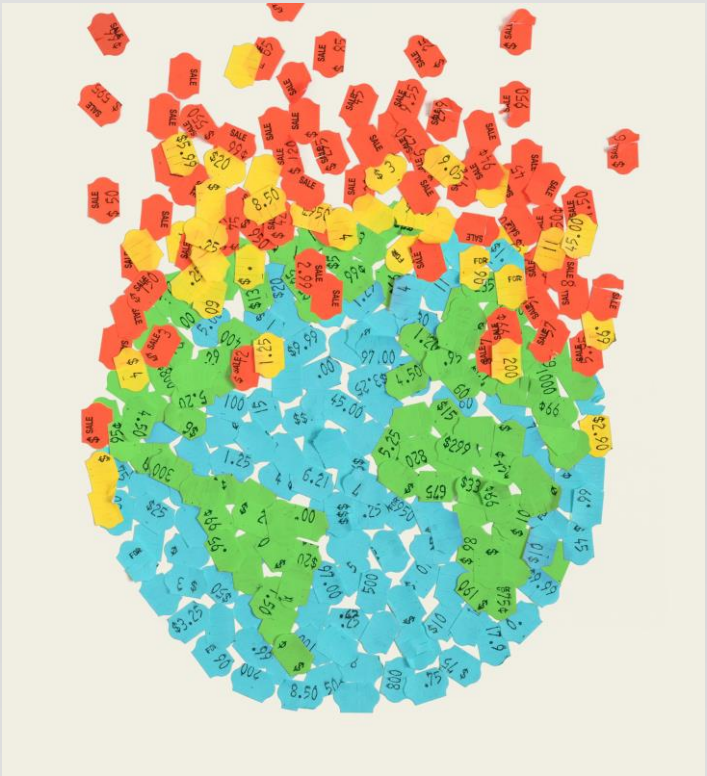
GIZ – Carbon Pricing Training for Members of the Energy Community

Welcome & Introduction

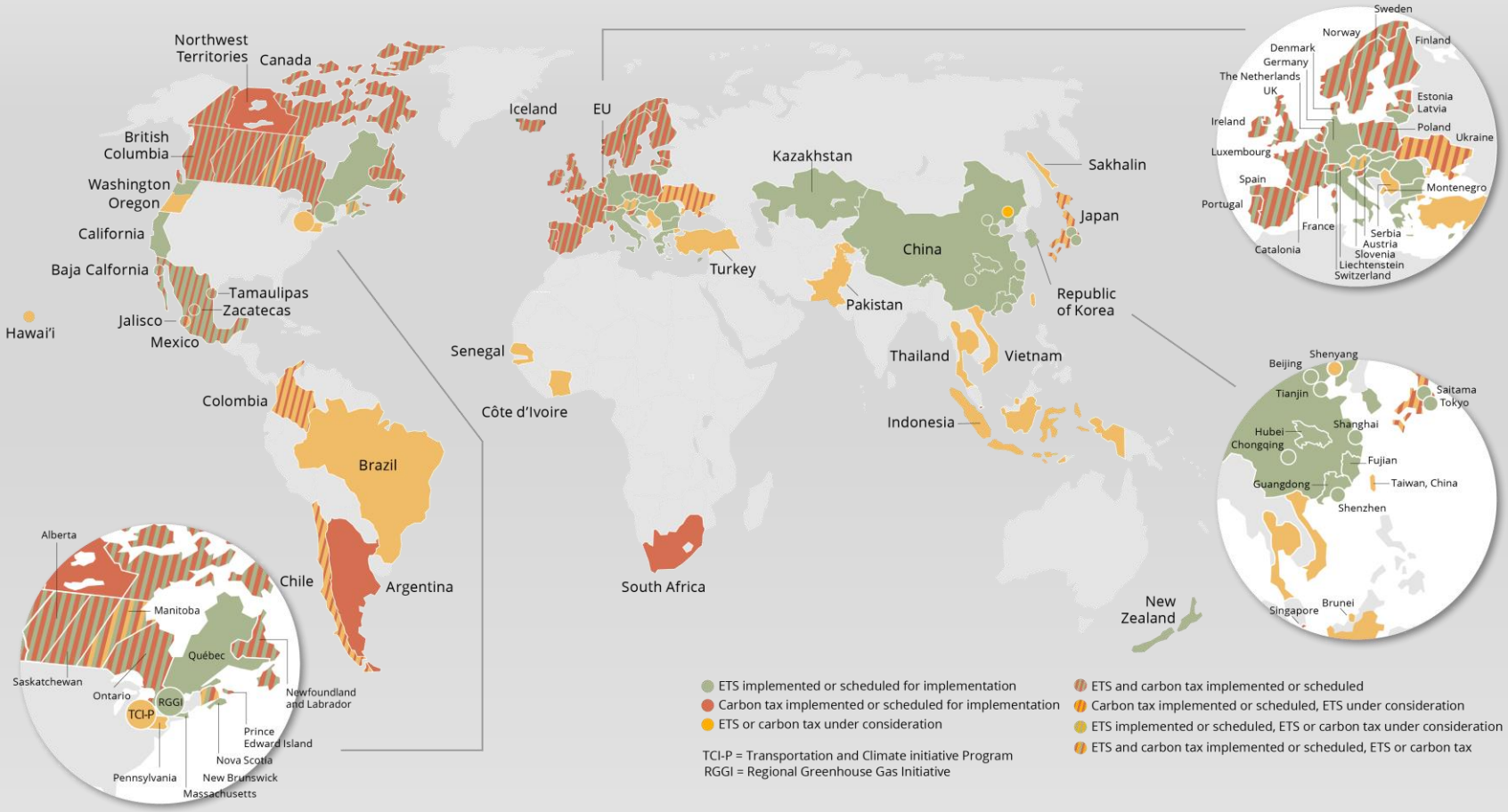
Dr Constanze Haug, Dr Baran Doda

27 January 2022



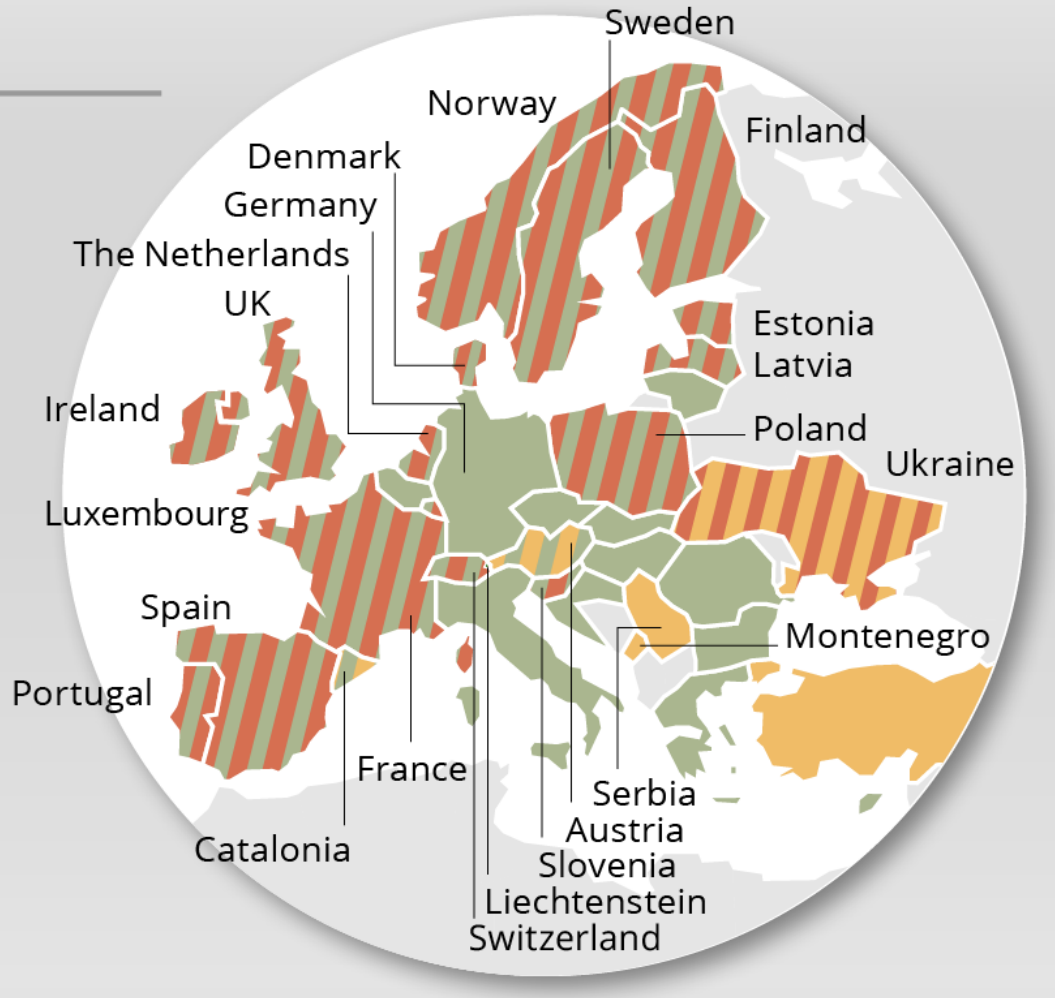
Source: NYT Magazine, 2019

Carbon pricing is emerging as a key tool for NDC implementation



Source: World Bank, *Carbon Pricing 2021*

Evolving carbon pricing landscape in Europe



- ETS implemented or scheduled for implementation
- Carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled
- Carbon tax implemented or scheduled, ETS under consideration
- ETS implemented or scheduled, ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled, ETS or carbon tax

TCI-P = Transportation and Climate initiative Program
RGGI = Regional Greenhouse Gas Initiative

Source: World Bank, *Carbon Pricing 2021*

Session	Date	Time (CEST)	Topic	Speaker
Session 1	27/01/2022	11:00 AM - 12:00 PM	**Introduction to the series & deep dive: carbon taxes**	Constanze Haug, Baran Doda
Session 2	11/02/2022	11:00 AM - 12:00 PM	**Deep dive: ETS design and implementation**	Constanze Haug, Stefano De Clara, Lutz von Meyerinck (tbc)
Session 3	25/02/2022	11:00 AM - 12:00 PM	**Carbon tax vs. ETS – similarities, differences and decision points**	Constanze Haug, Alexander Eden
Session 4	11/03/2022	11:00 AM - 12:00 PM	**Carbon pricing in the policy mix**	Baran Doda, Theresa Wildgrube
Session 5	25/03/2022	11:00 AM - 12:00 PM	**Building support for carbon pricing - stakeholder engagement, communications and using carbon revenues**	Constanze Haug, Anastasia Steinlein

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Mentimeter

Go to "menti.com" and enter the following code: 3260 2602

Question: What do you think about carbon pricing?

A) Indispensable for decarbonization in my country

B) Important, yes, but not more so than other policies

C) Really bad idea, people hate paying more for something

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Enjoy the training!

GIZ – Carbon Pricing Training for Members of the Energy Community

Key elements in tax design

Dr Baran Doda

27 January 2022

Learning objectives

- Understand why and when it makes sense to implement a carbon tax
- Understand the importance of laying the groundwork for carbon tax implementation by defining the objectives and considering the national circumstances in advance
- Get an overview of the key design elements of a carbon tax

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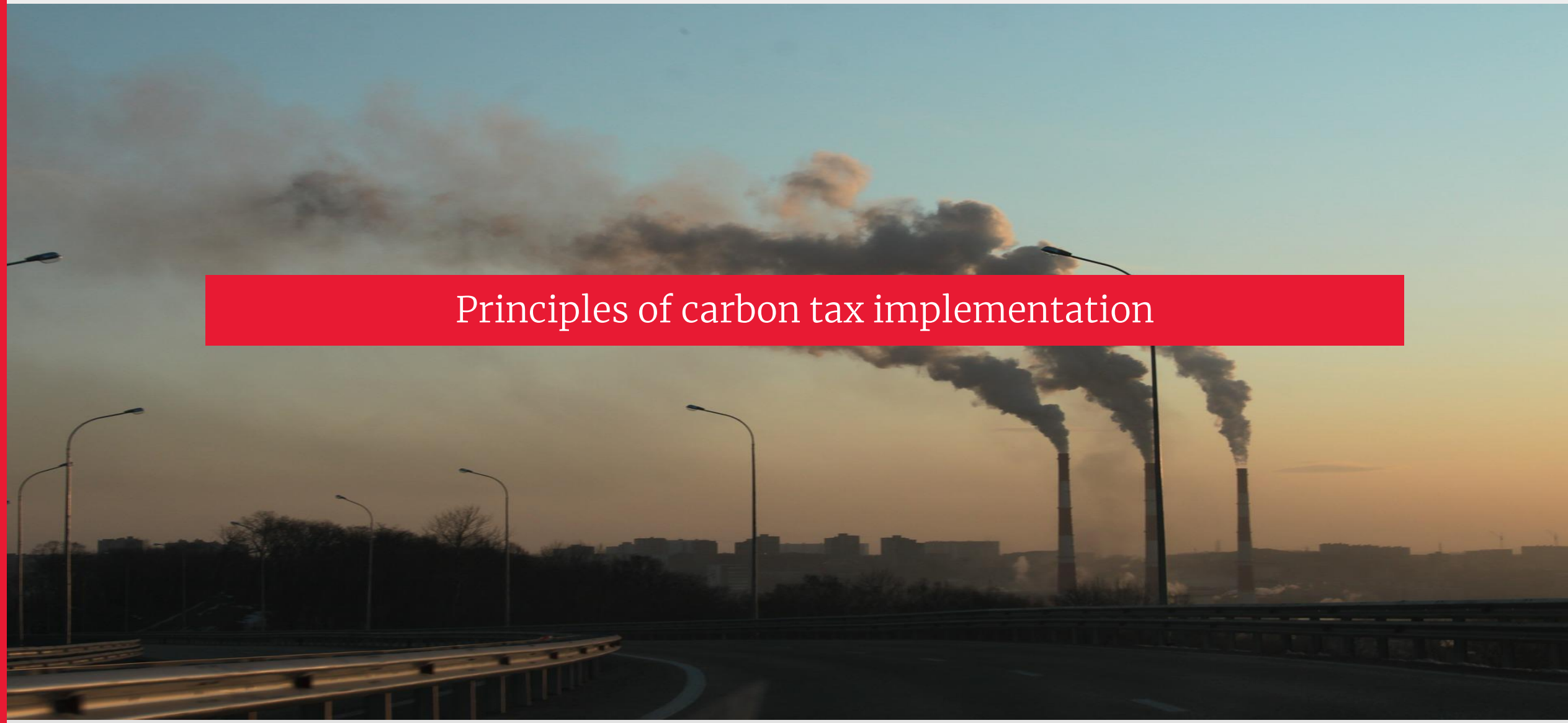

Principles of carbon tax implementation

Functioning of a carbon tax

- Government sets a tax rate for every ton of CO_2 emitted in one or more sectors
- Regulated entities are obliged to pay the carbon tax associated with their annual CO_2 emissions
- This means there is certainty on the price for emitting, but not on the emissions outcome and the revenues generated

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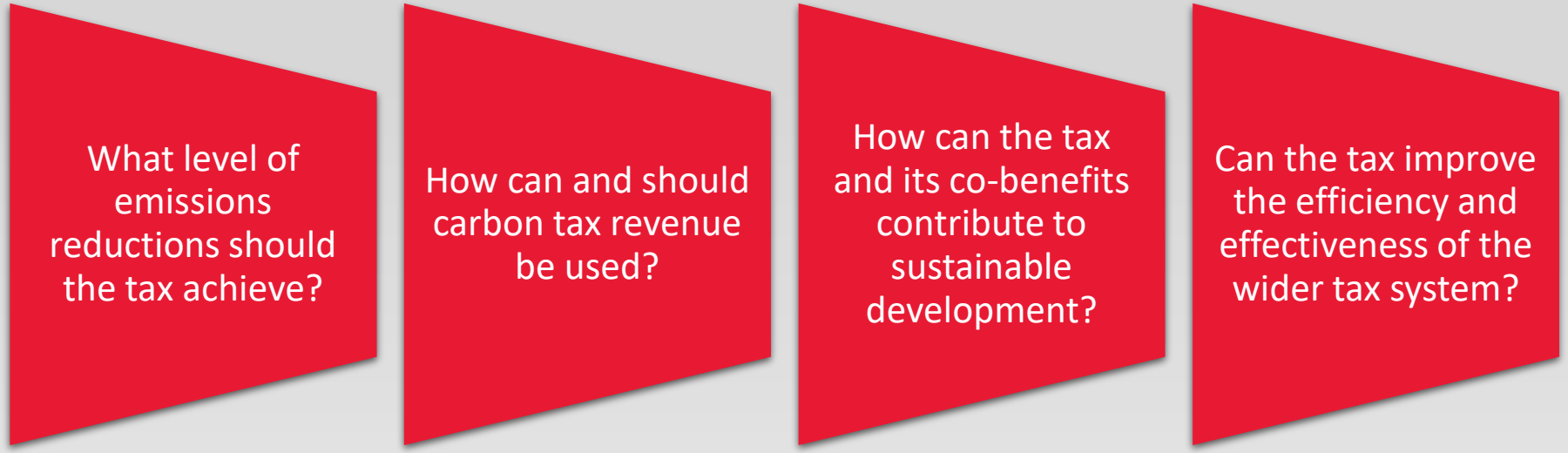
Basics for selection of carbon tax design

Setting objectives for the carbon tax

- The basis for the selection of carbon tax design is to understand the national circumstances and to define (policy) objectives for the tax
- Questions to consider when developing a carbon tax:



Considering the national context

- National circumstances should be considered when deciding on carbon tax design and implementation:

Pre-conditions for carbon tax implementation

Pre-conditions that facilitate effective carbon tax implementation and which jurisdictions should consider:

- Potential for reducing emissions in taxed sectors
  - Short-run (e.g. fuel switching)
  - Long-run (e.g. technology switching)
- Sufficient (institutional) capacities to implement and administer a carbon tax (incl. MRV)
- Legal mandate that enables institutional authority over and enforcement of the carbon tax

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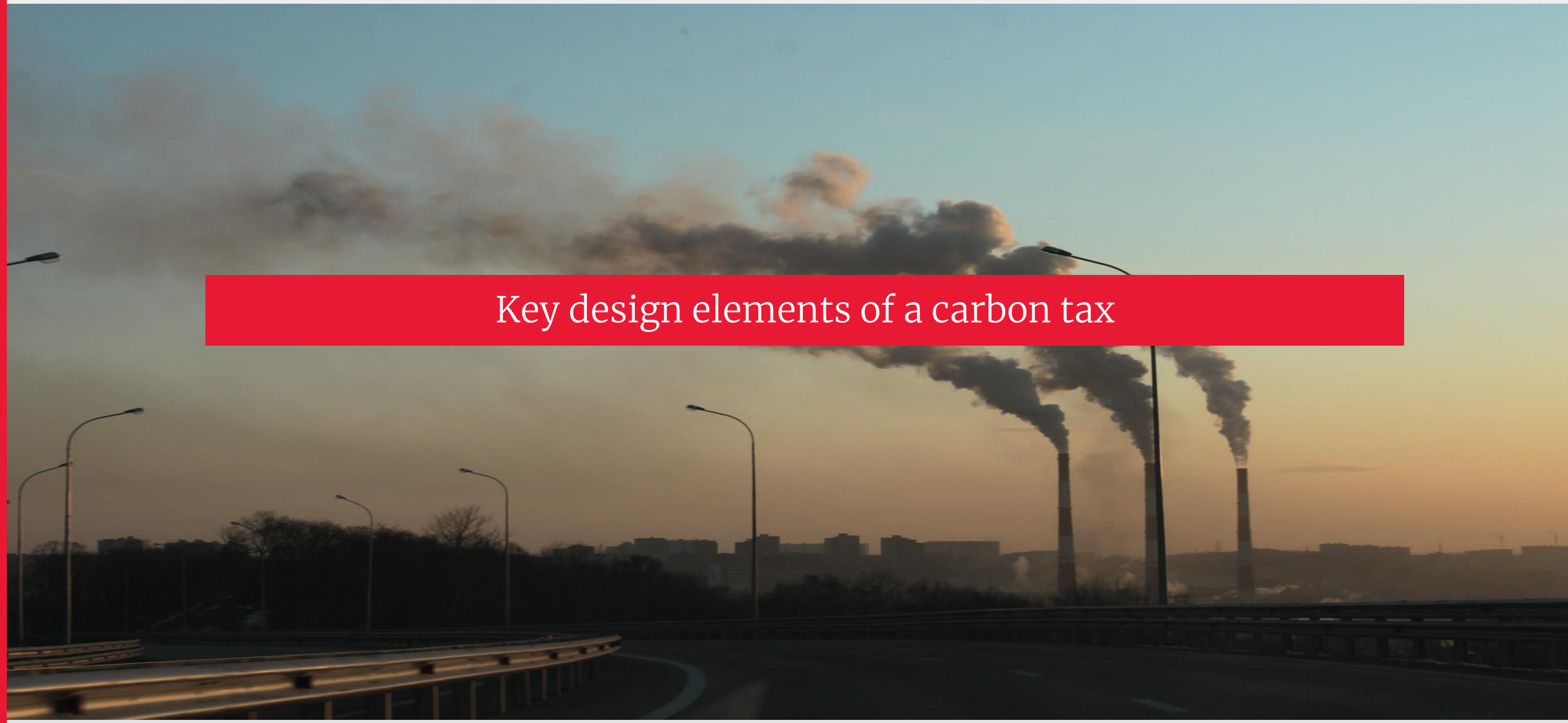

Key design elements of a carbon tax

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Each of the following four carbon tax (CT) scenarios allow your country to achieve its NDC target exactly. Which one would work best?

A) A constant $10 CT on CO2 emissions in all sectors

B) A CT on CO2 emissions in all sectors which starts at $2, increases by $2 annually until it reaches $20, and then stays constant

C) A constant $20 CT on CO2 emissions in electricity and heavy industry only

D) A constant $6 on GHG emissions in all sectors

Tax base

- Tax base or scope of the tax refers to the products, activities, and entities that are taxed
- Defining the tax base involves a number of decisions:
  1. Determining which sectors, activities and gases should be covered.
  2. Choosing the point in the supply chain at which emissions should be taxed (point of taxation).
  3. Defining the legal entity that will be held liable.
  4. Considering whether emissions below a certain threshold will be excluded from the tax.

Tax base – Sector-specific emissions

- A tax either covers the direct emissions associated with sector-specific processes or types of fossil fuels
- **Sectors:** Emissions taxed at the.ir source (power plant, factory). Usually emissions from electricity generation, industrial processes, or waste disposal are taxed.
- **GHGs:** Different GHG emissions can be covered
  - This approach allows for coverage of activities beyond fossil fuel combustion but MRV is a challenge.

Tax base – Emissions from fossil fuel

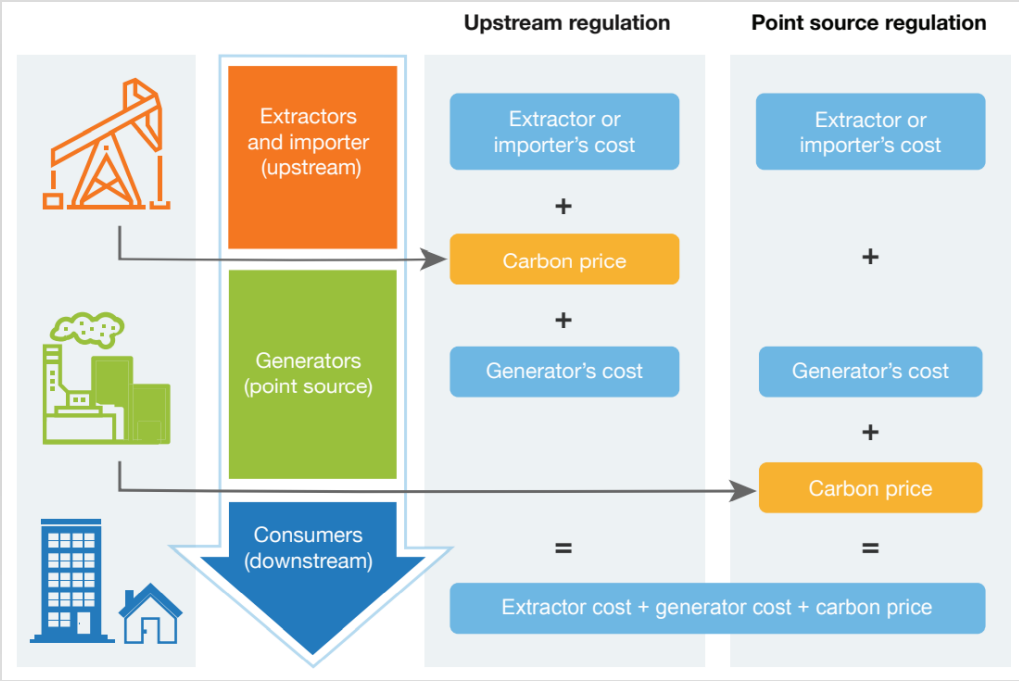
- **Fuels:** Either emissions resulting from the production, import or distribution of fossil fuels (coal, oil, gas) are taxed.
- **Sectors:** Fuels used for specific purposes (electricity generation, transport or heating) can be covered.
- **GHGs:** Only CO_2 is covered and process emissions are not covered.
  - The tax is calculated based on the carbon content of the fuels, not on the actual emissions. This can facilitate MRV as fuels are already subject to excise taxes.

Tax base – Point of taxation

- When considering the point of taxation it is crucial to determine what point is responsive to price signals and how high administrative/MRV efforts are
- Responsiveness to price signal: A carbon tax is effective in reducing emissions if
  - the increased costs can be passed through to entities/consumers
  - the carbon price is visible to relevant actors
  - they can change their behavior (fuel switch, low-carbon alternatives) accordingly.

Tax base – Point of taxation

- **Upstream:** Where product associated with emissions enters economy.
- **Midstream:** Usually point of processing.
- **Downstream:** Emissions regulated at point of consumption, by consumers, businesses or industry.



Source: PMR and ICAP Updated ETS Handbook, 2021

Tax base approaches worldwide

Taxes on fuels		
Jurisdiction	Fuel coverage	Major exclusions
Ukraine	**All**	**Agriculture, fishing, forestry, air, rail, and maritime transport**
Montenegro	**Coal**	**All sectors except electricity generation**
Slovenia	**All**	**EU ETS sectors, international maritime transport**
British Columbia	All	Agriculture, international aviation, and maritime transport
Denmark	All	EU ETS sectors, international maritime
France	All	EU ETS sectors, agriculture, commercial transport
India	Coal	Not applicable
Ireland	All	EU ETS sectors, agriculture, international maritime transport
Japan	All	Agriculture, forestry, air, rail, and maritime transport
Mexico	Coal, oil	Not applicable
Norway	Oil, gas	EU ETS sectors, international maritime transport, fishing, and agriculture (partially excluded)
Portugal	All	EU ETS sectors, international maritime
Sweden	All	EU ETS sectors, agriculture (partially excluded), international maritime transport
Switzerland	All	Transport, Swiss ETS-covered companies
United Kingdom	All	UK ETS sectors, agriculture (partially excluded), international maritime transport

Taxes on direct emissions	
Jurisdiction	Emissions covered
Australia (former)	Electricity generation, industry, waste, fugitive emissions
Chile	Large boilers and turbines
South Africa	Fossil fuel combustion, industrial processes, product use, fugitive emissions

Setting the tax rate (I)

- One of the most important aspects of carbon tax design is setting a tax rate that defines what amount companies are obliged to pay for every ton of emissions released
  - Determines the amount of emissions abatement, the revenue raised, and the overall economic impact of the tax
- Key points for setting tax rates:
  - Identifying the basis or principle to be used in setting the tax rate.
  - Determining whether and how the tax rate will vary over time after its initial implementation.

Setting the tax rate (II)

Useful starting points of different options for setting the tax rate:

- social cost of carbon: set the tax equal to the damages caused by a ton of emissions
- abatement targets: set the tax to achieve a specific carbon abatement level
- tax revenue targets: set the tax to achieve a specific level of revenue
- benchmarking: sets the tax to approximate neighbors and trading partners.

Setting the tax rate (III)

In a second step, jurisdictions should decide on how the tax rate will develop over time

Static – constant over time

Gradually increasing carbon tax rate

Dependent on **social cost of carbon**

Adjustment formula

Periodic review

Ad hoc adjustments

Setting the tax rate (III)

Decision on how to adjust the tax rate over time depends on considerations with regards to:

1) balancing the need to provide stability and predictability to investors and
2) retaining flexibility while taking into account changing circumstances.

Inflexible to external changes	**Static**	Simple and predictable
Inflexible to external changes	**Gradually increasing**	Ensures increasing carbon prices
Less predictable	**Social cost of carbon**	Ensures increasing carbon prices
Political feasibility	**Adjustment formula**	Predictable, flexible, incorporates policy goals and social impacts
Political feasibility, less predictable	**Periodic review**	Predictable, flexible, incorporates policy goals and social impacts
Not predictable	**Ad hoc intervention**	Responsive to new priorities

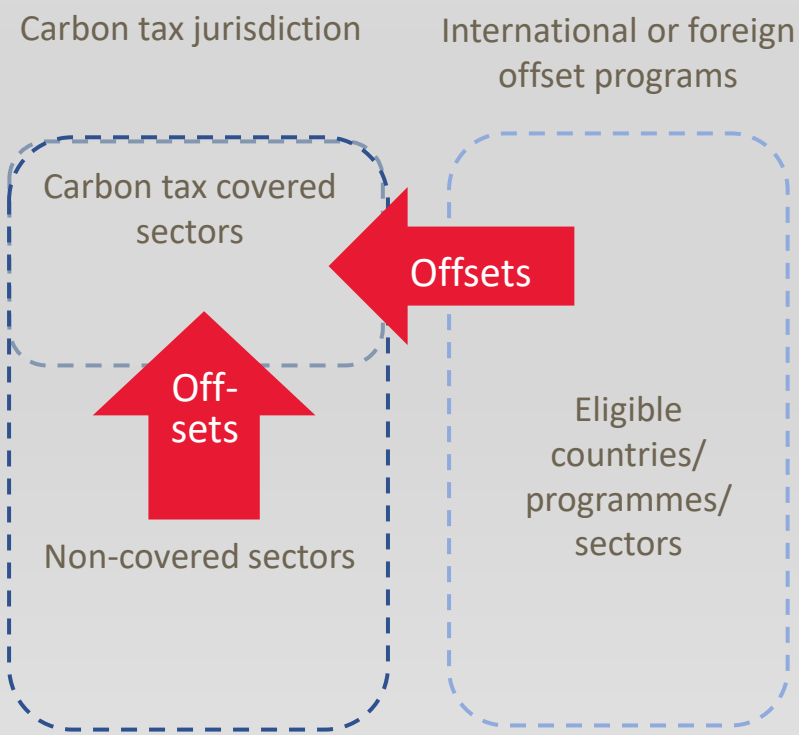
Setting the tax rate (III)

Government	Price in 2020 USD per ton of CO_2e
Mexico	0.30
Japan	2.71
Norway	29.96
Chile	5.00
South Africa	7.72
Portugal	26.98
Ireland	29.70
Denmark	27,06
United Kingdom (carbon price floor)	23.08
British Columbia	20.83
Iceland	31.27
France	50.95
Finland	31.44
Switzerland	102.25
Sweden	124.76
Colombia	5.01
Ukraine	1
Slovenia	19.44
Montenegro	27

Source: adelphi calculations based on publicly available national and WB data

Offset use in a carbon tax

- Offsets:
  - Credits for emissions reductions that took place outside the scope of the carbon tax
  - Quantified and sold in units that may replace, or offset obligations under the carbon tax
- Quantitative limits: Governments may set quantitative limits to the use of offsets as a form of compliance with tax liability, e.g. 10% of emissions.
- Qualitative limits or type of offsets: Governments may select priority sectors (e.g. forestry) or the use of offset from domestic programs only.



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Your country is considering a CT on CO2 emissions in all sectors which starts at $2 per ton, increases by $2 annually until emissions reach zero. Which one of the following would work best?

A) Return all revenues to citizens as a reduction in income taxes

B) Return all revenues to businesses adversely affected by the CT

C) Equal mix of A) and B)

D) Government keeps all revenues to spend on what it sees fit (e.g. to build schools hospitals, roads, etc.)

Addressing undesirable effects

- Carbon taxes can have adverse effects on consumers and the economy resulting from higher prices and cost pass through

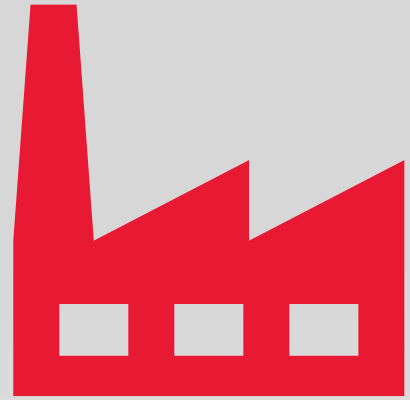
Adverse distributional impacts	Increasing prices of fuel, energy and other goods impact available income, particularly for poorer households.
Competitiveness and carbon leakage concerns	Carbon price puts emissions-intensive industries at a competitive disadvantage. Carbon leakage risk: shift of emissions to jurisdictions without equivalent climate policies.

Adverse distributional effects

- Carbon pricing often regressive (disproportionately affects the poor) in industrialized countries → likely different in developing and emerging economies (taxing fuels progressive, but not heating)
- Important: impacts may differ not just between different income groups but also geographically
- 'Energy poverty' as a particular challenge: carbon taxation should not run counter energy access and affordability goals .
- Using tax revenue is key to addressing social justice issues

Addressing undesirable effects – competitiveness and leakage concerns

- **Carbon leakage**: When carbon tax causes an increase in emissions in other jurisdictions that do not have equivalent emission-reduction policies (e.g. through relocating production)
- **Competitiveness concerns**: Carbon tax will increase input costs, which might put covered firms at competitive disadvantage
- Addressing these effects:
  - Reducing carbon tax payments: exemptions, reduced rates, rebates on carbon tax payments
  - Support measures: output-based rebates, support programs, subsidies (other tax reductions, flat payments)



Case study: Carbon tax in Ukraine

- Implementation: Carbon tax in place since 2011
- Purpose: 1) Encouragement of business entities to reduce emissions of pollutants; 2) Mobilization of funds to finance the costs of protection and rational use of natural resources
- Tax rate: UAH20/tCO2 *(2021)*
- Sectors covered: Applies to CO2 emissions from stationary sources emitting more than 500 tCO2e, so mainly the industry, power and buildings sectors
- Fuels covered: All types of fuels
- Share of jurisdiction's GHG emissions covered : 71% (312 MtCO2e) (2015)
- Government revenues: US$31 million (2020)
- Pathway towards strengthening the instrument over time: In addition to the tax, Ukraine has developed the main elements of the national MRV system to provide a solid basis for an upcoming ETS. The ETS launch could take place as early as in 2025.

Case study: Carbon tax in Montenegro

- Implementation: Carbon tax in place since 2019
- Purpose: Limitation of the energy facilities' GHG
- Tax rate: € 24/tCO2e (2020)
- Sectors covered: Electricity
- Fuels covered: Coal
- Future Pathway: In 2020, Montenegro's regulation on emissions trading entered into force, launching preparations for a national ETS that would cover the industry and power sectors.

Case study: Carbon tax in Slovenia

- Implementation: Carbon tax in place since 1996
- Purpose: 1) Reduce CO2 emission through the fuel price and therefore reduce environmental pollution; 2) Improve the competitiveness of renewable energy sources and the competitiveness of energy efficiency measures
- Tax rate: EUR 17.3/tCO2e (US$20/tCO2e) *(2021)*
- Sectors covered: Buildings and transport sector (almost all operators covered by the EU ETS are exempt from the carbon tax)
- Fuels covered: Natural gas and all liquid and solid fossil fuels
- Share of jurisdiction's GHG emissions covered : 50% (21 MtCO2e) *(2021)*
- Pathway towards strengthening the instrument over time: It is planned that CO2 tax will increase (at least 5% per year) and approach the ETS coupon price by 2030.

Key take-aways

- Setting carbon tax objectives, considering the pre-conditions and considering the national context are crucial before implementing a carbon tax.
- Key design elements of an environmentally and economically efficient carbon tax comprise a broad tax base, setting an ambitious tax rate trajectory and establishing robust MRVE.
- Adverse impacts of carbon tax (distributional effects, carbon leakage risks) can be addressed through appropriate design.

Thank you for your attention!

This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) supports this initiative on the basis of a decision adopted by the German Bundestag.

Useful resources and references

- United Nations Handbook on Carbon Taxation for Developing Countries, 2021, UNDESA. https://www.un.org/development/desa/financing/sites/www.un.org.development.desa.financing/files/2021-10/Carbon%20Taxation.pdf
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- Carbon Tax and Greenhouse Gas Control: Options and Considerations for Congress, 2009, Ramseur, J., and L. Parker. Congressional Research Service. https://sgp.fas.org/crs/misc/R40242.pdf