A “Fit for 55” Package Based on Environmental Integrity and Solidarity

Designing an EU Climate Policy Architecture for ETS and Effort Sharing to Deliver 55% Lower GHG Emissions by 2030

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Preface

Dear reader,

The European Commission plans to propose a "Fit for 55" legislative package in the summer of 2021 to fundamentally overhaul the EU's climate policy architecture and put the EU on track to deliver on its 2030 climate target of 55%. A fundamental decision by European Council is thus quickly needed on the key features of an EU climate policy framework that delivers on the EU's climate targets, including the role of EU-wide emissions trading for heating and transport fuels.

This paper makes the case for a strong European climate governance based on the principles of environmental integrity and European solidarity. It advocates for a smart mix of EU-level carbon pricing and companion polices to help Member States in fulfilling their goals.

I hope you find this report informative and stimulating.

Patrick Graichen,
Executive Director, Agora Energiewende

Key messages:

1. **The EU's "Fit for 55" climate policy architecture must guarantee environmental integrity and address solidarity.** To guarantee both, the architecture must have a robust compliance mechanism. Whatever EU climate policy architecture is chosen, each ton of CO_2 must be governed by the ETS or the Effort Sharing mechanism. At the same time, the target achievement must be a collective endeavor that supports lower-income Member States and poorer households.

2. **There are different options for strengthening the ETS and/or effort sharing while ensuring the environmental integrity of the 55% target.** A standalone ETS for transport and/or buildings, an enlarged EU ETS, or tightened effort sharing are all options that could work, and each has their pros and cons. The important thing is to define who is accountable for reducing emissions, and who will be responsible if targets are not met. When emissions trading serves as the central compliance mechanism, prices must be allowed to rise as high as necessary to reach the emission reduction target – which means not introducing a price cap.

3. **A carbon price works better if it is supported by companion policies.** This holds especially true for households and transport. Companion policies in these sectors guide investment decisions and drive innovation, while the carbon price ad-dresses the use of existing cars and heating systems. Strengthening EU-policies such as CO_2 standards for vehicles, building codes, or support programs for low-carbon heat grids gives consumers the low-carbon options they need to respond to rising carbon prices and to reduce emissions in line with the 55% target.

4. **Distributional effects are a challenge but there are solutions for resolving them.** 100% of revenues from carbon pricing must flow back to consumers in one way or another – as targeted support for vulnerable households, as a fund for climate policy measures, or as lump-sum payments. Using carbon pricing revenues for other purposes such as repaying EU debt threaten to undermine support for higher CO_2 prices. It is better to use tools that enable consumers to reduce their CO_2 footprint, and thus their exposure to higher prices, rather than simply trying to exempt consumer groups generally.

Contents

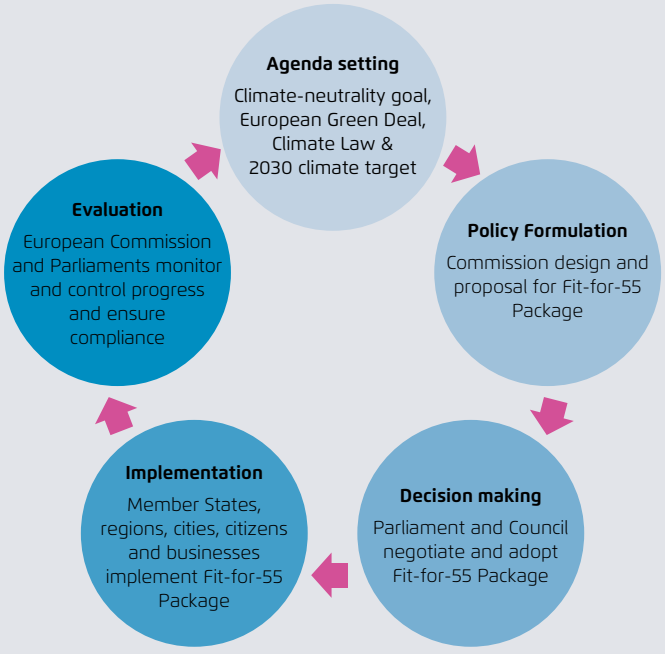
1 Introduction

The EU has set a goal of achieving climate neutrality by 2050 and decided to raise its 2030 climate target to 55%. Unfortunately, however, it is not on track to reach either of these objectives. The European Commission projects at least a 10% gap for emissions reductions in its current baseline scenarios for 2030 and estimates that in the 2021–2030 period the EU will need to invest €35–88 billion per year more for buildings and transport alone.1 Despite significant climate financing earmarked in the EU's budget deal from December 2020, EU financing alone will not close the projected investment gap. Quick and decisive action and investment frameworks will be needed across all sectors of the economy to meet the new 2030 target and to prepare for climate neutrality by 2050.

The European Commission has published a 2030 climate target plan and conducted multiple public consultations on how to strengthen the existing climate policy architecture to ensure target fulfillment. The Commission is considering the role that an EU-wide emissions trading system for heating and transport fuels could play in delivering these targets – in addition to strengthening existing EU policy instruments, such as CO_2 standards for cars. Based on these deliberations, the Commission plans to propose a massive "Fit for 55" package in June 2021.

1 In a separate study, McKinsey & Company (2020) concludes that an average incremental investment (additional CAPEX) of 160 Bn euros per year is needed for the 2021–2030 period. Of this amount, 31% (€50bn) is allocated to buildings and 12% (€19bn) is allocated to transport.

The Fit-for-55 Package Policy Cycle — Figure 1



Agora Energiewende based on Howlett and Ramesh (1995)

To fit all of these elements into a coherent whole, a fundamental decision is quickly needed on an EU climate policy framework that delivers on the EU's climate targets. If the EU is to reach its 2030 and 2050 goals, all elements of the European Commission's climate target plan must take shape by the end of the year.

This paper makes the case for a strong European climate governance based on the principles of environmental integrity and European solidarity. It advocates for a smart mix of EU-level carbon pricing and companion polices to help Member States in fulfilling their goals.

2 Options for regulating heat and transport emissions in the EU's future climate policy architecture

2.1 Heating and transport in the EU's current climate policy architecture

Delivering the higher EU climate target for 2030 and the climate neutrality target for 2050 will require a revision of the EU's climate policy architecture. The current climate policy architecture is organized around three pillars:

The EU Emissions Trading System (EU ETS) caps emissions of more than 11,000 installations in power generation, industry, and inner-European aviation. It sets a carbon price for the covered emissions.

The Effort Sharing Regulation (ESR) sets out different national reduction targets for the sectors not currently covered under the EU ETS – mainly buildings, transport, agriculture, and waste.

The LULUCF Regulation governs emissions and removals from land use and forestry. It currently aims to keep emissions and removals in balance (the "no debit" rule) and establishes EU-wide accounting protocols for tracking progress.

In 2018, road transport and buildings in the EU emitted 1,458 Mt CO_2, with 787 Mt CO_2 from road transport and 672 Mt CO_2 from buildings.[2] Road transport emissions are almost fully covered by the ESR. The exception is emissions from power generation for electric vehicles, which are part of power sector emissions and thus covered by the EU ETS. The share of electric vehicles was still negligible in 2018, but is set to rapidly in the coming decade.

In 2018, slightly more than two-thirds (69%) of all emissions in the buildings sector fell under the ESR and just under one-third was covered by the ETS (31 %). This applies to emissions from large-scale district heating generation (units of more than 20 MW of installed capacity) and to emissions resulting from electric heating and cooling, including water heating and cooking.[3]

The split of ETS and non-ETS emissions varies substantially across Member States depending mostly on the prevalence of district heating. In eleven Member States, the majority of heating emissions was covered under the existing ETS in 2018. On average, the ETS share in total heating emissions is higher in poorer Member States. In Member States with a GDP per capita below the EU average, 46% of total heating emissions fell under the ETS in 2018. For the group of Member States with a GDP per capita above the EU average, the share was 31%.

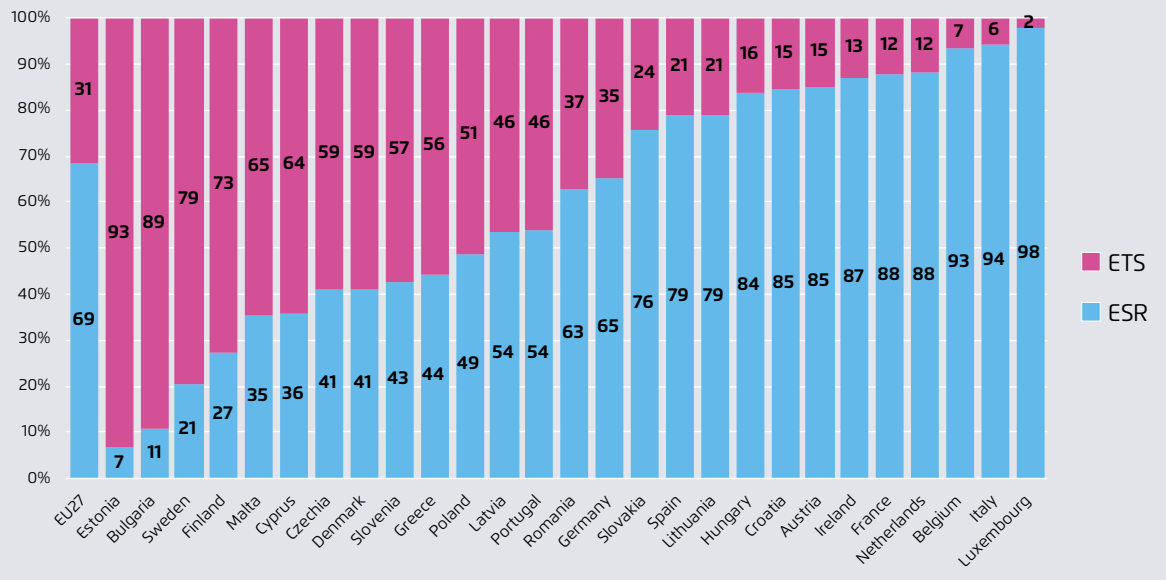
The three pillars of the current climate policy landscape are complemented by additional governance mechanisms:

The **Energy Efficiency and Renewable Energy Directives** add sectoral targets for reducing primary energy demand and expanding renewable energy use. Unlike the ESR targets, the energy targets are not subdivided into national targets. Rather, Member

2 The calculations are based on EEA and Eurostat data.

3 These figures are based on three assumptions: district heating is almost fully covered by the ETS so that all district heating is covered under the ETS; district heating generation below 20 MW is not included in the EU ETS by default; and Sweden has voluntarily included all district heating installations in the EU ETS so as to avoid incentives for building small units to escape the carbon price.

Share of buildings emissions in the ETS vs ESR in (%), EU-27 Figure 2



Calculations by Agora Energiewende based on EEA (2020a), EEA (2020b) and Eurostat (2021)

States define contributions to the EU-level target. These energy targets affect emissions in both the non-ETS and ETS sectors. They provide support for achieving the overall GHG reduction target, and are accompanied by measures aiming at removing financial and non-financial barriers to upscaling renewable energies and energy efficiency.

The **Governance Regulation** is an overarching framework requiring Member States to strategically plan their future energy systems, including their paths to decarbonization. The regulation stipulates that national governments must develop **National Energy and Climate Plans (NECPs)** based on a common template and regularly assess their progress. The first NECPs specify policy measures with a time horizon through 2030 and include the national contributions to the EU's 2030 energy targets indicated by the Member States. In addition, the Governance Regulation also obliges Member States and the EU to plan for 2050 by drafting long-term strategies.

Moreover, around half of EU Member States now have, or are preparing to adopt a national framework climate law[4] as a governance mechanism to ensure that the country remains on track to meet national climate and energy targets and national contributions to EU obligations. Although the design of these laws differs, quantitative evidence confirms that countries with such laws are performing better on their targets than those without. Qualitative evidence also shows that having climate action embedded into the domestic framework increases national governments' sense of political ownership of the task, ensures consistency of ambition between mandates, and provides them with cover for adopting more ambitious policies[5].

The EU climate policy governance framework has developed over time and is not free of overlaps and inconsistencies. Broadly speaking, however, it has

4 Duwe and Evans (2020).

5 Averchenkova et al (2018)

ensured environmental integrity for the climate ambition level it was designed to achieve. Its functions are to ensure:

- → that overall climate targets for 2030 are backed up by sectoral and national targets (target-setting function);
- → that national and EU level implementing measures exist to reach short- and long-term targets (implementation function); and
- → that progress is regularly monitored and corrective actions are taken where needed (compliance function).

2.2 Governance options for ensuring environmental integrity for the -55% target

The increase of ambition, and the possible extension of emissions trading, raise fundamental questions for the governance of EU climate policy: How should the climate target be enforced? What should be the instrument(s) that ultimately ensure compliance and accountability?

The current EU governance framework ensures compliance with the GHG reduction target through two basic mechanisms: emissions trading (the EU ETS) and legally binding national targets (the ESR). Under emissions trading, the instrument guarantees compliance by "capping" overall emissions at the available amount of emission allowances. Under the ESR, Member States are obligated to enact policies to achieve their legally binding national targets so as to ensure compliance with EU law. Under this system, there is also a cap of allowances with tradable allowances in the form of annual emission allocations (AEAs). However, instead of being traded between private entities they are traded between Member States.

When emissions trading is extended to emissions currently covered by the ESR, the question becomes how to ensure compliance with emission targets. Should the ESR remain the core instrument for compliance, or should the ETS make sure that emission targets are reached, or should a combination of both be used?

While several options can work, at least one of the two instruments must be sufficiently robust to ensure

Trading of emission rights under the Effort Sharing Regulation

Annual emission allocations (AEAs), the emission quantities under the ESR, can be traded between Member States since 2013. However, despite these rules there is currently no real AEA market due to two key factors: (1) AEA market participants are exclusively governments, and (2) a direct participation of private actors is not possible. The 27 national governments are in very different stages concerning their readiness and willingness to trade. Some countries have vastly more market power than others both in terms of fiscal resources as well as in terms of demand for/supply of AEAs. Looking to 2030, the main obstacle is likely the absence of a price signal and potentially very low liquidity. The few AEA trades that have taken place so far were conducted behind closed doors and there is no publicly available information about the closing price. There is also no information platform where Member States can show their interest to buy/sell AEAs. A government interested in trading AEAs needs to contact all potential partners individually. For more ideas on how market-based mechanisms could be integrated into the ESR, see Öko Institut and Agora Energiewende (2020).

that emissions are reduced and that targets are reached, be it by obliging emitters or Member States.

Essentially, there are two ways to expand emissions trading to cover building heat and road transport emissions in the 2020s:

- **Extend the scope of the EU ETS to emissions from buildings and road transport fuels starting in 2025**: The EU ETS Directive could be amended to include all CO_2 emissions from road transport and buildings in the existing EU ETS. A uniform allowance price in the EU ETS would then apply to all sectors in all countries that are part of the EU ETS.
- **Create a separate ETS for building heat and road transport fuels starting in 2025**: A new, separate emissions trading system could be established to cover CO_2 emissions from fossil fuels used in transport and/or buildings with mandatory participation by Member States. In contrast to the previous option, the newly established standalone transport-and-buildings ETS would have a different (presumably higher) allowance price than the existing EU ETS. Once its teething troubles have been sorted, it could also be merged after 2030 with the EU ETS for power and industry.

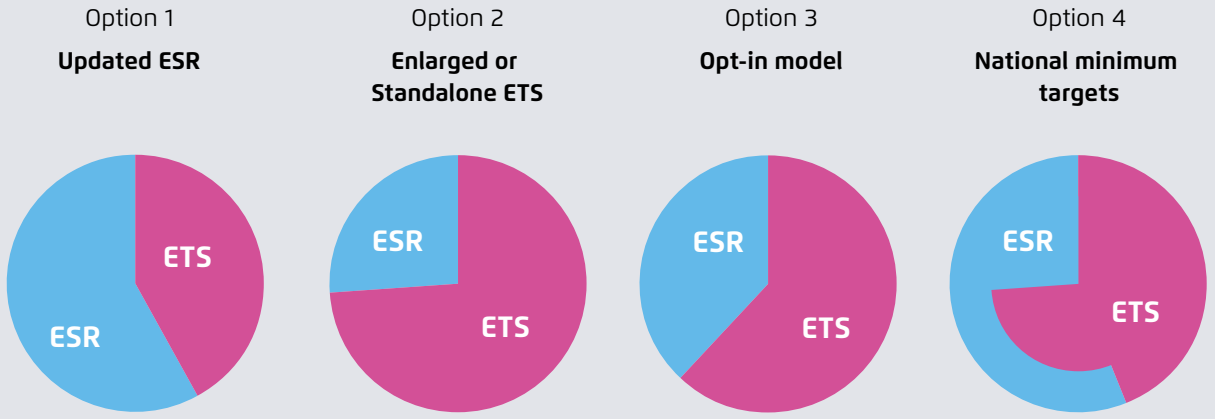
As we have seen, there are at least three moving parts that shape the EU's future climate governance: the scope of the ESR, the ambition level of ESR targets, and the role and form of emissions trading. Combining these yields the following options:

- **Option 1 – Keep the current scope of the ESR, adjust ESR targets in line with the 55% goal, and possibly combine it with a standalone ETS for transport & buildings.** In this case, the ESR would continue to serve as the chief compliance instrument for ensuring the delivery of emissions reductions in road transport, buildings, and other covered sectors. This option would not be compatible with an enlargement of the EU ETS. However, it could be combined with a price-capped, standalone ETS for transport and buildings emissions. The price cap (e.g. at 100 €/t) would ensure that heating and transport prices do not rise too high. However, in this case the ESR would have to remain the main compliance instrument because a price-capped ETS does not guarantee that the -55% target will be met.
- **Option 2 – Enlarge the ETS or introduce a standalone ETS and reduce the scope of the ESR.** The option follows the current logic that the ESR covers all emissions that are not covered under the EU ETS. If the EU ETS is expanded, or if a standalone ETS for buildings and transport is established, the emissions covered by either ETS would no longer be covered by the ESR. This has two important implications. First, the residual emissions that remain under the ESR would need to be geared towards a 55% reduction – unless they are covered by a new, yet-to-be-determined compliance mechanism.[6] Second, the ETS component would need to include a hard emissions cap (i.e. not a price cap) that is aligned with the 55% reduction objective.
- **Option 3 – ESR targets adjusted in line with 55%, with the possibility of opting into the ETS.** A variation of the above would leave it to Member States to decide whether they want to comply with their updated, 55%-aligned ESR targets – or whether they prefer to opt into the ETS (standalone or EU ETS), in which case the ETS would become the instrument to ensure compliance.[7] With the ETS opt-in, the respective emissions would no longer be part of the Member State's ESR obliga-

6 In the impact assessment for the increased 2030 target, the European Commission introduced the option of integrating agriculture and LULUCF emissions into a new separate governance pillar.

7 Article 24 of the EU Emissions Trading Directive already allows individual Member States to include additional activities and gases of their country in the EU emissions trading scheme on request. However, as the EU Emissions Trading Directive currently applies to direct emissions from stationary sources or aviation only – transport and buildings would be covered indirectly via fuel distributors – a change of the directive would likely be necessary for applying Art. 24 to transport or buildings.

Options for an EU climate policy architecture with environmental integrity — Figure 3



Agora Energiewende based on current emissions (2021)

tions. If all Member States were to make use of the option, the result would be equivalent to option 2.

→ **Option 4 – Maintain the current Member States targets under the ESR but ensure compliance via ETS:** This option would keep the ESR in its current scope but avoid updating the ESR targets to align them with the 55% objective. In order to ensure that emissions reductions are in line with the -55% target, transport and heating emissions would have to be covered by an ETS (standalone or expanded). As a consequence, the function and the role of the ESR targets would change significantly: rather than serving as a compliance mechanism to reach the EU's climate target, they would set a minimum threshold of emission reductions to be achieved domestically in each country. In this way, the ESR targets would require Member States to ensure that emission reductions are not taking place elsewhere – so as to reduce the risk of individual Member States staying locked in a high-carbon development trajectory. However, the flexibility provisions that are currently part of the ESR (e.g. AEA trading) would no longer make sense in this setting and therefore would need to be discontinued.

Note that in the options 2) and 4) additional provisions would be needed to ensure stronger ambition levels in the remaining ESR sectors such as agriculture and waste, which would not be subject to the new ETS.

The following table provides an overview of the four options sketched above.

The following insights can be drawn from this overview:

→ Options 2-4 require an ETS that serves as a strong compliance instrument, and thus sets a hard cap without a ceiling price or other arrangement (such as large exemptions) that increases the amount of allowable emissions. This is given in the existing

Options for an EU climate policy architecture with environmental integrity — Table 1

Option	Compliance mechanism for transport and building emissions	ESR scope	Level of ESR target	Standalone transport and/or building ETS	Expanded EU ETS
1 Updated ESR	ESR	Current	Aligned with -55%	Optional, possibly with price cap	Not compatible
2 Enlarged or stand-alone ETS	ETS	Only emissions outside ETS	Aligned with -55%	Compatible – but only without price cap!	Compatible
3 Opt-in model	ESR or ETS de-pending on MS choice	Different between MS	Aligned with -55%	Compatible – but only without price cap!	Compatible with legal adjustments
4 National minimum targets	ETS	Current	Current targets	Compatible – but only without price cap!	Compatible

Agora Energiewende (2021)

EU ETS. For a newly established standalone ETS for transport and buildings, this could pose a challenge for policymakers – but it would be a crucial to guaranteeing the environmental integrity of the -55% target.

→ Options 1–3 require that the current ESR targets are adjusted in line with the increased ambition of the EU target (options 1, 3), or with an increased ambition and reduced scope (option 2).

Two compliance mechanisms as a theoretical fifth option

A theoretical fifth option would be to strengthen the ESR targets at the EU and national levels, while introducing an ETS with a hard cap and full enforcement. In this case, however, the result would be double compliance: two instruments would oblige national governments and economic operators to comply with strict caps on emissions resulting from the road transport and buildings sectors. One instrument – the ETS – would allow emitters full flexibility to emit (as long as they purchase allowances from emitters in other countries to cover their emissions), while the other – the ESR – would impose a strict limit on national emissions. As a consequence, it would be impossible to avoid the case in which domestic emitters are in compliance (i.e., they have purchased allowances to cover their respective emissions) while the Member State in which they reside is not, and would need to acquire emission allowances (AEAs) to cover the gap. This option appears impractical, which is why we do not give it any more attention here.

2.3 Evaluating the reform options based on the principle of environmental integrity

We assessed the four options as follows:

Option 1 "Up-dated ESR" is the only option that ensures environmental integrity in a scenario where carbon pricing for transport and buildings comes with a price cap. In this scenario, a newly introduced standalone ETS for transport and/or buildings would not have to serve as a compliance mechanism. Instead, it would merely function as a policy instrument to incentivize certain behaviors and to deliver a certain amount of emission reduction. The carbon price could be phased in with a pre-set price corridor that would rise over time (as is the case for the new German ETS for building and transport). The approach could accommodate concerns about the social impact of an escalating carbon price and would reduce uncertainty. The option also promises to deliver early action since an ESR target update can be implemented faster than a new ETS once the political agreement is reached. It would ensure that national-level governance instruments, such as national climate laws, are geared towards an ambition level that is in sync with the EU's revised target. In this case, the ESR amendment should also encompass an overhaul of the compliance mechanism, which currently has clear deficits. (See the text box below.) It should be noted that option 1 is not compatible with an expansion of the EU ETS because it would lead to two overlapping and conflicting compliance mechanisms.

Option 2 "Expansion of ETS/Standalone new ETS & ESR with reduced scope" relies exclusively on the ETS as a compliance mechanism. This does not mean that there cannot be other companion policies at work – in fact this would need to be the case. But these companion policies would supplement the carbon price set by the ETS, which would ultimately ensure compliance with emission targets. The price would therefore need to rise to the level of "whatever it takes" to reach the target. The risk of high carbon price levels is particularly pronounced for the standalone ETS for buildings and transport. Low elasticity of demand, and a less liquid market, could lead to quickly escalating prices. For an expanded EU ETS covering buildings and transport, the price reaction would be less extreme due to the larger market size. But it could pose a different type of problem: The carbon price could rise to a level that is too high for industry to bear, and yet too low to really have an impact on emissions in housing and transport. As a result, the option could fail to initiate real change in the newly covered sectors.

How the ESR compliance control should be strengthened

In options 1) and 3) the enhanced ESR plays an important role – so its compliance mechanism is key for environmental integrity. Alongside general infringement procedures,[8] the ESR's current compliance framework includes a "compliance check" that takes place every five years (and is currently scheduled for 2027 and 2032). If a Member State is found to be non-compliant, its reduction obligations are multiplied by a factor of 1.08 and it is prohibited from transferring AEAs. However, because the compliance check for the 2021–2025 period will not occur until 2027 (and will not finish until 2028), there's little space for corrective action before 2030, which undermines the case for the robustness of the system.[9] These deficits could be corrected through a strengthening of the compliance regime in the ESR itself. This could include imposing tough fines directly on Member States in case of non-compliance, linking compliance with EU funding, and/or moving to an annual compliance review.[10]

Option 3 "Opt-in model" provides for political flexibility – but could also create considerable differences across Member States. As Member States decide to opt into an ETS, their decision-making would partly be guided by the expected behavior of other Member States. For example, some Member States may include their transport sector in the ETS, leading to higher fuel prices, while neighboring countries would choose not to do so. Member States not choosing the opt-in would need to adopt considerable additional national policies to meet their updated ESR targets.

Option 4 "National minimum targets" can appear like the path of least resistance, promising high acceptability. However, even if the ESR targets remained nominally unchanged, the entire regulatory philosophy of the ESR – and thus the meaning of the targets – would change profoundly. In particular, it is unclear how much importance national governments and the European Commission will still attach to updating national climate laws to reflect higher climate ambition or increasing national and sectoral targets in the NECP updates already scheduled for 2023/24. It is also unclear whether the breaching of targets would still be sanctioned, if a different mechanism ensures target compliance for the EU as a whole. What is more, this option carries the risk of leading to the worst of all worlds, if policy-makers do not succeed in ensuring a hard, sufficiently tight cap, once the threat of carbon price hikes approaches. If a price cap is com-bined with outdated ESR targets, the environmental integrity of the system would be lost entirely. On the upside, if the ETS is sufficiently strict and robust, the option could strike a good balance between economic efficiency in achieving the objectives, and yet ensuring that all Member States take at least some steps at national level towards transforming mobility and buildings.

8 The EU's general system of infringement procedures can lead the European Commission to impose significant fines on Member States that have been ruled to be non-compliant by the ECJ.

9 Ecologic Institute (2020)

10 Ibid.

2.4 The timeline for implementing emissions trading in the new sectors

Establishing a new ETS or integrating newly regulated entities into the EU ETS will be a complex and time-consuming endeavor. What is more, the regulatory and political challenges associated with this undertaking could create significant delays.[11] A new agreement first needs to be negotiated as part of the broader Fit for 55 package, and adopted by the end of 2022 or mid-2023. Once the political agreement is reached, implementation challenges include the need to set up a robust EU system for monitoring, reporting, and verifying emissions, and the need to create an auctioning system for the emission allowances. Since the political and regulatory efforts in the Member States will need 12 to 18 months, it is difficult to imagine a fully functional separate ETS or expanded EU ETS before 2025. Given that 2020–2030 will be decisive for accelerating emissions reductions in the transport and buildings sectors, such a delay could undermine the long-term feasibility of reaching net-zero by 2050. The decisiveness of the next decade also underlines the need to keep the current ESR in place until the system is up and running, even if the EU adopts options 2, 3, or 4 and the ETS becomes the main compliance mechanism.

2.5 Risks and benefits of an expanded EU ETS vs a separate trading scheme for building heat and road transport

There are two main paths for extending emissions trading to transport and buildings: either expand the scope of the current EU ETS, or establish a separate trading system covering only buildings and transport. While option 1 would require a separate system, options 2, 3, and 4 would work for both. Yet, expanding the existing EU ETS to include transport and buildings carries a number of risks.

For most of period from 2010 to 2020, the EU ETS had been rendered largely ineffective due to an accumulated surplus of allowances, resulting in low carbon prices. Only in 2018 did the EU ETS resume its intended function and since then it has been a driver of cost-effective emission reductions, particularly in the power sector. A key part of this was the Market Stability Reserve introduced in 2018, which succeeded in first setting aside and later eliminating the accumulated allowance surplus. For the emitters currently covered by the EU ETS, the rebounded carbon price sends a clear signal: for the power sector, the carbon price is the death knell for coal-fired power generation; to industry, it is the final call to develop strategies to radically reduce their emissions, and invest accordingly. In this way, at long last, the carbon price has become a driver of transformative change.

This newfound supply-demand balance could be upset if the EU ETS were expanded to include new sectors. This move would re-introduce uncertainty in two ways:

- *Market uncertainty*: The demand response of housing and transport are generally not well understood. While there is anecdotal evidence from ex-post evaluations of existing carbon taxes, this data is nowhere near the sophistication of energy market models, which track the carbon price and the market response on an hour-by-hour basis. As a result, it is much less clear which carbon price would result if transport and housing emissions were capped at any particular level.
- *Regulatory uncertainty*: Likewise, less is known about the ability of transport and buildings to drive regulatory adjustments, or what the political response to high carbon prices in the newly added sectors will be. Existing experiences, particularly with fuel taxes in transport, suggest that both organized groups of fuel users (freight haulers, farmers) and the general public (yellow vests) are effective in getting their point across and driving changes in regulation.

11 Felix Chr. Matthes (2019)

A particularly problematic feature would be a price cap or ceiling price. Though such a tool could ensure political support and prevent widespread opposition, a price cap would release an unlimited supply of allowances once the ceiling was reached. For this reason, a transport and buildings ETS that includes a ceiling price could not be tied to – let alone integrated with – the existing EU ETS without damaging its environmental integrity.

It is currently unclear where the carbon price would lie in a separate, standalone ETS for transport and buildings, since the price depends on the scarcity of allowances – i.e. how ambitious the cap is. Yet, given the low elasticity of demand in transport and buildings, it is likely that the carbon price in the separate system would need to be much higher than that of the current EU ETS if it was to have any noticeable effect on emissions. Therefore, the carbon price in an expanded EU ETS that covers transport and buildings as well as power and industry would be somewhere between those of the current EU ETS and that of a standalone system.

Establishing a separate trading system could avoid those risks, at least initially. At some point, probably after 2030, the two systems could be linked and eventually integrated. In this scenario, a separate, independent system would first be established. Over time, as the system overcomes its initial growing pains, it could be aligned with the existing EU ETS provided the price levels are found to converge. The systems could also be integrated by linking the markets for an interim period, possibly via a gateway that could set a limit on the transferability of allowances or implement other safeguards. Eventually, if the new buildings and transport ETS has proven to be sufficiently stable and robust, it could be fully subsumed under the existing EU ETS. Such an arrangement would allow the newly established transport and buildings ETS to mature without jeopardizing the stability and functioning of the EU ETS.

2.6 Effects of ETS reform and extension on industrial competitiveness

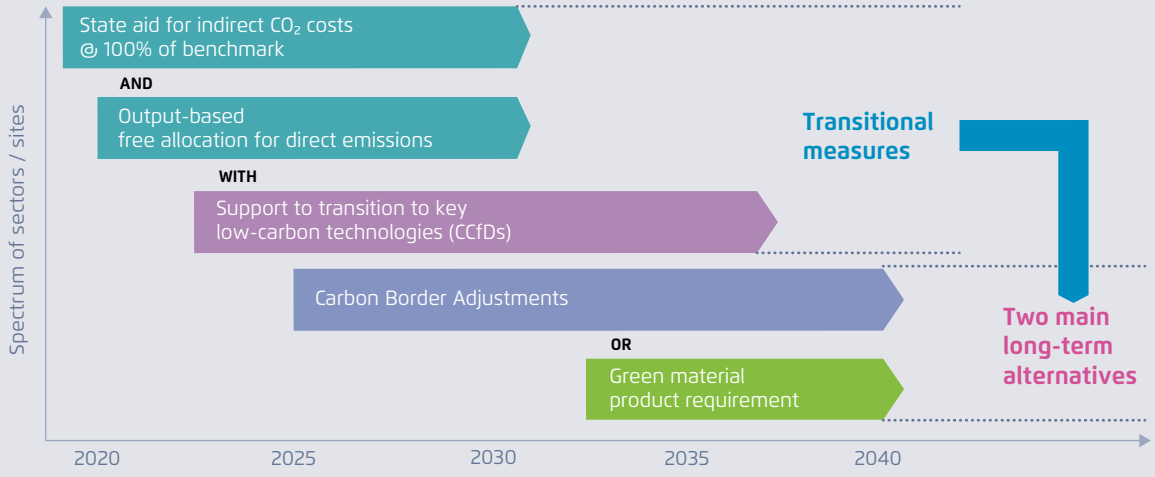
The 55% target will lead to higher prices in the EU ETS, and prices may rise even further if transport and/or heating are included in the overall ETS. This is a problem for businesses that face additional costs, but cannot pass these on to their consumers – particularly energy-intensive industries that compete internationally. This puts EU industry questions back on the agenda: How to address carbon leakage while incentivizing investment in climate-neutral industrial technologies?

In the past, the EU has sought to protect businesses from carbon leakage protection by providing them with allowances for free. This system is hitting its limits, as the free allocation makes up an increasing share of the dwindling allowance budget and industry will still eventually need to transition to alternative production methods with drastically reduced emissions. The task with regards to carbon leakage protection has thus fundamentally changed. It will no longer be sufficient to effectively exempt industry from the incentive to change. Rather a new clean industry policy must enter in its place to incentivize investments into climate-neutral technologies – at a scale sufficient to transform the EU economy over the next three decades. New tools like Carbon Contracts for Difference (CCfDs) are needed to assist EU industry not merely to just continue producing, but to invest in drastically reducing its emissions – as the best protection against carbon leakage. Agora Energiewende has proposed the introduction of an EU Clean Industry Package that would combine measures for carbon leakage protection with instruments such as Carbon Contracts for Difference to ensure that EU industry can benefit from the Fit for -55% package.[12]

By contrast, competitiveness issues are relatively minor under a separate emissions trading system for

12 For more, see Agora Energiewende (2020).

Short, medium and long-term policy tools for carbon leakage protection Figure 4



Agora Energiewende (2019)

transport and buildings. With regards to transport fuels, emissions trading has some implications for long-distance transport that crosses an EU border, providing an incentive to place refueling stops outside the EU, and even incentivizing additional trips or detours to refuel outside the EU. However, the scope of the problem varies significantly, as not all external borders have higher costs outside the EU. Carbon pricing would likely exacerbate existing price differences at the borders to Russia, Belarus and North Macedonia, while Norway, Switzerland, and UK already tend to have higher fuel prices. Leakage or competitiveness issues are also generally low for heating fuels in buildings, as heat is not transferred across an EU border.

With regards to industrial heat, the bulk of emissions is already included under the EU ETS: compared to the 591 Mt of industry CO_2 emissions already covered (2017), extending the EU ETS to all heat production (including heat currently not covered by the EU ETS) would add an estimated 80 Mt. Within this amount, there is enormous potential to replace natural gas use in low and medium temperature heat. For example, 39% of natural gas consumed in the EU industry (2017) was used to produce heat below 100°C – so that it could be efficiently supplied by heat pumps instead. Indeed, industrial heat pumps are already found in the food and beverage, packaging, textile and chemical industries today.[13]

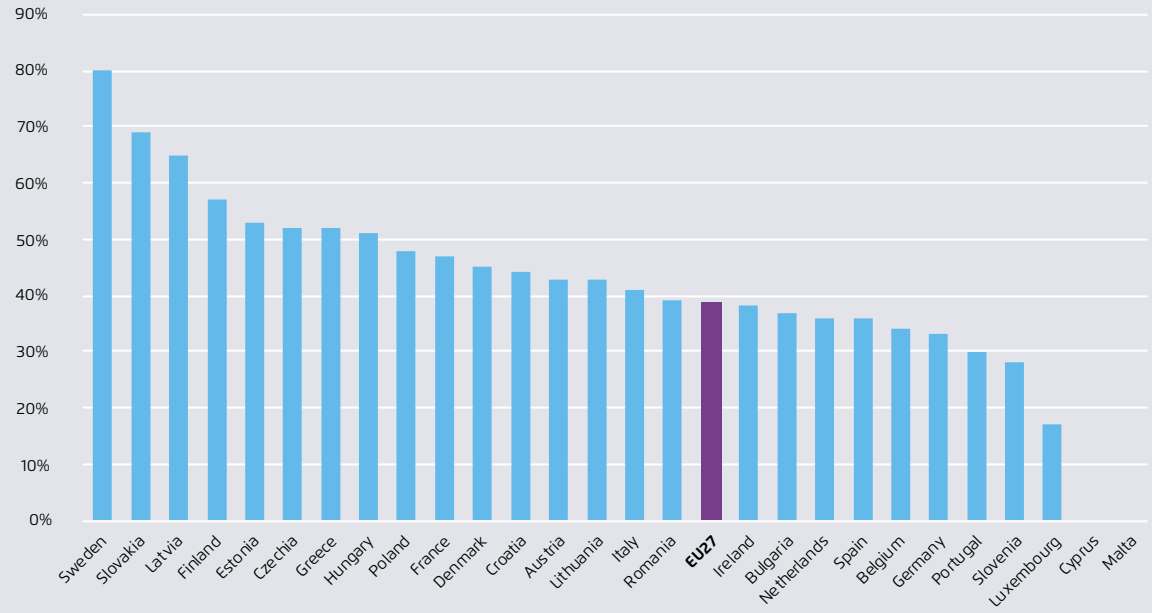
The situation is more complex for the select number of energy-intensive industries that did not fall under the current scope of the current EU ETS, mostly on account of installation size. For example, studies conducted for the introduction of the German ETS show that by 2025, at a CO_2-price of €55 per tonne, CO_2 costs would exceed 5% of gross value added in eight sectors that were not covered by the EU ETS. These include select industries producing plaster, malt, fats & oils, starch, ceramic tiles, and synthetic fibers. However, these sectors were also found to make up less than 0.1% of German GDP and only roughly 0.4% of the emissions covered by the German national ETS.[14]

13 For further information see Agora Energiewende and AFRY Management Consulting (2021)

14 See DIW (2020)

Share of natural gas consumption for heat below 100°C in total natural gas consumption in industry in 2017

Figure 5



Agora Energiewende and AFRY Management Consulting (2021) : No-regret hydrogen: Charting early steps for H_2 infrastructure in Europe.

In such cases, the best way to support particularly affected industries will be through targeted investment aid measures, as opposed to blanket exemptions, in particular for energy efficiency improvements, renewables deployment and the electrification of heat generation.

An undue burden can also arise where fuels destined for use in a non-EU-ETS installation are instead used in an EU ETS-installation, meaning that the resulting emissions are priced twice. Combining upstream and downstream coverage thus means fuels need to be legally separated depending on their intended use – a practice already known and established e. g. for diesel intended for off-road use.

3 Why carbon pricing works better with companion policies

3.1 The transformative potential of carbon pricing and the case for harmonized carbon pricing at the EU level

For CO_2 emissions from industry and energy, the EU ETS has shown that a carbon price can be a strong driver of cost-effective emission reductions – at least since 2018, when the European carbon price returned to a level that was high enough to have an impact. For transport and heating, there is also ample evidence from countries around the world that carbon pricing can reduce emissions and shift behavior and investment decisions towards low-carbon choices.[15] Carbon pricing could play a valuable role in helping to deliver climate action in the buildings and transport sector by

- creating price incentives governing the operating costs of cars and heating (unlike standards merely targeting new acquisitions);
- helping to prevent rebound effects from efficiency improvements delivered by other policy instruments;
- sending a long-term signal to investors and accelerating the business case for the transition from carbon-intensive to mature, low-carbon solutions such as electric vehicles and heat pumps;
- supporting standards and other instruments in driving the phase-out of fossil-intensive technologies;
- leveling the playing field between technologies competing across different sectors in a way that supports electrification; and
- generating revenues that can support the transition to a clean economy.

Carbon pricing is already an important driver of the clean-energy transition in a number of EU countries, albeit at vastly different levels. Carbon taxes and other pricing systems exist in Denmark, Finland, France, Germany, Ireland, Latvia, Portugal, Slovenia, Spain, and Sweden. Poland and Estonia also have a nominal carbon tax, but it is very low and its scope is limited.

There are strong arguments for greater harmonization of EU carbon pricing in the form of an ETS for heating and road transport:

- Harmonized carbon pricing would help ensure a more level playing field for business and consumers in the internal market, reducing distortive effects on competition and potentially fuel tourism.
- An EU-wide ETS could be agreed with majority voting rules, while a carbon tax requires unanimity. Failed efforts at reforming the Energy Taxation Directive have shown that unanimity is a high barrier, indeed.
- An EU-wide ETS could help generate revenues to finance EU-level projects such as low-carbon infrastructure, including high-speed rail, green hydrogen networks, and electricity transmission.
- An EU-wide ETS also makes it possible to apply allowance-based solidarity mechanisms supporting lower-income Member States, such as in the general ETS

15 In the largest regression analysis of the effects of carbon pricing conducted to date, Betz, Burke, and Jotzo found that carbon prices lower the emissions growth rate. For each euro of the carbon price applied to road transport emissions, the growth rate of emissions falls by 0.1 percentage points. This mirrors an effect that had already been observed for gasoline prices: the higher the gasoline prices are in a given country, the higher the fuel efficiency of the vehicle fleet. In terms of country-level evidence in the EU, Sweden has the longest history of explicit carbon pricing, and by now has the highest carbon price anywhere in the world. Andersson (2019) estimates that, from the introduction of the carbon price in 1990 to 2005, the carbon tax has reduced transport sector emissions 11% below would they would otherwise be.

Select national carbon pricing in the non-ETS sectors as of February 2020 Table 2

Member-State	Type of carbon price	Year introduced	Carbon price level (€ per t/CO_2)	(%) of overall GHG emissions*	(%) buildings emissions in the EU ETS (2018)	(%) buildings emissions in the ESR (2018)
Sweden	Carbon tax	1991 (2019)	SEK1190 (€115) (2020)	40%	79%	21%
Finland	Carbon tax	1990 (2019)	€62 (Transport), €53 (Other fossil fuels)	36%	73%	27%
France	Carbon tax	2014 (2019)	€45 (2020)	35%	12%	88%
Ireland	Carbon tax	2010	€26 (2020) – €100 (2030)	49%	13%	87%
Germany	ETS	2021	€25 (2021) - €55 (2025)	40%	35%	65%
Denmark	Carbon tax	1992	DKR177 (€24)	40%	59%	41%
Portugal	Carbon tax	2015	€24	29%	46%	54%

Note: * These carbon pricing systems generally apply to fossil fuel emissions not covered by the EU-ETS, with varying exemptions, especially with regards to industry due to competitiveness concerns.

World Bank (2021)

3.3 Why companion policies are needed as part of a Fit for 55 policy mix

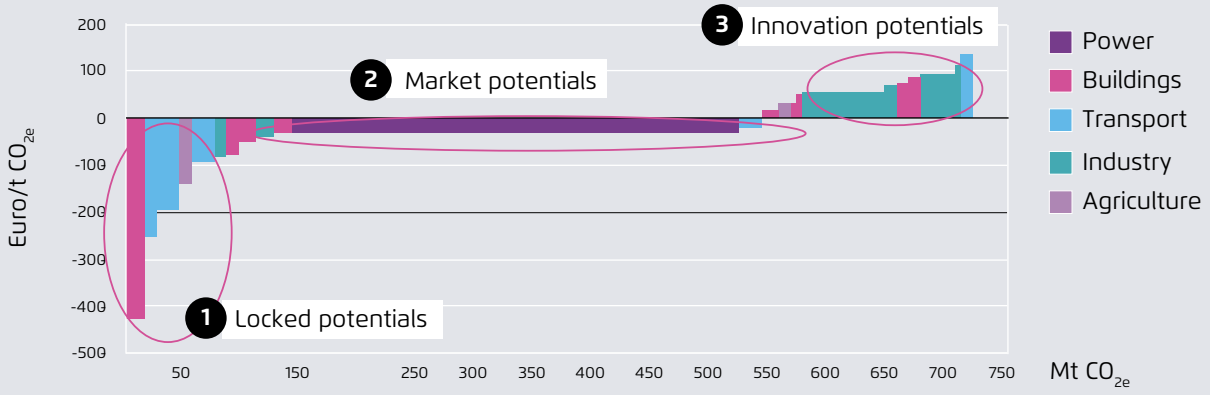
There are two basic reasons why companion policies need to be part of a policy mix that is fit for 55: first, to overcome the manifold market barriers and distortions that render the carbon price ineffective for particular uses and user groups, and second, to unlock future abatement potentials that are still a long way away from market maturity.

For the first category – market barriers and distortions – it is clear that carbon pricing will work differently for heating and transport than for the sectors under the current EU ETS. Transport and heating emissions are less elastic than emissions from energy and industry, which means that emitters are much less responsive to carbon pricing. Reasons for this include:

→ The options that consumers have of responding to a carbon price – switching to a lower-carbon transport mode, say – **are largely determined by the available infrastructure** (transport and mobility services as well as physical structures). For example, public transport and other sustainable

Mitigation cost-potentials in 2030 by sector grouped according to policy instruments needed for unlocking

Figure 6



1 Standards and support complemented by carbon pricing

2 Carbon pricing complemented, where necessary, by standards and support

3 Standards and support/financing complemented by carbon pricing

Agora Energiewende based on McKinsey & Company (2020), IEA (2011) and Matthes (2020)

mobility options are often less available or convenient in rural or peri-urban areas than in cities, making it difficult to choose a transport option other than a car.

→ The efforts of private households to reduce emissions **can involve significant up-front capital investment** (e. g. buying a new car or retrofitting a building). This means that once investments are made there is little scope for revisiting earlier decisions and access to financing can be difficult. Private actors also tend to discount future costs disproportionally when making purchase decisions. Consequently, consumers might choose a good with a lower purchase price despite the fact that it will incur higher costs over the product's lifetime. This effect is known as myopia.

→ Particularly in transport, climate targets are often **confounded with other public policy objectives** – such as reducing urban air pollution and associated health risks, reducing congestion, promoting a more active lifestyle, etc. Carbon pricing is by design a unidimensional tool, geared at cost-effective reduction of greenhouse gas emissions, but ill-equipped to pursue other goals (co-benefits) simultaneously.

→ Households have **incomplete information** about their energy consumption and the options for reducing it. Faced with limited time and resources, households often rely on fuzzy rules or routines that they have established over time. Without investment, options to reduce heating and cooling consumption within socially accepted limits are also limited. In private rental housing, the landlord is generally responsible for making investments in the energy performance of the building, including the specific heating systems, but the heating bill is covered by the tenant. Due to the tenant-landlord dilemma, landlords generally have little incentive to invest in the most overall cost-effective solution beyond the levels prescribed by building codes.

→ **Other policies may distort the carbon price signal** or offset it entirely. This is the case when, say,

particular fuels such as diesel are subsidized, or when particular uses of fuels (off-road use, company cars) benefit from tax exemptions.

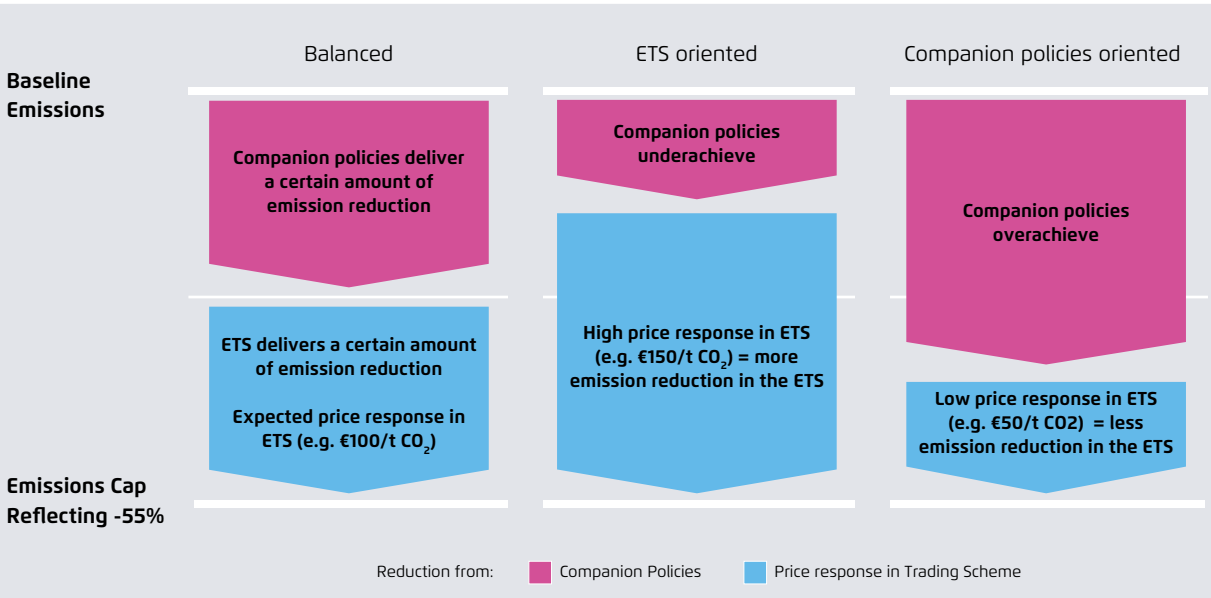
These barriers and distortions explain why a higher carbon price will be needed to achieve a given emission reduction in transport and heating than in the power sector. However, they also explain why emissions trading works better when it is part of a wider policy mix: most if not all of the barriers and distortions can (and must) be addressed by other instruments. These companion policies help to provide consumers with more and better choices; they enable the infrastructure that is needed for low-carbon options to work – from charging points to cycling lanes; they help to provide access to finance; and they lower transaction costs and information search costs through awareness-raising, labelling, and standards. In this way, companion policies put consumers into a position where they can better respond to a rising carbon price – and lower their exposure and vulnerability.[16]

Companion policies and emissions trading can thus work in conjunction to lower emissions. The two are interdependent: emissions trading ensures that emissions cannot exceed a given level. Thus, the more effective companion policies are in lowering emissions, the less reduction needs to be driven by the ETS – reflected in a lower carbon price. And vice versa – if companion policies underperform, the carbon price needs to rise higher to ensure emissions stay within the cap. In fact, CERRE (2020)[17] argues that the expansion of emissions trading may introduce

16 For example, the EU's recent impact assessment for the 2030 climate target plan highlighted different target scenarios achieved through different policy mixes. With standards playing a significant role in achieving increased ambition in the REG scenario and a lesser role in the CPRICE scenario the scenarios both resulted in moderate but divergent carbon prices. See also IEA (2011).

17 See CERRE (2020).

Illustration of how companion policies impact carbon prices — Figure 7



Agora Energiewende based on IEA (2011)

additional incentives to deliver emissions reduction commitments through existing policies and to commit more strongly to the broader climate policy objective.

By contrast, the failure to create an ETS for heating and transport fuels with strong companion policies could push carbon prices to higher levels[18] and increase political pressure to undermine the carbon pricing incentive effect or even the basic compliance mechanisms of the system. This could occur if, say, the EU introduces a price cap in the ETS or Member States reduce existing national energy taxation in order to neutralize the carbon price effect on consumers. In the governance options 2, 3, and 4, where the ETS is the chief compliance instrument, a price cap cannot be introduced without endangering target achievement. Companion policies will thus play a key role in ensuring the acceptability and the robustness of the governance system as a whole.

Beyond addressing market barriers, the second main case for companion policies is that they support the roll-out of new technologies and bring down their cost over time, and thus prevent a lock-in to a fossil-intensive infrastructure, technology and lifestyle.[19] The EU climate policy architecture chosen for the 2020s must not only facilitate 2030 climate target; it must also initiate the transition to full decarbonization by 2050. To deliver on these goals, massive changes will be required to the EU economy, the lifestyles of European citizens, to technologies, infrastructure and the building stock. Given the scale of the challenge and the long lead times, these changes must be initiated in the 2020s in the housing stock, heavy-duty transport, industrial processes, and other areas.

The logic of emissions trading, however, is first to exhaust all the cheaper mitigation options. As long as

18 For example, according to Matthes (2020) in the building sector, carbon prices of 145 to 245 €/t CO_2 would be required in addition to the existing regulatory and taxation system to achieve significant emission reductions in Germany by 2030 . With respect to emissions from cars, carbon prices of 250 €/t CO_2 or more in addition to the existing regulatory and taxation framework would be required to achieve significant emissions abatement contributions in Germany by 2030.

19 See, for instance, Tvinnereim and Mehling (2018).

Shadow carbon pricing

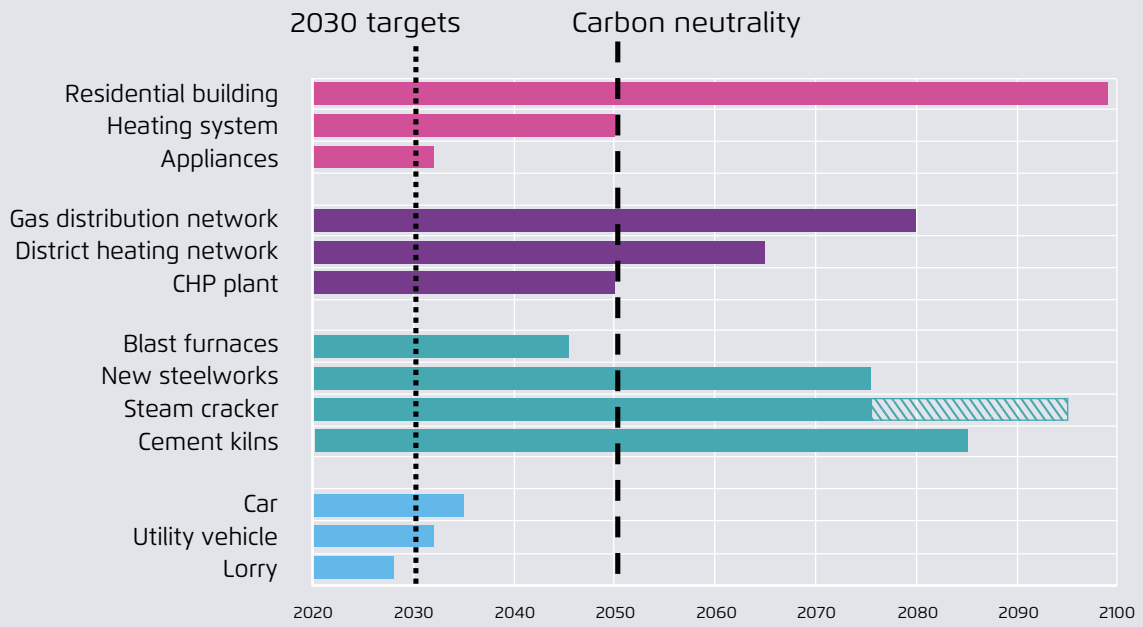
One of the instruments policymakers and businesses can use to anticipate the impact of carbon pricing is to integrate a shadow carbon price into policy and investment planning to better account for the impact a real carbon price would have. Shadow carbon pricing is a method used in investment and decision analysis that seeks to more accurately consider the true cost and/or risk of carbon emissions by applying a proxy cost per ton of carbon emissions. Unlike an explicit carbon price, a shadow price does not incur actual costs. Instead, it is used when planning long-lived infrastructure (e.g. buildings and grids) or making investment or procurement decisions with medium- to long-term consequences. Shadow prices on carbon emissions are already used by some infrastructure planners, governments, development banks, and hundreds of major companies today and can be set at levels reflecting potential future carbon prices under an emissions trading scheme. In order to signal these risks more clearly to consumers, governments could also require clearer CO_2 labelling for cars and heating systems and disclosure of climate-related risks for publicly traded companies. These measures can help to ensure that consumers and financial actors can make investment decisions that better anticipate future carbon price levels and reduce their exposure to related financial risks.

these exist, the CO_2 price will not incentivise transformative solutions for deep decarbonisation in the transport and buildings sector – and when the cheap options have been exhausted, it is too late to develop the needed transformative solutions.[20] This is because many such solutions will require a complex co-evolution of technologies, regulations, and business models. Examples include neighbourhood-level zero-energy concepts, new renewable-powered district heating networks in existing buildings, a modal shift in transport though redesigned cities, a modal shift to rail or cargo bikes in freight transportation, and an increase in shared mobility. Carbon pricing will be a key factor to scale up solutions as they approach market maturity. But to initiate and guide the transformation, and to do so at the scale and pace needed, additional policies will be required.

It will also require taking into account the asset lifetimes of investments and their compatibility with the EU's long-term vision of climate neutrality. Many investments made in the coming years will still be in use in 2030 and 2050. Houses last 80–100 years; grids, 50–60 years; heating systems, 30 years; and industrial installations, 20–40 years. Efficient policies take these investment cycles into account and allow for intelligent low-carbon investment decisions. If this is not guaranteed, investments may be stranded and expensive retrofits will be required. This would neither be economically sustainable nor resource-efficient. In principle, the carbon price should of course be sufficient to signal to investors which investments will remain viable also in a decarbonizing EU. In practice, however, the carbon price typically does not embody a sufficient long-term perspective, and it is debatable whether carbon prices are able to project scarcities more than a few

20 Vogt-Schilb and Hallegatte (2011)

Technical lifetime of selected technologies if reinvestment takes place in 2020 Figure 8



Based on Agora Energiewende (2019) and Agora Energiewende / Wuppertal Institute (2020)

years into the future.[21] As such, while the ETS is a strong tool to drive optimization, its performance in driving innovation and transformative investment is mixed. Companion policies are therefore necessary, justified and efficient to incentivize timely investments into clean infrastructure, and to provide long-term certainty to investors.[22]

In sum, carbon pricing must be complemented by companion policies at the EU and national level if it is to contribute to delivering a net-zero economy by 2050 and remain socially and politically acceptable. The companion policies must

- → create a regulatory environment for low- and zero-carbon technologies, including innovation and infrastructure policies;
- → provide options to households and consumers to lower emissions, including technologies and the necessary infrastructure;
- → protect vulnerable households and enable them to lower their energy use, and hence their exposure to higher carbon prices;
- → tackle the landlord-tenant dilemma and other instances where incentives are not aligned;
- → amplify the impact of carbon pricing where it is muted by perverse financial incentives;
- → protect the international competitiveness of Europe's industry and businesses; and
- → enable citizens and business leaders to take an active role in the transformation process.

3.4 Key EU-level companion policies for buildings and transport

We already have a policy mix in place to deliver the targets set out in the ESR – with instruments at the local, national, and EU level. Both national and local experiences have shown that great changes are possible with a robust mix of policy measures. This is perhaps best demonstrated by the performance of the Swedish building sector and the Norwegian transport sector: Within a few decades, Sweden switched from oil-based heating to much more efficient energy systems based on heat pumps and district heating, while Norway is the global leader in the shift to electric vehicles. Since 1990 Sweden has reduced emissions in the residential sector by 94 per cent and in the commercial sector by 86 per cent,[23] while in Norway electric vehicles made up 74.8 per cent of new vehicle registrations in 2020 (more than two-thirds of which are battery-electric vehicles).[24] In the EU, the Netherlands and Sweden lead in the deployment of electric vehicles, with EVs making up 33% and 25% of new registrations in 2020, respectively.[25]

As part of its 2030 Climate Target Plan, the Commission announced amendments and revisions of numerous important EU laws, frameworks, and regulations that could enable equally significant emissions reductions and clean technology uptake in buildings and transport. A number of expected proposals are particularly noteworthy in this context. These include

- → a revision of performance standards for CO_2 emissions from cars and vans[26]
- → a revision of CO_2 standards for trucks
- → the introduction of minimum energy performance standards for buildings in the Energy Performance of Buildings Directive (EPBD)
- → a reform of the Alternative Fuels Infrastructure Directive (AFID)
- → a revision of the Ecodesign and Energy Labelling Directives[27].

21 Acworth et al. (2017)

22 Liiliestam et al. (2020)

23 Naturvårdsverket (2020).

24 OFV.no

25 ICCT (2021).

26 For more information, see the Agora Verkehrswende (2021).

27 Öko-Institut & Agora Energiewende (2020)

Overview of transformative national-level building and transport policies Table 3

Key national and local building policies	Key national and local transport policies
• financial incentives for low-carbon heating and energy efficiency improvements	• purchase subsidies and other privileges for zero-emissions vehicles
• building codes and standards that mandate building efficiency improvements and/or promote renewable heating	• vehicle registration taxes, motor vehicles taxes and company car taxes
• high energy and CO2 taxation on fossil heating fuels	• high energy and CO2 taxation on fossil transport fuels
• comprehensive local heat planning and support for the expansion of district heating	• policies supporting a fully interoperable, and accessible recharging and fuelling network for zero-emissions vehicles
• restrictions in the use of fossil fuels for heating	• Local access restrictions for combustion engine vehicles

Agora Energiewende (2021)

A driver for emissions reductions in heating and transport could also be achieved by strengthening existing provisions in both the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED). For example, a recent paper estimates that a strengthening of energy savings requirements under the EED's Article 7 from 0.8% per year to 1.6% per year could help achieve an additional 3% of GHG emissions reductions in the ESR sectors.[28] Furthermore, a strengthening of renewable heating and cooling targets for industry and buildings could help ensure a greater deployment of clean heating solutions.

Finally, in May 2017 the Commission adopted a legislative proposal to amend the Eurovignette Directive, which sets out rules for charging heavy-duty vehicles for use on the roads and motorways of the Trans-European Transport Network. The revision would extend the directive's scope to passenger cars, vans, and buses and allow differentiated charging based on CO_2 emissions. Council and Parliament have just begun trilogue negotiations.

Due to the importance of these revisions for integrating European countries and meeting climate targets, it is imperative that they be adopted by EU policymakers in the coming years. This set of legislative proposals represents the last opportunity to change the EU policy framework for heating and transport in a way that can still make a meaningful contribution to achieving the EU's 2030 climate target.

28 Stefan Scheuer, RAP and Öko Institut (2020)

4 Why more solidarity is needed to achieve -55%

4.1 Higher national targets under the ESR require more solidarity

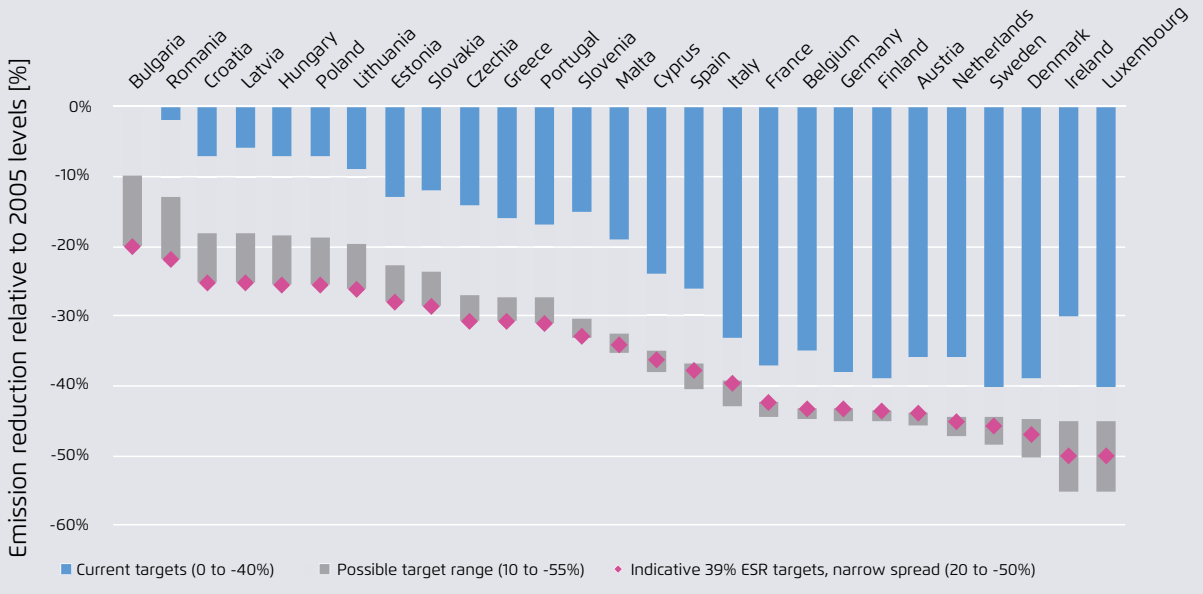
While the EU-wide target of 55% GHG emissions reductions applies to all Member States, the EU's climate policy architecture for delivering this target will in one form or another be based on a system of solidarity.

The EU's current climate policy architecture reflects the principle of solidarity by differentiat-ing respon-sibilities. Under the current EU Effort Sharing Regulation, the common target of reducing emissions 30% below 2005 levels is broken down into different national targets reflecting a Member State's relative wealth as measured by per capita GDP. As a result, rich-er countries have more ambitious targets.

In the past two effort-sharing periods, the spread between the poorest and richest Member States was 40 percentage points. Bulgaria could increase emissions by up to 20 per cent above its 2005 levels whereas Luxembourg and Ireland needed to reduce emissions by 20 per cent. Under current national targets for 2030, Bulgaria needs to stabilize emissions at 2005 levels, while Luxembourg and Sweden need to reduce emissions by 40 per cent.

But to set course for the EU's goal of net-zero emis-sions by 2050, the mechanism to dis-tribute the enhanced 2030 ESR target across Member States needs to change in a way that ensures that all coun-tries are on a path towards climate neutrality. Moreover, while in 2005 poorer Member States had lower per capita emissions than the richer EU Member States, under the current targets by 2030 most of the poorer Member States will have higher per capita emissions than the EU average. Increasing ambition in the effort-sharing sectors in line with the 55% target requires from an environmental integrity

Illustration of how companion policies impact carbon prices — Figure 9



Calculations by Öko-Institut e.V.

perspective that poorer EU Member States need to increase their 2030 targets considerably more than what their share would be based on previous fairness considerations. [29]

Because the 55% target represents a significant increase of ambition, it will also require enhanced EU solidarity mechanisms, including additional EU funds for poorer Member States, to ensure a fair distribution of costs and benefits between EU Member States.

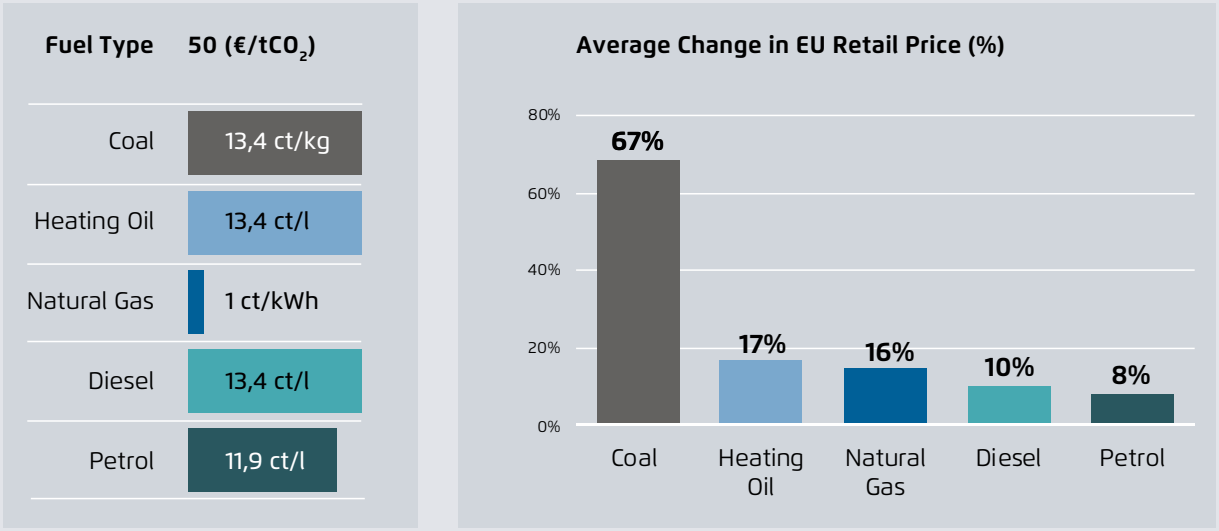
4.2 Emissions trading for heating and transport requires more solidarity

Carbon pricing increases the cost of heating and transport fuels. The extent of the cost increase depends on the CO_2 price and the carbon intensity of the fuel consumed. Consumers using more carbon-intensive fuels pay more than those using fuels with lower carbon intensity. The carbon price would be the same for all fuels covered under the system and would likely come on top of existing fuel taxation, which varies significantly between Member States.

Yet for the consumer, it is not so much the change of the fuel price, but rather the cost of heating and mobility that matters – which in turn is a function of the heating and mobility needs (e.g. floor space and temperature), the efficiency of insulation, of heating systems or of transport vehicles used. Furthermore, households differ in their capacity to respond to changing prices – depending on their level of knowledge, but also their available income. All these factors vary considerably both within and between EU Member States. As a result, certain types of households – and, by extension, the Member States in which these household types are prevalent – will feel the impact of rising carbon prices much more than others, and may have fewer options to respond to

29 Öko-Institut and Agora Energiewende (2020)

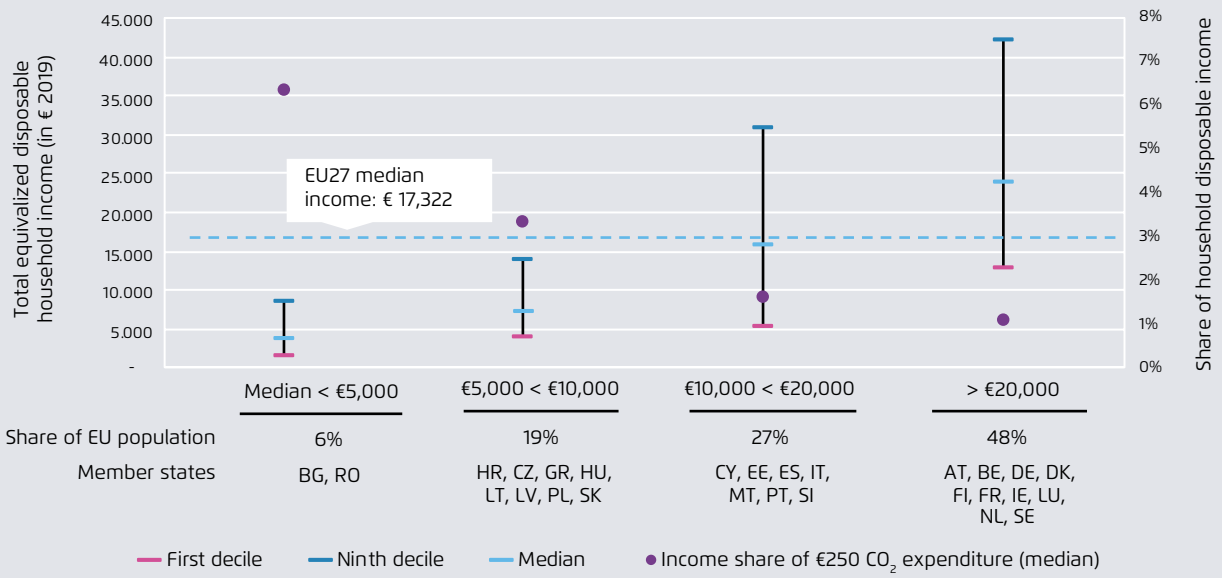
Change in fuel prices with a carbon price of €50/t CO_2 — Figure 10



Own calculations based on EC (2021a, 2021c), DIHK (2020), and Statistics Poland (2021)

Disposable income distribution and impact of CO2 expenditure on median income (in different EU member state groups)

Figure 11



Own calculations based on Eurostat (2021b)

them.[30] The following figure shows this relation. The increase of the cost of heating and transport due to the carbon price may be similar across the EU – for illustration estimated here at 250 Euro per year. But in the poorest Member States, with a median disposable household income of less than 5,000 Euro per year, households will feel this increase much more than in the more affluent Member States, where the median disposable household income is closer to 25,000 Euro per year.

Today, social protection systems already play an important role in mitigating the impact of energy costs on vulnerable low-income households. Next to general social benefits (e.g. unemployment benefits, minimum income schemes), which help tackle energy costs indirectly by increasing the disposable income of low-income households, Member States also provide direct support through energy bill subsidies and reduced tariffs. Targeted structural measures such as energy-efficient social housing, advising, and support for energy-saving retrofits provide more lasting solutions for low-income households because they permanently lower energy bills.[31]

At the same time, social programs and companion policies addressing vulnerable households vary significantly between Member States. Furthermore, the exposure to higher fuel prices differs: Member States differ in the age and quality of their building stock, the floor space per household, the age and efficiency of the vehicle fleet, the distances travelled per household and the choice of transport modes, etc.

30 For a more detailed assessment of these differences see the Annex.

31 Social housing can play a particularly important role in tackling the regressive nature of CO_2 pricing. Each year, 800,000 social housing units need renovation, requiring an estimated EUR 57 billion of additional funding (EC 2020a).

All these mean that the cost of heating and transport fuels, and thus the sensitivity to price increases, are distributed unequally between Member States. And the same is true within Member States, e. g. for households living in rural vs. urban areas. Indeed, distributional questions are part of any debate on new regulation and they warrant specific measures – including both revenue redistribution and additional companion policies – to avoid disproportionate impacts on vulnerable social groups.

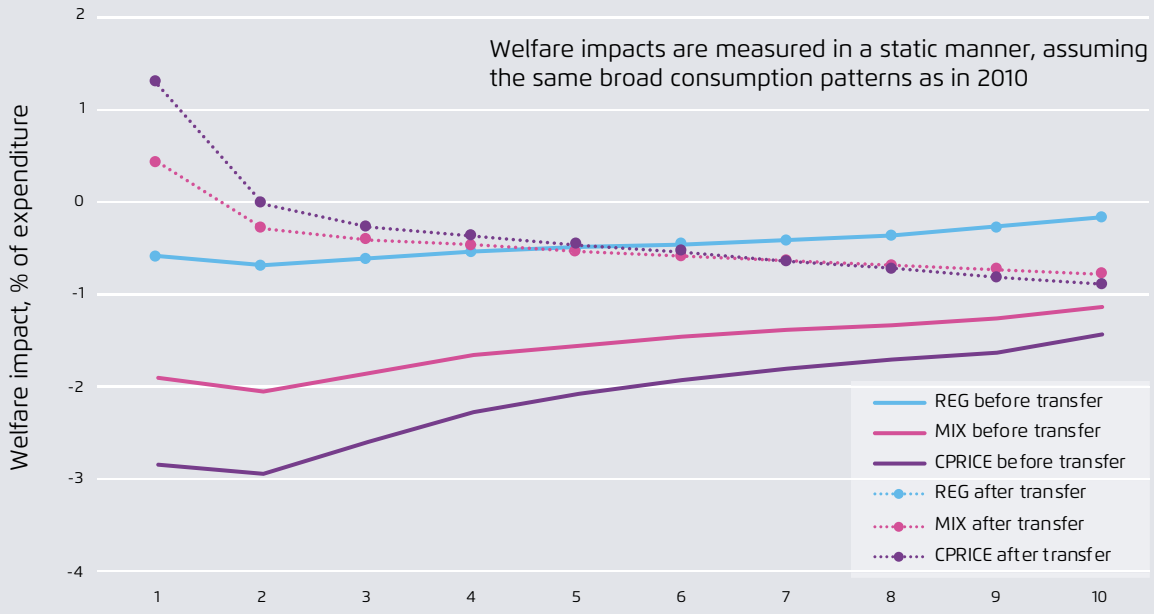
Put differently, we cannot ask every citizen in every Member State to pay the same price per ton of CO_2 irrespective of their income and the country's GDP. Rather, we must address the regressive distributional effects through solidarity mechanisms. This includes solidarity not only with the poorest, but also with those who are most exposed to fuel price increases, and who lack the means to reduce their exposure.

4.3 100% of revenues from carbon pricing needs to flow back to EU citizens

Carbon pricing raises revenues that Member States can use to encourage the needed clean investments. The level of these revenues is a function of the CO_2 price and the level of heating and transport emissions. For example, in its modelling for the 2030 Climate Target Plan, the European Commission estimates that carbon pricing for transport and

Changes in relative welfare by expenditure decile due to changes in relative prices in Commission scenarios with 55% level of ambition

Figure 12



Note: The analysis passumes that all revenues from carbon pricing are uniformly redistributed at the national level as a lump sum to all households, regardless of expenditure or income decile.

Commission Impact Assessment for the 2030 Climate Target Plan

buildings could raise €42 billion (58 billion) in 2030 at a carbon price of €44/tCO_2 (€60/tCO_2).[32]

These carbon pricing revenues are relatively small compared with other energy taxes collected by EU Member States, which amounted to EUR 294 billion in 2018.33 Still, given the investment gap in buildings and transport, they are significant.

To ensure the greater solidarity described in sections 4.1 and 4.2, 100% of carbon pricing revenues should flow back to EU citizens in one form or another.

For example, Member States could opt for **"Giving it back to the people"** programs, where revenues would be redistributed as lump-sum payments to citizens or be used to mitigate negative effects on vulnerable households. Numerous studies, including the European Commission's 2030 Climate Target Plan Impact Assessment, have shown that a lump-sum redistribution of carbon revenue could generate a positive welfare impact for poor households. In lump-sum redistributions, each inhabitant receives his or her equal share of the carbon revenues as an annual payment. As a result the population decile with the lowest expenditures receives a lump-sum payment that is higher than the increased energy cost caused by the carbon price.

Furthermore, revenue allocation between Member States should at least in part be based on solidarity criteria, such GDP per-capita and capability considerations. For example, a clean-investment fund could be established for Member States with a GDP per-capita that is below the EU average. Payments from this fund would be reserved for investments into zero-emission transport and heating that are compatible with a long-run decarbonisation pathway, and/or which benefit in particular the most vulnerable groups. An interesting initiative in this regard is Poland's proposal to use EU ETS revenues to create an Energy Solidarity Fund to support programs that decrease the energy expenses of low-income households by, say, upgrading the energy efficiency of buildings.

For more on the impact of other revenue allocation methods see the Annex.

4.4 Managing the impacts of carbon pricing requires making smart use of the EU budget for timely investments before the introduction of an ETS

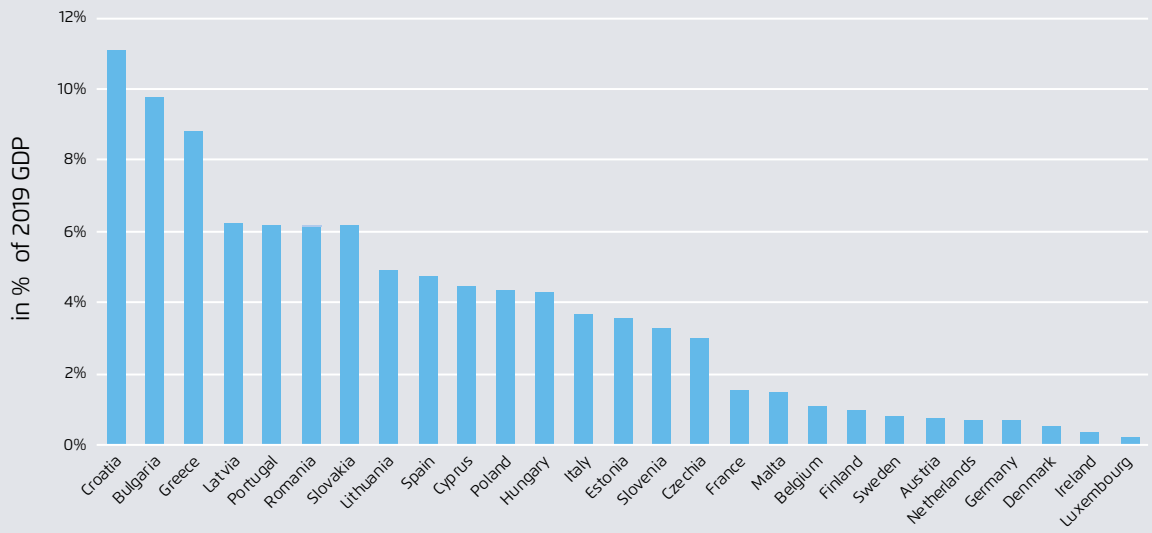
Many of the necessary clean investments and services for mitigating the impact of carbon pricing on industry and vulnerable households need time to achieve their intended effects. Supporting poorer Member States and vulnerable households in managing the distributional impacts of carbon pricing thus requires prior investment. The problem is that carbon pricing revenues cannot be expected until an emissions trading system is put in place, which will not happen until at least 2025.

The EU budget for 2021–2027, adopted at the end of 2020, must therefore play a crucial role in accelerating the roll-out of clean investments to help protect lower-income Member States and vulnerable households from the negative impacts of EU-wide carbon pricing in the second half of the decade. In particular, the EU's NextGenerationEU recovery fund earmarks 37% of all funds for climate objectives. This translates into at least 41 billion euros in short-term climate spending for Member States with below EU-average per capita GDP. These funds will be committed over the course of 2021–2023 and must be spent by no later than 2026.

32 While not precisely specified by the Commission, the modelling results indicate that at least €5.9 billion are generated from carbon pricing of aviation transport fuels, which would not be part of a separate EU ETS.

33 EC (2020b)

Grants – Recovery and Resilience Facility (2021–2026) in % of 2019 GDP, EU27 Figure 13



Note: Energy system investment costs estimates exclude transport

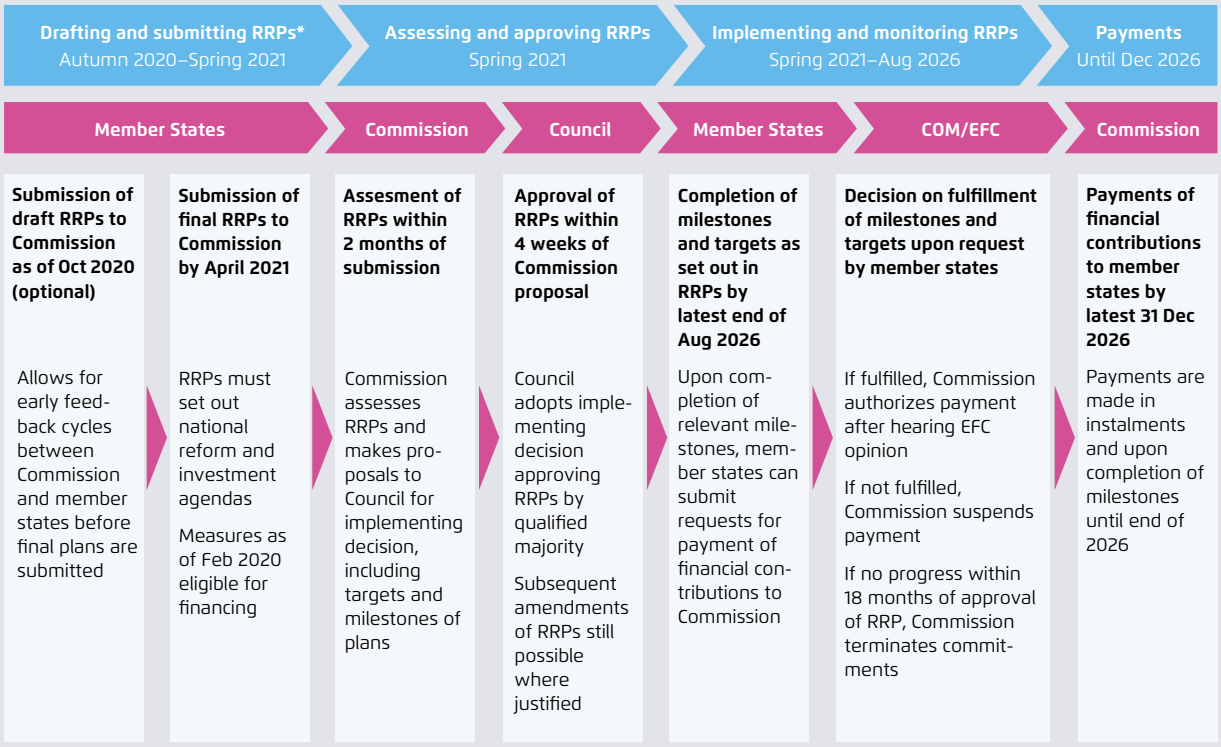
Calculations by Agora Energiewende based on EC (2021e) and Eurostat (2021)

The European Commission has also identified flagship areas for investment and reform related to buildings and transport. These include retrofitting the building stock, rolling out an electric charging infrastructure, and upgrading district heating and cooling systems. These flagship areas could be used to mobilize significant EU funding around mission-oriented goals such as a moonshot program to replace oil & coal heating systems across the EU by 2030 or an EU-wide initiative to improve low-carbon mobility services in rural and peri-urban areas.

The need for monitoring EU Recovery Fund spending

The initial experiences with programs under the RRF suggest that translating the EU's principled climate protection commitments into effective concrete investments will pose a challenge. Many of the investments rely on new, as yet untested planning processes, and decision-making has shifted its focus from the EU climate and energy budget framework to the economic governance framework (the "European Semester") and national governments. As such, Member State spending will also require a strong EU monitoring framework to ensure that EU recovery funds are spent effectively. This could take place through yearly updates on planned national investments in transport and building transition from national Recovery and Resilience Plans and through progress monitoring on transport and buildings transformation as part of the annual European Semester cycle.

An overview of the governance of the EU Recovery and Resilience Facility — Figure 14



* National Recovery and Resiliance Plans

Jacques Delors Centre (2021) based on Council (2020)

To ensure a timely and smooth functioning of redis-tribution mechanisms for carbon pricing revenues, funding from the RRF could also be used to develop and pilot lump-sum transfer schemes and targeted support programs for vulnerable and low-income households prior to the introduction of a carbon price in the buildings and transport sectors.

4.5 Managing the impacts of carbon pricing requires making smart use of ETS revenues after the introduction of an ETS

Given the significant investment gap from increasing the EU's 2030 climate target, carbon pricing revenues should only be used for climate spending and redis-tribution to households. This is all the more important because the revenues from an expanded EU ETS could pick-up when climate financing from EU recovery funds dries up.

The EU ETS Directive stipulates that at least 50 % of revenues should be used for climate and energy purposes. These funds provide valuable funding to support climate action such as energy efficiency programs. For example, in 2018 Slovakia spent or committed over €39 million to energy efficiency projects in public buildings.[34] Given the EU's clean investment needs, this approach must be expanded.

34 WWF (2020)

A roadmap towards the introduction of new "own resources"

At the European Council meeting in July 2020, heads of state and government reached an agreement on a package combining the new MFF, the recovery instrument, "own resources," and the mechanisms for financing these expenditures. The agreement permanently increased the "own resources" ceiling – the maximum funding that can be called from Member States in any given year to finance EU expenditures – from 1.20% to 1.40% of EU-27 gross national income. In parallel, the "own resources" ceiling was temporarily increased by a further 0.6% of EU GNI for borrowing related to the NGEU. The deal also provides for the introduction of new "own resources" for the early repayment of loans financing NextGenerationEU, including one based on non-recycled plastic waste, which went into effect on 1 January 2021. An inter-institutional agreement between the Parliament and Council reached on 10 November 2020 features a roadmap for new "own resources". These include an ETS-based resource (starting in 2023, possibly linked with a carbon border adjustment mechanism); a digital levy (starting in 2023); a Financial Transaction Tax-based resource (starting in 2026); and a financial contribution linked to the corporate sector (starting in 2026). On 14 December 2020, the Council adopted the Own Resources Decision, which needs to be ratified by all Member States before it goes into effect.

To garner sufficient political support, it makes sense to link the use of (additional) ETS revenues directly to the investment needs identified by Member States in their NECPs. [35] Draft NECP updates are due by 30 June 2023. NECPs will be finalized by 30 June 2024.[36] In other words, the NECP update will come just as negotiations on the Fit for 55 package are wrapping up and Member States have determined their respective national contribution to the EU's updated 2030 climate target.

Linking the use of ETS revenues to clear spending priorities identified in NECPs and related GHG reductions will facilitate the monitoring of revenue use. It will also help with the development of large-scale transformative projects, be it building renovations, the roll-out of an electric charging infrastructure, or the transition from coal to renewables.

This proposal may seem to contradict the conclusions of the European Council stipulating that (some) of the revenues from the revised EU ETS be used as "own resources" to repay loans for the Next Generation EU budget.[37] Of course, the European Council does not say that all of the revenues from the revised EU ETS must be used for repayment. But a decision to use 100% of ETS revenues for reducing the massive investment gap in Europe's clean-energy transition would indeed stand in tension with this political guidance and would need to be resolved.

35 This is in accordance with Art. 3.2 lit c) Regulation (EU) 2018/1999.

36 See Art. 14.1 and 2 Regulation (EU) 2018/1999.

37 See paragraph A29 of European Council Conclusions of 21 July 2020.

5 Annexes

Annex 1: The case for carbon pricing in buildings and transport

While the carbon price for transport and housing is expected to function differently, it is nonetheless an essential part of a Fit for 55 policy mix for a number of reasons:

A carbon price is needed to prevent rebound effects.

Standards and other types of regulation make cars, heating systems, and buildings more efficient. This not only lowers their environmental footprint; it also makes them cheaper to use. But if cheaper use means that cars and heating systems are used more often, or more intensively, efficiency may eventually lead to more driving, more and larger heating systems, more floor space in buildings, etc. As a result, the "rebound effects" offset some of the emission reductions that the technological improvement brings about. A well-designed carbon price can correct this, because it applies not only to the purchase of a product, but also to its use. Thus, a slowly but predictably rising carbon price can counter the incentive to use heating systems more often, and more intensely. And if the carbon price rises in line with the efficiency improvements achieved, the total cost to consumers and households will actually remain constant.

The carbon price addresses both operating expenditures and capital expenditures.

It influences not only which machinery and equipment is installed, but also how they are used. This ensures that emissions are reduced throughout the lifecycle of a product. This sets carbon prices apart from an efficiency standard. Whereas the standard makes sure that efficient heating systems are purchased, carbon prices also ensures that they are used efficiently. In this way, carbon pricing avoids another unwanted side-effect of standards: if stricter standards apply to new products, they can make it more attractive to continue using old, inefficient equipment.

The carbon price supports the business case for low-carbon solutions.

Putting a price on carbon moves forward the 'break-even point' of new, low, or zero-carbon technologies, it improves their competitiveness with incumbent fossil technologies, and it accelerates their market penetration. Because the carbon price raises the cost of fossil fuels in transport, it will take fewer kilometers in an electric car before the higher purchase price is offset. Because the carbon price raises the cost of oil and gas heating, it will make it more attractive for homeowners to install heat pumps. And this holds not only for new technologies, but also for new business models. The carbon price also promotes innovation towards low-carbon solutions because innovators see clear economic benefits and growing markets for new products and services. The carbon price also helps businesses identify GHG reduction potential along their supply chain that may not have been visible to business before, and thus acts as a discovery mechanism for low-cost abatement. McKinsey estimates that 61% of investments needed for 2021–2030 do not have a standalone investment case for individual stakeholders, particularly in the buildings sector. The authors estimate that this figure will drop to 23% when carbon prices reach €50–100 per ton[38]

The carbon price sends a long-term signal to investors and consumers

Investments made today will need to be compatible with pathways to climate neutrality, or risk ending up as stranded assets, at huge cost to investors and to society. This applies not only to businesses planning

38 McKinsey & Company (2020).

new facilities, but also to private households deciding which car to buy or whether to retrofit their house. The carbon price increasingly works as a signal to investors, telling them which investments are economically viable. And by changing the payback period, they make fossil-intensive investments less attractive, and expose the risk of fossil technology lock-in.

The carbon price can drive the phase-out of fossil-intensive technologies

As evidenced by the sharp decline of coal-fired power generation across Europe, a high enough carbon price can also accelerate the market exit of fossil-intensive technologies, especially where low-carbon or climate-neutral alternatives are available. With carbon pricing, the least efficient plants face the greatest pressure to exit the market, which helps to keep the overall costs of the transition as low as possible. For reasons of social equity and public support, the phase-out of fossil-intensive technologies will require that alternatives are in place, or at least available and commercially competitive.

Carbon pricing helps to level the playing field across sectors

As more and more sectors face carbon pricing, distortions between them will decline and solutions will arise that work across the conventional boundaries of power generation, industry, transport, private households, etc. As the power sector moves towards higher shares of renewables, several technologies will play a role connecting the sectors. They include electricity storage, the electrification of transport, space heating and industrial heat generation, and the production of green hydrogen. A common carbon price across sectors will thus benefit these technologies.

Carbon pricing generates revenues that can support the transition to climate-neutrality

If and when a carbon price applies to transport and households, it will raise significant additional revenues. Unlike the existing EU ETS, which started off by allocating most allowances for free, transport and heating will require an upstream trading mechanism. The revenue that is raised through a carbon pricing system can support the transition to climate neutrality in different ways. it can be used to ensure a just transition by helping vulnerable groups shoulder the costs and adjust to higher carbon prices. It can also be used for a blanket rebate – through a refund per households, or by lowering other taxes – or as a dedicated support system for innovation and investment in low-carbon technologies

Annex 2: Examples of annual heat and transport costs at a CO_2-price of €50/t CO_2

Illustrative examples of annual heat and transport costs at a CO_2-price of €50/t CO_2 Table 4

Heating	Living space (m^2)	Fuel Consumption	Annual CO_2 Costs at €50/t CO_2	Annual CO_2 Costs as a share of net income by income bracket, EU-27 (2019)			
				First Decile	First Quintile	First Quartile	Median
Oil Boiler	70 m^2 (Apartment)	Low	€ 107	1,2%	0,9%	0,9%	0,0%
		Medium	€ 173	2,0%	1,5%	1,4%	0,0%
		High	€ 264	3,0%	2,3%	2,1%	0,0%
	110 m^2 (House)	Low	€ 177	2,0%	1,6%	1,4%	0,0%
		Medium	€ 284	3,3%	2,5%	2,3%	0,0%
		High	€ 425	4,9%	3,8%	3,4%	0,0%
Gas Boiler	70 m^2 (Apartment)	Low	€ 73	0,8%	0,6%	0,6%	0,0%
		Medium	€ 125	1,4%	1,1%	1,0%	0,0%
		High	€ 195	2,2%	1,7%	1,6%	0,0%
	110 m^2 (House)	Low	€ 123	1,4%	1,1%	1,0%	0,0%
		Medium	€ 216	2,5%	1,9%	1,7%	0,0%
		High	€ 336	3,8%	3,0%	2,7%	0,0%
District Heating	70 m^2 (Apartment)	Low	€ 51	0,6%	0,5%	0,4%	0,0%
		Medium	€ 85	1,0%	0,7%	0,7%	0,0%
		High	€ 145	1,7%	1,3%	1,2%	0,0%
Transport	**Distance Travelled (km)**	**Fuel Consumption**	**Annual CO_2 Costs**	**First Decile**	**First Quintile**	**First Quartile**	**Median**
Petrol Car	10.000	4l/100 km	€ 47	0,5%	0,4%	0,4%	0,0%
		6l/100 km	€ 70	0,8%	0,6%	0,6%	0,0%
		8l/100 km	€ 93	1,1%	0,8%	0,8%	0,0%
Diesel Car		4l/100 km	€ 52	0,6%	0,5%	0,4%	0,0%
		6l/100 km	€ 78	0,9%	0,7%	0,6%	0,0%
		8l/100 km	€ 104	1,2%	0,9%	0,8%	0,0%

Calculations by Agora Energiewende based on Heizspiegel.de (2021), CO2-Preis-Rechner.de (2021) and Eurostat (2021)

Annex 3: EU funds available in the 2021–2030 period

EU funds available 2021–2027 (commitments MFF and NGEU) in billions of Euro — Table 5

Member states	"EU Budget (2021-2027)"			NextGenEU (2021-2026)	EU ETS (2021-2030)		Total funds (2021-2027)
	Structural funds	Common Agricultural Policy (CAP)	Just Transition Fund*	Recovery and Resilience Facility*	Regular ETS Auctioning Revenues 2021-2030 (€50/tCO_2)**	ETS Solidarity Mechanisms (€50/tCO_2)**	
Bulgaria	10,2	8,1	1,2	6,3	5,4	3,3	**34,5**
Romania	30,3	21,7	1,9	14,2	10,3	6,4	**84,8**
Croatia	9,1	5	0,2	6,3	1,8	0,8	**23,2**
Latvia	4,6	3,3	0,2	2,0	0,4	0,4	**10,8**
Hungary	22,5	12,2	0,2	7,2	3,9	1,8	**47,8**
Poland	75	32,2	3,5	23,9	29,6	15,6	**179,9**
Lithuania	6,5	5,6	0,2	2,2	1,5	0,9	**17,0**
Estonia	3,3	2	0,3	1,0	1,8	1,0	**9,4**
Slovakia	12,9	4,9	0,4	6,3	3,8	2,1	**30,5**
Czechia	21,8	8,1	1,5	7,1	11,6	5,1	**55,2**
Greece	21,4	19,4	0,8	17,8	9,7	1,5	**70,6**
Portugal	23,6	9,7	0,2	13,9	5,0	0,7	**53,2**
Slovenia	3,3	1,8	0,2	1,8	1,2	0,2	**8,5**
Malta	0,8	0,2	0,02	0,3	0,3	0,1	**1,6**
Cyprus	1	0,5	0,1	1,0	0,7	0,1	**3,4**
Spain	35,4	45,9	0,8	69,5	26,3	3,1	**181,0**
Italy	42,1	38,6	0,9	68,9	32,5	N/A	**183,0**
France	16,8	66,2	0,9	39,4	20,3	N/A	**143,6**
Belgium	2,7	4,1	0,2	5,9	8,7	N/A	**21,6**
Germany	18,4	43,3	2,3	25,6	68,5	N/A	**158,1**
Finland	1,7	6,4	0,4	2,1	5,6	N/A	**16,2**
Austria	1,1	8,9	0,1	3,5	4,7	N/A	**18,3**
Netherlands	1,3	5,6	0,6	6,0	12,0	N/A	**25,5**
Sweden	1,9	6,5	0,1	3,3	3,1	N/A	**14,9**
Denmark	0,5	6,6	0,1	1,6	3,9	N/A	**12,7**
Ireland	1,2	10,7	0,1	1,0	3,0	N/A	**16,0**
Luxembourg	0,1	0,3	0,01	0,1	0,4	N/A	**0,9**
Other	3,2	8,5	N/A	N/A	22,5	N/A	**34,2**
Total	**372,6**	**386,6**	**17,5**	**338**	**276,0**	**43,2**	**1433,9**

Note: * in 2018 prices; ** Based on ERCST estimates with BREXIT and higher ambition, but without the MSR

EC (2021e) and estimates based on ERCST (2021)

EU funds available 2021–2027 (commitments MFF and NGEU) in billions of Euro — Table 6

- EUR 95.5 billion from Horizon Europe;
- EUR 9.9 billion from InvestEU;
- EUR 30 billion from Connecting Europe Facility;
- EUR 360 billion in loans from the Recovery and Resilience Facility;
- EUR 3.2 billion for Technical assistance, Transnational cooperation, Interregional innovation and cooperation and the European Urban Initiative
- EUR 5.4 billion from the LIFE programme;
- EUR 8.5 billion from the European Agricultural Fund for Rural Development; and
- EUR 22.5 billion from the Innovation Fund at €50/tCO_2

Based on EC (2021b, 2021d, 2021e)

Annex 4: Indicative revenues in a separate ETS for buildings and transport

Indicative carbon pricing revenues and solidarity transfers in a separate ETS for buildings and transport by member state

Table 7

	Average ETS revenues (2025 - 2030)*			15% solidarity contribution	EU solidarity transfer**		Post redistribution, carbon pricing costs (% 2019 GDP)		Revenues available for domestic lump-sum transfers, post-redistribution (GDP/pop <80% rule)	
					ESR 2018	GDP/pop <80%	ESR 2018	GDP/pop <80%	€ per capita	% 2019 GDP/ capita
	€ bn	€ per capita	% 2019 GDP	€ bn	€ bn	€ bn	% 2019 GDP	% 2019 GDP	€ per capita	% 2019 GDP/capita
AT	1,47	166	0,4%	0,22	0,23	0,00	0,3%	0,4%	141	0,3%
BE	2,17	190	0,5%	0,32	0,34	0,00	0,4%	0,5%	161	0,4%
BG	0,82	117	1,6%	0,12	0,12	0,57	1,4%	0,5%	181	2,5%
HR	0,56	137	1,1%	0,08	0,07	0,33	1,0%	0,5%	198	1,7%
CY	0,12	142	0,6%	0,02	0,02	0,00	0,5%	0,6%	120	0,5%
CZ	1,89	178	1,0%	0,28	0,28	0,87	0,9%	0,6%	233	1,3%
DK	0,93	160	0,3%	0,14	0,15	0,00	0,3%	0,3%	136	0,3%
EE	0,19	143	0,8%	0,03	0,03	0,11	0,7%	0,3%	203	1,1%
FI	0,83	151	0,4%	0,12	0,14	0,00	0,3%	0,4%	128	0,3%
FR	10,18	152	0,4%	1,53	1,56	0,00	0,4%	0,4%	129	0,4%
DE	12,67	153	0,4%	1,90	1,98	0,00	0,3%	0,4%	130	0,3%
GR	1,69	157	0,9%	0,25	0,20	0,88	0,8%	0,4%	216	1,3%
HU	1,47	150	1,2%	0,22	0,20	0,80	1,0%	0,5%	209	1,6%
IE	1,05	215	0,3%	0,16	0,21	0,00	0,3%	0,3%	183	0,3%
IT	8,99	149	0,5%	1,35	1,27	0,00	0,4%	0,5%	126	0,4%
LV	0,27	141	1,0%	0,04	0,04	0,16	0,9%	0,4%	202	1,4%
LT	0,38	134	0,9%	0,06	0,06	0,23	0,8%	0,4%	196	1,3%
LU	0,27	450	0,5%	0,04	0,04	0,00	0,4%	0,5%	382	0,4%
MT	0,03	66	0,3%	0,00	0,01	0,00	0,2%	0,3%	56	0,2%
NL	3,05	177	0,4%	0,46	0,45	0,00	0,3%	0,4%	151	0,3%
PL	6,07	160	1,2%	0,91	0,97	3,11	1,0%	0,6%	218	1,7%
PT	1,35	131	0,7%	0,20	0,18	0,84	0,6%	0,3%	193	1,0%
RO	2,39	123	1,3%	0,36	0,35	1,59	1,1%	0,4%	186	1,9%
SK	0,69	126	0,8%	0,10	0,10	0,45	0,7%	0,3%	189	1,2%
SI	0,35	167	0,8%	0,05	0,05	0,17	0,7%	0,4%	224	1,1%
ES	6,50	139	0,6%	0,98	0,92	0,00	0,5%	0,6%	118	0,5%
SE	0,99	98	0,2%	0,15	0,14	0,00	0,2%	0,2%	83	0,2%
EU27	**67,37**	**151**	**0,5%**	**10,11**	**10,11**	**10,11**	–	–	**151**	**0,5%**
Low-income MS	**18,10**	**147**	**1,1%**	**2,72**	**2,66**	**10,11**	**0,9%**	**0,5%**	**206**	**1,5%**
Other MS	**49,27**	**153**	**0,4%**	**7,39**	**7,45**	**0,00**	**0,4%**	**0,4%**	**130**	**0,4%**

Note: All values are averages per year over the period 2025-2030; based on a CO2 price trajectory of €50-100/tCO2 from 2025-2030 and a 39% ESR emissions scenario with a 20-50% spread between lower and higher income Member States

Note: ESR 2018 redistributed the solidarity transfer based on historic ESR emissions from 2018 by Member State. GDP/pop <80% redistributes the solidarity transfer exclusively to Member States with a per capita GDP less than 80% of the EU average.

Öko Institute and Agora Energiewende

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