European Aluminium

END OF LIFE MODELLING

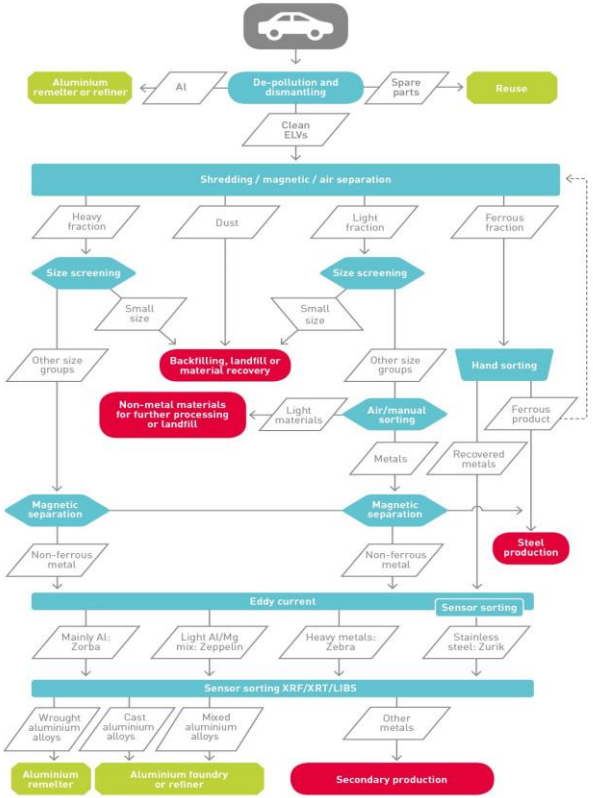
SG5 Meeting - Brussels

19th October 2023

Agenda

- Treatment of ELVs in Europe
- End-of-life modelling approach

Automotive



- ELV treatment in Europe is regulated today by the ELV directive
- Approx today there is 40% of vehicles of unknown whereabouts

- This directive is currently under review and requirements for EOL treatment may change (for example: increased dismantling + mandatory recycled content, etc)

ELV treatment today

1. Depollution (mandatory removal):

Treatment operations for depollution of end-of-life vehicles:

— removal of batteries and liquified gas tanks,

— removal or neutralisation of potential explosive components, (e.g. air bags),

— removal and separate collection and storage of fuel, motor oil, transmission oil, gearbox oil, hydraulic oil, cooling liquids, antifreeze, brake fluids, air-conditioning system fluids and any other fluid contained in the end-of-life vehicle, unless they are necessary for the re-use of the parts concerned,

— removal, as far as feasible, of all components identified as containing mercury.

2. Voluntary dismantling (mostly parts for reuse)

3. Rest of the car is shredded and resulting fractior is sorted

Treatment operations in order to promote recycling:

— removal or catalysts,

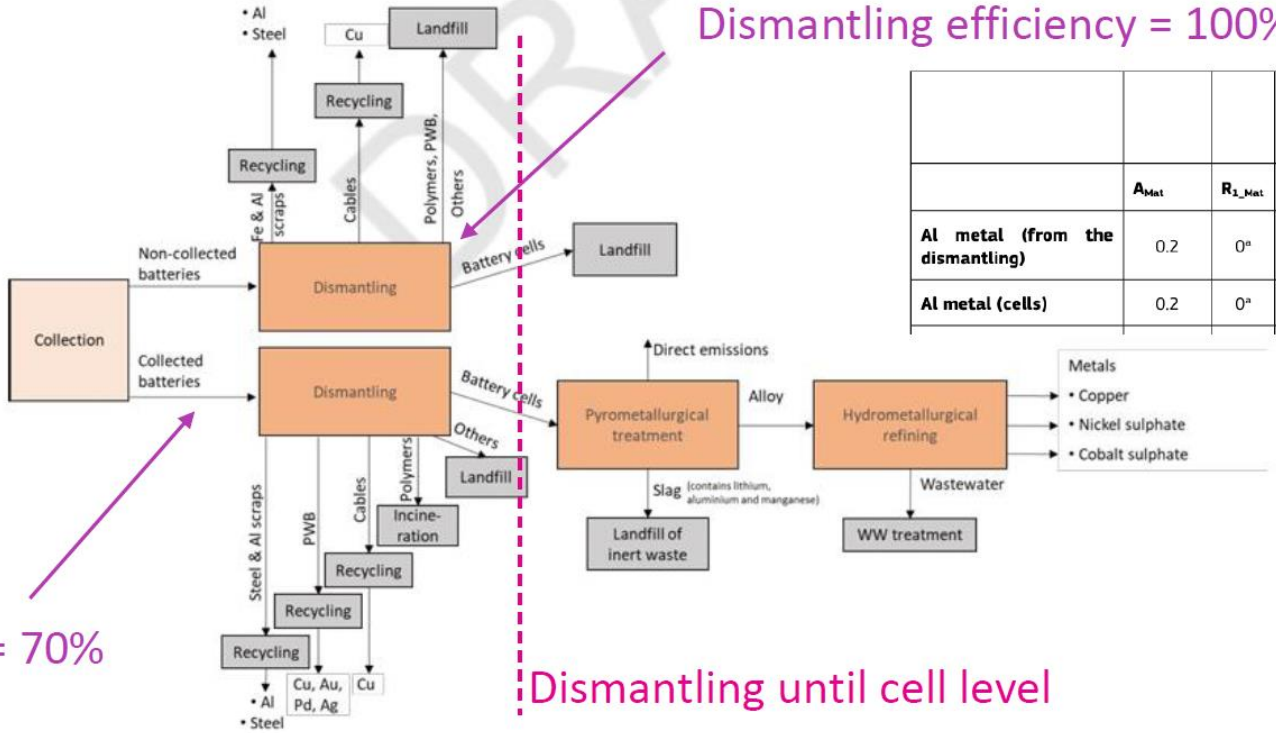
— removal of metal components containing copper, aluminium and magnesium if these metals are not segregated in the shredding process,

— removal of tyres and large plastic components (bumpers, dashboard, flui containers, etc), if these materials are not segregated in the shreddin process in such a way that they can be effectively recycled as material

— removal of glass.

Extract from batteries CF – draft delegated act

Figure 3. Schematic flowsheet of the default 'End-of-life' life-cycle stage of the battery in scope. PWB: printed wiring board.



Dismantling efficiency = 100%

				For the properly collected waste batteries		For the non-properly collected waste batteries	
	A_{Mat}	R_{1_Mat}	Q_{sin}/Q_P	R_{rec,c_Mat}	$Q_{Sout,c}/Q_P$	R_{rec,nc_Mat}	$Q_{Sout,nc}/Q_P$
Al metal (from the dismantling)	0.2	0[a]	1	0.9	1	0.9	1
Al metal (cells)	0.2	0[a]	1	0[a]	1	0	1

R,coll = 70%

Dismantling until cell level

Source: JRC

How to measure the recyclability (of metals)

End-of Life recycling approach
OR
CFF modelling (A=0.2 for metals)

Recycled content

It may make sense for products containing materials for which recycling industry is not profitable and/or the market is not yet mature. In these cases, a requirement for high recycled content may stimulate recycling for materials/products that would otherwise be landfilled or incinerated.

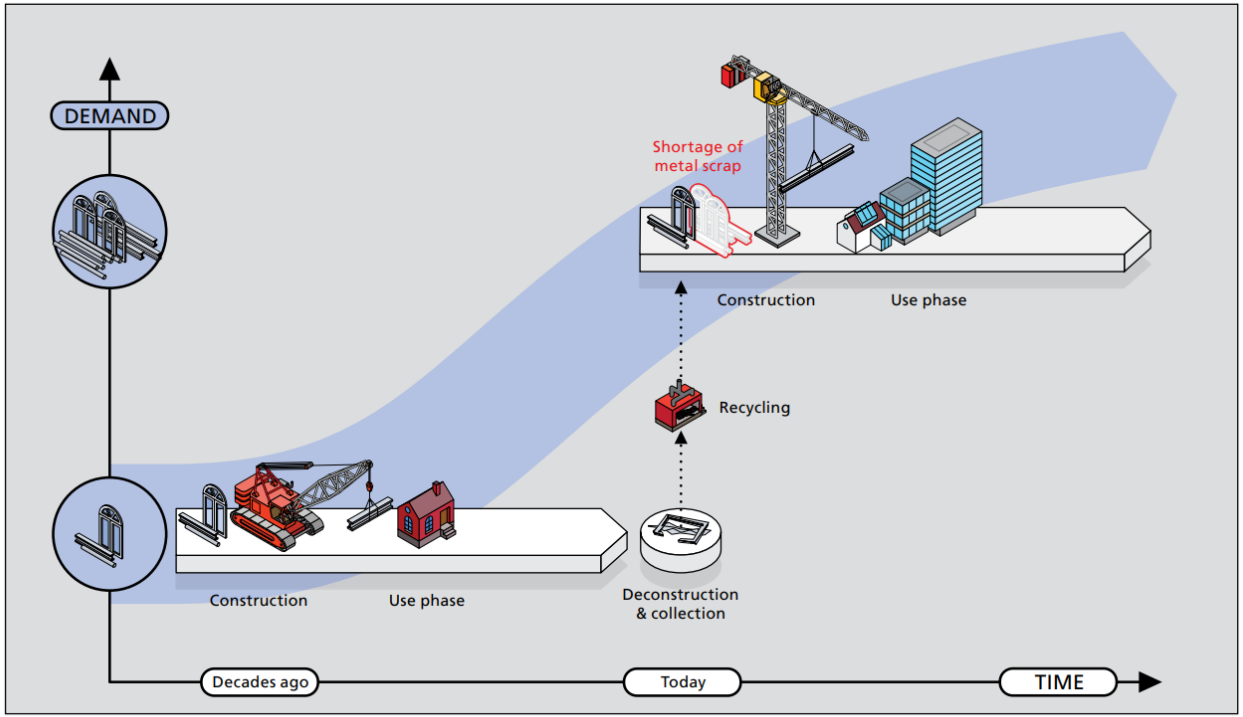
- → Not appropriate for metal products: they are already efficiently collected and recycled within a well stablished recycling market.
- → The recycled metal content does not reflect the intrinsic recycling performances of a metal product in the A&T sector.
- → **It may create market distortions and environmental inefficiencies (redirection of scrap)**

End-of-Life recycling rate

Including losses during collection, scrap preparation and melting, it directly reflects the specific recycling performance of a material/product independently from market growth or its lifespan.

- → Most relevant indicator for metal products in order to maximise and preserve metal availability for future generations see Metals Declaration on Recycling (2006)
- → A designer using an end-of-life recycling approach focuses on optimizing product recovery and material recyclability.
- → By facilitating greater end-of-life recycling, the decisionmaker mitigates the loss of material after product use and supports decisions for an efficient market.

Availability of aluminium scrap



Picture from Metals for building flyer, available here

How to apply the CFF to intermediate materials

In cradle-to-gate PEF studies, the parameters related to the product's EoL (i.e. recyclability at EoL, energy recovery, disposal) shall not be accounted for.
R2=R3=Ed=0

Use and report the results with **two A values** for the product in scope:

→ **Setting A = 1**: to be used as the default in calculating the PEF profile. This value applies only to the recycled content of the product in scope. The purpose of this setting is to enable the hotspot analysis to be focused on the actual system.

→ **Setting A = the application- or material-specific default values**: these results shall be reported as 'additional technical information' and used when creating EF compliant datasets. The purpose of this setting is to enable the correct A value to be used when the dataset is used in future modelling.

$$(1-R_1)E_v + AR_1E_{rec} + R_1(1-A)E_v\frac{Q_{s,IN}}{Q_p} + (1-A)R_2E_{recEOL} - (1-A)R_2E_v^*\frac{Q_{s,OUT}}{Q_p}$$

R2=0

R2=0

If A=1

Ev and E*v

Ev: specific emissions and resources consumed (per functional unit) arising from the acquisition and pre-processing of virgin material.
E*v: specific emissions and resources consumed (per functional unit) arising from the acquisition and pre-processing of virgin material assumed to be substituted by recyclable materials.

From PEFCR for metal sheets:

*Ev and Erecycled shall include all the relevant processes up to the **point of substitution**.*
*The **point of substitution** can be defined as the point at which recycled material effectively substitutes primary material. In the case of metals, these recycling operations involve transforming metallic scrap (of varying composition) into metallic ingot, slab or billet of specified purity and composition with well-defined properties. These recycling operations can include smelting, refining, melting and alloying processes.*
For metal sheet, the point of substitution can be defined at different places of the production chain. ***For aluminium and steel sheet the point of substitution is at slab,*** *which is the starting material for sheet production.*

Our proposals concerning E*v

When the results of the PEF study of a final product containing aluminium are communicated to the public (B2B and B2C), European Aluminium recommends two options for the calculations of the results.

Option 1

E*v= same dataset used to model Ev

Option 2

E*v=6.8 kg CO_2/kg aluminium (representing the average European production of primary aluminium), but E*v=Ev when Ev<6.8 kg CO_2/kg aluminium

THANK YOU!

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European Aluminium

ANYTHING BUT BASIC

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