

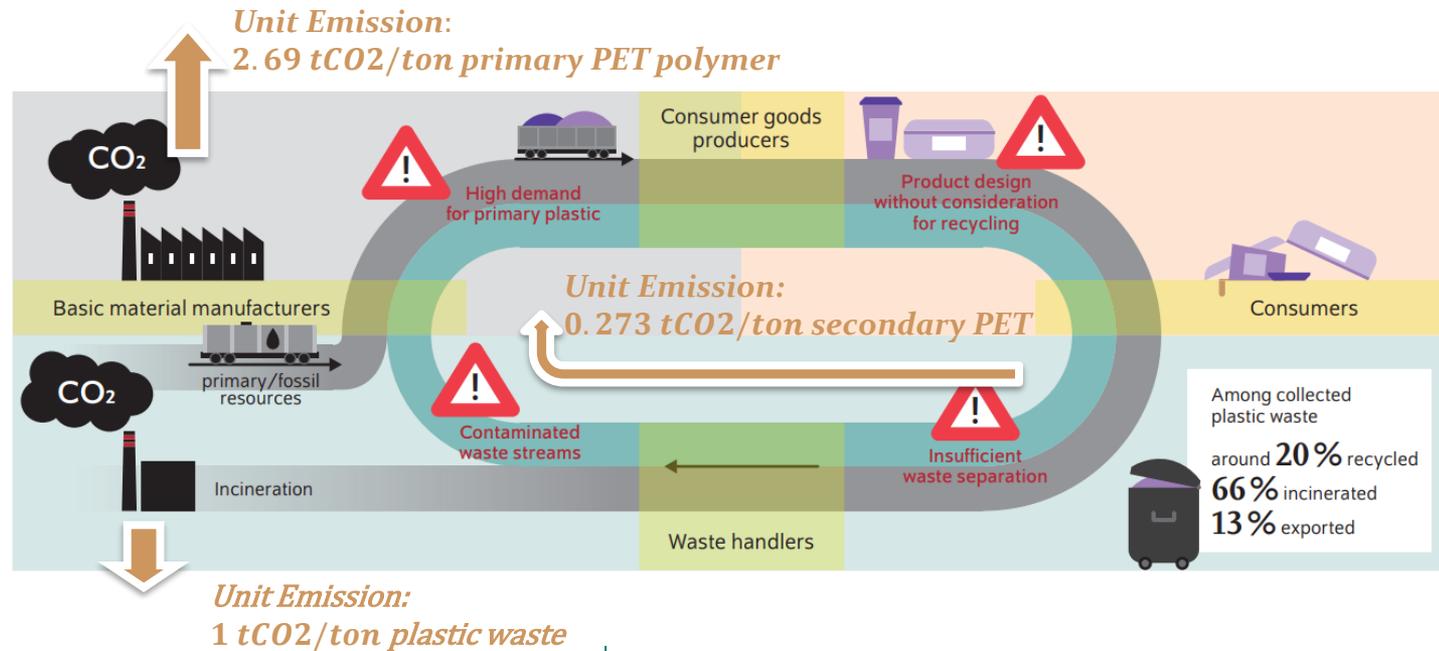
Climate Friendly Material Platform Recycling Workshop

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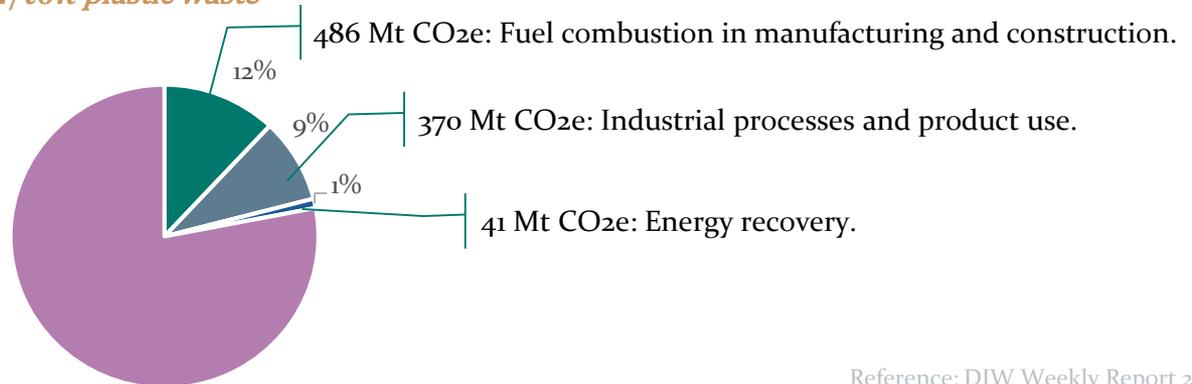
# Policy Framework for High-quality Material Recycling

SUN Xi, Climate Policy Department  
Berlin, 16.12.2022

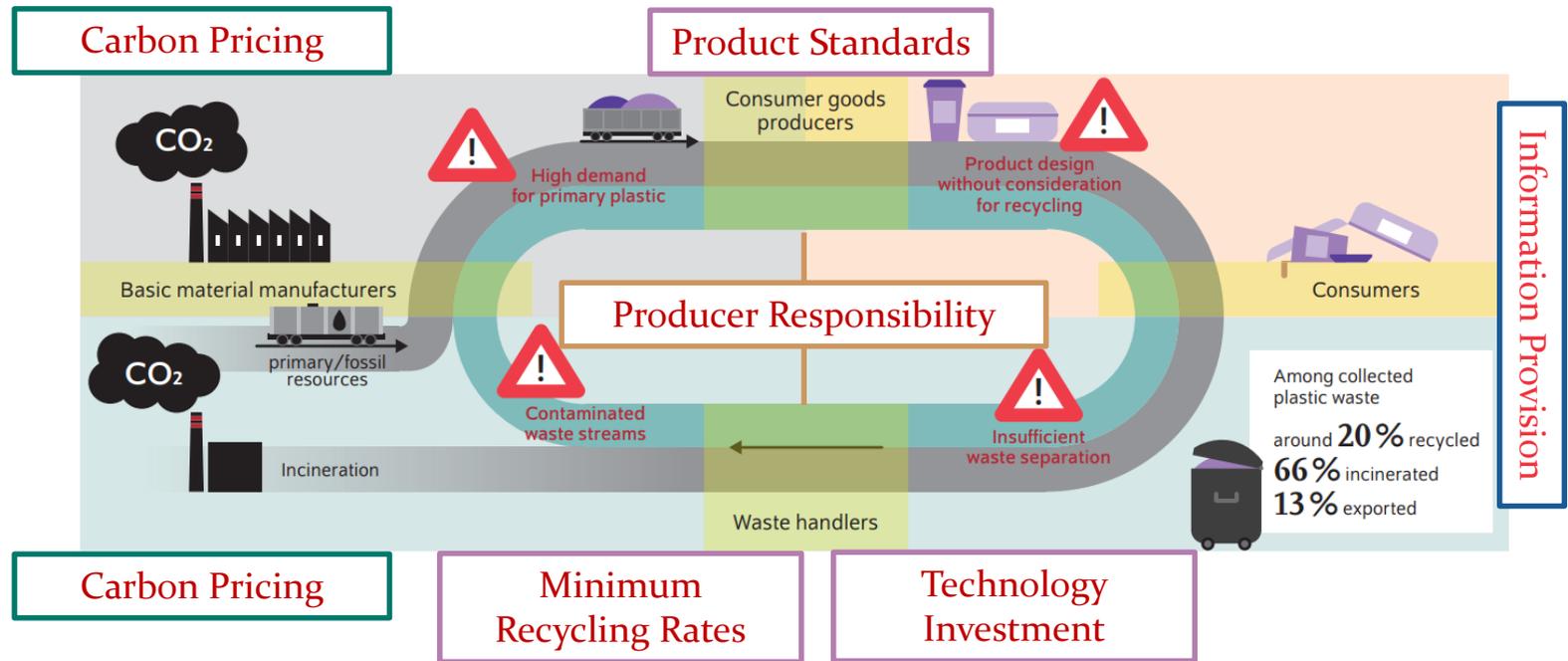
# Externalities, barriers and policy framework for a circular value chain



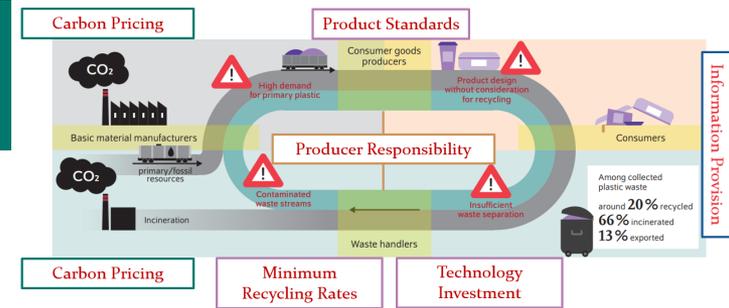
Total Emission in the EU (2019): 4 Gt CO<sub>2</sub>e.



Reference: DIW Weekly Report 26/2021  
 Dormer et al. (2013)  
 EU National Inventory Report (2021)



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EU National Inventory Report (2021)



EU ETS:

100% Free allocation to sectors deemed at risk of carbon leakage

X

Benchmark: 10% most efficient installations

X

Historical output level with activity triggers

## Manufacturing Processes

Insufficient internalization of environmental cost.

Example:

- Steam cracking: 0.681 allowances/t  
BUT! No Benchmark for waste sorting

1 allowance (EUA) = 1 tonne of CO<sub>2</sub>e

Each tonne primary plastics receive:

$$0.681 * 80\text{€}/\text{EUA} = 54\text{€}$$



## EU ETS:

Incineration of hazardous and municipal waste remains exempted.

## Waste Treatment

### Member States:

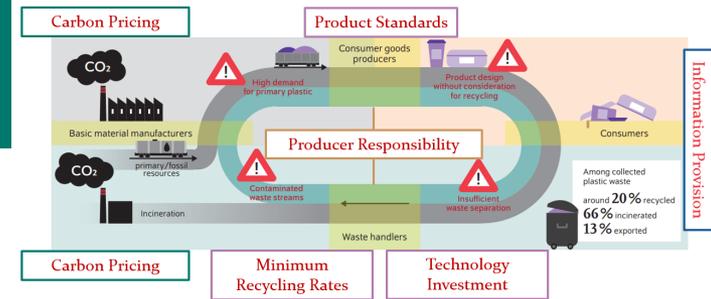
Sweden: opt-in the EU ETS (since 2004) + a waste incineration tax since 2020 (€11.5/ton-waste).

Germany: opt-out the EU ETS + inclusion into the national ETS (BEHG) most likely from 2023 on (€25/tCO<sub>2e</sub>).

Carbon pricing alone -> sufficient incentive for waste separation and recycling?

- Even when incineration plants are not exempt from the EU ETS, these costs are not reflected in purchasing prices (Stede et al., 2021).

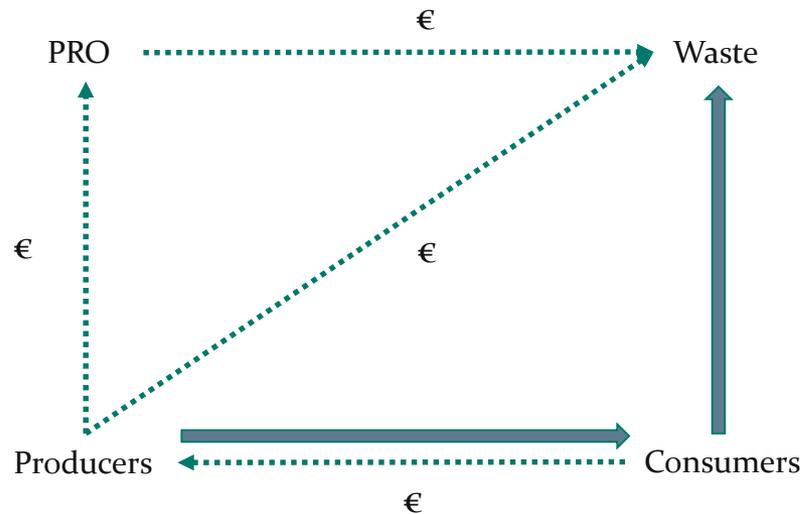
Reference: Stede et al. (2021) Carbon Pricing of Basic Materials: Incentives and Risks for the Value Chain and Consumers.



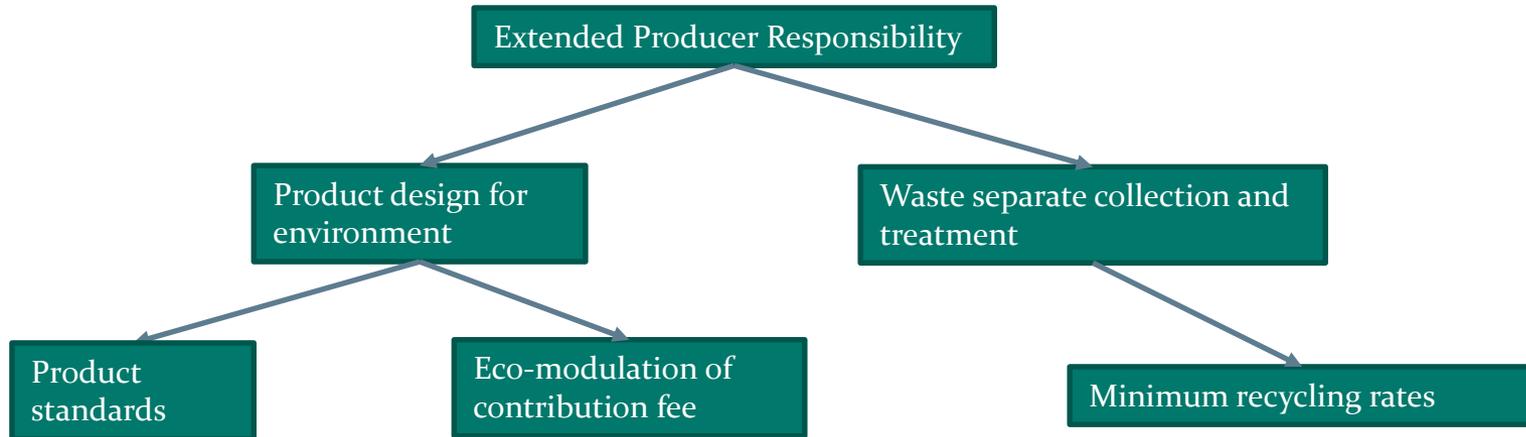
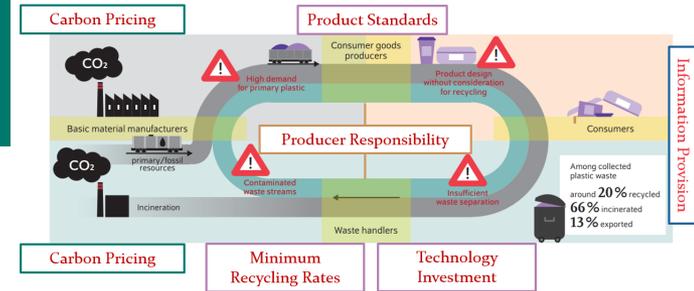
### Definition

an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle (OECD, 2016).

### Financial and Material Flow for Collective Take-back or ADF



Reference: OECD (2016). Extended Producer Responsibility: Updated Guidance for Efficient Waste Management.



Example:

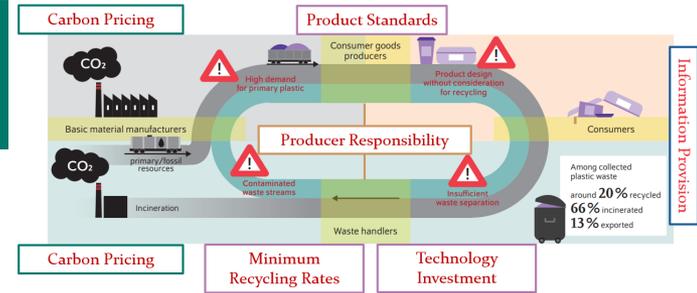
- Annual publication of a minimum standard for packaging recyclability by German ZSVR and UBA. (VerpackG § 21)

Example:

- France: Bonus-Penalty Scheme, e.g. a bonus of 8% for improved recyclability.
- Belgium: eco-modulation to material types, e.g. transparent and clear PET bottles: €246.1/t vs. opaque PET bottles: €711.2/t.

Example:

- All dual systems in Germany are required to reach a minimum recycling rate for plastic packaging of 58.5% in 2021 and 63% from 2022 on. (VerpackG § 16)
- Previous minimum recycling rate: 36%



## Packaging

- Minimum Standards for recyclability (VerpackG)
- Definition of recyclability and assessment procedure (EU PPWL)

## Construction Materials

- DGNB Building Certification TEC 1.6
- Construction Products Regulation (CPR)

## Electric and electronic equipment

- IEC TR 62635:2012 EEE – recyclability and recoverability

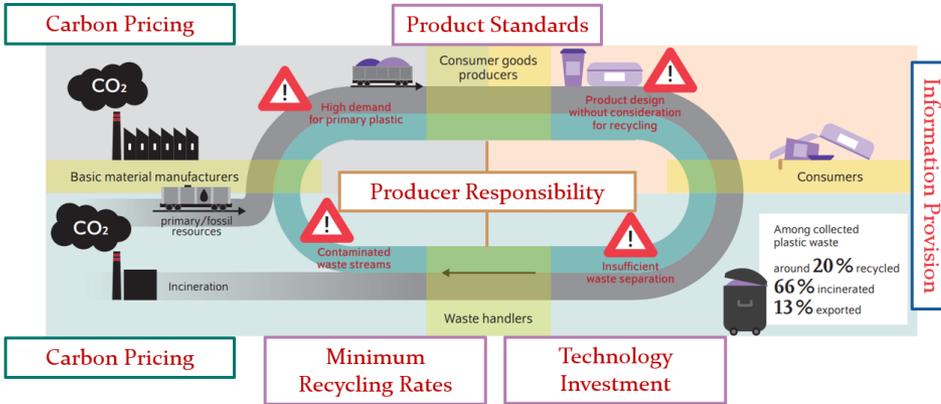
## Vehicles

- ISO 22628:2002 Road vehicles – recyclability and recoverability

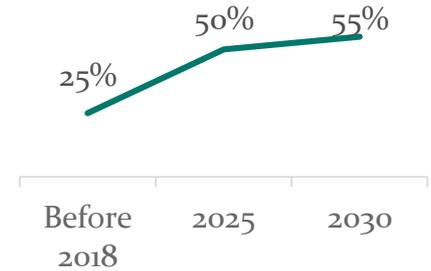
## Batteries

- Upcoming (adoption of new EU Battery Regulation)

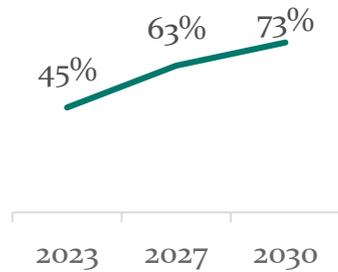
- Definition of recycling and recovery (EU Waste Directive)



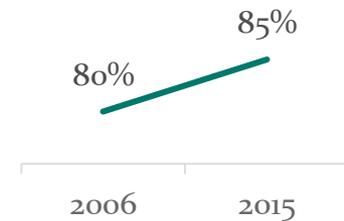
Plastic packaging mechanical recycling

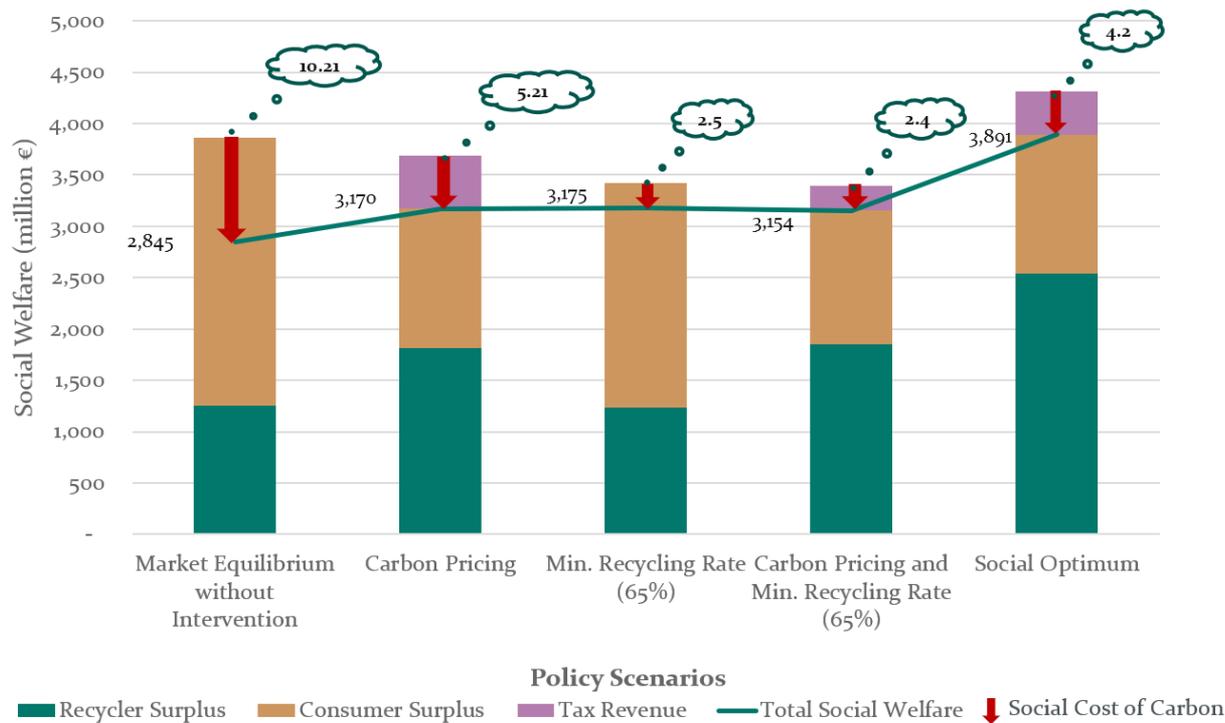


Portable battery collection



End-of-life vehicles reuse and recycling





- Carbon pricing improves the economic condition for recycling investment, but consumers face higher material price.
- Minimum recycling rate fully explores the emission-saving potential of recycling, but does not improve the economics of recycling businesses.
- Policies on, e.g. eco-design and innovation, are critical to reduce recycling costs.

Reference: Sun and Neuhoff. (2023)



Vielen Dank für Ihre Aufmerksamkeit.

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**Redaktion**

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