GIZ – Carbon Pricing Training for Members of the Energy Community

Carbon pricing in the policy mix

Dr. Baran Doda & Theresa Wildgrube
11 March 2022
Learning objectives

• Appreciate the **place of climate policy** in a broader policy landscape
• Understand the types of **interactions** between carbon pricing and other climate and energy policies
• Gain deeper insights into how carbon pricing can interact with the **electricity market**
• Understand how to assess and manage the **overlap** between carbon pricing and other climate and energy policies
Competing policy objectives
Climate policy as one facet of sustainable development

- Energy security
- Electricity market reform
- Energy affordability and access
- Reducing air pollution
- Industrial development
- Macro-economic and fiscal objectives
- Poverty reduction
- Economic policy
- Social policy
- Climate Policy
- Energy Policy
- Environmental policy
- Reducing emissions

17.03.2022
Climate Policy Instruments

Price-based instruments

Command-and-control regulation

Technology support policies

Information and voluntary approaches
Climate policy instruments

- Emissions Trading System
- Carbon tax and climate levies
- Subsidies for emission reduction activities

- Technology standards
- Performance standards
- Prohibition or mandating of certain products or practices
- Reporting requirements
- Land use planning

- Price-based instruments

- Command-and-control regulation

- Technology support policies

- Information and voluntary approaches

- Public and private RD&D funding
- Public procurement
- Green certificates
- Feed-in tariffs
- Public investment in clean energy infrastructure
- Removing financial barriers to acquiring green technology

- Rating and labelling programs
- Public information campaigns
- Education and training
Which set of policies would work best in the context of your country?

A) Price-based instruments
B) Technology support policies
C) Command-and-control regulation
D) Information and voluntary approaches

The code is: 5433 3363
Climate and energy policy interactions with carbon pricing
Interactions between carbon pricing and other policies

- Carbon pricing approaches always co-exist and interact with other policies, both in the climate field and beyond

  - Examples:
    - Renewables support policies: may drive emissions reductions inside the scope of the carbon tax/ETS
    - Electricity market regulations: competitive electricity markets where electricity prices reflect costs can enhance effectiveness of carbon tax/ETS
    - Pollution regulations on electricity generation: could reinforce a carbon tax by reducing total energy use
Policy mix: Carbon pricing, energy efficiency and technology policies

Carbon pricing mediates action economy-wide – negative to positive abatement costs
*Example:* A carbon tax on fossil fuels would help promote renewable energy use

Technology support policies to reduce costs for long-term decarbonization – high abatement costs
*Example:* Research, development and demonstration (RD&D) of renewable energy options could pave the way for clean energy infrastructure

Policies to unlock cost-effective energy efficiency potential – negative abatement costs
*Example:* Minimum energy performance standards for electric appliances promote production and use of energy efficient appliances

Price of CO$_2$ (€/t CO$_2$) vs. Abatement effort (Mt CO$_2$)

Graphic based on: Hood 2011
Types of policy interactions

Complementary policies
Can be combined with CP and enhance performance of each

Overlapping policies
Same incentive effect, but may impact & create tension with carbon pricing signal

Countervailing policies
Weaken carbon price signal
Complementary policies

- **Energy markets:**
  - Liberalized electricity markets

- **Infrastructure:**
  - Other policies that expand infrastructure provision and access and support

- **Land use:**
  - Afforestation policies encourage carbon sequestration

- **Finance:**
  - Improving access to and availability of finance
Partly create the **same incentive** as carbon pricing (motivated by their own objective), i.e. by adding cost to carbon cost or providing financial support to activities already incentivized by carbon price

**Prime example:** renewables support policies

**Rationales for retaining overlapping policies:**
- Industrial policy: promoting certain industries of the future
- Providing long-term investment certainty
Countervailing policy

- Fossil fuel subsidies
- Electricity market regulation that attenuates carbon cost pass through
- Exemptions that work against the carbon price signal
Carbon Pricing and Electricity Market Interactions
Should policymakers establish liberalized and competitive electricity markets before introducing carbon pricing?

A. Yes  
B. No  
C. It depends  
D. Looking forward to the slides on this
Why electricity market deserves special attention?

– Ideal for coverage as few large fossil-based emitters, with clear installation boundaries and simple MRV.
– Reducing emissions from the power sector is generally cheaper than in other sectors and alternative technologies are available in the market.
– The sector remains the single largest source of emissions worldwide (42% in 2018, IEA 2020) despite declining emissions in some regions.
– It will play a key role in decarbonizing transport, building and energy-intensive industry.
How does carbon pricing affect dispatch decisions? The Merit Order Curve
How does carbon pricing affect abatement channels in the electricity sector?

### Production
- Carbon-intensive power plants run less (reduced load factor)
- Carbon-intensive units’ net earnings decrease (price/cost spread; lower margins)
- Low-carbon assets run more (higher load factor)
- Low-carbon assets net earnings increase (price/cost spread; higher margins)

### Investment
- Decreased NPV of carbon-intensive plants → *early decommissioning*
- Decommissioning unfeasible? → *retrofitting*
- *Precludes* new investment in carbon-intensive generation assets
- Increased rate of return on low-carbon assets → *increased low-carbon capacity*

### Demand-side response
- Higher electricity prices → Improvements in *energy efficiency*
- Increased prosumer activity

Market requirements for carbon pricing to work effectively:

#1 Carbon costs must be reflected in electricity prices
#2 And be considered in least-cost dispatch decisions
Many countries considering carbon pricing do not have liberalized power markets

→ Different forms of electricity sector regulation interact with ETSs in ways that may prevent or change how participants respond to the carbon price.

Source: Power Markets Database, World Bank

17.03.2022
How can carbon pricing work when electricity markets are not liberalized?

- **Non-economic dispatch** – electricity is not prioritized based on economic cost but on average costs or broader criteria.
  
  Carbon price cannot drive fuel switching, hence no increased running hours for low-carbon generation
  
  ➢ Carbon costs of power plants must be considered in dispatch formula. Where PPAs fix utilization rates, they must be reformed.

- **Regulated wholesale tariffs**: focus on cost recovery and not marginal cost pricing
  
  Impact of carbon price will depend on tariff methodology (cost plus rate of return), allocation methodology (net carbon costs for generators), the dispatch formula as well as the existence of cost compensation outside of the market.
  
  ➢ At the minimum, net carbon price must be reflected in wholesale tariffs.

- **Regulated retail prices** – retail prices may not incorporate allowance costs
  
  Carbon price will not drive low carbon consumption.
  
  ➢ At the minimum, carbon costs should be recovered from the end consumer to avoid losses. Alternatively, indirect emissions can be covered by the ETS to retain abatement incentives.
Working towards policy alignment
1. General

- Recognize that governments face multiple competing objectives
- Evolutionary approach: provide for structured processes for review and realignment
- Use policy mapping and analytical tools to understand the impact of policy interactions
2. Complementary policy instruments should address mitigation potentials that carbon pricing cannot address:
   • Emissions reductions in sectors that usually do not react to carbon pricing (e.g. agriculture)
   • Provision of long-term impulses for R&D and deployment
   • Infrastructure investments in the transport sector that facilitate a modal shift (e.g. ICE car to rail)
   • Reform packages (electricity sector!) where carbon pricing and other reforms can reinforce each other
3. Overlapping policies should be limited and have a clear rationale:
   • Enhance coordination between actors responsible for mitigation policy
   • Clarify rationale for each policy in the policy mix and evaluate accordingly
   • Design carbon pricing and other instruments accounting for the overlaps

4. Clarify rationale for countervailing policies and consider possible options for less distorting measures
Managing interactions between carbon pricing and other policy instruments
Managing policy interactions

1. **Start with existing climate targets and instruments**
   Use sectoral targets, current and future abatement costs and abatement potentials to model and plan the expected emission reductions of existing and new climate policy instruments and analyze benefits for sustainable development.

2. **Impacts of other factors and policies**
   Make assumptions about all factors (economic growth, fuel prices) and policies that might impact the emissions trend in covered sectors.

3. **Setting policy stringency**
   Set the ETS cap level or carbon tax rate with these assumptions, contributions of other policy instruments and the emission target in mind.

4. **Review assumptions regularly**
   Adjust the ETS cap / tax rate (or complementary policies) based on the reviews and if necessary.
Tools/approaches to assess policy interactions

• Assessment should happen **before** carbon pricing policy is introduced and reviewed periodically after.
• Will likely involve qualitative and quantitative components:
  - **Qualitative** - policy mapping: identify complementary, overlapping and countervailing policies. Identify the objectives of each instrument, including scope, system functioning and administration, review cycles and responsible bodies.
  - **Quantitative** - different types of models can provide useful insight.
Key take-aways

- Carbon pricing is an efficient instrument in the climate policy toolbox, but will not and should not be the only instrument – additional instruments are needed.
- Policy interactions and overlaps are common and can be managed.
- In a coherent policy mix, complementary policies should go hand in hand with carbon pricing.
- In the policy mix, each instrument has to have its function. Interactions between the different instruments need to be monitored and managed.
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.
References


