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GIZ – Carbon Pricing Training for Members of the Energy Community

Carbon pricing in the policy mix

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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



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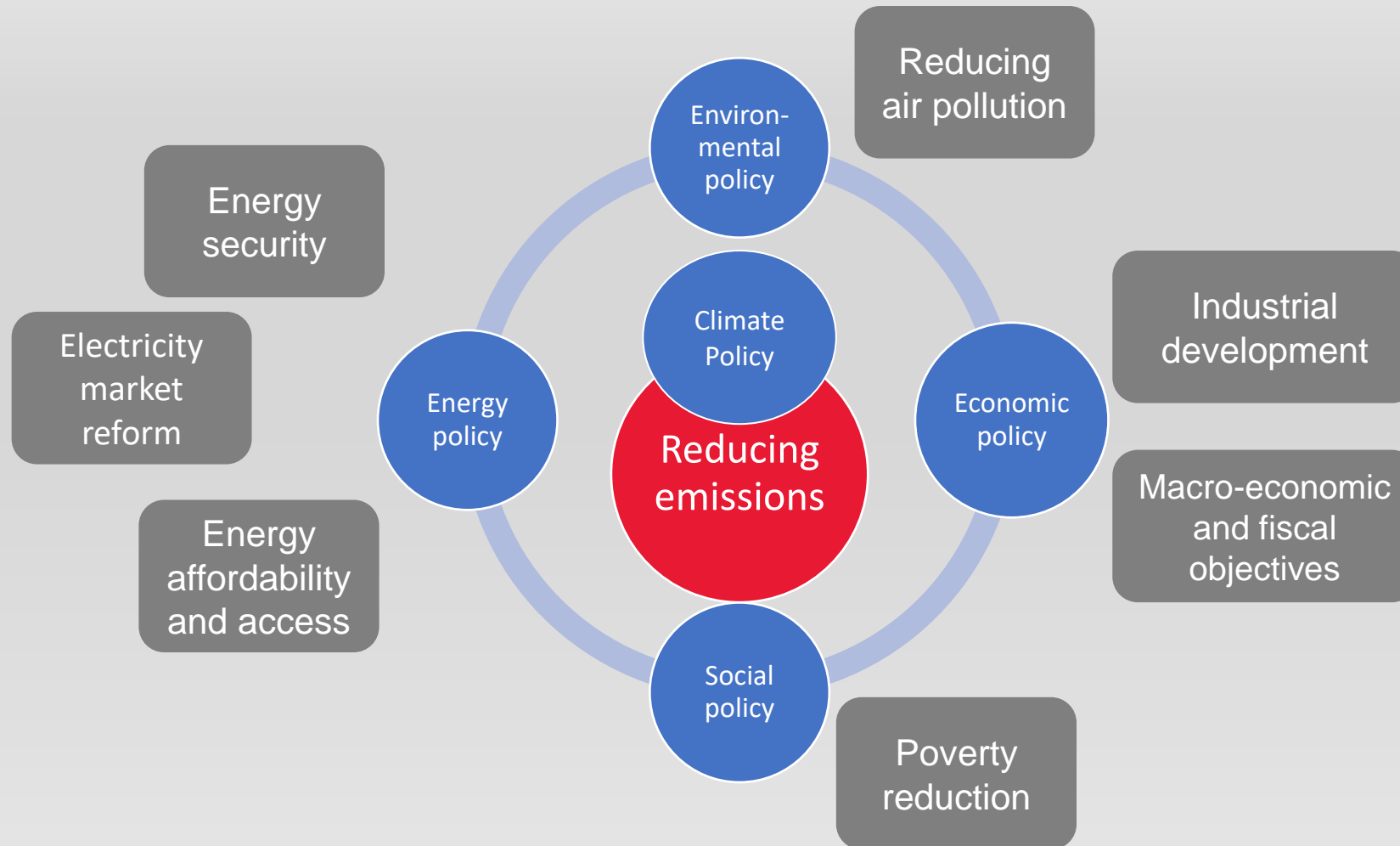
Competing policy objectives

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Climate policy as one facet of sustainable development



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Climate Policy Instruments

Price-based instruments

*Technology support
policies*

*Command-and-control
regulation*

*Information and voluntary
approaches*

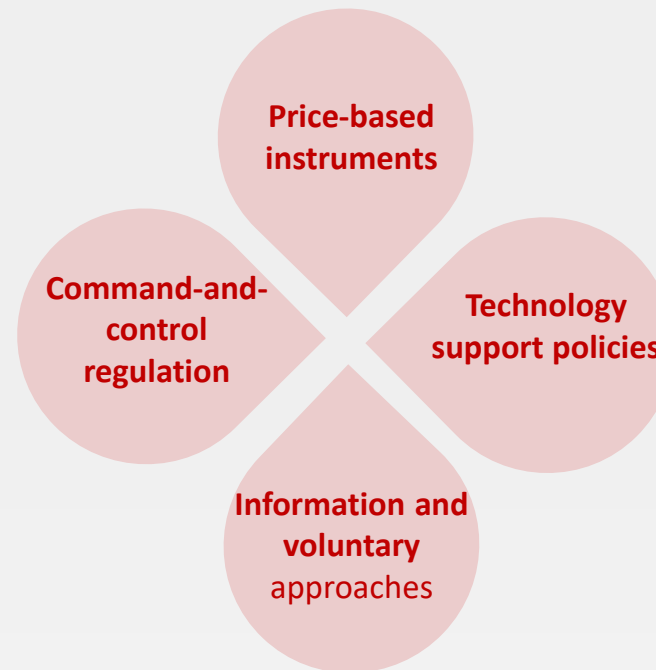
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Climate policy instruments

- 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



- 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

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 **Mentimeter**

The code is: 5433 3363

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*



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Climate and energy policy interactions with carbon pricing

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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

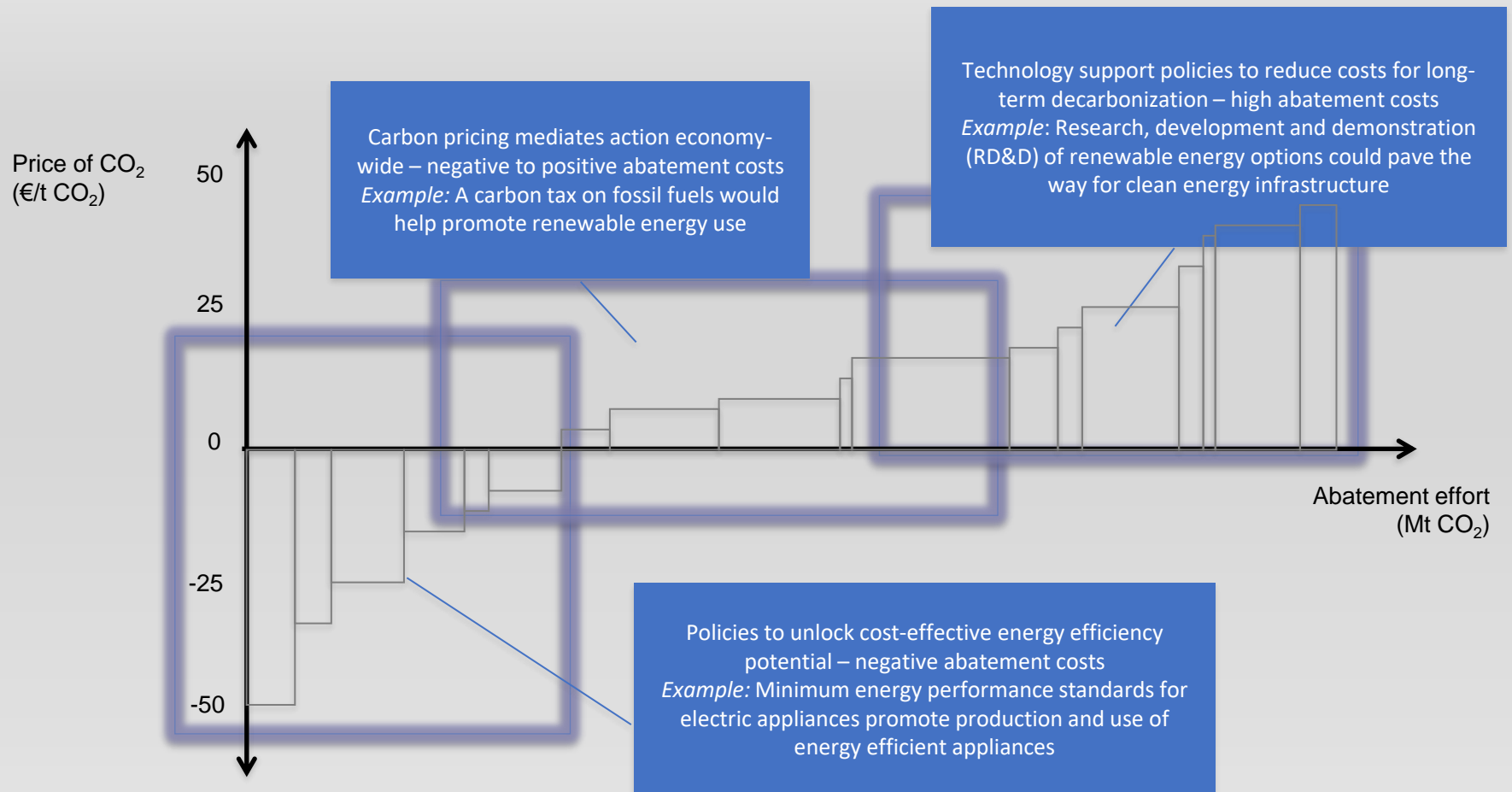
Electricity market regulations: competitive electricity markets where electricity prices reflect costs can enhance effectiveness of carbon tax/ETS

Pollution regulations on electricity generation: could reinforce a carbon tax by reducing total energy use

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Policy mix: Carbon pricing, energy efficiency and technology policies



Graphic based on: Hood 2011

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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



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Complementary policies

- **Energy markets:**
 - Liberalized electricity markets
- **Land use:**
 - Afforestation policies encourage carbon sequestration
- **Infrastructure:**
 - Other policies that expand infrastructure provision and access and support
- **Finance:**
 - Improving access to and availability of finance



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Overlapping policy

- 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

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Countervailing policy

- Fossil fuel subsidies
- Electricity market regulation that attenuates carbon cost pass through
- Exemptions that work against the carbon price signal



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Carbon Pricing and Electricity Market Interactions

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 **Mentimeter**

The code is: **5433 3363**

Should policymakers establish liberalized and competitive electricity markets before introducing carbon pricing?

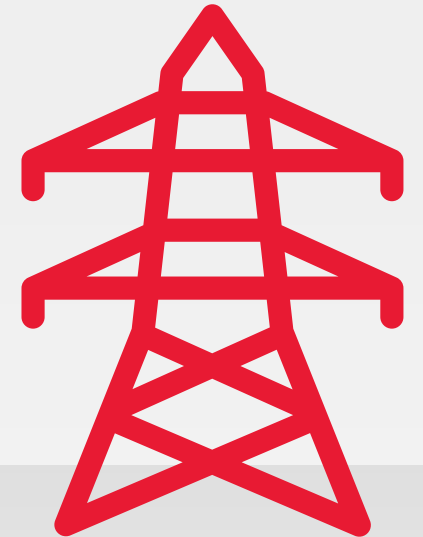
- A. Yes
- B. No
- C. It depends
- D. Looking forward to the slides on this

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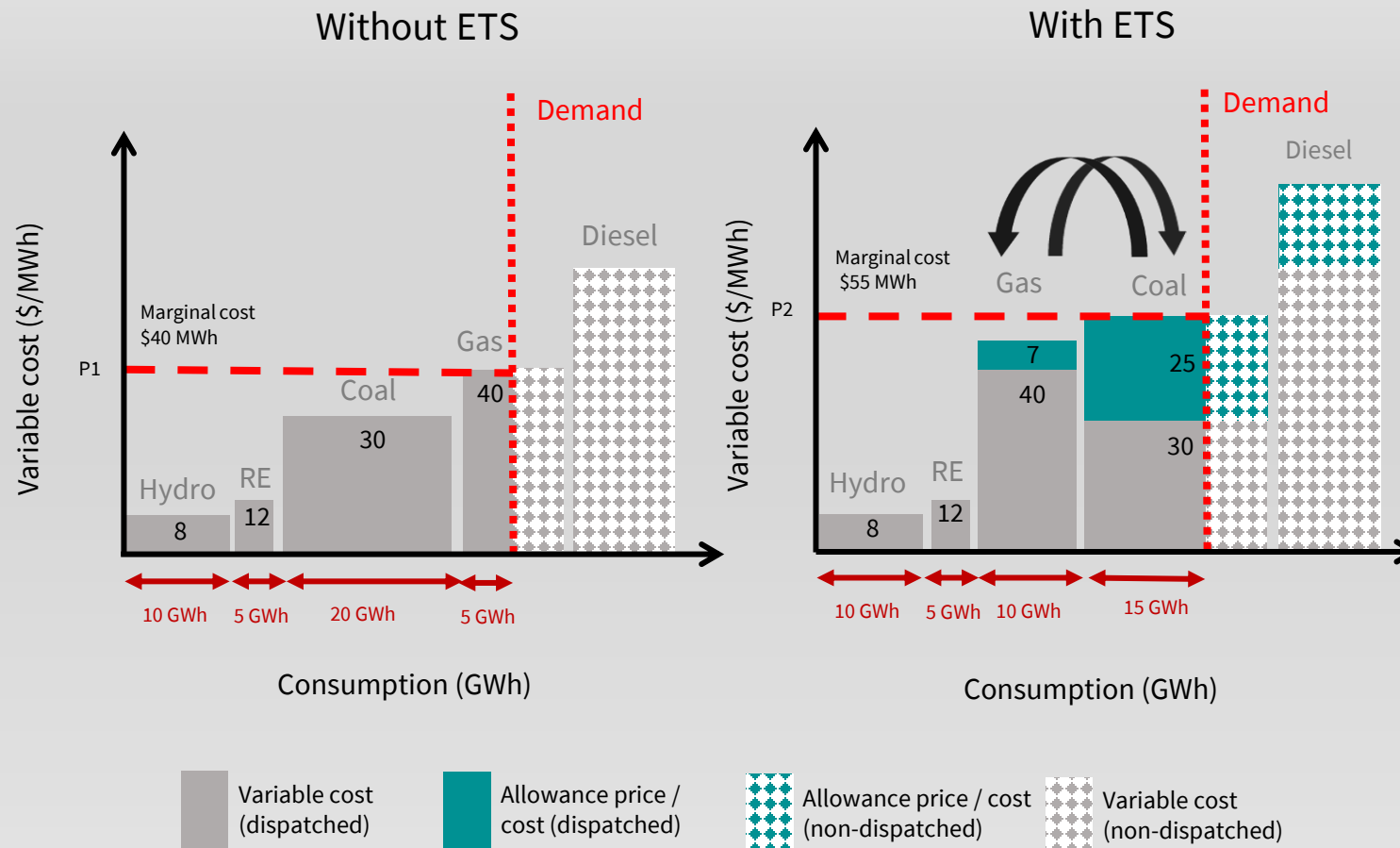


Why electricity market deserves special attention?

- 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



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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

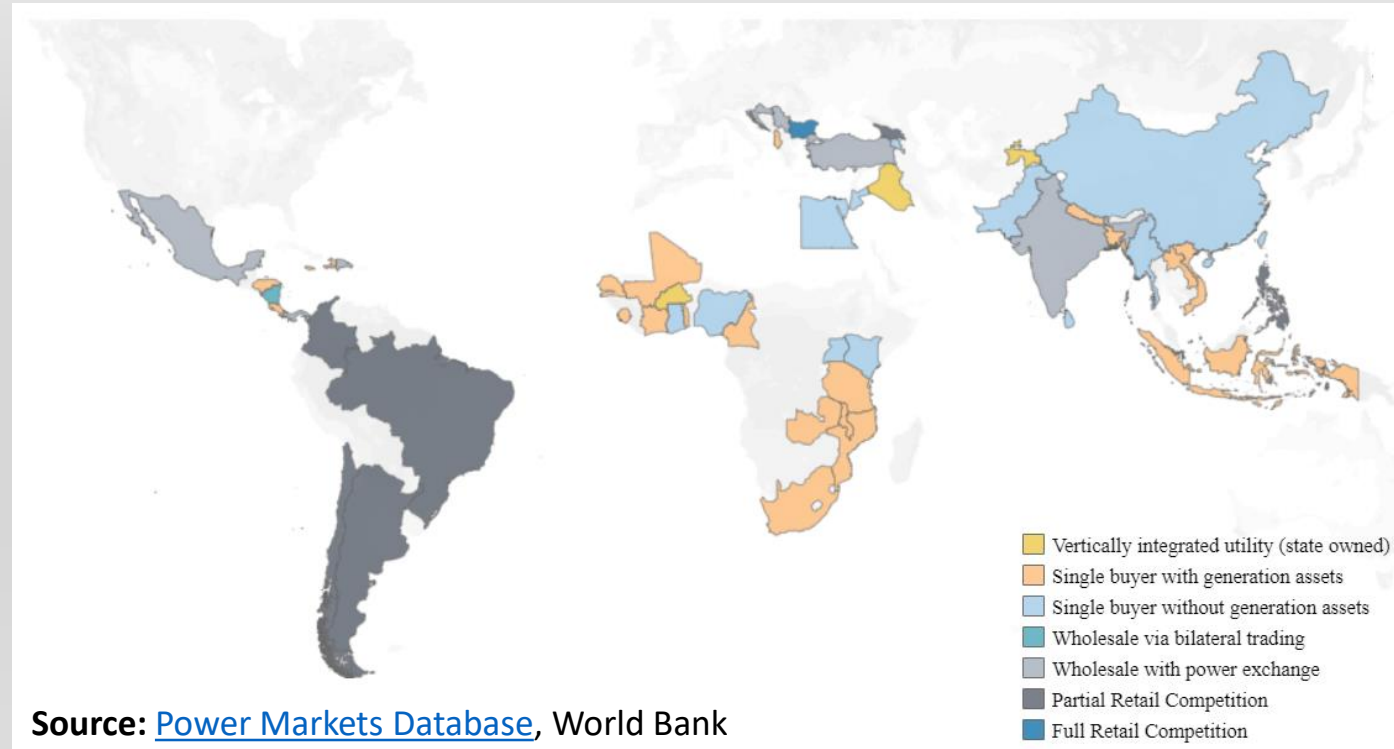
Market requirements for carbon pricing to work effectively:

- #1 Carbon costs must be reflected in electricity prices
- #2 And be considered in least-cost dispatch decisions

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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.

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

Regulated wholesale market

Vertically integrated monopoly

- **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.**

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Working towards policy alignment

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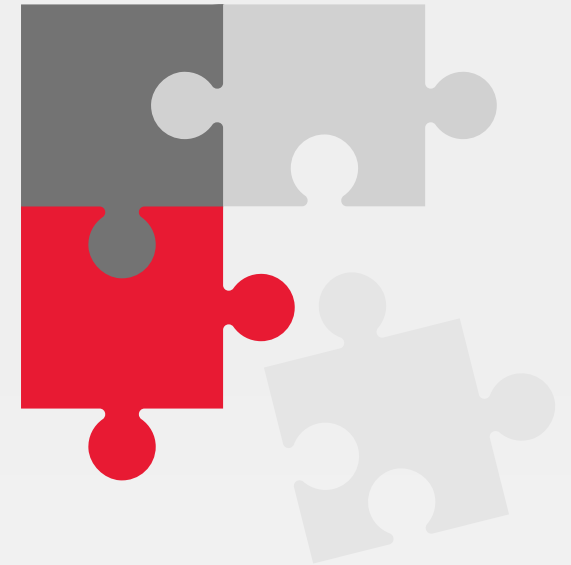
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Working towards policy alignment (1)

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



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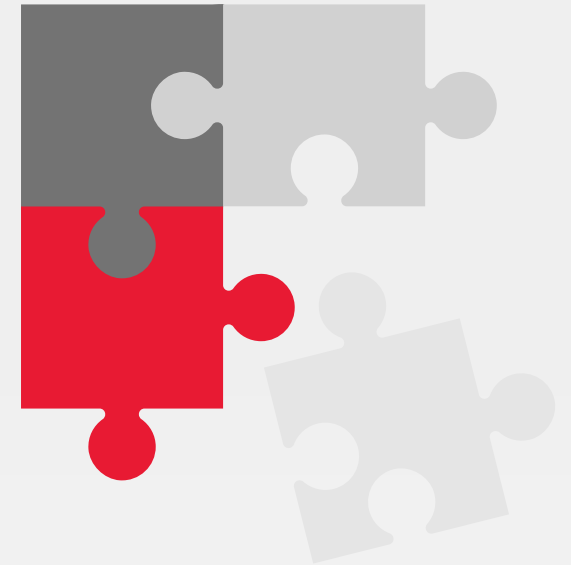
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Working towards policy alignment (2)

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**



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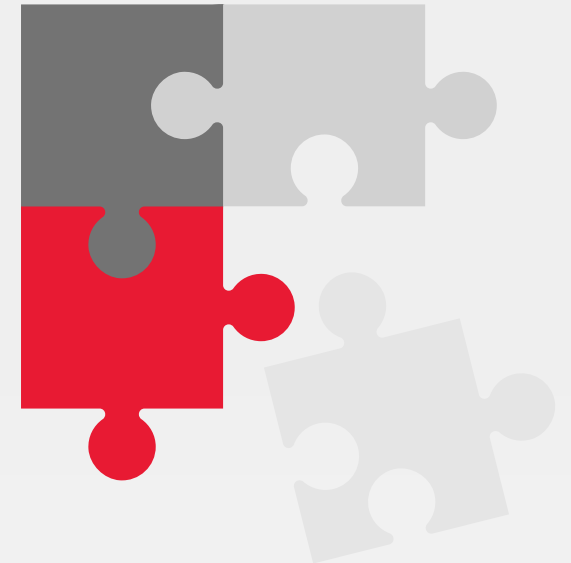
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Working towards policy alignment (3)

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



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Managing interactions between carbon pricing and other policy instruments

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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

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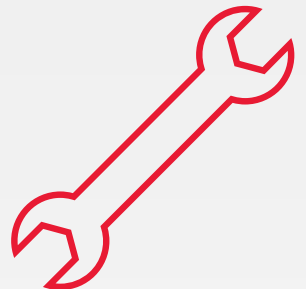
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Tools/approaches to assess policy interactions

- 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.



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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.



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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.

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