JRC / DG GROW Project on the "Review of the Methodology for Ecodesign of Energy-related Products - MEErP"

STAKEHOLDER MEETING

24/6/2021

Agenda

1. **Welcome and intro to the meeting**
2. **Presentation of progress in project Tasks**

   Progress in Task 1 – Presentation

   Progress in Task 1 - Q&A

Short break

   Progress in Task 2 – Presentation

   Progress in Task 2 – Q&A

3. **Next Steps and AOB**
4. **Closing of the meeting**

TASKS

- Task 1: Updating of the EcoReport tool
- Task 2: More systematic inclusion of material efficiency aspects and of environmental footprint/ecological profile aspects in the design options and in the LLCC curve
- Task 3: More systematic inclusion of societal life cycle costs
- Task 4: More refined evaluation of the economic impacts in task 7 of the MEErP
- Task 5: Other updates and integrations

JRC / DG GROW Project on the "Review of the Methodology for Ecodesign of Energy-related Products - MEErP"

Progress on Task 1: Updating of the EcoReport tool

Content of Subtasks

- **Subtask 1.a and 1.b:** PEF impact categories in the **ERT;** List of datasets from EF3.0 to be included in the Ecoreport Tool (**ERT**).
- **Subtask 1.c:** Guidance on ERT – to be provided at a later stage
- **Subtask 1.d and 1.g:** Material efficiency and EoL modelling in the ERT and **Further updates of the EcoReport Tool**
- **Subtask 1.e**: Ecological profile: to be investigated at a later stage
- **Subtask 1.f**: Modelling of annual sales
- **Subtask 1.h:** CRMs (novel approach);
- **Subtask 1.i:** procedure for future updates- to be investigated at a later stage
- **Subtask 1.j:** IT infrastructure - to be investigated at a later stage
- **Subtask 1.k:** Other aspects from stakeholders - to be investigated at a later stage

Subtask 1.a: Impact assessment

Update impact categories in ERT

- **Objective:** Update of the impact categories in the ERT

Status ERT

- List of environmental inputs and outputs **not in line with usual impact assessments**.
- **Outdated** assessment (MEEuP in 2005 and in 2011 a partial revision)
- **Impact categories not aligned** with LCA literature (ad-hoc developments in MEErP)
- **Difficult to update** these impacts within ERT database and to include any new datasets.
- **Difficult interpretation** (very few impact cat. used to develop product requirements).

Revised ERT

- **PEF** Impact categories
- Use of **robust indicators** aligned to prominent literature
- **Facilitated continuous updates** of characterisation factors
- **Alignment with** developments in **PEF** and other **EU policies**
- **Easier interpretation**

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- **Easier interpretation**

ERTool

"NEW IMP_CAT" spreadsheet. List of Impact categories aligned with PEF.

	A	B	C	D
1		Impact categories	Unit of measurement	Selection
2	IC 1	Climate change, total	kg CO2 eq	☑
3	IC 2	Ozone depletion	kg CFC-11 eq	☑
4	IC 3	Human toxicity, cancer	CTUh	☑
5	IC 4	Human toxicity, non-cancer	CTUh	☑
6	IC 5	Particulate matter	disease incidence	☑
7	IC 6	Ionising radiation, human health	kBq U235 eq	☑
8	IC 7	Photochemical ozone formation, human health	kg NMVOC eq	☑
9	IC 8	Acidification	mol H+ eq	☑
10	IC 9	Eutrophication, terrestrial	mol N eq	☑
11	IC 10	Eutrophication, freshwater	kg P eq	☑
12	IC 11	Eutrophication, marine	kg N eq	☑
13	IC 12	Ecotoxicity, freshwater	CTUe	☑
14	IC 13	Land use	UoM	☑
15	IC 14	Water use	m3 world eq	☑
16	IC 15	Resource use, minerals and metals	kg Sb eq	☑
17	IC 16	Resource use, fossils	MJ	☑

16 PEF impact categories included in the ERT

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Subtask 1.d and 1.g: EoL modelling
(recycled content and recyclability at EoL)

- **Objective:** Revising the current approach. Granting consistency of modelling and allowing the implementation of different assumptions about the EoL modelling

Status ERT

- **Credits** based on predefined EoL mass fraction by material category and recyclability aspects.
- **Recyclability Benefit Rate** applied to plastics only
- **Missing of sufficient data** on recycled materials
- **Low transparency** (assumptions and datasets)
- Risk of **inconsistencies** (different modelling assumptions for different materials

Revised ERT

- Aligned to **PEF** method by using the **Circular Footprint Formula (CFF)** – simplified version **for Recyclability** and **Recycled content**
- **Internal Consistency** within the ERT (datasets) and with external studies (PEF results)
- Default values available (from PEF guidance documents) **Annex C**

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Circular Footprint Formula in the ERT

"Energy recovery" and "disposal in landfill" will be not implemented to keep the ERT easy and lean

Material

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

- **R1:** recycled content; default values from Annex C of the PEF method
- **R2:** recycling output rate; default values from Annex C of the PEF method
- **A:** allocation factor; default values from Annex C of the PEF method
- **Ev:** virgin material (available in the datasets)
- **Erecycled:** dataset of recycling processes of the recycled material
- **Erecycling EoL:** set equal to Erecycled
- **Ev*:** set by default equal to Ev
- **Qs/Qp:** Q parameters are set equal to 1.

Subtask 1.d and 1.g: EoL modelling
(recycled content and recyclability at EoL)

- **Simplified version of the CFF**

$$(1 - R_1)E_V + R_1 \times \left(AE_{recycled} + (1 - A)E_V\right) + (1 - A)R_2 \times \left(E_{recycled} - E_V\right)$$

- **New spreadsheet** added in the ERT for the implementation of the CFF
- Default data are assigned to the various parameters (i.e. values of the recycled content R1, recyclability R2 and allocation factor A) as referring to the PEF guidance documents
- it is possible for the user to adjust or change these values according to specific information available

ERTool

"Inputs" spreadsheet. Example of introducing new inputs for the Bill of materials

Nr	Product name Products	Date	Author	CFF implementation								
Pos nr	Bill of Materials Description of componer	Weight in g	Category Click &select lect Category first !	Virgin Material	Recycled Material	Default R1? Yes/No	**R1**, recycled content default	 custom please insert	Default R2? Yes/No	**R2**, recyclability default	 custom please insert	Default A? Yes/No	**A** coefficient default	 custom please insert
1	COMP1	50.0	01-Plastics	8-PET granulate:	51-Polyethylene terephthalate (F	Yes	0%		Yes	0%		Yes	0.5	
2	COMP2	50.0	02-Metals	18-Steel sheet c(	52-Secondary steel slab	Yes	30%		Yes	90%		Yes	0.2	
3	COMP3	50.0	01-Plastics	1-LDPE granulat	49-Plastic granulate secondary (I	Yes	0%		Yes	0%		Yes	0.5	
4	COMP4	50.0	02-Metals	196-New_NON F	197-New_NON FERRO	Yes	30%		Yes	90%		Yes	0.2	
5	COMP5	50.0	03-Electronic:	34-Capacitor SM	62-End of life of Capacitor SMD;	Yes	0%		Yes	50%		Yes	0.5	
6	COMP6	50.0	03-Electronic:	192-New_ELECT	193-New_ELECTR	Yes	0%		Yes	50%		Yes	0.5	
7	COMP7	50.0	04-Others	40-Corrugated b	66-EoL of beverage carton	No	n.a.	10%	No	n.a.	30%	Yes	0.5	

CFF implementation in the ERT

Component	Category	Virgin Material	Recycled material	Mass of materials	R1	R2	A	Climate change, total	Ozone depletion	Human toxicity, cancer	Human toxicity, non-canc
								kg CO2 eq	kg CFC-11 eq	CTUh	CTUh
COMP1	01-Plastics	8-PET granulates, amorph	51-Polyethylene terephtha	50	0%	0%	0.5	0.31	0.49	0.60	0
COMP2	02-Metals	18-Steel sheet cold rolling	52-Secondary steel slab	50	30%	90%	0.2	0.56	0.72	0.36	0
COMP3	01-Plastics	1-LDPE granulates	49-Plastic granulate seco	50	0%	0%	0.5	0.56	0.26	0.18	0
COMP4	02-Metals	196-New_NON FERRO	197-New_NON FERRO	50	30%	90%	0.2	0.83	0.40	0.40	0
COMP5	03-Electronics	34-Capacitor SMD	62-End of life of Capacito	50	0%	50%	0.5	0.79	0.59	0.02	0
COMP6	03-Electronics	192-New_ELECTR	193-New_ELECTR	50	0%	50%	0.5	0.34	0.85	0.54	0
COMP7	04-Others	40-Corrugated board	66-EoL of beverage carto	50	10%	30%	0.5	0.45	0.77	0.29	0

Results
(fictitious numbers)

Subtask 1.a and 1.b: Datasets

1.a Update of underlying datasets and 1.b introduction of additional materials

- **Objective:** Update the underlying datasets of ERT and include additional datasets on new materials also considering the possibility to provide regular updates in future

Status ERT

- **Outdated datasets**
- **Discrepancy** of emission data from the various sources
- **Lack of detail** on the data references and modelling (few documentation/metadata available)
- **Lack of datasets for certain materials and components** (especially electronics)

Revised ERT

- Replacement with **EF datasets**
- **Virgin and recycled materials** are covered
- **Consistency and robustness** across data (same rules)
- **Transparency**
- **Representativeness** at EU level
- Potential **interoperability** with LCA software
- Extension of the database to include **additional datasets**: plastics, metals and electronics

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ERTool

"NEW_ERT_DB" spreadsheet. Values in the table need to be defined (tbd). For each material both datasets on virgin and the correspondent recycled material need to be included

Category in ERT	id	Datasets	Virgin/ Recycled	Unit of measure	Climate change, total	Ozone depletion	Human toxicity, cancer	Human toxicity, non-cancer
					kg CO2 eq	kg CFC-11 eq	CTUh	CTUh
01-Plastics	1	LDPE granulates	V	kg	tbd	tbd	tbd	tbd
01-Plastics	2	HDPE granulates	V	kg	tbd	tbd	tbd	tbd
01-Plastics	3	LLDPE granulates	V	kg	tbd	tbd	tbd	tbd
01-Plastics	4	Polypropylene (PP) fibers	V	kg	tbd	tbd	tbd	tbd
01-Plastics	5	EPS Beads	V	kg	tbd	tbd	tbd	tbd
01-Plastics	6	Polystyrene production, high impact	V	kg	tbd	tbd	tbd	tbd
01-Plastics	7	PVC granulates, low density	V	kg	tbd	tbd	tbd	tbd
01-Plastics	8	PET granulates, amorphous	V	kg	tbd	tbd	tbd	tbd
01-Plastics	9	Acrylonitrile Butadiene Styrene (ABS)	V	kg	tbd	tbd	tbd	tbd
RECYCLED MATER	49	Plastic granulate secondary (low metal	R	kg	tbd	tbd	tbd	tbd
01-Plastics	11	Polycarbonate (PC) granulate	V	kg	tbd	tbd	tbd	tbd

Subtask 1.a and 1.b: Datasets

1.a Update of underlying datasets and 1.b introduction of additional materials

- **Datasets inserted by the user:** new spreadsheet “New datasets”
  - The user will have to:
    - Select category for the dataset (e.g. plastics, metals, electronics, electricity, others)
    - Name of the dataset and unit of measurement
    - For each dataset, insert the 16 LCIA values for **virgin and recycled material**.

ERTool

Category	nr	Dataset Name	Virgin/ Recycled?	Unit of measure	Climate change, total	Ozone depletion	Human toxicity, cancer	Human toxicity non-ca
Please select the category	unit				kg CO2 eq	kg CFC-11 eq	CTUh	CTUh
01-Plastics	188	New_PLAST1	V	kg	tbd	tbd	tbd	tb
	189		R		tbd	tbd	tbd	tb
01-Plastics	190	New_PLAST2	V	kg	tbd	tbd	tbd	tb
	191		R		tbd	tbd	tbd	tb
03-Electronics	192	New_ELECTR	V	item	tbd	tbd	tbd	tb
	193		R		tbd	tbd	tbd	tb
02-Metals	194	New_FERRO	V	kg	tbd	tbd	tbd	tb
	195		R		tbd	tbd	tbd	tb

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Further updates of the ERT

- **Objective:** Increase transparency and granularity level of the assessment in order to put emphasis on life cycle stages which can be more relevant for a specific product group

Status ERT

- Predefined assumptions, not possible to be modified
- Not possible to include additional materials/energy sources to be used for the various life cycle stages
- Maintenance and repair is based on fixed assumptions related to impact of manufacturing
- Distribution is based on the volume of the package
- Modelling assumptions not clear for all the life cycle phases

Revised ERT

- Impacts of '**Packaging**', '**Distribution**' and '**Maintenance & Repair**' are modelled separately and consistently
- Possible to **add energy and materials** consumed during the processes.
- **Use phase** is kept with the **same format** (but allowing to select more datasets from the database)
- **Results** of resources use and emissions are reported by phase.

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Further updates of the ERT

Manufacturing/Assembly phase & Distribution

ERTool

Pos	MANUFACTURING / ASSEMBLY		additional materials/energy compared to the Bom above used in the manufacturing (e.g. materials ending in scraps; ancillary materials, etc.).				
	Process description	Manufacturing/ Energy/ Materials	Category	Datasets	Recycled material	Amount	Unit of measure
nr	please insert	Click and select	click and select	click and select	click and select	please insert	
201	material1	Materials	02-Metals	19-Cast iron	52-Secondary steel slab		kg
202	electr	Energy	05-Electricity	80-Electricity grid mix (EU mix)			MJ
203	manuf	Manufacturing	Manufacturing	111-Forging of steel parts			kg
204							
205							

Pos	DISTRIBUTION				
nr		Description		Amount	unit
226	Transport mean 1	e.g. tranport to the regional storage	85-Articulated lorry transport, Euro 5, Total weight 28-32 t (without fuel)		kgkm
227	Distance 1				km
228	Transport mean 2	e.g. raw material transport	93-Freight train, electricity traction		kgkm
229	Distance 2				km
230	Transport mean 3	e.g. maintenance&repair	90-Barge		kgkm
231	Distance 3				km

Further updates of the ERT

Packaging & Maintenance and Repair

ERTool

Pos nr	PACKAGING Description	Material/Energy Click and select	Category Click and select	Dataset click and select	Amount	Unit of measure automatic
218	Box	Material	04-Others	40-Corrugated board		kg
219						
220						
221						

Pos	MAINTENANCE and REPAIR	Select Yes/No	percentage (adjust)			Amount	Unit of measure
	Spare parts % of product materials	Yes	1%			4	g
nr	Alternatively, if relevant and more refined data are available,please include energy and materials consumed during this stage Description	Energy/Materials Click and select	Category Click and select	Dataset click and select	Recycled material click and select	Amount	Unit of measure automatic
269	Electricity consumption	Energy	05-Electricity	80-Electricity grid mix (EU mix)		10	MJ
270	Other materials	Material	04-Others	200-New_Other	201-New_Other	5	kg
271	Steel	Material	02-Metals	21-Steel cold rolled co	52-Secondary steel slab	16	kg
272							
273							

Subtask 1.d: Material efficiency

- **Objective:** Revising the current approach. Granting consistency of modelling and allowing the implementation of different assumptions about the recyclability

Status ERT

- Modelling of the material efficiency aspects is **partially implemented** (Recyclability Benefit Rate for plastics only)
- A systematical approach would have required a **substantial revision** of the tool

Revised ERT

- Material efficiency aspects are **modelled consistently** in various parts of the tool
- **Recyclability and recycled content** are modelled as parameters of the newly introduced **CFF**
- **Reparability** is modelled as a **separate section** of the tool and materials and energy inputs can be tailored by the user.
- **Durability** is modelled through lifetime estimation and impacts normalised per year (Details in Task 2)

Subtask 1.d: Material efficiency

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Subtask 1.e: Ecological profile

- **Inspired by the new Battery Regulation proposal:**
  - Declaration of the **Carbon Footprint** (based on **PEF method** and **PEFCR** to be developed)
  - **Performance classes:** future definition

- **A similar approach** could be followed in **future Ecodesign implementing measures**
  - Communication of information on **ecological profile of products**

Task 1

Questions / Comments?

Subtask 1.e: Ecological profile

- **Inspired by the new Battery Regulation proposal:**
  - Declaration of the **Carbon Footprint** (based on **PEF method** and **PEFCR** to be developed)
  - **Performance classes:** future definition

- **A similar approach** could be followed in **future Ecodesign implementing measures**
  - Communication of information on **ecological profile of products**

Subtask 1.f: Modelling of annual sales

- **Linked to subtask 1.d Material efficiency and Task 2:**
  - Modelling based on Weibull distributed lifetime
- **Estimation of annual sales inserted by prep-study user using:**
  - either real data;
  - or a model (e.g., constant rate of growth), and Weibull parameters
- **Model would allow for evolution and changes over time of:**
  - the stock model
  - the Weibull lifetime parameters (if required by the modelling)

Shape	β	2	14.2	Average lifetime
Scale	η	16	1246	Stock
Year	Surv. factor	Sales	Surv.	Stock app.
0	1.000	100.0	100.0	1185.8
-1	0.996	98.0	97.7	1162.5
-2	0.984	96.1	94.6	1139.8
-3	0.965	94.2	91.0	1117.4
-4	0.939	92.4	86.8	1095.5
-5	0.907	90.6	82.1	1074.0
-6	0.869	88.8	77.1	1053.0
-7	0.826	87.1	71.9	1032.3
-8	0.779	85.3	66.5	1012.1
-9	0.729	83.7	61.0	992.2
-10	0.677	82.0	55.5	972.8
…	…	…	…	
-39	0.003	46.2	0.1	
-40	0.002	45.3	0.1	

Subtask 1.h: Critical Raw Materials

- **Objective:** critically revising the current approach for Critical Raw Materials

Status ERT

- Some guidelines on how to assess the impact of CRMs (based on CRM eq. index)
- Few preparatory studies applied these guidelines (in some cases ad-hoc assessment where applied)
- Not easily associated to the definition of Ecodesign measures.
- Not alighted to the updated EU criticality assessment methodology

Revised ERT

- CRM eq. index replaced by a new **step-by-step approach**
- Provide guidance and streamline the analysis with **available information**
- **Sequential screening of CRM** contained in the product under scrutiny
- Based on the results of **Criticality Assessment 2020** (and future 3 yearly updates)
- **Suggestions of strategies** supporting the mitigation of criticality

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CRMs new approach

Draft Step by step approach box

Step 1: shortlist the CRMs that are potentially in the product group using table 1, table A.2, the corresponding full table in the annexed excel, and any other additional information related to the product group;

Step 2: when possible, collect quantitative data on the BoM of the shortlisted CRMs;

Step 3: look at information available in the above tables (Substitution, RR, RIR, etc.), define a possible strategy, e.g.:

- Declare quantity when data is not available or of good quality and
- Extend lifetime, especially in the case of low substitutability;
- Improve recyclability and/or use recycled materials, especially in the case of low substitutability;

Short list of combinations of CRMs and specific application derived from the proposed methodology

B	C	D	E	I	J	L	N	O	P
Material	Application	Share	NACE-2 sector	EOL-RIR	EOL-RR	High priority	RECYCLE MORE or ADD RECYCL CONTENT	DECLARE Q.TY	EXTEND LIFE
Beryllium	Electronic and telecommunications equipment	42%	C26 - Manufacture of computer, electronic and optical products	0%	0%	X		X	
Beryllium	Transport and Defence : Vehicle electronics	17%	C26 - Manufacture of computer, electronic and optical products	0%	0%	X			
Cobalt	Magnets	7%	C27 - Manufacture of electrical equipment	22%	32%	X	X		
Cobalt	Battery	3%	C27 - Manufacture of electrical equipment	22%	32%	X	X		
Dysprosium	Magnets	100%	C25 - Manufacture of fabricated metal products, except machinery and equipment	0%	0%	X		X	
Erbium	Lighting	26%	C27 - Manufacture of electrical equipment	1%	1%	X		X	
Europium	Lighting	100%	C27 - Manufacture of electrical equipment	38%	34%	X		X	
Fluorspar	Refrigeration and air conditioning	9%	C27 - Manufacture of electrical equipment	1%	4%	X			
Gadolinium	Magnets	38%	C25 - Manufacture of fabricated metal products, except machinery and equipment	1%	1%	X		X	
Gadolinium	Lighting	25%	C27 - Manufacture of electrical equipment	1%	1%	X		X	
Gadolinium	Magnetic Resonance Imaging - MRI	8%	C21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations	1%	1%	X			
Gallium	Integrated circuits	70%	C26 - Manufacture of computer, electronic and optical products	0%	0%	X		X	
Gallium	Lighting	25%	C27 - Manufacture of electrical equipment	0%	0%	X		X	
Gallium	CIGS solar cells	5%	C26 - Manufacture of computer, electronic and optical products	0%	0%	X			
Germanium	Infrared optics	47%	C26 - Manufacture of computer, electronic and optical products	2%	12%	X		X	
Germanium	Optical fibres	40%	C27 - Manufacture of electrical equipment	2%	12%	X		X	
Germanium	Satellite solar cells	13%	C26 - Manufacture of computer, electronic and optical products	2%	12%	X			

Task 1

Questions / Comments?

JRC / DG GROW Project on the "Review of the Methodology for Ecodesign of Energy-related Products - MEErP"

Progress on Task 2:

"More systematic inclusion of material efficiency aspects and of environmental footprint/ecological profile aspects in the design options and in the LLCC curve"

Subtasks breakdown

a) Guidelines for systematic inclusion of design options related to ME and EF/EP

- e.g., increased durability / reparability / recyclability

b) Guidelines on the LCC of the design options developed at a)

- Factoring of each cost category
- How to deal with costs which could significantly vary across the EU and Minimum data quality on costs/prices
- Systematic inclusion of lifetime in the LLCC ranking by normalization of costs per year

c) Other options for inclusion of lifetime in the LLCC ranking

General principles for Task 2

a) Align as much as possible the nomenclature and modelling with the work done by CEN/CENELC JTC10 and the family of standards EN 4555X.

b) Align with the EoL modeling based on the Circular Footprint Formula (CFF), which as already been decided upon. Specifically, this means being able to inform the costume calculation of recyclability and other material efficiency parameters.

c) The calculation (estimation) of the lifetime is the cornerstone of Task 2. It will be used to normalize one-off quantities and allow for an equivalent annual to be determined.

Lifetime calculation

The lifetime of a product (durability under the nomenclature of EN 45552) will be calculated based on its initial lifetime expectation (reliability under the nomenclature of EN 45552) plus the lifetime increase due to repairability and upgradability. These calculations will be based on a scoring system with discrete steps. The discrete levels are dependent on the product's design characteristics.

Reliability	
Level	Initial lifetime (L_0)
1	AA
2	BB
3	CC
4	DD

Repairability	
Level	% increase in lifetime (ΔL_R)
1	XX%
2	YY%
3	ZZ%
4	0%

Upgradability	
Level	% increase in lifetime (ΔL_U)
1	XX%
2	YY%
3	ZZ%
4	0%

Outline of method for lifetime calculations - I

a) According to standards EN 4555X, a number of critical components for repair and upgrade are identified.

b) These components will be treated as a series assembly, meaning that the failure of just one component will determine the failure of product as whole.

c) The initial lifetime of the product (reliability) is estimated - based on design characteristics – using the discrete steps scoring system previously presented.

Outline of method for lifetime calculations - II

d) The cost of repair and upgrade operations is estimated based on:

1. The labor (in hours) required to carry out the operation. This is dependent on the ease of the operation and, therefore, on the product's design characteristics. The discrete steps scoring system previously presented can be used for this task.
2. The cost of labor (per hour). This cost can vary substantially across Member States. However, a single value must be used in all situations. A method to approach this problem will be proposed further ahead.
3. The cost of required parts (required parts can be estimated from the Bill-of-Materials present in the EcoReport Tool and their cost – which are expected to be quite homogeneous across the EU - can be found through market research).

Outline of method for lifetime calculations - III

e) A cost analysis is performed (given the relative cost of repair or upgrade compared to the purchase price of a new item) to determine the minimum (critical) lifetime extension that is economically viable to be carried out.

1. Notice that this is a method to decide to either repair (or upgrade) or replace the item. As such, any other method that allows to take the decision to repair or replace could also be used. One example of such a method is the 'durability index' model, which takes the decision to repair or replace based on energy consumption.
2. Regardless of the method used, the important aspect is that a critical lifetime extension is calculated, i.e., if a repair (or upgrade) operation is expected to extend the product's lifetime by more than the critical lifetime extension, then the operation will be carried out. Otherwise, the product will be replaced.

Outline of method for lifetime calculations - IV

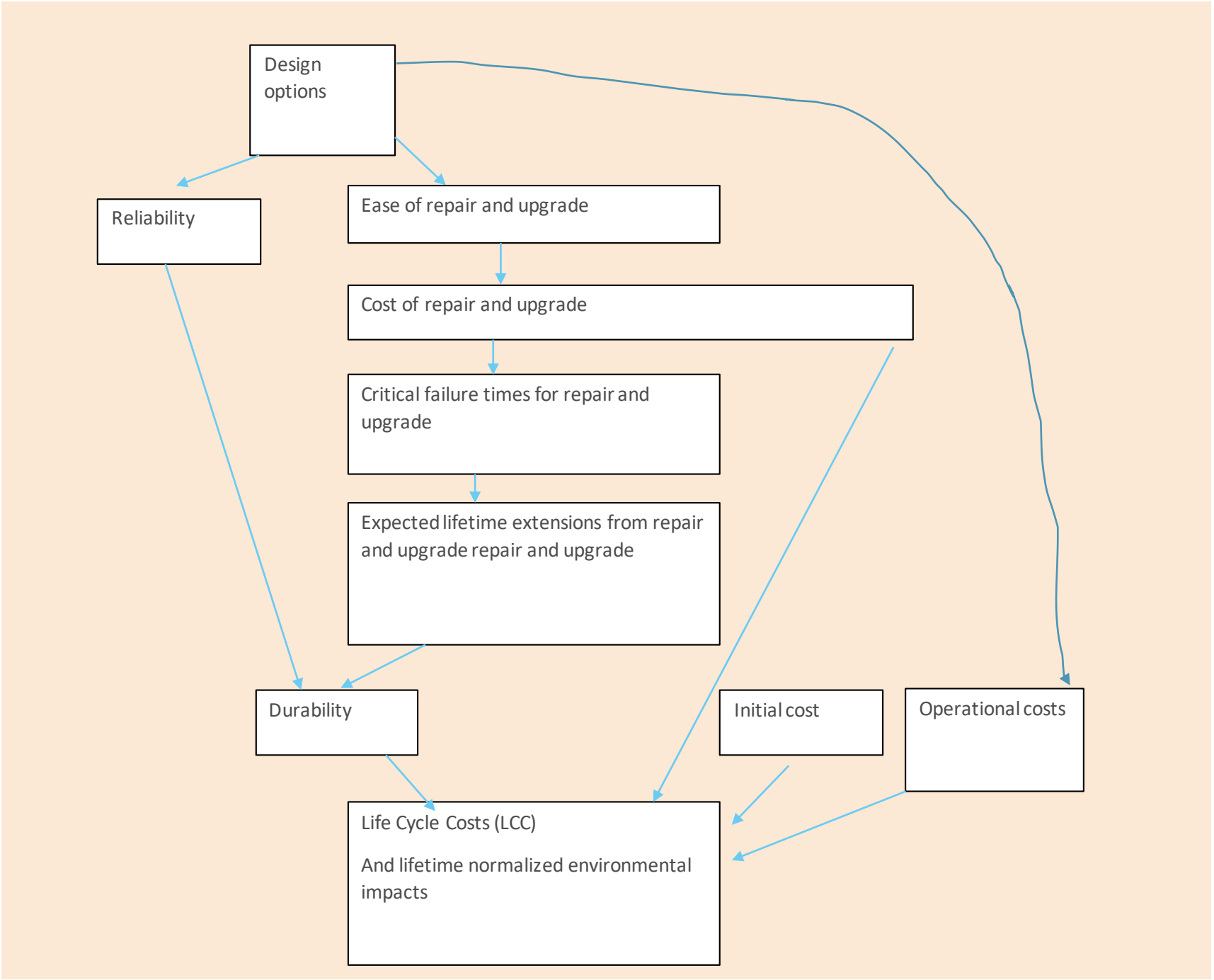
f) It is assumed that each product will at most undergo 1 repair or upgrade operation, i.e., the second failure (either due to repair or upgrade needs) will bring about the product's end of life.

g) Given the critical lifetime extension calculated before, a critical time of failure will be calculated, i.e., if the product fails for the first time before this critical time, then it will be repaired or upgraded, according to the case. If the first failure happens after this critical time, or if a second failure takes place, then the product will not be repaired or upgraded and will simply be replaced.

h) New lifetimes are calculated taking into account the described repair or upgrade scenarios.

i) Increased lifetimes (%) are calculated and used to fill in the scoring tables.

Flowchart



Task 2

Questions / Comments?

An Example:

As an illustration of the kind of results that can be possible to obtain, we present below an example of possible values for an electronic device (values are used for purely exemplification purposes).

Reliability	
Level	Initial lifetime (L_0)
1	6.3 yrs
2	5.7 yrs
3	5.2 yrs
4	4.7 yrs

Repairability	
Level	% increase in lifetime (ΔL_R)
1	6%
2	5%
3	3%
4	0%

Upgradability	
Level	% increase in lifetime (ΔL_U)
1	19%
2	17%
3	10%
4	0%

In the example above, you can see that the overall durability can float from a minimum of 4.7 years to a maximum of 8 years. Therefore a 70% increase in longevity (durability) is possible through an adequate choice of design options.

$$Lt_{min} = 4.7(1+0\%)(1+0\%) = 4.7\ yrs$$

$$Lt_{max} = 6.3(1+6\%)(1+19\%) = 8\ yrs$$

Dealing with Costs that can vary significantly across the EU

a) Some costs - such as labor costs associated with repair operations - can vary significantly across the EU.

b) In such cases, we propose the following procedure:

   1) Estimate the product's stock in place for each member state using the sales/stock model presented in task 1.f

   2) Average out the costs under analysis across Member States using the stock in place previously calculated as a weighting factor

Dealing with other material efficiency parameters (e.g., recyclability)

a) In the cases where the recyclability default average (stated in the EcoReport Tool) value is not adequate, a more specific estimate can be estimated based on a discrete steps scoring system identical to the durability one.

Recyclability	
Level	% recoverable mat. (rcycl%)
1	XX%
2	YY%
3	ZZ%
4	0%

b) About recycled content, the values for this parameter will be principally implemented in the Bill-of-Materials of the EcoReport Tool.

Task 2

Questions / Comments?

Thank you for your attention

European Commission