

# ESPR – Tyres Tasks 5-7

Preparatory Study and Impact Assessment  
support study on tyres

Stakeholder Meeting – 8 June 2026

Oeko-Institut, Ecomatters B.V., Trinomics B.V. and VITO

# Agenda



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- Please **state your name and affiliation** before speaking.
- Participants are expected to exchange thoughts and ideas in a **respectful manner**.



# Agenda – morning

Time	Topic	Presenter (Institution)
09:00	<i>Arrival and registration</i>	
09:30	Welcome (Disclaimer, CoC, Agenda)	Daniel Hinchliffe (Oeko-Institut)
09:35	Introduction to ESPR	Lie Heymans / Pierre Henry (DG ENV) Alexander von Campenhausen (DG GROW)
09:45	Recap of Tasks 1-4	Yifaat Baron (Oeko-Institut)
10:00	Task 5 - LCA	Maria Papavasileiou, Max Sonnen (Ecomatters)
10:45	Coffee break	
11:00	Task 5 - Substances of concern	Yifaat Baron (Oeko-Institut)
11:30	<i>Task 6 – Design Options</i>	Daniel Hinchliffe (Oeko-Institut)
12:30	<i>Lunch break (including 15 min to re-enter the building)</i>	

## Agenda – afternoon

Time	Topic	Presenter (Institution)
13:45	Task 7 – Policy Options	Daniel Hinchliffe (Oeko-Institut)
15:15	<i>Coffee break</i>	
15:30	Digital product passport	Yifaat Baron (Oeko-Institut)
16:30	<i>Wrap up and next steps</i>	Daniel Hinchliffe (Oeko-Institut)
16:45	<i>End of meeting – thank you for joining!</i>	

# Welcome and Introduction

Lie Heymans / Pierre Henry –  
DG ENV (EC)



Image: Getty Images

# Ecodesign for Sustainable Products Regulation (ESPR)

## A short introduction

ESPR for tyres | Second stakeholder meeting

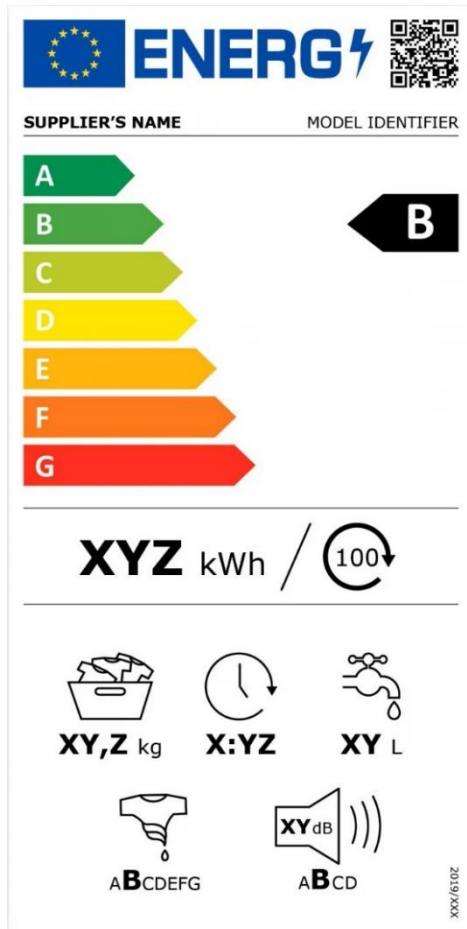
*8 June 2026*

Lie Heymans, DG Environment

# The Ecodesign for Sustainable Products Regulation (ESPR)

1. Looking back: the Ecodesign and Energy Labelling Directives
2. ESPR: what's new?
3. ESPR: the process

# Building on the success of the Ecodesign Directive and the Energy Labelling Directive

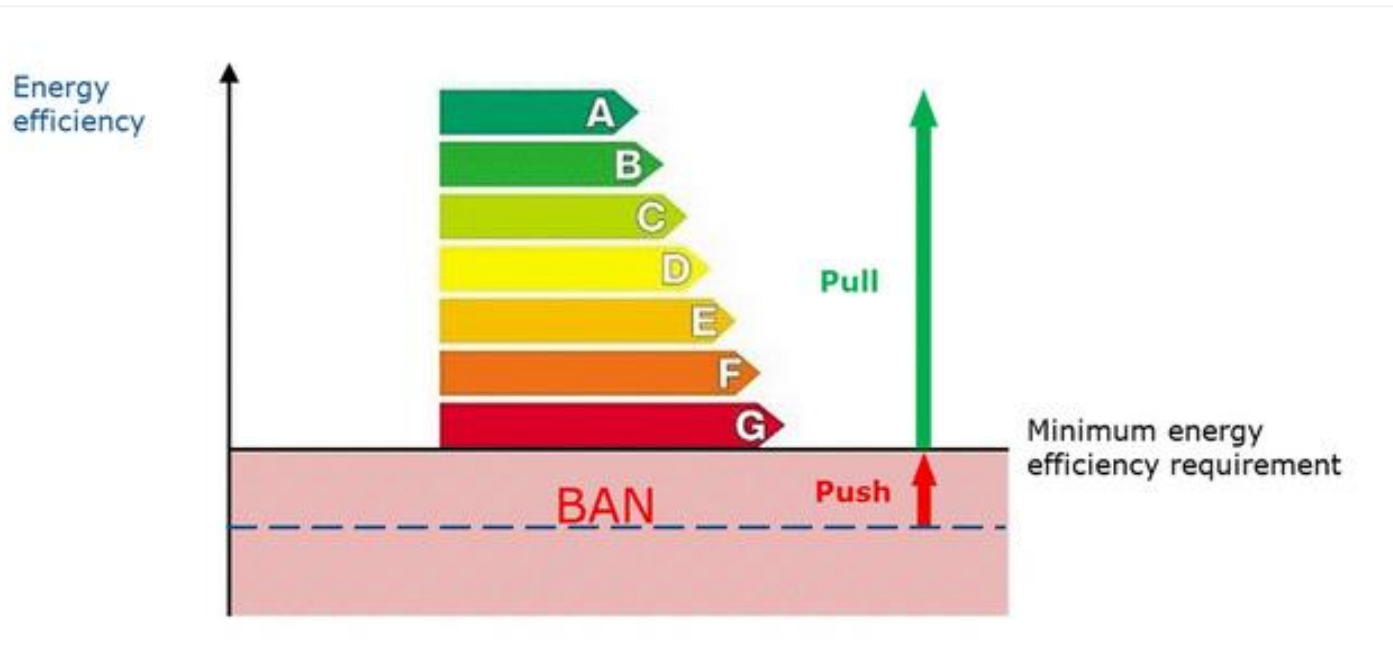


**Energy labelling:** mandatory energy label for all regulated products placed on the EU market

**Ecodesign:** minimum efficiency requirements for all regulated products placed on the EU market

More information: [Energy Label web page](#)  
[Ecodesign web page](#)

# How ecodesign and energy labelling requirements steer the markets



Energy labelling "pulls" the market towards more efficient products

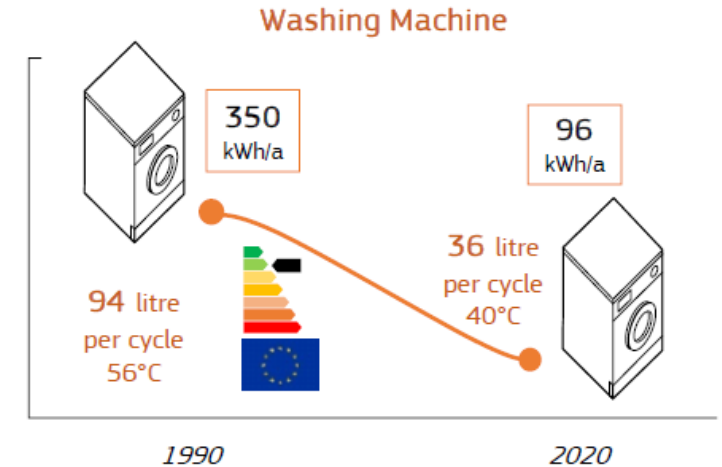
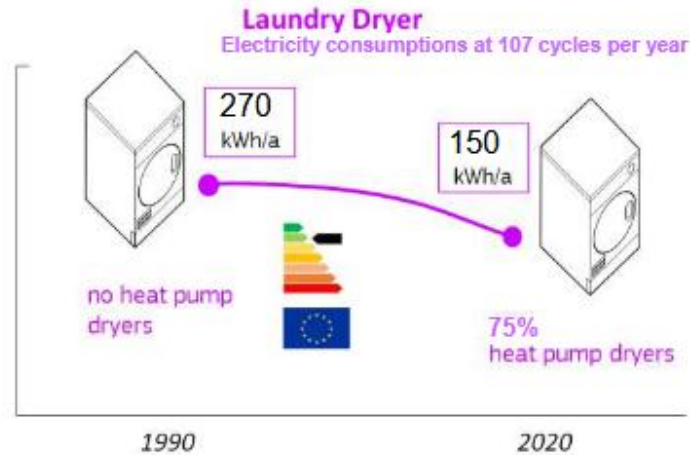
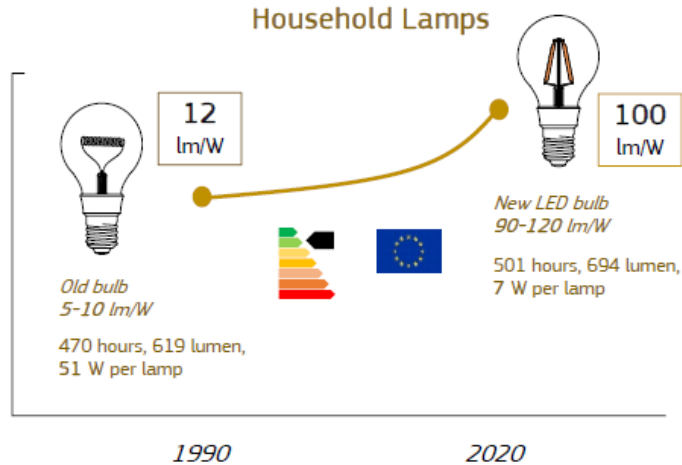
Ecodesign requirements "push" the market towards more efficient products

## Legal basis:

**Article 114 TFEU** on the functioning of the Internal Market

=> applicable to all products placed on the market

# A powerful instrument to bring about energy savings



Impact on consumer choices  
=  
75%

Estimated financial savings per household  
=  
EUR 209 per year

The estimated GHG savings (all measures combined)  
=  
-9%

# The Ecodesign for Sustainable Products Regulation (ESPR)

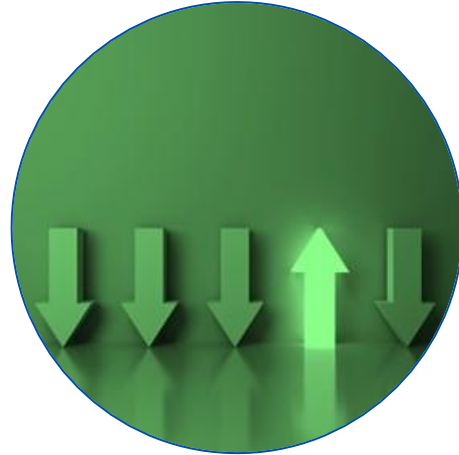
1. Looking back: the Ecodesign and Energy Labelling Directives
- 2. ESPR: what's new?**
3. ESPR: the process

# Opening up to more possible interventions



## Broader scope

Moving beyond energy-related products to a **wide product scope**



## New sustainability & ecodesign aspects

e.g. **performance requirements** – e.g. durability, CO<sub>2</sub> footprint, recycled content, ...



## Strong focus on product information

**Digital Product Passport**, labels & information requirements



## And more ...

Horizontal measures, **Green Public Procurement**, prohibition of destruction of unsold goods, support for market surveillance, ...

# Key product aspects under ESPR

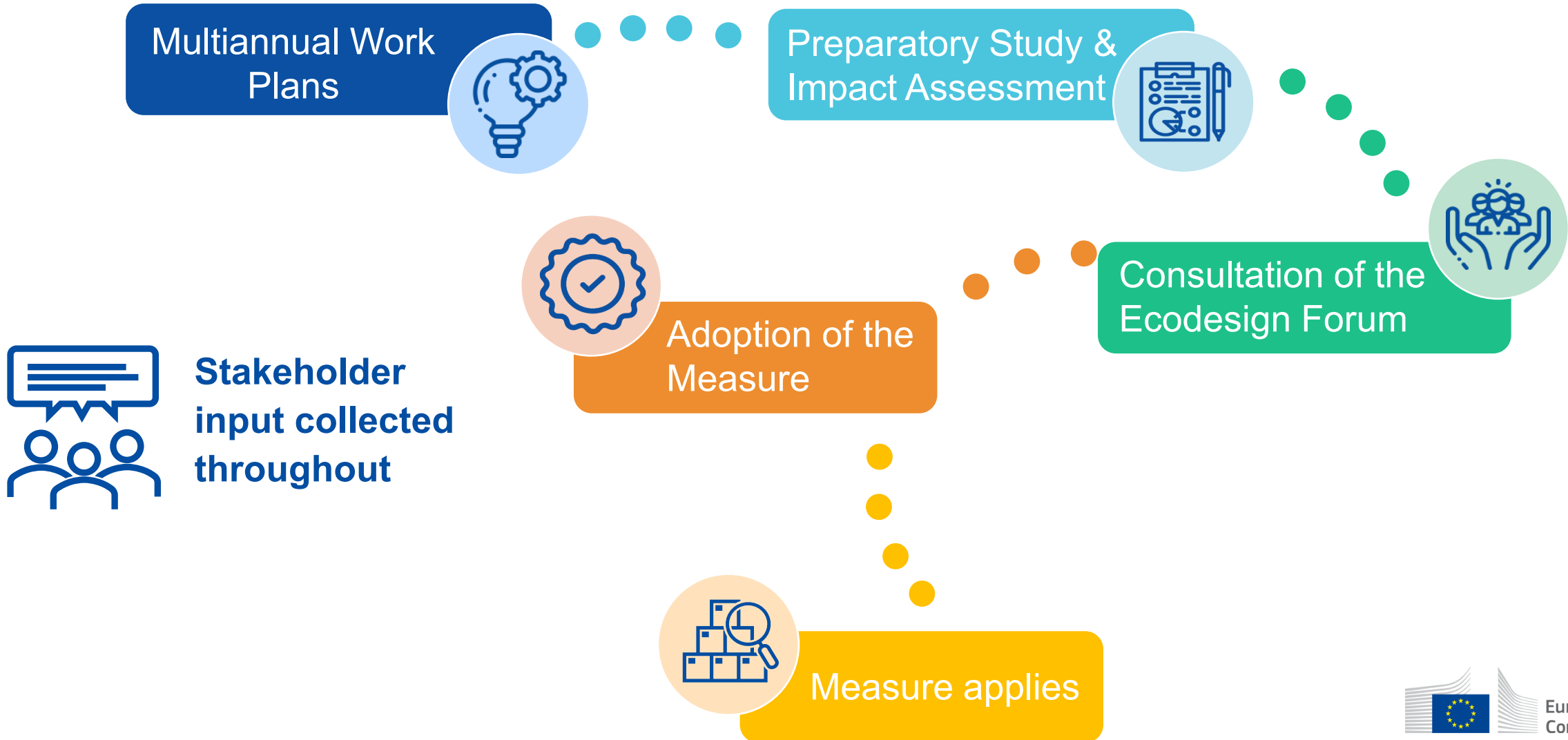
## Article 5 – Ecodesign requirements



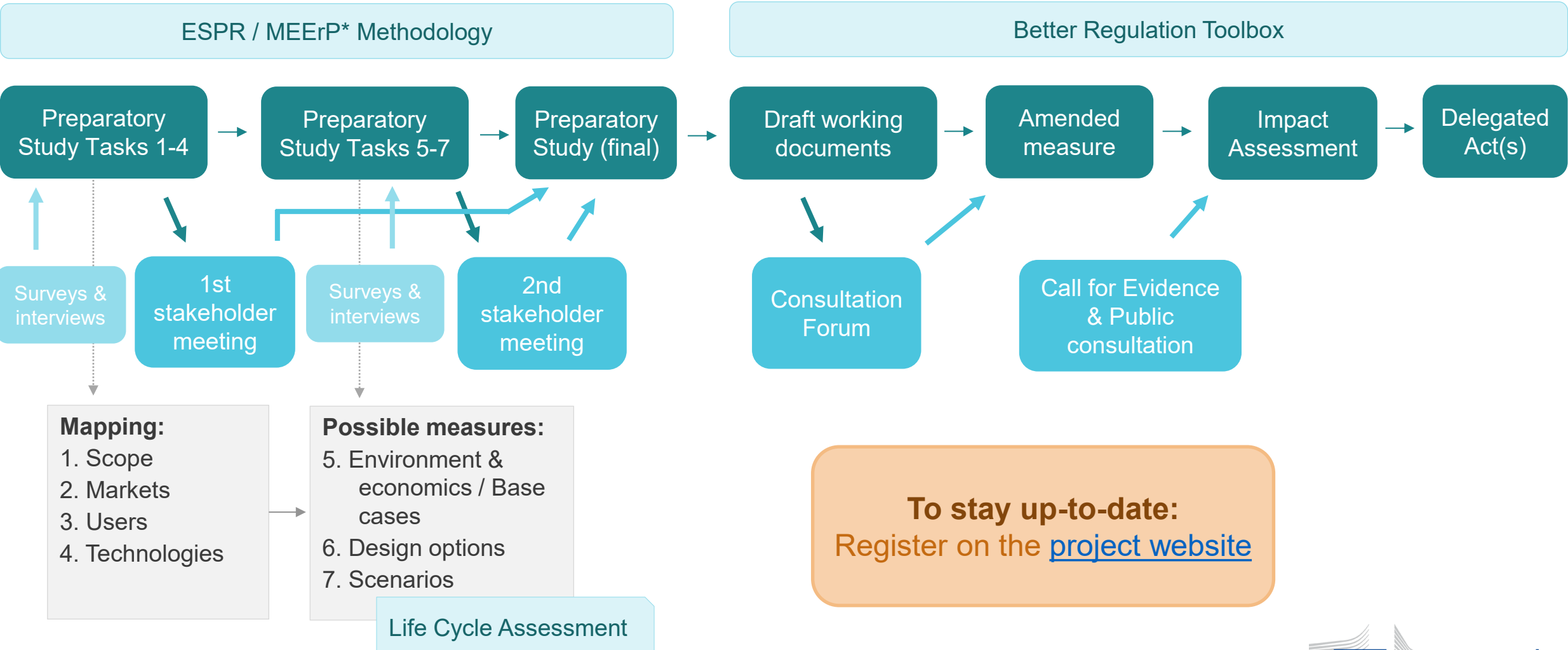
# The Ecodesign for Sustainable Products Regulation (ESPR)

1. Looking back: the Ecodesign and Energy Labelling Directives
2. ESPR: what's new?
- 3. ESPR: the process**

# A multi-staged process



# A thorough process with extensive stakeholder consultation



\* Methodology for the Ecodesign for Energy Related Products  
 More information: [MEErP web page](#)

# The Ecodesign for Sustainable Products Regulation (ESPR)

1. Looking back: the Ecodesign and Energy Labelling Directives
2. ESPR: what's new?
3. ESPR: the process

# Thank you



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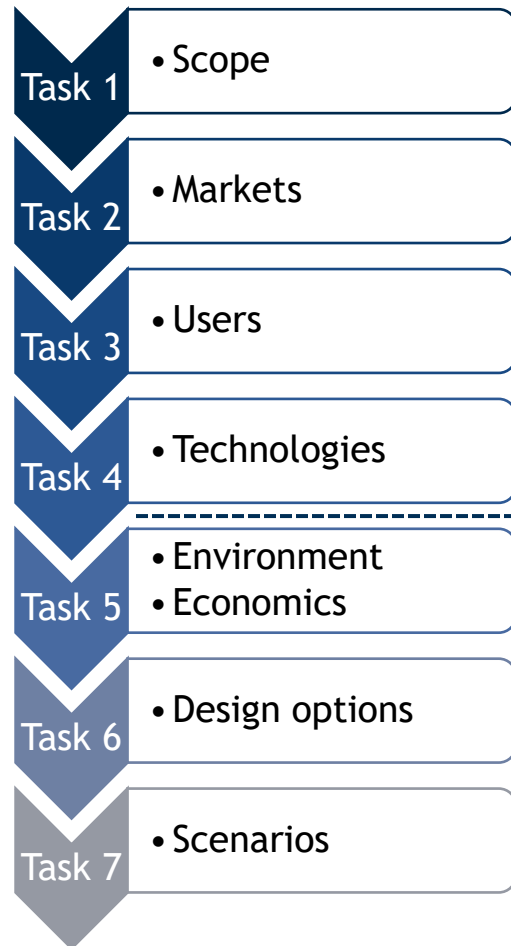
# Recap of tasks 1-4

Oeko-Institut GmbH



# Task 1-4 - Recap

Tasks performed prior to last stakeholder meeting



- Task 1 – Scope
- Task 2 – Markets
- Task 3 – Users
- Task 4 – Technologies
- Stakeholder feedback to first tasks + consultation
- Task 5 – Environment & Economics
- Task 6 – Design options
- Task 7 – Scenarios

Definition of **Base Cases (BC)** representing the average product on the market in terms of resources efficiency, emissions and functional performance

# Task 1: Scope

## Conclusions - Recap

Many tyre impacts on the environment **already covered by legislation and standards** (or in development) e.g. rolling resistance, noise, abrasion → ensures tyre reliability, safety & minimum performance.

The following aspects identified that could be in focus of potential ESPR legislation for tyres:

- The **use of renewable, sustainable and recycled materials** in the production of tyres;
- **SoC** (*Materials* and substances) used in tyres with a negative impact on the waste management of tyres;
- **Retreadability** of tyres;
- **Recyclability** of tyres;
- **DPP**: Provision of information on tyres to various stakeholders in association with above aspects.

The inclusion of certain **tyres in waste management may influence the composition of secondary materials** → current open scope – exclusions could be considered later.



Significant **data gaps** beyond C1, C2 & C3, affecting ability to regulate certain products in short term.

**Base cases** for analysing life cycle impacts & costing in this study, will thus focus on C1, C2 and C3 tyres.



# Task 2: Markets

## Conclusions - Recap

**Data was mainly available** for **C1** and **C3** tyres and to a lower degree for **C2** tyres (e.g., production, sales, prices, installed base, lifetime). This included also data on the annual number of **retreaded tyres**.

Ca. 25% of market are **OEM sales** and the rest (ca. 75%) **replacement tyres**.

**Noise reduction** and **self-sealing** tyres have very low market shares and mainly sold to OEMs.

Limited data was available for **other vehicle tyre types**, e.g., motorcycles/bicycles, agrarian tyres.

To further substantiate data for the modeling performed in task 5, stakeholders were consulted to develop a data set supposed to be representative of the average tyre on the market for each base case (covering among other data gaps of task 2).

# Task 3: Users

## Conclusions - Recap

- Use phase considered largest environmental impact in various LCA studies.
- Consumer choice (tyre / car type) and driving behaviour impact tyre longevity and fuel consumption, ability for retreading etc.
- Fuel consumption is related to rolling resistance – regulated by UN No. R117 which sets RR limits that increase over time and Tyre Labelling Regulation (interface to consumers through label and EPREL).
- Functional performance trade-offs between rolling resistance, wet grip and abrasion of tyres makes design changes a challenge.
- Proposals underway for retreading label for C3 tyres. Market for C3 retreads established but declining, very weak for C2 and C1.
- EPR schemes in most countries for ELTs but large share of exports reported (not all legal), sometimes ending up in unacceptable treatment facilities



# Task 4 Technologies

## Conclusions - Recap

Most data collected concerns C1, C2 and C3 tyres: average weight, average composition, performance characteristics, abrasion, mileage, etc.

The concept of best available technologies is not really applicable to tyres, given the inherent trade-offs.

Initially, devulcanization was not covered in detail in the report – data completed through consultation with stakeholders.

Composition limitations for specific routes of waste management identified (i.e., sticky gels, PU foams, aramid/kevlar fibres, batteries in shredding, silica limitations in pyrolysis, etc.).

Alternative bio-based materials identified. Market readiness and shares of use in tyre models looked into.

Shares of use of recycled content in tyres looked into based on treatment capacities, suitability of qualities for use in tyres, manufacturer promotional material.

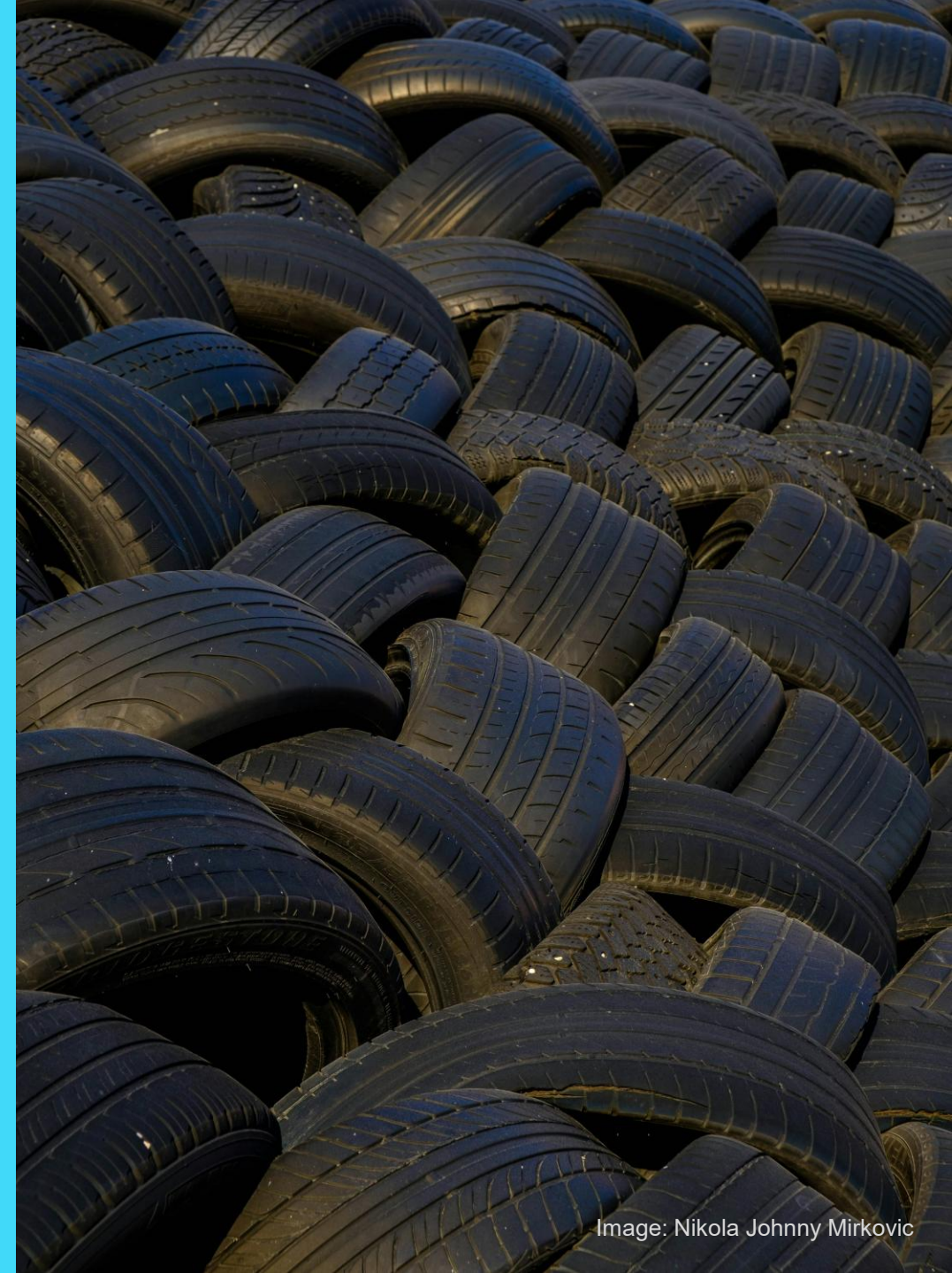
To further substantiate data for the modelling performed in task 5, stakeholders were consulted to develop a data set supposed to be representative of the average tyre on the market for each base case (covering performance aspects relevant to task 4).

# Base Case definition

- Three main **Base Cases** aligned to the three main tyre classes as average products.
  - C1: passenger car tyres
  - C2: busses, commercial vehicles and their trailers with load capacity index  $\leq 121$ , speed symbol  $\geq$  'N'
  - C3: busses, commercial vehicles and their trailers with load capacity index  $\geq 122$  or load index  $\leq 121$  and speed symbol  $\leq$  'M'
- Separate base case: Retreaded tyre in C3 (with extrapolation to C1/C2 if feasible).
- Other aspects to be addressed through Design Options (e.g., retreadability)/ or Sensitivity Analysis (e.g., tyre segment, electric vehicles in fleet)
- Assumptions regarding the main characteristics of the base cases presented under task 5

# MEErP Task 5 Environment & Economics

Maria Papavasileiou, Max Sonnen  
Ecomatters



# Understanding of the assignment

## MEErP Task 5: LCA and LCC

- **Life Cycle Assessment (LCA):** to calculate the environmental impact of each base case of tyres
- **Life Cycle Costing (LCC):** to calculate costs of each base case over the life cycle including possible repair/refurbishment actions
- Task 5 is to provide an overview on the environmental impact and lifetime costs of the base cases and will enable the assessment of design options in Task 6

# LCA and LCC

## Life Cycle Assessment (LCA)

- Calculates the environmental performance of a product or process over its entire life cycle
- Typically takes into consideration the full life cycle of a product, from material extraction through manufacturing, product use, and until end-of-life
- Impact categories are a way to quantify the potential negative effect on the environment, e.g. global warming (CO<sub>2</sub>-eq emissions) or water use



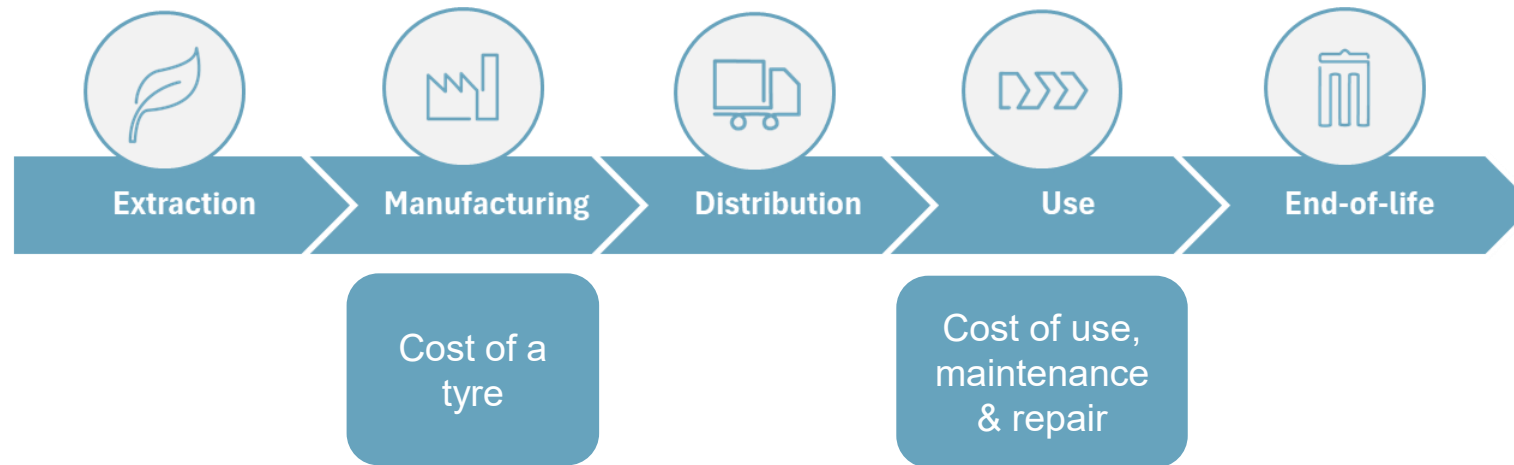
### Impact category examples



# LCA and LCC

## Life Cycle Costing (LCC)

- LCC calculates all costs (e.g., purchase, operation, maintenance, disposal) over the product's life cycle.
- LCA and LCC share the same life cycle stages, allowing integration for sustainability assessments that consider both environmental and economic factors.



- LCA and LCC combined make more informed decisions possible by balancing environmental and financial sustainability.

# Methodology

- The LCA/LCC was conducted per Base Case of tyres
- Functional unit: **one tyre used over its lifetime**
- **PEF-aligned LCA study**
  - Ecoinvent database (version 3.11) is used
  - PEF version 3.0 and relevant Product Category Rules (PCRs) followed
- EcoReport Tool used for the LCC calculations

# Data collection and quality

## ■ Data collection

- Data consultation rounds with Stakeholders
- Consolidated in Task 1-4 report and discussed in SHM1
- Scientific literature

## ■ Data availability and quality

- Most data from stakeholders and scientific literature – high quality
- Presented in SHM1 and already reviewed and commented on by stakeholders

## ■ Data quality assessment

Source	Data quality assessment
Stakeholder input, Scientific literature	High quality
Expert judgement, Literature	Medium quality
Web research	Fair quality

# Base Case definition

- **Base Cases (BCs): average / representative product on the EU market**
  - Aligned to the three main tyre classes as average products (assume retreadable baseline for the record)
  - Developed according to the MEErP
  - Not individual real-world products but combination of characteristics
  - BCs are defined to enable efficient market analysis and capture full technological diversity
- **Four Base Cases:**

Characteristics	Base Case 1: C1 tyres	Base Case 2: C2 tyres	Base Case 3: C3 tyres	Base Case 4: Retreaded C3 tyres
Application	Passenger car tyres	Tyres for buses, commercial vehicles and their trailers, with load capacity index $\leq 121$ , speed symbol $\geq$ 'N'	Tyres for buses, commercial vehicles and their trailers with load capacity index $\geq 122$ or load index $\leq 121$ and speed symbol $\leq$ 'M'	C3 retreaded tyres
Reference Service Life (RSL) (km)	40,000	57,000	253,410	245,920
Rolling Resistance Coefficient (RRC) (kg/t)	8.4	6	5.3	5.3
Product Weight (kg)	8.2	15.5	64.1	64.7

## LCA data inputs - Raw materials (%)

Material	BC1: C1 tyres	BC2: C2 tyres	BC3: C3 tyres	BC4: Retreaded C3 (new tread)
	%	%	%	%
Natural Rubber	17.2	20.2	32.4	40.6
Synthetic Rubber	24.8	22.8	14.4	19.3
Silica	13.2	6.4	3.9	2.2
Carbon Black	17.2	19.1	20.3	28.3
Zinc oxide	1.5	1.7	2.0	2.3
Sulfur	1.2	1.1	1.2	1.2
Plasticizers and other additives	8.2	10.1	4.8	6.2
Steel	12.3	12.5	20.8	-
Textiles	4.4	6.1	0.03	-

Raw materials in retreaded C3 tyres represent the new tread.

# LCA data inputs – Use phase

Parameters for Energy consumption calculation	BC1: C1 tyres	BC2: C2 tyres	BC3: C3 tyres	BC4: Retreaded C3 tyres
Rolling Resistance coefficient (Kg/ton)	8.4	6	5.3	5.3
Reference Service Life (Km)	40,000	57,000	253,410	245,920
Tyre Wear Loss (Kg)	1.6	1.9	12.3	12.3
Outer Radius (cm)	31.6	33.7	50.6	50.6
Seat Radius (cm)	20.3	20.3	28.6	28.6
Tread Depth (cm)	0.8	0.8	1.7	1.7
Treadwear Indicator Height (cm)	0.2	0.2	0.2	0.2
Tread Length (cm)	196.1	208.8	312.7	312.7
Density (g/cm <sup>3</sup> )	1.2	1.14	1.14	1.1
Contact Width (cm)	15.8	15.1	26.8	26.8
Void ratio (%)	29	22	16	16
Fuel consumption	BC1	BC2	BC3	BC4
Petrol blend E10 (kg fuel/tyre)	68.2	-	-	-
Diesel (kg fuel/tyre)	-	83.4	1,344.8	1,313.6
Direct emissions	BC1	BC2	BC3	BC4
PM 2.5 (Kg)*	0.02	0.023	0.15	0.15
PM 10 (Kg)*	0.064	0.076	0.49	0.49

\*These values refer to Tyre Wear Road Particles

- Fuel consumption refers to energy consumption due to rolling resistance and acceleration resistance - **Calculated based on the Product Category Rules (PCR)** for the product category tyres developed and published by the UL environment
- Use Phase impacts were calculated based on **emissions from the combustion of the fuel.**

# LCA data inputs – Other Life Cycle Stages

- **Transport of raw materials:** data from Tasks 1-4
- **Packaging:** not applicable to the product type
- **Manufacturing and assembly:** stakeholder input on electricity, heat from natural gas, steam, coal and process water.
- **Distribution:** assumption of an average distance within EU
- **Maintenance and repair:** deemed negligible and not included in the study - minimal energy consumption and other utilities used for this stage

# LCA data inputs – End-of-Life (EoL)

Waste treatment scenario	%
Mechanical recycling (granulation)	40.2%
Fuel substitution in cement kiln	48.8%
Pyrolysis	7.2%
Devulcanisation	0.5%
Civil engineering/backfilling/public works	3.3%

- All EoL calculations have been performed using the **Circular Footprint Formula (CFF)**, as described in the PEF methodology.

## Waste treatment paths

- **Mechanical recycling:** shredding and separation of the rubber fraction, recycled rubber granulate – downcycled
- **Fuel substitution in cement kiln:** replacement of fossil fuel mix used in the EU cement production
- **Pyrolysis:** separation of the rubber fraction, thermochemical decomposition of organic materials and production of pyrolysis coke, gas and oil
- **Devulcanisation:** separation of the rubber fraction, thermochemical decomposition of organic materials and production of devulcanized rubber (high-quality recycled rubber)
- **Civil engineering/backfilling/public works:** whole tyres used as erosion barriers, breakwaters etc.

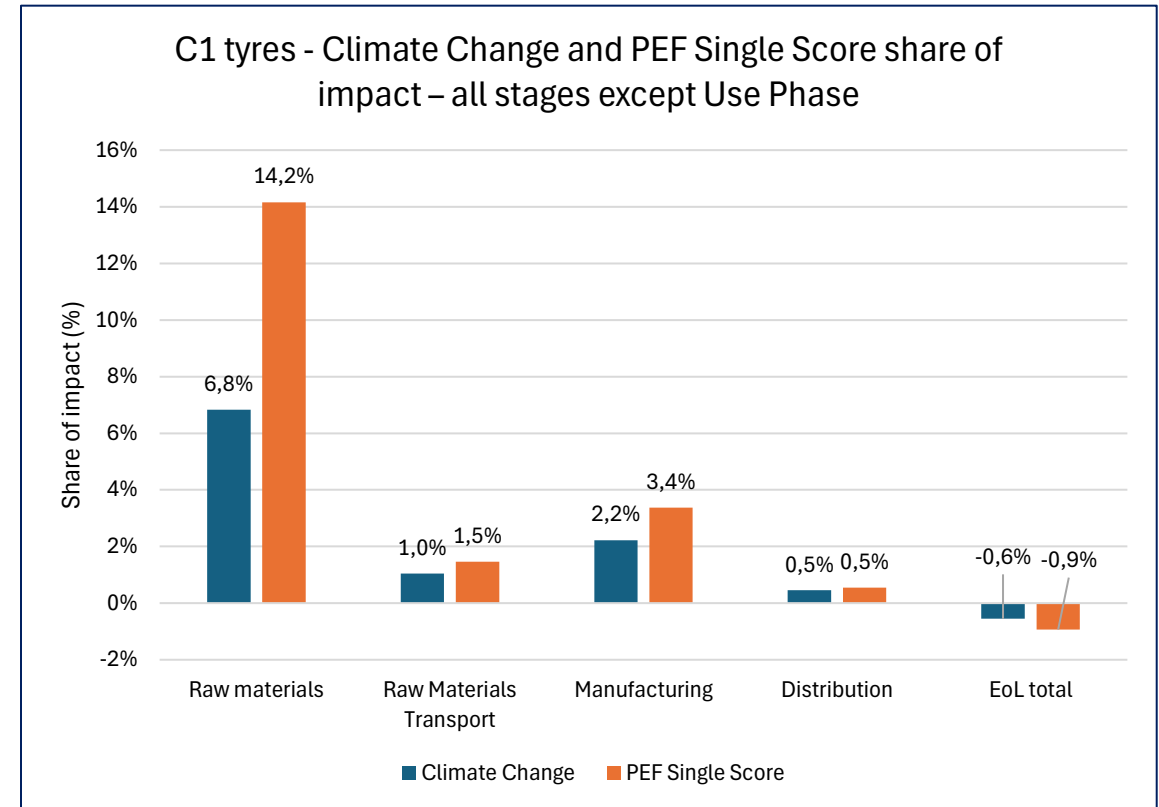
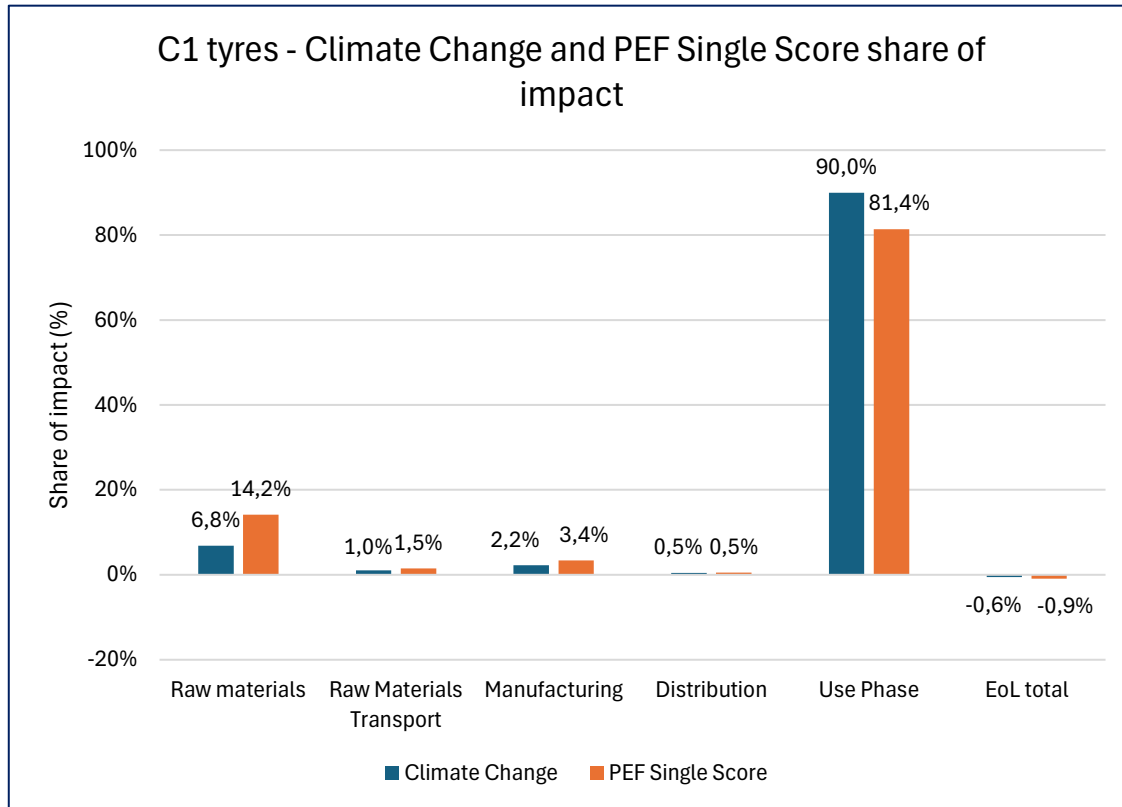
# LCC Data inputs

LCC parameters	C1 tyres	C2 tyres	C3 tyres	Retreaded C3 tyres	Comment
Latest annual sales (2024) (million units)	305.7	29.3	16.6	2.1	Data taken from Task 2
Average expected lifetime (years)	4	3	3	3	Data taken from Task 2
Assumed purchase price (in EUR, excl. VAT)	71	111	419	363	Data taken from Task 2, in 2024 euros, including markup by retailers
Fuel rate (EUR/litre)	1.563	1.434	1.434	1.434	Petrol for C1 tyres, and diesel for C2 and C3 tyres)
Installation costs (EUR/tyre)	19				Average price for mounting and balancing
Repair and maintenance costs (EUR/tyre)	59				Average price for wheel alignment, tyre balancing and patching/puncture repair
Weibull shape parameter	1.9				Assumption: limited literature, average numbers based on literature.

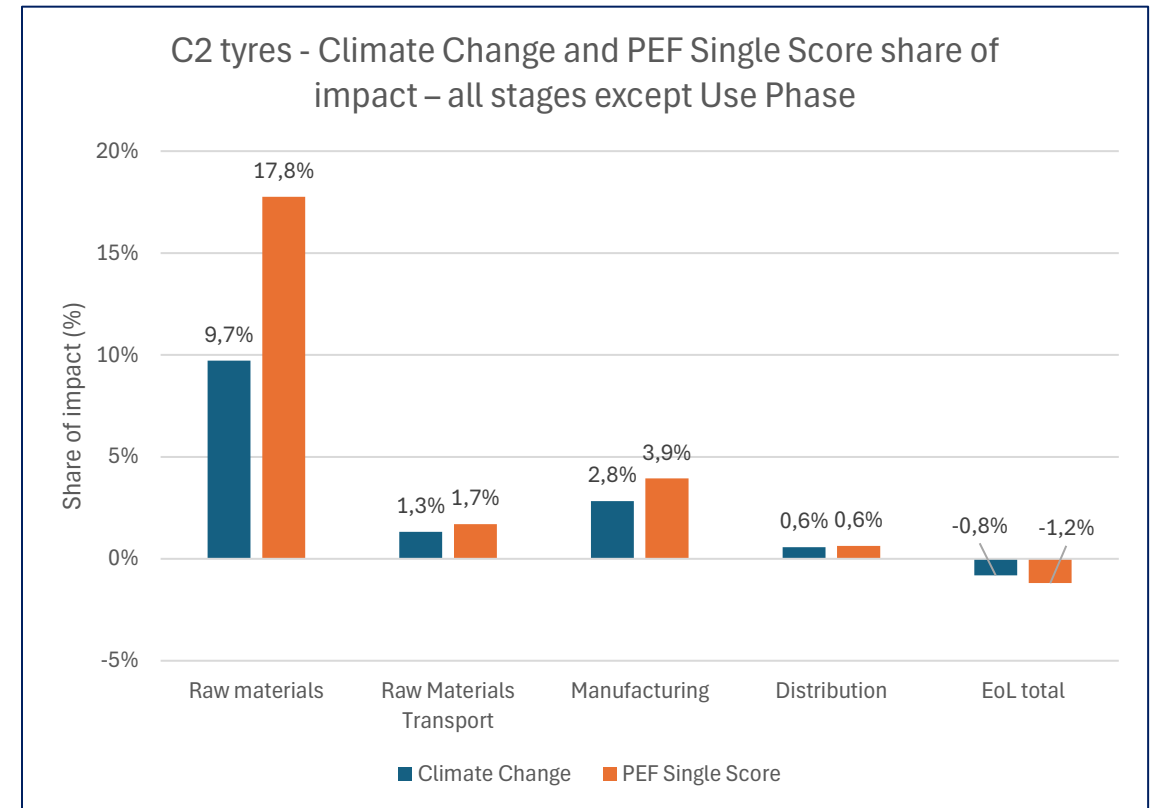
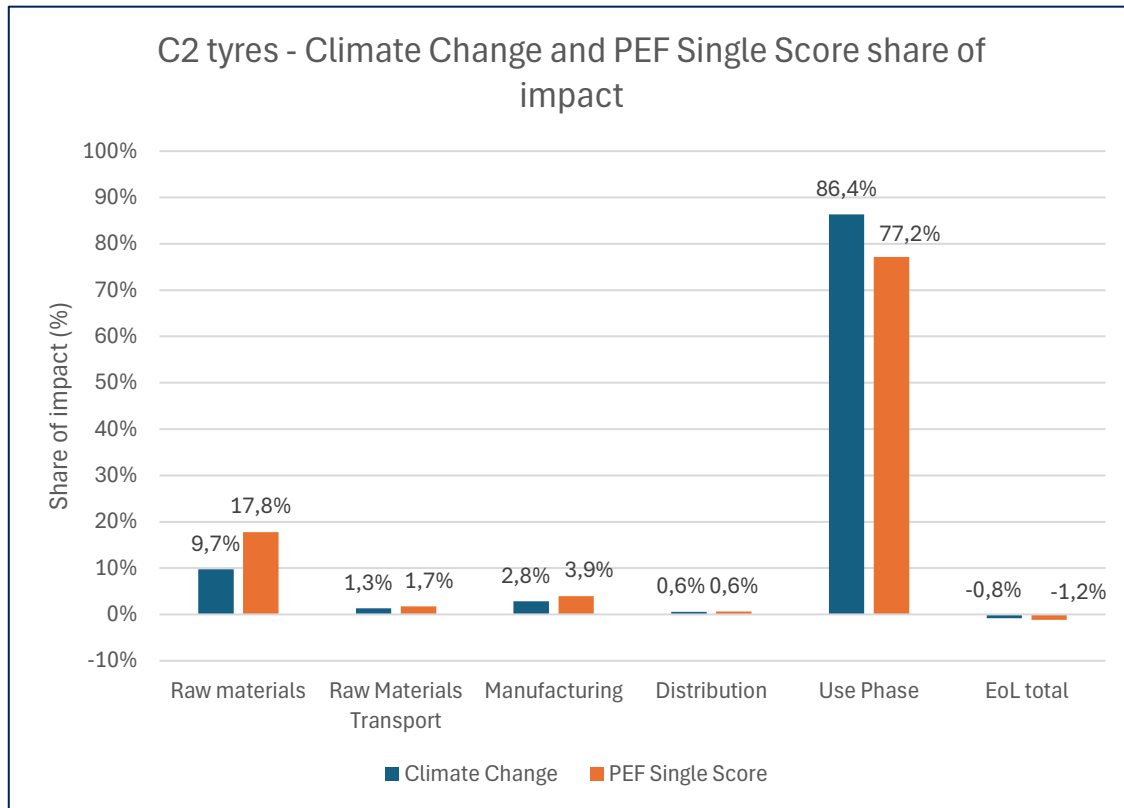
## Assumptions

- Repair and maintenance costs are assumed to be the same for all Base Cases
- Each repair activity is performed once during a tyre's lifetime
- Manufacturing costs and EoL costs are reflected in the purchase price

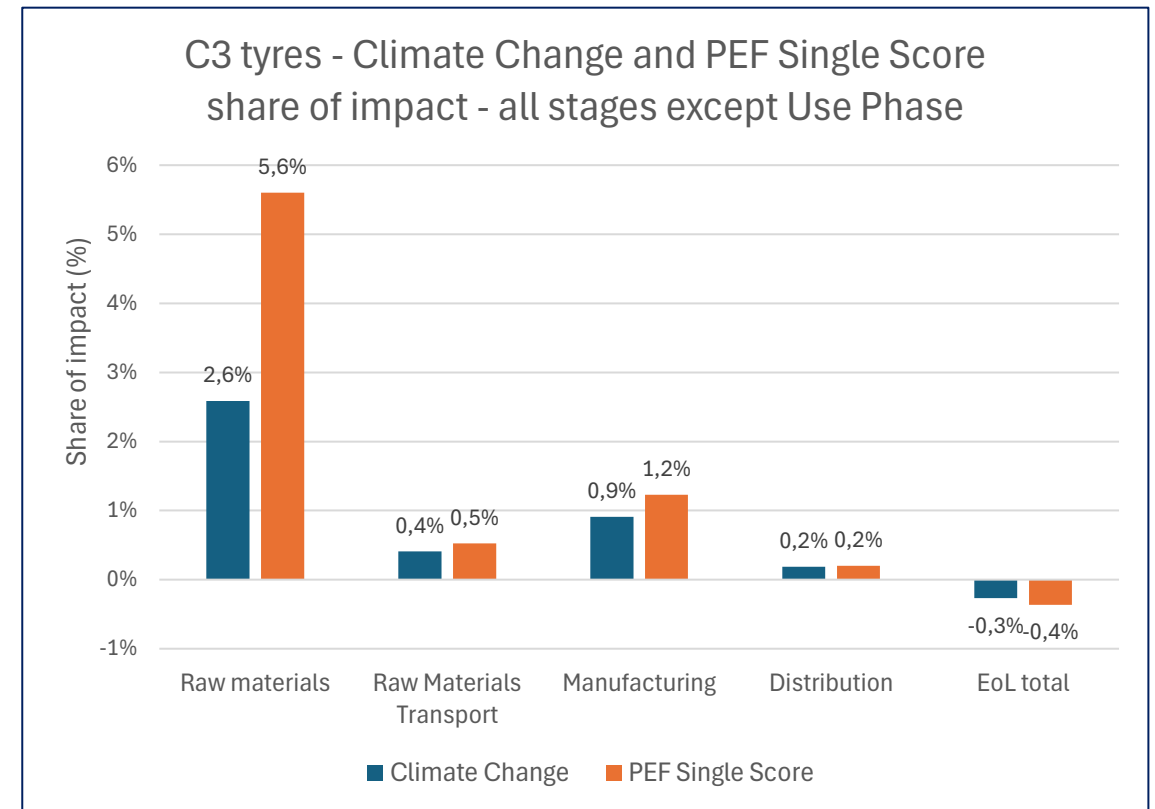
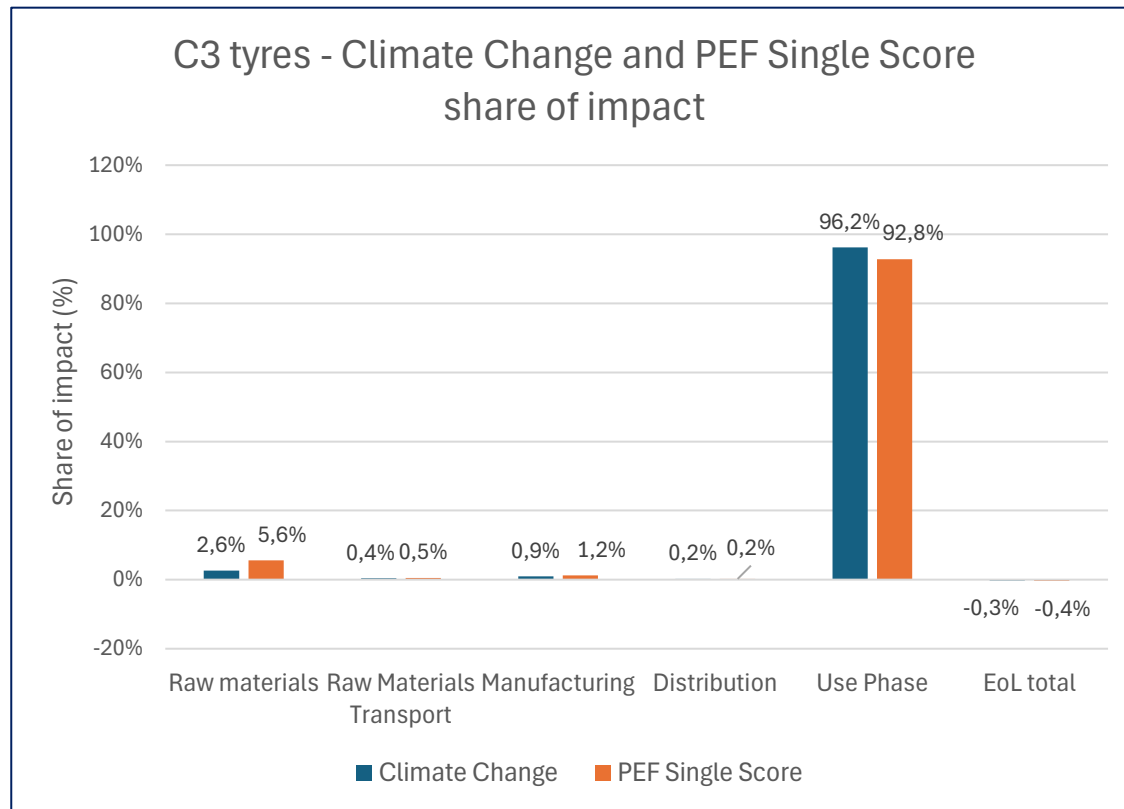
# LCA results - BC1: C1 tyre (passenger car)



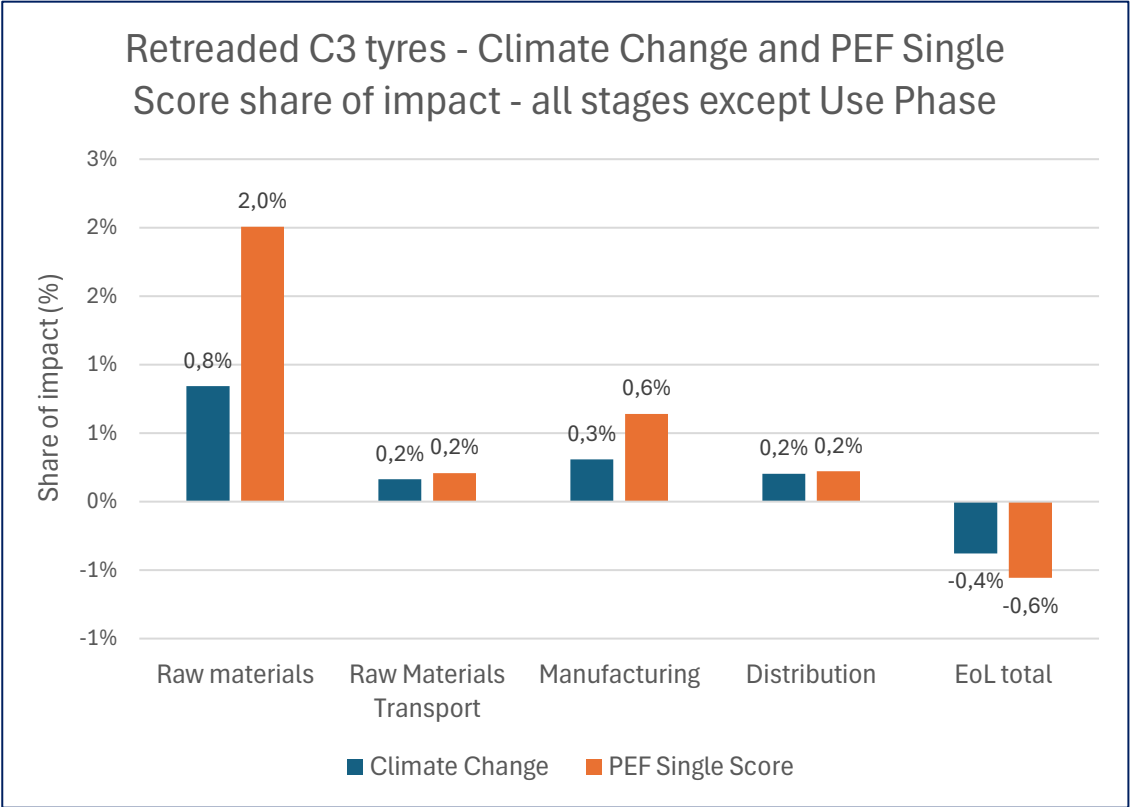
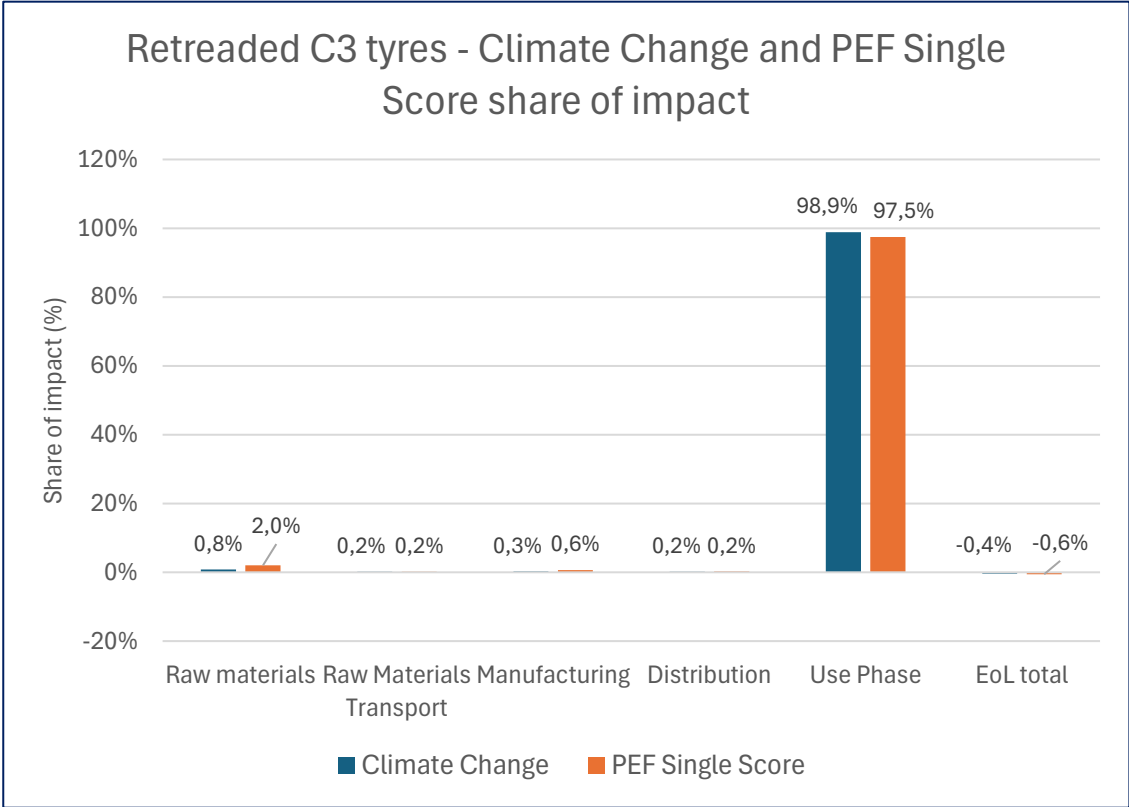
# LCA results – BC2: C2 tyre (buses and commercial vehicles)



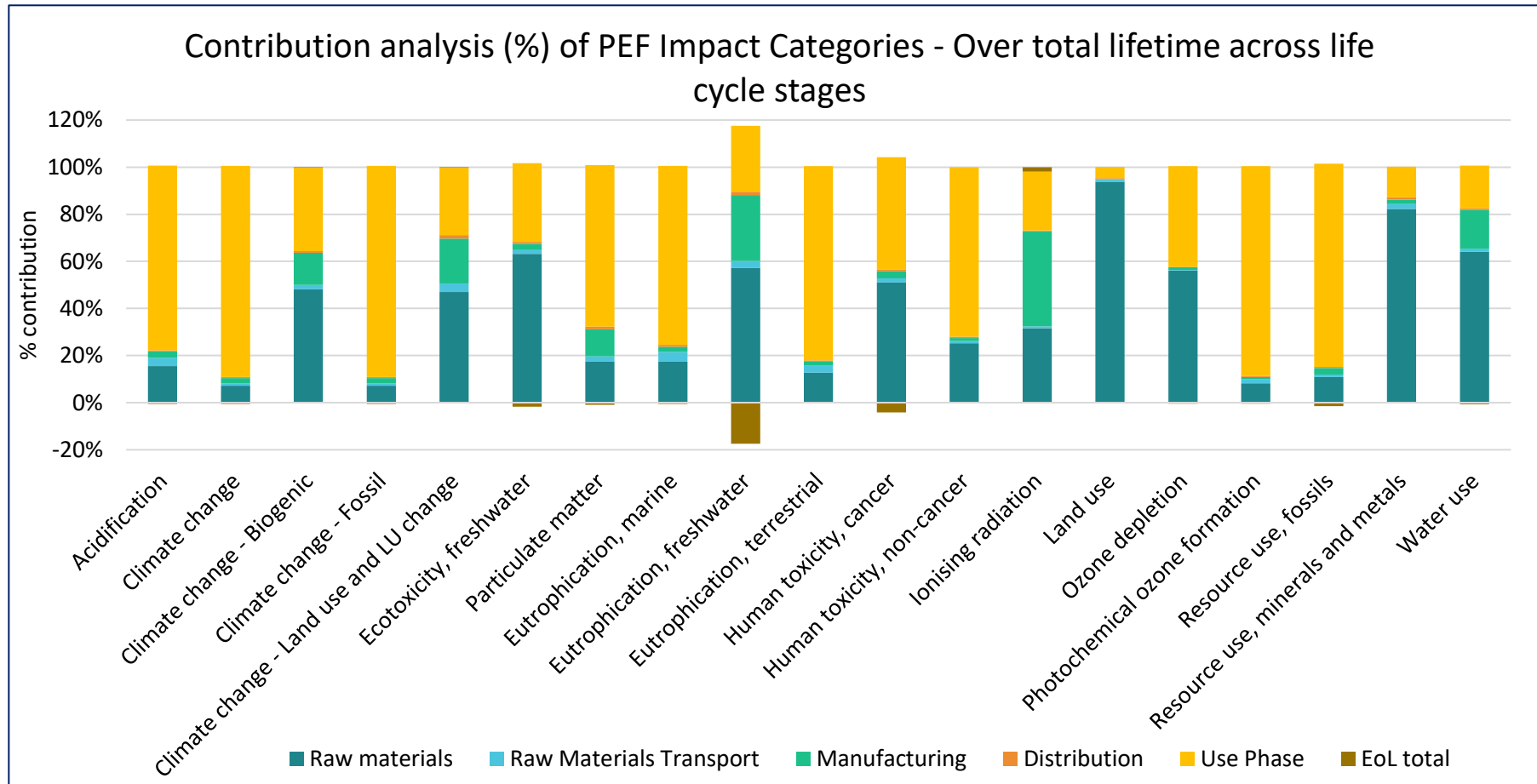
# LCA results – BC3: C3 tyre (buses and commercial vehicles)



# LCA results – BC4: Retreaded C3 tyre (buses and commercial vehicles)

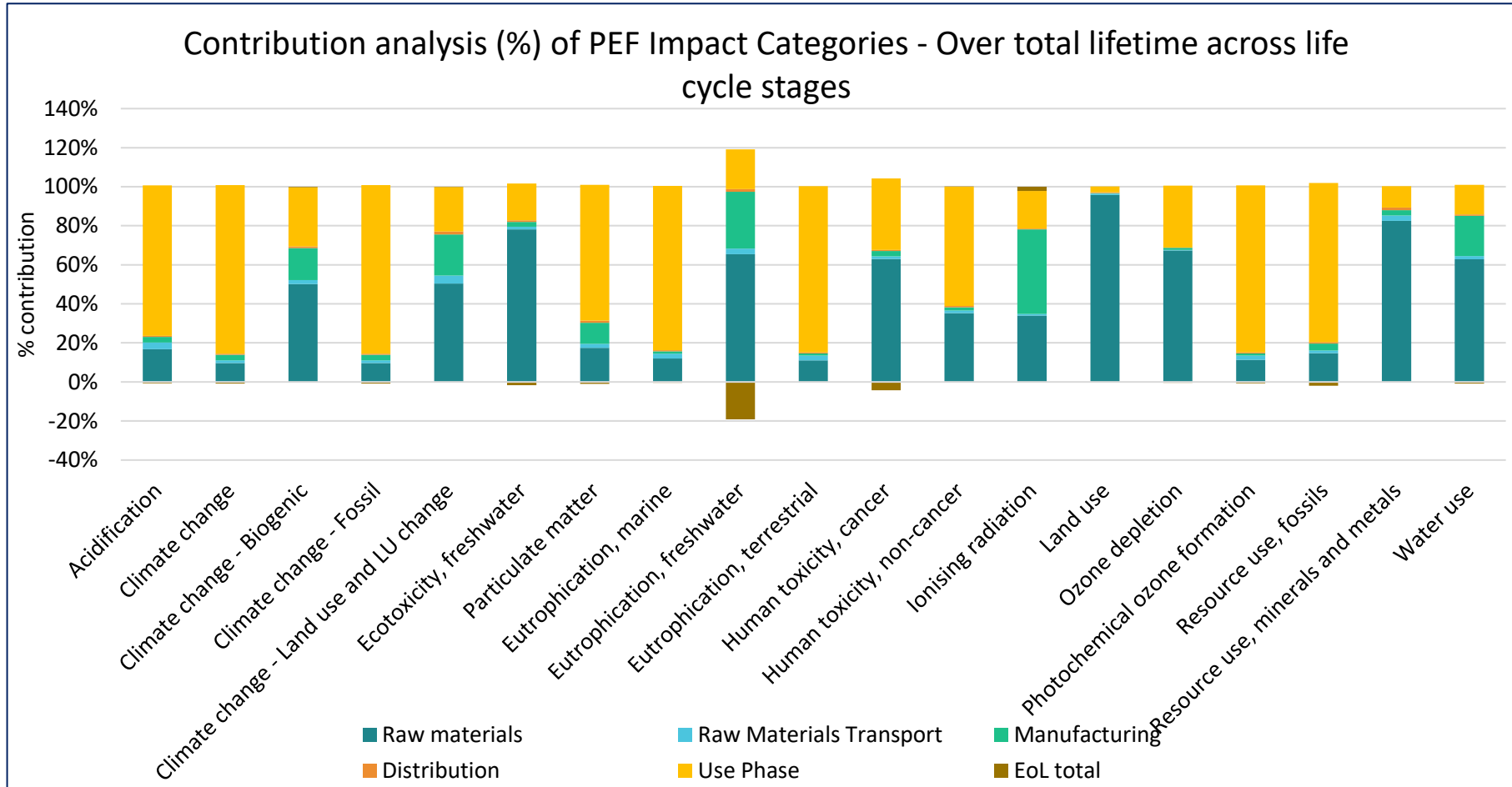


# LCA Results – Contribution analysis C1 tyres



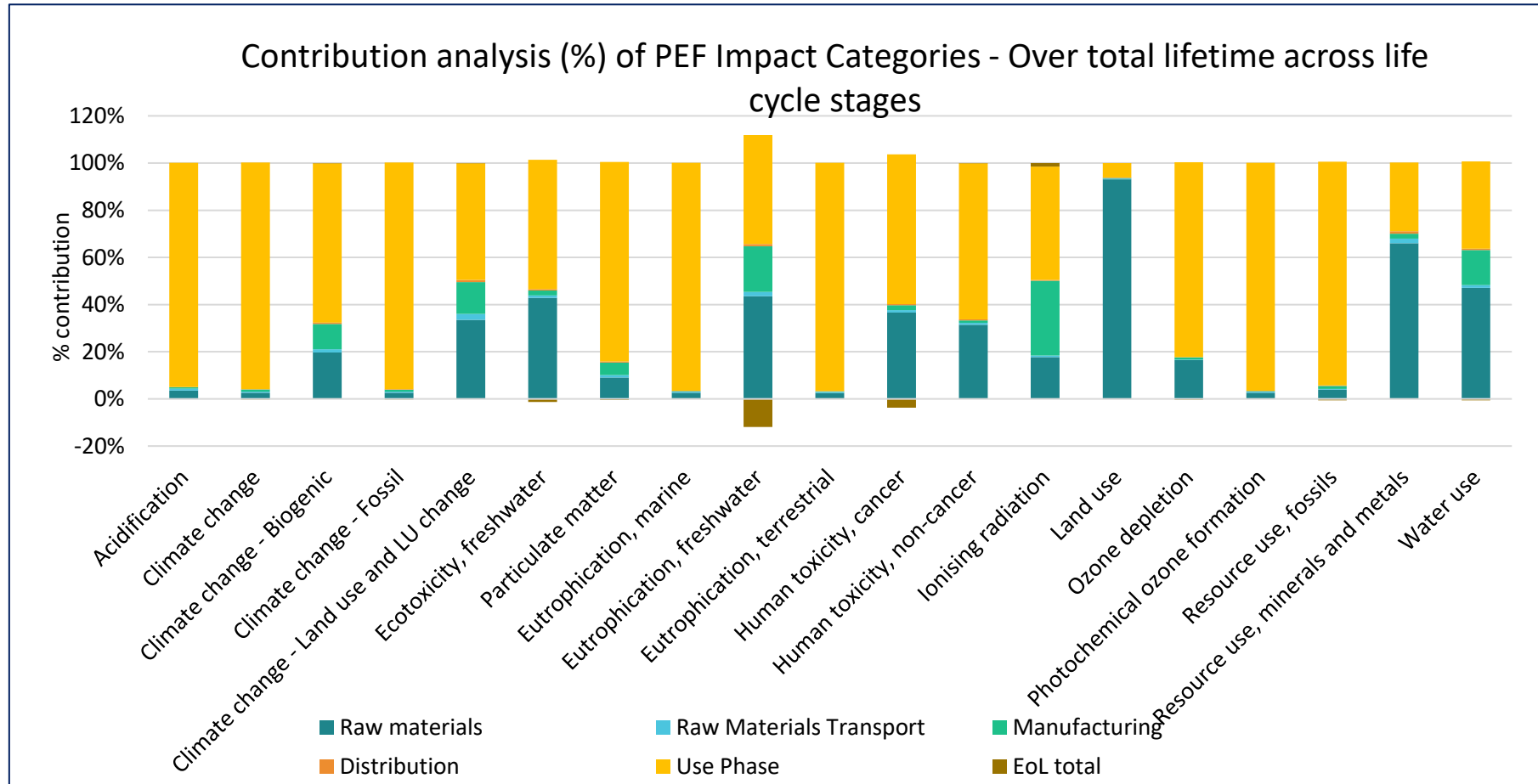
- **Use Phase** is the top contributor (66 to 90%) followed by Raw Materials.
- **Use Phase** impact related to **fossil fuel combustion**
- **Raw Material** impact related to **production processes of materials** such as mining, cultivation of natural rubber etc.
- **Manufacturing** impact related to **utilities and fossil fuel use** in the manufacturing process.
- **EoL credits** due to **avoided raw materials and fossil fuels** in processes like cement kiln fuel substitution.

# LCA Results – Contribution analysis C2 tyres



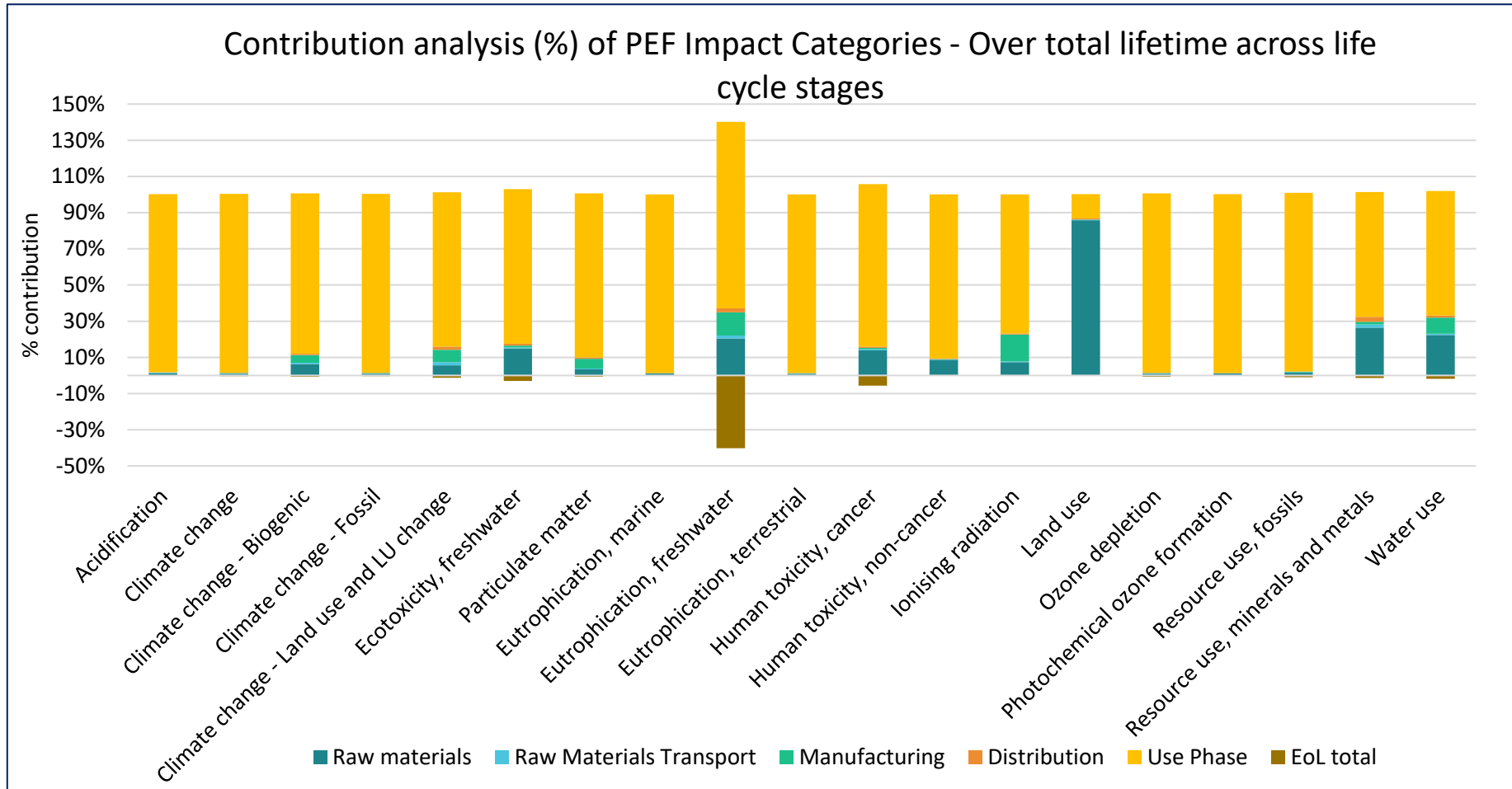
- **Use Phase** is the top contributor (61 to 86%) followed by Raw Materials.
- **Use Phase** impact related to **fossil fuel combustion**
- **Raw Material** impact related to **production processes of materials** such as mining, cultivation etc.
- **Manufacturing** impact related to **utilities and fossil fuel use** in the manufacturing process.
- **EoL credits** due to **avoided raw materials and fossil fuels** in processes like cement kiln fuel substitution.

# LCA Results – Contribution analysis C3 tyres



- **Use Phase** is the top contributor (46 to 97%) followed by Raw Materials.
- **Use Phase** impact related to **fossil fuel combustion**
- **Raw Material** impact related to **production processes of materials** such as mining, cultivation etc.
- **Manufacturing** impact related to **utilities and fossil fuel use** in the manufacturing process.
- **EoL credits** due to **avoided raw materials and fossil fuels** in processes like cement kiln fuel substitution.

# LCA Results – Contribution analysis Retreaded C3 tyres

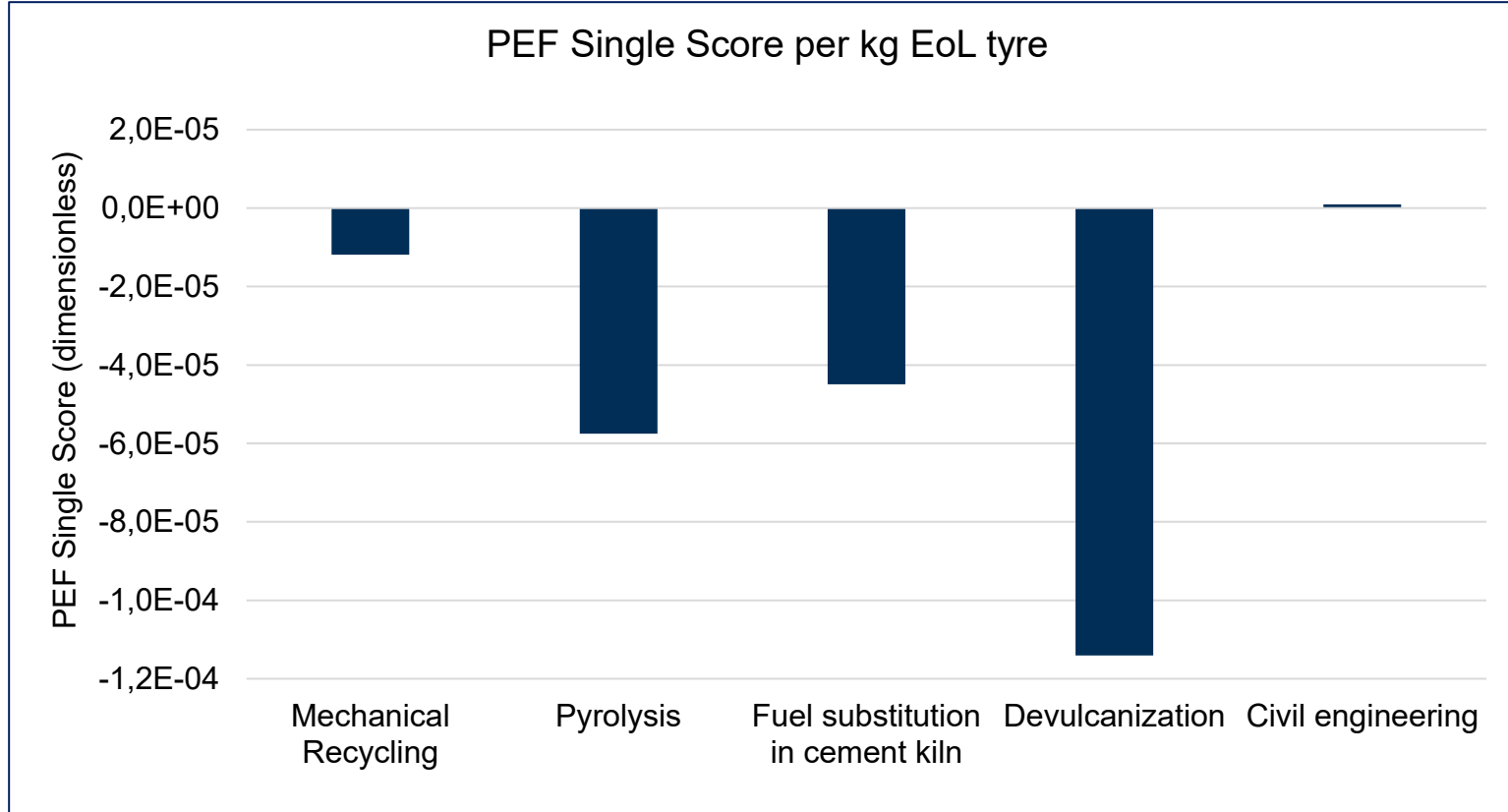


- **Use Phase** is the top contributor (69 to 99%) followed by Raw Materials.
- **Use Phase** impact related to **fossil fuel combustion**
- **Raw Material** impact related to **production processes of materials** such as mining, cultivation etc.
- **Manufacturing** impact related to **utilities and fossil fuel use** in the manufacturing process.
- **EoL credits** due to **avoided raw materials and fossil fuels** in processes like cement kiln fuel substitution.

# Raw Materials Contribution analysis – Climate Change

- **BC1 – C1 tyres**
  - **Synthetic rubber** is the largest contributor to the total weight of the tyre in terms of mass (25%)
  - **Synthetic rubber** contributes by 27% to the Climate change impact category, followed by **carbon black** (16%) and **natural rubber** (12%).
- **BC2 – C2 tyres**
  - **Synthetic rubber** is the largest contributor to the total weight of the tyre in terms of mass (23%)
  - **Synthetic rubber** contributes by 22% to the Climate change impact category, followed by **carbon black** (16%) and **natural rubber** (12%).
- **BC3 – C3 tyres**
  - **Natural rubber** is the largest contributor to the total weight of the tyre in terms of mass (32%)
  - **Natural rubber** contributes by 24% to the Climate change impact category, followed by **carbon black** (21%) and **synthetic rubber** (17%).
- **BC4 – C3 retreaded tyres**
  - **Natural rubber** is the largest contributor to the total weight of the tyre in terms of mass (40%)
  - **Natural rubber** contributes by 32% to the Climate change impact category, followed by **carbon black** (31%) and **synthetic rubber** (25%).

# LCA results – EoL scenarios per kg tyre (PEF single Score)



- The more negative the environmental impact → more environmentally preferable scenario
- Scenarios involving reuse/recycling → negative impact due to credits from avoided virgin materials
- Credits are assigned by the CFF, related to the nature of the avoided raw materials, substituted energy and the quality of the recycled product.

# Additional Environmental Information - Microplastics

Parameter	C1 tyre	C2 tyre	C3 tyre	Retreaded C3 tyre
Microplastics released to the environment (kg/tyre)	1.54	1.83	11.81	11.81
Microplastics to the aquatic environment (kg/tyre)	0.61	0.73	4.72	4.72
Freshwater ecotoxicity (PAF.m3.day/tyre)	1,971.6	2,353.6	15,156.7	15,156.7

- Release and impacts of microplastics into the environment are not yet accounted for in the LCA methodology
- Product Environmental Footprint Category Rules (PEFCR) framework for synthetic turf surfaces was followed
- Microplastics emissions calculated based on Tyre Wear Loss values provided by the stakeholders

# Life cycle costs (LCC)

## Life cycle costs (LCC) methodology

- LCC calculated in the ERT for the full product lifetime and expressed in costs per year
  - Purchase price and repair/maintenance costs divided by lifetime
  - Costs for fuel (i.e. running costs) are discounted to their net present value (using escalation rate and discount rate values)

# LCC Results - All Base Cases

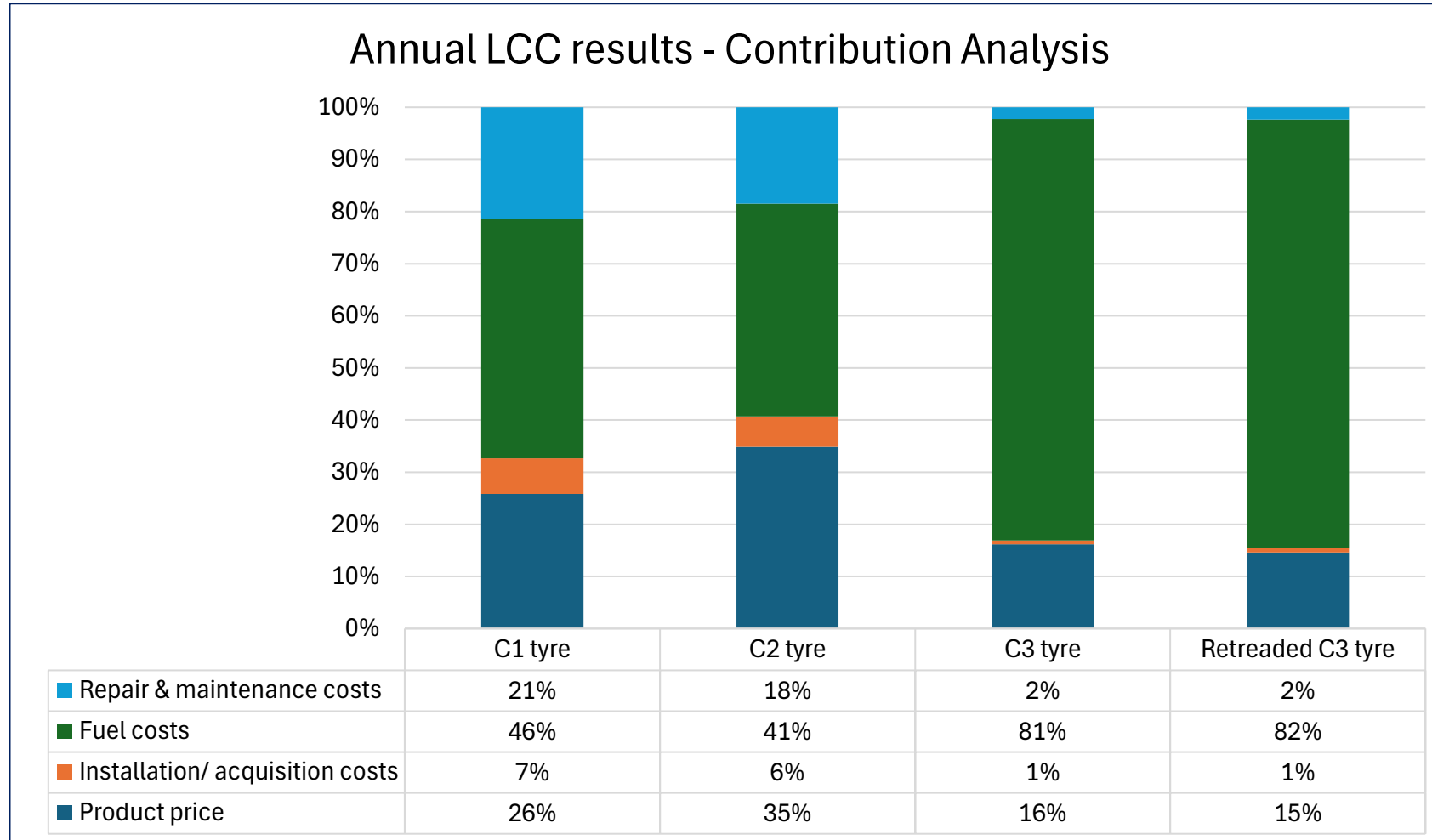
## Total costs per year and per Km driven

- **C3 tyres** have the **highest annual life cycle costs** and per km driven per year
  - Due to higher fuel use and larger mass
- C2 tyres have higher annual life cycle costs compared to C1 tyres, but lower costs per km driven due to its higher lifetime
- **Majority** of the costs (>41 %) for all Base Cases are the **fuel costs** (petrol for C1 tyres and diesel for the rest)

Product aspect	Unit	C1 tyres	C2 tyres	C3 tyres	Retreaded C3 tyres
Consumer purchase price	EUR/lifetime	71	111	419	363
Installation costs	EUR/lifetime	19	19	19	19
Fuel costs due to rolling resistance and acceleration resistance*	EUR/year	32	52	836	816
Repair and maintenance costs	EUR/lifetime	59	59	59	59
<b>Total costs (per year)</b>	<b>EUR/year</b>	<b>69</b>	<b>115</b>	<b>1,001</b>	<b>963</b>
<b>Total costs (per kilometer driven/year)</b>	<b>EUR/km driven</b>	<b>0.0069</b>	<b>0.0060</b>	<b>0.0119</b>	<b>0.0117</b>
Reference service lifetime	Km	40,000	57,000	253,410	245,920

\*Fuel costs related to fuel consumption attributable to tyre use only (i.e., to rolling resistance)

# LCC Results - Contribution Analysis - All Base Cases



- Costs due to **fuel use** is the top contributor for all Base Cases (41-82%)
- **Product price** is the second largest contributor (15-35%)

# EU-27 Totals – LCA & LCC

## Calculation methodology EU totals

- Environmental impact for total **EU-27** calculated for the lifetime of each Base Case
  - For the total stock of each Base Case
    - The per product impact multiplied with the stock volume (last 30 years) for EU-wide impact of all tyre types
  
- LCC calculated for total EU-27 (in ERT)
  - Costs per year multiplied with stock volume of tyres

# EU totals – LCA results

## Environmental impact on EU-27 level

- EU-27 wide **environmental impact** of tyres in stock is largest for **C1** and **C3 tyres**
  - To different degrees depending on the impact category
  - Although the per product impact is largest for **C3 tyres**, the sales volumes of C1 tyres are much higher than C3 tyres, therefore contributing largely to the total EU environmental impact as well

PEF Impact categories	unit	C1 tyres	C2 tyres	C3 tyres	Retreaded C3 tyres
Acidification	mol H+ eq				
Climate change	kg CO2 eq				
Climate change - Biogenic	kg CO2 eq				
Climate change - Fossil	kg CO2 eq				
Climate change - Land use and LU change	kg CO2 eq				
Ecotoxicity, freshwater	CTUe				
Ecotoxicity, freshwater - inorganics	CTUe				
Ecotoxicity, freshwater - organics	CTUe				
Particulate matter	disease inc.				
Eutrophication, marine	kg N eq				
Eutrophication, freshwater	kg P eq				
Eutrophication, terrestrial	mol N eq				
Human toxicity, cancer	CTUh				
Human toxicity, cancer - inorganics	CTUh				
Human toxicity, cancer - organics	CTUh				
Human toxicity, non-cancer	CTUh				
Human toxicity, non-cancer - inorganics	CTUh				
Human toxicity, non-cancer - organics	CTUh				
Ionising radiation	kBq U-235 eq				
Land use	Pt				
Ozone depletion	kg CFC11 eq				
Photochemical ozone formation	kg NMVOC eq				
Resource use, fossils	MJ				
Resource use, minerals and metals	kg Sb eq				
Water use	m3 depriv.				
<b>Total EU stock</b>	<b>mln. units</b>	<b>1158.07</b>	<b>84.93</b>	<b>51.94</b>	<b>7.89</b>
<b>Weight of stock</b>	<b>kilotonnes</b>	<b>9472.9</b>	<b>1146.6</b>	<b>3329.8</b>	<b>522.9</b>

# EU totals – Results LCC

## Total annual expenditure on EU total level

- EU-27 annual expenditure is highest for **C1 tyres**
  - Due to the high sales volumes leading to high stock of C1 tyres in the EU
- Main contributor to the costs are fuel costs followed by the purchase price

Product aspect	Unit	C1 tyres	C2 tyres	C3 tyres	Retreaded C3 tyres
Consumer purchase price	mln. EUR/year	21,717	3,251	6,956	746
Installation costs	mln. EUR/year	5,731	550	311	39
Fuel costs due to rolling and acceleration resistance*	mln. EUR/year	40,131	4,736	46,707	6,932
Repair and maintenance costs	mln. EUR/year	18,636	1,790	1,095	166
<b>Total costs (per year)</b>	<b>mln. EUR/year</b>	<b>86,215</b>	<b>10,327</b>	<b>55,068</b>	<b>7,883</b>
<b>Total EU stock</b>	<b>mln. units</b>	<b>1,158.07</b>	<b>84.93</b>	<b>51.94</b>	<b>7.89</b>

\*Fuel costs related to fuel consumption attributable to tyre use only (i.e., to rolling resistance)

# Conclusions

## ▪ Life Cycle Assessment

- **Use phase** followed by **raw material** stages are the most impactful phases
  - In the use phase, the main contributor are **emissions** related to **fuel combustion**
  - The raw materials that contribute the most are **synthetic rubber, natural rubber and carbon black**

## ▪ Life Cycle Costing

- Fuel use is the main cost driver for all Base Cases

## EU-27 level

### ▪ LCA & LCC

- Sales volume has a significant effect on stock-level impact, showing the highest effect for **C1 tyres**, which have the highest sales volume and thereby **stock accumulation**
- **C1 tyres** also have the highest **EU-27 annual expenditure**

# COFFEE BREAK

Online participants are kindly requested to return at 11h00



# MEErP Task 5 Substances of Concern

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# The objective of the Substances of Concern Task (1)

## Objectives:

- Identifying 'Substances of Concern' (SoC) in accordance with Article 2(27) (a–d) of the ESPR
- Determining specifications of information requirements, e.g.:
  - reporting thresholds,
  - exemptions,
- Specifying performance requirements, e.g.:
  - Substances to which they apply,
  - Restriction thresholds.

# RECAP -SoC in the ESPR legal text

## SoC definition

ESPR Article 2(27) 'substance of concern' means a substance that:

- (a) meets the criteria laid down in Article 57 of **Regulation (EC) No 1907/2006 (REACH)** and is identified in accordance with Article 59(1) of that Regulation (SVHCs);
- (b) is classified in **Part 3 of Annex VI to Regulation (EC) No 1272/2008 (CLP)** in one of the following hazard classes or hazard categories:
  - carcinogenicity categories 1 and 2, germ cell mutagenicity categories 1 and 2, reproductive toxicity categories 1 and 2, endocrine disruption for human health categories 1 and 2, endocrine disruption for the environment categories 1 and 2, persistent, mobile and toxic or very persistent, very mobile properties, persistent, bioaccumulative and toxic or very persistent, very bioaccumulative properties, respiratory sensitisation category 1, skin sensitisation category 1, chronic hazard to the aquatic environment categories 1 to 4, hazardous to the ozone layer, specific target organ toxicity – repeated exposure categories 1 and 2, specific target organ toxicity – single exposure categories 1 and 2;
- (c) is regulated under **Regulation (EU) 2019/1021 (POPs)**; or
- **(d) negatively affects the reuse and recycling of materials in the product in which it is present;**

# The objective of ESPR for SoC

All Article 2(27)(a-d) substances: information requirements apply as default (ESPR Art. 7(5)(4))

- substance identity, location, concentration, safe-use instructions, end-of-life guidance
- Exemptions justified where: tracking not technically feasible, e.g., lacking analytical methods and/or need to protect confidential business information

Article 2(27)(d) substances: performance requirements can be stipulated:

- E.g., maximum concentration limits or bans needed to safeguard circularity
- Justified if the substance impacts ESPR Article 5(1) aspects (i.e., durability, reliability, reusability, etc.)
- Only justified if alternatives available, not affecting product functionality/affordability, health and safety, competitiveness of economic operators, creating disproportionate administrative burdens for manufacturers, and does not force economic operators to use proprietary technology.

# Methodology for SoC Task

Based on JRC methodology (*Pérez-Camacho et al., 2025*)<sup>1</sup>

- Collection of data on substances used in the manufacture and contained in the product group throughout the lifecycle – intentionally and non intentionally;
- Literature review – literature on substances in life cycle stage context, legislation;
- Stakeholder consultation:
  - dedicated online consultation on SoC 2 June 2025-19 September 2025,
  - inputs on SoC in other consultations,
  - interviews with selected stakeholders
- Development of **Inventory of Substances of Concern** , reflecting all substances of relevance for product group;
- Identification of Article 2(27)(a-d) substances in the inventory → Bill of chemicals
- Proposal of information and performance requirements

# The SoC Tyres Inventory (Table 5-1, excerpt)

**QSoC1:** Please specify substances not yet specified, of relevance to the inventory for tyres

**QSoC2:** Please provide feedback on the inventory regarding completeness, incorrect and imprecise information



Component	Material	Function class	Intentionally added Substance	CAS number	Average concentration	Maximum concentration	Comments on substance	Life cycle process	Identified as SoC under art 2(27)
<b>Intentionally added substances (IAS)</b>									
Noise cancelation tyres	polyurethane foams	Noise reduction material	polyurethane	9009-54-5			Recycling quality disturbing	Manufacturing	d
Noise cancelation tyres	Adhesives used with polyurethane foams	Adhesive	Unidentified	Unidentified				Manufacturing	d
Rubber components: e.g., tread, sidewall	Tyre tread	Basic material: natural rubber	Polyisoprene [C <sub>5</sub> H <sub>8</sub> ] <sub>n</sub> )	9006-04-6	15-25% w/w%			Manufacturing	
Rubber components: e.g., tread, sidewall	Tyre tread	Basic material: synthetic rubber	Styrene butadiene	9003-55-8	25-45% w/w%			Manufacturing	

# Proposal of information requirements for tyres

## General approach

### All ESPR Article 2(27)(a-d) need to be tracked

- Reporting only on **substances in the product** when PoM
- Proposed **reporting thresholds** – above which level reported (see next slides)
- Proposed **binary approach** (contained yes/no) for reporting – **needs EC confirmation that in line with legal text obligations which requires specifying concentration**
- Calculation of concentration at **product level** unless otherwise specified (specific cases for ESPR Article 2(27)(d) substances) → **see granularity considerations**

Report proposes **exemption** of Article 2(27)(b) substances **but not clear if a complete category can be exempted – needs to be assessed by legal service and in impact assessment.**

- Grounds for exemption of Article 2(27)(b) substances and concentration reporting:
  - Administrative burden
  - (Confidentiality) → needs substantiation

# SoC information requirements

## Considerations on binary approach + SoC b

Multiple stakeholders suggest introducing information requirements only for **substances in the final product**, due to complexity of verification of information for imported tyres.

Specifying **data on exact location and concentration or amounts is not straightforward.**

- Some constituents undergo **reactions**, during curing (manufacture) and/or use, exact composition can change over time.
- **Tyre wear** changes tyre weight which affects tyre composition over time – **would concentration not be the same in tread before and after?**
- Deriving substance composition of a tyre through **analysis** after it is manufactured is not a simple task
- **Administrative burden** to track and analyse all instances of use of a single substance:
  - Substance / mixture / raw material purchased by manufacture
  - Used in X manufacturer locations
  - Used in manufacture of Y tyre models
  - Used in Z components of each tyre model
  - → for a single substance multiple instances must be analysed or calculated =  $X*Y*[Z_1+ Z_2+...Z_n]$
  - Raw material composition can vary between suppliers, potentially making exercise more complex

# SoC information requirements

## Considerations on reporting granularity

Report suggests a **binary approach** (yes/no) for reporting once SoC above reporting threshold.

- **Not clear if this approach is in line with ESPR**
- Potential compromise – reporting of concentration range, e.g.:
  - <substance threshold% → no reporting necessary
  - substance threshold-5%
  - 5-10%
  - 10-25%
  - 25-50%
  - 50-100%
- Under REACH, reporting on the **article level** – are tyre components considered as a single article or separate articles based on components in this respect?



**Figure 4-2: Schematic construction of a radial tyre.**

Source: (European Commission, n.d)

1.	Tread	6.	Radial plies
2.	Tread grooves	7.	Bead wire
3.	Crown belts	8.	Inner liner
4.	Cushion	9.	Carcass belt
5.	Sidewall	10.	Shoulder

# Proposal for tyres

## Proposed thresholds and transition periods for tracking

- SoC a) (SVHC/ Candidate list substances)
  - Threshold: 0.1%w/w at tyre (or tyre component) level
  - Applies [18 months] after adoption of the DA
  
- SoC c) (PoPs)
  - Threshold: 0.1%w/w at tyre (or tyre component) level
  - Applies [18 months] after adoption of the DA

\*Subject to impact assessment study

# Proposal for tyres

## Proposed thresholds and transition periods for tracking – SoC b) (CLH substances)

- Suggested not to report in SoC report – not clear if in line with legal text obligations
- Lowest applicable threshold based on SoC classification(s) at tyre (or tyre component) level
  - carcinogenicity cat 1 and 2: 0.1% w/w
  - germ cell mutagenicity cat 1: 0.1% w/w
  - germ cell mutagenicity cat 2: 1.0% w/w
  - reproductive toxicity cat 1 and 2: 0.1% w/w
  - endocrine disruption human health cat 1: 0.1 % w/w
  - endocrine disruption human health cat 2: 1.0% w/w
  - endocrine disruption environment cat 1: 0.1% w/w
  - endocrine disruption environment cat 2: 1.0% w/w
  - persistent, mobile and toxic or vPvM: 0.1% w/w
  - persistent, bioaccumulative and toxic or vPvB: 0.1% w/w
  - respiratory sensitisation cat1: 0.1% w/w
  - skin sensitisation cat 1: 0.1% w/w
  - hazardous to the aquatic environment cat chronic 1 to 4: 1.0% w/w
  - hazardous to the ozone layer: 0.1% w/w
  - specific target organ toxicity RE cat 1 and 2: 1.0 % w/w
  - specific target organ toxicity SE cat 1 and 2: 1.0 % w/w
- Applies [36 months] after adoption of the DA
- Exemptions for substances classified under ‘EU-CLP-only’ (hazard classes not present in GHS\*) – tracking applies [36 months after inclusion of the hazard class in GHS] / or [5 years] after adoption of the DA]

# Proposal for tyres

## Proposed thresholds and transition periods for tracking

- SoC d) negatively affects the reuse and recycling
  - Threshold: 0.1%w/w at tyre (or tyre component) level, additional requirements in some cases (next slide)
  - Applies [18 months] after adoption of the DA
- Retroactive reporting of **new ESPR Article 2(27)(a-c)\* substances** at tyre (or tyre component) level
- Applies [6 months] after new substances included in the various categories (e.g., new SVHCs, new POPs, etc.)

\*Mainly relevant for a, b and c substances

\*\*Subject to impact assessment study

# SoC information requirements

## Thresholds and additional information requirements for SoC d

Though for most identified substances, a **0.1% w/w reporting threshold**, meaning that the information requirement would currently have a binary nature, for a few of the Article 2(27)(d) substances, **additional information requirements** apply – see table:

Substance	CAS	Proposed threshold	Additional information requirements or comments
Sealing material - sticky gel materials used in self-sealing tyres	Unidentified	0.1% w/w	Specific substances should be specified, if possible, for this category <a href="#">Localisation and instructions for easy removal</a> should be specified
Polyurethane	9009-54-5	0.1% w/w	<a href="#">Localisation and instructions for easy removal</a> should be specified
Chlorobutyl rubber	68081-82-3	0.1% w/w	In addition, <b>chlorobutyl rich (<math>\geq 3\%</math>)</b> and <b>chlorobutyl poor (<math>&lt; 3\%</math>)</b> should be specified
Bromobutyl rubber	68441-14-5	0.1% w/w	In addition, <b>bromobutyl rich (<math>\geq 3\%</math>)</b> and <b>bromobutyl poor (<math>&lt; 3\%</math>)</b> should be specified if use of this substance is not restricted
Zinc oxide	1314-13-2	0.1% w/w	It should be considered to require the introduction of binding <b>maximum content thresholds for Pb and Cd</b> from ZnO suppliers
Cadmium oxide	1306-19-0	0.1% w/w	
Lead and lead compounds	7439-92-1; 68411-78-9; 598-63-0	0.1% w/w	
Silica	7440-21-3; 7631-86-9 (amorphous); 112926-00-8	0.1% w/w	In addition, <b>silica rich (<math>\geq 5\%</math>)</b> and <b>silica poor (<math>&lt; 5\%</math>)</b> should be specified
Aramid/Kevlar	308069-56-9; 24938-64-5	0.1% w/w	Declaration of textile class: Standard (Nylon/Poly) or Advanced (Aramid/Kevlar).
Lithium battery related substances: 1,3-propanesultone 1, 2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME) Decamethylcyclopentasiloxane 1,3-propanesultone 2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one Potassium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonate	1120-71-4; 110-71-4; 97 541-02-6; 1120-71-4; 71868-10-5; 29420-49-3	0.1% w/w	<a href="#">Localisation and instructions</a> for easy removal of the battery should be specified

# How to include the SoC information

Detailed substance information is confidential

- SoC data proposed to be reported to **digital product passport** and **accessible only waste management operators** for sorting and/or characterizing batches of materials recycled from ELTs
- Based on ESPR Article 7(7), the data must also be provided in one or more of the following forms:
  - a) on the product itself;
  - b) on the product's packaging;
  - c) on a label referred to in Article 16;
  - d) in a user manual or other documentation accompanying the product;
  - e) on a free access website or application.

QSoC3: Which of the above is feasible?



# SoC information requirements

## Proposed scenarios for impact assessment

- **Highly ambitious scenario:** All SoC listed in Art. 2(27)(a–d) present in the product would fall under the information requirement with the proposed thresholds and transition timelines (see previous slides), with no exemptions. Retroactive reporting within 6 months...
- **Moderate ambition scenario:** All Art. 2(27)(a,c and d) SoC would be tracked, requiring retroactive information on newly identified substances within 6 months for any of these substances once it is subject to regulatory action that would affect information requirement.
- **Limited ambition scenario:** All SoC listed in Art. (a,c and d) present in the product when PoM would fall under the information requirement with a threshold of 0.1% w/w and no further information requirements (e.g. on location or concentration range).

**QSoC13:** Would it be practical for information on SoCs covered by Article 27(2)(a, b,c) to be provided retroactively within 6 months of a substance being subjected to EU regulatory action that would limit the substances' usability in tyres?

**QSoC14:** In the latter case, would the indication of use above the threshold of 0.1% w/w be sufficient as a general obligation?



**Disclaimer: scenario moderate and low need to be legally assessed - unclear if whole SoC categories or certain information parameters (concentration, location etc) can be omitted**

# The SoC Tyres Bill of Chemicals – methodology

Substance	Component and function	Origin	SoC Art 2(27) a	SoC Art 2(27) b	SoC Art 2(27) c	SoC Art 2(27) d	Customer driven limitations	Regulatory limitations/ thresholds	Process disturbing	Quality disturbing	Exemptions according to stakeholders
Sealing material - Unidentified	Self sealing tyres; Sealing material	Manufacturing				d			Shredder disruptive		
Polyurethane	Noise cancelation tyres; Noise reduction material	Manufacturing				d			Shredder disruptive		
Foam adhesive in noise reduction tyres - Unidentified	Noise cancelation tyres; Adhesive	Manufacturing				d			Shredder disruptive		
Chlorobutyl Rubber	Inner liner rubber; Maintaining the low gas permeability	Manufacturing				d			Can cause extensive damage via corrosion during the pyrolysis process and during the use of TPO as a feedstock for material re-use.	Affects the quality of TPO and its use as a feedstock for material re-use.	Stakeholders suggested to limit but said it cannot be avoided
Bromobutyl Rubber	Inner liner rubber; Maintaining the low gas permeability	Manufacturing				d			See chlorobutyl rubber	See chlorobutyl rubber	Stakeholders proposed to restrict as more problematic

# Discussion of SoC d substances

## Specific questions (1)

### Sticky gel materials used in self-sealing tyres

- **QSoC4:** Are you aware of **substances that are constituents of sticky gel materials** used in self-sealing tyres? Please provide substance name and CAS number and any additional information you consider relevant



### Polyurethane foams and adhesives of noise reduction tyres

- **QSoC5:** Can noise reduction tyres be designed to enable **easy removal** of the PU foams?
- **QSoC6:** Please confirm that the **adhesives** used in noise reduction tyres, though prohibitive to PU foam removal, do not negatively **impact the quality of recycling outputs**.
- **QSoC7:** New developments in **wheel rim design** are looking into the use of **perforations, grooves** and other forms to reduce the noise created by vibrations of the wheel. Could such solutions provide an equivalent **alternative** to noise reduction tyres?



### Rubber liner materials: Halobutyl: Chlorobutyl and bromobutyl

- **QSoC8:** Would waste operators need the content of chlorobutyl rubber and/or bromobutyl rubber to be specified in information provision (e.g., concentration rounded at unit level) or would the specification of a range suffice (e.g., chlorobutyl rich or poor or >5% or >5%.?)



# Discussion of Bill of Chemicals substances

## Specific questions (2)

### Zinc oxide (rubber filler and activator) and lead and cadmium impurities

- **QSoC9:** Are there practical thresholds that could be introduced for lead and for cadmium as information requirements to facilitate tyre sorting and batching of tyres sent to pyrolysis?
- **QSoC10:** Considering the possible growth in pyrolysis treatment capacities in the EU, shall it become necessary in coming years to introduce measures for limiting the presence of lead, cadmium oxide and other organic substances in tyre rubber?



### Silica (filler), sulphur and chlorine

- **QSoC11:** Would specification of the general range of silica content support waste operators in sorting and batching tyres sent to pyrolysis (e.g., silica or poor or >5% or >5% silica rich content. Please propose suitable silica content categories for information requirements.
- **QSoC12:** Could information requirements for sulphur and chlorine be addressed in a similar way and if so, which range categories should be applied??



# SoC performance requirements

## General approach

Several substances identified under Article 27(2)(d) category for which ESPR allows introducing performance requirements, potentially restricting the use of such substances where suitable substitutes available. Two sub-groups can be identified:

- **Reasoning for restriction related to chemical safety → regulatory** action is already under consideration **under REACH** and should be followed up for PAHs, 6PPD, DPG, Cobalt salts:
  - PAHs - REACH Annex XVII restriction should be extended to CB;
  - 6PPD: REACH restriction under consideration;
  - DPG: regulatory action may be considered under REACH. Waste management disruption not clear;
  - Cobalt salts – restriction underway in REACH;
- **Restrictions aimed at facilitating tyre recycling and quality of recycling output material:**
  - Sticky gel sealing materials used in self-sealing tyres – **run-flat tyres** provide similar function
  - Chlorobutyl and bromobutyl rubber – the former should be limited to **3%**, the latter restricted
  - Cadmium and lead compounds in ZnO used in tyres - binding **maximum content threshold** for Pb and Cd in supplied ZnO.

QSoC13: How do you view these restrictions/thresholds?



# SoC performance requirements

## Proposed scenarios for impact assessment

Substance	Impact on recyclability	Severity of impacts	Low ambition Policy Option	Moderate ambition Policy Option	High ambition measure Policy Option
<b>Polyurethane foams</b>	Leads to clogging, bridging, or jamming of shredding and grinding machines, increases share of non-recyclable material in tyre	Moderate impacts as long as bot used in many tyres: increased downtime for cleaning/ maintenance at shredding plants	Flag contents + require provision of removal instructions in DPP	Require redesign of foam integration in the tyre to ensure quick removal + flag contents + require provision of removal instructions in DPP	Prohibit the use of polyurethane foams
<b>Sticky gel and elastomer self-sealants</b>	Adhere to shredding and grinding equipment and lead to increased downtimes for cleaning and replacing blades	Severe impacts: Can lead to heating up of treated fractions that can result in fires; Increased downtime for cleaning/ maintenance at shredding plants	Flag contents + require provision of removal instructions in DPP	Prohibit use of sticky gels and elastomer self-sealants in tyres	Prohibit the placing on the market of self-sealing tyres
<b>Aramid/ Kevlar fibres</b>	See sticky gels	Severe impacts: See sticky gels	Flag contents in DPP	Declaration of textile class: Standard (Nylon/Poly) or Advanced (Aramid/Kevlar)	Prohibit use of aramid/Kevlar fibres in tyres
<b>Lithium batteries in TPMS</b>	Can induce explosions and fires in shredders	Severe impacts: Can lead to heavy damages to equipment, resulting in downtime and related losses	Flag contents + require provision of removal instructions in DPP (possibly also in vehicle DPP)	Flag contents + require provision of removal instructions in DPP (possibly also in vehicle DPP)	Require redesign of battery integration in the TPMS to ensure quick removal + Flag contents + require provision of removal instructions in DPP
<b>Silica</b>	Can lower rCB quality when present in high amounts	Moderate impacts: Only hindering for pyrolysis treatment route	Flag contents in DPP	Specify contents in DPP as silica poor or silica rich	Specify contents in DPP as silica poor (<10%) or silica rich (≥10%)
<b>Chlorobutyl rubber and bromobutyl rubber</b>	Cause damage during the pyrolysis process via corrosion; Impacts TPO quality	Moderate impacts: Decrease in TPO quality affects feedstock for material re-use	Flag contents in DPP	Flag contents in DPP + restrict use of bromobutyl	Flag contents in DPP + restrict use of bromobutyl + limit maximum content of chlorobutyl to 5%
<b>Cadmium and lead in ZnO</b>	Can affect the quality of recycled carbon black when such tyres undergo pyrolysis	Depends on total cumulative content of inorganic elements	Flag contents in DPP	Flag contents in DPP	Introduce binding maximum content threshold for Pb and Cd in ZnO to be passed down to suppliers

# SoC Policy Option Analysis (Task 7)

- Expected impacts:
  - Restriction of sticky gels, PU foam and TPMS battery removal → increase in tyres available for recycling
  - Removal of batteries from tyres prior to shredding to reduce related damage costs, assessment based on 135 facilities and annual costs of 190,000€ per facility – proxy for impacts.
    - • the low ambition policy option would save 5.1 million € worth of damages per annum;
    - • the moderate ambition policy option would save 12.8 million € worth of damages per annum;
    - • the high ambition policy option would save 20.5 million € worth of damages per annum.
  - Availability of information on substances of concern to support optimization in sorting and batching of ELTs for pyrolysis and devulcanization

# MEErP Task 6 Design Options

Daniel Hinchliffe

Oeko-Institut Consult GmbH

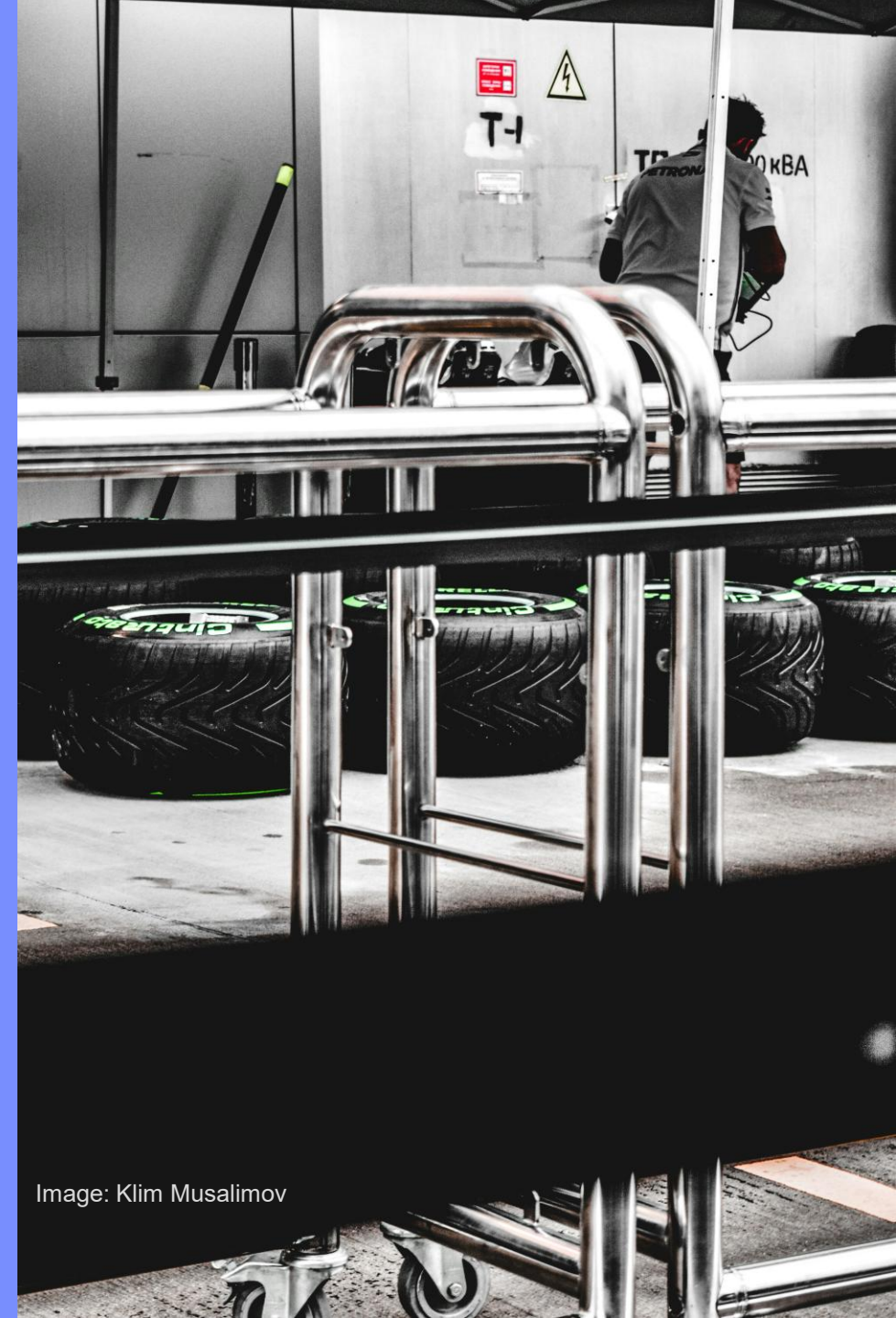


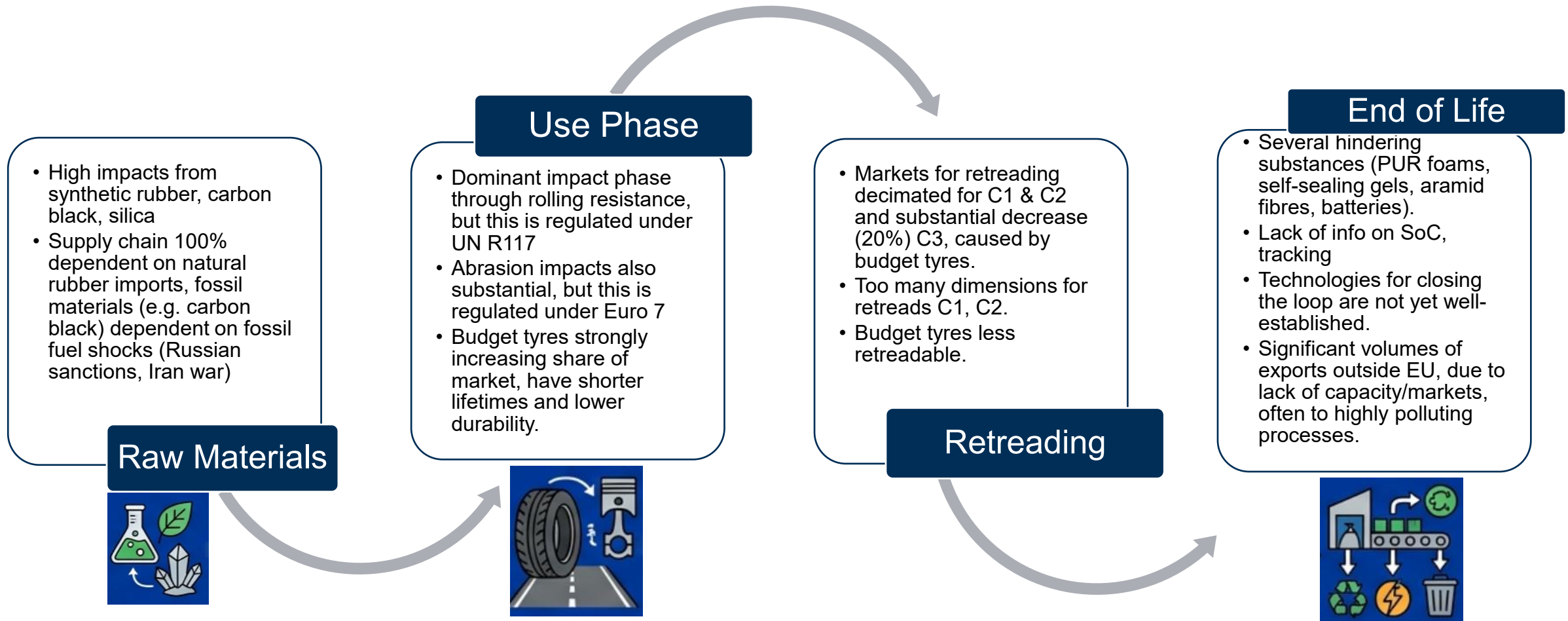
Image: Klim Musalimov

# The objective of MEERP Task 6

MEERP Task 6 aims to provide:

- Overview of Design Options Considered
- Technical and Economic Feasibility
- Quantification of their impacts on Bill of Materials, performance, EoL and costs
  
- The quantifications enable determination of the policy option impacts in Task 7 for the EU.
  
- Our Task 6 report also covers initial Use Cases for the DPP – these will be discussed in DPP segment.

# Problem Drivers and Environmental Hotspots



# Design Options Proposed

## Overview

### Pathway A: Closing the Loop

1. Recycled Content Targets
2. Design for Recycling- restriction of hindering materials
3. Design for Recycling- information on hindering materials

### Pathway B: Bio-Transition

5. Minimum Bio-based/Renewable Content

### Pathway C: lower impacts in use phase

4. Removal of extrusion spikes before sale
6. Rolling Resistance Limits
7. Abrasion Limits

### Pathway D: Life extension / retreading

8. Support retreading of C3 tyres
9. Standardisation of C1/C2 tyre dimensions
10. Mileage Extension
11. Criteria for re-use
14. Design for Repair

### Enablers:

12. DPP
13. Substances of Concern

# Design Options Proposed

Filtered by quantification potential and relevance for ESPR

## Pathway A: Closing the Loop

1. Recycled Content Targets
2. Design for Recycling- restriction of hindering materials
3. Design for Recycling- information on hindering materials

## Pathway B: Bio-Transition

5. Minimum Bio-based/Renewable Content

## Pathway C: lower impacts in use phase

4. Removal of extrusion spikes before sale
6. Rolling Resistance Limits → UN R117
7. Abrasion Limits → Euro 7

## Pathway D: Life extension / retreading

8. Support retreading of C3 tyres → markets in T7
9. Standardisation of C1/C2 tyre dimensions → markets in T7
10. Mileage Extension → Consider Euro 7 lifetime indicators
11. Criteria for re-use → ESPR only when place on market
14. Design for Repair → not highlighted as priority

## Enablers:

12. DPP → Analysis in T6 & T7, not quantified
13. Substances of Concern → Analysis in SoC report

**Question:** Are there any major Design Options where ESPR can act when placing on the market that we have missed?



# Path A: Closing The Loop

## Design Option 1: Recycled Content

Propose recycled content of:

- 5% rubber compound, rising to 20%
- 50% reinforcement materials, rising to 80%

### Rubber Compound:

Micronised rubber, reclaim rubber -> 1% filler

Devulcanised rubber -> higher substitution rates, carbon black, natural/synthetic rubber mix (up to 20%)

Pyrolysis -> TPO & rCB. Processes to improve uptake enable closed loop recycling (sCB, additives for rCB)

### Reinforcement materials

Recycled steel readily available

Recycled textiles, e.g. rPET also readily available

How this target could be met (indicative composition):

	C1		C3	
Recycled Content Target	5 % Rubb., 50 % Reinf.	20 % Rubber, 80 % Reinf.	5 % Rubb., 50 % Reinf.	20 % Rubber, 80 % Reinf.
devulcanised rubber   closed loop	3.2 %	16.0 %	3.2 %	16.0 %
sCB   closed loop	6 %	15 %	5.0 %	12 %
rPET   open loop	20 %	70 %		-
micronised rubber   closed loop	0.25 %	0.5 %	0.3 %	0.5 %
reclaimed rubber   closed loop	0.25 %	0.5 %	0.3 %	0.5 %
recycled steel   open loop	65 %	96 %	50.0 %	81 %

(shown as % of rubber compound, %textiles, %steel)

# Path A: Closing The Loop

## Design Option 1: Recycled Content

### Cost Implications:

- Devulcanised rubber scales modularly and is independent of oil prices → lower costs
- Micronised/reclaim → same costs
- sCB or rCB → same costs to virgin
- rPET → same costs to virgin
- rSteel → same costs to virgin

Costs impact: On balance, assumed no impact on cost.

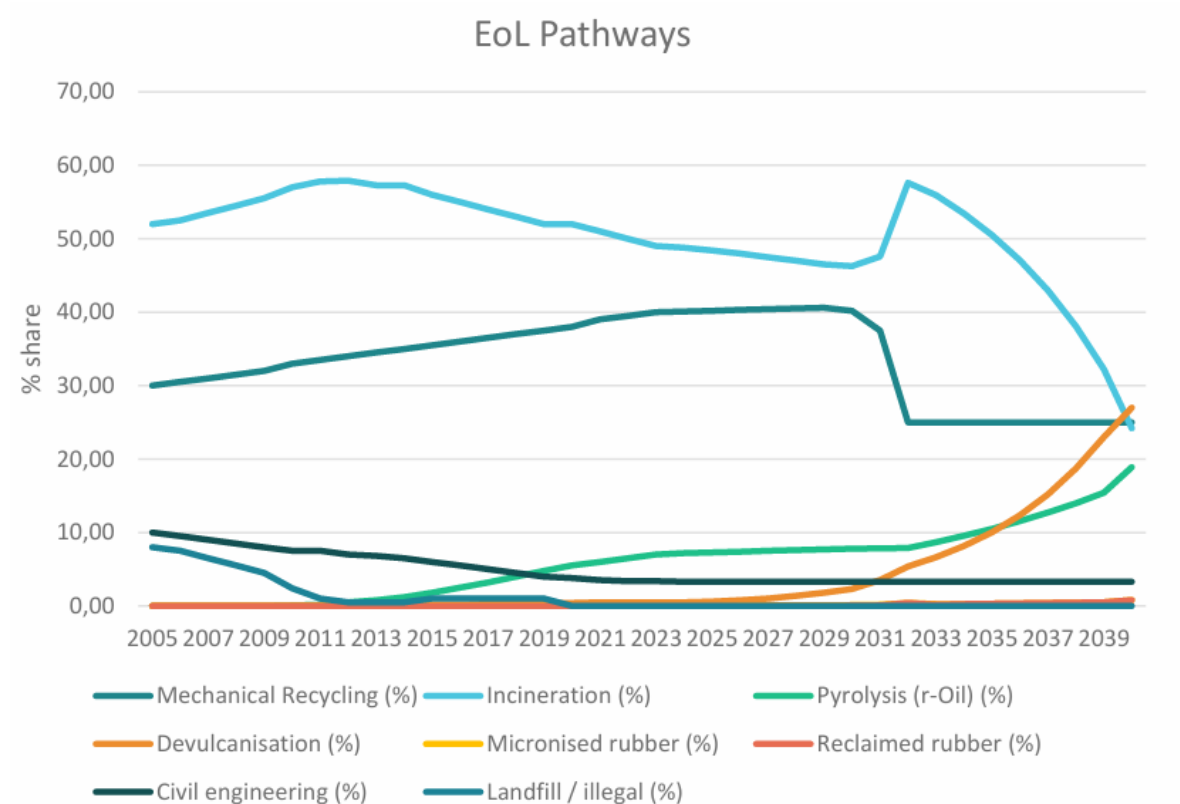
### Performance:

All major manufacturers currently have high performance (AAA) demonstrator tyres hitting high recycled content targets -> can assume it is possible to integrate and meet existing performance/safety requirements.

# Policy Option – Recycled Content

## Design Option 1: Recycled Content

- **Existing targets:** Most manufacturers have a „sustainable materials“ target of 40% by 2030 (bio-based + recycled content). Several have 100% by 2050.
- **Potential targets:**
  - 2029: recycled content declaration requirements
  - 2032: 5% rubber compound, 50% reinforcement
  - 2040: 20% rubber compound, 80% reinforcement
- **Needs:**
  - EoL Pathways: pyrolysis outputs (rCB) become viable for use in tyres, devulcanisation ramps up to >25% by 2040.
  - Standardisation mandate: currently EN standards only exist for ELT granulates. ASTM standards describe other recycling streams, gaps remain for quality on devulcanisation outputs.
  - Verification approach based on mass-flow at batch level – DPP.



# Questions on Recycled Content

## Policy and Design Option

1. Is this kind of timing & ramp up at EoL feasible for tyre fleets and pyrolysis/devulcanisation?
2. Is standards mandate necessary or can/are ASTM standards be used?
3. Verification at factory level eventually feasible?
4. Can pyrolysis outputs eventually be used to close loop?
5. If higher % of recycled content in ELT, would this affect output quality of subsequent pyrolysis/devulcanisation runs?

# Path A: Closing The Loop

DO-02, DO-03: Design for Recycling – restriction or information requirements

Declaration / Phase out of substance that hinder recycling

- PUR noise reducing foams
- Aramid/kevlar Fibres
- TPMS Batteries inside tyre
- Silica content that affects
- Self Sealing gels

Assumed no impact BOM, use phase.

Main impact is to support EoL processing, reducing negative effects for end processors

Assumed no cost impacts

Assumed EoL Impacts:

Restriction	Declaration
+1% Mechanical Recycling	-2% Mechanical Recycling
+1% Co-processing	+1% Co-processing
-1% Civil Engineering	+ 1% Civil Engineering

# Pathway B: Bio-Based Content

## DO-05 Substitution of bio-based materials

- Tyres have several inherently bio-based materials (natural rubber, stearic acid, rayon cord)
- Some materials easier to substitute than others:

Tier 1: Relatively straightforward drop in

Tier 2: Replacement via functionally equivalent performance or mass-balancing.

Tier 3: Technically constrained or material-linked (not suitable)

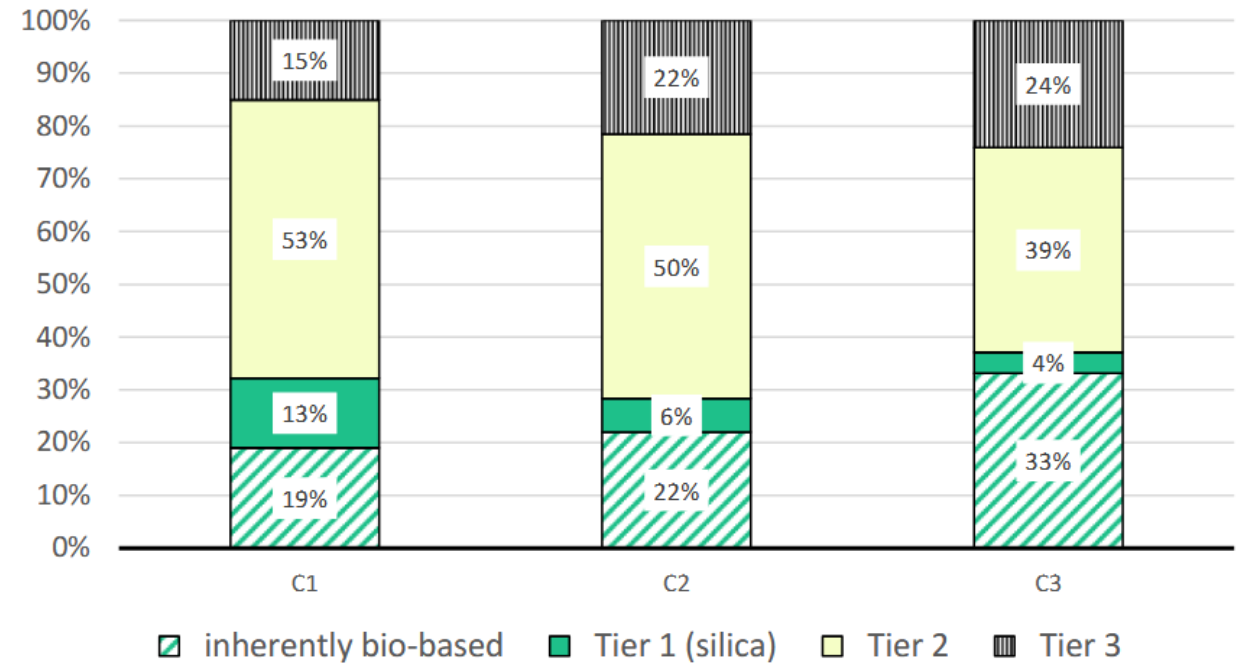


Figure 1-1: Share of materials suitable for a bio-based substitution of C1, C2 and C3 tyres.

**Table 1-10: Overview of bio-based material classifications.**

Compartment	Material (group)	Inherently bio-based	Tier 1 bio-based substitution	Tier 2 bio-based substitution	Tier 3 Technically Constrained /mineral-Linked	TRL (1-3= Research; 4-6=Development; 7-9 Deployment)
Rubber	Natural Rubber	X				Deployment
	Synthetic Rubber			X		Development
Filler	CB				X	Research
	Silica		X			Deployment
Rubber compounding additives	Oils			X		Deployment
	Sulfur				X	Research
	Cobalt Organic Salts			X <sup>5</sup>		Development
	other additives			X		Development/ Research
	Stearic Acid	X				Deployment
	ZnO				X <sup>6</sup>	Development
Steel	Steel Belts and bead wire				X	Not applicable
Fabric	Rayon cord fabric	X				Deployment
	other fabrics (polyester, nylon, aramid)			X	Development	

# Policy Option: Bio-Based Content

## DO-05 Substitution of bio-based materials

- 2032:
  - C1 5% in addition to natural rubber
  - C3 2% in addition to natural rubber
- 2040:
  - C1 15% in addition to natural rubber
  - C3 5% in addition to natural rubber

Modelled impacts using bio-based synthetic rubber or silica on 10% changes.

Silica content in C3 tyres too low to substitute in large quantities

Assumed no impact on performance.

Mass balance verification and carbon 14 radiography.

Tyre Material		Weight in reference tyre (kg)	10 % bio-based substitution of tyre weight (kg)	Remaining non-bio-based material (kg)	Amount of material substituted
C1	Synthetic Rubber	2.031	0.818	1.22	40 %
	Silica	1.082	0.818	0.26	73.3 %
C3	Synthetic Rubber	9.25	6.41	2.84	69 %

### Cost Impacts:

Currently a premium for bio-based additives, other materials not fully available.

No cost impact modelled initially.

**Question:** is a cost premium of 20-30% at current time about correct?

# Pathway C: Use Phase Impacts

DO-4: Removal of extrusion spikes, DO-6: Rolling Resistance, DO-07 Abrasion

- No measures proposed on rolling resistance or abrasion as dealt with in other legislation
- Consideration of extrusion spikes:
  - Spikes have weights of  $\approx 5\text{mg}$  per spike (0.5 mm radius, 5 mm length, density of  $1.15\text{ g/cm}^3$ ).
  - Mandate that all tyres shave spikes before sale.
  - Estimated under 10,000 tons a year – minor, but avoidable.



Tyre type	Number of spikes (est.)	Impact per tyre	% of tyre wear	Annual mass (multiplied sales 2024)
Bicycle	600	3 g	5%	
C1	1,200	5.4 g	0.25%	1,651 tons
C3	2,500	11.3 g	0.15%	187.6 tons

**Question:** do abrasion tests already force this under Euro 7, or no specific requirement?

# Pathway D: Lifetime Extension

DO-08: Support to Retreading; DO-09: Casings Standardisation; DO-10: Lifetime Extension

## ■ DO-08: Retreadable Tyre Standard

- A range of measures could be implemented to increase retreading, but these are market interventions. In Task 6 we therefore considered primarily the possibility of deferring to a retreading standard, if set, under the retreading energy performance label.

## ■ DO-09: Standardised Casing Dimensions for C1:

- Define casing dimensions which would be retreadable, and require % of tyres to meet this.

## ■ DO-10: Mileage Extension

- Investigated options to extend mileage. Without sales data, difficult to meet meaningful conclusions. Setting minimum mileage requirements for 159 non-sales weighted C1 models tested by ADAC of 40,000 km would increase overall mileage by 4.4%-7.1%.
- Propose no specific limits on mileage due to associated performance trade-offs, and instead defer to service lifetime indicator intended for development under Euro 7.

# Retreading Standard

## DO-08 Support to Retreading (C3)

Retreadability affected by:

- Robustness of the bead wire, steel belts, and sidewall cords,
- Depth of undertread and tread width geometries,
- a clearly defined "buffer zone" (the layer of rubber between the bottom of the tread grooves and the steel belts),
- Quality of adhesives and interlocking compounds.

**Retreading standard** to be defined by CEN which would enable determination of retreadability (pass/fail, or score on index).

### Policy Option:

- Ban % of non-retreadable tyres from the market or require Green Public Procurement of retreadable tyres.
- Introduce information requirements on:
  - Tread width
  - Buffing radius
  - Rolling resistance grade (following retread label)

Challenges: Attempts to define standard so far have been difficult, and no accepted proposal (e.g. destructive testing based on adaptation of existing UN R54 standard).

# Retreadable Casing Dimensions C1/C2

## DO-09 Casing Dimension Standardisation

- CEN or ETRTO to define EV green casing: underlying casing geometry (the bead, the sidewall thickness, the undertread radius) would be standardised across brands to fit minimum range of retreading molds.
- Could be applied for replacement tyres, if OEM tyres have differing requirements.
- Use opportunity of tyres for EVs being reinforced to handle heavier loads as opportunity to define new retreadability aspects.

### Policy Option

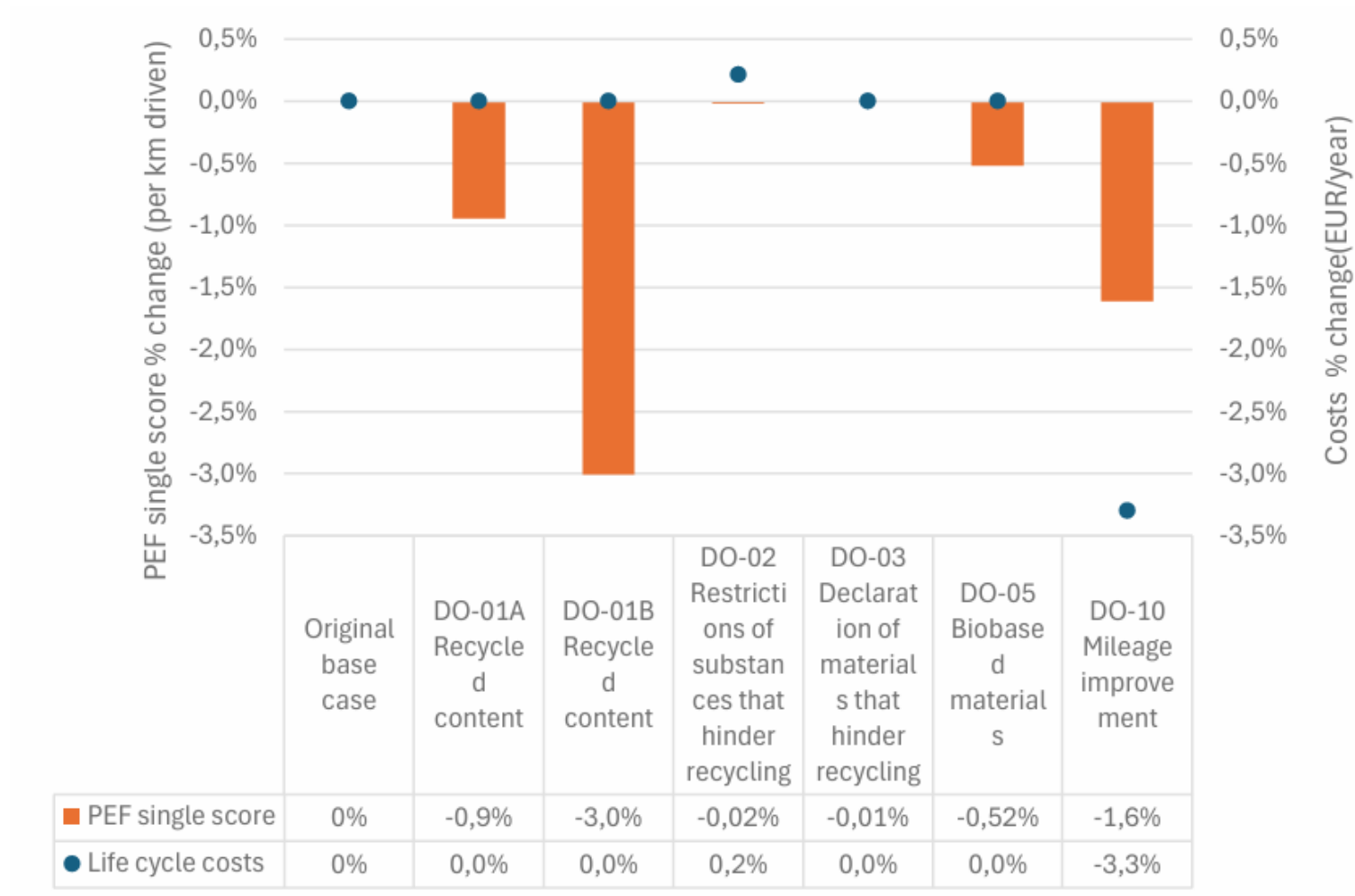
- 70% of new (replacement) tyres must meet retreadable casing dimensions.
- Information requirements on tread width
- Retreadable casing standard for C3 could eventually be extended to apply for C1/C2.

# Modelling of Lifetime Extension

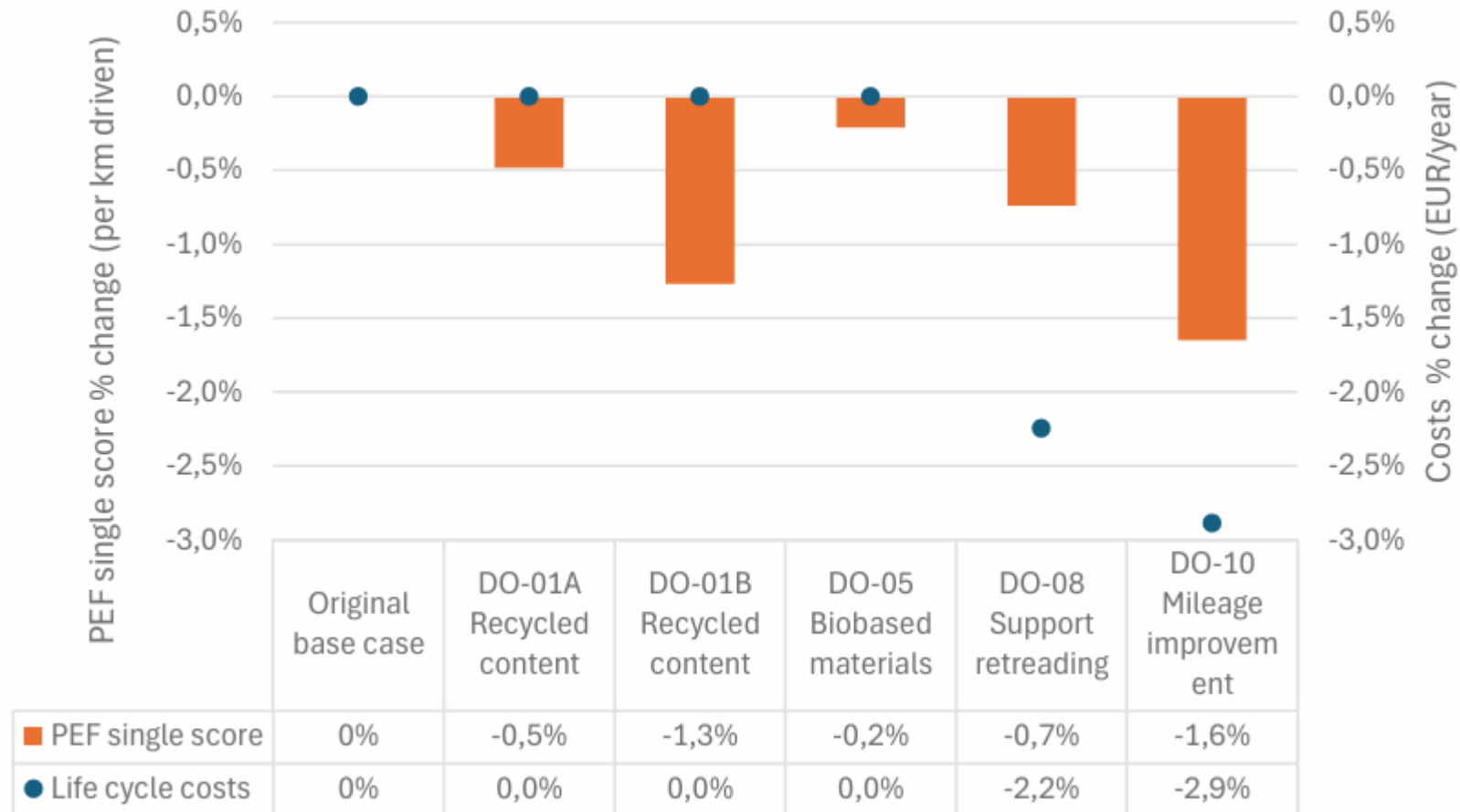
DO-08: Support to Retreading; DO-09: Casings Standardisation; DO-10: Lifetime Extension

- Retreadability Standard
  - Assumed to make tyres live longer than current situation due to better casing construction for longevity -> 10% lifetime extension.
  - No cost changes modelled since base case C3 tyre already retreadable. However, a ban of non-retreadable tyres would likely increase purchase prices.
  
- Casing Dimensions
  - No changes modelled
  
- Lifetime extension
  - Assumed 10% lifetime extension met via -5% tread wear (better abrasion-resistance), half met via greater tread depth (+5%).
  - Assumed 10% higher maintenance / repair costs only.

# BC1 PEF Score Change (%) vs. Costs



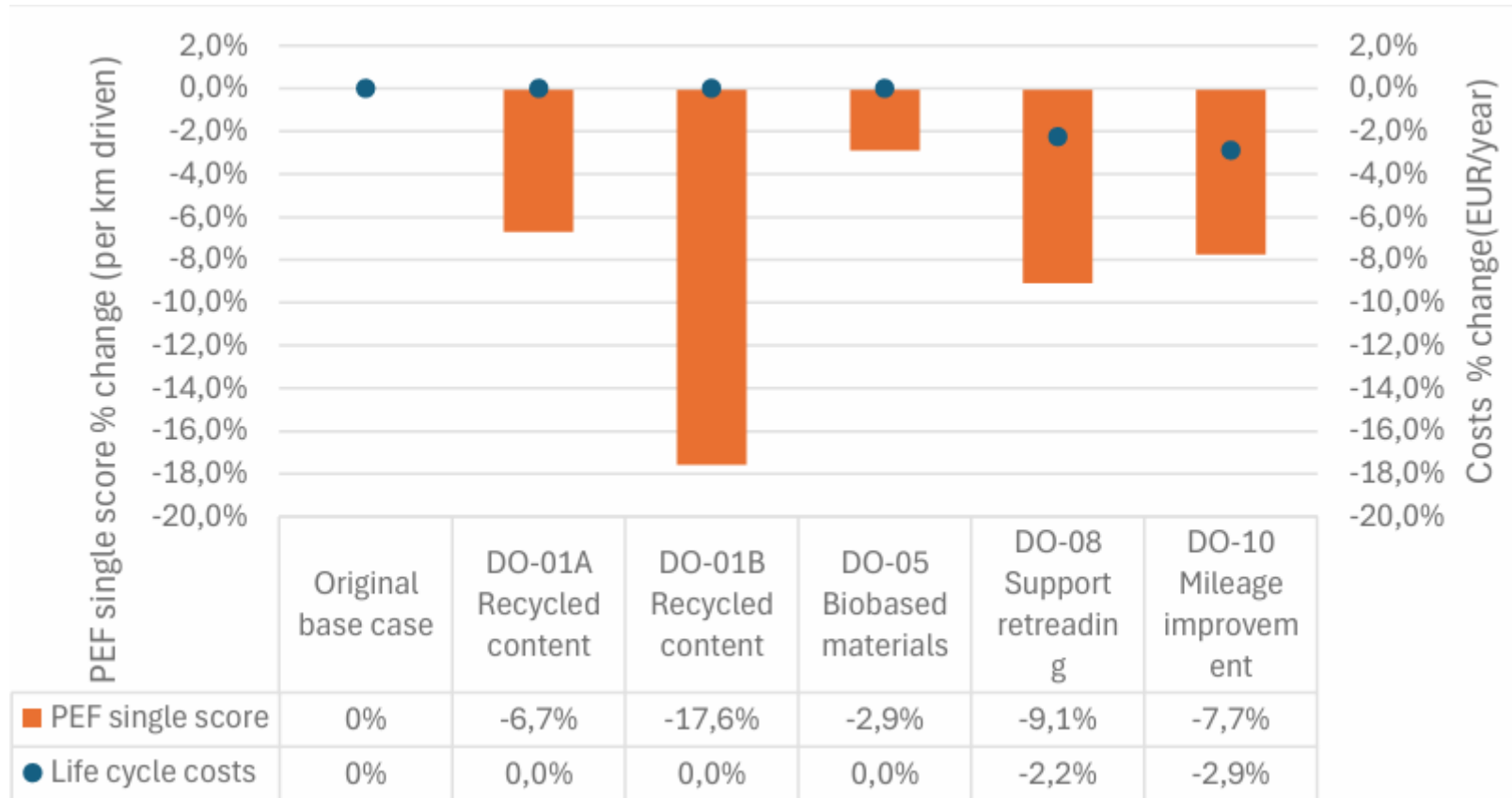
# BC3 PEF Score Change (%) vs. Costs



# BC1 excluding use phase



## BC3 – Impacts PEF excluding use phase



# Initial Findings Task 6

- Changes to environmental performance are low per design option (0.5-3%), when use phase is included due to dominant use phase impacts.
- Recycled content targets and lifetime extension have largest impact on production and End of Life impacts, of up to 16.2% for C1, or 17.6% for C3 as modelled.
- Lifetime extension by 10% for retreadability or in general has second highest impacts purely from perspective of per km impacts, however, this does not take into account full lifecycle savings from retreading.
- Bio-based content savings appear to be minor for the cases modelled (20% substitution in C1, 10% substitution in C3).
- Design for recycling savings are minor. This is expected as they primarily facilitate recycling.

-> To capture retread impacts vs budget tyres, an extended lifecycle analysis is required to capture waste avoided and production savings. This is covered in Task 7.

# Lunch break

Please note that there is unfortunately no canteen / cafeteria in CCAB anymore.

For lunch, you will need to go out and have a short lunch in the many places around CCAB.

Restart at 13:45h



## Agenda – afternoon

Time	Topic	Presenter (Institution)
13:45	Task 7 – Policy Options	Daniel Hinchliffe (Oeko-Institut)
15:15	<i>Coffee break</i>	
15:30	Digital product passport	Yifaat Baron (Oeko-Institut)
16:30	<i>Wrap up and next steps</i>	Daniel Hinchliffe (Oeko-Institut)
16:45	<i>End of meeting – thank you for joining!</i>	

# MEErP Task 7 Policy Options

Daniel Hinchliffe

Oeko-Institut Consult GmbH



# Task 7 Objectives

- Determine policy options based on the design options developed in Task 6
- Develop a stock model for the European Tyres Industry to determine impacts from a baseline
- Conduct sensitivity analyses on different parameters
  
- Our task 7 report:
  - Contains second part of DPP analysis according to JRC DPP methodology released in march
  - Attempts to model a retread vs a budget tyre to enable better comparison of impacts
  - Contains the Open Strategic Autonomy Assessment
  
  - Due to time constraints not perfect and still requires application of a societal cost calculation

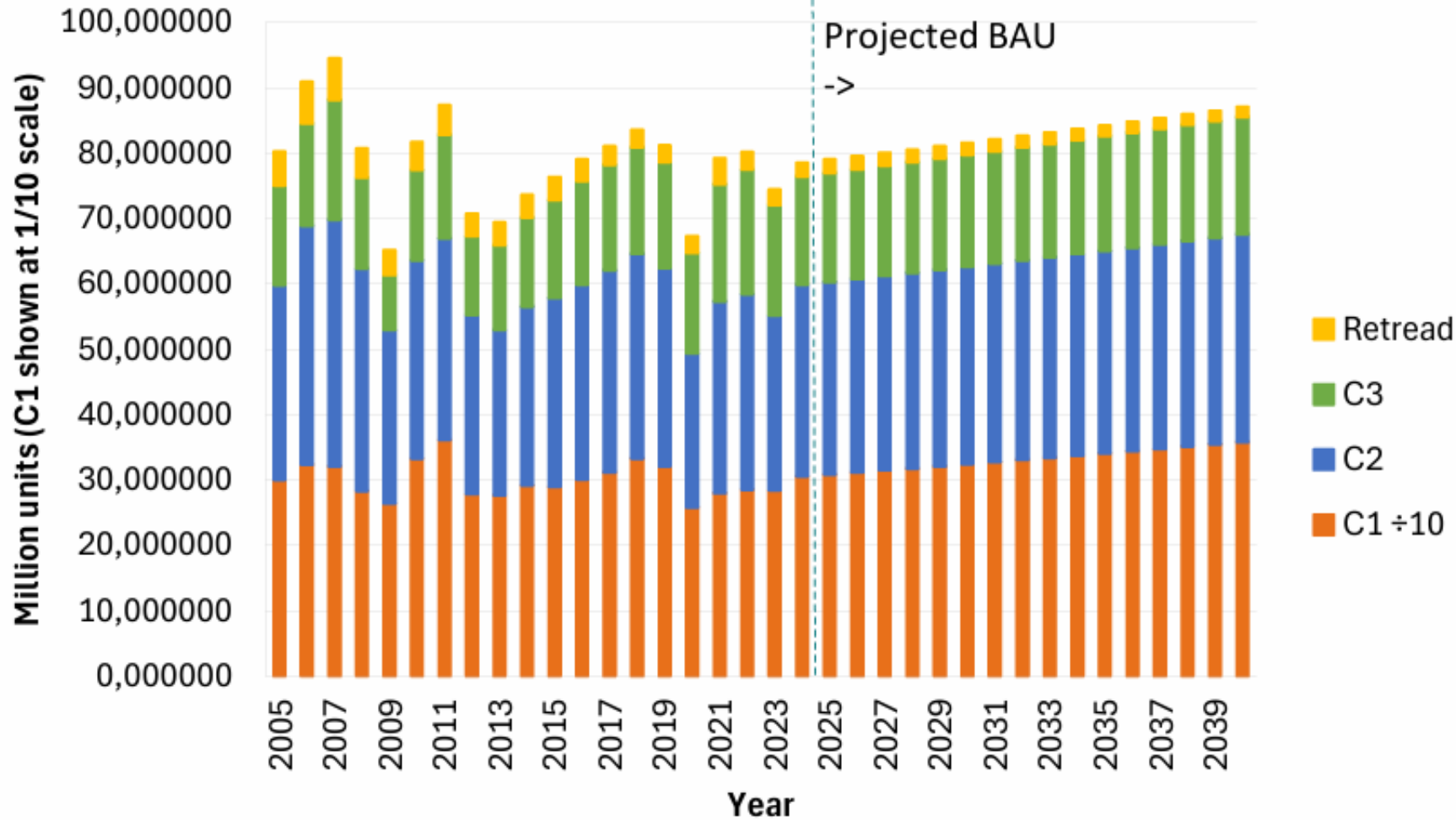
# Tyres Stock Model

## Objectives

- Determine Business As Usual (BAU) impacts for C1-C3 tyres and retreads
- Determine impacts of policy measures
- Compare these to support decision making
- A number of assumptions around how market develops

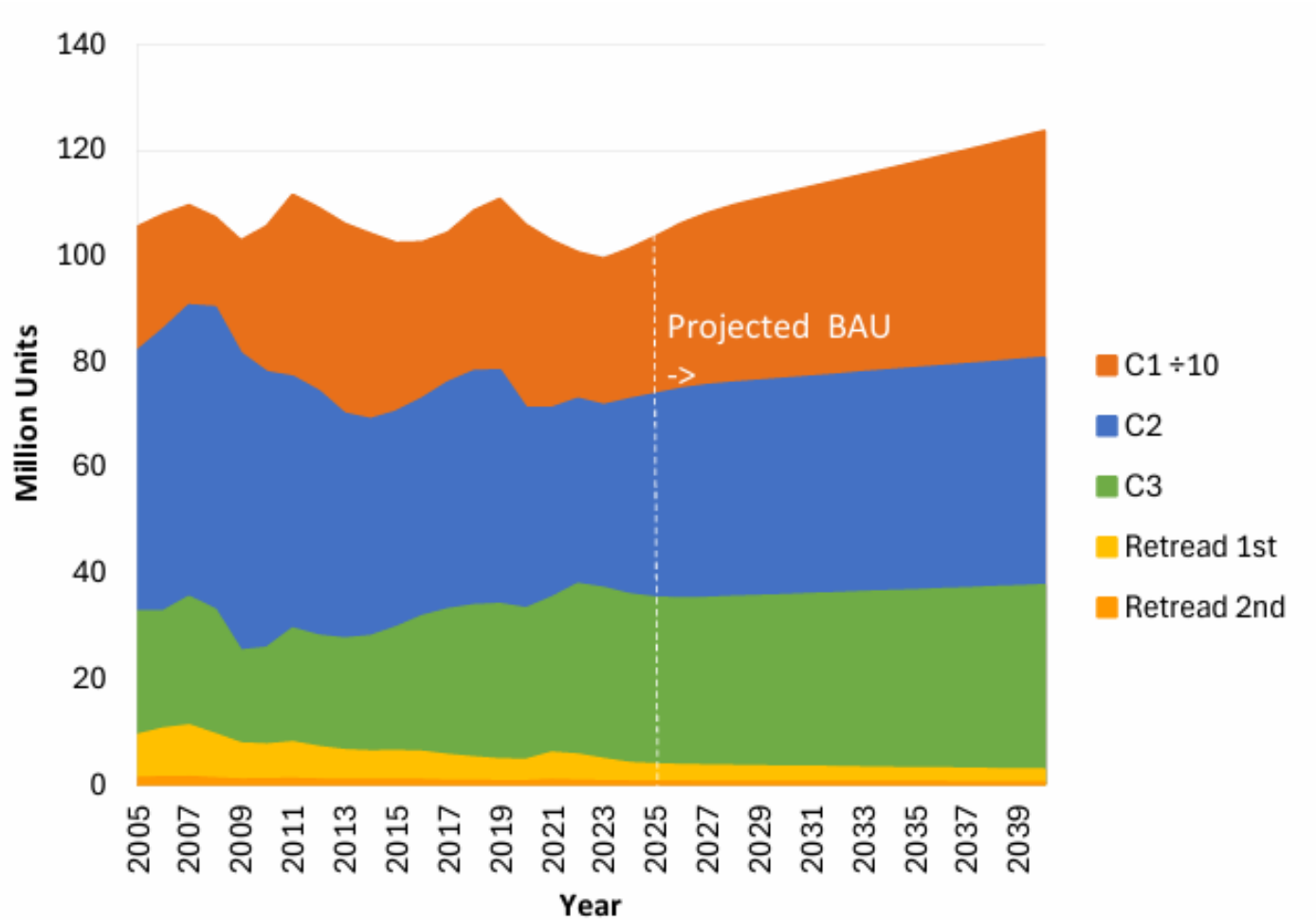
Parameter	C1	C2	C3	C3 Retread
Lifetime (years)	4	3	3	3
Total km	40,000	57,000	253,410	245,920
Annual km	10,000	19,000	84415,584	84415,584
New weight (kg)	8.5	12	64	66*
Tread applied (kg)	—	—	—	22
Tyre wear (kg)	1.6	1.9	12.3	12.3
EoL weight (kg)	6.9	10.1	51.7	51.7

# Tyre Sales, Million Units



Type	Sales 2024 (M)	Post 2024 CAGR
C1	305.7	1%
C2	29.3	0.5%
C3	16.6	0.5%
Retreads	2.1	-2%

# Tyres in use, Million Units

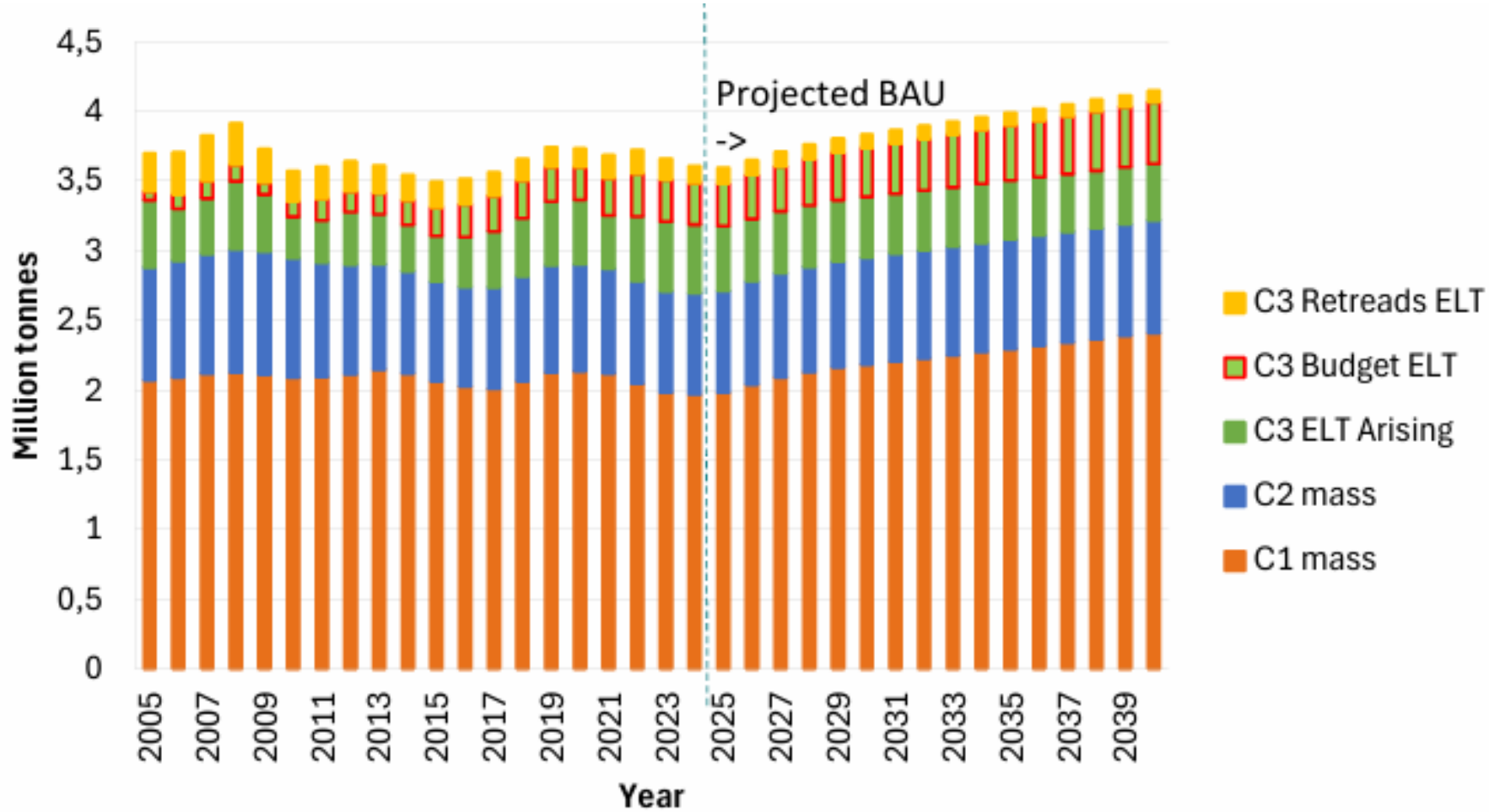


Application of survival rates as below

- 85% of retreads assumed first retread
- 15% of retreads assumed second retread

Category	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Tyre survival rate						
C1 (Passenger)	1.00	0.90	0.75	0.50	0.25	0.10
C2 (Vans)	1.00	0.80	0.50	0.20	0.05	—
C3 (Trucks)	1.00	0.70	0.30	0.10	—	—
Retread 1st life	1.00	0.60	0.20	—	—	—
Retread 2nd life	1.00	0.40	0.05	—	—	—

# ELT arising by weight



Type	2024 Mass (Mt)
C1	1.97
C2	0.73
C3	0.80
Retreads	0.09
Total	3.6
Export for re-use 10%	0.36

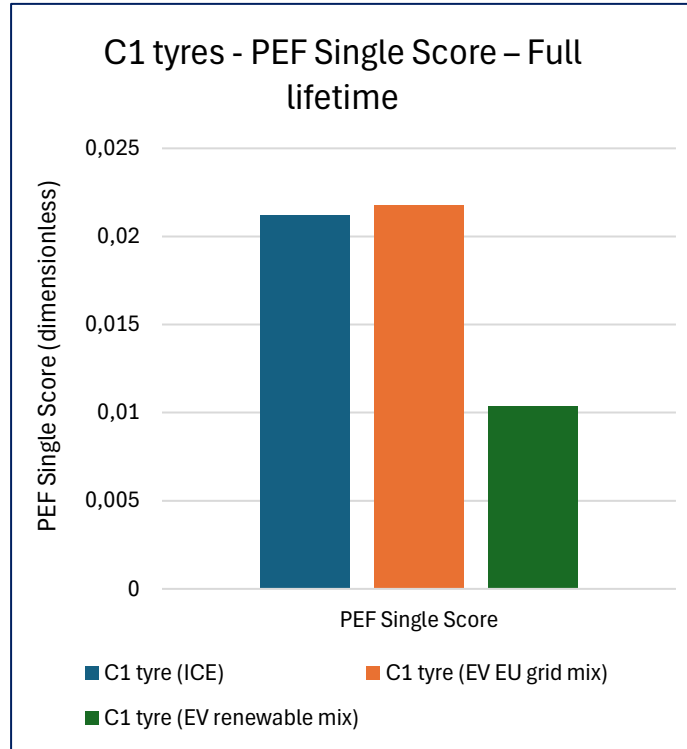
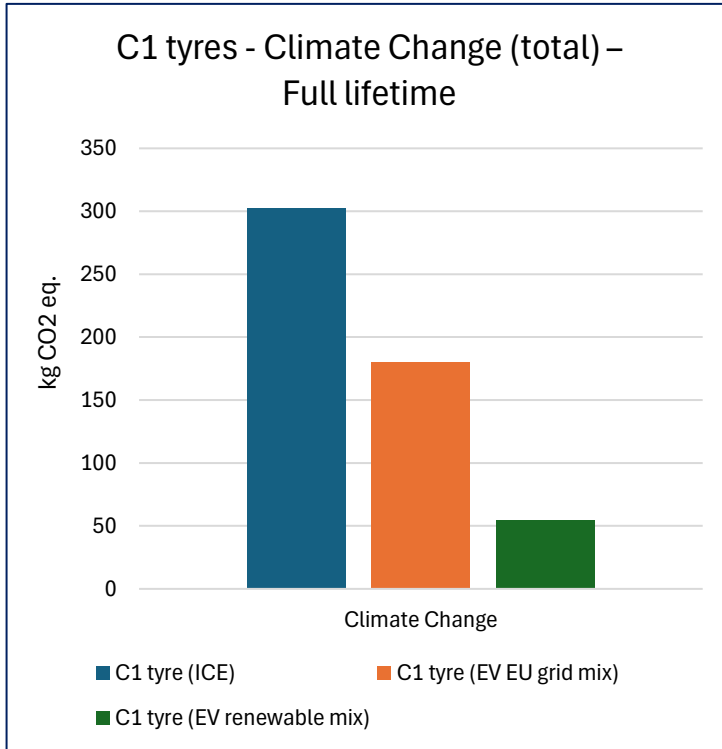
# Calculating BAU Impacts

- Production impacts = sales x lifetime emissions
- Use Phase impacts = per km impacts x annual km driven x stock in use
- EoL Impacts = ELT mass arising x pathway impacts in given year

Adjustments to reflect reality:

- For simplicity: no changes on production, where raw materials are majority contributor
- Task 5 base cases modelled ICE vehicles, but EVs increasing to meet EU targets
- Sensitivity analysis: what if 20% of ELT are exported to open burning?

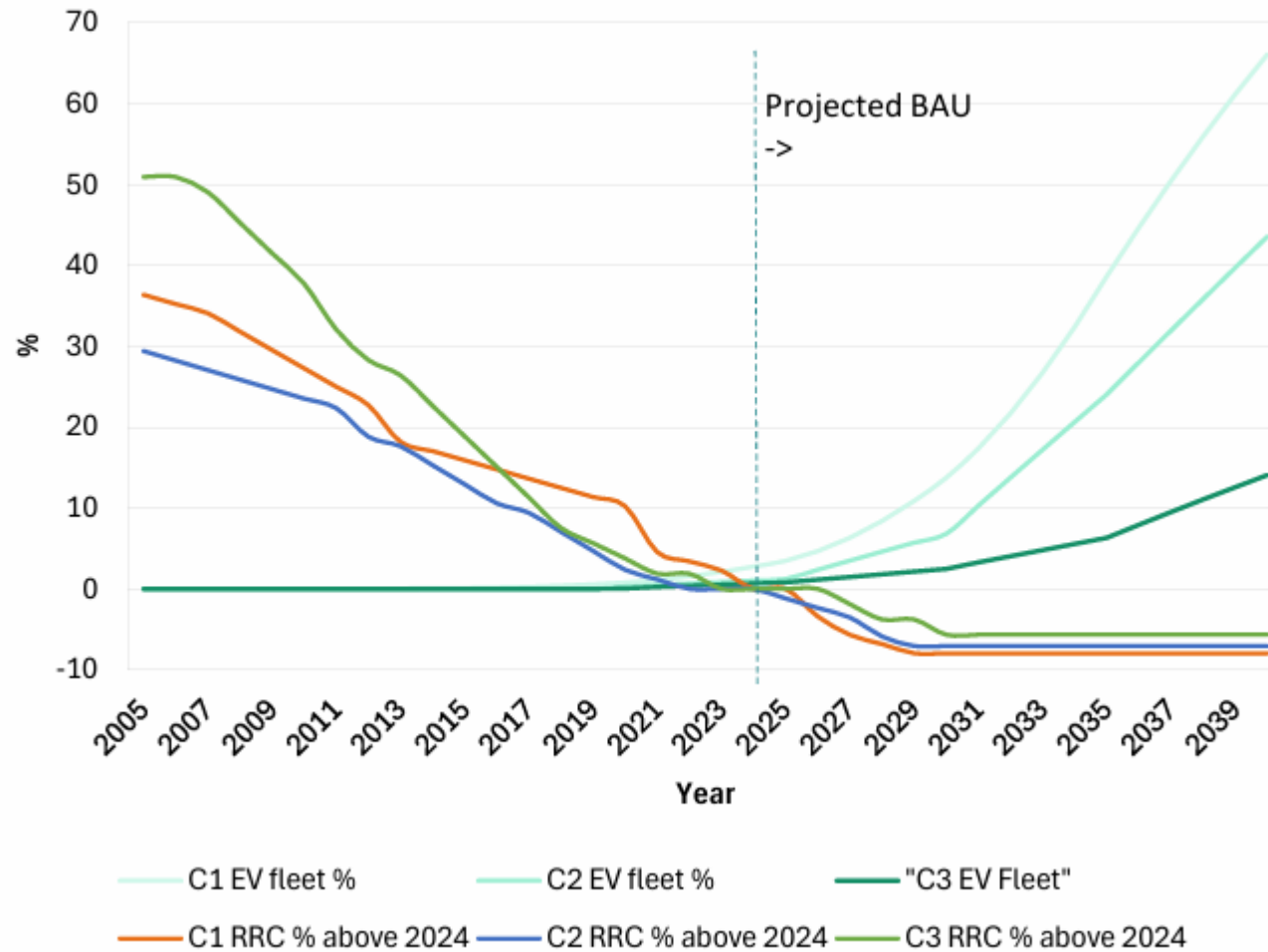
# Sensitivity analysis – Electric vehicles



When modelled with EVs instead of ICE vehicles:

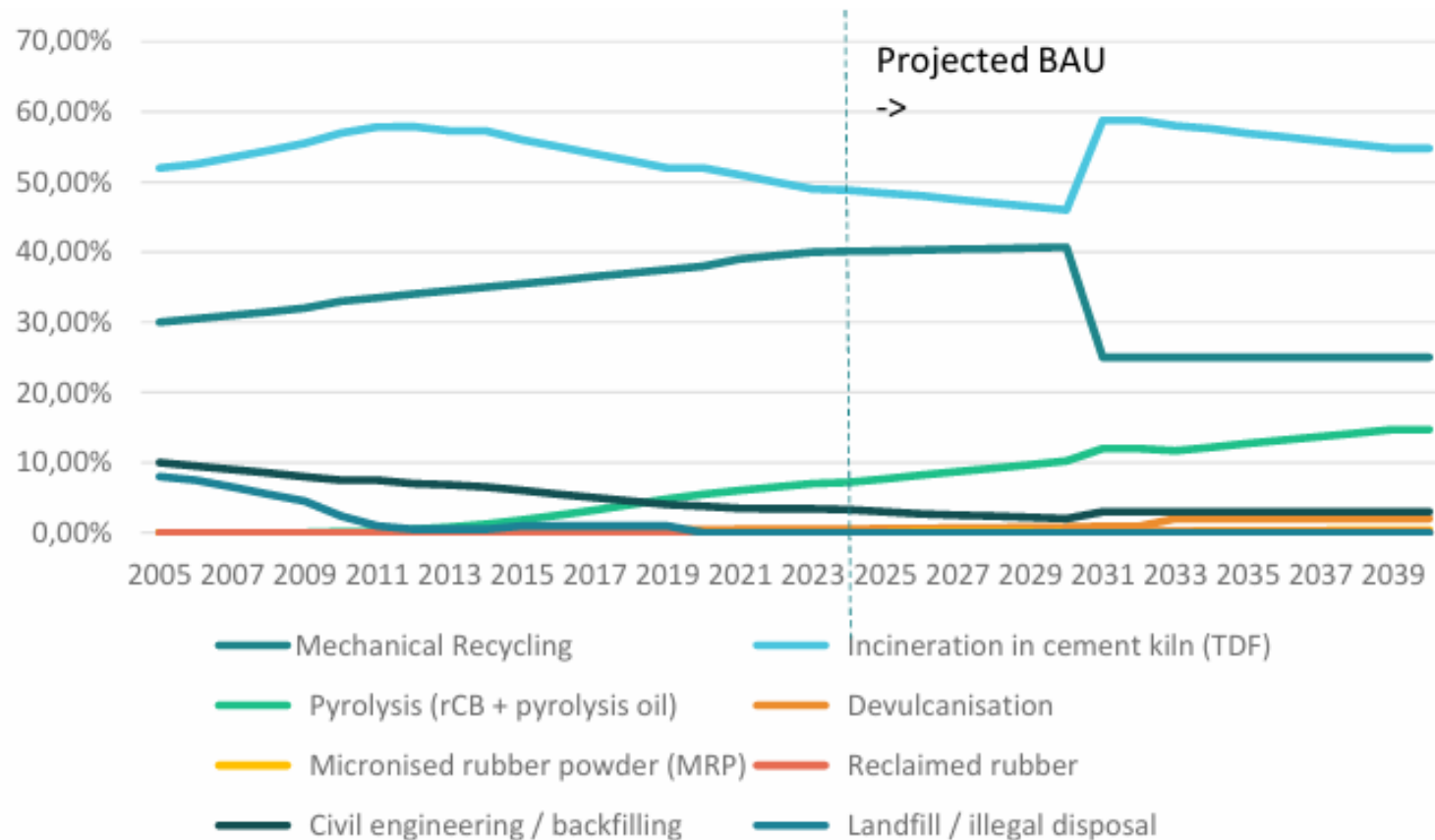
- Climate Change full lifecycle impact of a C1 tyre decreases by 41% (EU grid mix) and by 82% (fully renewable electricity)
- PEF single score impact increases by 2% (EU grid mix) and decreases by 51% (fully renewable electricity)
  - EU grid mix includes electricity from fossil fuel sources that impact all impact categories (covered by the PEF single score).

# BAU Use Phase: Rolling Resistance & EVs



- EV Fleet model based on EU sales targets for 2040.
- Fleet penetration lags sales
- Rolling resistance improvements of base case assumed to increase following regulations windows, then plateau post 2028 (?)
- Electricity grid assumed to increase from 48% renewables share in 2024 to 72% in 2040.
- EV Efficiency gains of light commercial vehicles mirror that of passenger cars (approx. factor 3x more efficient), while heavy vehicles efficiency gains are factor 2x due to higher efficiency of diesel engines.

# BAU Projected EoL Pathways



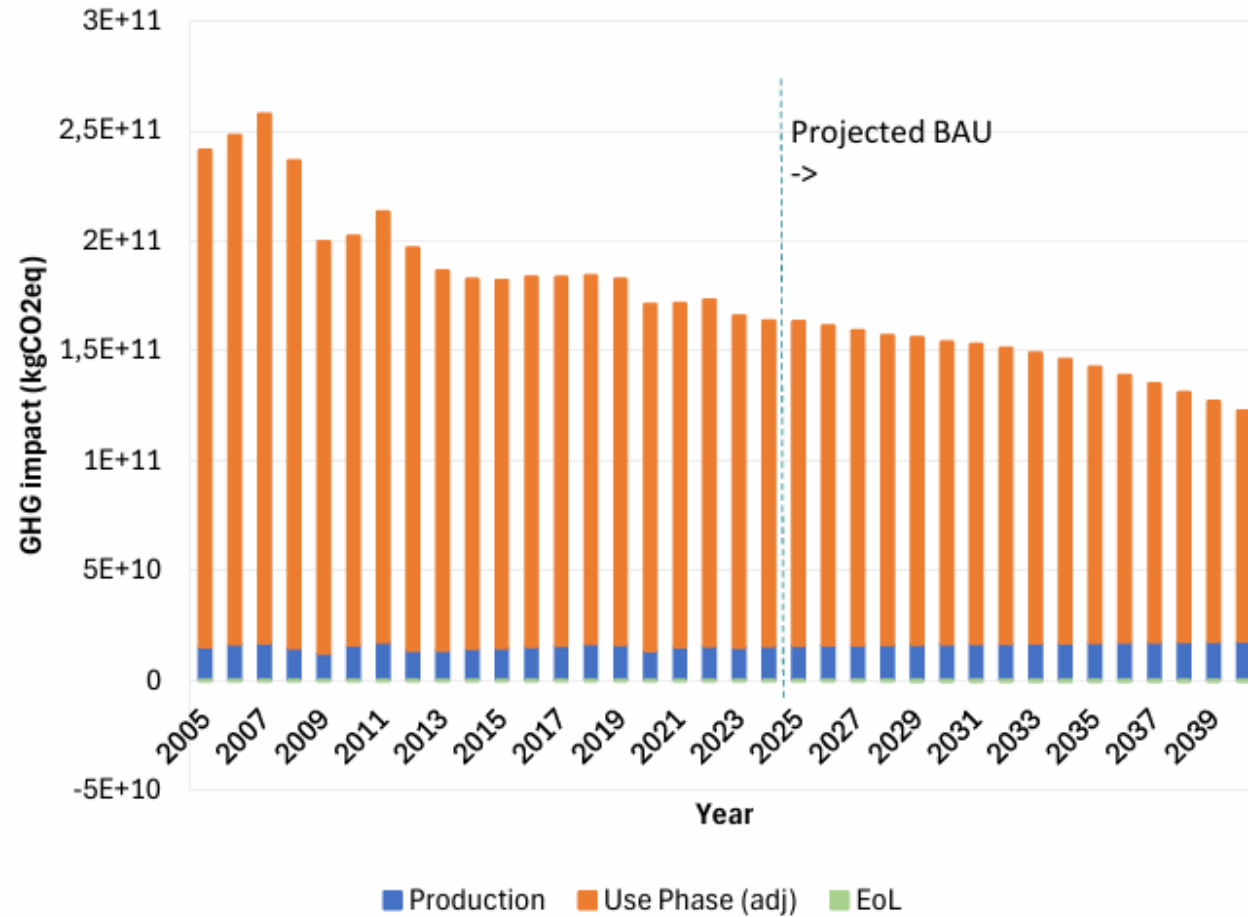
- Likely to see commercial availability of pyrolysis and devulcanisation increase.
- 2031 discontinuity: assumed that the loss of artificial playground/turf market leads to higher co-incineration.

## Question to stakeholders:

What is likely to happen when this off-take market is no longer possible when microplastic regulations come into effect in 2021?

# Total GHG Impacts

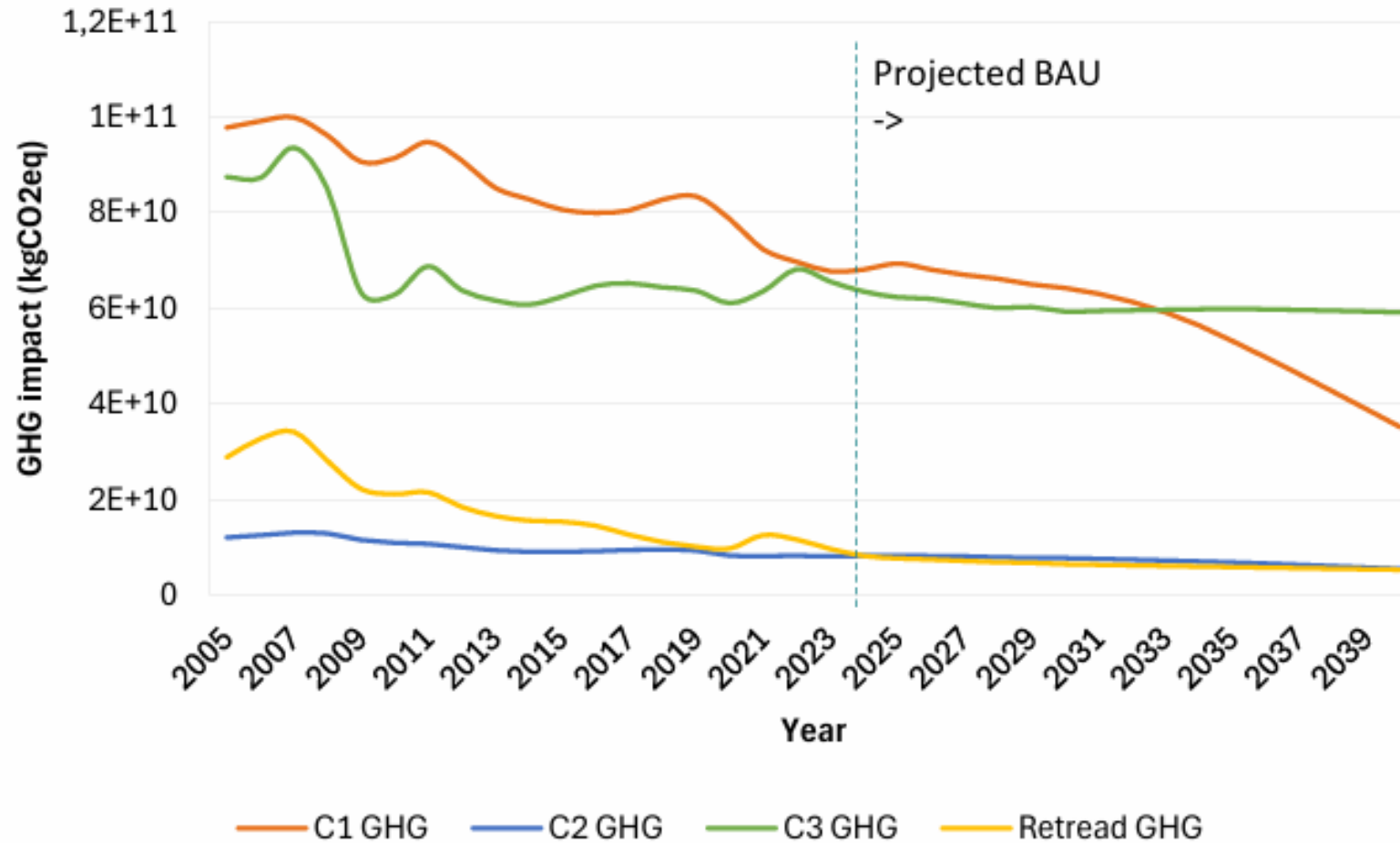
## Total GHG by Phase



Type	2024	2032	2040
Total GHG MtCO <sub>2</sub> eq	164	152	123
C1 GHG MtCO <sub>2</sub> eq	77.7	71.7	46.4
C3 GHG MtCO <sub>2</sub> eq	69.0	65.1	64.8

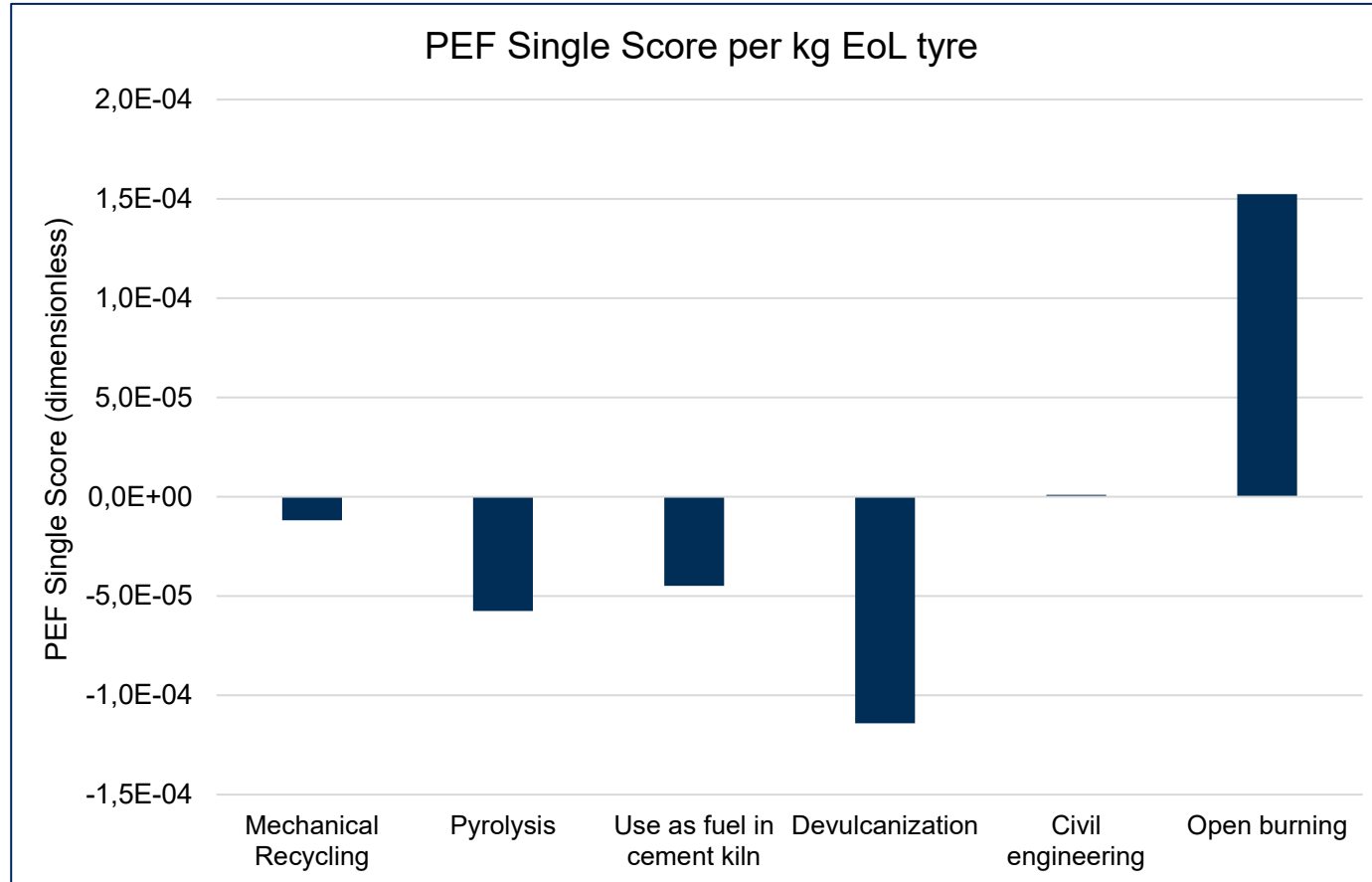
# GHG emissions: Use phase by tyre type

## GHG Use Phase by Tyre Type



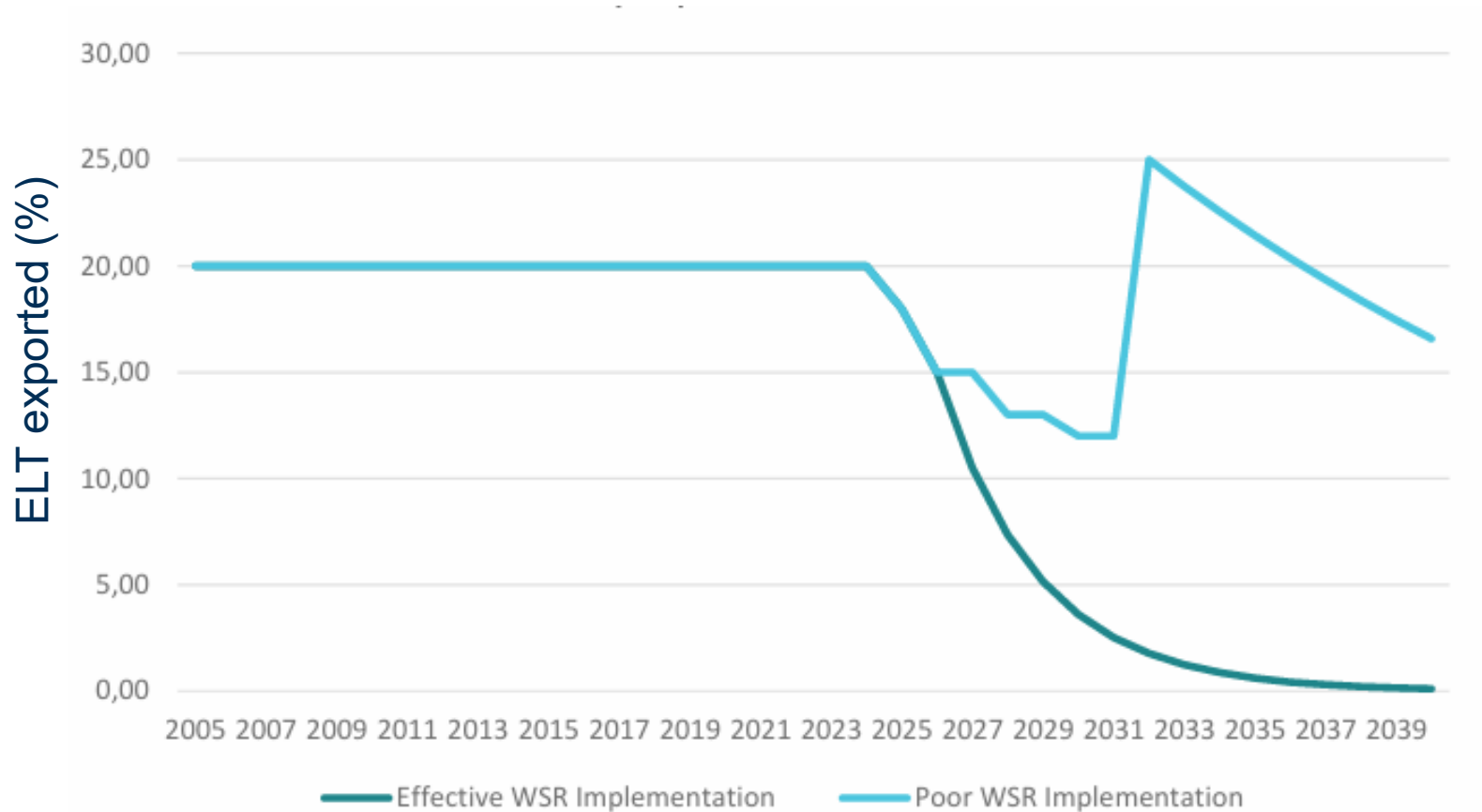
- Primarily major reductions in use phase of C1 tyres due to fleet electrification and improving renewables share.
- In 2040, production & EoL impacts represent 32% of impacts for C1.
- Less change for C2 and C3 due to slower penetration rate and longer vehicle lifetimes.

# Sensitivity analysis – Uncontrolled burning of EoL tyres



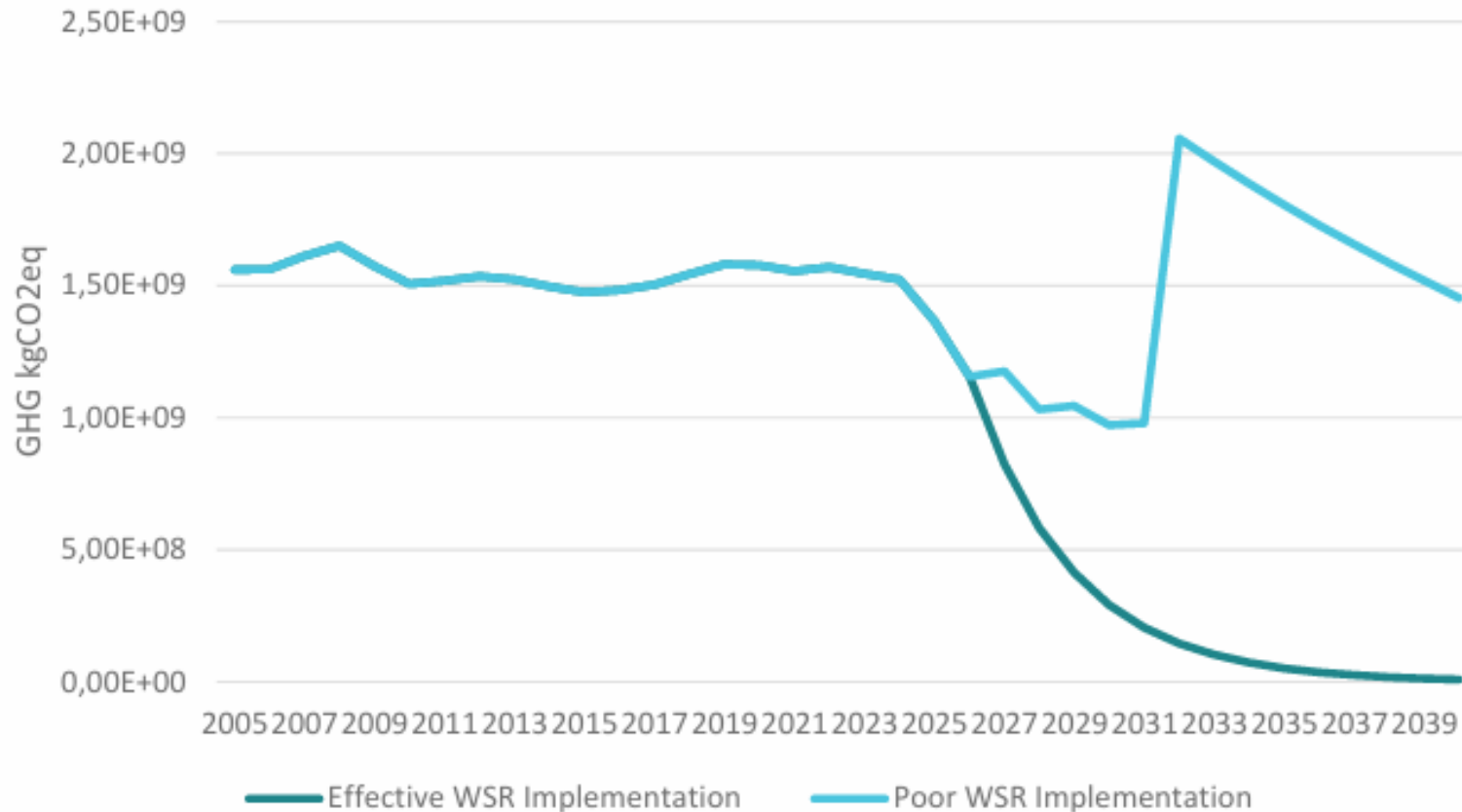
- Open burning most impactful EoL scenario – no recycling/reuse and no energy recovery. Direct release of emissions.
- Scenarios involving reuse/recycling → negative impact due to credits from avoided virgin materials

# Sensitivity analysis: exports to sub-standard open burning/ pyrolysis outside EU



- Difficult to determine exactly how much is exported, since latest 2019 figure of 800,000 tons is EU27 + UK (around one third exported).
- Latest UK investigation by environmental authorities found up to 95% of UK ELT exported to India.
- In 2031, poor Waste Shipment Regulation (WSR) implementation - > spike in exports.
- Sensitivity: apply 20% and consider two scenarios:
  - WSR enforced well
  - WSR enforced poorly

## Sensitivity: Exports to open burning



- For 20% of EU ELT mass arising exported, GHG impacts of open burning on order of 1.5Mt CO<sub>2</sub>eq
- Ensuring treatment pathways exist in the EU of high relevance.

# Overview of Modelled Policy Options

## Closing the Loop

- Recycled Content Targets of 5% rubber compound, 50% reinforcement in 2032
- Recycled Content Targets of 20% rubber compound, 80% reinforcement in 2032

## Design for Recycling

- Information or restrictions on SoC applied in DPP: Minor changes on EoL pathways (1-2% diverted from mechanical to co-incineration)

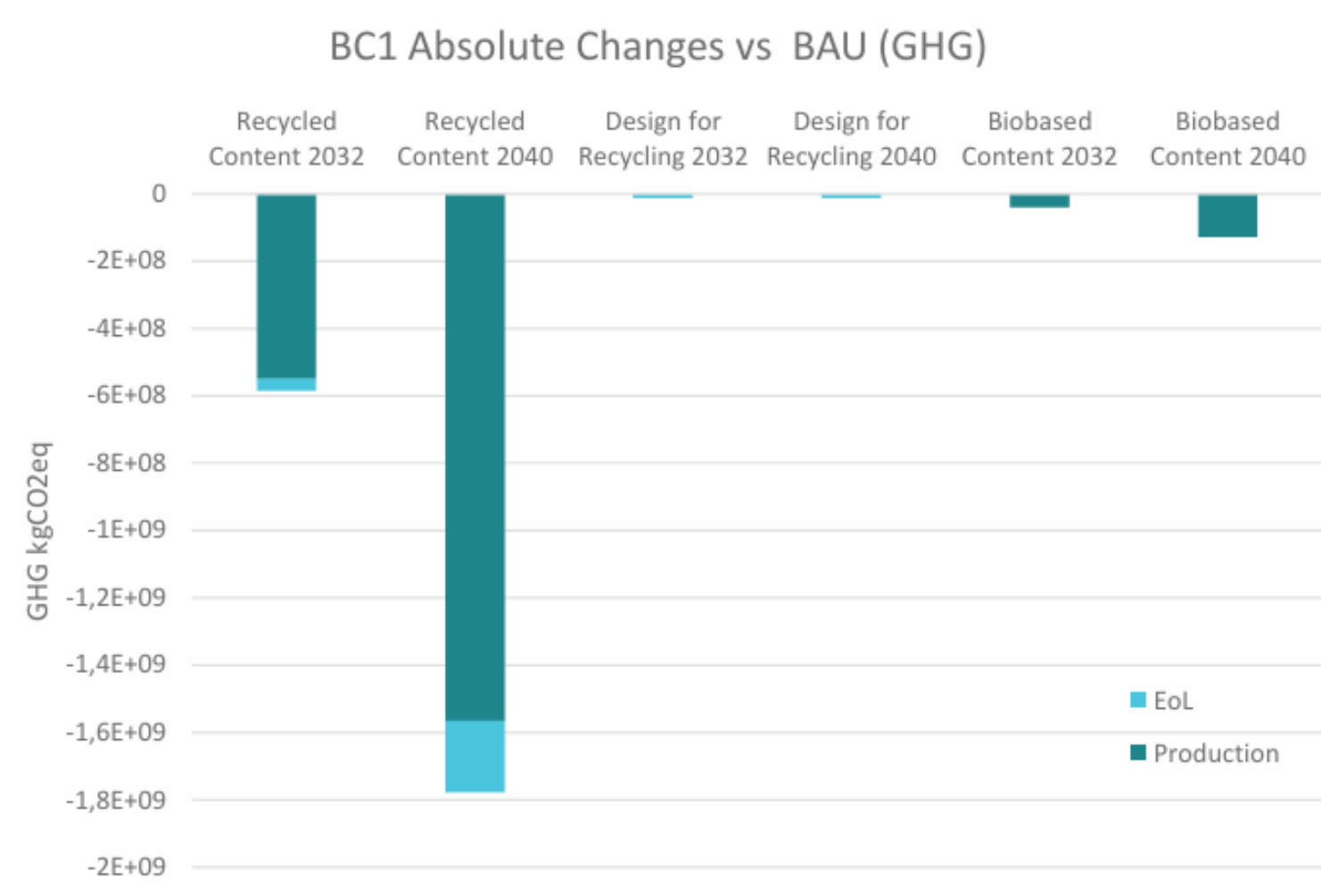
## Bio-Based Content

- C1: 5% by 2032, 15% by 2040
- C3: 2% by 2032, 5% by 2040

## Retreading

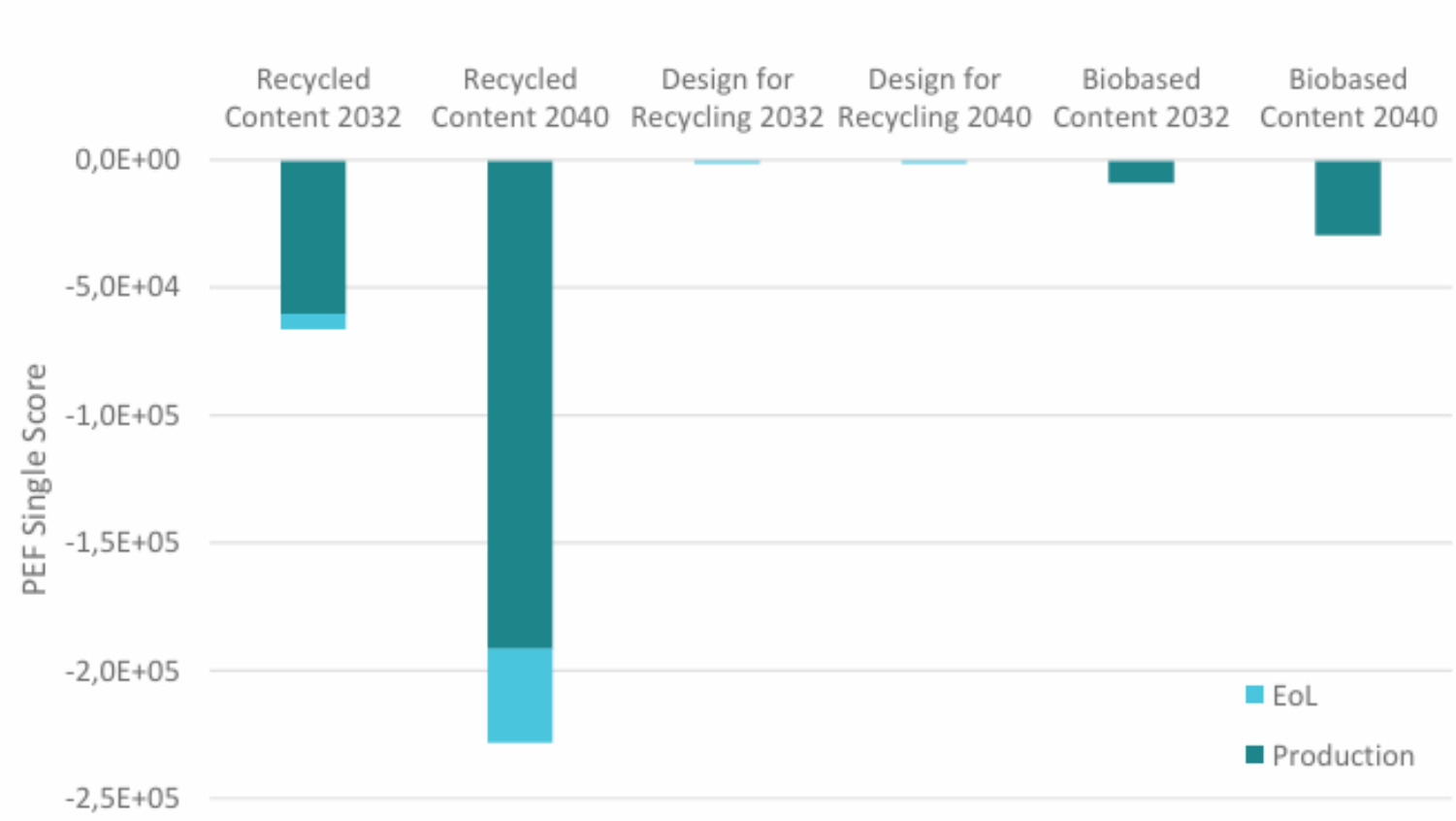
- Specific Sub-Model

# BC1 GHG savings vs BAU



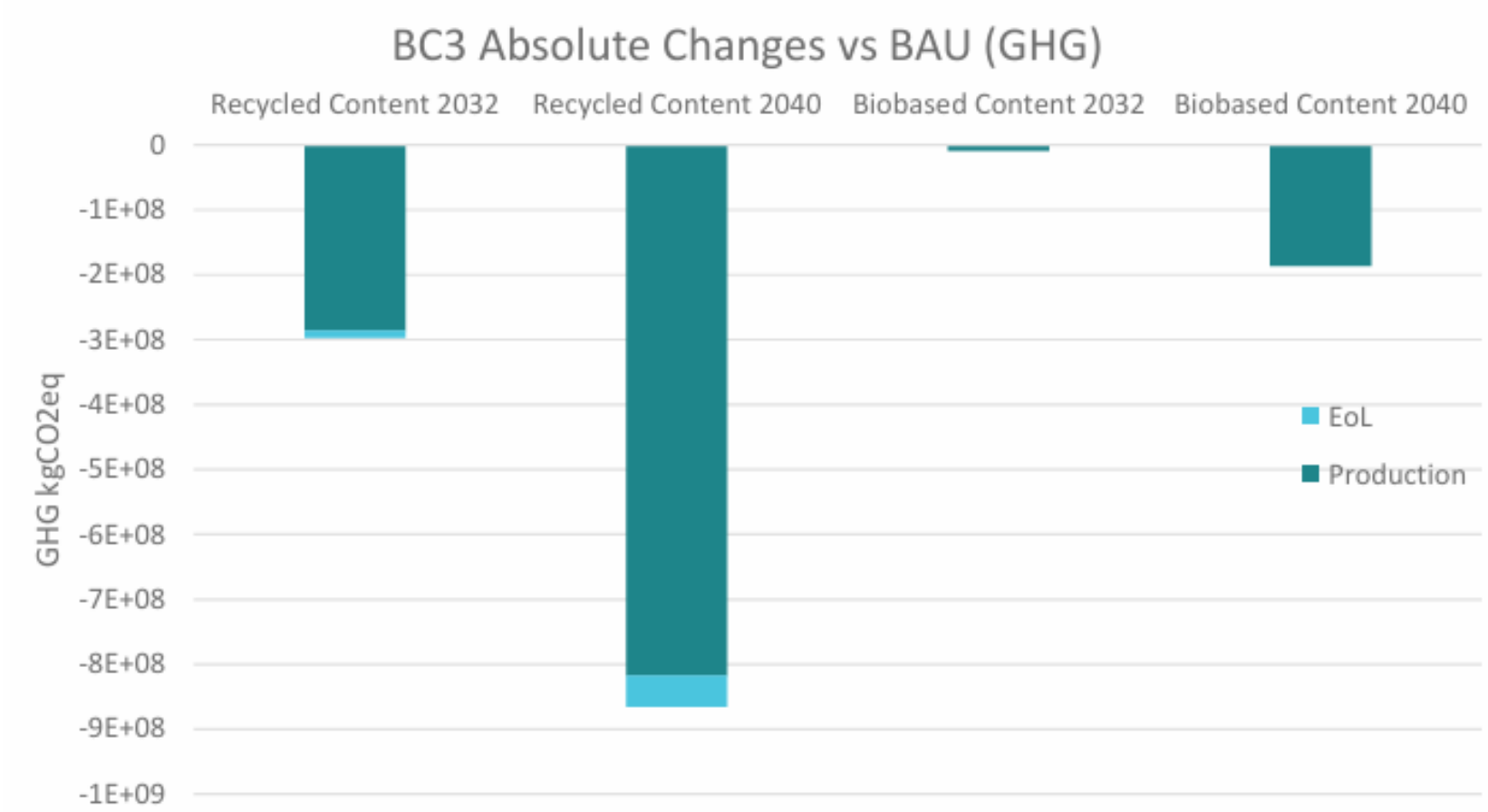
# BC1 PEF Savings vs BAU

BC1 DO Absolute Changes vs BAU (PEF)

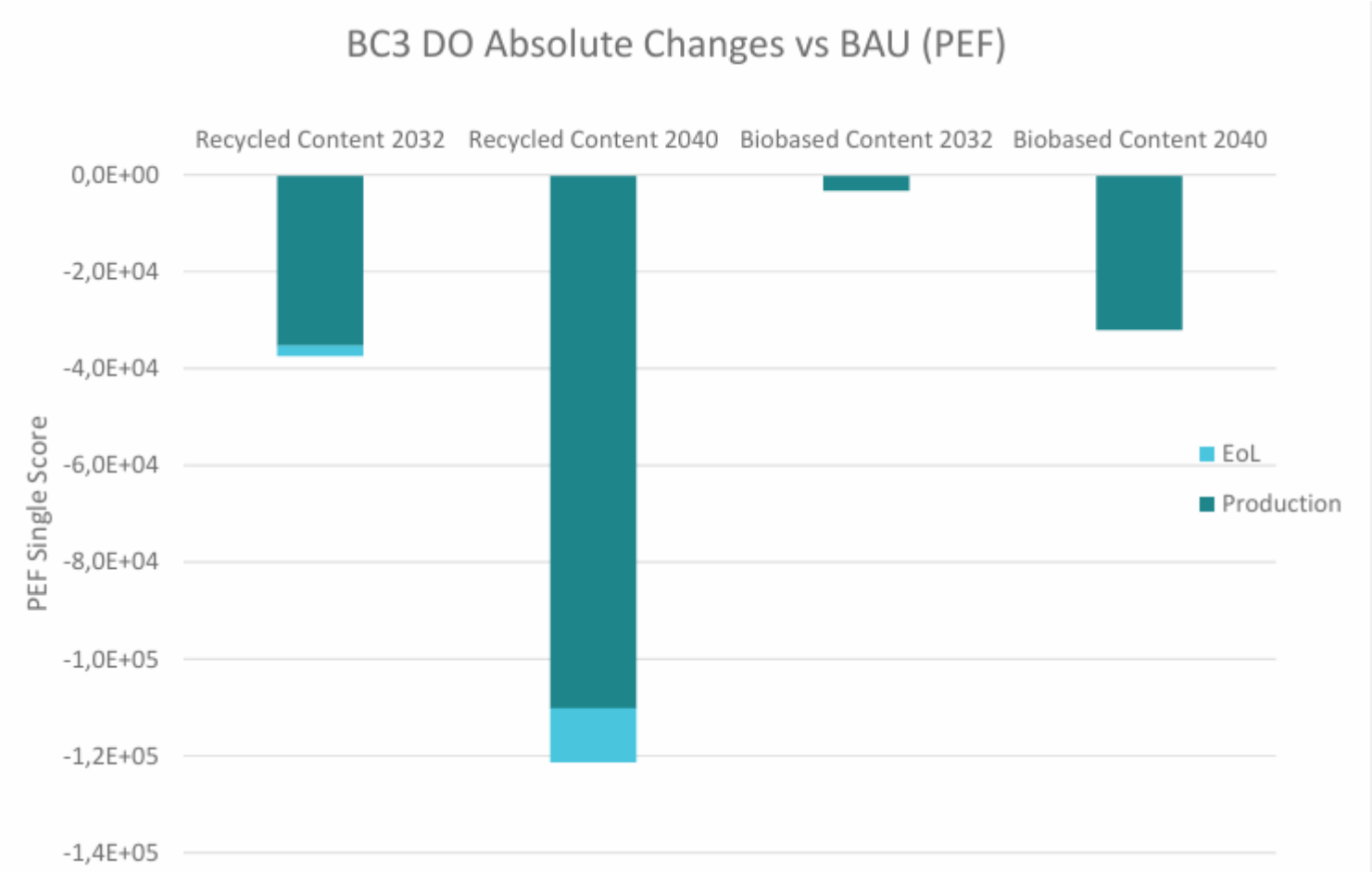


- Similar order changes to GHG

# BC3 GHG Savings vs BAU



# BC3 PEF Savings vs BAU



# Retreading Sub-Model

- BC4 considers savings of retread vs new C3. Correct comparison requires comparison with similar priced tyres conducting similar function on the market
- A *simplified* retread sub-model aims to therefore compare:
  - BAU scenario where budget share of tyres increases over time
  - Retread scenario where retread share increases over time, and budget decreases
- Understand the impacts of choosing a tyre that is non-retreadable vs. a tyre which is retreaded 1.15 times (85% with 1 lifetime, 15% with 2 lifetimes).
- For our budget scenario, we consider a tyre with lifetime: 130,000 km
- Limitations:
  - Some budget tyres are expected to be retreadable, does not accurately show mid-tier segment.
  - Retread lifetime currently considered too high.
  - Retreads and new tyres not applied on same axle.
  - Current model uses fixed sales and is not dynamically based on shorter lifetimes -> more sales.

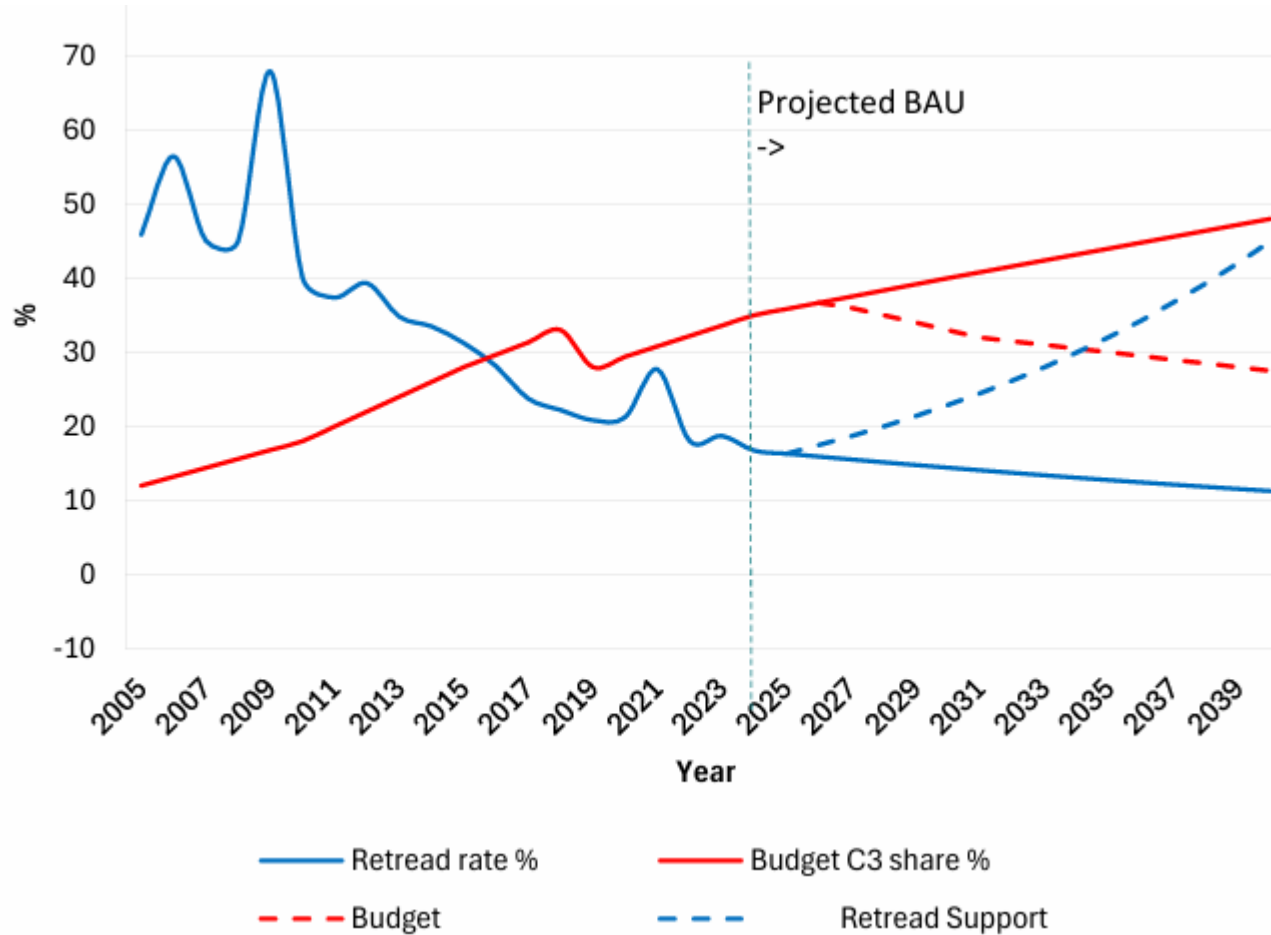
# Retreading Rate in EU

$$C3 \text{ Retread Rate} = \frac{\text{Retread Sales}}{\text{Eurostat Total Sales} - \text{OEM Sales}}$$

- OEM Sales available for 2020-2024, otherwise estimated (\*) based on EU vehicle fleet stock model.
- Assumed to continue decline without policy measures

Year	2005	2011	2017	2024	2032	2040
Retread Sales (Eurostat) mil. units	5.16	4.55	2.81	2.05	1.71*	1.49*
OEM C3 Sales (M. Units)	4*	3.6*	4.3*	3.34	4.9*	5,3*
Total sales (mil. units Eurostat)	15.3	15.8	16.1	16.6	17.3*	18.0*
Retread rate	45.9%	37.4%	23.7%	16.7%	13.7%	11.3%

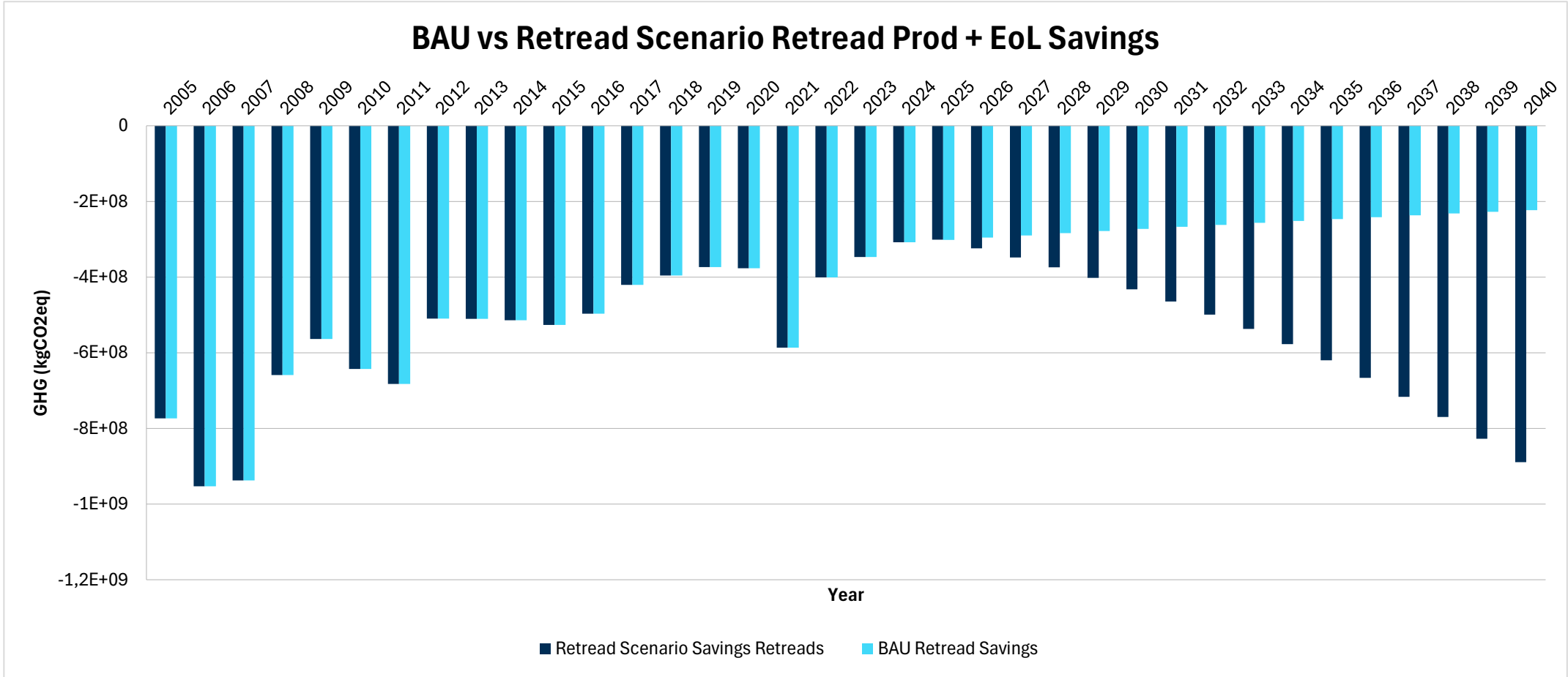
# Retread vs Budget Share



- Assumed in retread scenario retreading can again reach 2005 levels of ca. 45%, which partially reduces the sales of budget tyres.
- In BAU scenario budget tyres sales continue to increase while retreads decrease.

# Retread Production and EoL savings

vs C3 single lifetime



# Waste & Raw Material Avoided by Retreads

The model considers:

- C3 tyre first lifetime: 253,410 km
- Retread lifetime: 245,920 km
- Budget lifetime: 130,000 km

GHG savings per retread vs C3 single use (EoL + Prod): 149.8 kgCO<sub>2</sub>eq

Production Material Avoided per Retread vs C3 single use: 44kg

Waste burden per budget tyre vs C3 single use: 48.9 kg (1.89 tyres for same distance)

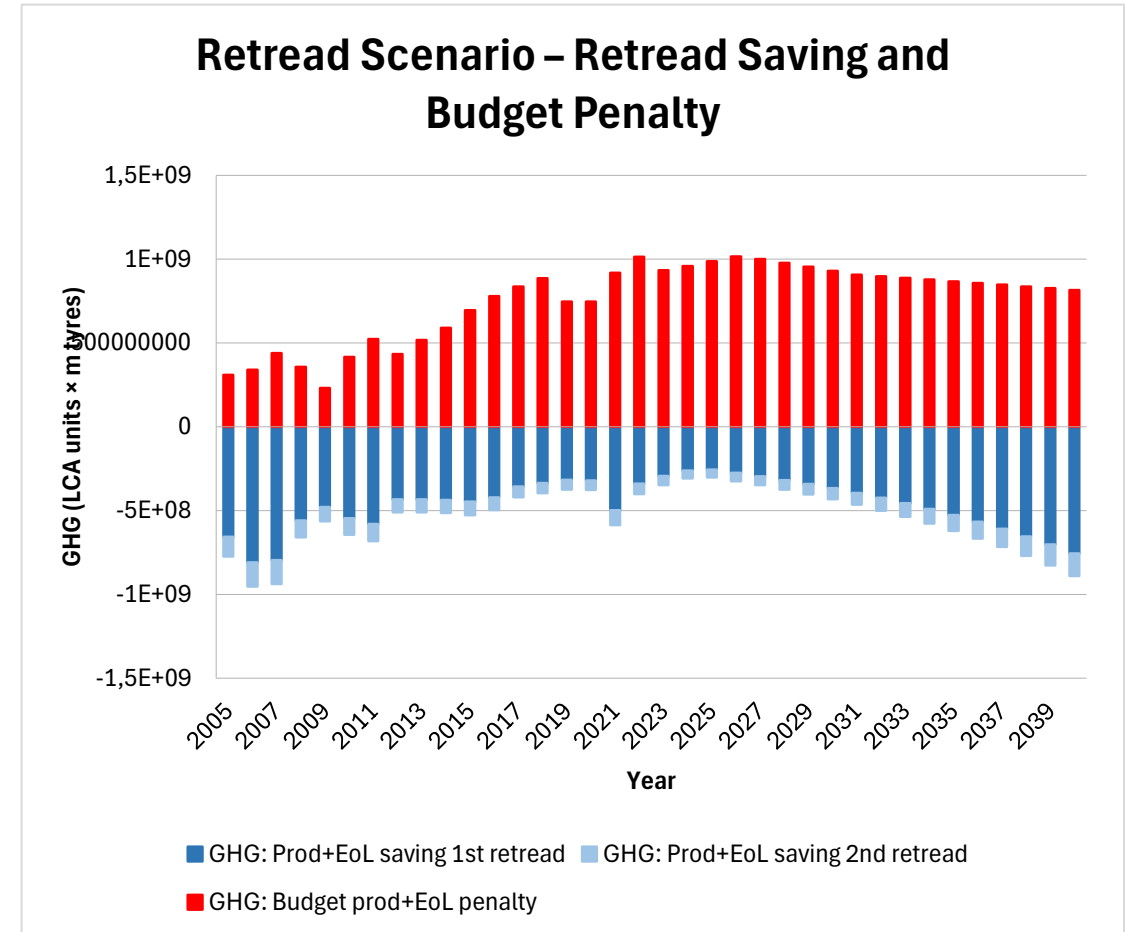
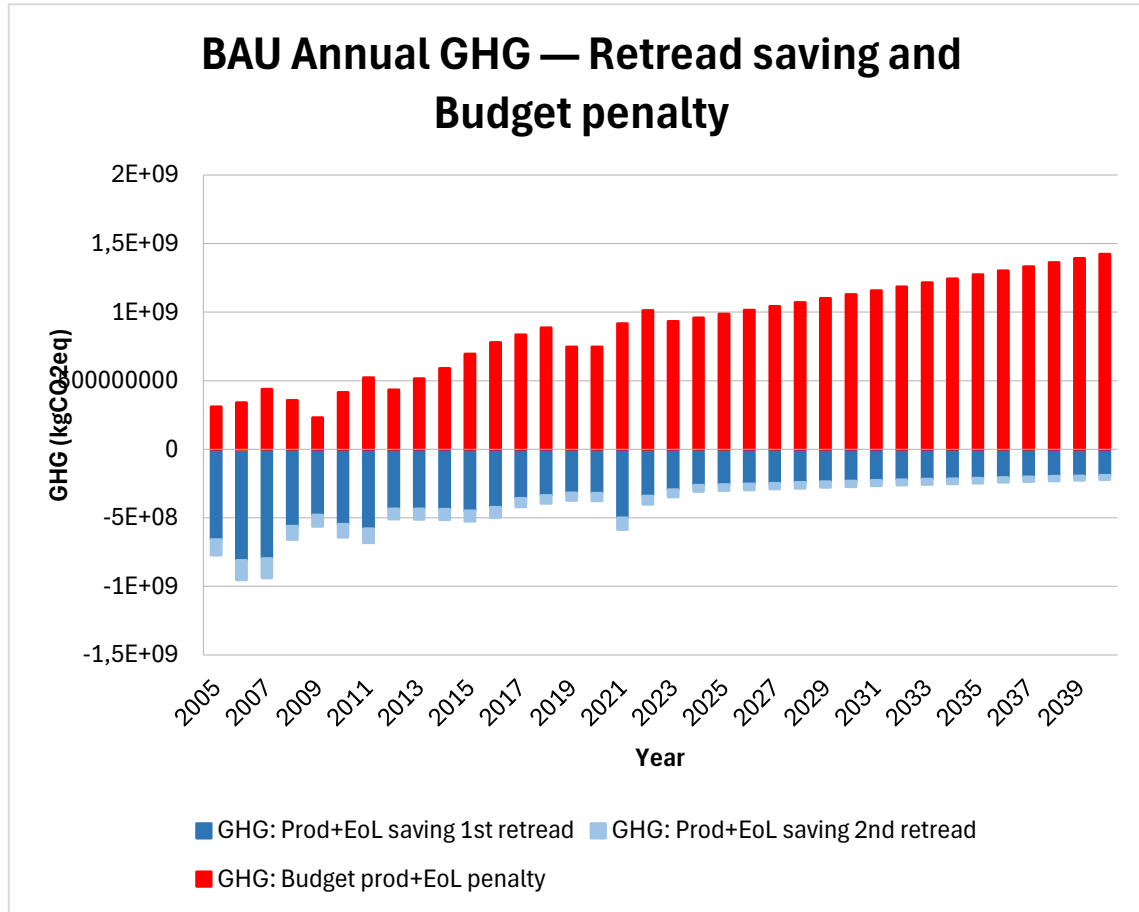
Retread system: a tyre is retreaded on average 1.15 times, then the average lifetime is 536,218 km.

Consider using budget tyres only to meet retread system mileage, would need 4.12 budget tyres.

- Waste burden per budget tyre vs C3 retread system: 162 kg
- GHG burden per budget tyre vs C3 retread system: 143.5 kgCO<sub>2</sub>eq

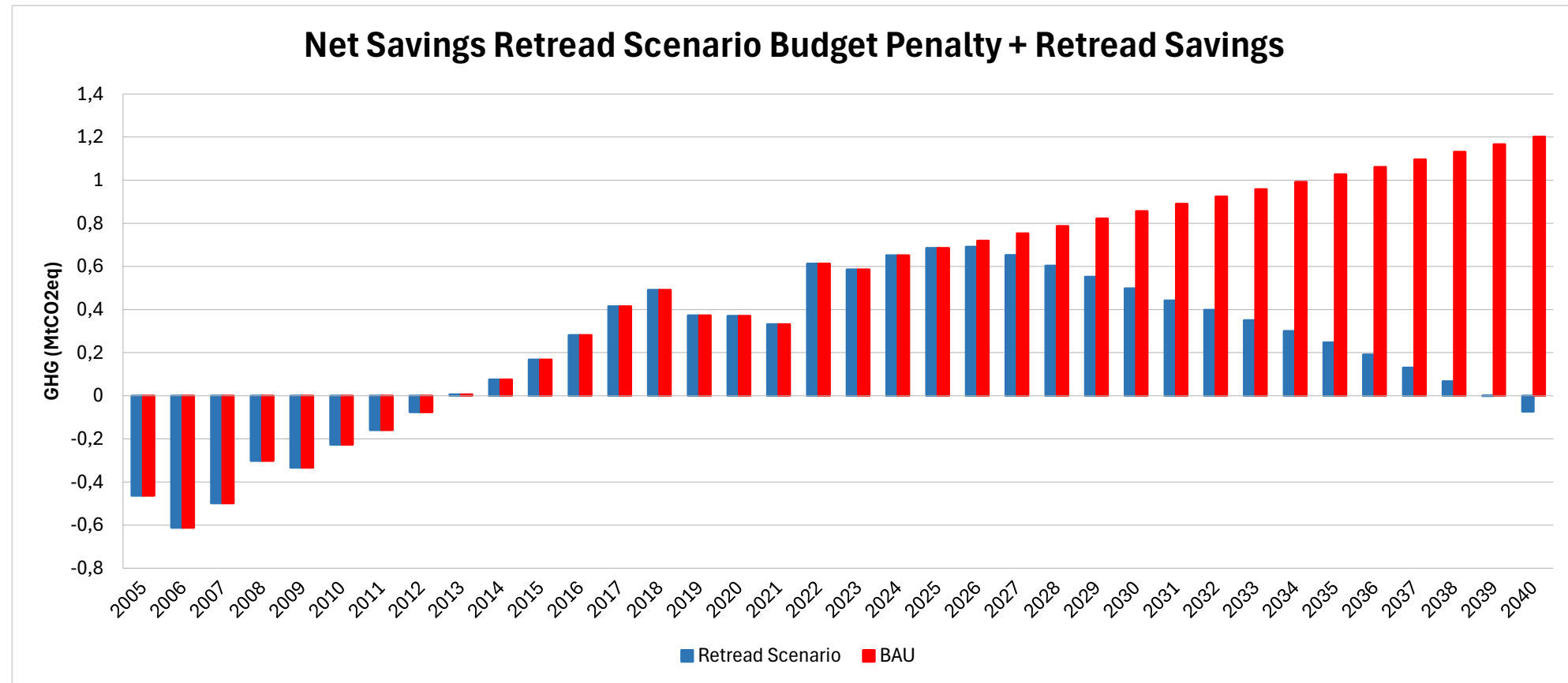
# Comparison of EoL and Production of retreads vs budget

(Graphs exclude standard C3 tyres)

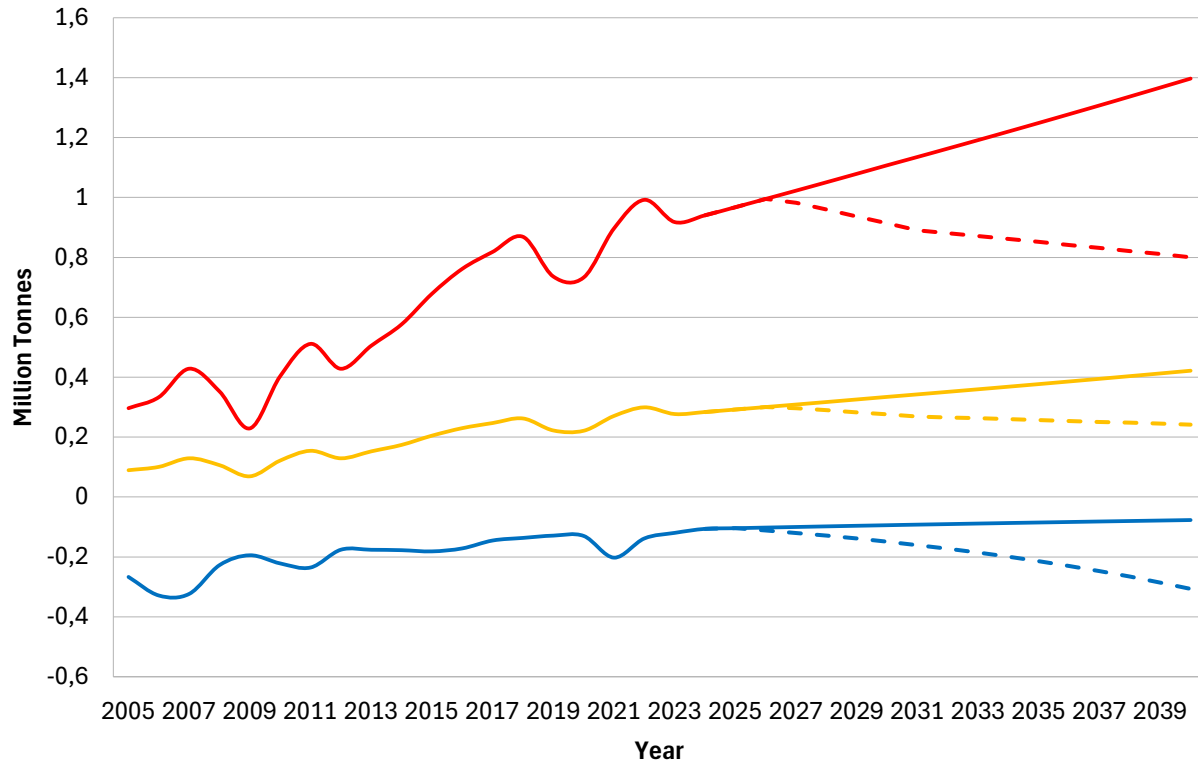


# Net impacts – retreads vs budget tyres

(Graphs exclude standard C3 tyres)

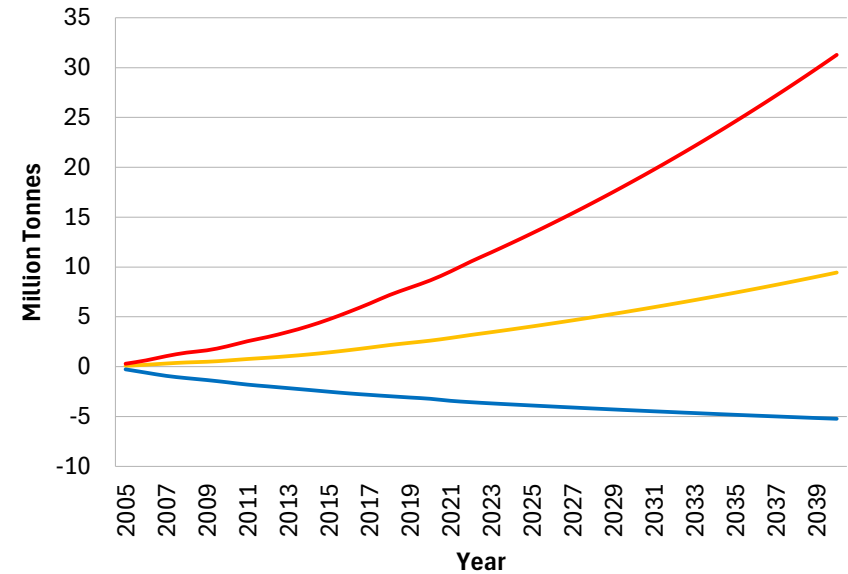


### Annual Waste Savings / Burdens Generated By Segment



- BAU Waste Avoided by Retreads
- - - Retread Scenario Waste Avoided Retreads
- BAU waste generated by budget vs C3
- - - Retread Scenario waste generated by budget vs C3
- BAU waste generated budget vs retread system
- - - "Retread Scenario waste generated budget vs retread system"

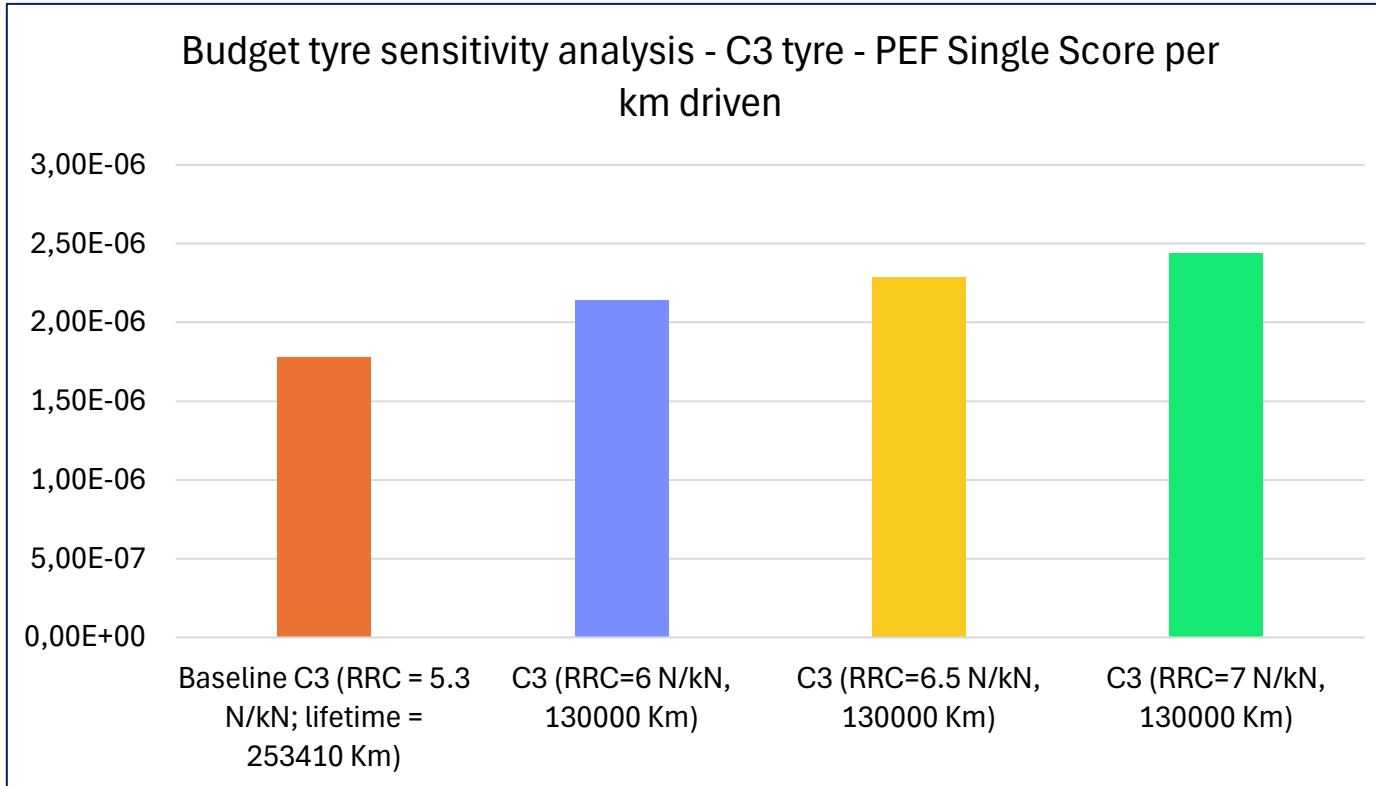
### BAU Cumulative Waste Saved / Generated



- cumulative waste caused by budget vs C3
- Cumulative Savings Retreads
- Cumulative waste caused budget vs retread system

Waste intensity:  
 Retread system: 0.096 tonnes per million km  
 Premium C3: 0.210 tonnes per million km  
 Budget: 0.398 tonnes per million km

# Sensitivity analysis – Use Phase RRC Budget C3 tyres



## Baseline C3 tyre scenario:

- RRC=5.3 N/kN, Lifetime= 253,410 km

## Three budget tyre scenarios:

1. RRC = 6 N/kN, Lifetime= 130,000 km
2. RRC= 6.5 N/kN, Lifetime= 130,000 km
3. RRC= 7 N/kN, Lifetime= 130,000 km

The **higher the RRC**, the higher the fuel use and the **more the impact**.

1. 20% higher than baseline
2. 29% higher than baseline
3. 37% higher than baseline

\*Modelled for ICE (diesel) vehicles.

For retreads, sensitivity analysis finds break even of 0.3 N/kN vs new C3 tyre.

# Findings Retread Sub-model

- Sub-model aims to demonstrate trends, and not perfectly model market.
  - Short lifetime budget tyres as modelled lead to massive waste burden and increased material needs vs. retread system
  - Substantial savings on production material avoided + waste can be made from increasing retread rates -> 0.22 MtCO<sub>2</sub>eq in BAU vs 0.89 MtCO<sub>2</sub>eq from higher retread rates in 2040.
  
- Several limitations:
  - Sales presented here are not adjusted to higher number of budget sales needed
  - Retread and C3 lifetimes likely too high
  - Budget tyres can also be retreadable, oversimplifies mid-tier segment
  - Does not consider that retreads are not suitable for all axles, nor differences in retread processes (1st hot, 2nd cold).
  - Without scaled sales, use phase results in current draft report are not so useful

# Policy Options Retreading (C3)

- Retreadable tyre standardisation request to CEN
  - % of tyres placed on market must meet retreadability condition
- Information requirements on tread width, buffing radius. Tread depth?
- Green Public Procurement:
  - Mandatory requirements for public waste management and other suitable users to prioritise retreads in their fleets.
  - If retreadable standard can be defined: mandatory to use retreadable tyres in fleets.
  - Alternative: mandate provision, where possible, of tyres as a service
- Lifecycle tracking via DPP
- EPR Scheme financial support to retreaders (outside ESPR scope)
- Retreading energy label (separate process)
  
- **Question:** can these measures support retread market sufficiently?

# Open Strategic Autonomy Assessment

## Builds on JRC Case Study Report

- Supply chain sensitive materials make up significant portion of tyres BOM:
  - Fossil fuel dependency: synthetic rubber, carbon black
  - Natural rubber: 100% dependent on imports, large share in South East Asia
  - Precipitated silica: increasing China dependency (third of imports)
- Sanctions on Russia and current geopolitical tensions highlight need to reduce dependencies.
- Recycled content, lifetime extension and retreading can meaningfully reduce dependence on these supply chains.
- Bio-based content support is conditional on where the material comes from – could also compete with food crops.

# Initial conclusions Task 7

Support development of recycling system:

- Recycled content requirements & design for recycling measures
- DPP to support channeling to appropriate EoL processing

Reduce waste generation and import of raw material needs:

- Retreading support

Lower priority:

- Bio-based material targets: limited environmental impact at low % substitution and high complexity across many substances.

# COFFEE BREAK

Online participants are kindly requested to return at 15h30



# Digital Product Passport

Yifaat Baron

Oeko-Institut Consult GmbH



# Digital Product Passport

## Objectives and Scope

### Main objective:

- Define requirements for the inclusion of data and information in the digital product passport of ESPR legislation for tyres.

### Subsequently defined tasks:

- Defining what information should be included in DPP and why?
- Differentiating between:
  - elements that can be identified in this study:
    - information needs, use cases, data types, access categories, data acquisition and update, and
  - elements that need to be addressed through standardization:
    - system arch., data exchange mechanisms, technical interface, etc.

### Scope

- All DPP requirements to apply to C1, C2 and C3 tyres
- Some DPP requirements could apply to other tyres for certain types of information, e.g., SoC.

# Digital Product Passport

Data collection mandated by other legislation and existing platforms

Data collection requirements (existing or forthcoming) → existing platforms:

- **Tyre Labelling Regulation** – Data on Rolling Resistance, Wet Grip, and external Rolling Noise and more. Could be extended to retreading label → **EPREL platform**
- **REACH** Article 33 requires provision of data on SVHC presence in the supply chain. WFD requires provision to waste management operators → **SCIP**
- **ELVD** – data on vehicle dismantling, including tyres and TPMS components → **IDIS**
- **Euro 7** Emission Standards - microplastic abrasion indices (A-E).
- **EUDR** (Deforestation Regulation) - geospatial traceability for natural rubber sourcing.



# Digital Product Passport

## Use of EPREL or DPP interface

- EPREL
- Advantages
  - Existing platform, with some users already acquainted with system
  - Public facing interface, Market Surveillance Authority interface for compliance verification
- Limitations:
  - Data at model level (prevents tracking of lifecycle events)
  - Building a DPP “on top” of EPREL infrastructure would require a full re-engineering of the EPREL system architecture
- DPP
- Advantages:
  - Can be designed to provide data at model, batch and item level tracking via a RAIN RFID
  - Can enable the circular economy at item level
- Disadvantages:
  - A DPP in parallel to EPREL would potentially duplicate efforts for manufacturers (e.g., data population)

**QDPP-02:** Do you have a current opinion/preference for a separate DPP system, or extension of EPREL?



# Digital Product Passport

## Overview of use cases

Use Case	Information Requirement	Actor/s with access	Granularity	Action
<b>Active Life / Placing on the Market</b>				
<b>1. Primary Purchase</b>	Label parameters, potentially also durability/mileage aspects, Green Public Procurement	Consumer / B2B / public authority	Model	READ
<b>2. Recycled Content / Bio-Based Content</b>	Material Composition information	Market Surveillance Authorities (MSA)	Batch / Item	READ
<b>3. Regulatory Compliance</b>	Parameters to meet, safety and performance requirements.	Market Surveillance Authorities (MSA)	Model	READ
<b>End of First Life</b>				
<b>4. Centralised EoL Sorting</b>	SoC for recycling, number of retreads, production date, retreadable	EPR scheme, sorting operator	Model, Item	READ
<b>5. Lifecycle Events Tracking</b>	Repair, retread, EoL status	Repair, retread, waste operators	Item	READ/WRITE
<b>6. Customs Export Enforcement</b>	EoL Status	Customs agents	Item	READ
<b>7. 2nd Hand Purchase</b>	Safety / retread history	Consumer / B2B	Item	READ
<b>Circular End of Life Processing</b>				
<b>8. Retreading</b>	Retreadable, production date, tread width, buffing radius and depth	Retreaders	Model, Item	READ/WRITE
<b>9. Mechanical Shredding</b>	Presence of SoC that hinder shredding process	Recyclers	Model, Item	READ
<b>10. Pyrolysis / Devulcanisation</b>	Log assessment events	Recyclers	Model, Item	READ

# Digital Product Passport

## Questions on use cases

- **QDPP-03:** Are the specified use cases accurate and complete?
- **QDPP-04:** Are the identified actors, triggers, and actions realistic and correctly represented?
- **QDPP-05:** Do the use cases reflect current or credible future practices across the value chain?
- **QDPP-06:** Are additional use cases or relevant variations missing?
- **QDPP-07:** What is the perceived value of the data required for each use case for industry stakeholders (including EU-based and third-country producers) relative to the effort required to generate, maintain, and share that data?



# Digital Product Passport

## Use case 1:

Use case 1: Primary Purchase & Green Public Procurement (GPP)			
Primary actor	Consumers, Corporate Fleet Managers, Public Authorities (e.g., Municipal Bus Fleets).	Secondary actor	Regulatory Labelling Systems (EPREL), B2B Procurement Software.
Granularity	Model	Trigger	A procurement cycle is initiated. A buyer evaluates new tyre models for purchase, or a public authority drafts a tender requiring strict adherence to Green Public Procurement (GPP) emission and durability thresholds.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. The buyer or their procurement software queries the DPP (via a web interface or API) for specific tyre models.</li> <li>2. The DPP provides the static, verified physical baselines, label parameters, and Euro 7 abrasion ratings.</li> <li>3. For Public Authorities, the system automatically cross-references these data points against mandatory GPP criteria (e.g., verifying falls within the required threshold for municipal fleets).</li> <li>4. The buyer executes the purchase based on verified Total Cost of Ownership (TCO) and compliance data.</li> </ol>		
Data access	READ	Conceptual information needs	All label and public facing information parameters.

# Digital Product Passport

## Use case 2:

Use case 2: Verification of Recycled Content/Bio-Based Content (DO-01/05)			
Primary actor	Market Surveillance Authority (MSA) / Regulatory Auditors	Secondary actor	Certification Bodies (e.g., ISCC PLUS), Manufacturers
Granularity	Batch	Trigger	An annual regulatory compliance audit to verify the manufacturer is meeting ESPR recycled content mandates (rCB, rPET).
Step-by-step actions	<ol style="list-style-type: none"> <li>1. The MSA accesses the restricted regulatory view of the DPP;</li> <li>2. The auditor queries specific production batches rather than individual items;</li> <li>3. The DPP resolves the cryptographic token/credential linked to that batch;</li> <li>4. The MSA's auditing software takes that token and pings the external, third-party certification ledger (e.g., the ISCC+ database) to verify its cryptographic authenticity and confirm the volume of sustainable material allocated to that batch.</li> </ol>		
Data access	READ	Conceptual information needs	Mass_Balance_Cert_ID

# Digital Product Passport

## Use case 3:

Use case 3: Regulatory Compliance verification/auditing of parameters			
Primary actor	MSA / Environmental Regulators	Secondary actor	n.a
Granularity	Model	Trigger	Routine market surveillance to verify the legitimacy of a manufacturer's public declarations on label, e.g. RRC, Euro 7 Abrasion Index rating, SoC threshold reporting.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. The MSA queries the data attribute for a specific tyre model.</li> <li>2. The system reveals parameters, and any related standards applied or test results.</li> <li>3. The MSA verifies that information is correct for tyre in question.</li> </ol>		
Data access	READ	Conceptual information needs	Various parameters required by regulations (e.g. entered to EPREL currently).

# Digital Product Passport

## Use case 4:

### Use case 4: Centralised EoL Tyre Sorting and Routing

Primary actor	EoL Collection & Sorting Facilities / EPR Operators.	Secondary actor	OEM Manufacturers (accounting for waste), Downstream Recyclers.
Granularity	Item	Trigger	Mixed loads of unclassified End-of-Life (EoL) tyres arrive at a centralised sorting facility from various municipal or commercial collection points.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. Tyres are loaded onto a high-speed, automated sorting conveyor (e.g., at speeds of 3 tyres per second).</li> <li>2. Automated RFID portal arrays scan each tyre as it passes.</li> <li>3. The sorting software queries the DPP to instantly retrieve the aggregate physical and chemical parameters of the tyre.</li> <li>4. The system's algorithms cross-reference this data to dynamically route the tyre down specific conveyor channels:</li> <li>5. To Retreading: If Retreadable_Casing and &lt; 2 previous retread events.</li> <li>6. To Pyrolysis: if Silica_Ratio is &lt;10% and DO-02 contaminants are absent.</li> <li>7. To Devulcanation: if high natural rubber content and no legacy/contaminants flagged.</li> <li>8. To High-Torque Mechanical Shredding: If Textile_Class is Aramid.</li> </ol>		
Data access	READ	Conceptual information needs	This actor requires the information to route effectively: Retreadable_Casing, production date, number of past retreads/repairs, Silica_Ratio_Category, Textile_Class, and DO-02_Physical_Hindrances.

# Digital Product Passport

## Use case 5:

### Use case 5: Dynamic Lifecycle State & Event Log

Primary actor	Authorized B2B Actors (Certified Mechanics, Retreaders, EoL Collection Facilities).	Secondary actor	MSAs / Customs (who will read the output), GDSO / Decentralized Ledger (routing).
Granularity	Item	Trigger	A physical intervention occurs that permanently alters the tyre's operational status—such as a successful retreading, a major vulcanised repair, catastrophic accident damage, or final decommissioning for material recovery.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. The authorised technician or facility operator scans the tyre's UHF RAIN RFID tag to access the physical asset's DPP.</li> <li>2. The operator's terminal authenticates their legal corporate identity (via strict Identity and Access Management) to unlock 'Write' permissions.</li> <li>3. The operator logs the specific intervention (e.g., "Retread Applied") OR updates the overarching status from the standardised matrix (changing it from Active to EoL_Critical_Damage or EoL_Material_Recovery).</li> <li>4. The software transmits a secure API 'Write' request to the GDSO resolver/manufacturer cloud.</li> <li>5. The DPP updates instantly, ensuring the new Lifecycle_State is permanently appended. This becomes visible to sorting facilities, second hand markets and allows border control to mass scan tyre shipments.</li> </ol>		
Data access	READ / WRITE	Conceptual information needs	Lifecycle_State (Write access), Lifecycle_Event_Log (Write access).

Note: granting Write Access to decentralised network requires Identity and Access Management (IAM) framework. If repair shop patches tyre or retreader carries out retread, they must digitally sign that entry using a verifiable credential (proving they are certified). Building IT infrastructure to authenticate thousands of independent European repair shops would require multi-year phase-in.

# Digital Product Passport

## Use case 6:

Use case 6: Secondary Market Evaluation (Part-Worn & Retread Purchase)			
Primary actor	Consumers, B2B Fleet Operators	Secondary actor	Second-hand Retailers, Certified Retreaders (who generated the data)
Granularity	Item	Trigger	A buyer is evaluating a physically used, part-worn, or remanufactured (retreaded) tyre for purchase.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. The buyer scans the secondary data carrier (e.g., NFC tap with a smartphone or QR code scan) on the individual used tyre.</li> <li>2. The interface queries the item-specific DPP ledger.</li> <li>3. The buyer reviews the asset's specific history, verifying its precise age, confirming it has not been flagged as <code>EoL_Critical_Damage</code> (illegally salvaged from a scrapyard), and reviewing the <code>Lifecycle_Event_Log</code> to see who performed past vulcanised repairs or retreads.</li> <li>4. If it is a retread, the buyer also can read (forthcoming) retreaded label performance ratings.</li> </ol>		
Data access	READ	Conceptual information needs	<code>Manufacturing_Date_Timestamp</code> , <code>Lifecycle_State</code> , <code>Lifecycle_Event_Log</code> .

# Digital Product Passport

## Use case 7:

Use case 7: Customs Export Blocking & Waste Enforcement (DO-11)			
Primary actor	MSA / Customs Agents	Secondary actor	Certified EoL Collection Agencies (who initially update the status)
Granularity	Item	Trigger	A shipping container manifested as "used, roadworthy tyres" arrives at an EU port bound for export to a developing nation.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. Customs agents perform a rapid, non-line-of-sight sweep of the shipping container using high-frequency UHF RFID portal arrays.</li> <li>2. The scanner queries the DPP lifecycle ledger for all detected SKUs.</li> <li>3. If the database returns a verified "End of Life" status for the assets, the system flags the shipment.</li> <li>4. Customs agents legally embargo the container under EU waste shipment regulations, requiring "End of Life" status tyres to be removed.</li> </ol>		
Data access	READ	Conceptual information needs	EoL_Status_Flag.

# Digital Product Passport

## Use case 8:

Use case 8: Automated Casing Intake for Retreading (DO-08)			
Primary actor	Retreaders (B2B)	Secondary actor	GDSO (Data Routing Network)
Granularity	Model/Item	Trigger	A worn C1/C2/C3 casing arrives at a remanufacturing facility for intake inspection.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. Automated portal reads the tyre's embedded UHF RAIN RFID tag.</li> <li>2. The facility's ERP system queries the DPP via the GDSO network.</li> <li>3. Retrieval of retread parameters (buffing radius, tread width, retreadable)</li> <li>4. The system automatically rejects internally compromised/non-standard casings to material recovery or accepts compliant casings and calibrates the buffing machinery. <ul style="list-style-type: none"> <li>• If Lifecycle Event updating is possible, then the retreader can also write to the DPP: new retread parameters, or assign new status (destined for EoL).</li> </ul> </li> </ol>		
Data access	READ / WRITE	Conceptual information needs	Retreadable casing, buffing radius, tread width, optimal buffing depth.

# Digital Product Passport

## Use case 9:

Use case 9: Design for Recycling - Mechanical Shredding & Hazard Mitigation (DO-02/03)			
Primary actor	Mechanical Recyclers / Shredder Operators	Secondary actor	Manual Dismantlers
Granularity	Model	Trigger	An EoL tyre drops onto the intake conveyor of an ambient or cryogenic shredding facility.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. Intake scanner reads the RFID tag and alerts the operator's dashboard that the tyre contains material that would disrupt shredding process;</li> <li>2. Operator checks for physical hindrances (e.g., TPMS Lithium-ion batteries, PU foams, gels) and if possible physically extracts them to prevent facility fires or other impacts. Alternatively divert to incineration in co-processing.</li> <li>3. Operator checks the textile class. If Aramid/Kevlar is present, the tyre is diverted from standard steel blades to specialised high-torque shear shredders to prevent catastrophic equipment damage;</li> </ol>		
Data access	READ	Conceptual information needs	Textile_Class, DO-02_Physical_Hindrances.

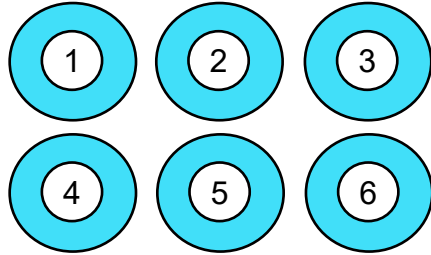
# Digital Product Passport

## Use case 10:

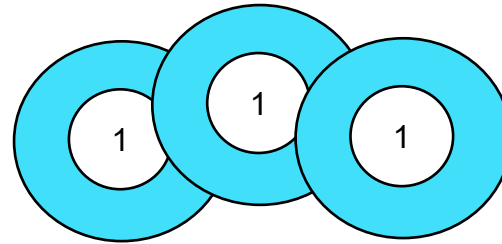
Use case 10: Design for Recycling - Pyrolysis/Devulcanisation (DO-02/03)			
Primary actor	Pyrolysis / Devulcanisation Operators	Secondary actor	n.a
Granularity	Model	Trigger	EoL tyre batches are evaluated for high-temperature reactor feeding.
Step-by-step actions	<ol style="list-style-type: none"> <li>1. Facility RFID arrays scan incoming material;</li> <li>2. The system queries the DPP to verify chemical compatibility;</li> <li>3. The system algorithmically flags and rejects tyres with high silica content (which would contaminate the recovered CB with high ash in pyrolysis) or internal gels/foams (which would poison the pyrolysis oil or contaminate devulcanisation);</li> <li>4. Automated systems use other composition data to optimise tyre batching for EoL processes;</li> <li>5. Safe, compliant tyres are loaded into the thermal reactor.</li> </ol>		
Data access	READ	Conceptual information needs	Silica_Ratio_Category, DO-02_Physical_Hindrances

# Digital Product Passport

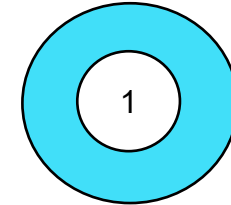
## Setting DPP data granularity



- Model level data
  - engineering baseline data, theoretical performance metrics, chemical category classifications, and dimensional blueprints
  - already maintained by corporate Product Lifecycle Management (PLM) systems and in part shared



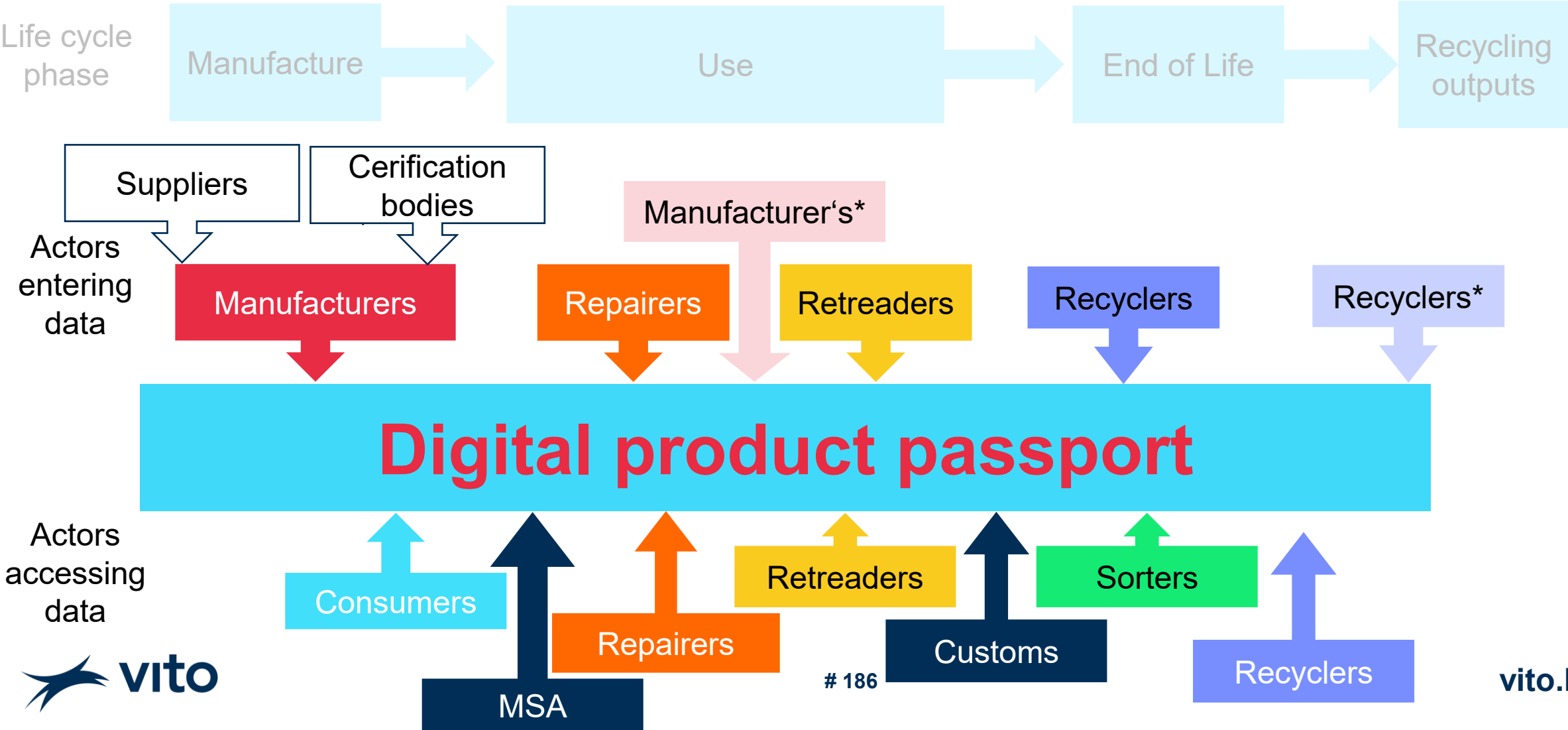
- Batch level data
  - needed for tracking material origin, quality control recalls, and the allocation of mass-balanced sustainable or recycled materials
  - exists internally on the manufacturer's side but rarely shared



- Item/Unit level data
  - Relevant for tracking “events” during the lifecycle
  - becoming a standard practice for high-value C3 commercial truck tyres
  - highest data resolution, requiring a unique digital identifier and lifecycle tracking for every single physical tyre

# Digital Product Passport

Market actor roles and responsibilities – governance and roles

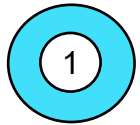


# Digital Product Passport

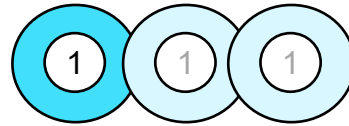
## . Data Survivability & Orphan Passport Management

**Data stored** on the DPP for a tyre **must remain available over time** to support objectives like retreadability, recyclability and market surveillance...

→ lifetime of the tyre

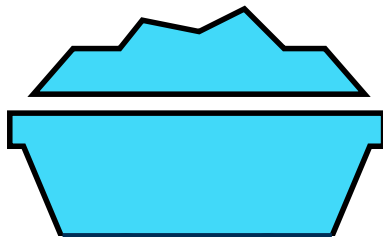


→ for a retread - extend over a few lifetimes



CIRPASS 2 Project, which focused among others on tyres, has reported a **need to consider retaining data also after a tyre has been shredded** (CIRPASS2, 2025). This would allow characterising the composition of secondary raw material batches

→ for SRM batch originating from ELTs



**QDPP-08:** Would the retaining of DPP data after tyre shredding enable characterizing batch composition after waste management treatment? For how long should data be retained?



**Orphan Protocol.** If an OEM or retreader declares bankruptcy or ceases operations, the governance rules must mandate that their active Item-level DPP ledgers are transferred to a centralised, neutral registry



# Digital Product Passport

## Selection of the Data Carrier

- **Primary Carrier (Industrial/B2B): Vulcanised UHF RAIN RFID.** The CIRPASS project experiences and current practice indicates that the most suitable data carrier is a UHF RAIN RFID tag embedded directly into the tyre casing prior to vulcanisation.
  - non-line-of-sight
  - resilient enough to survive extreme manufacturing temperatures and 10-year wear and tear lifespan on a commercial vehicle
- **Secondary Carrier (Consumer/B2C): 2D Matrix (QR) or NFC.** Because consumers and independent mechanics generally lack industrial RFID wands, a secondary carrier such as a **laser-engraved QR code** on the inside bead/sidewall linking to the same digital identifier could be applied, enabling smartphone access.
  - back-up function in case that the UHF RAIN RFID is damaged

# Digital Product Passport

Requirement proposal – general questions

Proposal shown on next slides

**QDPP-09:** Are there any data points missing under either of the data categories?

**QDPP-10:** Do you have comments on any of the specified parameters?



# Digital Product Passport

## Requirement proposal: Data category: Product identification and classification

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
<b>Unique Product Identifier (UPI)</b>	Obligatory	Model number	GS1 Serialized Global Trade Item Number (SGTIN)	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer	n.a	Public/Consumers
<b>Unique unit identifier</b>	Obligatory	Item number		1,2,3,4,5,6,7,8,9	Unit	Tyre manufacturer/ importer	n.a	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs
<b>Product classification</b>	Obligatory	C1, C2, C3, other	Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer	n.a	Public/Consumers
<b>Origin</b>	Obligatory	Country of origin		1	Model	Tyre manufacturer/importer		Public/Consumers
<b>Manufacturing_Date_Stamp</b>	Obligatory	Date		1,6	Model	Tyre manufacturer/importer		Public/Consumers
<b>Retread date</b>	Obligatory	Date		4,5,6,8	Unit	n.a	Retreader/s	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs
<b>Repair date</b>	Obligatory	Date		4,5,6,8	Unit	n.a	Repairer/s	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs

# Digital Product Passport

## Requirement proposal: Data category: Producer identification

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
Supplier type	Obligatory	Manufacturer /Authorised representative	Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Customer care service	Obligatory		Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Phone	Obligatory		Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Email	Obligatory		Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Website	Obligatory		Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Address	Obligatory		Regulation (EU) 2020/740	1,2,3,4,5,6,7,8,9	Model	Tyre manufacturer/ importer		Public/Consumers
Repairer name	Obligatory	Repairer name, address, contact		4,5,6	Unit	n.a	Repairer/s	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs
Retreader name	Obligatory	Retreader name, address, contact		4,5,6,8	Unit	n.a	Retreader/s	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs

# Digital Product Passport

## Requirement proposal: Data category: Material compliance and substances of concern (SoC)

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
<b>Name/numerical code of SoC present in the product</b>	Obligatory	IUPAC name or other international name if IUPAC not available	IUPAC Available via ECHA CHEM database	3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>Other names</b>	Obligatory	Usual name, trade name, abbreviation		3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>EC number</b>	Obligatory	Numerical identifier	EC Inventory Available via ECHA CHEM database	3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>CAS number</b>	Obligatory	Numerical identifier	Chemical Abstracts Service	3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>Location of the substance of concern within the product</b>	Voluntary	Component/Material	SCIP	3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>Concentration, max. concentration or concentration range of SoC in product/relevant component/spare part</b>	Voluntary	Concentration descriptor: concentration; maximum concentration; concentration range Value (numeric) Units (eg %, g/kg, etc.)	SCIP	3,4	Batch	Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs
<b>Instructions for safe use (as relevant)</b>	Obligatory	Description	SCIP	3,4		Tyre manufacturer/importer	Tyre manufacturer/ importer (retroactive updated); Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders; MSA/ Customs

# Digital Product Passport

## Requirement proposal: Data category: Product environmental and circularity information

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
<b>Recycled Material Content (ReCo) carbon black</b>	Obligatory	Recycled content declaration	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Pre-/post-consumer material split	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Conformity declaration/certification	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
<b>Recycled Material Content (ReCo) rubber</b>	Obligatory	Recycled content declaration	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Pre-/post-consumer material split	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Conformity declaration/certification	ISCC+ or equivalent mass balancing method (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
<b>Recycled Material Content (ReCo) steel</b>	Obligatory	Recycled content declaration	ResponsibleSteel certification or ISO 22095 chain-of-custody	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Pre-/post-consumer material split	ResponsibleSteel certification or ISO 22095 chain-of-custody	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Conformity declaration/certification	ResponsibleSteel certification or ISO 22095 chain-of-custody	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
<b>Recycled Material Content (ReCo) textiles</b>	Obligatory	Recycled content declaration	Chain-of-custody / mass-balance verification (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Pre-/post-consumer material split	Chain-of-custody / mass-balance verification (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Conformity declaration/certification	Chain-of-custody / mass-balance verification (ISO 22095-2:2026)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
<b>Bio-based material content</b>	Obligatory	Bio-based content declaration	ISCC+ or equivalent mass balancing method + Radiocarbon testing (14c analysis)	2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs
	Obligatory	Conformity declaration/certification		2	Batch	Tyre manufacturer/ importer	n.a	MSA / Customs

# Digital Product Passport

## Requirement proposal: Data category: Tyre Labelling data and other regulatory requirements (1)

Data Category	Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
Tyre Labeling data	Tyre size designation	Obligatory	(width, aspect ratio, rim)	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Tyre type identifier			Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Load-capacity index	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Speed category symbol	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Reinforced /XL			Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Snow tyre designation (3PeakMountain SnowFlake)			Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Ice-grip tyre designation			Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Load version	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Fuel efficiency - rolling resistance class	Obligatory	Class A-E	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	RRC - Rolling resistance coefficient	Obligatory	Value	Regulation (EU) 2020/740	1,3	Model	Tyre manufacturer/ importer		MSA / Customs
	Wet grip class	Obligatory	Class A-E	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Wet grip index	Obligatory	Value	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	External rolling noise class	Obligatory	Class A-C	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	External rolling noise	Obligatory	dB	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
Measured noise value	Obligatory	dB	Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs	

# Digital Product Passport

## Requirement proposal: Data category: Tyre Labelling data and other regulatory requirements (2)

Data Category	Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
...Tyre Labelling data	Snow-grip pictogram	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Snow-grip test value	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Ice-grip pictogram	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Ice-grip test value	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	QR code (link to EPREL)	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Date of placing on the EU market	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Declaration of conformity	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Technical documentation (test reports, conformity evidence)	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Test laboratory details / accreditation	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		MSA / Customs
	Label template version	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
Other regulatory requirements	QR-code consistency with EPREL entry	Obligatory		Regulation (EU) 2020/740	1	Model	Tyre manufacturer/ importer		Public/Consumers
	Euro 7 abrasion ratings	Obligatory	Class and value	Regulation (EU) 2024/1257	1	Model	Tyre manufacturer/ importer	n.a	MSA / Customs

# Digital Product Passport

## Requirement proposal: Data category: Retreading

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
Retreading date	Obligatory	Date		8	Unit	n.a	Retreater/s	B2B / Specific Actors: Waste management operators, repairers, retreaders MSA/ Customs
Retreadable_Casing	Obligatory	Yes/No		3,8	Model	Tyre manufacturer/importer	n.a	B2B / Specific Actors: Waste management operators, repairers, retreaders
Number of (previous) retread/repair events (< 2 previous retread events), unit level, public access;	Obligatory	Number of events		1,3,4,5,8	Unit	n.a	Retreader	Public/Consumers
Buffing radius	Obligatory	Dimension		8	Model	Tyre manufacturer/importer	?	Retreaders (B2B)
Tread width	Obligatory	Dimension		8	Model	Tyre manufacturer/importer	?	Retreaders (B2B)
Optimal buffing depth	Obligatory	Dimension		8	Model	Tyre manufacturer/importer	?	Retreaders (B2B)

**QDPP-11:** Could the values for buffing radius, tread width and optimal buffing depth change once the tyre has been retread? Should input be anticipated for these fields by the retreader?



# Digital Product Passport

## Requirement proposal: Data category: DO-02\_Physical\_Hindrances

Data requirement	Requirement type	Data description	Reference methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
Potential presence of TPMS battery	Obligatory	Yes/No	IDIS	4,9	Unit	Tyre or vehicle manufacturer/importer	Dismantler	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
	Obligatory	Removal instructions		4,9	Unit	Tyre or vehicle manufacturer/importer	Dismantler	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
PU Foam presence	Obligatory	Yes/No		4,9	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
	Obligatory	Removal instructions		4,9	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Sticky gel presence	Obligatory	Yes/No	IDIS/Manufacturer	4,9	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
	Obligatory	Removal instructions		4,9	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Textile_Class: standard/advanced	Obligatory	Nylon/Poly/Armaid/Kevlar		4,9	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Silica_Ratio_Category <10%	Obligatory	Yes/No		4	Model	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Natural rubber content	Obligatory	Yes/No		4	Batch	Tyre manufacturer/importer	Retreader	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Bromobutyl rubber content	Obligatory	Yes/No		4	Batch	Tyre manufacturer/importer	Retreader	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Chlorobutyl rubber content > 5%	Obligatory	Yes/No		4	Batch	Tyre manufacturer/importer	Retreader	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Cadmium and lead content in ZnO	Obligatory	Specify content in tyre ZnO		4	Batch	Tyre manufacturer/importer	Retreader	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers
Presence of legacy/contaminants	Obligatory	Yes/No per substance		4	Batch	Tyre manufacturer/importer		B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers

# Digital Product Passport

## Requirement proposal: Data category: Lifecycle state and event log

Data requirement	Requirement type	Data description	Ref. methodology	Applicable use cases	Data granularity	Initial data governance	Secondary data governance	Actors with access
Lifecycle_State	Obligatory	Active/ EoL_Retreadable/ EoL_Material_Recovery/ EoL_Critical_Damage		5,6,7,8	Unit	Tyre manufacturer/ importer	Retreader/ repairer/waste operator	Public/Consumers
EoL_Status_Flag	Obligatory	Waste/destined for material recovery/destined for reuse/destined for retreading		7	Unit	n.a	Retreader/ repairer/waste operator	B2B / Specific Actors; MSA/ Customs
Destined for EoL	Obligatory	Yes/No		8	Unit	n.a	Retreader/ repairer/waste operator	B2B / Specific Actors: Waste management operators, retreaders and tyre manufacturers

**QDPP-12:** Please consider the above data points carefully and comment if in your view they are repetitious and could be formulated in a more efficient manner.



# Wrap up and Next steps

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# Study schedule

Overall preparatory study duration: 03.2025 – 05.2026 → **XX.XX.2026**

Date (planned)	Event
March 2025	<b>Start</b> of the ESPR Preparatory Study and Impact Assessment support study on tyres
May 2025	Launch of the project's online platform and <b>consultation questionnaire</b>
June 2025	Start of <b>consultation of registered stakeholders</b> for inputs on the development of the MEErP Task 1-4 reports (i.e. scope, market, users, technologies)
September 2025	<b>Interim draft</b> Task 1 to 4 reports for stakeholder comments
15 October 2025	<b>First Stakeholder meeting</b> on the MEErP Tasks 1 to 4
May 2026	<b>Interim draft</b> of Task 5 to 7 (+SoC) reports for stakeholder comments
08 June 2026 (tentative date)	<b>Second Stakeholder meeting</b> on the MEErP Tasks 5 to 7
08 July 2026	Feedback deadline Tasks 5-7
September/October 2026	<b>Finalisation of the ESPR Preparatory Study</b> Condition*: launch of the Impact Assessment support study
July 2026	Condition*: drafting of Working documents for the Impact Assessment support study
August 2027	Condition*: finalising of the Impact Assessment support study, contractual end of the project

## Next steps

- **Draft MEErP Task 5-7 reports** available for download under [Draft Task 5 Report](#), [Draft Task 5 SoC Annex](#), [Draft Task 6 Report](#), [Draft Task 7 Report](#)
- **Stakeholder feedback to MEErP Task 5-7 (+SoC) draft reports and to SHM presentations requested**
  - Deadline: **08 July 2026**
  - Please send feedback to [ecodesign-tyres@oeko.de](mailto:ecodesign-tyres@oeko.de).
- **Stakeholder registration** still possible, please inform your network:  
[register as a stakeholder](#)

# ECO-DESIGNED TYRES

## RECYCLABLE & RETREADABLE

Thank you  
very much for  
your contribution!

