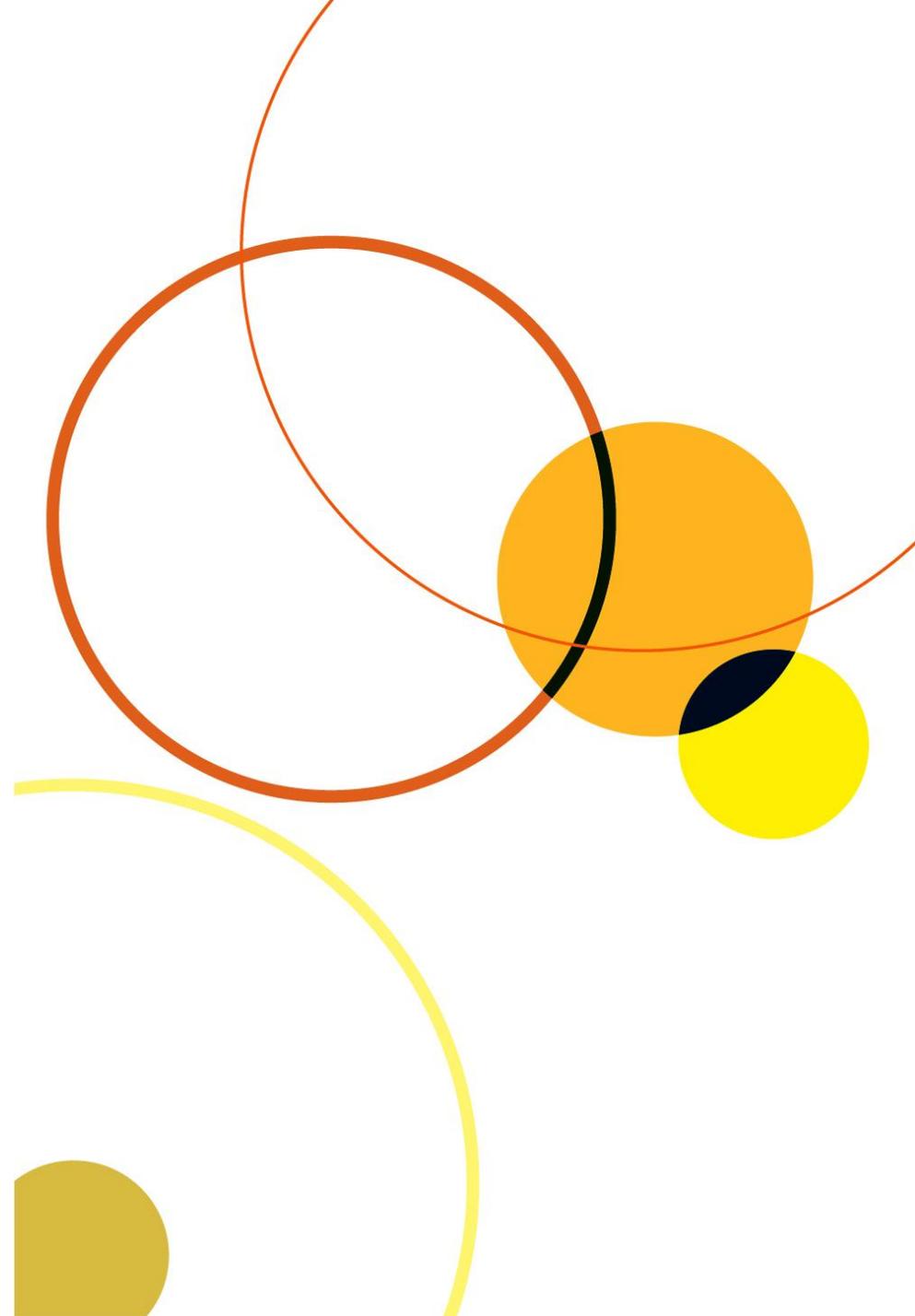


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How policy interactions can be explored

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While developing climate policies, countries face a host of interactions with policies and the economy

There is the potential to increase efficiency and avoid costs by aligning policies

carbon pricing is often presented as a **cross-sectoral cornerstone** of emissions mitigation by

delivering economic growth, employment and macroeconomic stability, improving educational performance and access to health services, supporting efficient infrastructure delivery and ensuring social protection – **many policies to achieve these objectives interact with carbon pricing**

an integrated package of climate policies that also supports other policy objectives will be much more likely to gain widespread stakeholder support and smooth policy implementation

- in contrast, incoherent policy packages that lead to duplication or negative interactions will raise costs and face resistance

The interactions can be analysed in a framework of three types of policy interactions

complementary: those that are combined with carbon pricing in such a way as to enhance the performance of each

- improving access to finance for emission reduction investments

overlapping: trigger the same incentive effect as carbon pricing and contribute to the overall goal of decarbonisation; however, because of this overlap, they may also affect and create tension with the carbon pricing signal

- renewable portfolio standards and vehicle efficiency standards

countervailing: those that weaken the carbon price signal

- fossil fuel subsidies

Complimentary policies strengthen the carbon price signal and create efficiencies

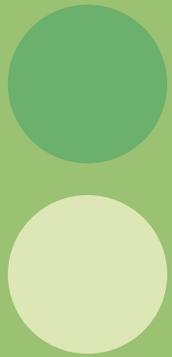
Four policy domains can provide strong complementarity with carbon pricing

energy markets, particularly power: the interaction between carbon pricing and other policies in power markets to deliver greater emission reductions while also supporting energy access and reliability

infrastructure: the benefits from policies that both expand infrastructure provision and access, as well as support the delivery of emission reductions

energy efficiency: overcoming non-price barriers to energy efficiency investments that deliver emission reductions and multiple other benefits in the buildings and transport sectors

finance: improving access to and availability of finance in order to support both emerging emission reduction technologies and overall investments



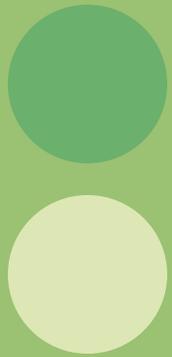
Overlapping policies operate in parallel to, and independently of, carbon pricing

Motivated by their own objective, they partly create the same incentive as carbon pricing

overlapping policies may affect the carbon price signal **and increase the overall social cost of reducing emissions**

- they provide additional financial support or create additional financial costs to activities that the carbon price also incentivizes or penalizes
- renewables support policies such as feed-in tariffs or green certificates provide low-carbon electricity generators with a financial incentive in addition to the competitive advantage provided by a carbon price

overlapping policies are **often restricted to certain sectors or economic activities**, in contrast to the broader cross-sectoral focus that is typical of carbon pricing



Four main reasons why policy makers want to introduce or keep **overlapping** policies

provision of long-term investment certainty: capital grants, feed-in tariffs, performance standards and other policies may provide a stronger long-term investment signal than potentially volatile carbon prices, such as in an ETS, or when there is uncertainty about the long-term carbon price path under a tax

industrial policy: the use of overlapping policies to support certain low-carbon technologies may be a form of industrial policy with the intention of boosting jobs and export performance in the sectors that are believed to be the future comparative advantage of a country

support penetration of technologies: support certain technologies that may face short term market barriers, but are believed to be necessary for long term disruptive transformation

avoid lock-in of capital in assets that may be stranded in future: carbon prices may not deter investment, particularly in long-lived assets such as infrastructure or power plants, that may become stranded under tightening emission targets. Performance standards, as seen in electricity in the UK, are an example of overlapping policies to help overcome this

Countervailing policies reduce the effectiveness of carbon pricing

Three broad types of countervailing policies

controversial in their own terms: policies with objectives directly counteract emission reduction efforts without achieving their objective (or being less efficient at this than alternatives)

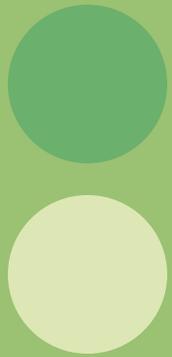
- fossil fuel subsidies to support low-income households

modifiable: possibility to keep original objective while modifying the policy instrument to support the carbon price signal

- urban mobility policies and interventions

competing interests: represents legitimate trade-offs between competing public interest objectives

- fiscal and financial stability policies that may reduce tilt investment in favour of conventional, more emission intensive technologies



For some policies, their design determines whether they are complementary, overlapping or countervailing

transport policy and infrastructure can either enhance or impede the carbon price signal, **depending on its calibration**

in some cases, previous infrastructure investments **can be modified to become complementary instead of countervailing**

- part of Bogotá's originally car-focused infrastructure was converted into a bus rapid transit system, the TransMilenio, serving over 2 million passengers per day, reducing congestion and operating at a profit, providing an opportunity to maintain mobility at low cost should transport fuel prices increase to reflect the cost of pollution

A range of options exist to improve policy alignment

Aspect	Opportunity for alignment
Generic	Recognize that governments face multiple competing objectives
	Anticipate the need for iteration and evolution and build in structured processes that provide the flexibility for review and realignment
	Develop and make use of an increasingly diverse range of analytical tools to understand how firms and individuals may respond to multiple policies
Complementary	Acknowledge and communicate the need for multiple policies
	Look for packages of reforms, most likely in the power sector, where carbon pricing and other policy reforms mutually reinforce each other
Overlapping	Enhance coordination between bodies responsible for mitigation policy
	Clarify the rationale for each additional policy in the policy suite and evaluate the efficacy of each policy according to this rationale
	Design carbon pricing and other policies to take account of overlaps
Countervailing	Articulate the rationale for countervailing policies and replace with less distorting alternatives if the rationale is not defensible
	Recognize that carbon pricing can be part of the process of scaling down countervailing policies that do not have a clear rationale

Successful analysis of policy interactions is likely to use several qualitative and quantitative tools in combination

qualitative policy-mapping

- policy mapping: **complementary, overlapping and countervailing** to better understand where pressure points between policies and carbon pricing may occur
- including policy objective, instruments that are aimed at achieving the objective, scheme administration, review processes and sectoral and energy-source coverage

quantitative analysis

- **general equilibrium** models to provide a comprehensive macroeconomic assessment of policies
- **partial equilibrium** models that seek to explain behavior within a particular market or sector
- **optimisation models** covering specific sectors, such as electricity
- **agent-based modelling (ABM)** approaches to support the design and implementation of policies
- policy-induced marginal abatement cost methodology (**POL-MAC**)

Policymakers can also combine a qualitative understanding of existing policies with quantitative analysis

general equilibrium models provide a comprehensive macroeconomic assessment of how carbon reduction policies might influence an economy and account for both the direct impacts and the final incidence of the policy, including the cost, output and employment impacts after the direct impacts have propagated through the economy

- however, comprehensive economic coverage is achieved only by sacrificing details on how policies might be designed and expected to influence firms and individuals. In particular, they tend to collapse all carbon mitigation policies into a single “shadow” carbon price making the assessment of multiple climate policies difficult

partial equilibrium and **optimization models** that seek to explain behavior within a particular market or sector and provide greater granularity than general equilibrium models

- however, they often fail to capture the impact of policies on the behavior of economic agents and are likely to miss interactions across the economy

Agent-based models (ABMs) can help overcome challenges of ex-ante assessments

ABM in climate policy is relatively new, yet several models exist to analyze policy interactions

ABMs **simulate how individual economic agents**, such as firms or households, might react to the incentives generated simultaneously by multiple – complementary, overlapping and countervailing – policies

- a bottom-up supplement to the top-down approach taken by equilibrium models to help policymakers understand the path through which policy shocks might lead to a change in behavior
- one of the first application looked at effectiveness of energy efficiency policies in Ireland, Bulgaria and Croatia
 - ABMs have also been used to consider the distributional impacts of a number of possible designs of climate policy packages

one particular family of ABMs is the methodology of converting traditional techno-economic marginal cost curves into the financial models representing policy impact from the perspective of investors and consumers, a so called policy-induced marginal abatement cost methodology (**POL-MAC**)

Further details on the framework for policy interaction and quantitative tools can be found in recent publication

Framework and quantitative tools: Chapter 3 of the World Bank's State and Trends 2016 ([link](#))

Additional details on quantitative tools: Checklist on Establishing Post-2020 Emission Pathways ([link](#))

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