E_{SE,heat} - LHV \times X_{ER,elec} \times E_{SE,elec}\right)$

disposal $(1-R_2-R_3) \times E_D$

<legend symbol>
✓ ; Available
- ; Not available
*** ; Other. e.g. possible to take CFF parametr**

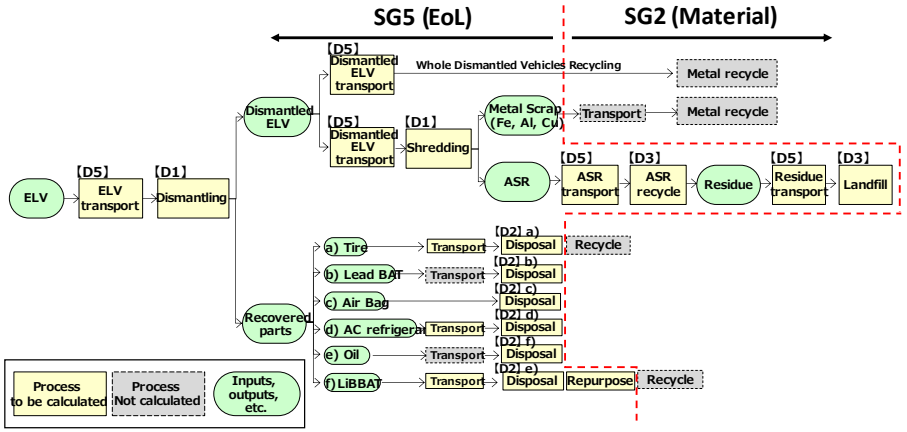
Country; China

For detai EoL process confirmation, please refer to Sept SG5 material in Wiki

EoL process			Activity data (Primary data)	Intensity data: Secondary data availability	Intensity data: Secondary data set information	Remarks
【D1】ELV treatment	Dismantling		ELV weight [kg]	✓	CALCD	
	Shredding		Dismantled ELV weight [kg]	✓	CALCD	
【D2】 Recovered parts treatment	a)Tire	Disposal	Parts weight [kg]	(✓)	CALCD	Perhaps we have misunderstood this table. We do have data for the dismantling phase. The data for tires, lead BAT, and AC refrigerant,oil,LiB BAT are what we understand to be from the dismantling of the whole vehicle into its components, and this data does exist. It is allocated from the overall dismantling phase. The table may be tallying data specifically from the component to material phase, which indeed we do not have.
	b)Lead BAT	Disposal	Parts weight [kg]	(✓)	CALCD	
	c)Air Bag	Disposal	Parts weight [kg]	—	CALCD	
	d)AC refrigerant	Disposal	Parts weight [kg]	(✓)	CALCD	
	e)Oil	Disposal	Parts weight [kg]	(✓)	CALCD	
	f) LiB BAT	Parts Remanufactuaring	Parts weight [kg]	—		
		Parts Reuse	Parts weight [kg]	—		
		Parts Repurpose	Parts weight [kg]	—		
		Disposal	Parts weight [kg]	(✓)	CALCD	
	Other Parts	Disposal/Recycle	Parts weight [kg]	—		For the incineration and landfill phase of the data, only one OEM has reported so far. The data quality is relativley poor, so we did not include this part in the first report.
【D3】ASR trearment	ASR Recycle (Thermal recovery)		ASR weight [kg]	✓	CALCD	
	ASR Residue landfill		Residue weight [kg]	✓	CALCD	

EoL system boundary

- Vehicle EoL CO2 emission-



Vehicle EoL CO2 emission=Σ(Process to be calculated CO2 emission)

Process to be calculated CO2 emission=Activity data×Intensity data

<legend symbol>

✓ ; Available

－ ; Not available

＊ ; Other. e.g. Primary data is available or possible to

Country; China

CFF parameter		Data set availability	Data set information	Remarks	Reference; JPN case: Data set availability	Data set information	Remarks
Material/Parts recycling	A	–			✓	PEFCR	
	R1	✓	CALCD	Steel, Al, only	✓	JAMA LCA guideline data set	Steel, Al, Cu only
	R2	✓	CALCD	based on current technology	✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Qsin/Qp	–			✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Qsout/Qp	–			✓	JAMA LCA guideline data set	Steel, Al, Cu only
	Ev	✓	CALCD		✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	E*v	–			✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	Erecycled	✓	CALCD	Steel, Al, only	✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
	ErecyclingEoL	✓	CALCD		✓	JAMA LCA guideline data set	Steel, Al, Cu only, IDEA basis
Energy (ASR thermal recovery etc)	EER	–			✓	JAMA LCA guideline data set	
	LHV	–			✓	General JPN industrial database	
	XER,heat	–			✓	General JPN industrial database	
	ESE, heat	–			✓	General JPN industrial database	
	XER,elec	–			✓	General JPN industrial database	
	ESE, elec	–			✓	General JPN General database	

For detail CFF and CFF parameter confirmation, please refer to the European Commission Recommendation (EU) 2021/2279 through below link

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021H2279&from=EN

material $(1-R_1)E_V + R_1 \times \left(AE_{recycled} + (1-A)E_V \times \frac{Q_{Sin}}{Q_P} \right) + (1-A)R_2 \times \left(E_{recyclingEoL} - E^*_V \times \frac{Q_{Sout}}{Q_P} \right)$

energy $(1-B)R_3 \times \left(E_{ER} - LHV \times X_{ER,heat} \times E_{SE,heat} - LHV \times X_{ER,elec} \times E_{SE,elec} \right)$

disposal $(1-R_2-R_3) \times E_D$

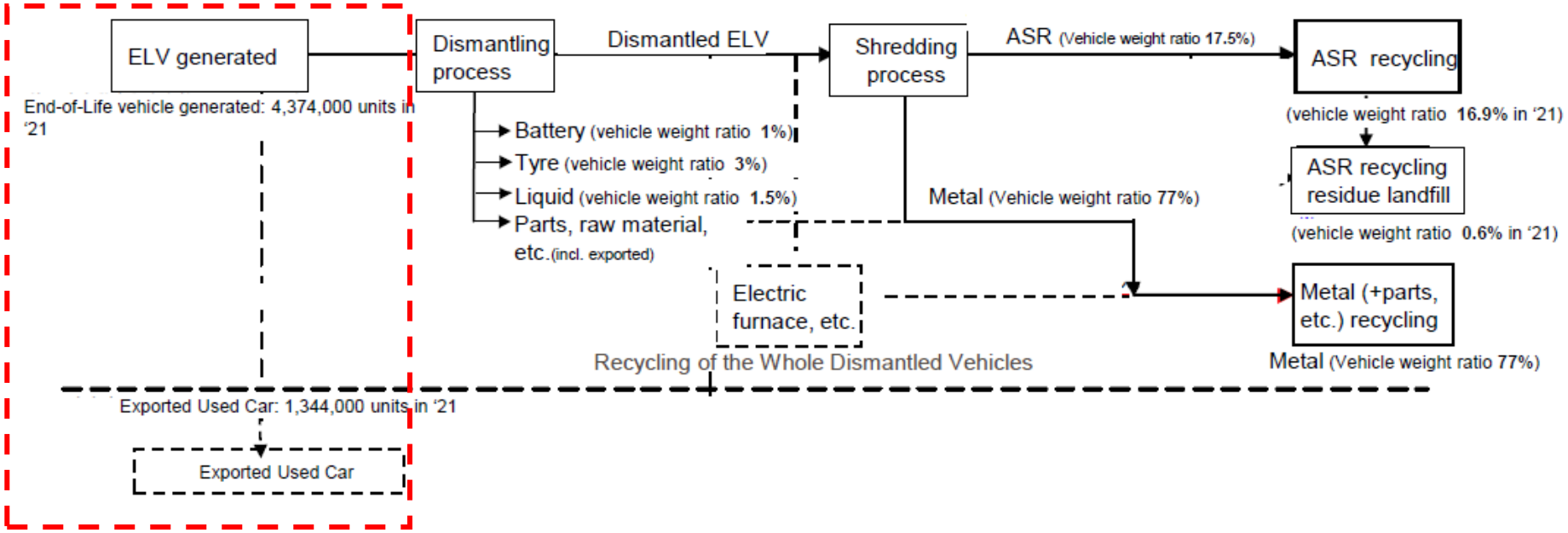
<legend symbol>
✓ ; Available
- ; Not available
*** ; Other. e.g. possible to take CFF parametr**

5. ELV management out of sale region

Topic	Option 1	Option 2	Option 3
ELV management out of sale region	Take into account process of country of sale	Take into account global average	Take into account process of country of EoL

- Option 1 preferable because of no data about EoL treatment of exported used car

Japan End-of-Life Vehicle Recycling and Treatment Flow

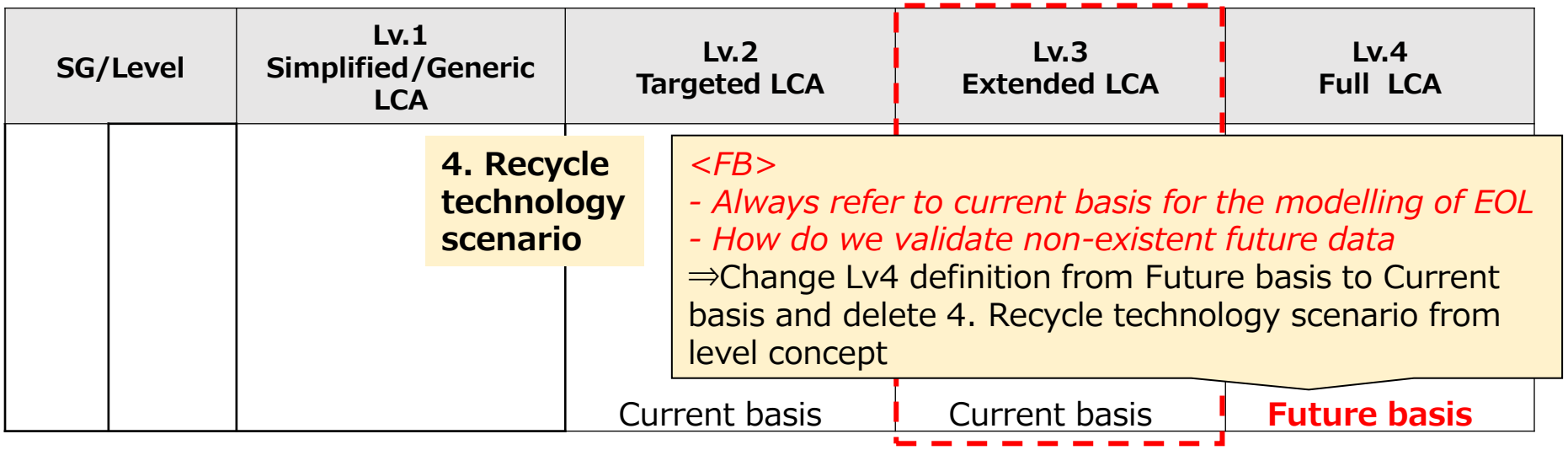


6. Recycle process

Topic	Option 1	Option 2	Option 3
Recycle process	Current process	Future process	-

- Take Option 1 respecting the discussion about “4. Recycle technology scenario” in Level concept @12th July SG5(EoL) Meeting 002

FB summary from 12th July SG5(EoL) Meeting material



Agenda

1. SG5 008 minutes & 009 agenda confirmation
2. EoL LCA discussion
   1) Material/Parts recycling modeling discussion
      -Each CPs and NGOs position
      -CFF or RCM application condition
      Remark) Module D is under study in SG5 small meeting
   2) Other controversial topics discussion
      including EoL process modeling harmonization
3. Next action

4. SG5 12 months Schedule

Today

			2023						2024					
			7	8	9	10	11	12	1	2	3	4	5	6
Main activities			Develop Methodologies											
GRPE A-LCA IWG			☆10		☆7	☆ 17-18		☆4	☆ 7-8	☆ 20		☆ 18-19		
SG5 leading team Meeting (LTM)			☆11 ☆26	☆ 23	☆6 ☆20	☆12 ☆25	☆9 ☆22	☆5 ☆21	☆18 ☆31	☆21	☆ ☆	☆ ☆	☆ ☆	☆ ☆
SG5 Meeting		☆26	☆12		☆4	☆19	☆13	☆12	☆23	☆ 22	☆ 26	☆	☆	☆
Objectives	1. Level concept Definition & Initial target		☆12											
	2. System boundary with activity data & Intensity data based on each regional EoL process				Reginal info. sharing ☆ JPN, CHI	☆ EU#1	☆ EU#2			☆ US	Harmonization ☆ #1	☆ #2	☆ Final	
	3. Contro versial topics	1) Material/Parts recycling modeling	☆JRC CFF intro.		☆ JAMA CFF intro.	Common Pros/Cons Discussion ☆ #1	☆ #2	☆ #3	☆ #4	☆ #5	☆ #1	☆ #2	☆ #3	☆ Final
		2) Other			Boundary Conditions ☆		1.Boundary #2 3. 2nd life Parts 4. Logistics ☆	☆	☆	☆	☆	☆		
	4. Summary for drafting													☆

Regional 2ndary data Study

CFF or RCM Application condition Study

2.Secondary data
5. ELV management out of sale region
6. Recycle process

- Next SG5 meeting

1. Date ; 2hours, late April
2. Venue; Online
3. Attendee; all SG5 member
4. Agenda; according to SG5 12 months schedule
   - Material/Parts recycling modeling
     Focus on CFF or Cutoff application condition study
   - Other controversial topics discussion
   - EoL process modeling harmonization
   - Next action

<Proposal>
-April. SG5 ; 23rd April. from 12:00 to 14:00 @CET