The Outlook for Plastics

DAKOFA 29 November 2022

Joe Papineschi, Chairperson, Eunomia Research & Consulting

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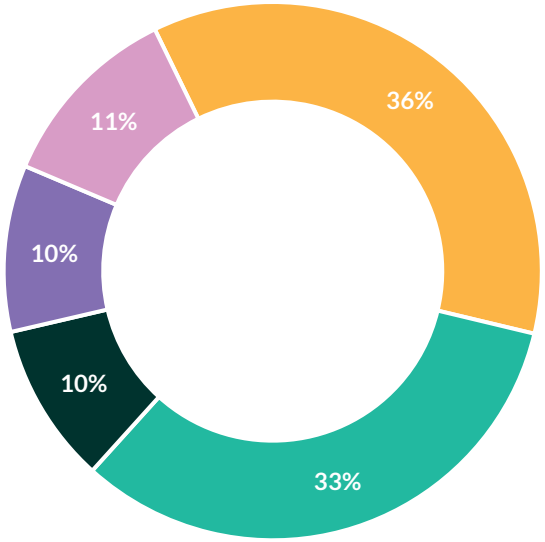
Our Clients

National, Regional Government

Ministry of Environment & Energy
Department of Energy & Climate Change
Finnish Government
Department for Environment Food & Rural Affairs
Norwegian Environment Agency
Llywodraeth Cymru Welsh Government
Hong Kong
The Scottish Government
Department of Ecology State of Washington
RPRA Resource Productivity & Recovery Authority
UKRI UK Research and Innovation

Supranational Government

OECD
JRC European Commission
European Environment Agency
eurostat
UNEP
European Commission
European Medicines Agency Science Medicines Health



Non-Governmental Organisations

wrap
reloop
C40 Cities
WWF
Alliance to End Plastic Waste
Commission for Environmental Cooperation
CHEMTrust
ClientEarth
Zero Waste Scotland
EEB European Environmental Bureau
SCC CCN
Changing Markets Foundation
RCA Recycling Council of Alberta
Zero Waste Europe

Local Government

Euro Cities
New York City Department of Sanitation
King County Council
Hoboken
Yukon
Camden
Manchester City Council
Calgary
SWA Sacramento Regional Solid Waste Authority
Exeter City Council
Oslo
City of Westminster
Greater London Authority
Islington

Private Sector

Nike
TOMRA
FIFA
Consumer Brands Association
Deloitte.
Danone
M&S
Itochu
E.ON
Policy Hub
Tesco
Red Bull
Europen
Eastman
Ball
Apple
Suez
Coca-Cola
Aldi Süd
L'Oréal
PepsiCo
BASF We create chemistry
Nestlé
Macquarie

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The basics

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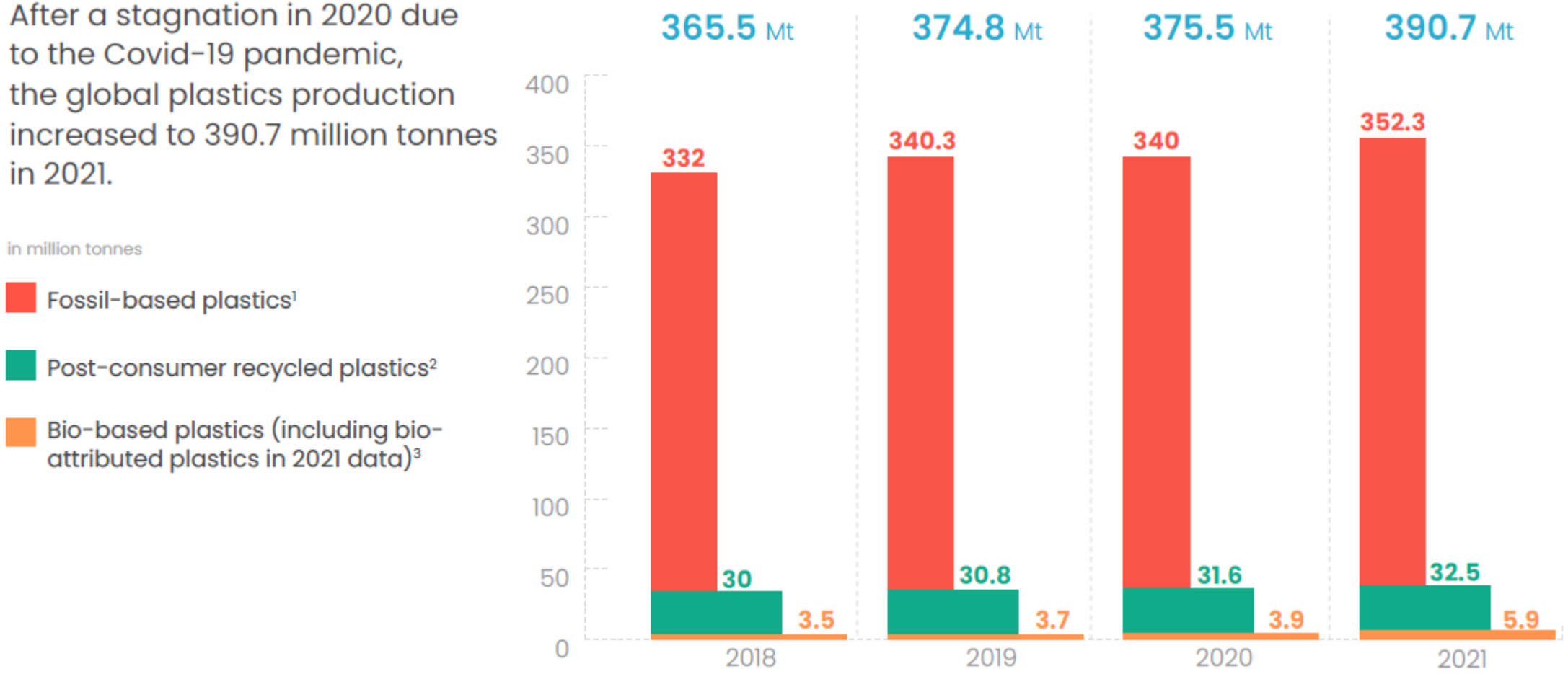
Trend in Global Plastics Production

After a stagnation in 2020 due to the Covid-19 pandemic, the global plastics production increased to 390.7 million tonnes in 2021.



Source: Plastics - the Facts (Plastics Europe)

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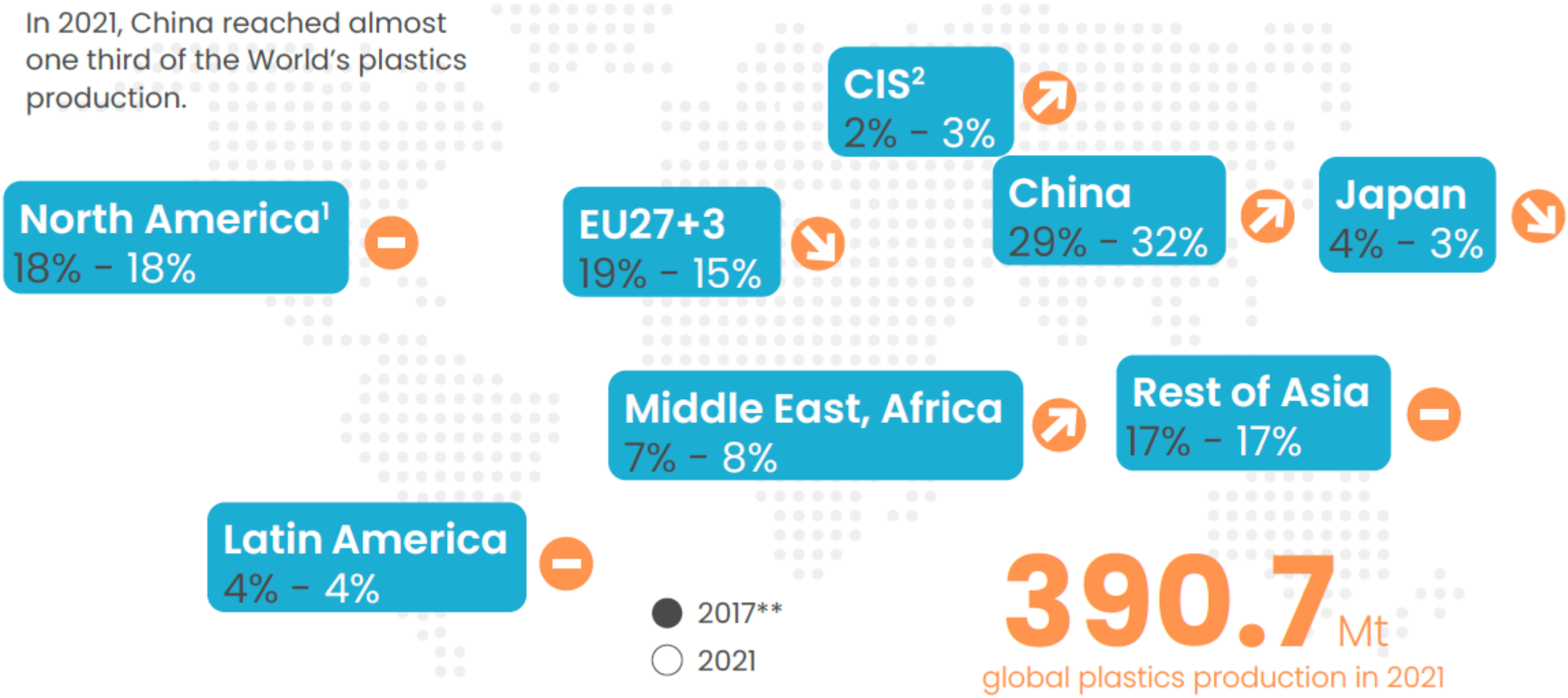
Global Distribution of Plastics Production



Source: Plastics - the Facts (Plastics Europe)

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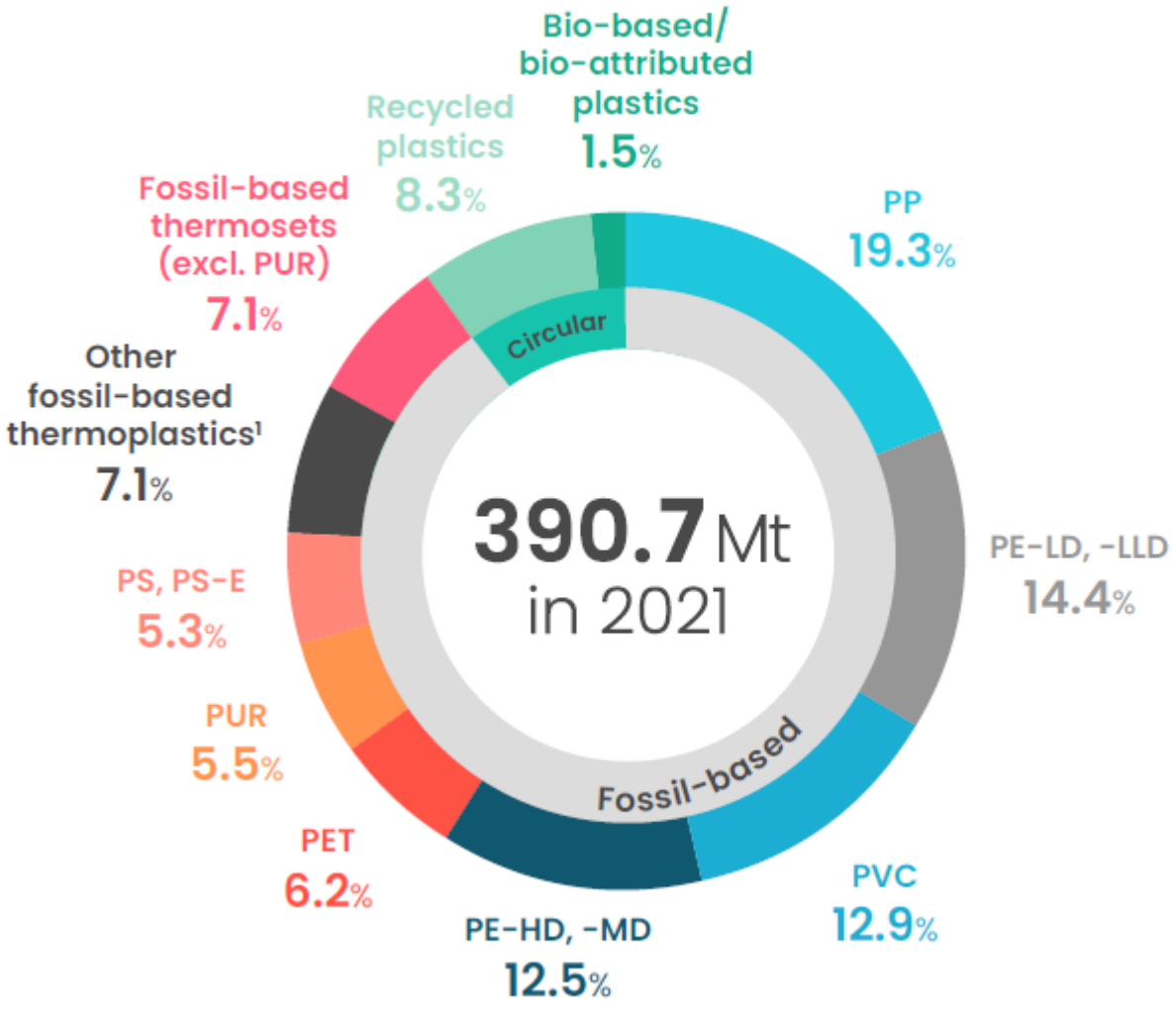
Global Plastics Production by Type

In 2021, circular plastics represented about 9.8% of the World plastics production.



Source: Plastics - the Facts (Plastics Europe)

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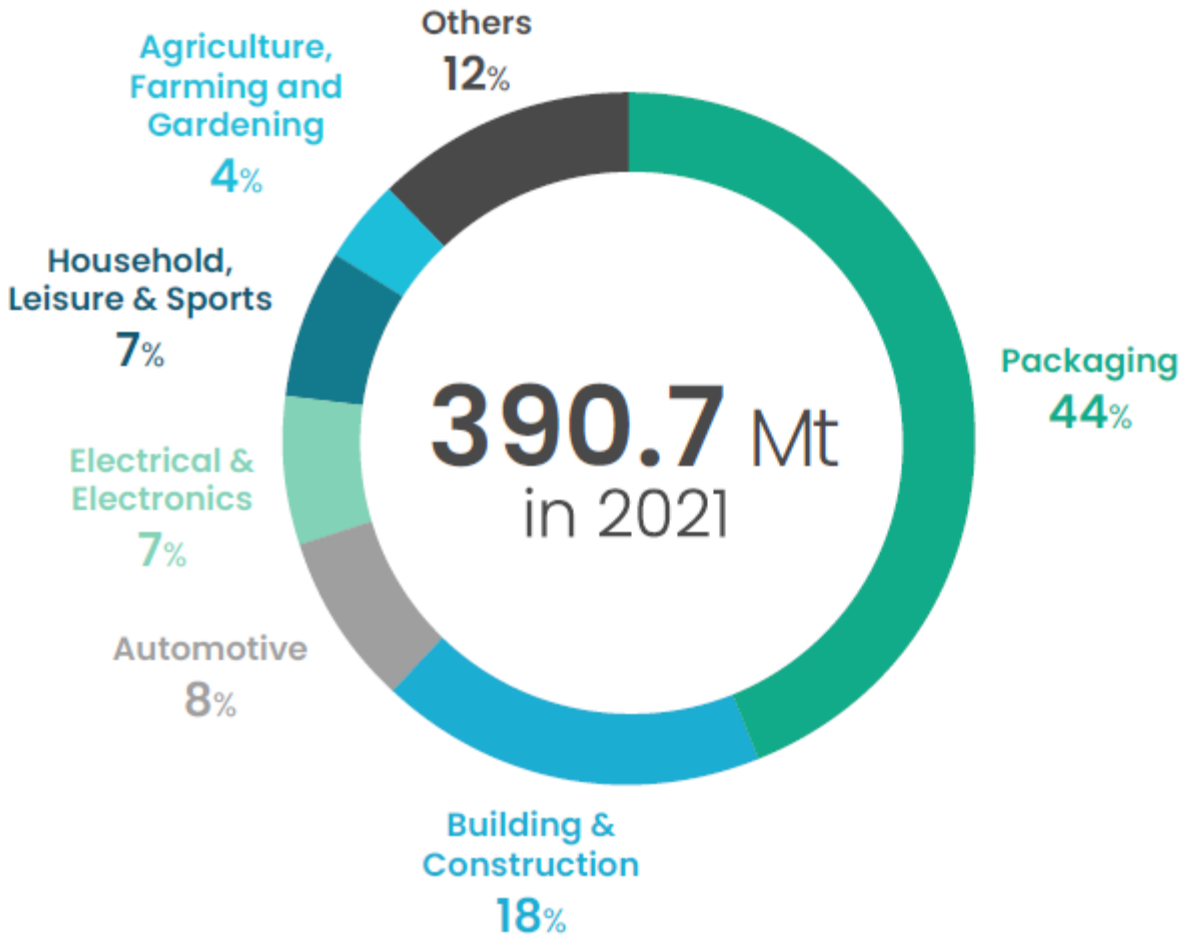
Global Plastics Production by Application

In 2021, packaging and building & construction applications were the two largest World plastics markets.



Source: Plastics - the Facts (Plastics Europe)

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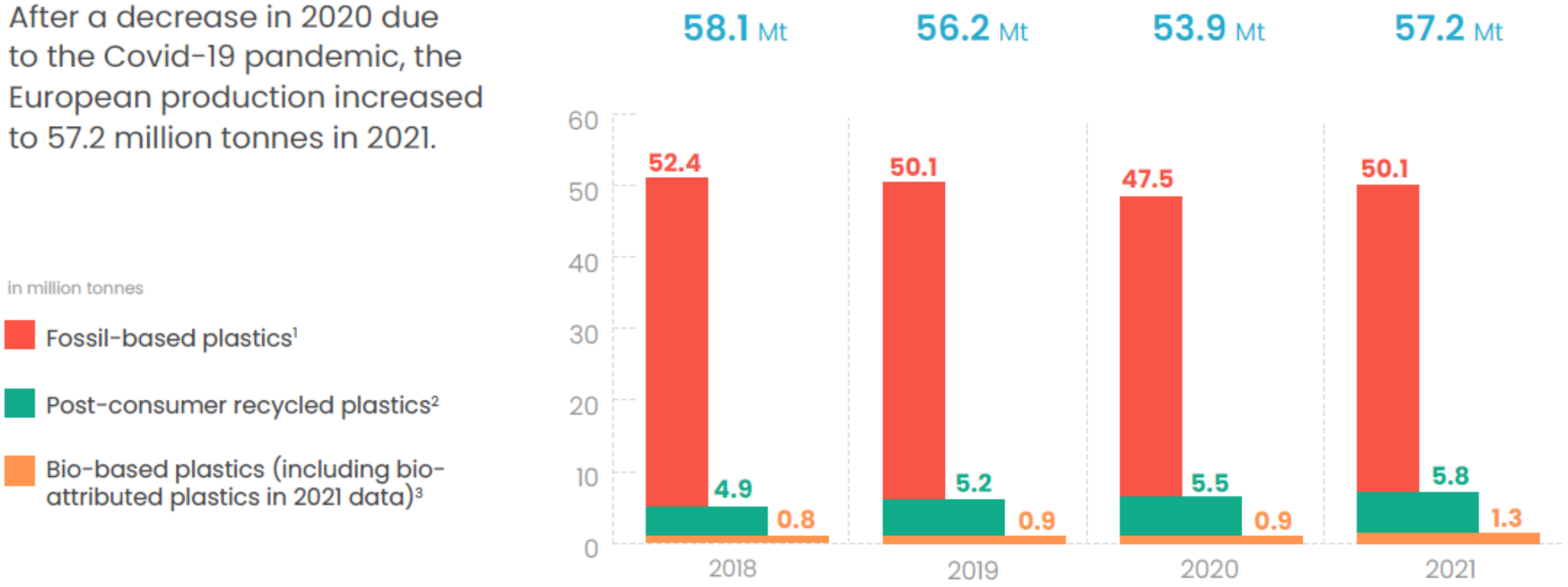
Trend in European Plastics Production

After a decrease in 2020 due to the Covid-19 pandemic, the European production increased to 57.2 million tonnes in 2021.



Source: Plastics - the Facts (Plastics Europe)

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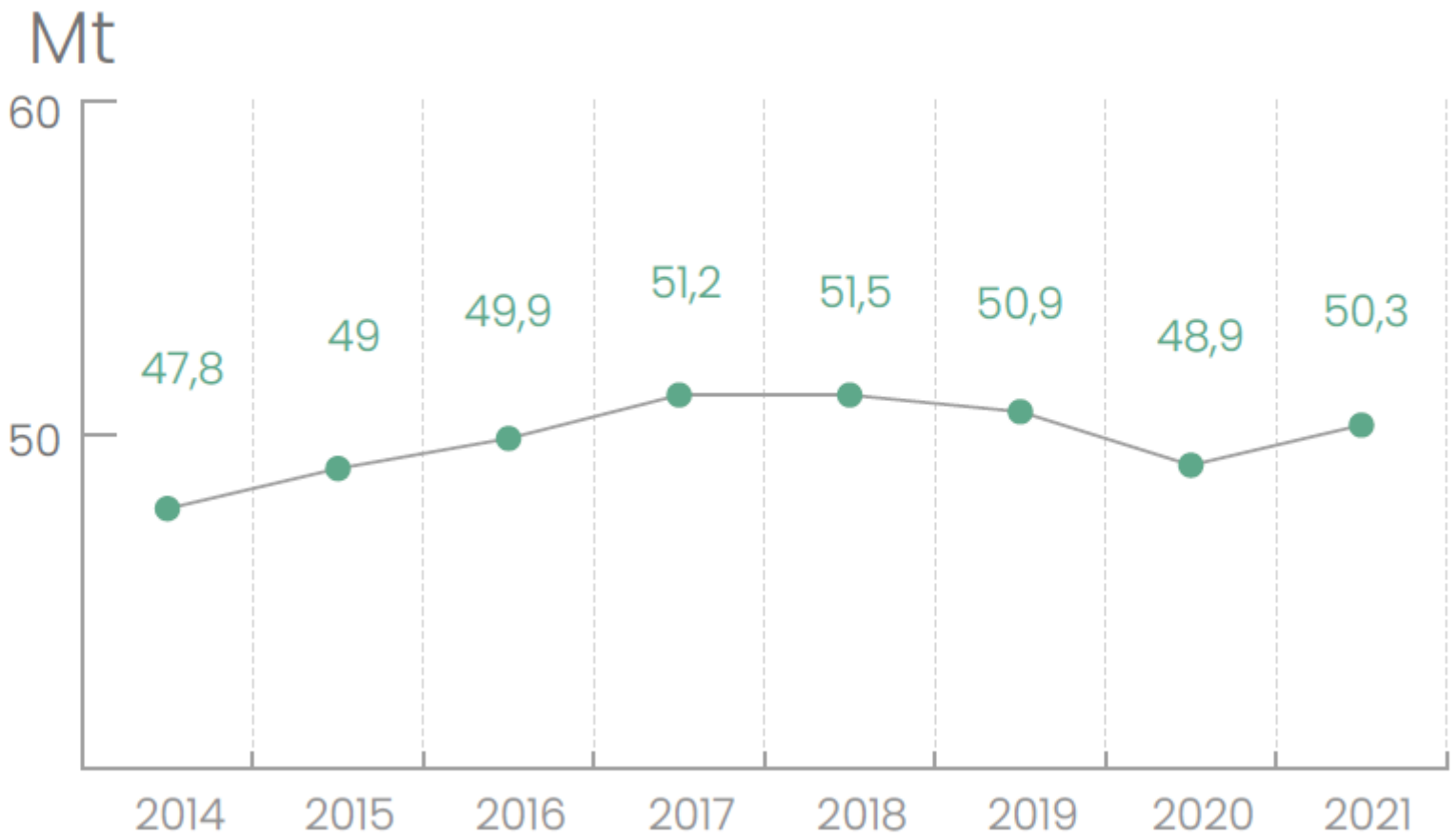
Trend in European Plastic Converter Demand

In 2021, converters plastics demand increased for the first time after two years of decrease.



Source: Plastics - the Facts (Plastics Europe)

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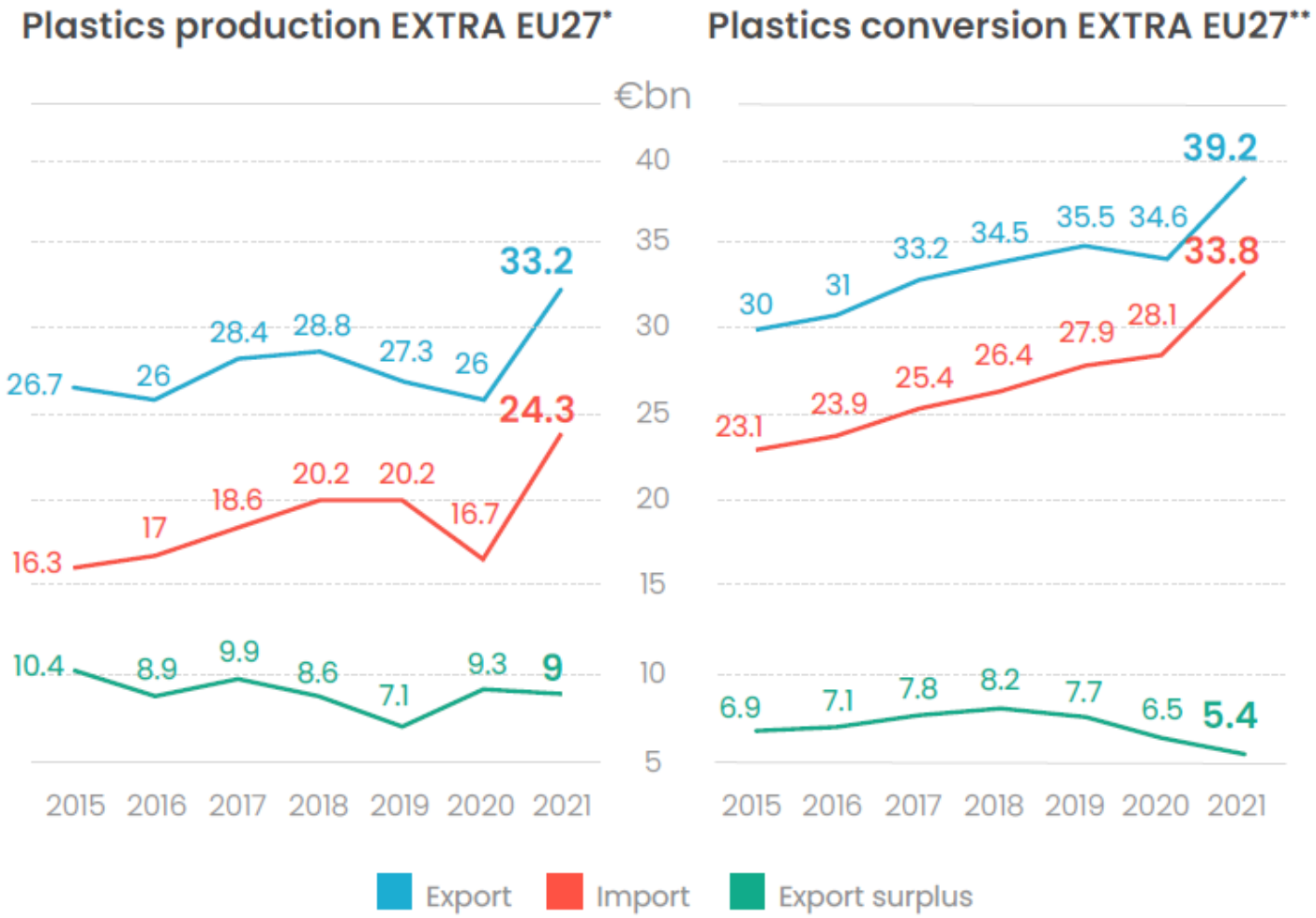
European Plastics Trade Balance

In 2021, the European plastics industry achieved a positive trade balance of 14.4 billion euros.

14.4
billion €
trade balance



Source: Plastics - the Facts (Plastics Europe)

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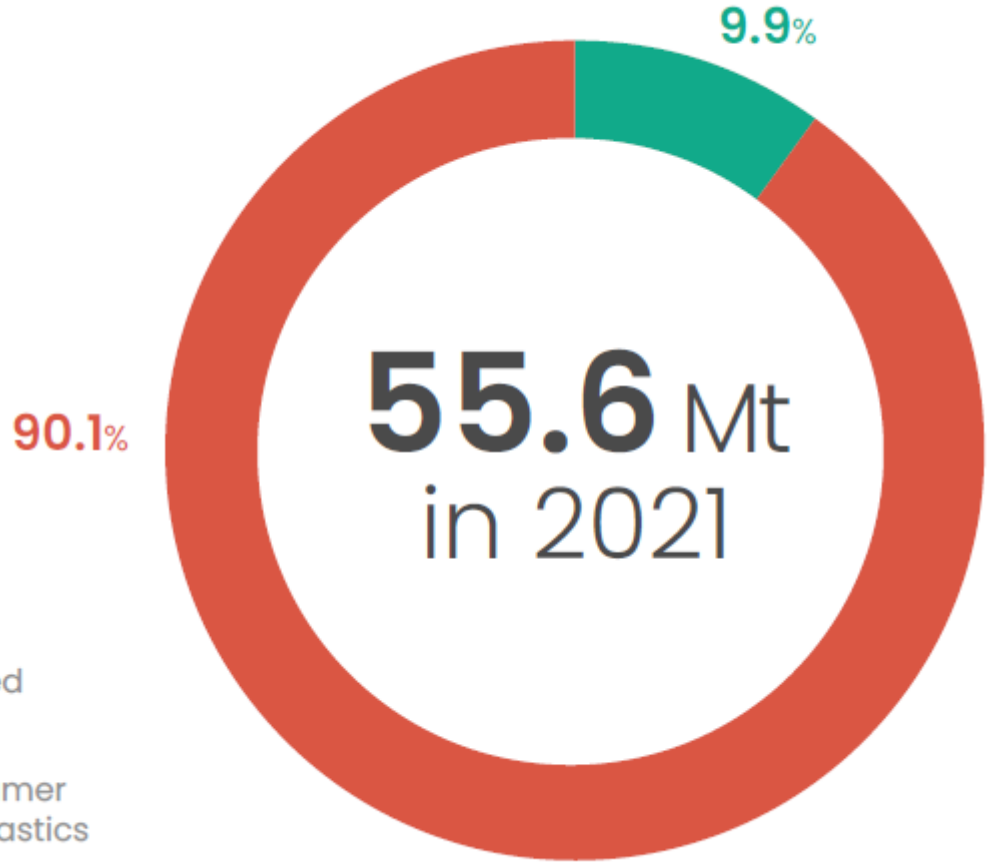
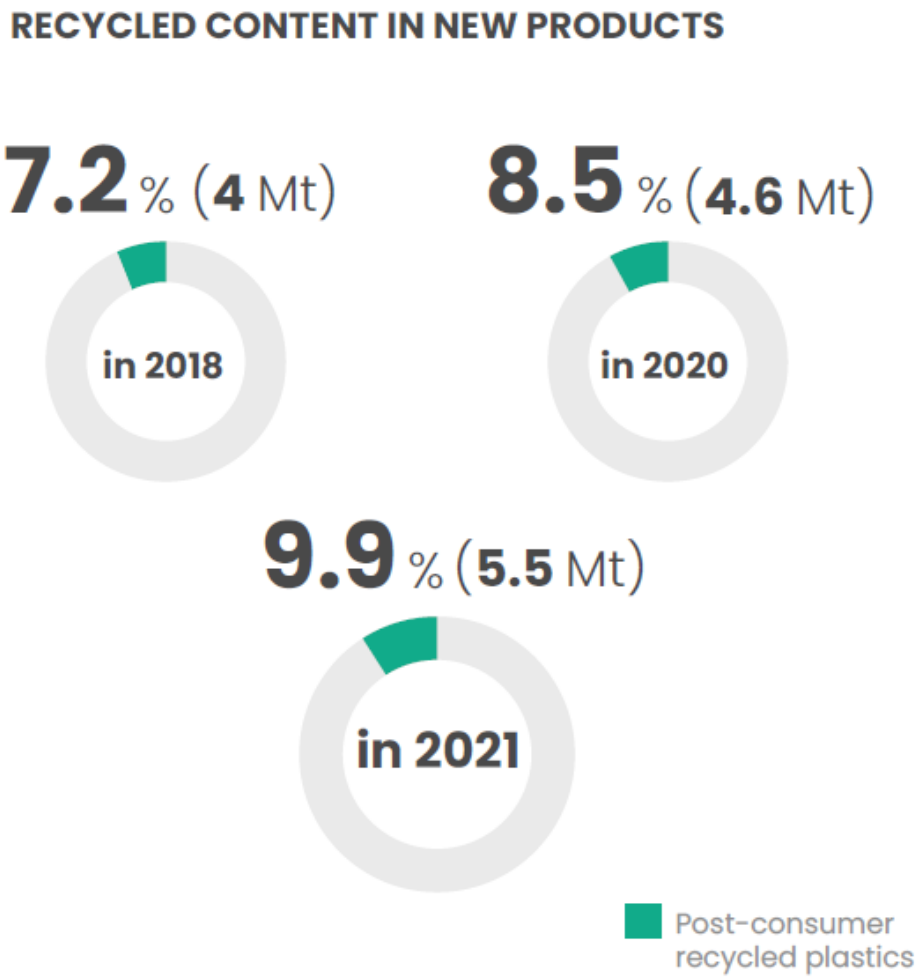
European Post-consumer Plastics Use

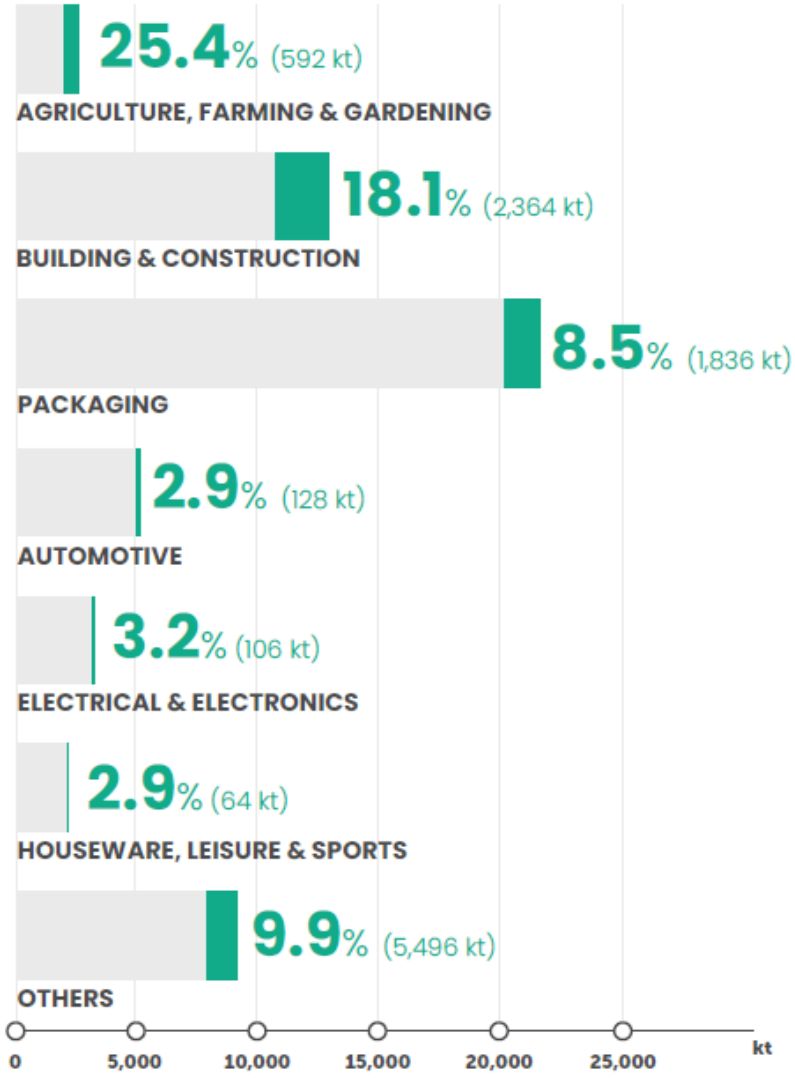
In 2021, the use of post-consumer recycled plastics by European converters reached 5.5 Mt, representing a 9.9% recycled content. This represents an increase of about 20% compared to 2018.



Source: Plastics - the Facts (Plastics Europe)

European Post-consumer Plastics Use





Source: Plastics - the Facts (Plastics Europe)

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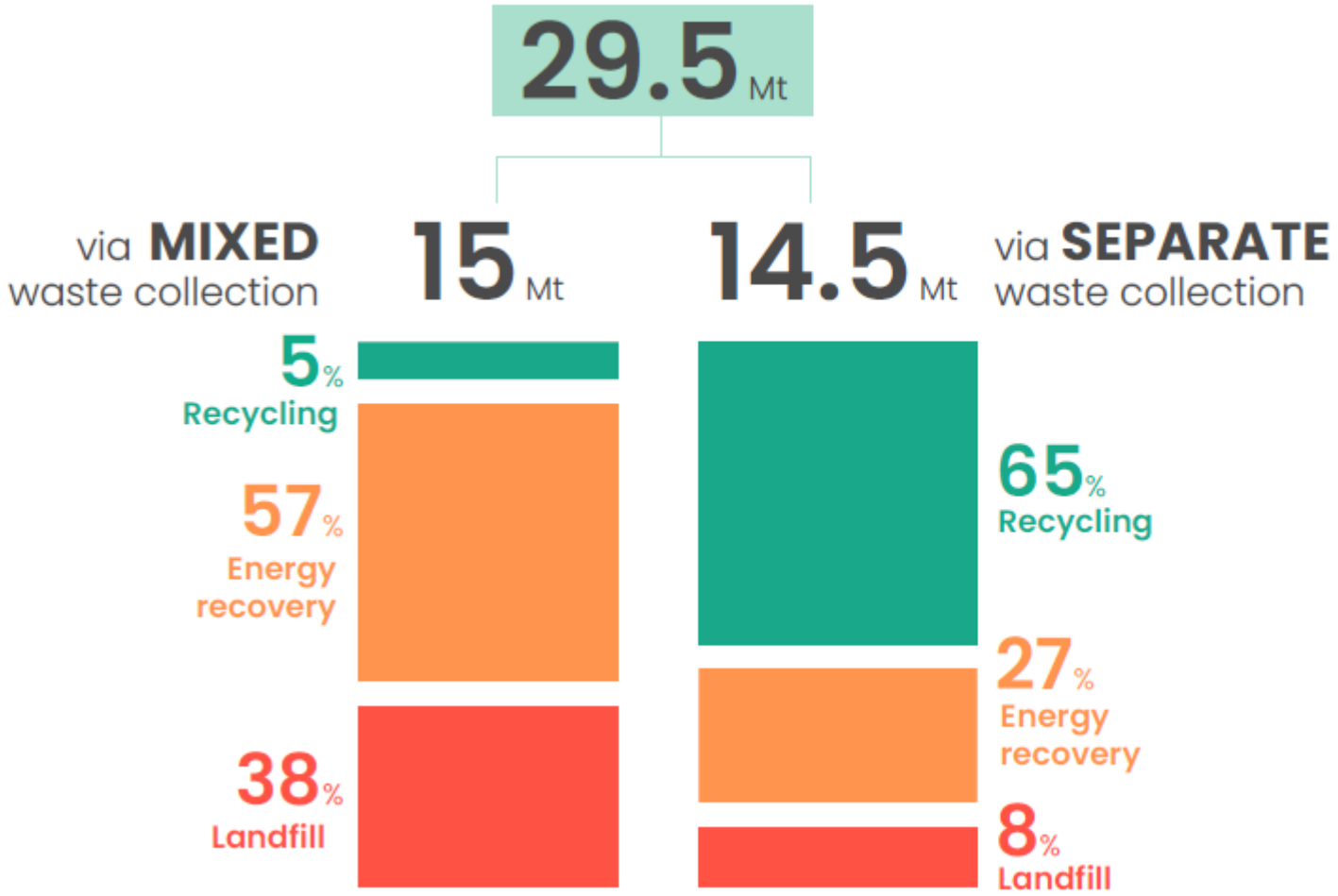
European Collection of Plastic Waste

In 2020, 29.5 million tonnes of post-consumer plastics waste were collected in the EU27+3. Plastics waste recycling rates are 13x higher when collected separately compared to mixed waste collection schemes.



Source: Plastics - the Facts (Plastics Europe)

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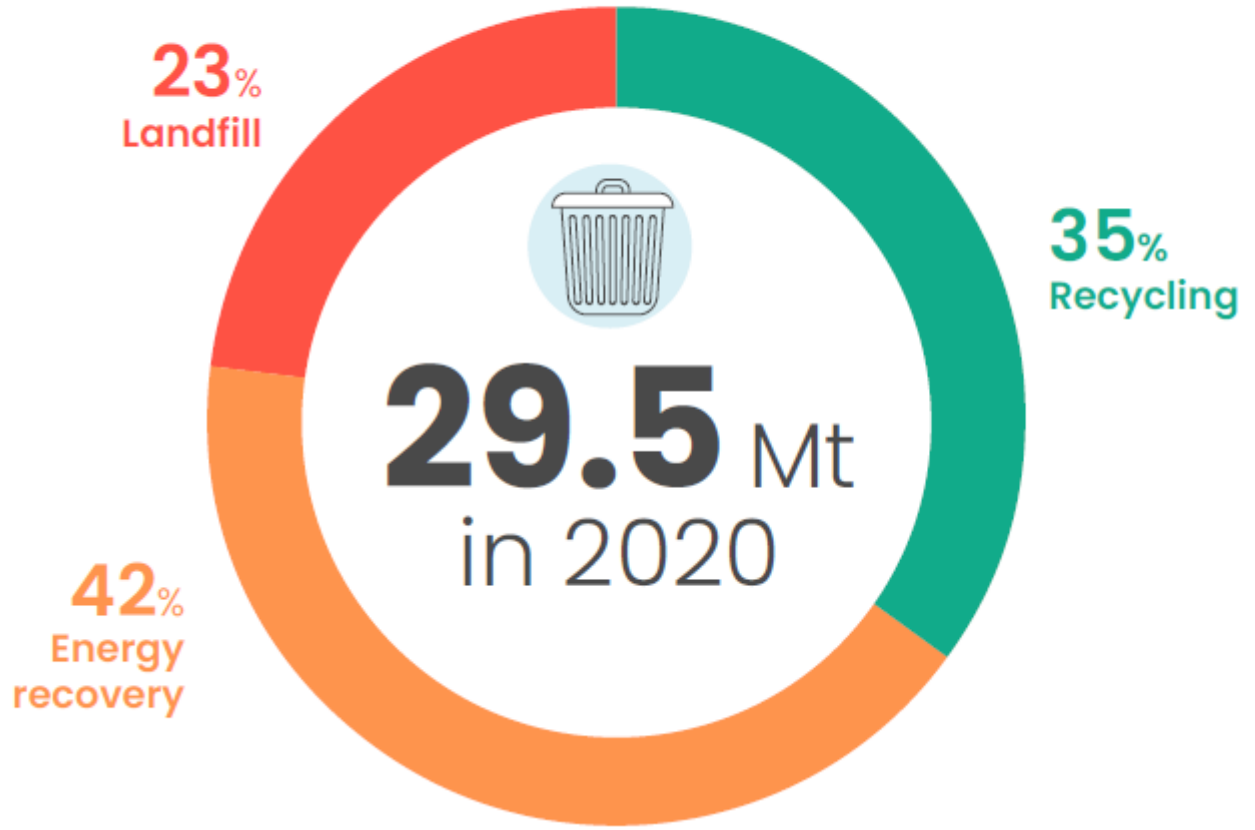
European Plastic Waste Management

In 2020, 35% of post-consumer plastics waste was sent to recycling.



Source: Plastics - the Facts (Plastics Europe)

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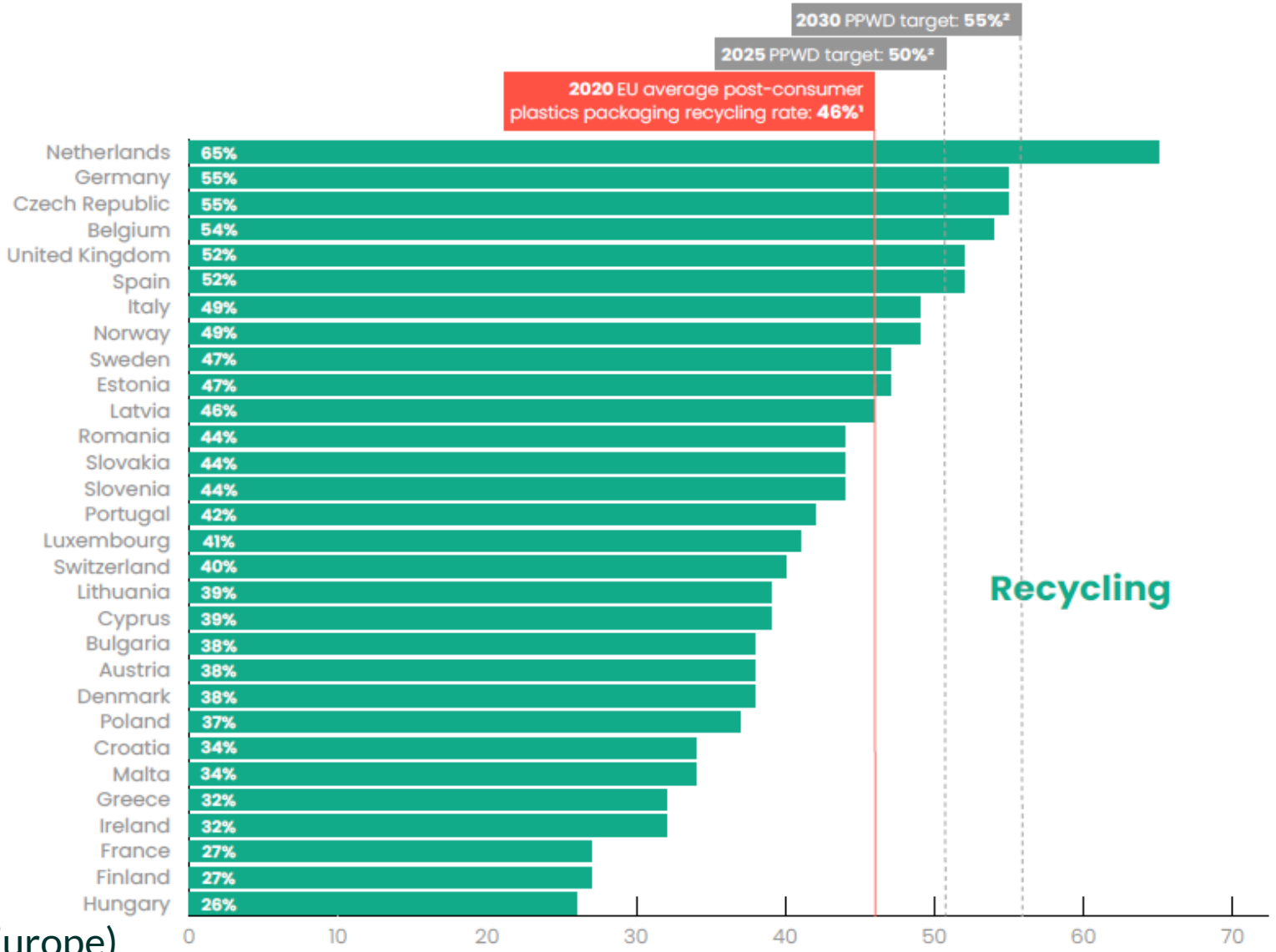
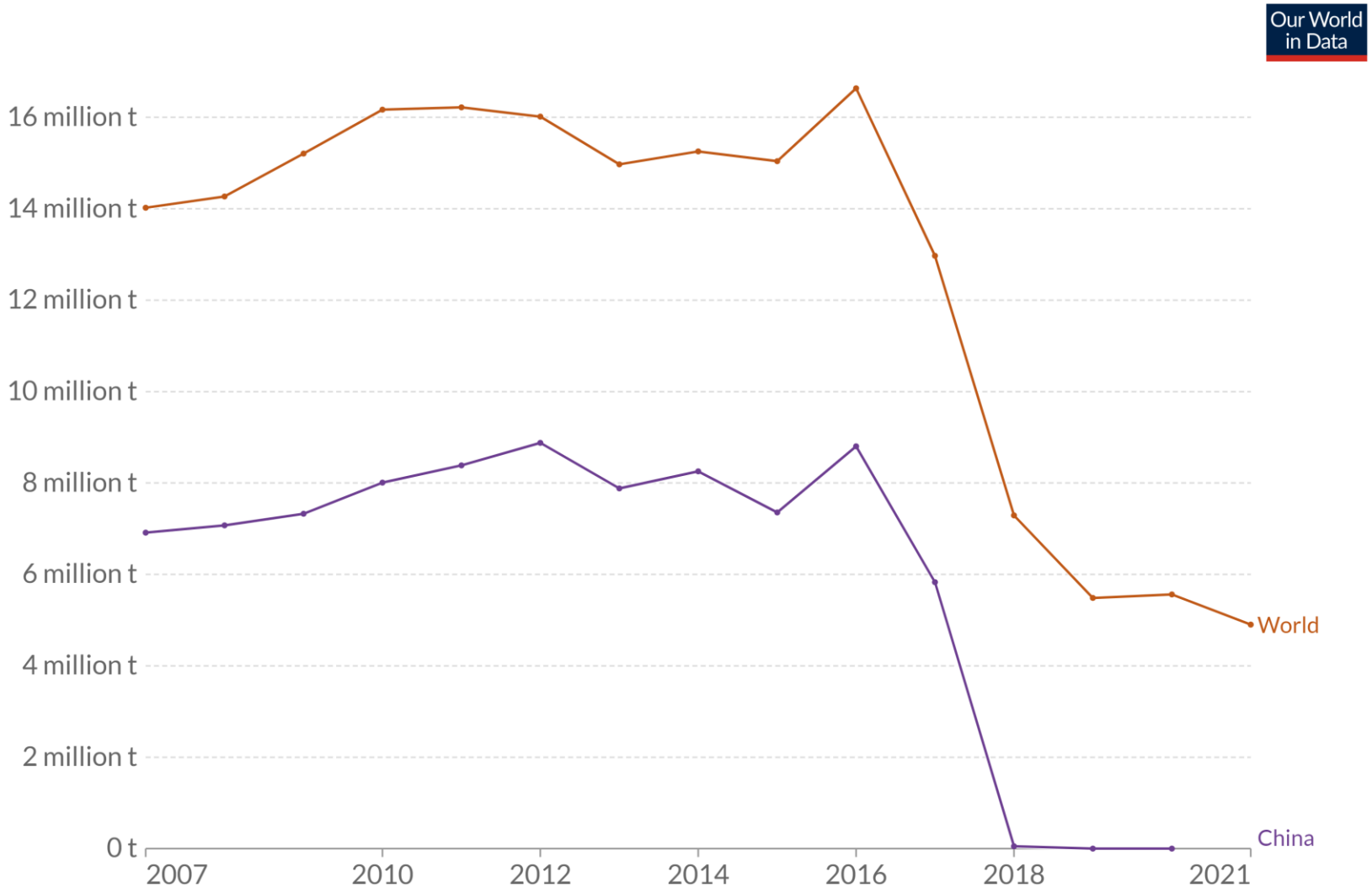
European Plastic Packaging Recycling

The current 46% recycling rate would potentially equal 32% under the new plastics packaging recycling calculation methodology foreseen by the Packaging and Packaging Waste Directive (PPWD) (Directive (EU) 2018/852).



Source: Plastics - the Facts (Plastics Europe)

Plastic Waste Imports, 2007 to 2021



Source: United Nations Comtrade Database

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The bad news

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Is Net Zero Enough for the Material Production Sector?
Analysing the decarbonisation pathways for key material sectors and their ability to meet global carbon budgets
November 2022
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ZERO WASTE EUROPE

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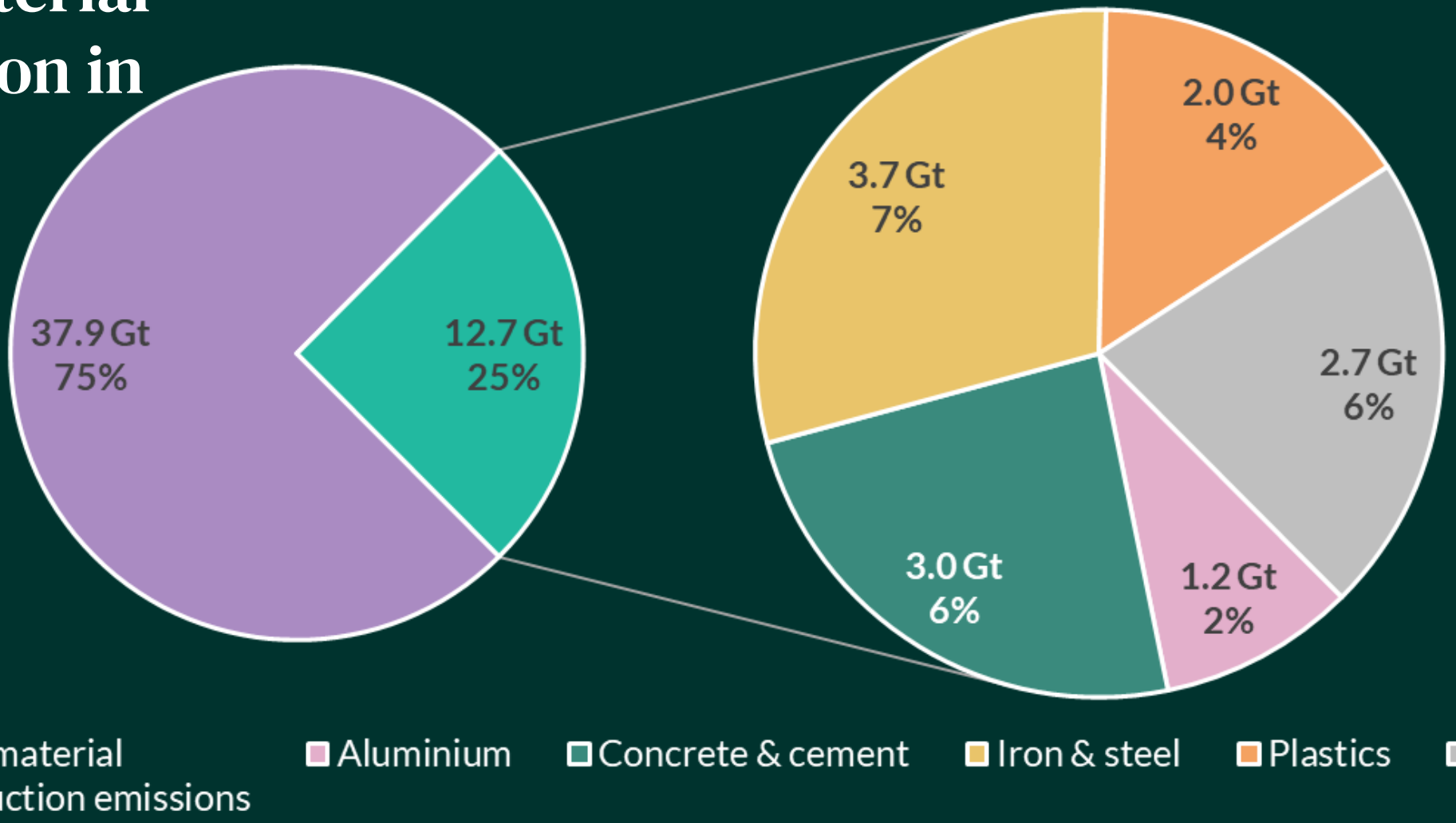
“There is a 67% chance of global warming staying within 1.5°C of pre-industrial levels if cumulative global CO_2 emissions stay below

400 $GtCO_2$”

Source: IPCC AR6

“Current trajectories suggest that this budget will be depleted **within the next 10 years** if growth rates are maintained”

GHG Emissions from Material Production in 2020



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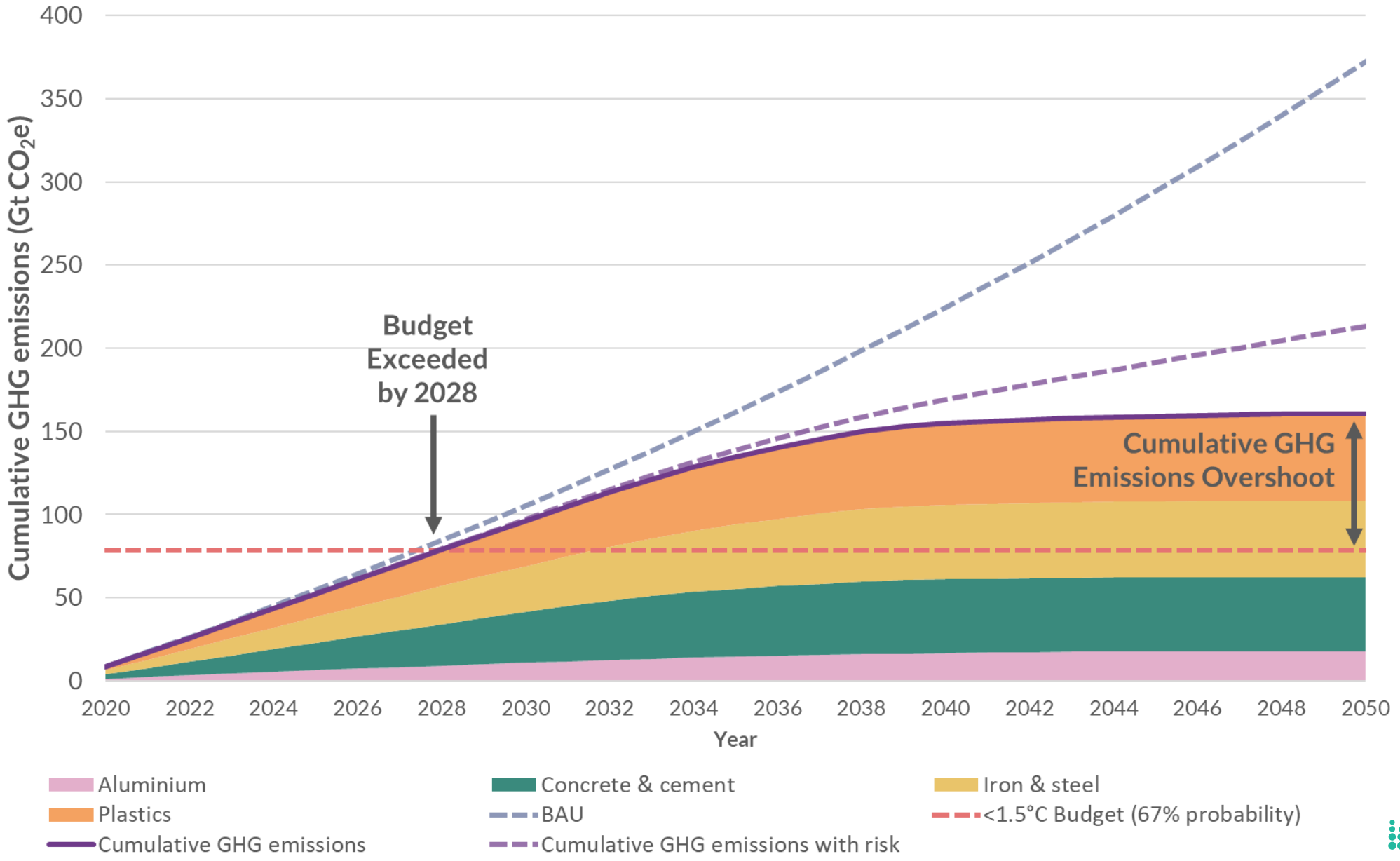
Cumulative Material CO_2 Emissions - Expected Deployment Scenario



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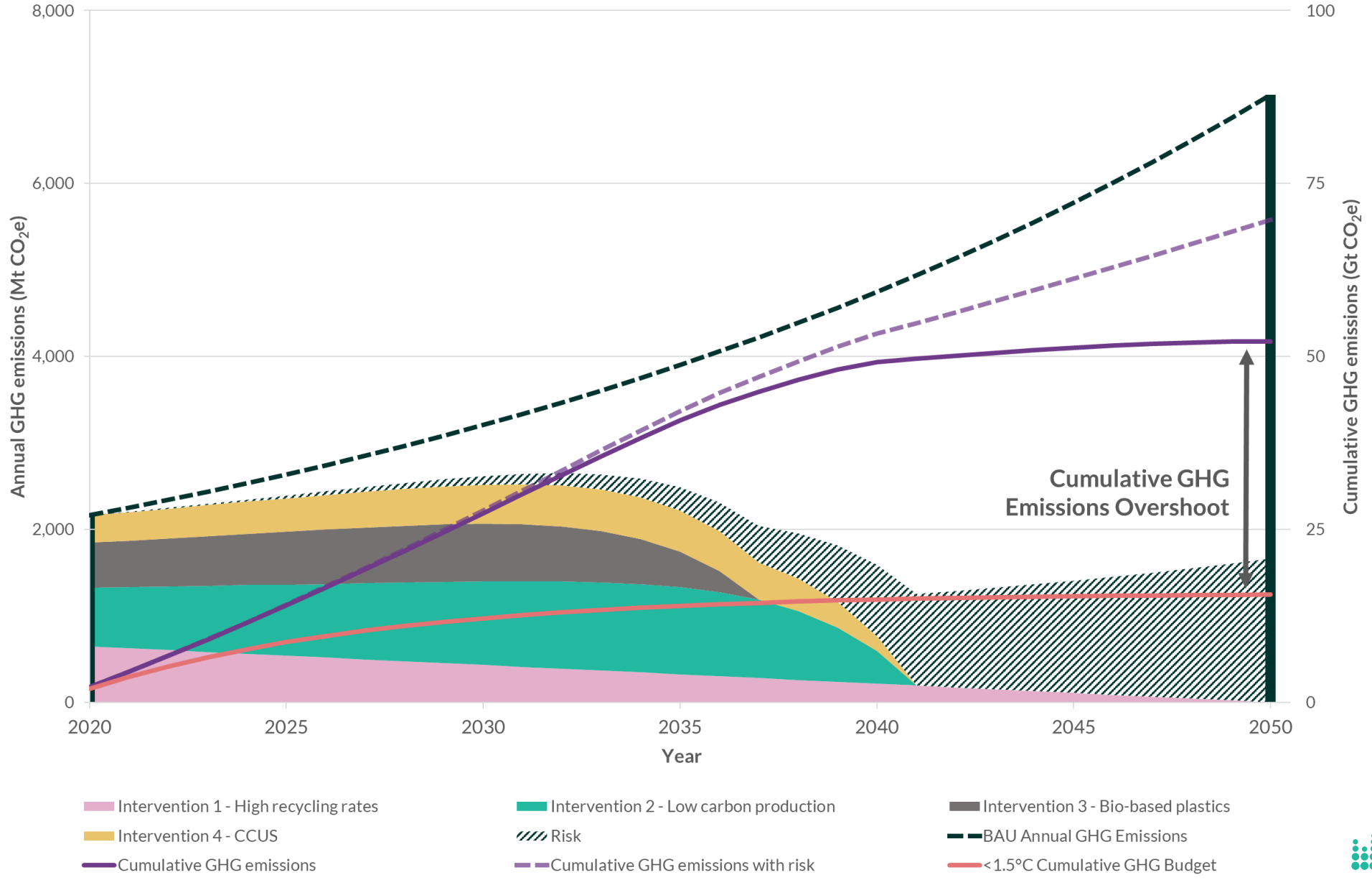
“The materials sector on a trajectory towards a warming of 2.5ºC …current net zero strategies reduce that to 1.7-2ºC”

CO_2 Emissions for the Plastics Sector – Fossil/Bio-based Mix Scenario



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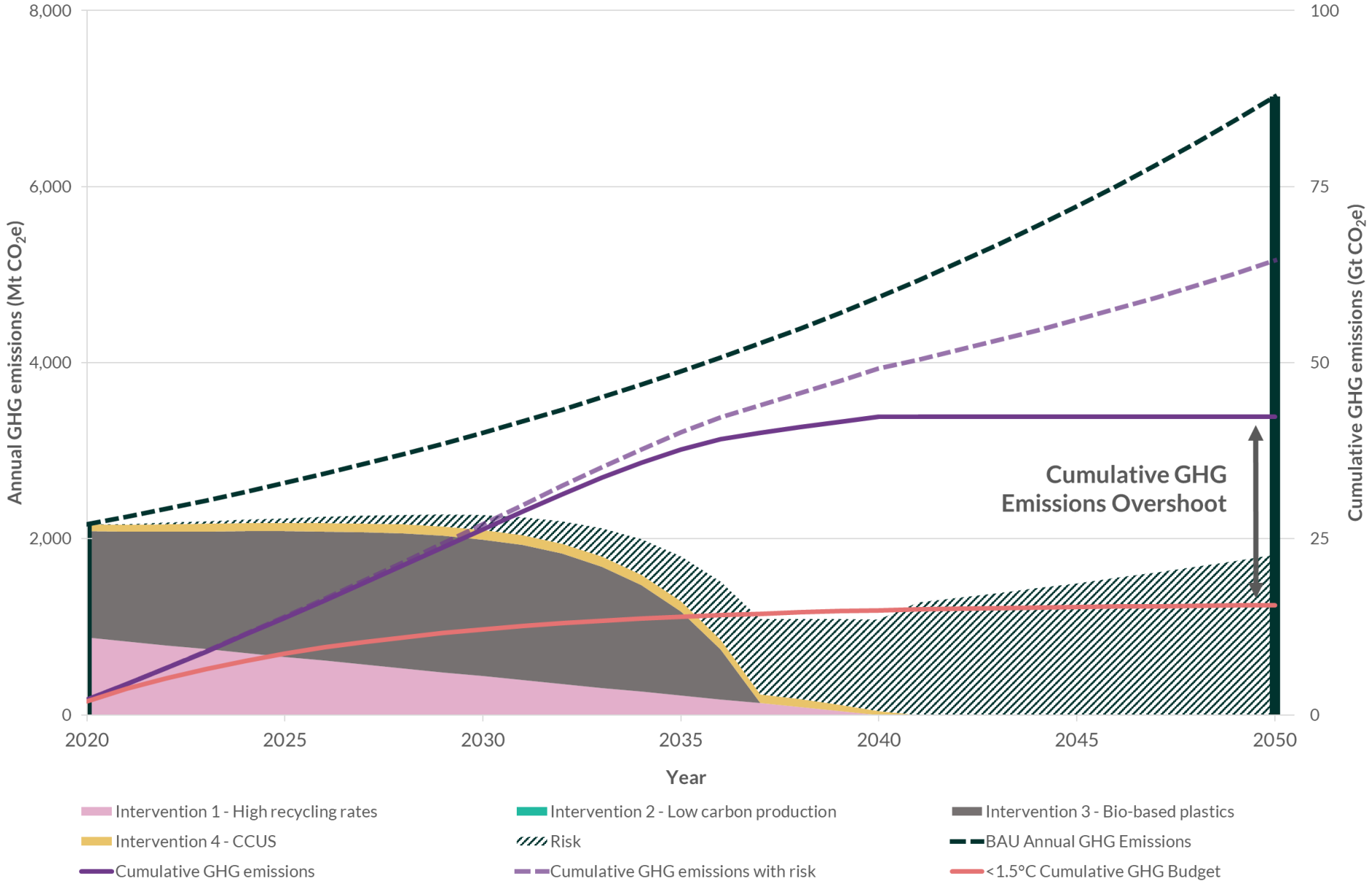
CO_2 Emissions for the Plastics Sector – Bio-based only Scenario



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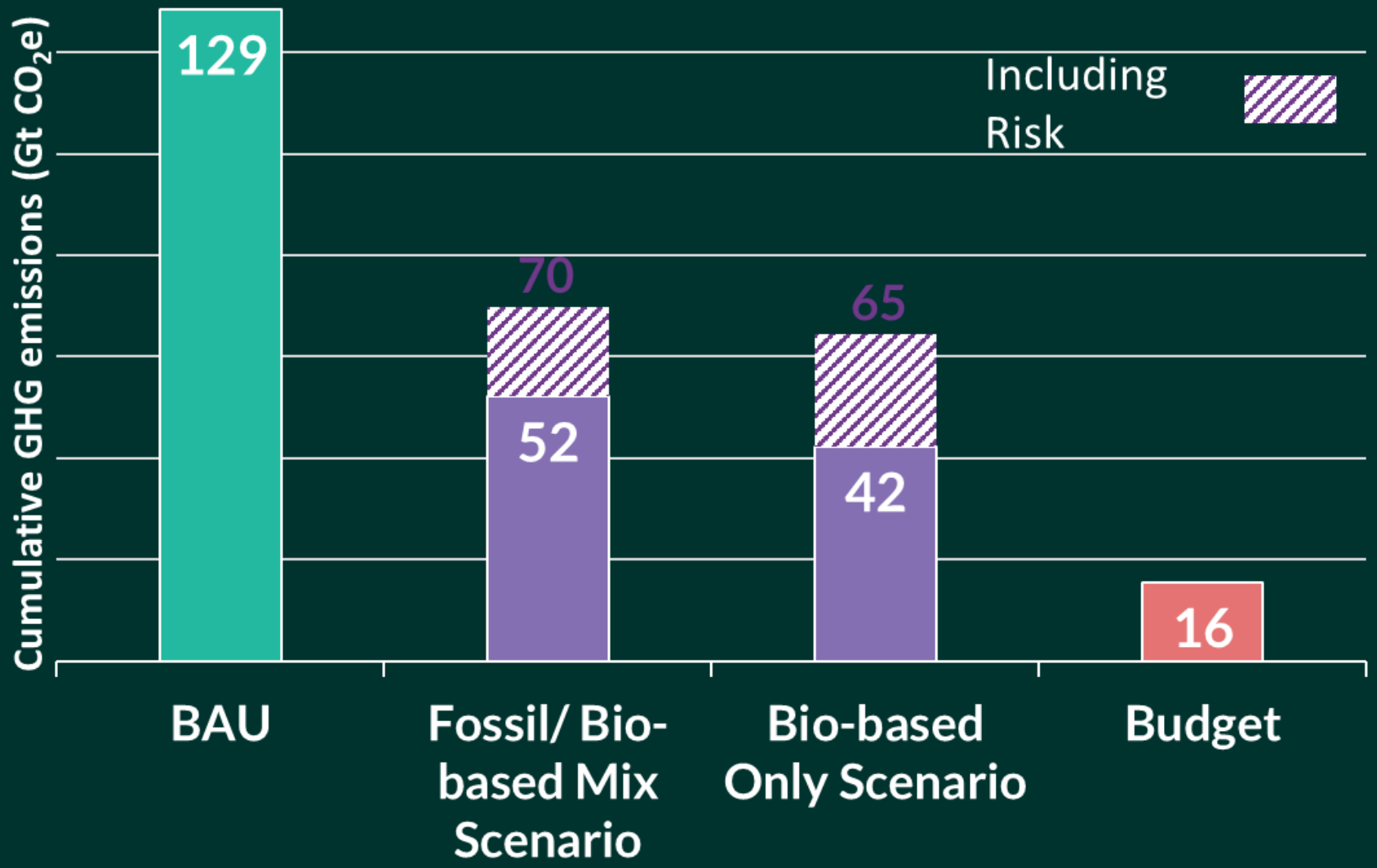
Plastics Decarbonisation Scenarios



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“

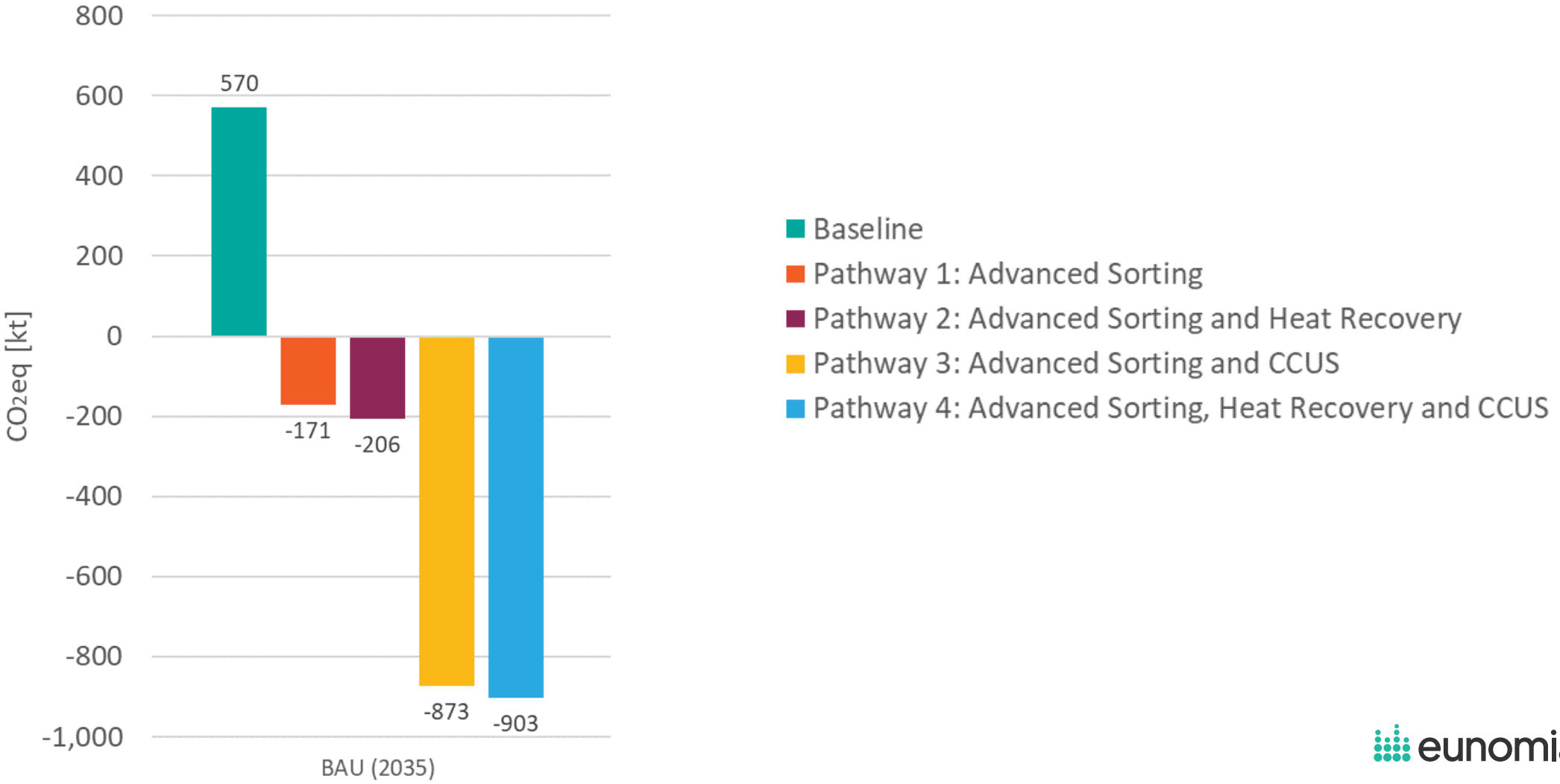
The plastics industry has no net zero strategy and is on a trajectory of 3.5ºC

”

> Even if this concerted action takes place… rather than growing by 4%, demand for plastics would need to reduce by 3% each year… with annual consumption halved by 2050, and per capita consumption reduced by 75%

Residual Waste Carbon Modelling (Scotland)

(End-of-life emissions only, all including WtE)



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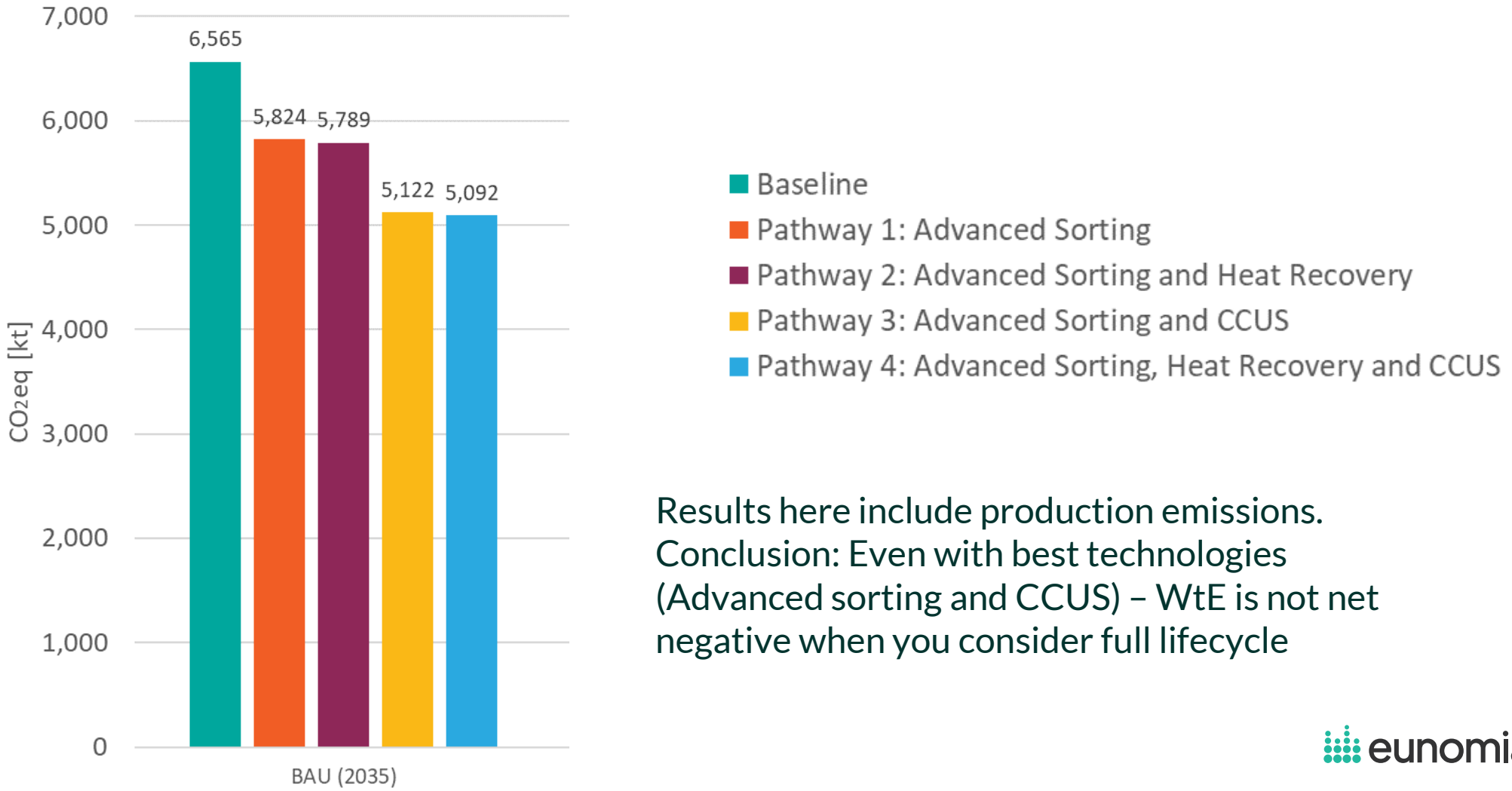
Residual Waste Carbon Modelling (Scotland)

(End-of-life emissions, all including WtE + production emissions)



Results here include production emissions.
Conclusion: Even with best technologies (Advanced sorting and CCUS) – WtE is not net negative when you consider full lifecycle

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The vision

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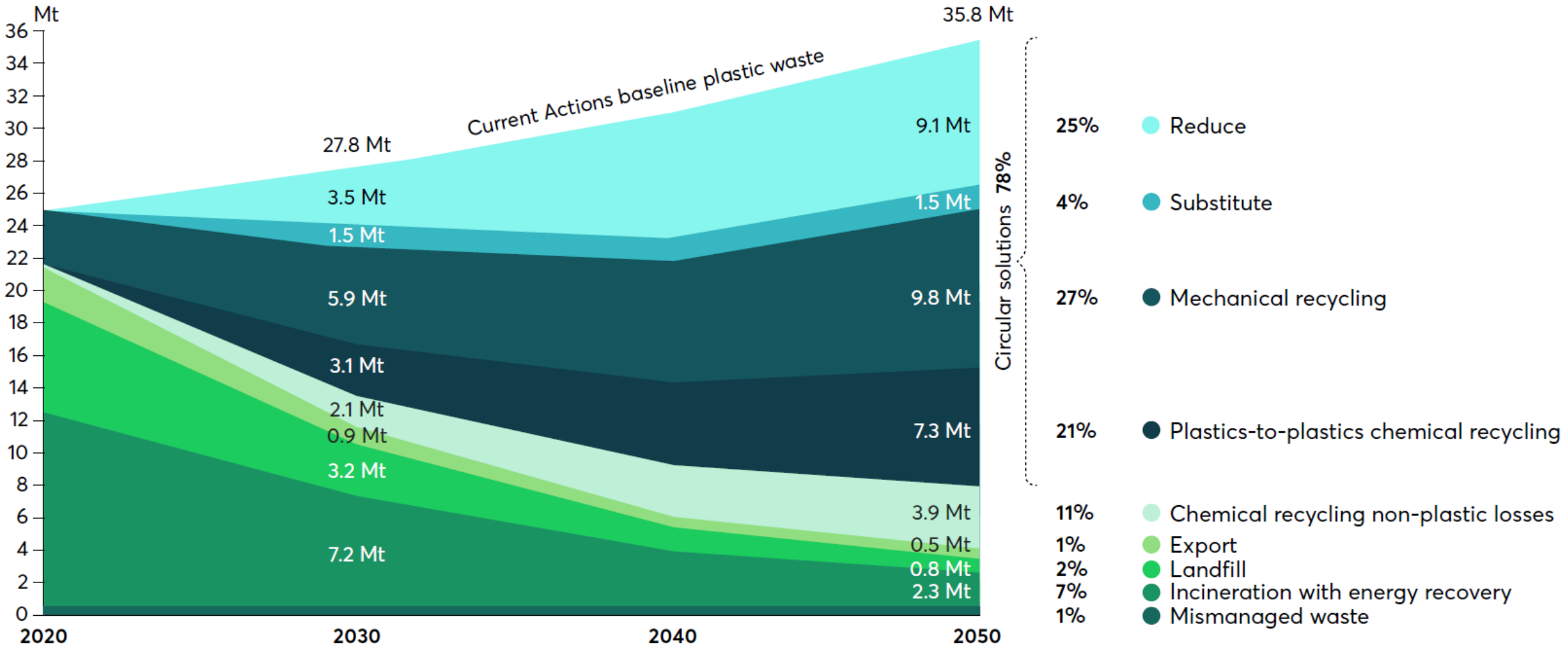
A Circular Plastics Future?



Source: ReShaping Plastics (SYSTEMIQ 2022, funded by Plastics Europe)

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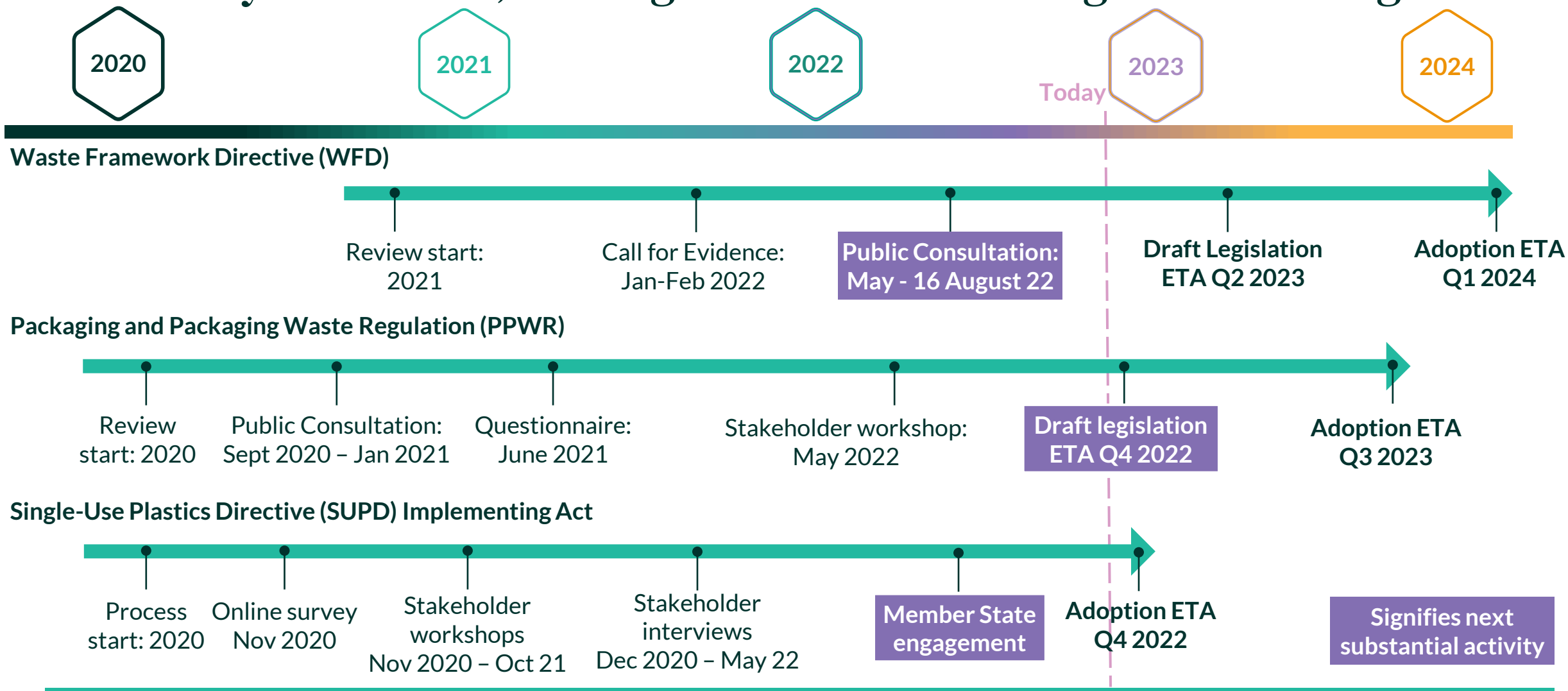
EU legislative processes are in flight in all key policy areas and can still be substantially influenced, although time for CGF to align further is tight



- Ongoing revisions to WFD (priority positions 1, 2, 3 , 5, 6, 8, 11 & 13) and PPWD (4, 6, 9, 11 & 12) present opportunities to advocate (Commission, Parliament, MS)
- Member States will be consulted on recycled content calculation rules under SUPD in second half of 2022 (6)
- Commission adoption of draft *Regulation on Recycled Plastic Intended to Come into Contact with Foods* to be published imminently prior to co-decision process (7)

The EU Packaging and Packaging Waste Regulation

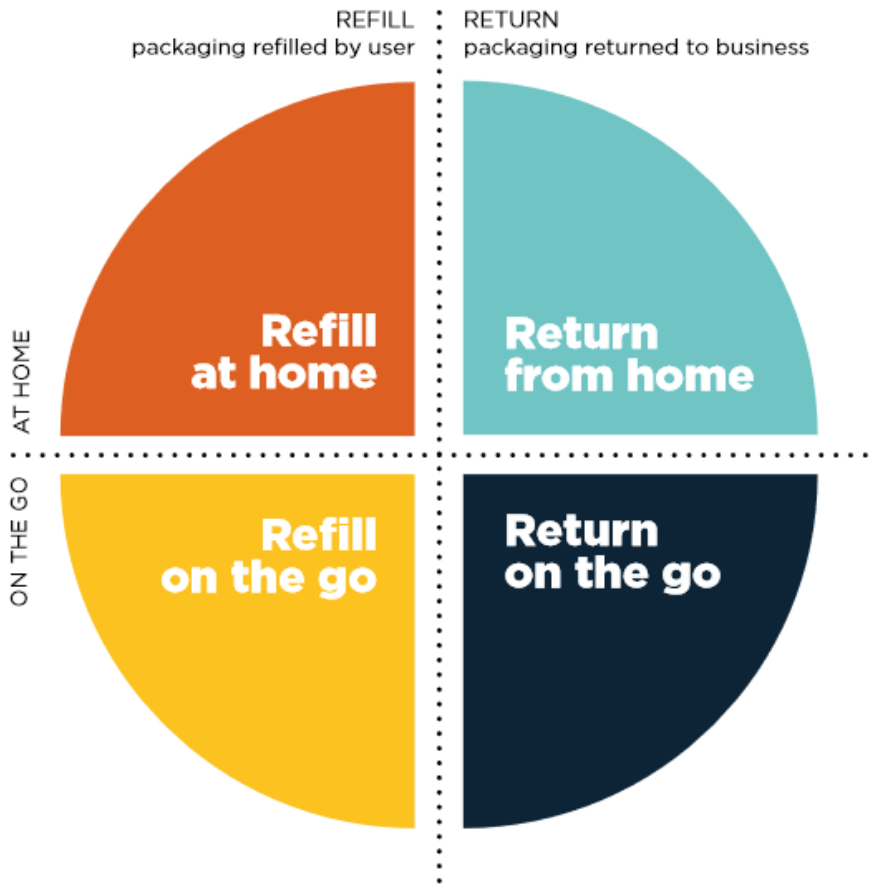
- **The European Commission is about to change the Directive on Packaging and Packaging Waste to a Regulation, giving responsibility to brands**

- **It is likely include the following mandatory recycled content targets:**
  - 25% [10%] for contact sensitive plastic packaging like food wraps (50% as of 2040)
  - 50% [30%] for single use plastic beverage bottles (65% as of 2040)
  - 45% [35%] for other plastic packaging (65% as of 2040)
  - [30% for non-beverage PET contact-sensitive packaging (50% as of 2040)]
  - All packaging to be recyclable or reusable by 2030

- **~60% of plastic film is contact sensitive. Food-grade flexible film recyclates are crucial to meeting these recycled content targets**

Source: Leaked drafts 18 October and [24 November] 2022

Mandatory Reuse Targets Also Likely…



The four reuse models

Business-to-consumer reuse models differ in terms of packaging 'ownership' and the requirement for the user to leave home to refill/return the packaging.

Refill at home
users refill their reusable container at home (e.g. with refills delivered through a subscription service)

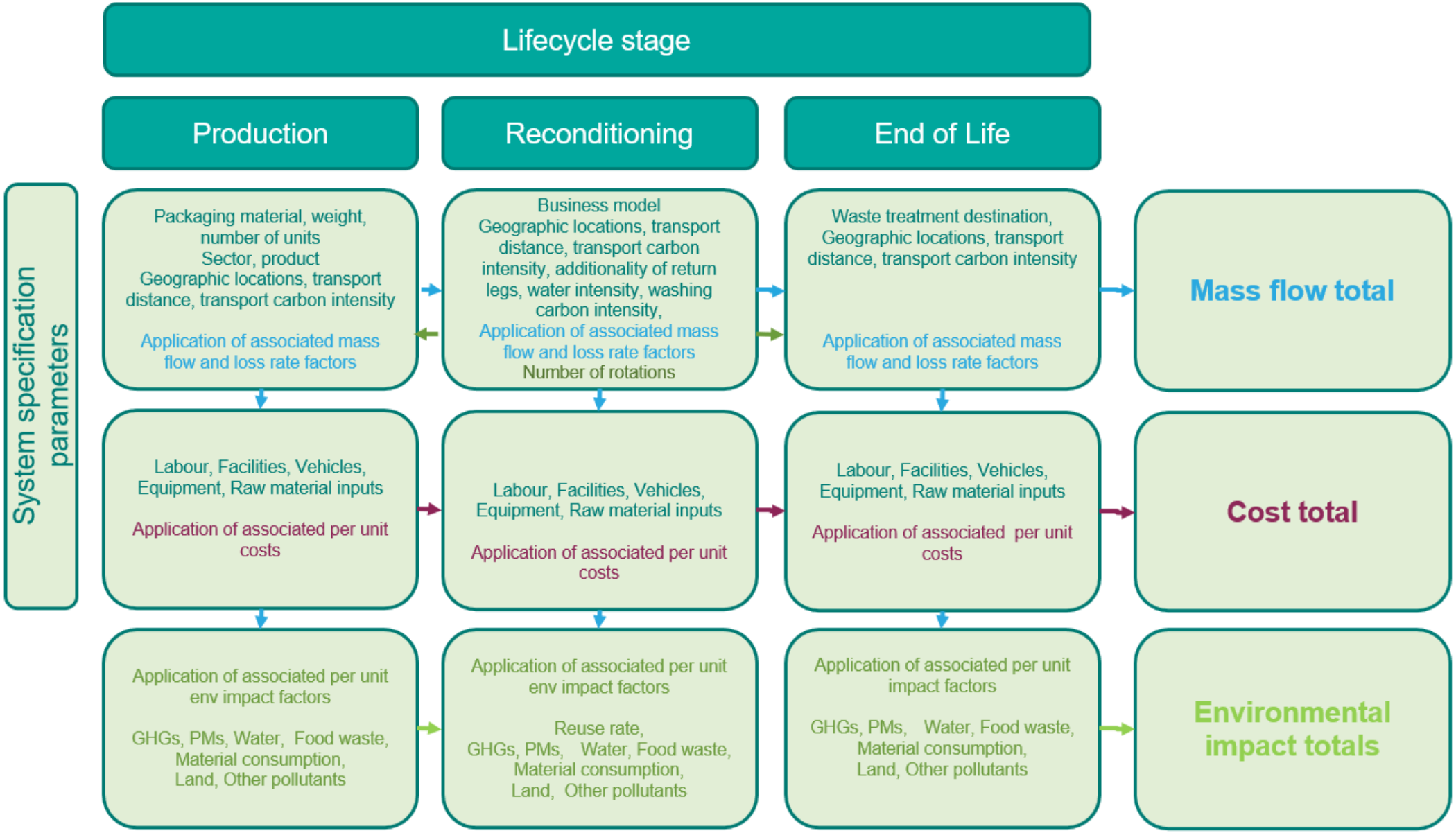
Return from home
packaging is picked up from home by a pick-up service (e.g. by a logistics company)

Refill on the go
users refill their reusable container away from home (e.g. at an in-store dispensing system)

Return on the go
users return the packaging at a store or drop-off point (e.g. in a deposit return machine or imailbox)

Source: Ellen MacArthur Foundation

Eunomia ReSim Software



Future Policies Promoting WtE Pre-Sorting

- GHG implications of incinerating plastic waste gives cause to use pre-sort technologies. With EfW likely to be added to the EU ETS, economics of pre-sort improved
- The latest reading of the new Renewable Energy Directive (RED III) by the European Parliament proposes that EfW must implement mixed waste sorting prior to incineration in order to qualify as “renewable” energy
- Extensive NGO lobbying for mandating pre-sorting prior to WtE in the forthcoming revisions to the Waste Framework Directive

→ expectation that pre-sorting prior to incineration (and potentially also landfill) is likely to be either mandated or more strongly incentivised in the coming years

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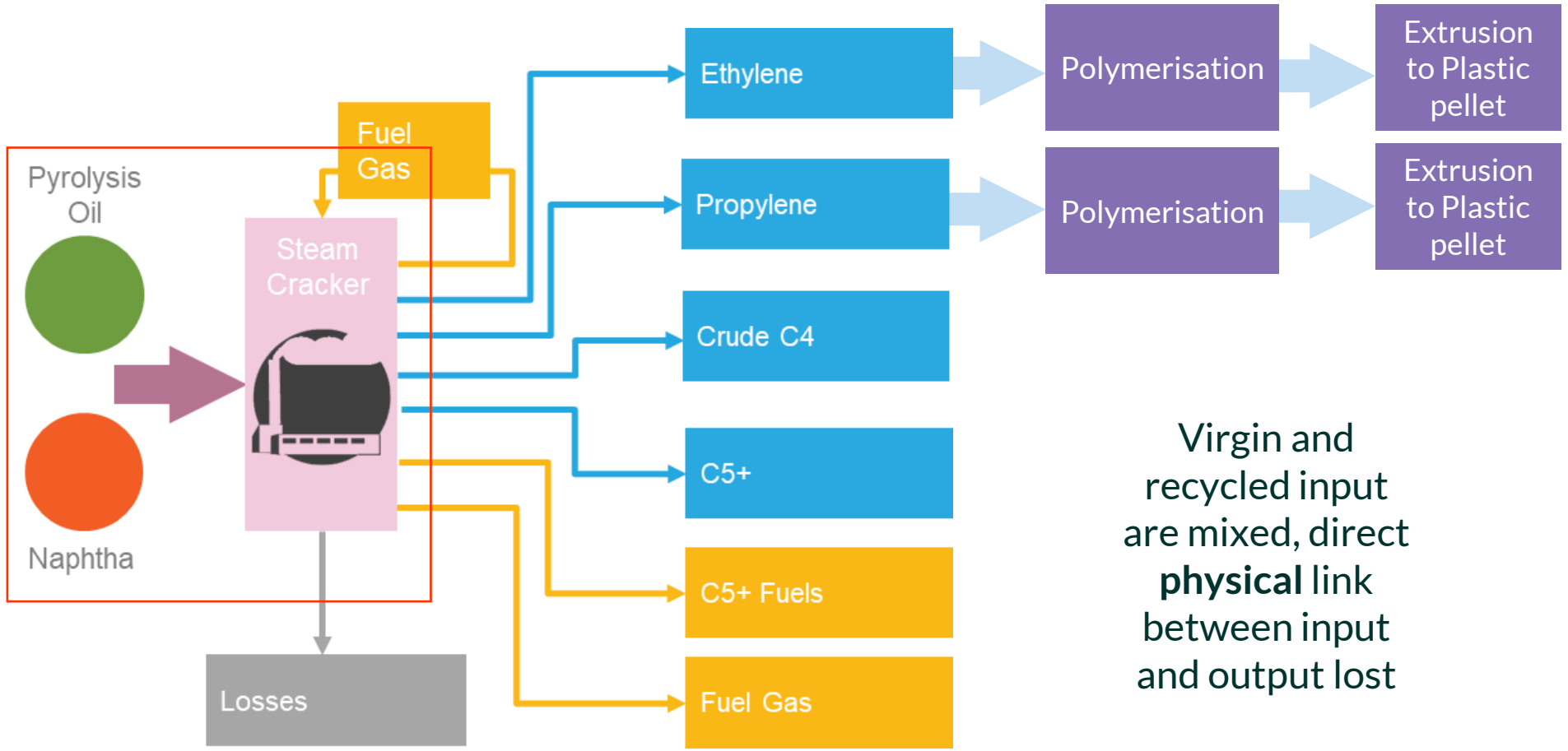
The complications

Pyrolysis Chain of Custody Challenges



Virgin and recycled input are mixed, direct **physical** link between input and output lost

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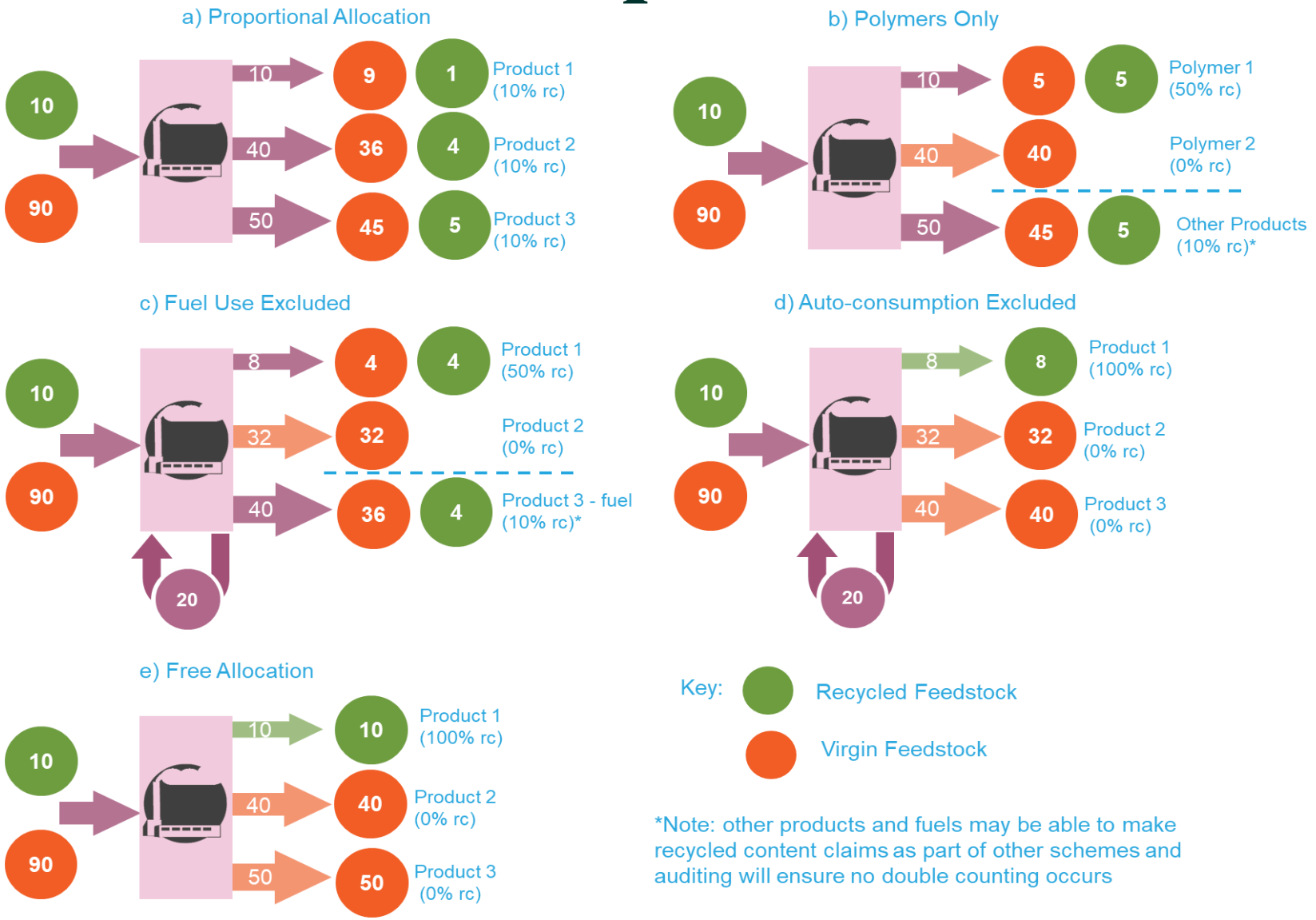
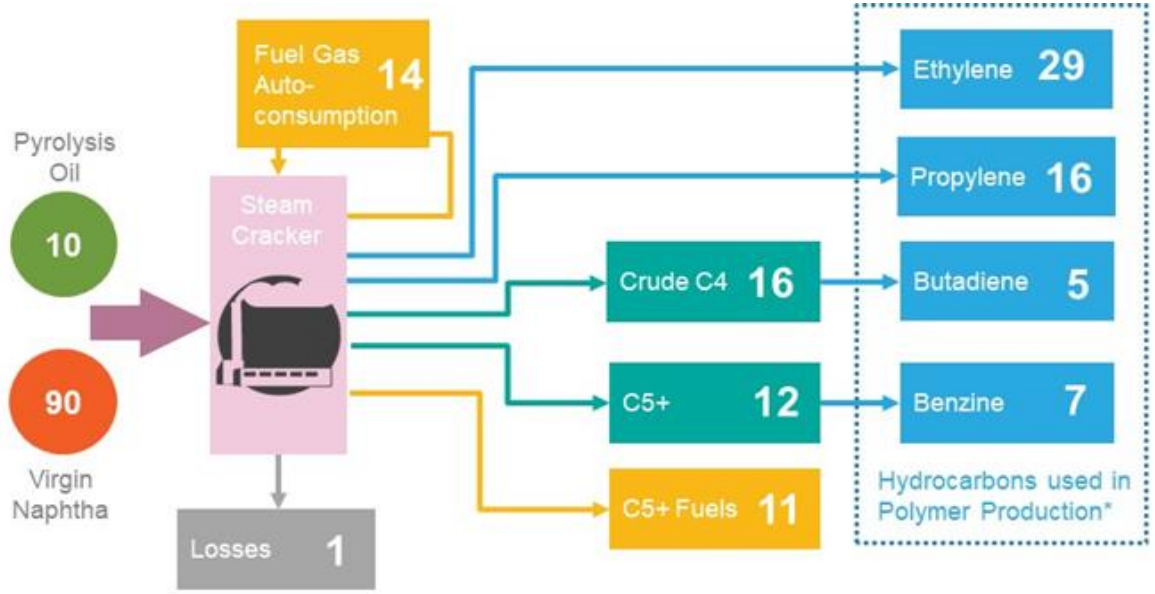
Allocation Method Options



Source: Eunomia (2022), Options for the calculation, verification and reporting of recycled content with a focus on rules for the implementing act related to SUP bottles under Directive (EU) 2019/904

Allocation and Capacity Implications



	Proportional Allocation	Free Allocation
Allocated Recycled Ethylene (losses)	2.9 (71%)	9.9 (1%)
Virgin Ethylene	26.3	19.3
Mass Balance Conversion Factor	0.29	0.99
Recycled Input Required to Meet 25% RC Output	85%	25%

*Examples of typical output hydrocarbons that are commonly (but not always exclusively) used in polymer production. Benzene can be used as a precursor to styrene used in polystyrene and butadiene is commonly used in various types of rubber.

Source: Eunomia (2022), Options for the calculation, verification and reporting of recycled content with a focus on rules for the implementing act related to SUP bottles under Directive (EU) 2019/904

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Takeaways

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Some concluding thoughts…

- **Plastic has some issues as a material (aside for it's consumer 'reputation')**
  - It's challenging to decarbonise
  - Although there has been a lot of focus on recycling, progress is somewhat slow…
  - …and recycling is in the end material inefficient and energy intensive
- **Reuse almost certainly has to play a big role – circular products, not just circular materials**
- **Ultimately, plastic has to become much more highly valued**
  - Does its durability have to become its big advantage, not just its big disadvantage?

Thank you.

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