



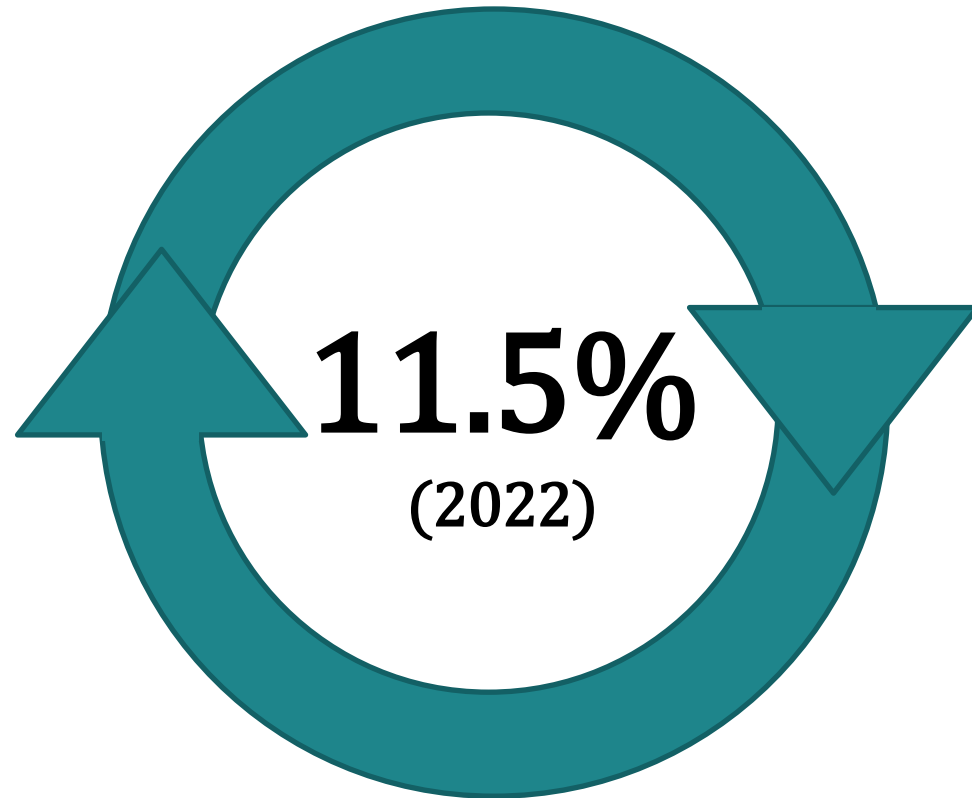
# Circular material use rate indicator: how it is calculated, results and interpretation

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*Regional Training on the production and use of waste  
and circular economy statistics and indicators  
20-21 June 2024*

# Circular material use rate

**The EU is**



**Circular**

CMUR = share of secondary raw materials in total intake of material resources

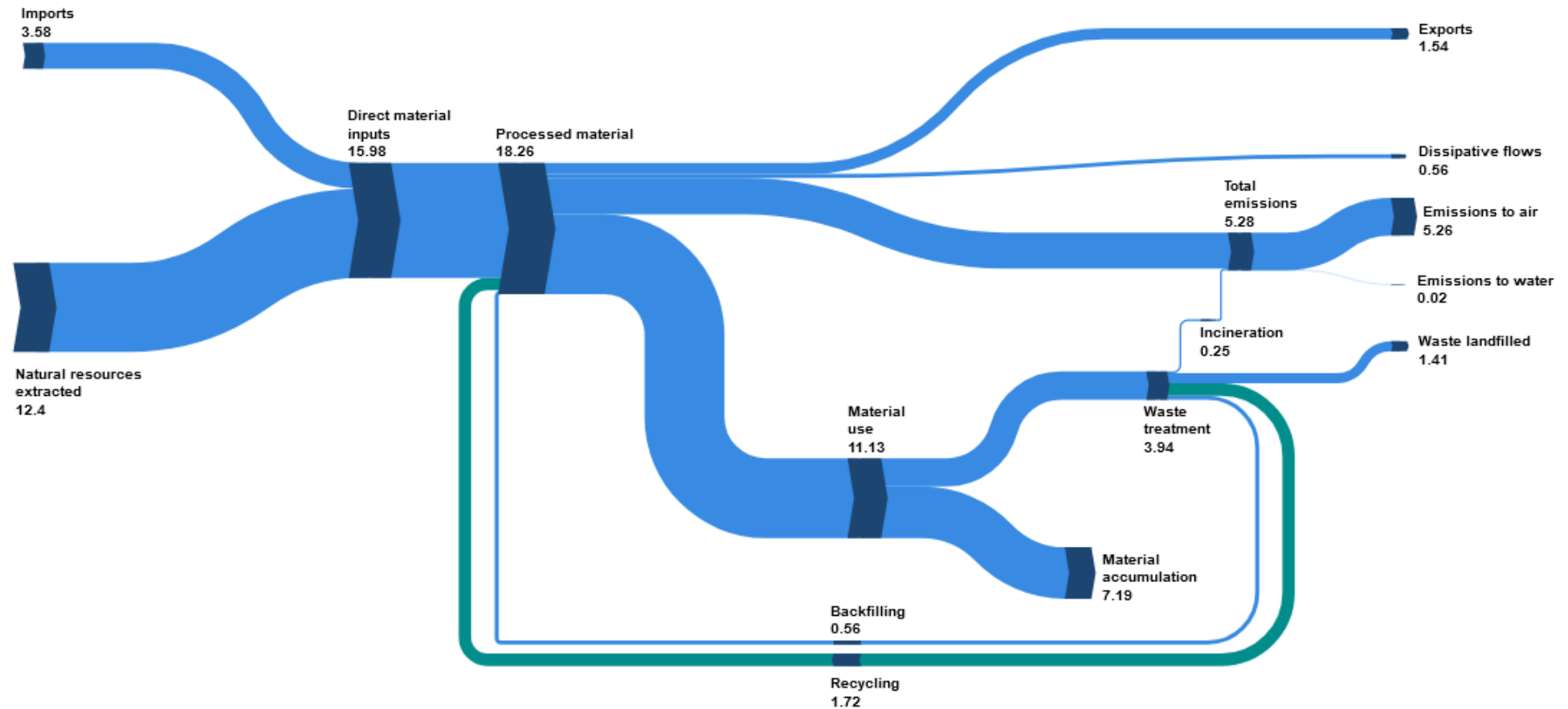
The EU aims to double the CMUR between 2020 and 2030.

# CMUR as flagship indicator

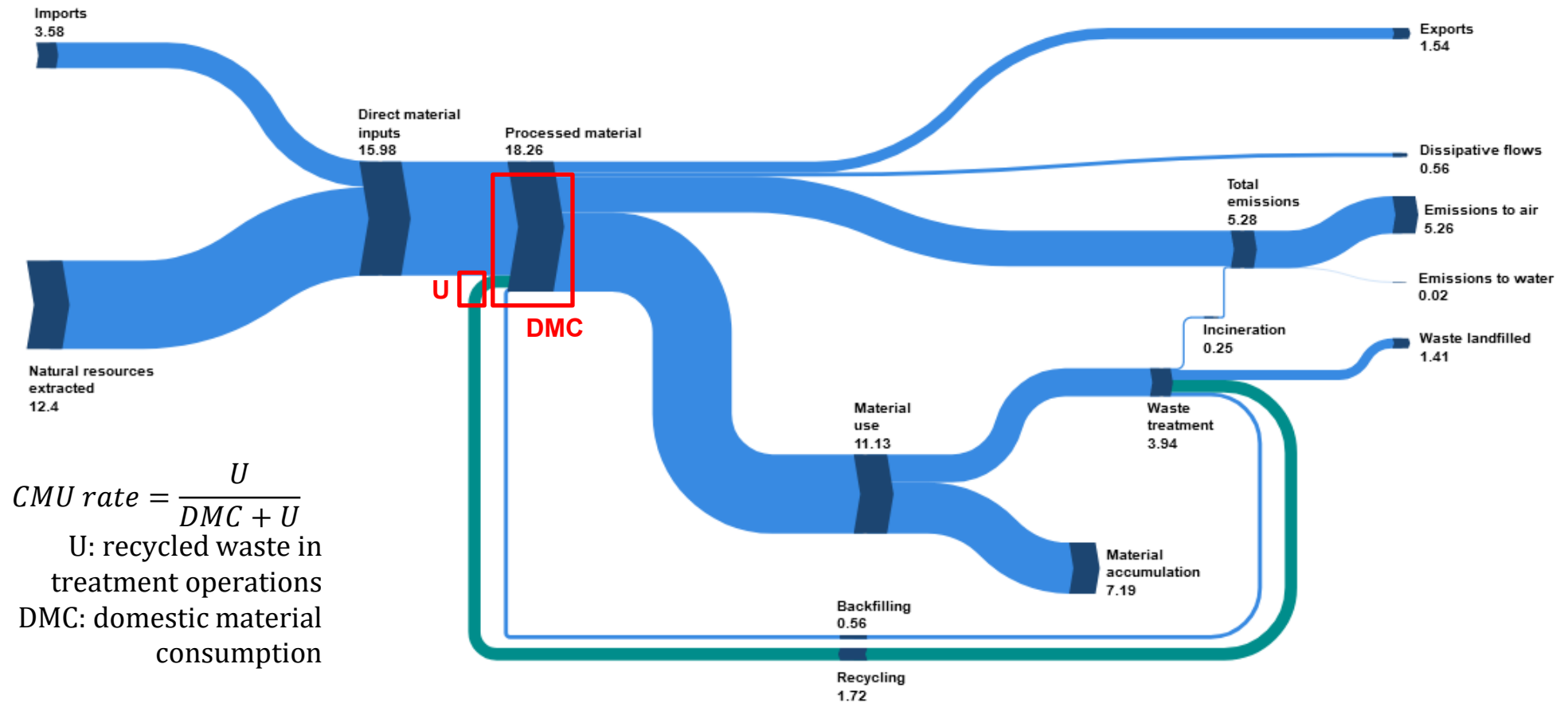
CMUR in many dashboards:

- [EU circular economy monitoring framework](#)
- [EU SDG indicators](#)
- [8<sup>th</sup> Environmental Action Programme monitoring framework](#)
- [EU single market scoreboard](#)
- [Joint UNECE/OECD guidelines for measuring circular economy](#)

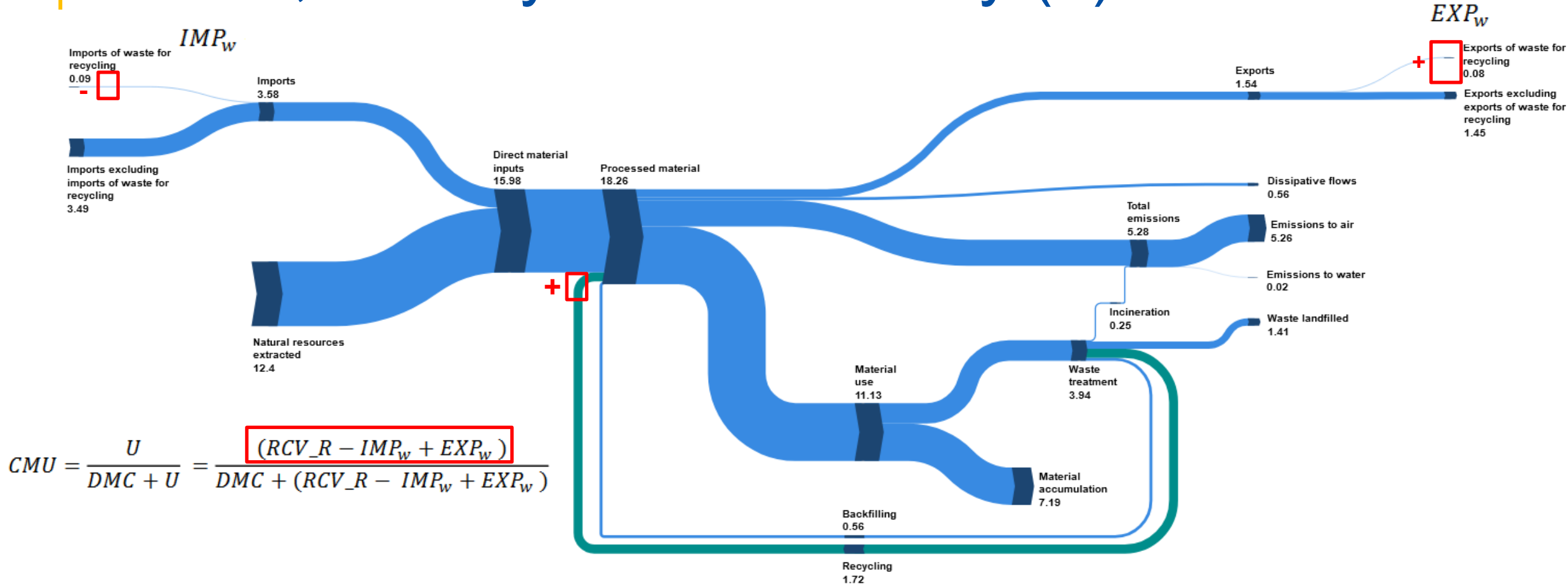
# CMUR meaning, visually – 1<sup>st</sup> approximation



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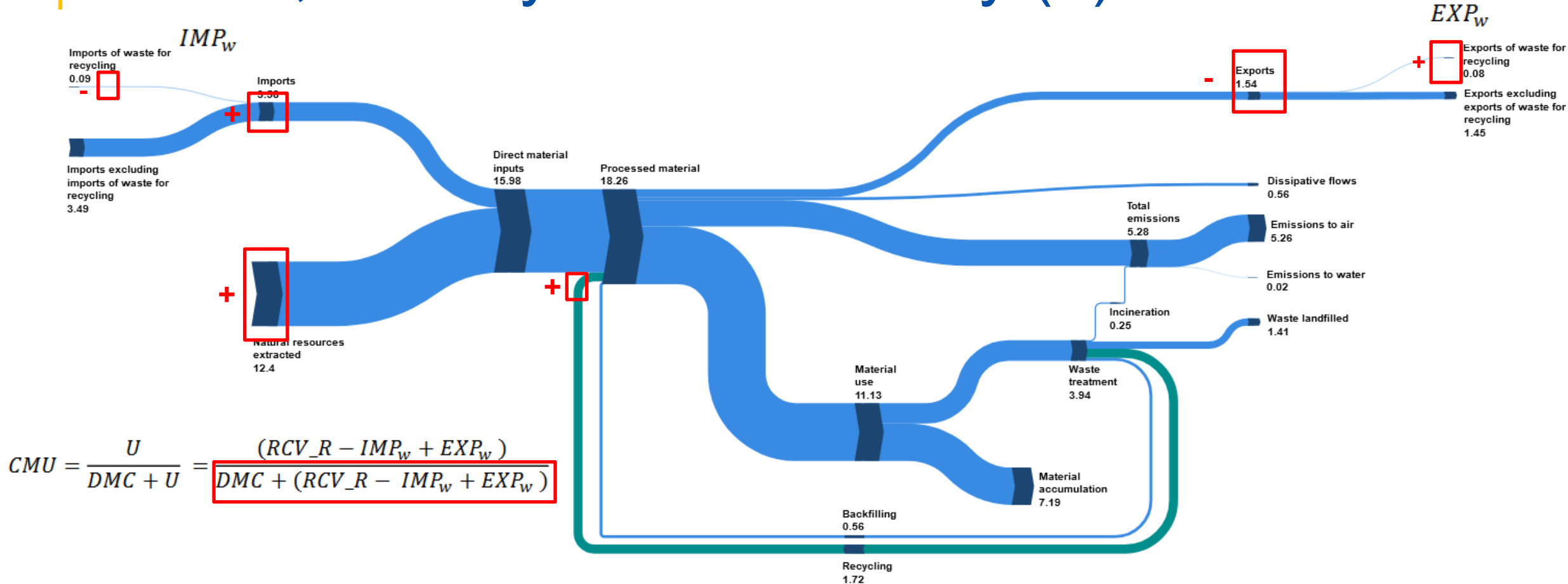


# CMUR, visually – more exactly (1)



$$CMU = \frac{U}{DMC + U} = \frac{(RCV_R - IMP_w + EXP_w)}{DMC + (RCV_R - IMP_w + EXP_w)}$$

# CMUR, visually – more exactly (2)



# Calculation method

$$CMU\ rate = \frac{U}{DMC + U} = \frac{(RCV\_R - IMP_w + EXP_w)}{DMC + (RCV\_R - IMP_w + EXP_w)}$$

With

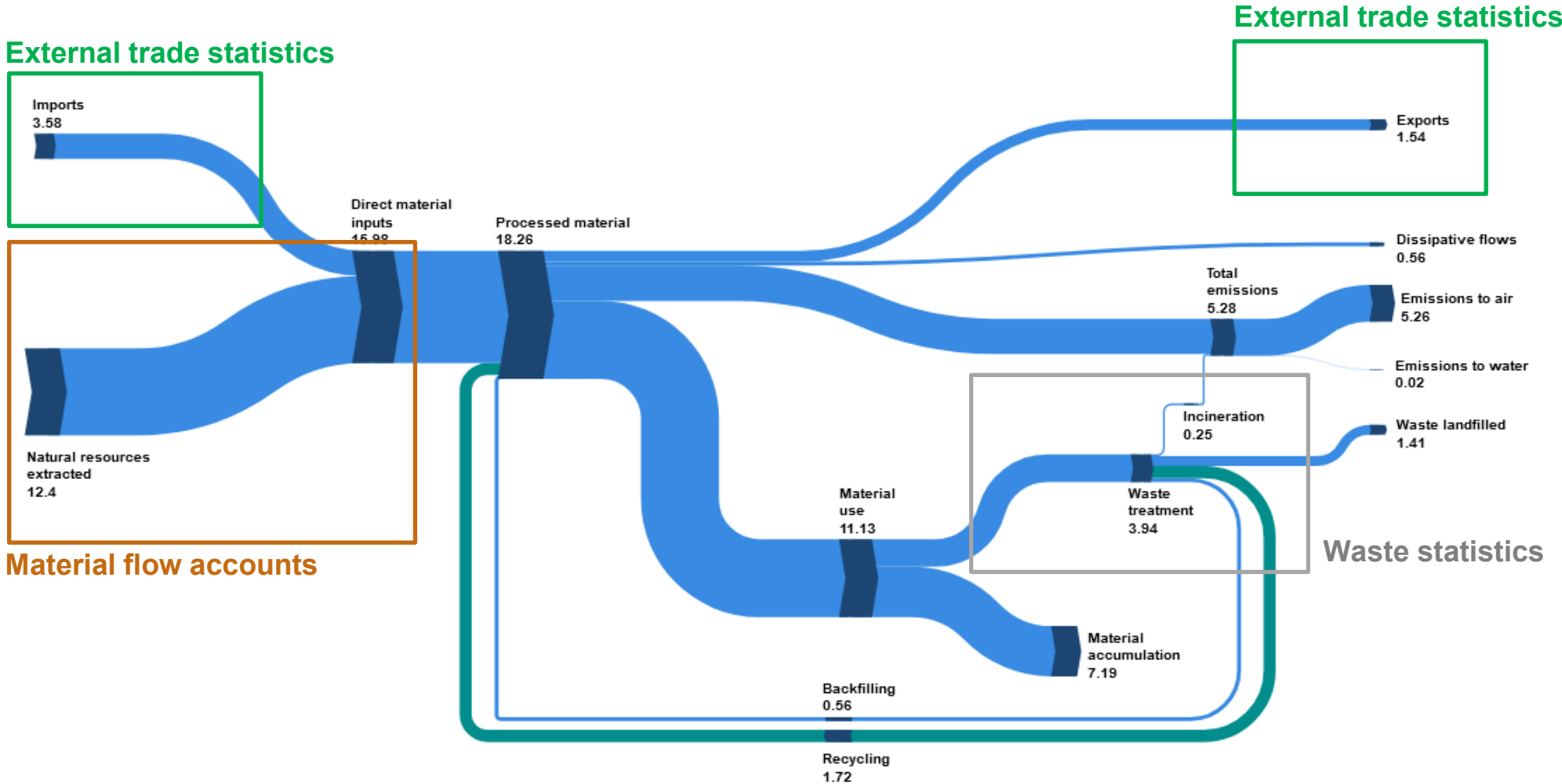
U = circular use of materials total amount of recycled waste in treatment operations

- $RCV\_R$ : waste recovery (recycling) in treatment operations
  - $IMP_w$ : amount of imported waste bound for recycling
  - $EXP_w$ : amount of exported waste bound for recycling
- (proxy for imports & exports secondary raw materials)

DMC = domestic material consumption



# Data sources



# 3 data sources

- **Economy-wide material flow accounts**
  - collected under Regulation (EU) 691/2011 (Eurostat data set env\_ac\_mfa)
  - In turn based on global System Environmental-Economic Accounts (SEEA)
- **Waste statistics**
  - collected under Regulation (EC) No 2150/2002 (Eurostat data set env\_wastrt)
  - Waste amounts classified according to EWC-Stat waste categories
  - Data every 2<sup>nd</sup> year. Interpolations & extrapolations needed
- **International trade in goods statistics**
  - collected under Regulation (EC) No 638/2004 (intrastat) and Regulation (EC) No 471/2009 (extrastat)
  - [Selected codes](#) of CN classifications which are considered trade in waste

# CMUR, calculation

Integration of 3 data sources:

1. Alignment of classifications
2. Alignment of frequency

# 1. Alignment of classifications

Eurostat calculates CMUR with 4 broad material categories as in MFA:

1. Biomass
2. Metal ores
3. Non-metallic minerals
4. Fossil energy materials carriers

Trade statistics (classification CN)

Waste statistics (EWC-Stat classification)

} We re-classify them into  
the 4 MFA main categories

[List of CN codes for the calculation of imports and exports.](#)

[Correspondence of waste codes to the four material flows MF1 to MF4](#)

## List of CN-codes used to approximate imports and exports of waste destined for recycling.

Last update: 2023-11-14

Product	Description of CN-code (label)	Material	factor_o per
05059000	Skins and other parts of birds, with their feathers or down, feathers and parts of feathers, whether or not with trimmed edges, not further worked than cleaned, disinfected or treated for preservation; powder and waste of feathers or parts of feathers (excl. feathers used for stuffing and down)	MF1	1
05119110	Fish waste	MF1	1
05119910	Sinews or tendons of animal origin, parings and similar waste of raw hides or skins	MF1	1
09019010	Coffee husks and skins	MF1	1
15220091	Oil foots and dregs; soapstocks (excl. those containing oil with characteristics of olive oil)	MF1	1
15220099	Residues from treatment of fatty substances or animal and vegetable waxes (excl. those containing oil with characteristics of olive oil, oil foots and dregs and soapstocks)	MF1	1
18020000	Cocoa shells, husks, skins and other cocoa waste	MF1	1
23033000	Brewing or distilling dregs and waste	MF1	1
23070011	Wine lees, having a total alcoholic strength of $\leq 7,9\%$ mas and a dry matter content $\geq 25\%$ by weight	MF1	1
23070019	Wine lees (excl. wine lees having a total alcoholic strength of $\leq 7,9\%$ and a dry matter content of $\geq 25\%$ by weight)	MF1	1
24013000	Tobacco refuse	MF1	1
25253000	Mica waste	MF3	1
26190020	Waste from the manufacture of iron or steel suitable for the recovery of iron or manganese	MF3	1
26190040	Slag from the manufacture of iron or steel suitable for the extraction of titanium oxide	MF3	1
26190080	Slag, dross, scalings and other waste from the manufacture of iron or steel (excl. granulated slag, waste suitable for the recovery of iron or manganese and slag suitable for the extraction of titanium oxide)	MF3	1
26190090	Slag, dross, scalings and other waste from the manufacture of iron or steel (excl. granulated slag, waste suitable for the recovery of iron or manganese)	MF3	1
26201100	Hard zinc spelter	MF2	1
26201900	Slag, ash and residues containing mainly zinc (excl. hard zinc spelter)	MF3	1
26202900	Slag, ash and residues containing mainly lead (excl. leaded gasoline sludges and leaded anti-knock compound sludges)	MF3	1
26203000	Slag, ash and residues containing mainly copper	MF3	1
26204000	Slag, as and residues containing mainly aluminium	MF3	1
26206000	Slag, ash and residues, containing arsenic, mercury, thallium or their mixtures, of a kind used for the extraction of arsenic or those metals or for the manufacture of their chemical compounds (excl. those from the manufacture of iron or steel)	MF3	1
26209100	Slag, ash and residues, containing antimony, beryllium, cadmium, chromium or their mixtures (excl. those from the manufacture of iron or steel)	MF3	1
26209910	Slag, ash and residues containing mainly nickel	MF3	1

## ANNEX - Correspondence of waste codes to the four material flows MF1 to MF4

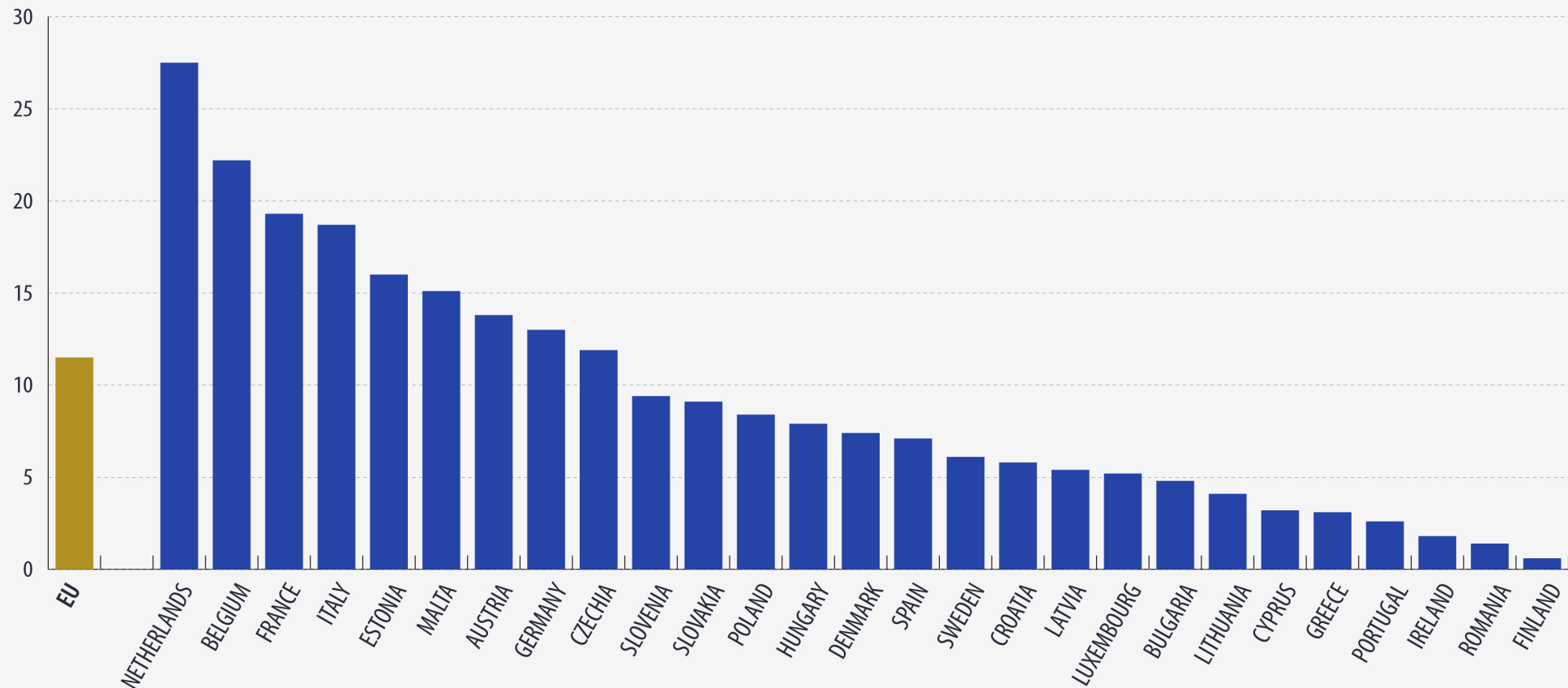
Code	EWC-Stat label	MF1 biomass	MF2 Metal ores	MF3 Non- metallic minerals	MF4 Fossil energy carriers	Total
<b>Total</b>	Total Waste	0%	0%	0%	0%	100%
<b>W011</b>	Spent solvents	0%	0%	0%	100%	0%
<b>W012</b>	Acid, alkaline or saline wastes	0%	0%	100%	0%	0%
<b>W013</b>	Used oils	0%	0%	0%	100%	0%
<b>W02A</b>	Chemical wastes (W014+W02+W031)	7%	16%	18%	59%	0%
<b>W032</b>	Industrial effluent sludges	42%	8%	43%	6%	0%
<b>W033</b>	Sludges and liquid wastes from waste treatment	21%	16%	47%	16%	0%
<b>W05</b>	Health care and biological wastes	62%	1%	3%	35%	0%
<b>W061</b>	Metal wastes, ferrous	0%	100%	0%	0%	0%
<b>W062</b>	Metal wastes, non-ferrous	0%	100%	0%	0%	0%
<b>W063</b>	Metal wastes, mixed ferrous and non-ferrous	0%	100%	0%	0%	0%
<b>W071</b>	Glass wastes	0%	0%	100%	0%	0%
<b>W072</b>	Paper and cardboard wastes	100%	0%	0%	0%	0%
<b>W073</b>	Rubber wastes	0%	0%	0%	100%	0%
<b>W074</b>	Plastic wastes	0%	0%	0%	100%	0%
<b>W075</b>	Wood wastes	100%	0%	0%	0%	0%
<b>W076</b>	Textile wastes	30%	0%	0%	70%	0%
<b>W077</b>	Waste containing PCB	0%	0%	100%	0%	0%
<b>W08A</b>	Discarded equipment (W08 except W081, W0841)	0%	100%	0%	0%	0%
<b>W081</b>	Discarded vehicles	0%	100%	0%	0%	0%
<b>W0841</b>	Batteries and accumulators wastes	0%	100%	0%	0%	0%
<b>W091</b>	Animal and mixed food waste	100%	0%	0%	0%	0%

## 2. Alignment of sources frequency

- International trade in goods statistics (**monthly** data) → **Annual** data
- Economy-wide material flow accounts (**annual** data) → **Annual** data
- European waste statistics (**biennial** data) → **Annual** data
  - We produce annual waste estimates by interpolation
  - Every second year we must extrapolate to the most recent year, for the 4 breakdown categories and the total
  - Eurostat uses a simple linear interpolation-extrapolation
  - It is crude but it ensures internal consistency (no negative CMUR estimates)
  - European environmental agency has a more advanced method that Eurostat is looking into possible use

## Circular material use rate in the EU, 2022

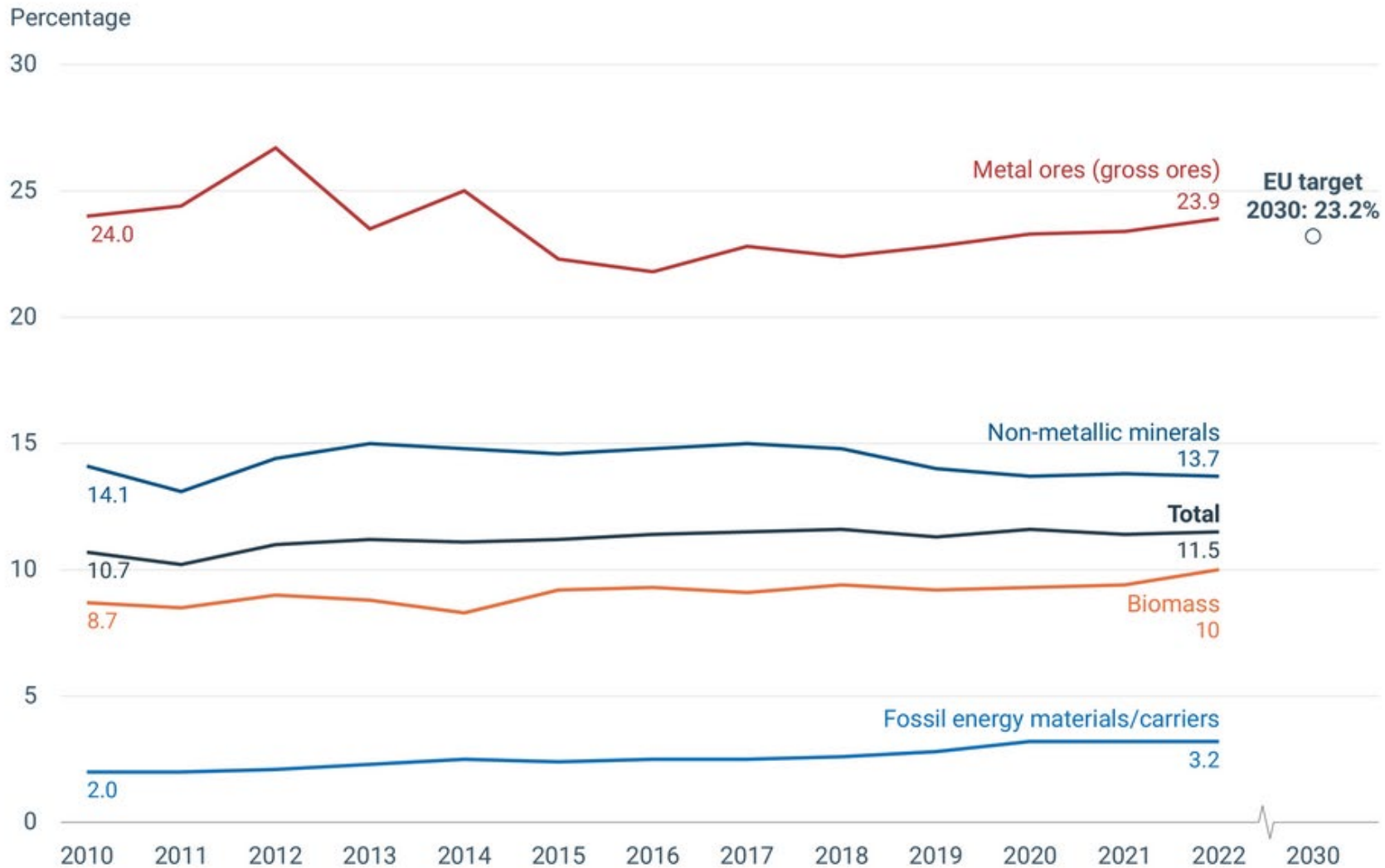
(%)



Circular material use rate: share of used material resources which came from recycled waste materials.



# CMUR, results for European Union

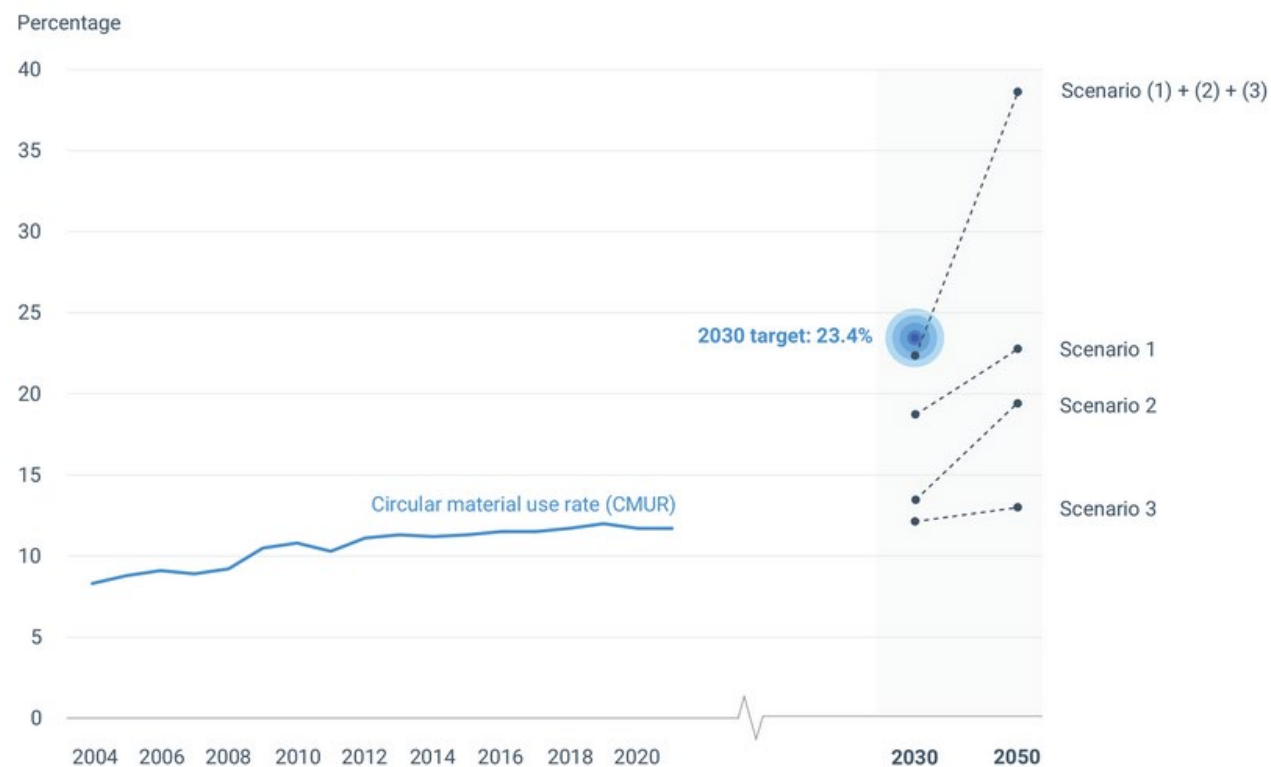


# Analysis – how to increase CMUR?

- More recycling of waste
  - E.g. metal ores are economically attractive to recycle
- Reduce economy's intake of metals & minerals and increase recycling
  - Metals & minerals add to stocks of buildings and infrastructure
  - There is a time lag between extraction of resources and waste generation
- Reduce consumption of fossil fuels and make biomass production more sustainable
  - Reduce fossil fuels and reduce food waste
  - Fossil fuels and biomass are largely converted into emissions







# EEA scenarios to double CMUR in EU by 2030

- **Scenario 1: enhancing recycling**— increase recycling rates from 40% in 2020 to 70% in 2030 and 90% in 2050.
- **Scenario 2: improving material efficiency** and reducing material consumption — decrease DMC by 15% by 2030 and 45% by 2050, from 2020 level.
- **Scenario 3: reducing the use of fossil fuels** by 34% by 2030 and 83% by 2050, compared with the 2020 level.
- **A combination** of scenarios 1, 2 and 3.



# To know more:

- Eurostat [online database](#)

- [-] Circular economy indicators (cei)
  - [-] Production and consumption (cei\_pc)
  - [-] Waste management (cei\_wm)
  - [-] Secondary raw materials (cei\_srm)
    - [-] Circular material use rate (cei\_srm030)  
    - [-] Contribution of recycled materials to raw materials demand - end-of-life recycling input rates (EOL-RIR) (cei\_srm010)  
    - [-] Trade in recyclable raw materials (cei\_srm020)  
  - [-] Competitiveness and innovation (cei\_cie)
  - [-] Global sustainability and resilience (cei\_gsr)



- [Reference methodology](#)
- Eurostat 'Statistics Explained' [article](#)
- Analysis: [how far is Europe from reaching its ambition to double the circular use of materials?](#) (European Environmental Agency)
- Interpretation: [Circular material use rate in Europe](#) (EEA)

# Thank you

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