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Challenges in the practical application of LCA exemplified by DTAG

Herausforderungen in der praktischen Anwendung von LCA am Beispiel der DTAG

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Berlin, September 2023

Our sustainability commitments are relevant for product design

We take responsibility for climate and resource protection and support the 1.5-degree target of the Paris climate agreement[1)]

Net-zero
for internal emissions until 2025

100 % renewable
electricity for DT Group from 2021 onwards

Achievement requires LCA

55 % reduction
Scope 1-3 emissions by 2030

Net-zero
From the production to the customer until 2040

Sustainable packaging

Save resources:

100% for all new T-branded devices in 2022
100% for all devices in 2025

Full circularity
around technology and devices until 2030

1) Certified by the Science Based Targets Initiative.

How to approach the target achievement?

The mobile phone business constitutes a substantial portion of DTAG's scope 3 emissions and needs to contribute to reductions

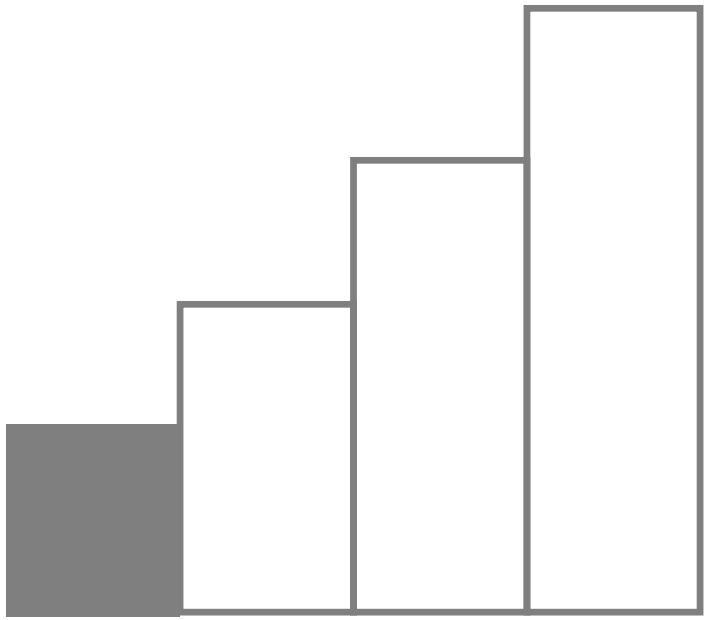
Step 1: emission inventory

Step 2: identify levers for reduction

Step 3: work with partners on key levers

Step 4: measure of success

Step 1



Key consideration

- What is the current basis of emissions that needs to be reduced?

Need

- Accurate emission data for each device type in portfolio
- Data need to be provided by partners in the supply chain

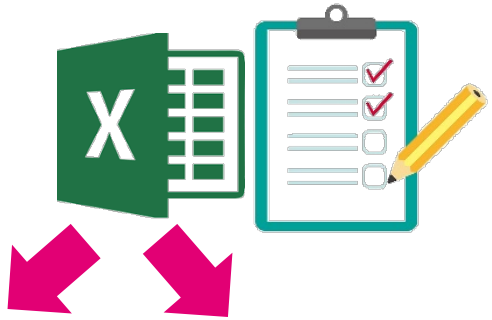
Challenges

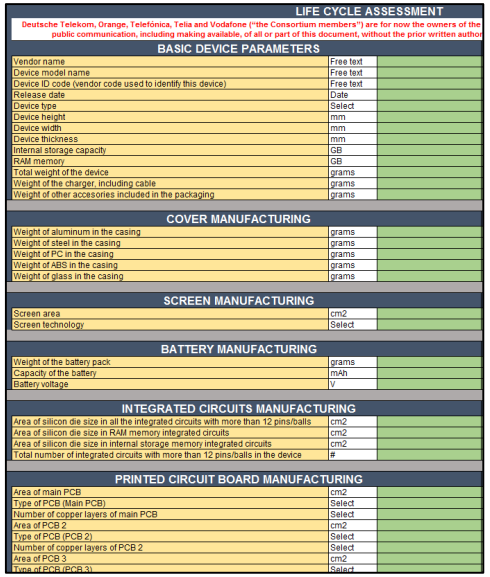
- Not every partner has the data as of now
- Lack of comparability of data from different sources
- What is the “calibration factor” to make data comparable?
- What is the reference factor (unit/device)?

THE ECO RATING METHODOLOGY – the solution to the challenges

The tool

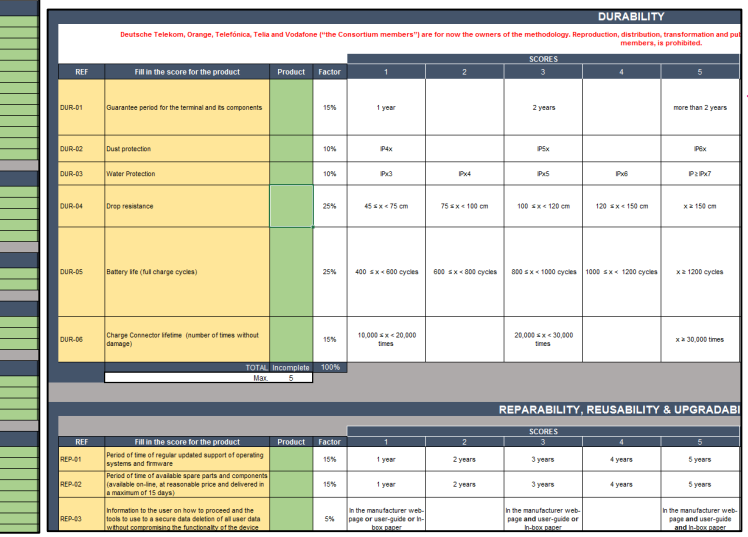
EXCEL-BASED QUESTIONNAIRES
ALLOWING TO OBTAIN THE FULL EVALUATION OF THE DEVICE





LIFE CYCLE ASSESSMENT

BASIC DEVICE PARAMETERS	
Vendor name	Free text
Device model name	Free text
Device ID code (vendor code used to identify this device)	Free text
Release date	Date
Device type	Select
Device height	mm
Device width	mm
Device thickness	mm
Internal storage capacity	GB
RAM memory	GB
Total weight of the device	grams
Weight of the charger, including cable	grams
Weight of other accesories included in the packaging	grams
COVER MANUFACTURING	
Weight of aluminum in the casing	grams
Weight of steel in the casing	grams
Weight of PC in the casing	grams
Weight of ABS in the casing	grams
Weight of glass in the casing	grams
SCREEN MANUFACTURING	
Screen area	cm2
Screen technology	Select
BATTERY MANUFACTURING	
Weight of the battery pack	grams
Capacity of the battery	mAh
Battery voltage	V
INTEGRATED CIRCUITS MANUFACTURING	
Area of silicon die size in all the integrated circuits with more than 12 pins/balls	cm2
Area of silicon die size in RAM memory integrated circuits	cm2
Area of silicon die size in internal storage memory integrated circuits	cm2
Total number of integrated circuits with more than 12 pins/balls in the device	#
PRINTED CIRCUIT BOARD MANUFACTURING	
Area of main PCB	cm2
Type of PCB (Main PCB)	Select
Number of copper layers of main PCB	Select
Area of PCB 2	cm2
Type of PCB (PCB 2)	Select
Number of copper layers of PCB 2	Select
Area of PCB 3	cm2
Type of PCB (PCB 3)	Select



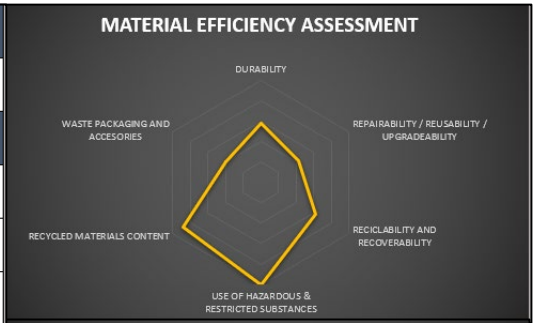
DURABILITY

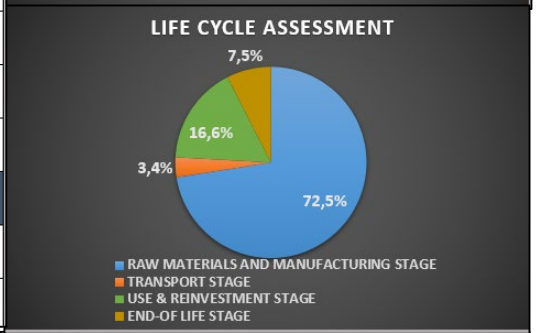
REF	Fill in the score for the product	Product	Factor	SCORES 1	2	3	4	5
DUR-01	Guarantee period for the terminal and its components		15%	1 year		2 years		more than 2 years
DUR-02	Dust protection		10%	IP4x		IP5x		IP6x
DUR-03	Water Protection		10%	IPx3	IPx4	IPx5	IPx6	IP ≥ IPx7
DUR-04	Drop resistance		25%	45 ≤ x < 75 cm	75 ≤ x < 100 cm	100 ≤ x < 120 cm	120 ≤ x < 150 cm	x ≥ 150 cm
DUR-05	Battery life (full charge cycles)		25%	400 ≤ x < 600 cycles	600 ≤ x < 800 cycles	800 ≤ x < 1000 cycles	1000 ≤ x < 1200 cycles	x ≥ 1200 cycles
DUR-06	Charge Connector lifetime (number of times without damage)		15%	10,000 ≤ x < 20,000 times		20,000 ≤ x < 30,000 times		x ≥ 30,000 times
	TOTAL Incomplete		100%					
	Max. 5							

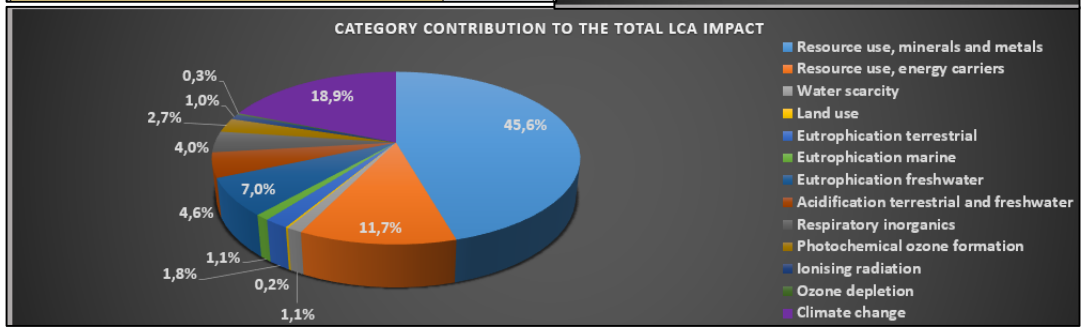
REPARABILITY, REUSABILITY & UPGRADABI

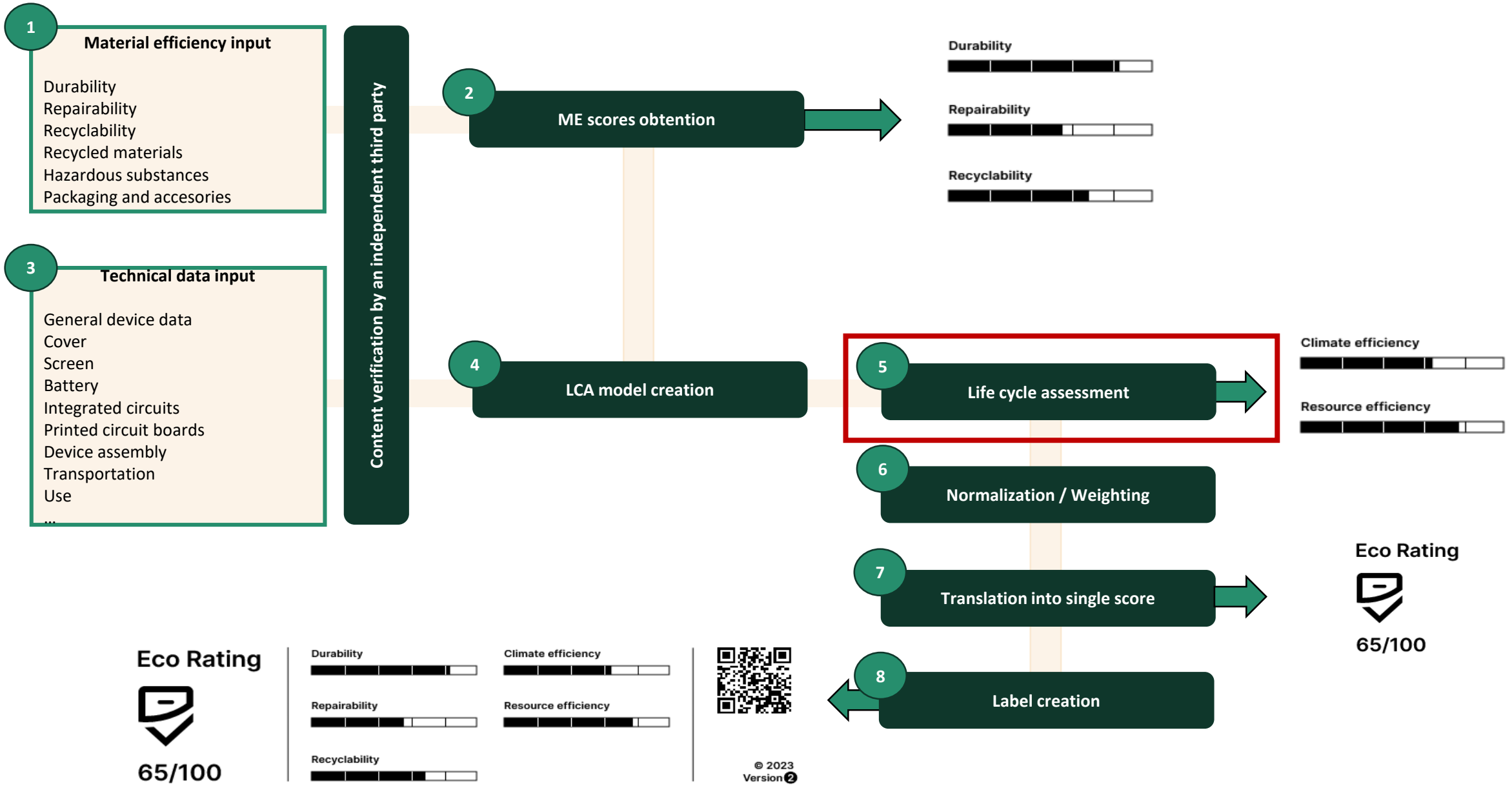
REF	Fill in the score for the product	Product	Factor	SCORES 1	2	3	4	5
REP-01	Period of time of regular updated support of operating systems and firmware		15%	1 year	2 years	3 years	4 years	5 years
REP-02	Period of time of available spare parts and components (available on-line, at reasonable price and delivered in a maximum of 15 days)		15%	1 year	2 years	3 years	4 years	5 years
REP-03	Information to the user on how to proceed and the tools to use to a secure data deletion of all user data without compromising the functionality of the device		5%	In the manufacturer web-page or user-guide or In-box paper		In the manufacturer web-page and user-guide or In-box paper		In the manufacturer web-page and user-guide and In-box paper

OVERALL RESULT	SCORE
ECO-RATING SCORE	80
MATERIAL EFFICIENCY RESULTS	**SCORE**
DURABILITY	58
REPAIRABILITY / REUSABILITY / UPGRADEABILITY	43
RECICLABILITY AND RECOVERABILITY	62
USE OF HAZARDOUS & RESTRICTED SUBSTANCES	100
RECYCLED MATERIALS CONTENT	88
WASTE PACKAGING AND ACCESORIES	40
ADDTIONAL RESULTS	**SCORE**
LOW CLIMATE CHANGE	68
LOW RESOURCE USE	83








1
Material efficiency input
Durability
Repairability
Recyclability
Recycled materials
Hazardous substances
Packaging and accesories
3
Technical data input
General device data
Cover
Screen
Battery
Integrated circuits
Printed circuit boards
Device assembly
Transportation
Use
...
Content verification by an independent third party
2
ME scores obtention
Durability
Repairability
Recyclability
4
LCA model creation
5
Life cycle assessment
Climate efficiency
Resource efficiency
6
Normalization / Weighting
7
Translation into single score
Eco Rating
65/100
8
Label creation
Eco Rating
65/100
Durability
Repairability
Recyclability
Climate efficiency
Resource efficiency
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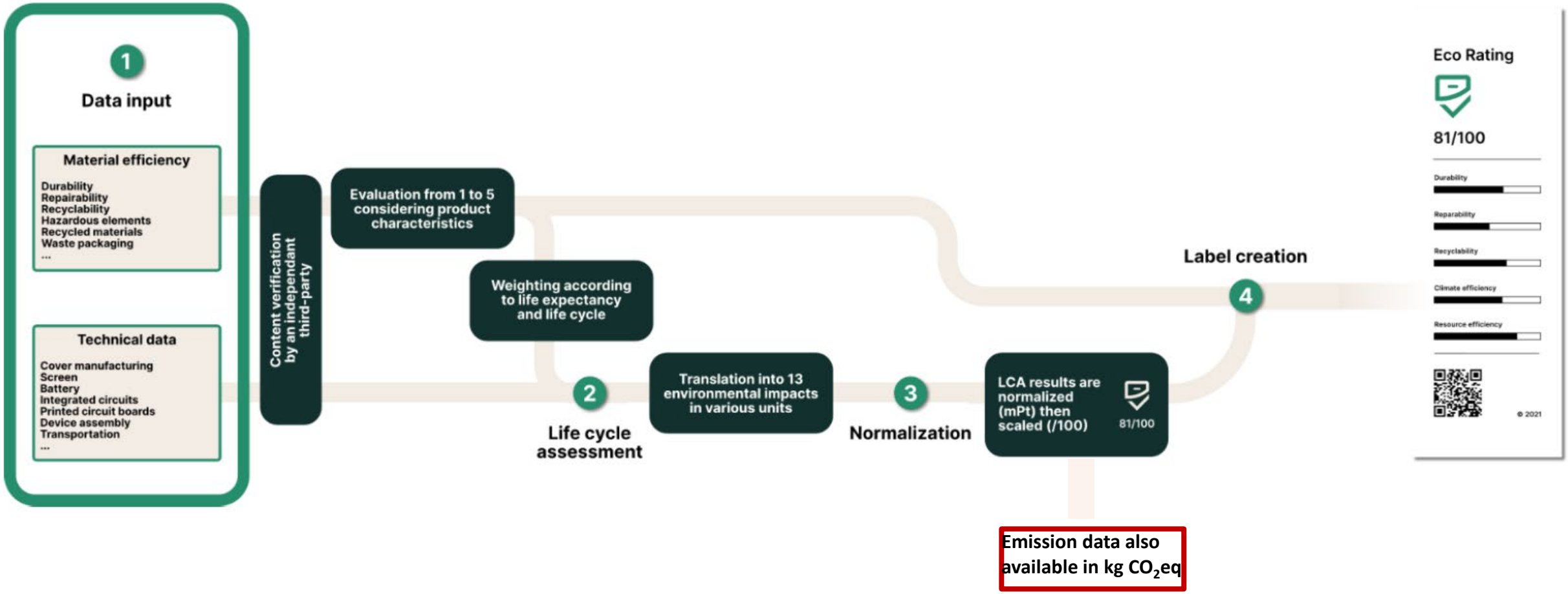
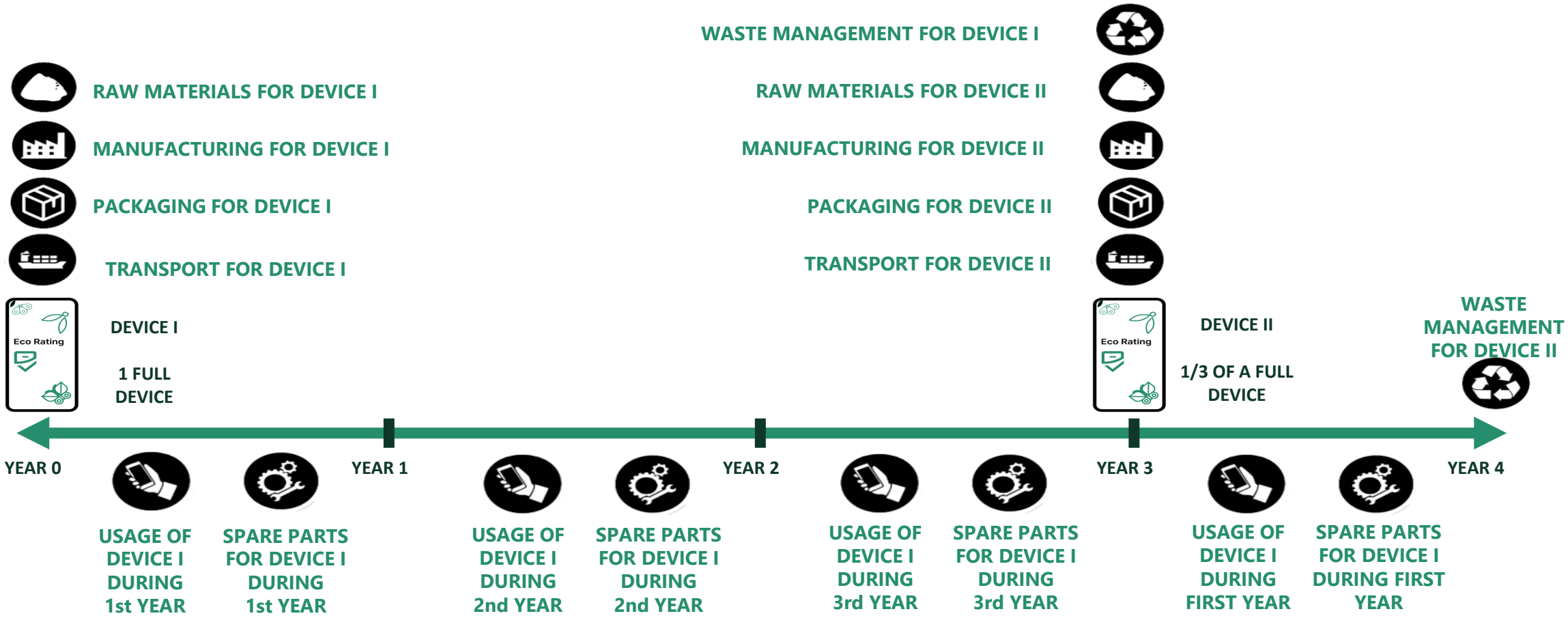
THE ECO RATING METHODOLOGY

Calculation Procedure

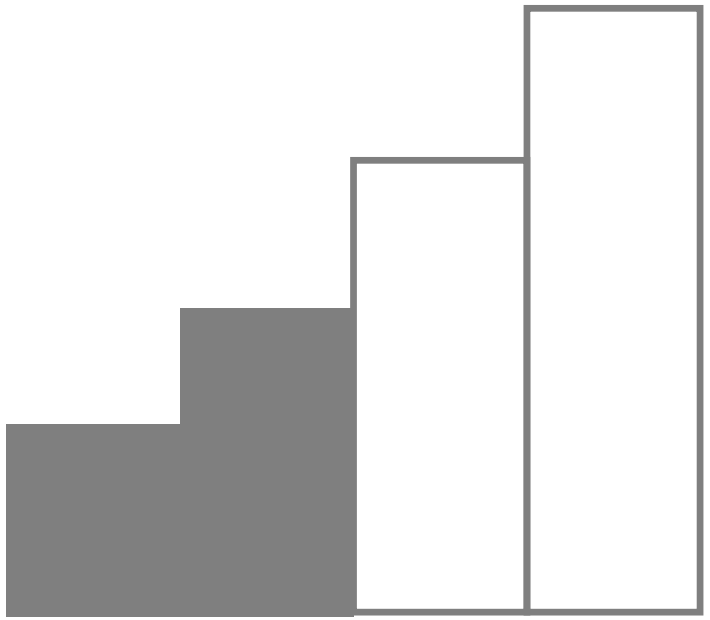



RAW MATERIALS FOR DEVICE I
MANUFACTURING FOR DEVICE I
PACKAGING FOR DEVICE I
TRANSPORT FOR DEVICE I
Eco Rating
DEVICE I
1 FULL DEVICE
WASTE MANAGEMENT FOR DEVICE I
RAW MATERIALS FOR DEVICE II
MANUFACTURING FOR DEVICE II
PACKAGING FOR DEVICE II
TRANSPORT FOR DEVICE II
Eco Rating
DEVICE II
1/3 OF A FULL DEVICE
WASTE MANAGEMENT FOR DEVICE II
YEAR 0
YEAR 1
YEAR 2
YEAR 3
YEAR 4
USAGE OF DEVICE I DURING 1st YEAR
SPARE PARTS FOR DEVICE I DURING 1st YEAR
USAGE OF DEVICE I DURING 2nd YEAR
SPARE PARTS FOR DEVICE I DURING 2nd YEAR
USAGE OF DEVICE I DURING 3rd YEAR
SPARE PARTS FOR DEVICE I DURING 3rd YEAR
USAGE OF DEVICE I DURING FIRST YEAR
SPARE PARTS FOR DEVICE I DURING FIRST YEAR

Step 2

Key consideration

- Focus resources on biggest contributors
- Realize quick wins



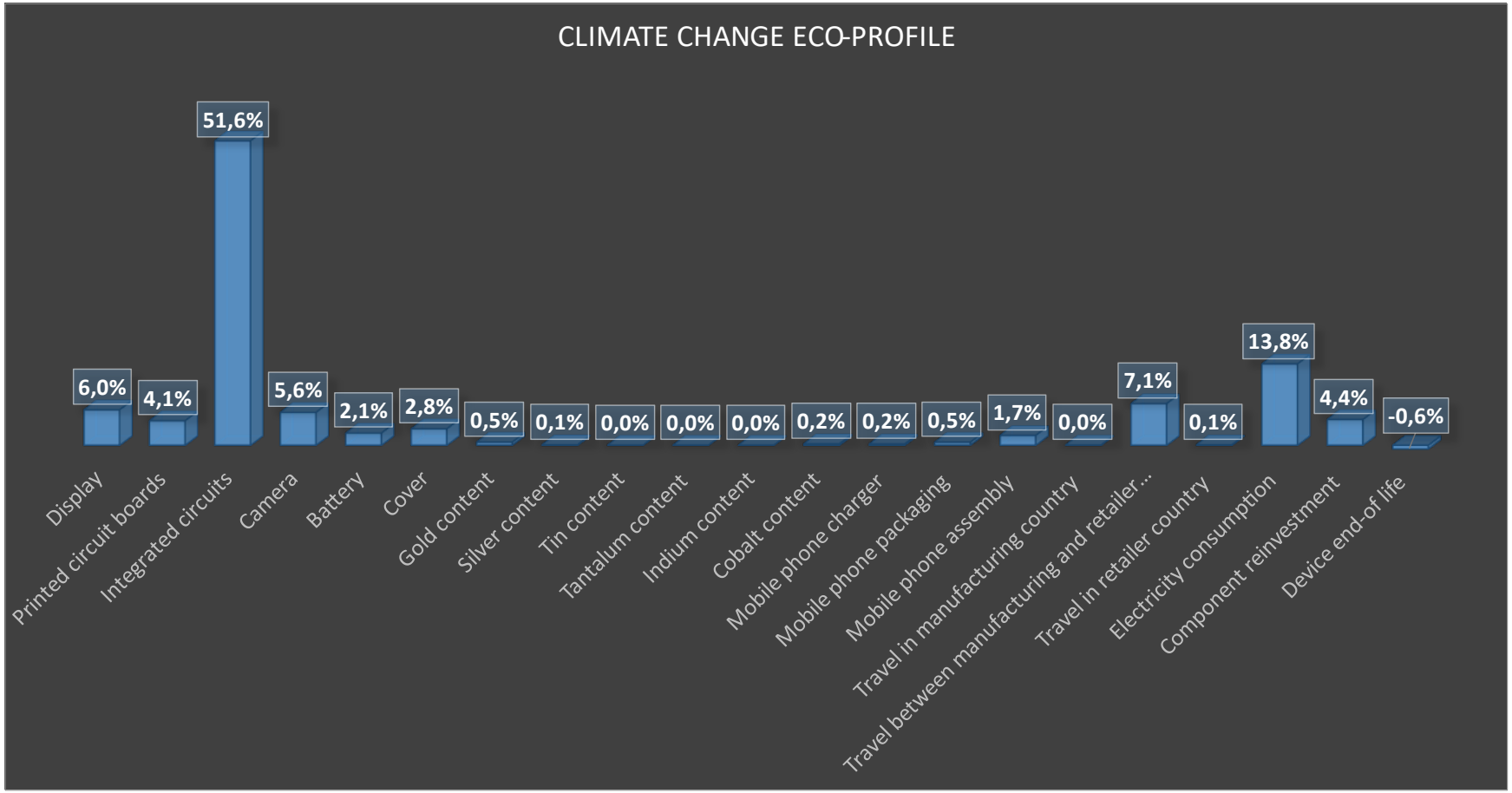
Need

- Quantify the contributions of each LCA element
- Identify reduction measures for relevant LCA elements

Challenges

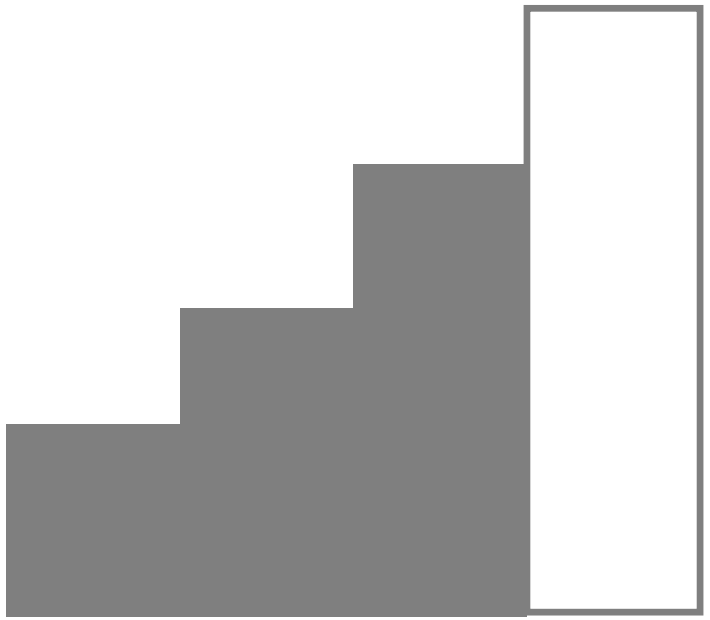
- Partners in the supply chain may not have such detail data or may not want to disclose it

Identifying the levers



- Integrated circuits are the main contributor
- Resulting necessity to look into the manufacturing of integrated circuits to yield appreciable emission reductions for Smartphones
- Integrated circuits are the result of a wider supply chain; emission reduction contributions required from all players in the supply chain

Step 3



Key consideration

- Engage with partners in the supply chain to tackle emissions
- Just one player cannot do it alone

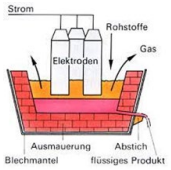
Need

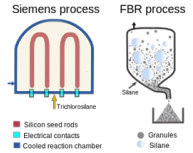
- Joint commitment along the supply chain to find ways to reduce emissions

Challenges

- Diverging interests of the players in the supply chain
- Technology for emission reduction not yet available or mature
- Difficult control of success

Semiconductors – very energy-intensive production





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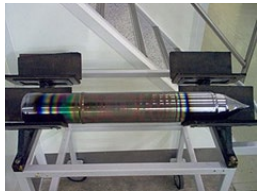

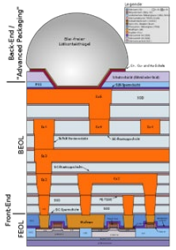

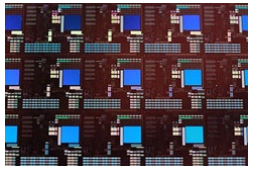

- Reductions in this area are essential for the emission reductions in the whole mobile phone industry
- Otherwise, pressure will increase on production volume reduction by longer use to still fulfill emission reduction targets
- Information exchange with the wider supply chain is meaningful to understand and/or trigger emission reduction concepts there

Step 4

Key consideration

- Emission reductions need to be quantifiable and provable, also in view of the upcoming Green Claims directive
- Residual emissions need to be compensated, so these need to be kept as small as possible

Need

- Select reduction measures also in view of later measurability and provability

Challenges

- How to deal with emission reductions that are not quantifiable?
- Emission reductions must exceed uncertainty range of original emission inventory

Thank You!


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