

Carbon Pricing in the EU

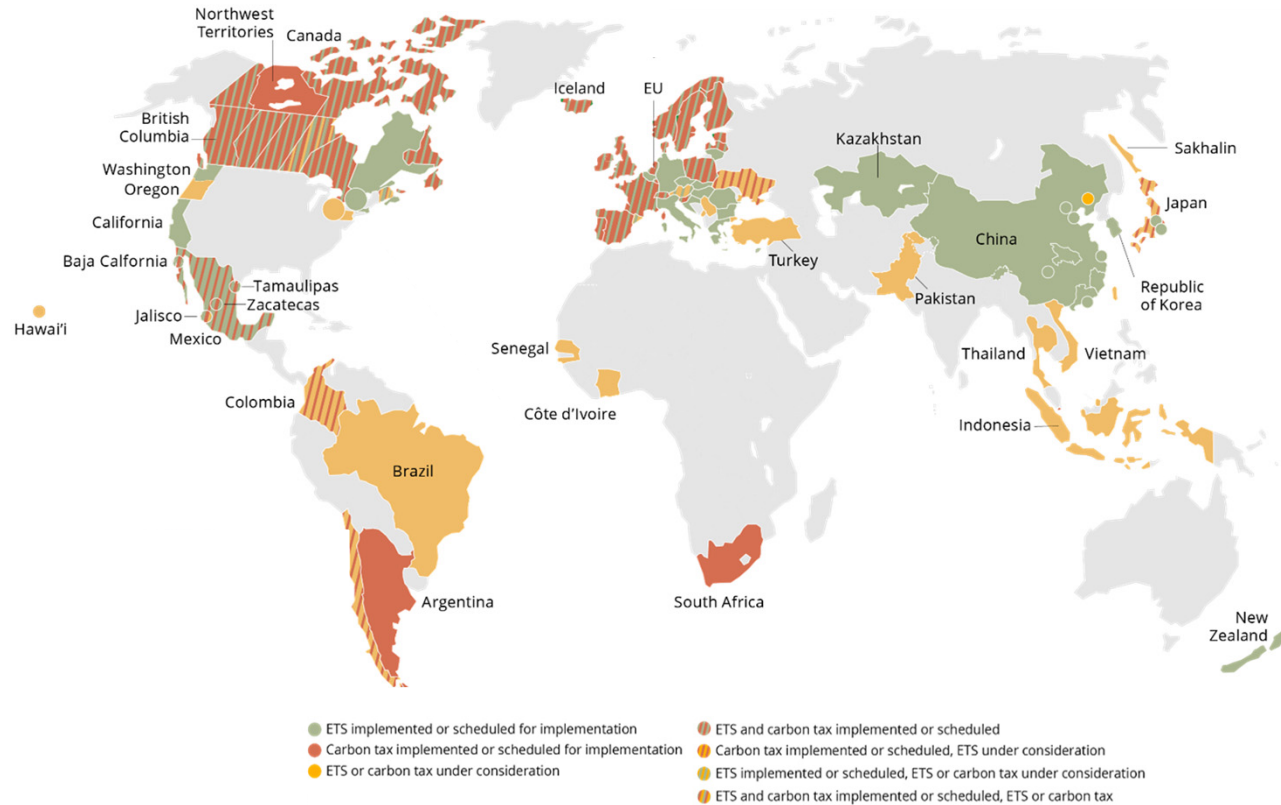
The EU ETS & National Approaches

Claudia Kettner

EU and US Climate Change Mitigation

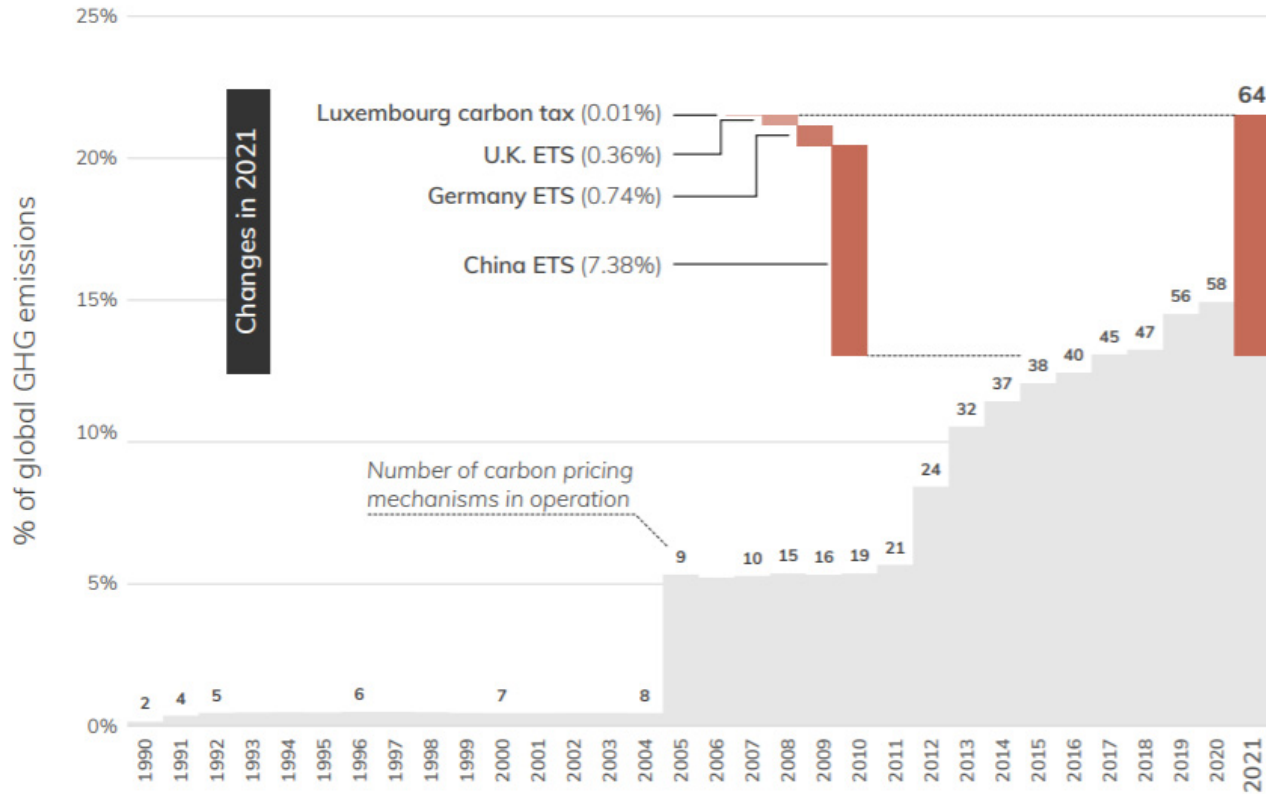
March 17th, 2022

Pricing Carbon (Inter)National and Regional Initiatives (I)



Source: World Bank (2021).

Pricing Carbon (Inter)National and Regional Initiatives (II)



Source: World Bank (2021).

Carbon Pricing in Europe



EU ETS for energy supply and
emission intensive industry

National CO₂ taxes for
Non-ETS sectors

Source: World Bank (2021).

The EU Emission Trading Scheme (EU ETS)

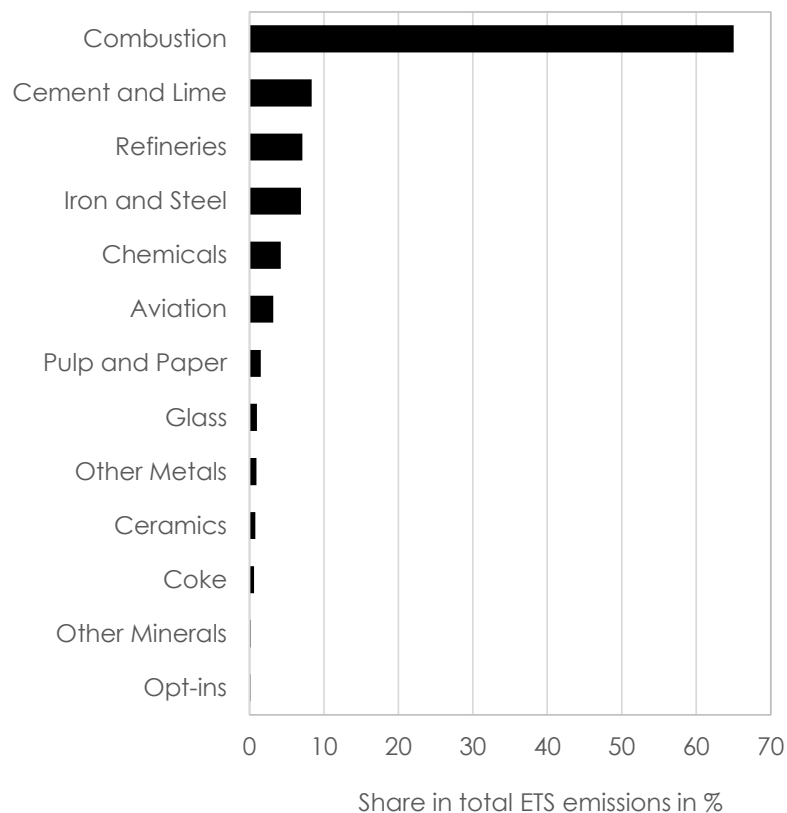
The EU Emission Trading Scheme

Key Facts

- The EU Emission Trading Scheme (EU ETS) is a key instrument in European climate policy
- Covers more than 50% of EU CO₂ emissions
- Broad range of activities covered by the scheme
- Trading phases
 - Phase 1 (2005 - 2007) – "Pilot Phase"
 - Phase 2 (2008 - 2012) – Kyoto Commitment Period
 - Phase 3 (2013 - 2020)
 - Phase 4 (2021 - 2030)

Sectoral shares in ETS emissions

Average Phase 3



*Preliminary emission data

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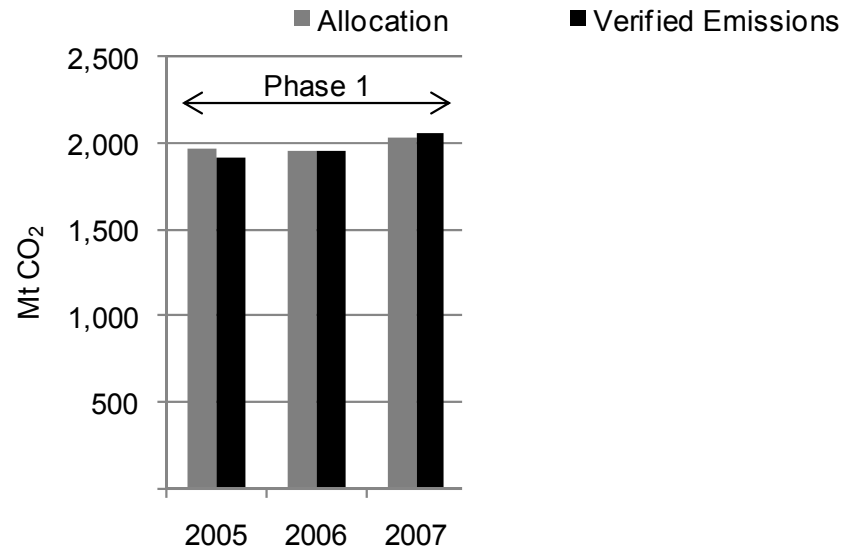
The EU Emission Trading Scheme

Design in Phases 1 & 2

- Allocation Principles
 - Allocation of allowances at Member State level in National Allocation Plans (NAPs)
 - Grandfathering as allocation principle
- Allowance Transfers
 - No banking between Phase 1 and Phase 2
 - Banking of allowances between Phase 2 and Phase 3
 - Offsets could be used within the limits defined in the NAPs
- Penalty for non-compliance (100 € per t CO₂)

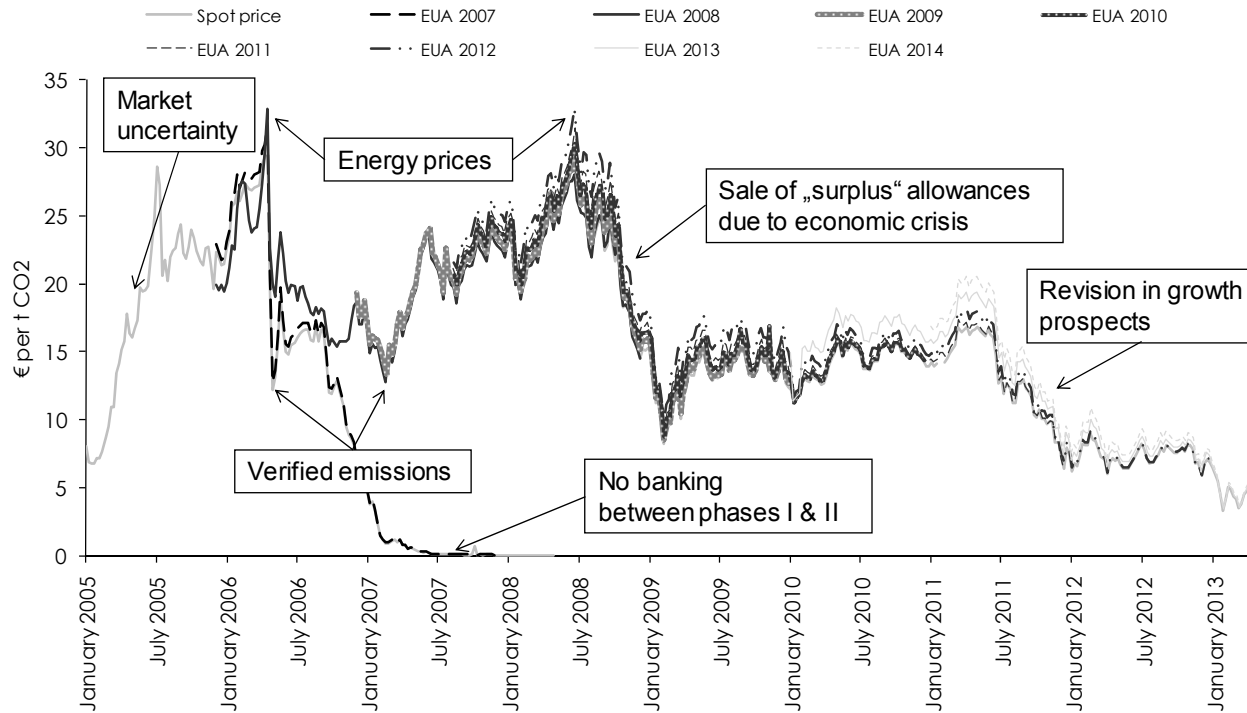
Allocation and Emissions

Phases 1 - 2



Price Development

Phases 1 - 2



Source: Point Carbon; own illustration.

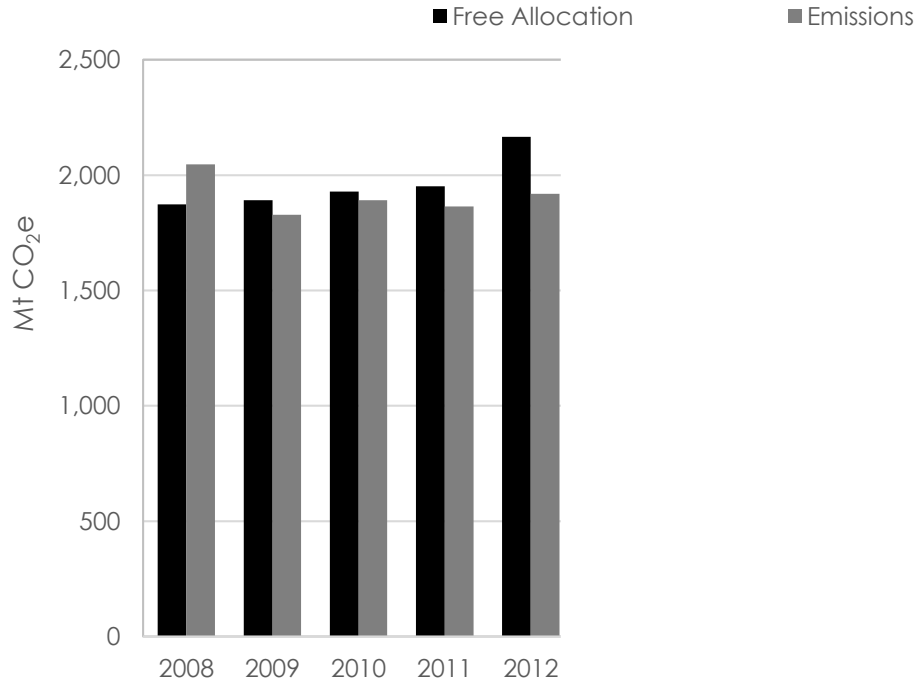
The EU Emission Trading Scheme

Design in Phase 3

- Allocation Principles
 - EU-wide cap declining over Phase 3 (-1.74% p.a.)
 - EU-wide allocation process
 - Power sector: Full auctioning
 - 'Exposed' sectors: 100% free allocation
 - 'Normal' sectors: 80% free allocation in 2013 (30% in 2020)
 - Free allocation is based on EU-wide sectoral benchmarks
- Quantity management
 - Protection against excessive price increases
 - Backloading of allowances
 - Market stability reserve

Allocation and Emissions

Phases 2 - 3

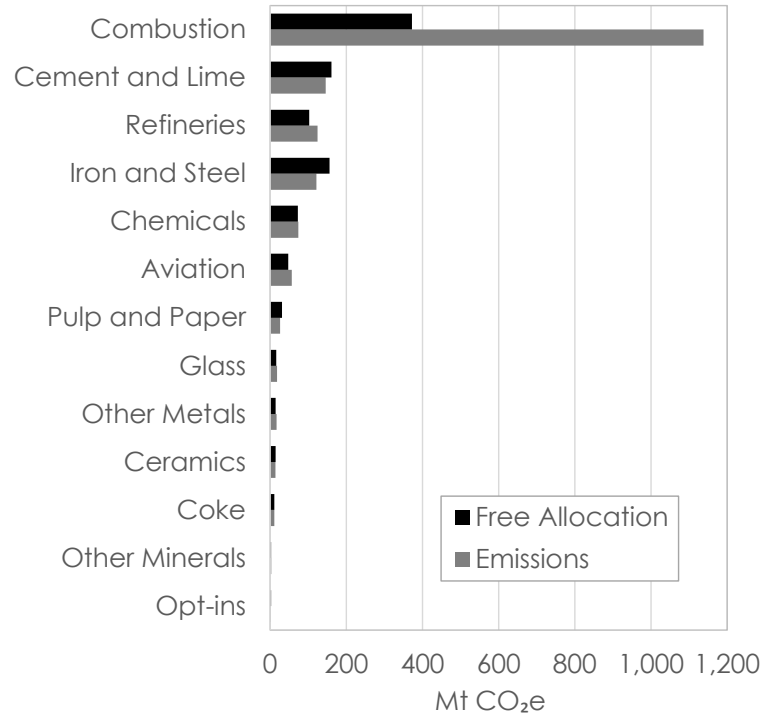


*Excluding aviation; preliminary emission data

Source: EC; own calculations.

Free Allocation and Emissions

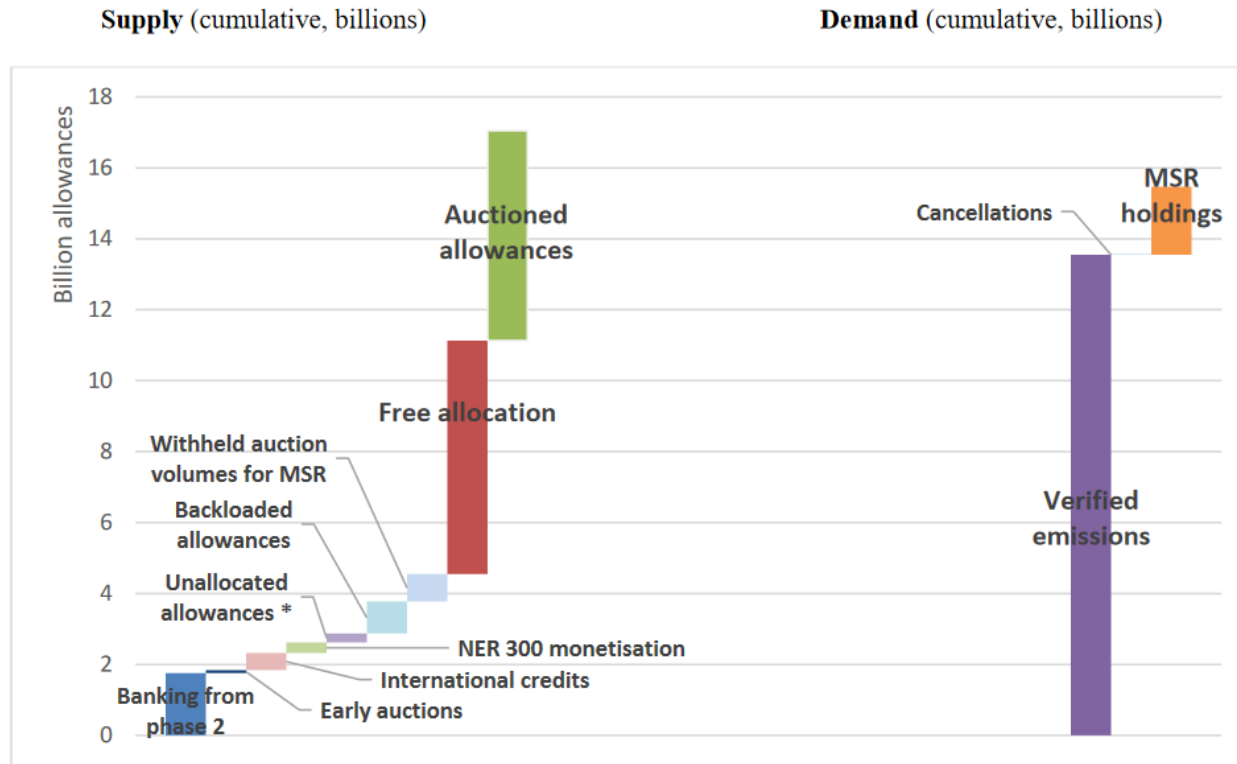
Sector level, Phase 3



*Preliminary emission data

Source: EC; own calculations.

Cumulated Allocation and Emissions 2020



Source: EC (2021).

The EU Emission Trading Scheme

Design in Phase 4 – Cap and Allocation Principles

Directive 2018/410 EU

- Emission reduction target of the ETS sectors for 2030:
-43% compared to 2005
- Linear reduction factor of the cap increased to 2.2% p.a.
- Continued mix of auctions and free allocation – share of auctioned allowances fixed to 57%

"Fit for 55" Proposal

- Emission reduction target of the ETS sectors* for 2030:
-61% compared to 2005
- Linear reduction factor of the cap to be increased to 4.2% p.a. in 2025

* Shipping will be integrated into the existing ETS. A new separate ETS will be introduced for transport and buildings in 2026 (emission target -40%; linear reduction factor 5.43% p.a.).

The EU Emission Trading Scheme

Design in Phase 4 – Carbon Leakage Provisions

Directive 2018/410 EU

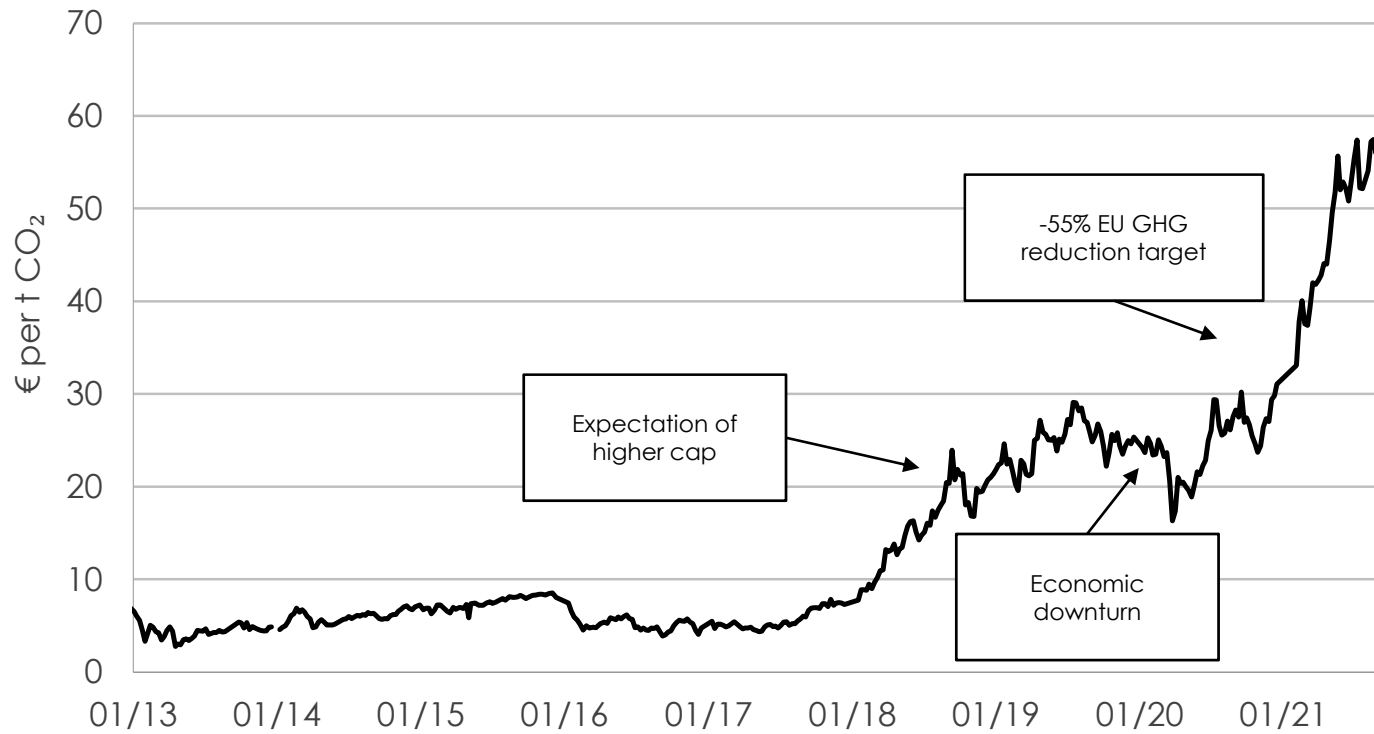
- Sectors potentially affected by carbon leakage continue to receive free allocation
- Criteria for determining carbon leakage are adjusted
- Update of benchmark values for free allocation

"Fit for 55" Proposal

- From 2026 on, gradual introduction of a Carbon Border Adjustment Mechanism (CBAM) replacing free allocation
- For installations that are obliged to carry out an energy audit according to the Energy Efficiency Directive free allocation shall only be granted fully if the recommendations of the audit report are implemented

Price Development

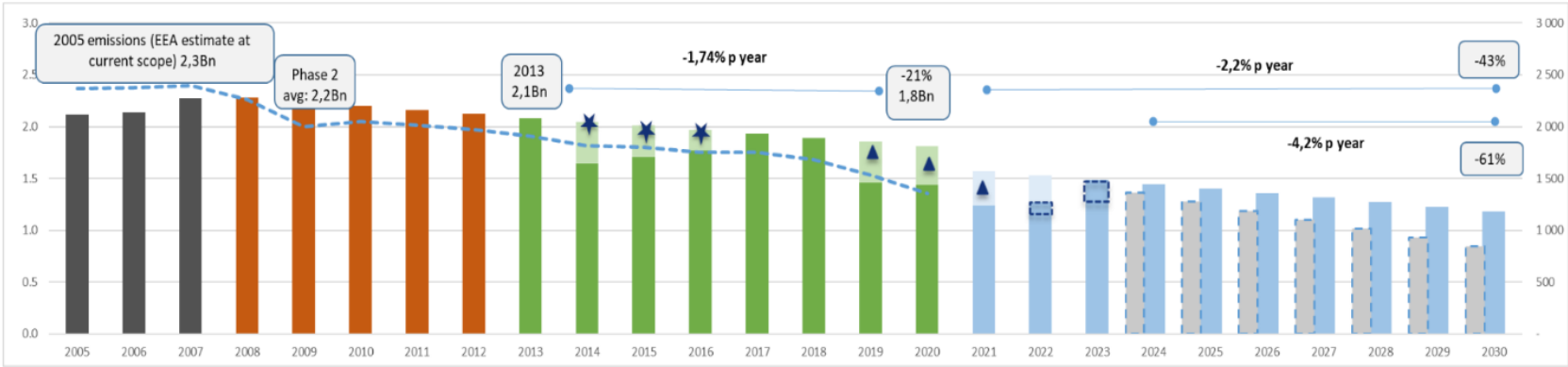
Phase 3



Source: EEX; own illustration.

Development of ETS cap and emissions

Figure 1. Cap reduction applying the linear reduction factor of 2.2% as of 2021²⁵



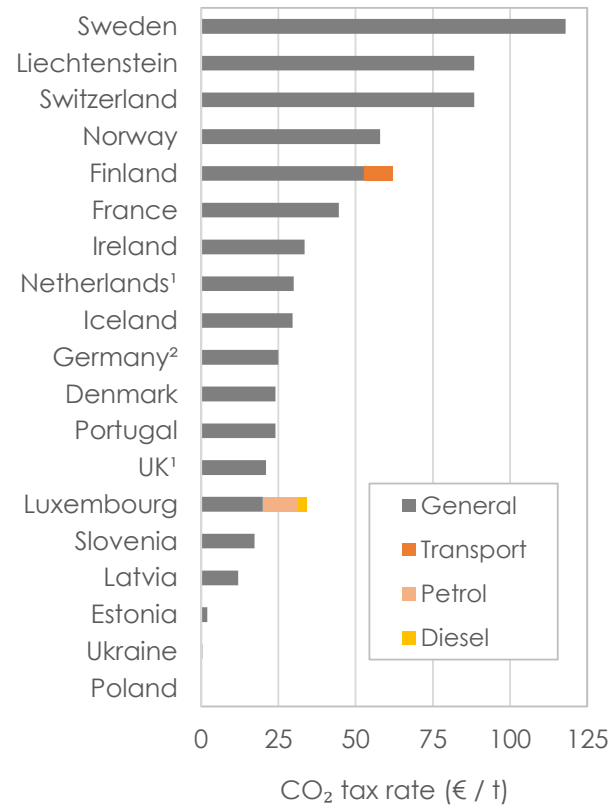
- ★ Backloaded allowances (total 900 million)
- ▲ Market Stability Reserve feed
- Market Stability Reserve feed in/out depending on market surplus

Taking Stock

- Compliance with emission limit ensured
- Given very moderate carbon prices
low – probably least ? – cost of compliance
- Dynamic efficiency must be challenged in face of persistent low prices
- Whether quantity management is sufficient to improve dynamic efficiency remains to be seen

Carbon Pricing in EU Member States

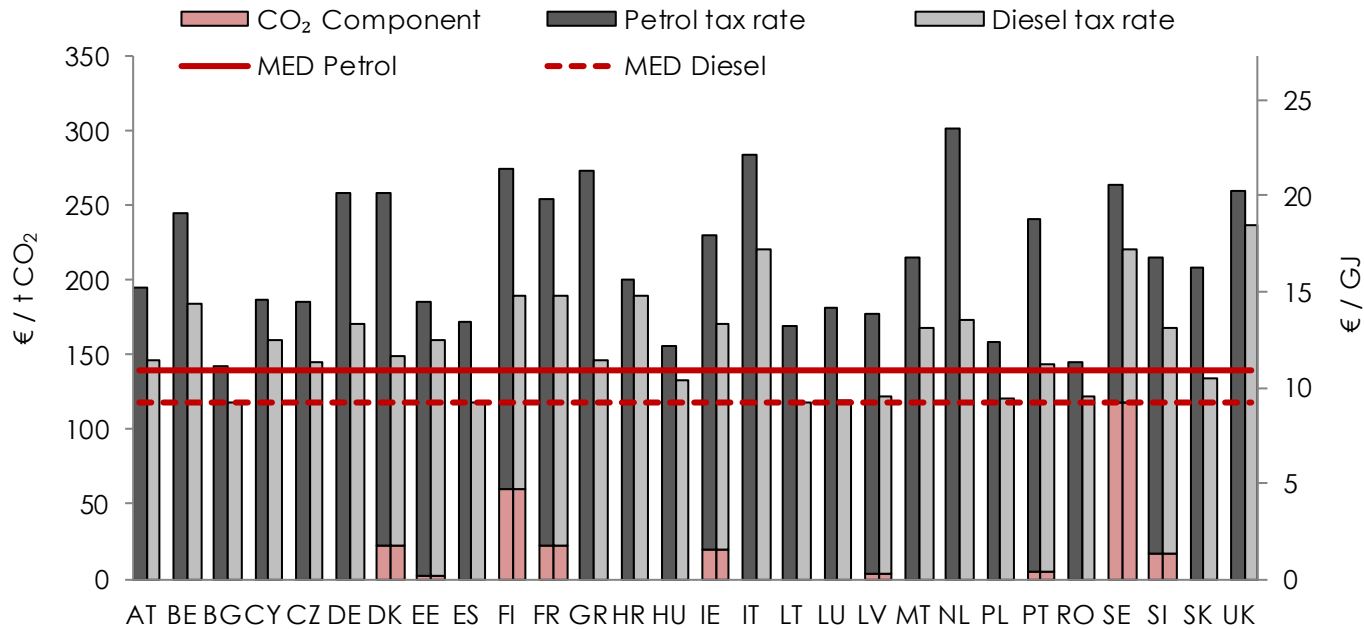
Carbon Tax Rates in Europe 2020



¹ For ETS sector; ² National ETS w fixed price.

Implicit Carbon Tax Rates in the EU Petrol and Diesel, January 2017

Implicit CO₂ tax rates in EU Member States: 142 – 301 € / tCO₂

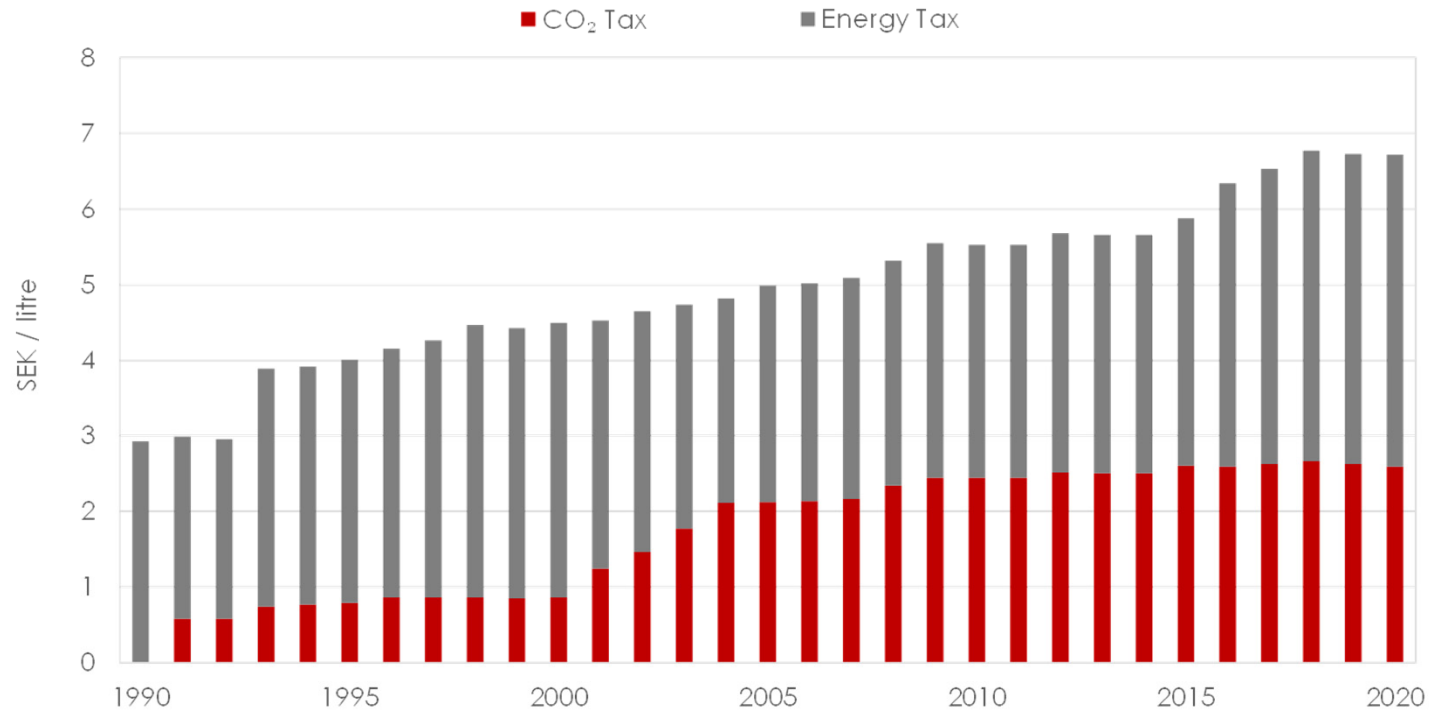


CO₂ Taxation in Sweden

Key facts

- Introduction of CO₂ tax on transport and heating fuels in 1991
- Tax rate
 - 25 € / t CO₂ (250 SEK) in 1991
 - 119 € / t CO₂ (1,200 SEK) in 2021
- Introduction integrated in ecological tax reform (Akerfeldt, 2019)
 - Not revenue neutral
 - Reduction of income taxes (-6 bn USD)
 - Increase in VAT on energy (+1.8 bn USD)
 - Introduction of CO₂ tax & reduction of existing energy taxes (+0.4 bn USD)
 - Promotion of renewable CHP
- Subsequently further reductions of income taxes and increase of CO₂ tax

Development of Swedish energy and CO₂ tax rates on petrol



*Tax rates as of January.

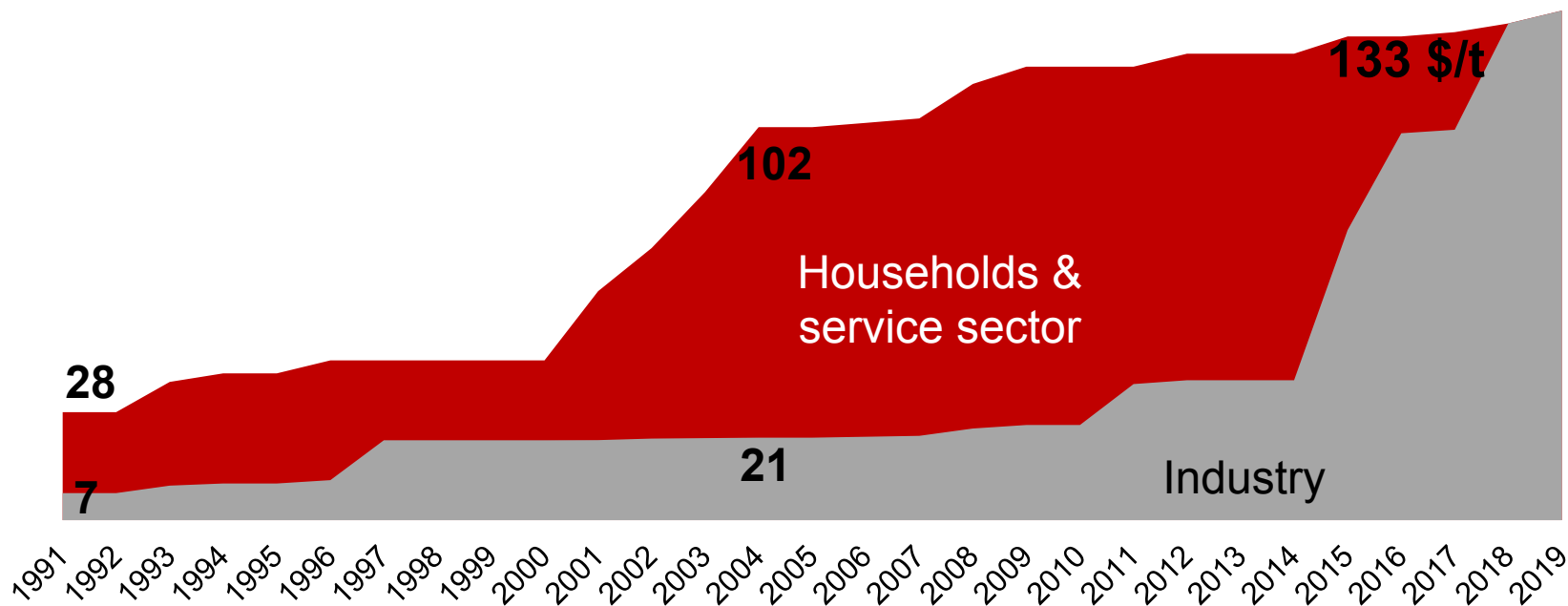
CO₂ Taxation in Sweden

Exemptions

- From 1993 reduced CO₂ tax rate for industry and agriculture (-75%) – now expired
- ETS industry exempt from CO₂ tax since 2011
- Reduced CO₂ tax rate for heat generation from cogeneration in the ETS

CO₂ Taxation in Sweden

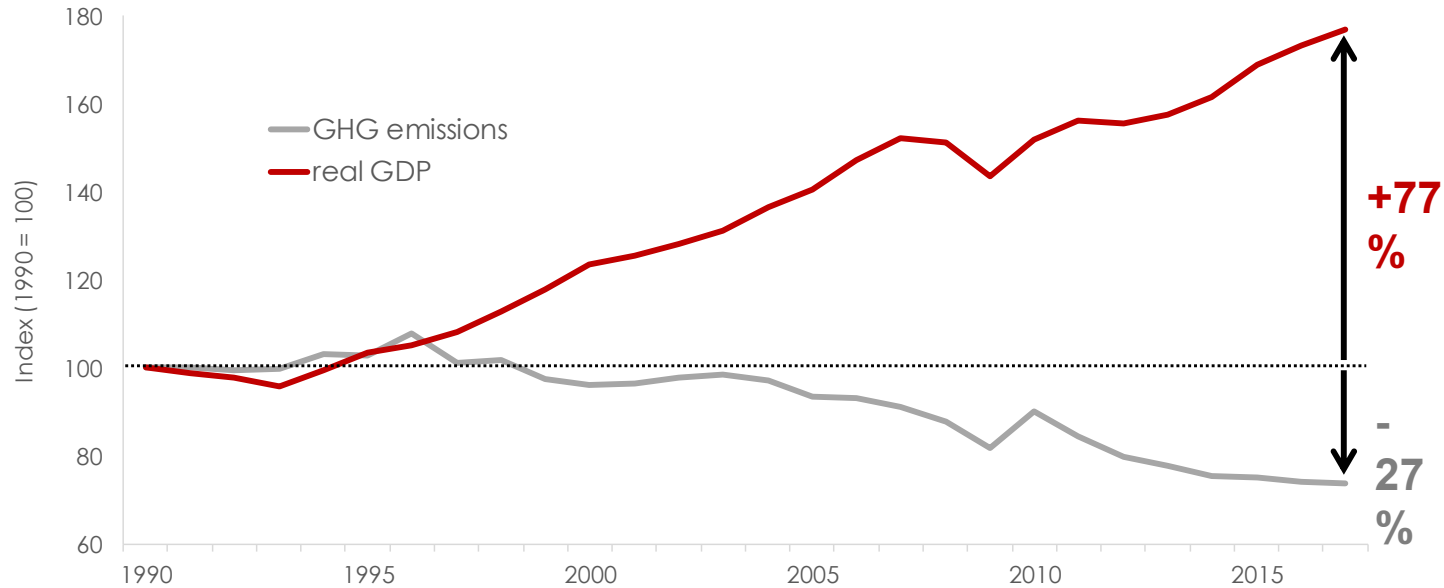
Development of tax rate by sector



Since 2008: Non-ETS Industry

Source: Adapted from Akerfeldt (2019).

Development of real GDP and GHGs Sweden (1990–2017)

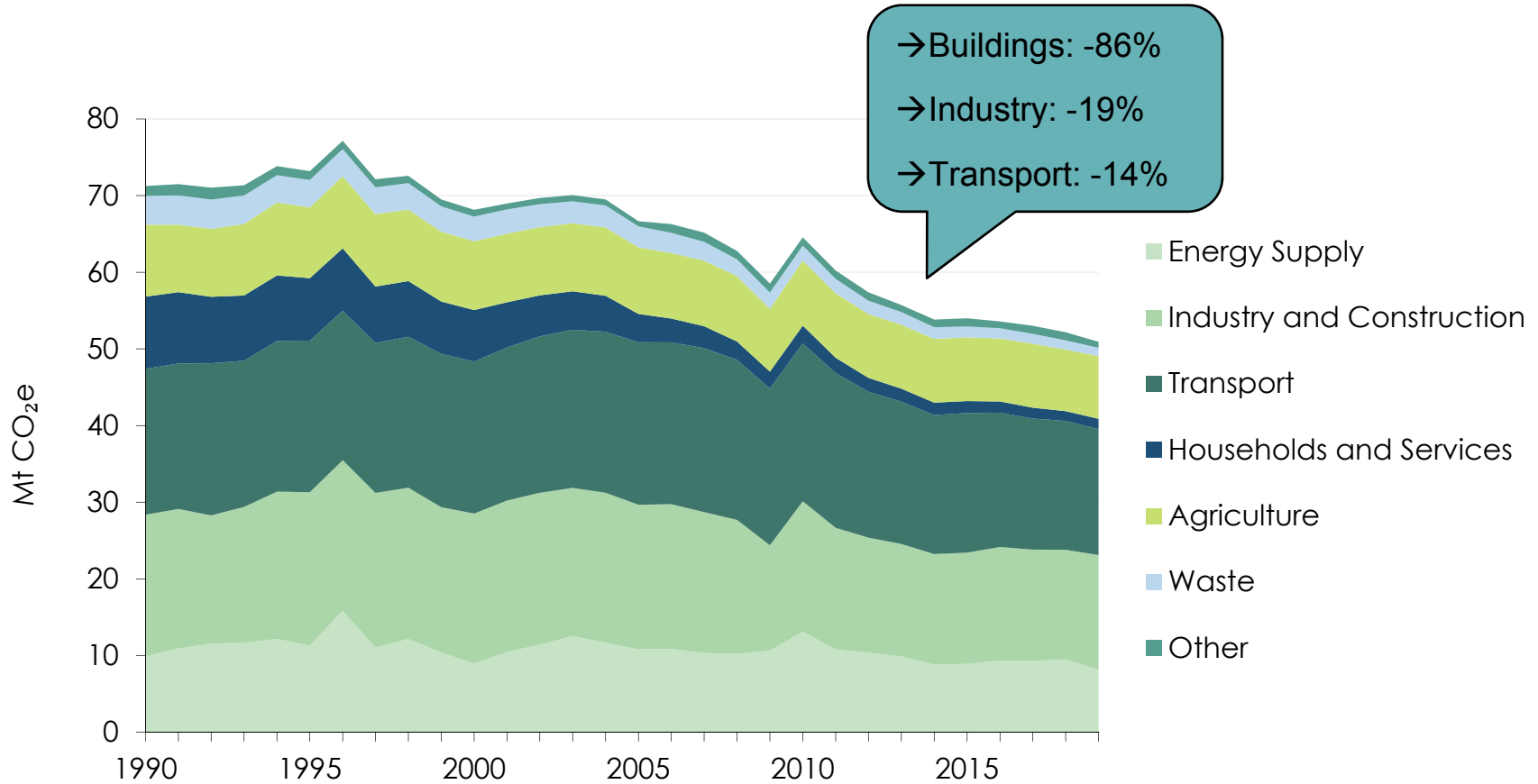


Non-ETS emission reduction target for 2020: -17%

Non-ETS emission reduction 2017: -25%

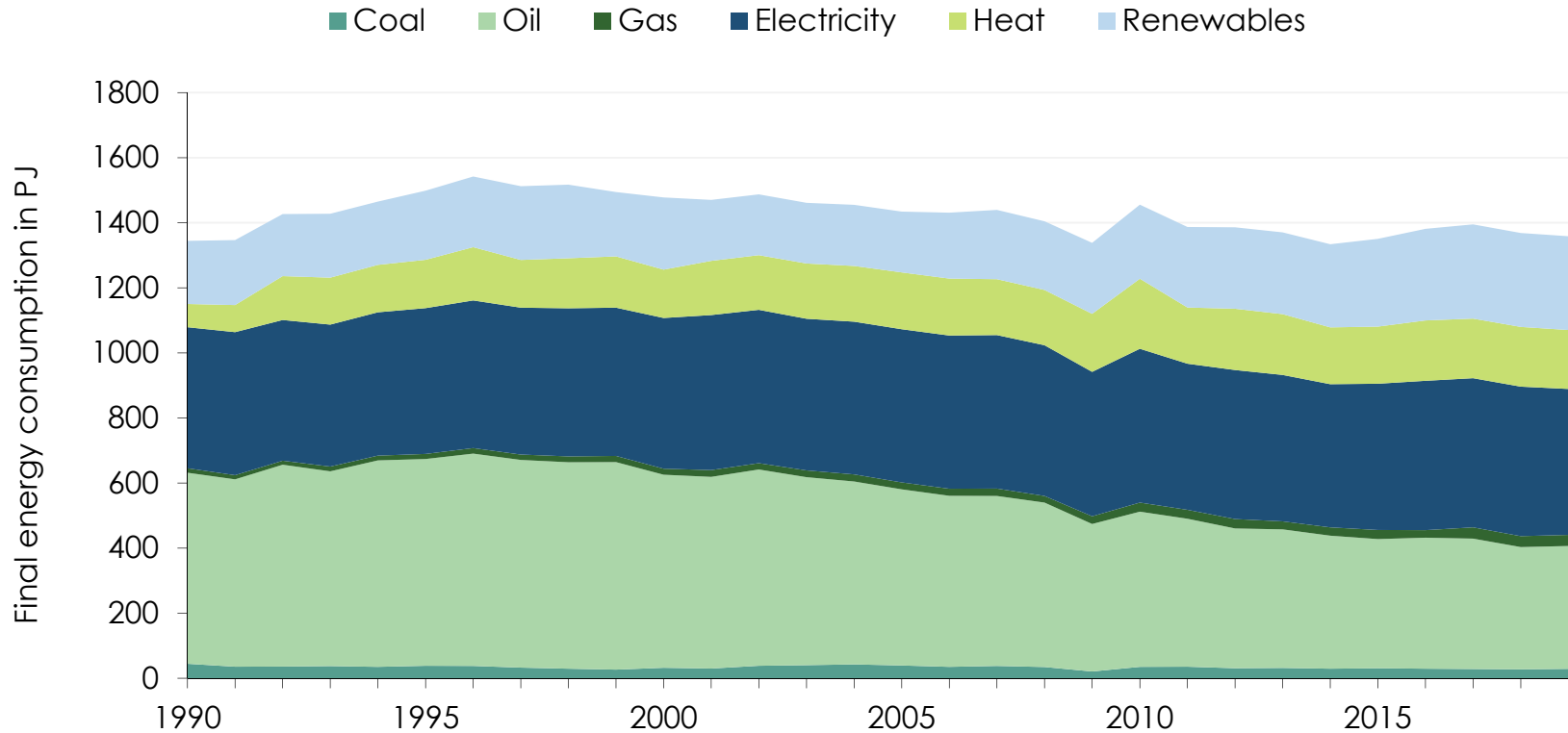
Source: Eurostat and IEA; own illustration.

GHG Emissions by Sector (excl. LULUCF) Sweden (1990 - 2019)



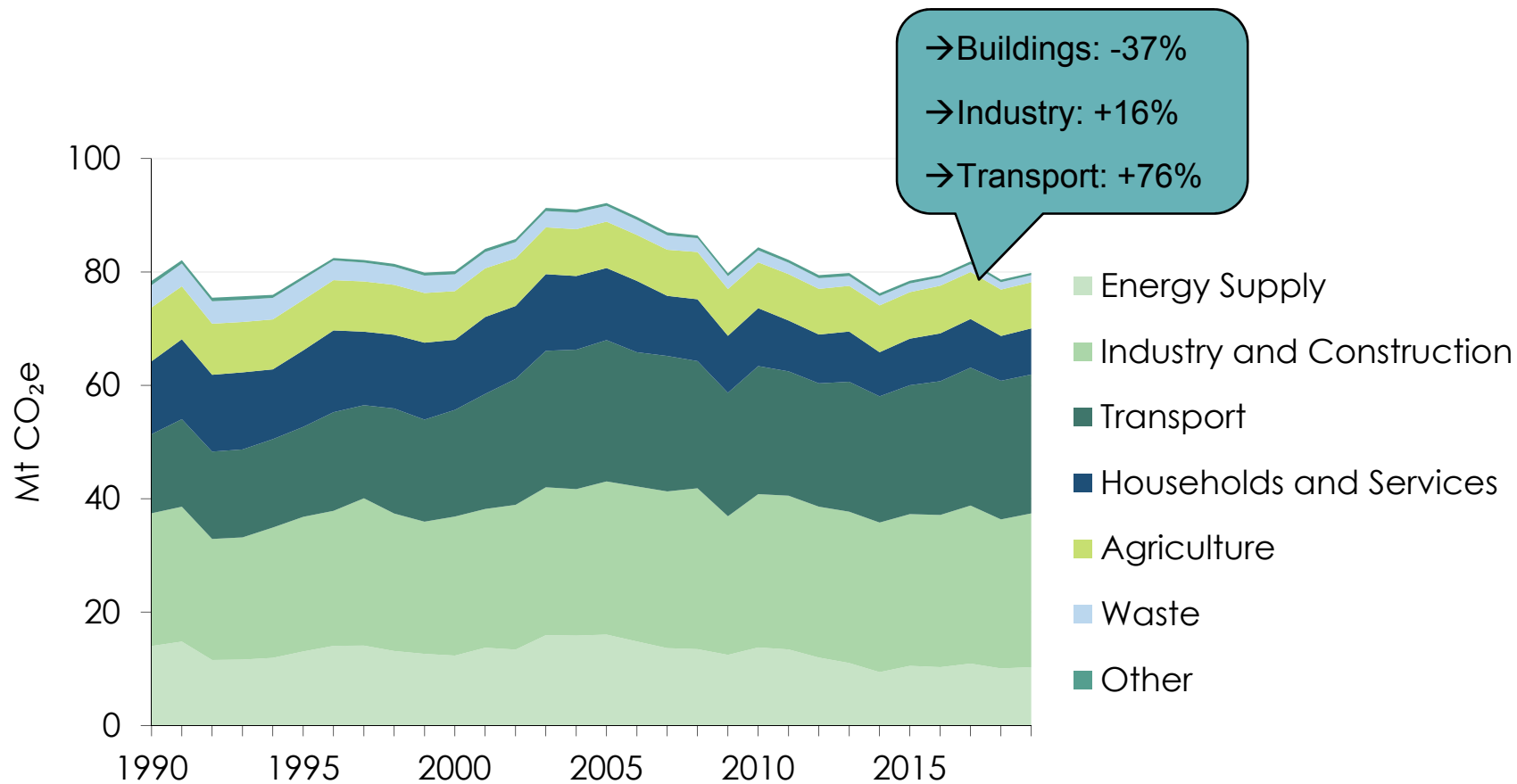
Source: Eurostat (2021).

Final Energy Consumption by Energy Source Sweden (1990 – 2019)



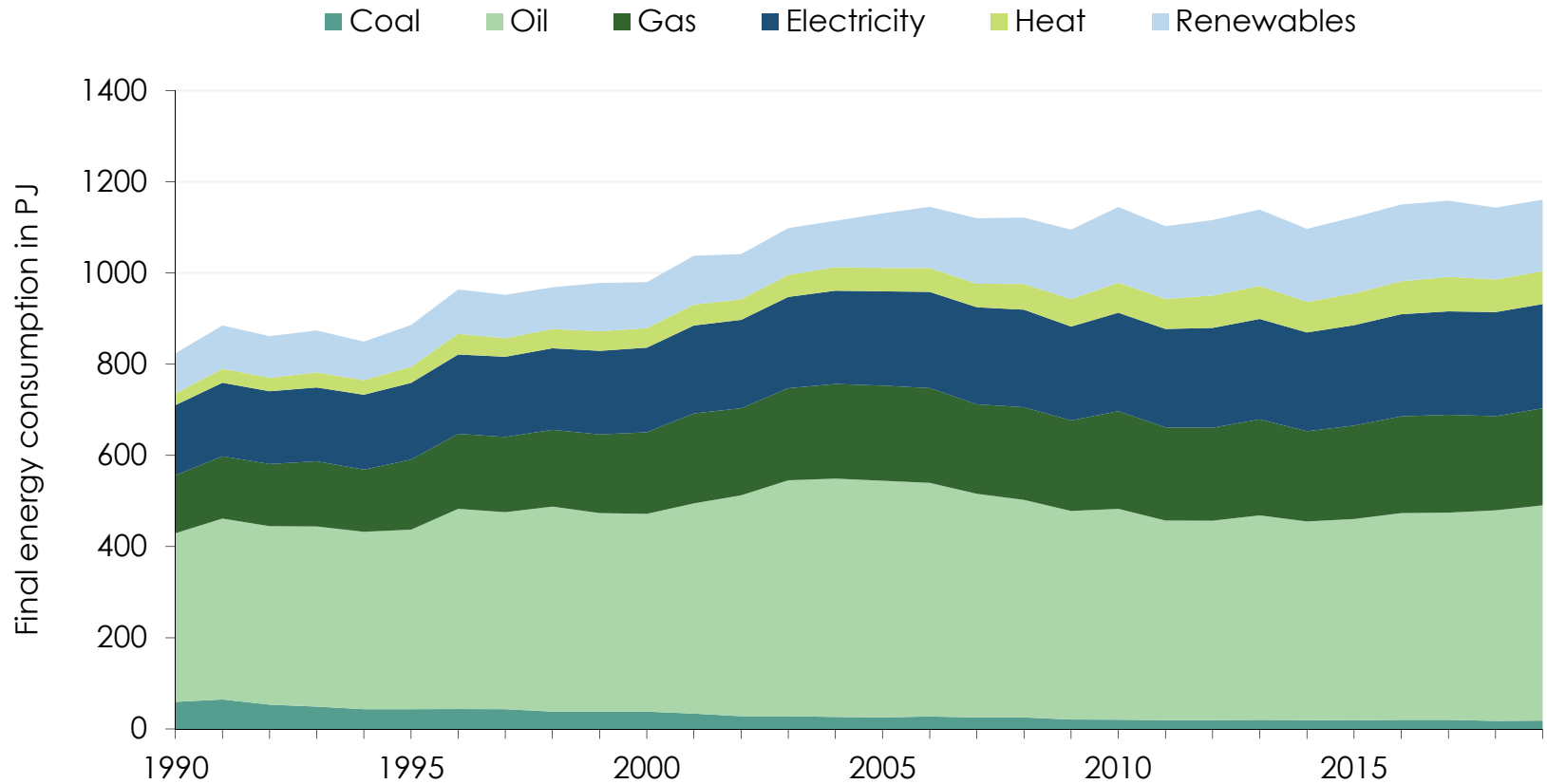
Source: IEA (2022).

GHG Emissions by Sector (excl. LULUCF) Austria (1990 vs. 2019)



Source: Eurostat (2021).

Final Energy Consumption by Energy Source Austria (1990 – 2019)



Source: IEA (2022).

CO₂ Pricing in Austria

Introduction

- National Emission Trading with Fixed Price
- Applies to fossil fuels used in Non-ETS sectors (esp. transport, buildings) – ETS emissions are exempt from the tax
- Start: July 2022 at 30 € / t CO₂
- Price generally follows German price development
- Compensation Measures
 - Households: Regional differentiated climate bonus (2022: 100-200 € p.c.)
 - Companies: Hardship clause, Carbon leakage provisions
 - Agriculture: Tax refund
 - Integrated in broader tax reform

CO₂ Pricing in Austria

Price development

	2022	2023	2024	2025
	In €			
CO ₂ Price	30	35	45	55

Price adjustment mechanism

- The CO₂ price increase will be adjusted if energy prices change
- Average change in the fossil energy price index for households in the first three quarters of year $t > 12.5\%$ ($< -12.5\%$) →
CO₂ price increase for year $t+1$ is reduced (increased) by 50%
- Development of CO₂ price in following years is unaffected

CO₂ Pricing in Austria

Regional Climate Bonus

- Four categories depending on quality of public transport and urban-rural typology
 - Category I: Urban centres w. top-ranking public transport accessibility
 - Category II: Urban centres w. at least good public transport accessibility
 - Category III: Centres with good basic accessibility and municipalities in the surrounding area of centres with at least good basic accessibility
 - Category IV: Rural communities and communities with at most basic accessibility

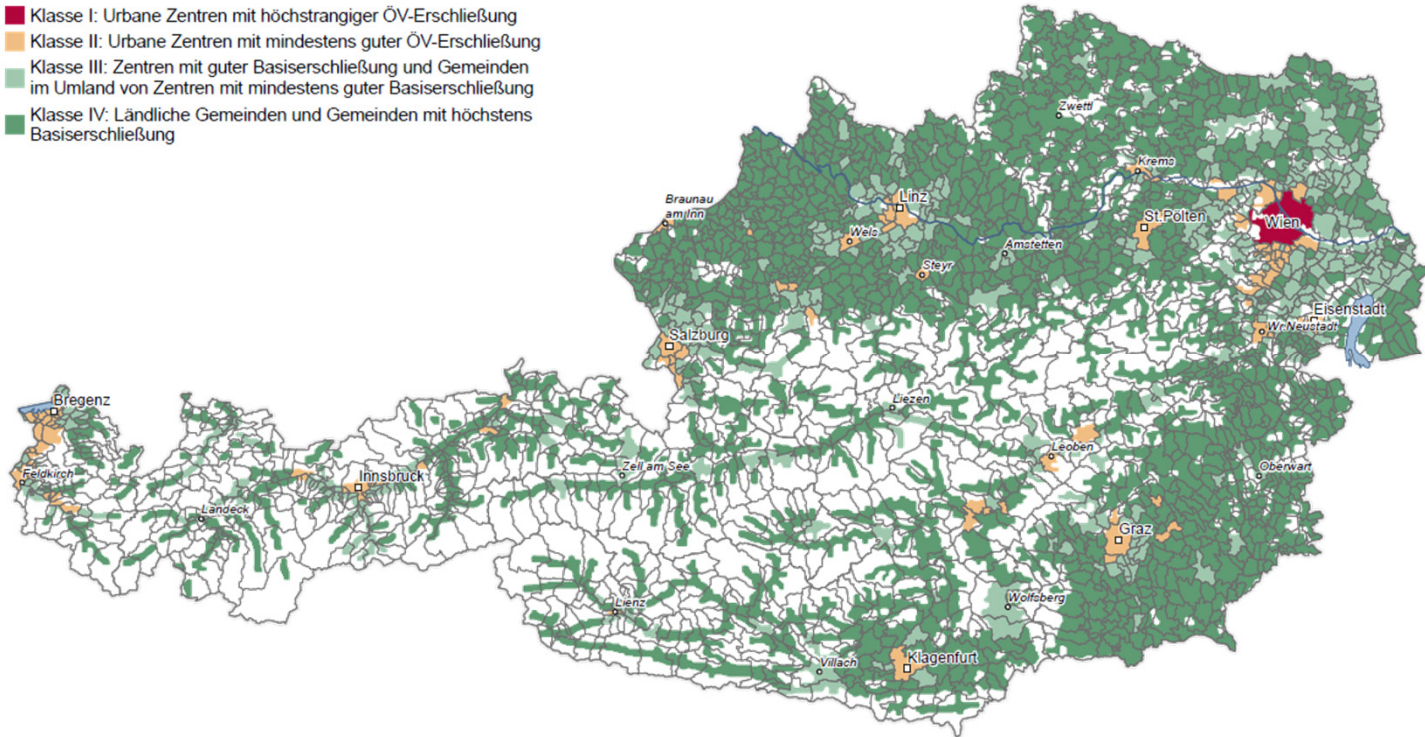
	Adults	Children
Category I	100	50
Category II	133	67
Category III	167	83
Category IV	200	100

CO₂ Pricing in Austria

Regional Climate Bonus

Kombinierte Klassen

- Klasse I: Urbane Zentren mit höchstrangiger ÖV-Erschließung
- Klasse II: Urbane Zentren mit mindestens guter ÖV-Erschließung
- Klasse III: Zentren mit guter Basiserschließung und Gemeinden im Umland von Zentren mit mindestens guter Basiserschließung
- Klasse IV: Ländliche Gemeinden und Gemeinden mit höchstens Basiserschließung



Source: APA.

Taking stock

- In practice, CO₂ taxes differ considerably in terms of tax rate, tax base etc.
- Revenues from carbon taxes are usually recycled in various ways
- Recycling options include
 - Transfers and tax reductions for households and companies
 - Support of investment or R&D in climate-friendly technologies
- Acceptance of carbon taxes can be increased by
 - "Salient" recycling measures
 - Predictable gradual implementation

Summary and Conclusions (I)

- Carbon pricing can contribute to achieving the emission reduction targets, but it must be integrated into a comprehensive set of policy instruments / measures
- In real implementation policymakers must choose between
 - Uncertainty regarding costs (emissions trading)
 - Uncertainty regarding emissions (CO₂ taxes)
- A combination of price- and quantity-based instruments might be advisable – would ensure the achievement of given target alongside dynamic efficiency

Summary and Conclusions (II)

- To achieve acceptance of MBIs (potential) negative impacts on distribution and competitiveness must be alleviated
- Broad range of options available
 - ETS
 - free allocation
 - use of auction revenues for targeted subsidies
 - Use of carbon tax revenues for
 - socio-ecological tax reform
 - eco-bonus / carbon dividend
 - targeted subsidies and investments
- Predictable gradual implementation and transparency of revenue use can increase acceptance

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Market-based instruments for environmental policy

- Economic literature favours market-based instruments for regulating negative environmental externalities, since they are considered
 - environmentally effective (ensure compliance with a predefined target)
 - economically efficient (ensure lowest societal cost by providing flexibility for regulated entities)
- Under the restrictive assumptions of economic theory, tradable permits and taxes lead to the same result (identical level of pollution, identical price)
- In the real world, policymakers must choose between
 - Uncertainty regarding the costs (tradable permits)
 - Uncertainty regarding the level of emissions (taxes)

Principle of environmental taxation

- The concept of taxing externalities has been developed in the 1920s (Pigou) but implementation took more than 50 years
 - Regulator sets the tax rate to be paid for each unit of pollution emitted
 - Relative prices change
 - Actors adapt consumption/production decisions

Emissions Trading

(Cap-and-Trade with Free Allocation)

- Emission rights are allocated to actors
- Actors with lower mitigation costs can reduce their emissions below their initial allocation and sell the surplus reductions
- Actors with higher abatement costs can buy these surplus reductions and therefore need to reduce less
- Trading of certificates leads to an equalization of costs between actors and to overall cost efficiency at the equilibrium

Carbon taxes and emissions trading

Carbon tax

- Price-based instrument
- Quantity of emission reductions uncertain
- Connection to existing taxes – easy to administrate
- Provides tax revenues & options for tax shifting

Emission trading

- Quantity-based instrument
- Market price uncertain
- Administrative complexity
- Provides revenues when permits are auctioned