

CARBON TAXATION:

A STEP-BY-STEP GUIDE

Webinar on Carbon Pricing and Fossil Fuel Subsidies Reduction, Asian Development Bank, Manila

MIKAEL SKOU ANDERSEN, PH.D.

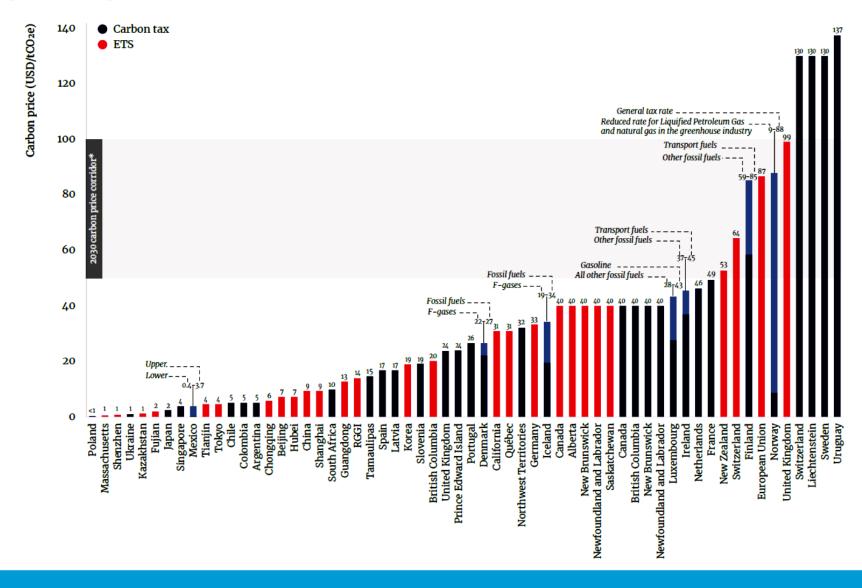
Professor, Aarhus University

12 December 2022



Carbon pricing rates 2022

Carbon prices as of April 1, 2022



Interface carbon taxes to emissions trading



Emissions Trading System

- Power plants & refineries
- Large manufacturing installations
 - steel/iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals
- 11,000 installations; 55% of EU GHG

Carbon taxation:

- Motor fuels
- Heating
- Small business



Carbon tax complements excise taxes

	Portugal	France	Sweden	Denmark
Energy tax: Motor fuels Domestic	√ √ √	√ √ √	√ √ √	√ √ √
Business Carbon tax: Motor fuels Domestic Business	√ √ √	√ √ √	√ √ √	√ √ √
Air pollution tax Motor fuels Domestic Business		√	√	V V
Electricity tax Domestic Business ETS - carbon	∨ ∨ √	√ √	√ √ √	۷ ۷

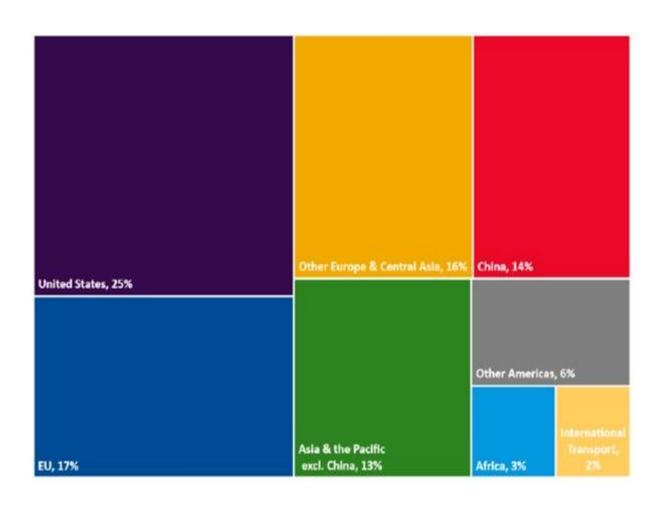


How to introduce a carbon tax?



Identify mitigation gap and priority sectors

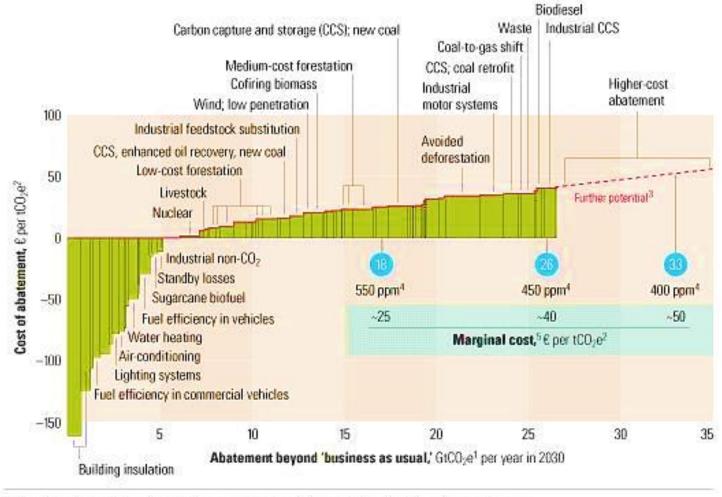




- Cumulative emissions of Asia-Pacific (incl. China) are now comparable to USA
- Glasgow climate pact calls on countries to strengthen their NDC targets
- Low-carbon green technologies are available to substitute fossil fuels in many sectors

Global cost curve for greenhouse gas abatement measures beyond 'business as usual'; greenhouse gases measured in GtCO₂e¹

 Approximate abatement required beyond 'business as usual,' 2030



¹6tCO₂e = gigaton of carbon dioxide equivalent; "business as usual" based on emissions growth driven mainly by increasing demand for energy and transport around the world and by tropical deforestation.

Source: McKinsey

²¹CO2e = ton of carbon dioxide equivalent.

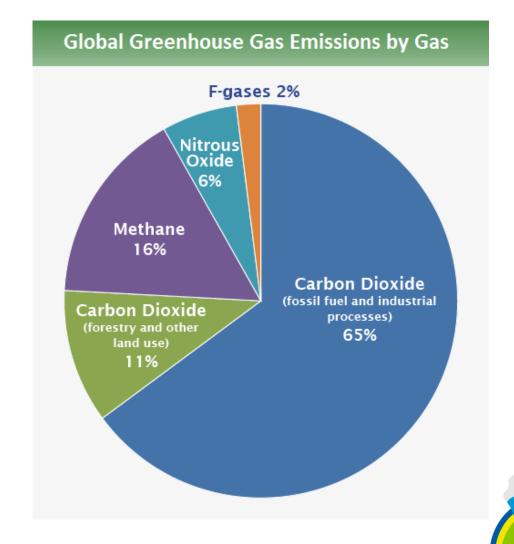
³Measures costing more than 640 a ton were not the focus of this study.

^{*}Atmospheric concentration of all greenhouse gases recalculated into CO2 equivalents; ppm = parts per million.

Marginal cost of avoiding emissions of 1 ton of CO₂ equivalents in each abatement demand scenario.

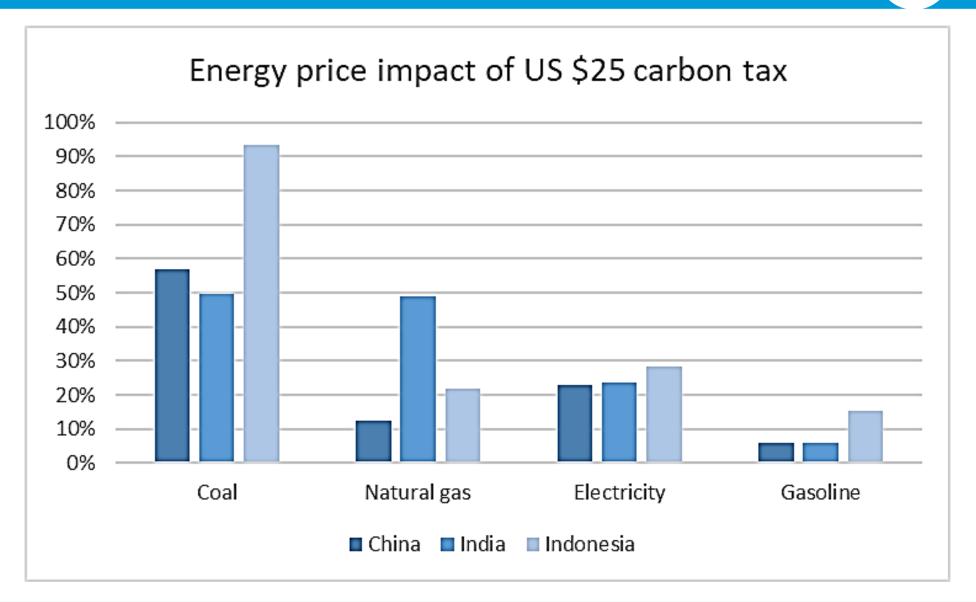
Fuel approach vs Direct emissions approach

Greenhouse Gas	Formula	100-year GWP
Carbon dioxide	CO ₂	1
Methane	CH ₄	25
Nitrous oxide	N ₂ O	298
Sulphur hexafluoride	SF ₆	22,800
Hydrofluorocarbon-23	CHF ₃	14,800
Hydrofluorocarbon-32	CH ₂ F ₂	675
Perfluoromethane	CF ₄	7,390
Perfluoroethane	C ₂ F ₈	12,200
Perfluoropropane	C ₃ F ₈	8,830
Perfluorobutane	C ₄ F ₁₀	8,860
Perfluorocyclobutane	c-C ₄ F ₈	10,300
Perfluoropentane	C5F12	13,300
Perfluorohexane	C ₆ F ₁₄	9,300



Assess implications and risks of leakage



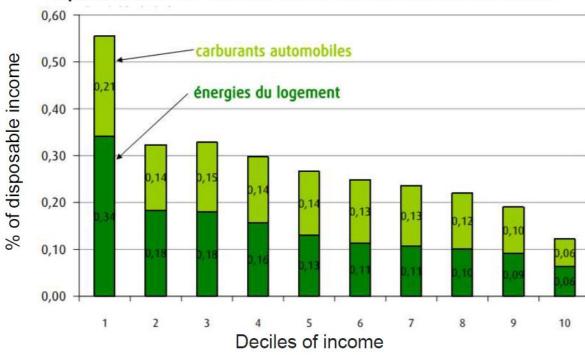




Assess distributional impacts

Without compensation, carbon tax has regressive effects

Impact of a 22 €/T carbon tax on the household revenues

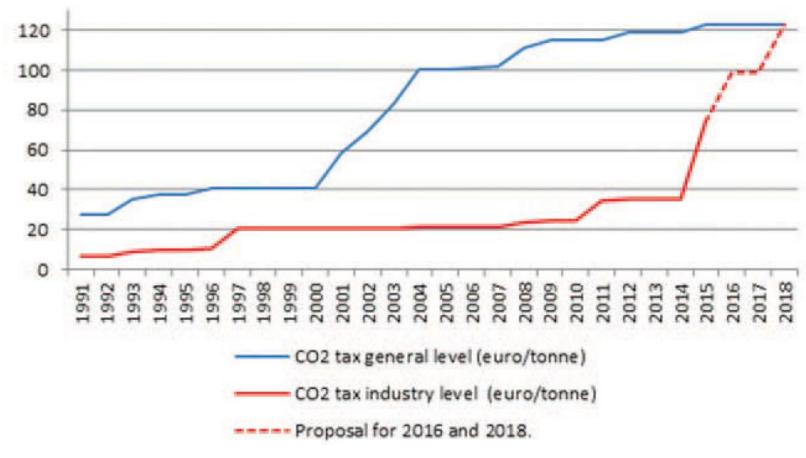


Source: Mathilde Clement, CGDD-INSEE, using households surveys (2016)

Calibrate carbon tax rate

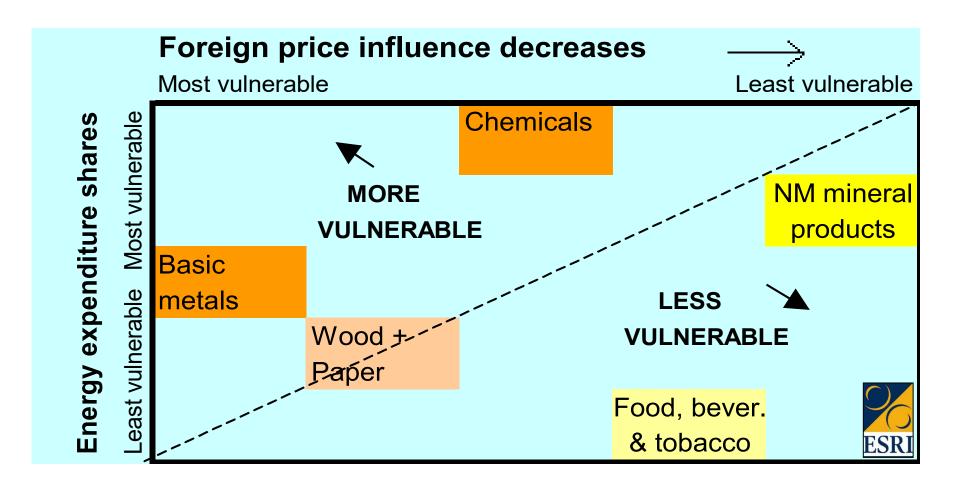


FIGURE 2: Development of Swedish carbon tax rate over time



Source: Swedish Ministry of Finance (NOTE: from 2008 industry outside EU Emissions Trading Scheme (EU ETS)).

Energy-intensive AND trade-intensive sectors — who are they?





Support for low-income households



Mitigation

- An ex-ante measure to reduce effective tax rates and alleviate tax burden for specific groups
- e.g. zero or reduced tax rate for 'basic' consumption (consumption floor)

Compensation

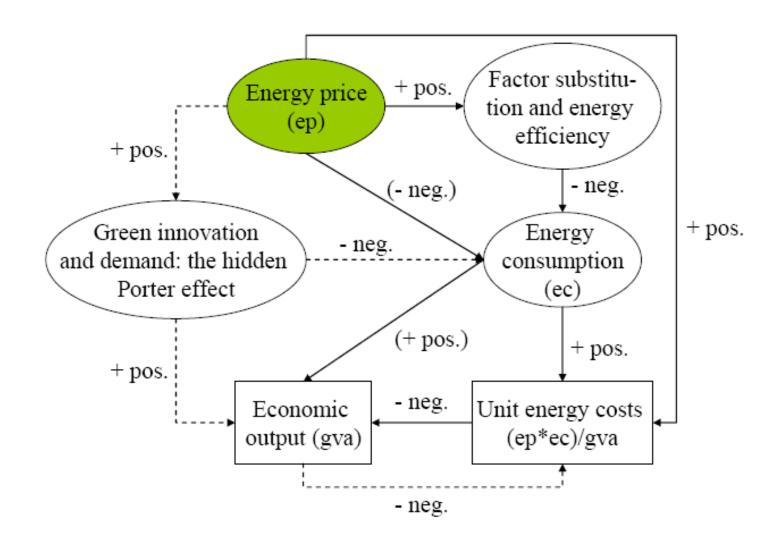
- An ex-post measure (transfer payment)
 outside the realm of taxation as such, not
 affecting tax base or rate structure,
- e.g. 'green bonus' to low-income households



OECD advises to use compensation

ADB Photo

Shantang's residents still use coal-burning stoves for cooking.



Determine institutional oversight







Establish monitoring for ex-post evaluation







Consult stakeholders

Energy Conservation Act (2013)

- Mandatory energy management and reporting for large energy users (>54TJ)
- Appoint energy manager, monitor and report energy consumption and GHG emissions
- Submit plans for energy efficiency improvement

Consultations with companies

Companies were consulted on the competitiveness impact from climate change

Announcement of Carbon Tax

- Carbon tax from 2019 as part of a suite of mitigation measures
- Cost-effective and enhances other measures

Carbon Pricing Bill

- Announcement of the carbon tax mechanism and details
- Introduction and passing of the bill

Carbon Tax review

Review the trajectory and level of the carbon tax post-2023, in consultation with industry and expert groups

Singapore

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

2022



Singapore International Energy Week

First public communication on the need to price carbon to send the right signal if there is a global deal on climate change

Climate Action Plan

Studying the need to price carbon to enhance efforts across all sectors

National Climate Change Strategy

A role for carbon price to reinforce measures for energy efficiency and low-carbon investments if deeper emissions reduction needed



Implementation of Carbon Tax

Public and industry consultations

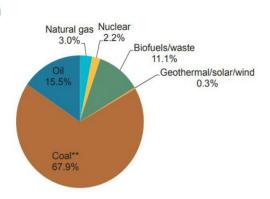
- 1-on-1 consultations with directly impacted companies
- Focus group discussions
- Engagements with industry associations
- General public consultation

Outcome for the carbon tax review will be announced



South Africa's energy context

- · Energy supply dominated by coal
- SA accounts > ⅓ of CO₂ emissions in Africa
- Among the top 20 CO₂ emitters globally
- Peak, plateau and decline trajectory
- Paris Agreement commitments



South Africa's new carbon tax

- Implemented on 1 June 2019
- A phased implementation approach
- Manufacturing, construction, mining and transport sectors will be affected.
- Requires accurate system for monitoring, reporting and verifying emissions
- South African Revenue Service (SARS): tax liability assessment
- Department of Environmental Affairs: assist SARS in audits

Tax rate

- Headline carbon tax is R120 (Euro 7.30) per ton of CO₂ emissions
- Taking into account tax-free thresholds = R6 to R48 per ton of CO_2 emissions (or Euro 0.36 to Euro 2.92)

Tax base

- total quantity of GHG emissions from combustion, fugitive and industrial processes
- Proportionately reduced by tax-free allowances
- Tax liability = tax base X carbon tax rate

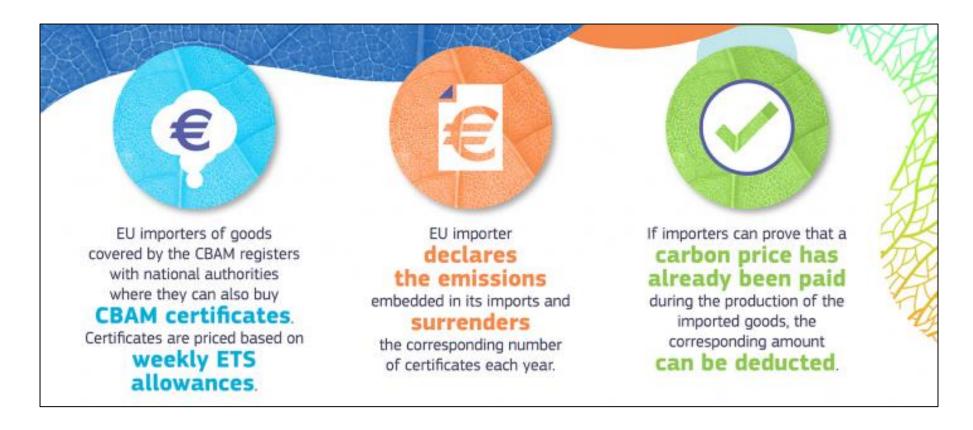
L-A. Steenkamp University of Stellenbosch Business School



EU's carbon toll will reward carbon pricing

Carbon Border Adjustment Mechanism (CBAM)

Energy intensive goods imported from countries with no CO2-price will be imposed CO2-toll



Implementation in 2026; reporting to begin 2023



Thank you for your attention!

Mikael Skou ANDERSEN http://au.dk/en/msa@envs.au.dk

™@MikaelSkouA

