

## Headline common messages

The studies included in this evidence review point to the common headline messages, grouped by theme, below.

### **The role and action of ETS2 in a holistic policy mix to drive the achievement of the EU social and climate goals**

1. Stricter regulation and complementary policies lower the ETS2 price.
2. Continued effort sharing through the ESR combined with effective Annual Emissions Allocations (AEA) trade between Member States complements the achievement of emissions reductions under the ETS2 and helps to spread transition costs fairly.
3. A lot of investment is needed to decarbonise transport and buildings. ETS2 revenue can help the EU meet the €240 billion or more needed by 2030.
4. Using carbon revenues to finance energy efficiency improvements, will reduce exposure of households to high energy costs, while bringing additional health and climate co-benefits.
5. The ETS2 is needed to drive down emissions, but it requires additional policies to address market barriers and to limit the distributional challenges of a carbon price.

### **Impact of ETS2 on households across the EU**

6. The impact of ETS2 on disposable household income varies considerably, depending on Member State and household specificities. A carbon price on heating is regressive, but accompanying measures can mitigate this effect.

7. The ETS2 typically has greater relative negative impacts on household disposable income in lower income Member States with high carbon intensity heating systems.

## **ETS2 revenue use**

8. The ETS 2 can be progressive, if revenue is recycled to households. The ETS2 is most progressive if revenue recycling is targeted to the most vulnerable households
9. Supporting investments in energy efficiency or renewable energy tend to benefit the middle and high income groups most, unless investment support is targeted.
10. 25% of the revenue from ETS2 will be sufficient to offset the additional cost of the ETS2 for the poorest 40% of all households across the EU.
  - However, the actual proportion of ETS2 revenue received by the Member State and needed to compensate the poorest 40% of households will differ, depending on the Member State concerned.

## **Social Climate Fund**

11. If capped and static, the SCF budget will decline in relative size compared to ETS2 revenues as carbon prices rise. A budget of €72.2 billion would mean there is less than 25% of the ETS2 revenue available at a carbon price above €50 per tonne.
12. The SCF plays a vital role in ensuring sufficient revenue is available to compensate the poorest households for additional costs and to support investment in the lowest income Member States, thanks to its redistributive function within and between Member States.
13. The governance of the SCF should ensure some EU oversight of spending, according to subsidiarity and proportionality principles.

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# Introduction

As part of the Fit for 55 Package, the European Commission proposed to introduce a carbon price on the emissions of fossil fuels consumed in road transport and buildings through the creation of a separate and upstream ETS (or ETS2). While the ETS2 requires fossil fuel suppliers to purchase emissions allowances, the carbon price paid will be passed on to the final consumers - including households. This pass-through of the carbon cost is essential to generate a price signal that will induce demand shifts towards clean technologies and accelerate the decrease of emissions in the two sectors<sup>1</sup>.

*Disclaimer: The estimated impact of an ETS2 carbon price on the energy prices varies according to the type of fuel and existing fossil fuel taxation in member states, but it is very low in light of the current energy crisis fuelled by fossil fuel costs, in which the retail price of gas for household consumers in the second quarter of 2022 increased by 62% compared to the previous year<sup>2</sup>. The level of energy prices is a variable in the modelling of ETS2 price estimations, therefore the reader must be aware that price estimations referred to in the reviewed studies were developed before the current energy price spikes and might now be outdated. For more information, please see the section in the summary on interactions of the ETS2 and the energy prices.*

## Purpose of Paper

The introduction of a carbon price in the road transport and buildings sectors raises some outstanding questions which remain untouched by the Commission's Impact Assessments - the findings from which are outlined in a section below. The studies reviewed in this paper have tried to answer some of these unanswered questions, including in particular:

- The role of the ETS2 in reaching the EU's 2030 emissions reduction targets
- The ETS2's impact on households in each Member State depending on household characteristics (i.e. size, level of income and expenditure, geographical distribution and energy consumption patterns)
- The ways to recycle revenues for offsetting negative distributional impacts
- The respective role and need for investments and compensating measures (including direct income support)
- The impact of the redistribution of revenues across Member States and income groups

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<sup>1</sup> Emissions from the building and road transport sectors respectively amount to 12% and 20% of EU GHG emissions. Emissions from buildings have decreased compared to 1990 but increased from 2014 to 2018 by 3%. Road transport emissions have increased compared to 1990, and by 6% from 2014 to 2018. Source: European Commission's Impact Assessment of the proposal for the ETS for road transport and buildings, SWD (2021) 601 final.

<sup>2</sup> Wholesale gas prices rose by three-fold in 2n quarter of 2022 compared to the same period in the previous year. [European Commission, Q2 2022 Gas market report.](#)

- The SCF envelope, its redistribution among Member States and its adequacy vis à vis the spending and investment challenges

This paper brings together the results of 8 studies on the impacts of the proposed ETS2 and the SCF, which is proposed to accompany it. As an evidence review, it does not seek to make specific policy recommendations, but does focus on the most controversial aspects in the debate.

The 13 headlines focus on findings common to the studies. No headline is contradicted by one of the studies included in this overview, although not every study addresses every point included. Each individual study or report is based on potentially different assumptions.

The paper is split into 4 sections: the role of the ETS 2 and importance of investment to reach the social and climate goals of the European Green Deal, the impact of ETS2 on households across the EU, the impact of ETS2 revenue use, and the SCF.

The paper aims to inform the debate around the ETS2 and SCF, to ensure that policy makers can adopt a package of measures which delivers on both the climate and social goals of the EU Green Deal.

## **Background to the ETS2 and Social Climate Fund Proposals and the Commission's Impact Assessment**

Alongside the ETS2, the European Commission has proposed to create a new financial instrument: The Social Climate Fund (SCF). The SCF would aim to address the distributional impacts of a carbon price on particularly vulnerable social groups and would be financed with 25% of the ETS2 revenues, corresponding to €72.2 billion at €50 per tonne of carbon, over the 8 years between 2025 and 2032.

The distribution key of the SCF contains a solidarity component which takes into account the social impact of an ETS2 in that Member State and its capacity to tackle it. As Member States must complement the allocation they get from the SCF with 50% co-financing, the cumulative SCF budget is doubled to 144.4 billion.

According to the Commission's Proposal, the SCF budget should be used to benefit households, micro-enterprises and transport users which are vulnerable and particularly affected by the new carbon price with a particular attention to households in energy poverty and citizens without alternatives to private car use. In order to access the SCF, Member States must prepare and implement a Social Climate Plan outlining the measures that will help achieve the objectives of the SCF, including measures and investments that provide temporary income support, increase the energy efficiency of buildings and building renovation, improve energy efficiency and decarbonise heating and cooling, and spur the uptake of low and zero emissions mobility and transport.

The remaining ETS2 revenues would be distributed to Member States on the basis of their average emissions in the two sectors in 2016-2018.

However, the introduction of an ETS2 remains controversial and there has been no integrated impact assessment of the interaction between ETS2 and SCF.

Instead, the Commission's Impact Assessment (IA) has focused on the simple impact that the introduction of a carbon price on fossil fuels consumed in road transport and buildings would have on household expenditure for investments and fossil fuels. The IA took into account the distributive impact for different income groups in member states grouped by GDP per capita (above EU-27 average, 60-100% of EU-27 average, <60% of EU-27 average). This found:

- **Lower income households experience a relatively higher burden without targeted support.** In all EU countries these income groups see their expenditure for investments and for fossil fuel consumption increase the most as a share of their total expenditure.
- In the residential sector, annual investment costs (for housing stock renovation or energy efficient equipment) will constitute a higher percentage of the total household expenditure compared to a baseline without a carbon price. Such an increase will be well above EU average in low income EU member states and for low income households in all EU countries<sup>3</sup> compared to other income groups. The IA thus outlines the uneven burden that an EU harmonised carbon price would have across income groups and member states, however, **it doesn't investigate further the detailed impact in each Member State.**
- Households in the lower income deciles also face a relatively higher burden<sup>4</sup> from expenditure on fossil fuels for heating and cooling<sup>5</sup>. Lower income deciles spend a higher share of their income on fossil fuels compared to wealthier households, although the expenditure for fossil fuels used *in transport* is higher for medium income households as lower income households have less access to car ownership. The IA also recognises that the impact on fossil fuel expenditure would be higher for households (and countries) that use coal for heating and in countries with lower fossil fuels' taxes.
- **The burden due to fossil fuel consumption will however decrease as effects of the investment in energy efficient and clean solutions kick in.** The IA estimates that if investments in housing renovation, energy efficient equipment, clean solutions for heating, cooling and mobility are realised, then, lower income households in the EU

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<sup>3</sup> See Table 20 of the Commission's Impact Assessment of the proposal for the ETS for road transport and buildings [SWD \(2021\) 601 final](#).

<sup>4</sup> Table 22, *ibidem*.

<sup>5</sup> The Impact Assessment considers the impact descending from the cumulative effect of the ETS2 and the revision of the Energy Taxation Directive.

will see a drop in fossil fuel expenditure as a share of total consumption. In low income Member States, however, the rise of fossil fuel expenditure remains high, indicating that the **investment challenge for low income households in low income countries needs special attention**. The Commission's IA does not investigate the impact on fossil fuel consumption and expenditure due to investments in building renovation, energy efficiency and other clean solutions per income group in each Member State.

- **Some redistributive mechanisms are proposed to address the social impacts, especially for low income households in low income Member States.** The IA to the Climate Target Plan (CTP) and to the ETS2 indicates that **some redistribution can help offset the negative effects of a carbon price**<sup>6</sup>. If using all ETS2 revenues for lump-sum payments<sup>7</sup> to households on the basis of household size, small welfare gains for the bottom-most decile are observed and negative impacts for the other income groups are significantly reduced – but the payments do not offset the overall negative impact in the latter case. While such payments could be more targeted at lower income deciles, revenue redistribution mechanisms could also include reduction in labour taxation, income tax, employer social security contributions and VAT, and investments and reforms that would improve the energy situation of households (such as housing renovation, advice on energy audits, measures such as protection against disconnection for vulnerable households). However, even if **the IA suggests that targeted measures would better support vulnerable households**, more detailed assessment of the measures and investments needed and their impact is not made.

An impact assessment was carried out for the ETS2, but not for the SCF proposal. The European Commission retained that the problems tackled by the SCF and the possible solution had been sufficiently analysed by the IA of the Climate Target Plan and of the ETS<sup>8</sup>. However, those Impact Assessments do not explain and justify why the SCF budget should be worth 25% of the ETS2 revenues. A detailed assessment of the impact of the ETS2 and of the redistribution of the ETS2 revenues at Member State level is also missing. The IA fails to define the redistribution of revenues between Member States that is needed to compensate for the relatively higher burden of the carbon price on households in lower income countries and, consequently, whether the proposed redistribution is fit for purpose. Nor is it modelled how the level of revenue redistribution among Member States changes if the SCF budget is fixed and not allowed to increase as the carbon price rises.

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<sup>6</sup> Mechanisms that address excessive price fluctuations are also presented as a solution to balance the burden due to high prices.

<sup>7</sup> Similarly, the IA of the Energy Taxation Directive (ETS) shows that revenue recycling through compensations to households can have a progressive effect and compensate for the impact of the ETD revision.

<sup>8</sup> Answer given by Executive Vice-President Timmermans on behalf of the European Commission, 25.1.2022, [here](#).

# Glossary

**AEA** - Annual Emission Allocations. These correspond to binding annual limits for emissions covered by the ESR and are allocated to each Member State according to the ESR every year. They set the maximum emission a Member State shall emit and reduce in a linear manner each year.

**Double Dividend<sup>9</sup>** - It refers to the notion that environmental taxes can both reduce pollution (the first dividend) and reduce the overall economic costs associated with the tax system by using the revenue generated to displace other more distortionary taxes that slow economic growth at the same time (the second dividend).

**ESR** - Effort Sharing Regulation. It distributes the national efforts for emissions reduction in sectors not covered by the ETS, ensuring that Member States with higher GDP per capita have higher emission reduction targets. The revision of the ESR under the Fit for 55 purpose by the Commission would see emissions under the ESR reduce by at least 40%, compared to 2005 levels.

**ETS** - Emissions Trading System. This is a cap and trade system in which a total number of emissions allowances is made available each year in accordance with a cap and they are bought and traded via auctions. The sectors covered include electricity and heat generation, but not in buildings or road transport. The EU ETS has operated since 2005 and has been revised multiple times. It is currently undergoing a revision. The full name of the relevant Directive is Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

**ETS2** - The revision of the ETS as part of the Fit for 55 package includes a proposal to introduce a carbon price cap and trade system for emissions from the road transport and buildings sectors. This is known as ETS2 or the ETS Buildings and Road Transport (BRT).

**ETS revenue** - refers to the revenue generated from the auctioning of emission allowances under the ETS. ETS2 revenue refers to that generated by auctioning allowances under the introduction of emissions trading to the road transport and buildings sectors.

**Fit for 55 package** - a set of proposals to revise and update EU legislation and to put in place new initiatives with the aim of ensuring that EU policies are in line with the updated EU climate goal to reduce net EU emissions by at least 55% by 2030.

**IA** - impact assessment, such as that carried out by the European Commission for the EU Climate Target Plan. Where not otherwise qualified, IA refers to the impact assessment to the Climate Target Plan.

**MEPS** - Minimum Energy Performance Standards. MEPs are proposed for inclusion in the Energy Performance of Buildings Directive as part of the review. They would require existing

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<sup>9</sup> See EEA Glossary "[Double Dividend](#)"

buildings to meet a minimum energy efficiency performance standard by a given date or period of time.

**Progressive** - in this document, progressive refers to a greater impact on higher income groups than lower income groups.

**SCF** - The Social Climate Fund has been proposed by the European Commission to address any social impacts that arise from the extension of emissions trading to road transport and buildings. The new fund would be financed, in principle, with 25% of ETS2 revenue. The adopted European Parliament position suggests the fund should address impacts of the transition to climate neutrality more generally.

**Regressive** - in this document, regressive refers to a greater impact on lower income groups than higher income groups.

**REPowerEU** - The European Commission proposed-plan to “rapidly reduce dependence on Russian fossil fuels and fast forward the green transition”. It was published on 18th May 2022.

**Revenue recycling** - using ETS revenue to address the distributional impacts of the carbon price under an ETS or ETS2.

**Welfare impact** - unless otherwise qualified, welfare impact relates to the relative impact on disposable income or total expenditure. ‘Welfare losses’ refers to the negative impact on disposable income.

# Section 1: The role of the ETS2 in a holistic policy mix to reach social and climate goals

**The ETS2 price could be very high or very low, but stricter regulation and complementary policy will lower the carbon price.**

The higher the ETS2 price, the greater the risk of unacceptable impacts on household spending, especially for lowest income households who may struggle to absorb a carbon price that is too high without dropping into energy poverty.

The studies analysed consistently support that the carbon price in buildings and road transport can be expected to be lower if regulatory ambition is higher and additional supporting policies to achieve the climate and energy targets are in place. The same conclusion is reached by the Commission's IA for the ETS. In a MIX scenario with more balanced regulation and carbon pricing instruments, the carbon price in the new ETS would be €48 in 2030, while in a scenario with stronger carbon pricing (MIX-CP scenario), prices would reach €80 in 2030<sup>10</sup>. This is because the regulatory environment encourages changes before a carbon price begins to operate, meaning the threshold carbon price to incentivise emissions reduction is lower and additional support means that upfront investment costs and barriers can be more easily overcome.

As is elaborated in other headline common findings, policies that particularly target the barrier low income households face to participate in the energy transition and achieve emissions reductions are especially effective in this regard.

In support of this headline:

- IEECP's study<sup>a</sup> looked at the impacts of 3 policies (ETS2, MEPS and fossil fuel boiler phase out). They modelled that a lower carbon price would prevail throughout the period of operation of ETS2 when the ETS2 was combined with other pro-decarbonisation policies, such as Minimum Energy Performance Standards (MEPS) and fossil fuel boiler phase out.
- The Regulatory Assistance Project (RAP)<sup>c</sup> 'Pricing is just the icing' paper<sup>c</sup>, underlines that supporting policy measures, like grants and subsidies for decarbonisation, informative instruments, such as energy performance certificates and innovation support can all ease compliance with regulations, in turn lowering the carbon price.
- The Cambridge Econometrics<sup>d</sup> analysis shows that if a share of the revenues from ETS2 are used for low-carbon technologies and building energy efficiency, then this leads to both lower resultant low-carbon technology costs for all consumers, and lower carbon prices.

<sup>10</sup> See Table 36, in [SWD \(2021\) 601 final](#), p. 64 .

## Continued effort sharing through the ESR combined with effective Annual Emissions Allocations (AEA) trade between Member States complements the achievement of emissions reductions under the ETS2 and helps to spread transition costs fairly.

Similar to the first headline common finding relating to the carbon price and regulation, if Member States bear the ultimate responsibility for achieving their emissions reduction targets through the continued operation of the Effort Sharing Regulation (ESR) and its national annual emissions allocations (AEAs), the costs of the transition can be shared more fairly between and within Member States - and the overall costs may also be reduced.

However, in order to achieve such fair effort sharing, it is vital that AEA trade between Member States is strong. This is because the ETS2 could otherwise shift the burden of emissions reductions to households, including in the poorest Member States (increasing the essential nature of the SCF to avoid undesirable social welfare impacts). This is a product of two principle reasons:

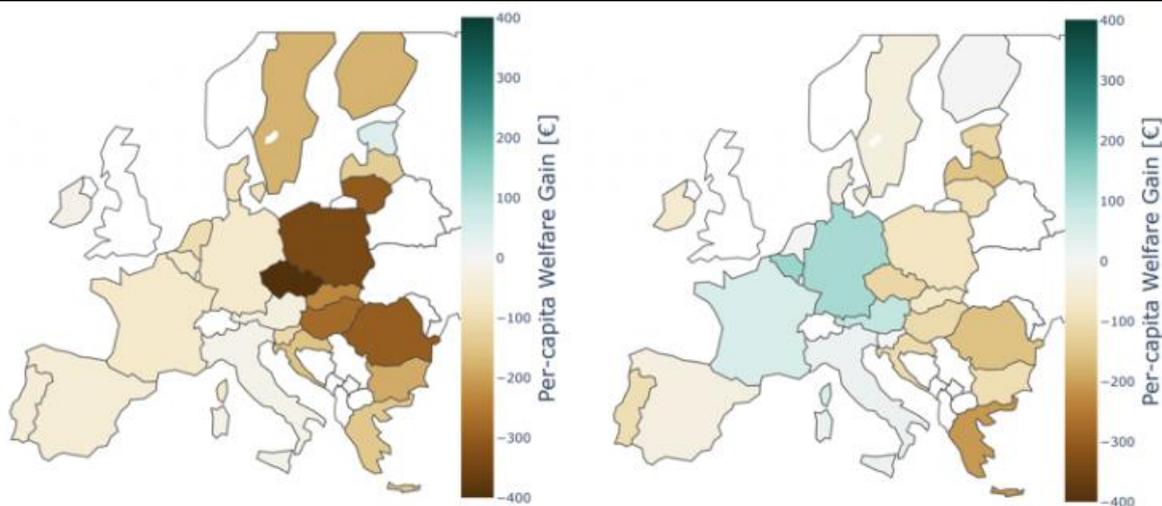
1. **The existence of the national ESR target encourages the Member State to take further measures to decarbonise transport and buildings**, in turn reducing the carbon price for households and sending a clear signal about the direction of the transition to investors, incentivising decarbonising investments and lowering overall transition costs.
2. AEA trade shifts resources from richer Member States to poorer ones (with lower ESR targets), facilitating the delivery of the most cost effective emission reductions.

In support of this headline:

- The Ariadne<sup>e</sup> study acknowledges that while ESR targets are fair in terms of the effort required per Member State, they are inefficient when it comes to minimising total costs of emissions abatement across the EU. **Without high and effective AEA trade between Member States, emissions abatement costs are higher (for all EU countries combined) and welfare gains lower**, especially at high ETS2 prices.

With high AEA trade under the ESR abatement is more cost efficient and there may be downward pressure on ETS 2 prices because richer Member States - who have higher ESR targets - can transfer resources to poorer Member States by buying AEAs which can then finance 'easier' emissions reductions in these poorer Member States. The ETS2 obliges, in particular poorer, Member States to make the reductions, enhancing this effect.

If there is no AEA trade, almost all countries incur substantial welfare losses of up to €400 per capita. Low AEA trade could therefore undermine the political acceptability of EU climate ambition - and the introduction of an ETS2 - because of the perceived high cost of the transition and the impact on population welfare. Therefore, high AEA trade is even more important when an ETS2 is introduced.

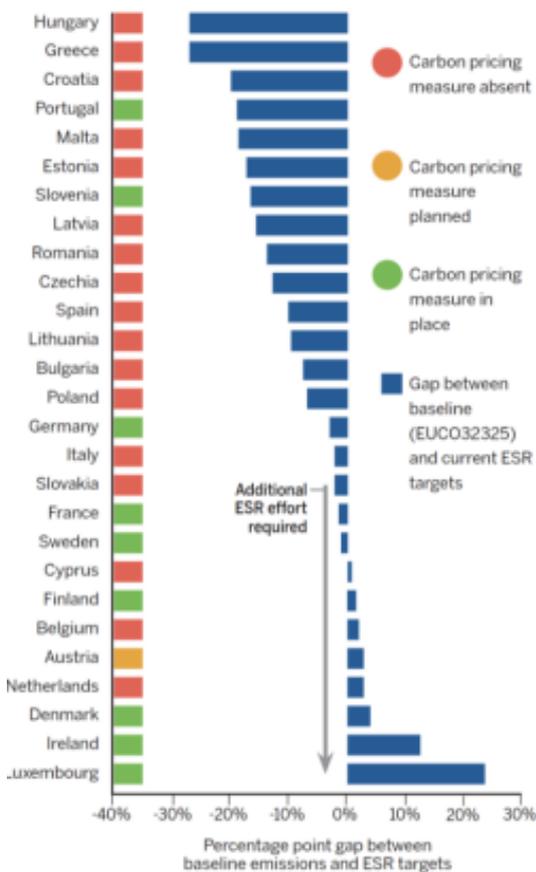


Scenario 1: No AEA trade & low ETS2 price

Scenario 2: High ETS2 price & AEA trade

Figure 1 (ES3 from study): changes in welfare per capita – compared to the base case with AEA trade and a low ETS2 price.

- RAP<sup>c</sup> has also explored the effect of ESR targets in combination with carbon pricing. They have found that **Member States with higher ESR targets tend to more commonly have existing national carbon pricing systems** in the ESR sector, as well as higher carbon prices. For example, in Sweden the current 2030 ESR target is -40% emissions compared to 2005 and the national carbon tax level is €114 per tonne, while it is €17 in Slovenia (15% ESR target).



From this fact, they extrapolate that continued, high and binding ESR targets will encourage Member States to adopt further measures to drive down emissions in the buildings and transport sectors, in turn lowering the carbon price and reducing overall costs of the transition. This effect is well-demonstrated in their graph (opposite).

These binding national ESR targets would mean that the ETS2 would not be the ultimate compliance mechanism for EU climate targets and would instead play a supporting role, allowing carbon pricing to be introduced in a managed way.

(Left) Figure 2 (figure 11 from study): Effort required to meet existing ESR targets and status of carbon pricing measures for building emissions.

## **A lot of investment is needed to decarbonise transport and buildings. The ETS2 revenue can help the EU meet the €240 billion or more needed by 2030 to decarbonise transport and buildings.**

The European Commission has estimated that around €350 billion in additional annual energy system investment will be needed to meet the EU's updated 2030 climate target of -55% emissions versus 1990 levels. Of this, approximately €130 billion is foreseen in the transport sector and €110 billion in the buildings sector. Housing Europe estimates that €13 billion in additional investment will be required each year until 2050 to renovate the social housing sector alone<sup>11</sup>. On top of this, an extra €56 billion will be needed for residential sector energy savings alone under REPowerEU, for instance to finance energy efficiency upgrades and heat pumps.

Households, especially those with the lowest incomes, cannot be expected to meet this investment cost alone. This is backed up by the Commission non paper on the ETS2<sup>12</sup>, which claims that additional annual capital costs in 2030 for investments in buildings occupied by the 40% lowest income households in every Member State to achieve their emissions reductions (understood as for insulation, renovation, energy efficiency, fuel switch etc.), are estimated at €25 billion annually. Indeed, IEECP has found that emissions reductions, in the absence of supporting measures, are most likely to be achieved through suboptimal use of energy by lower income households - not through structural investments.

The expected revenue generated by the ETS2 would equal around €35 billion per year at a carbon price of €50<sup>13</sup>. Revenue recycling can therefore deliver a 'double dividend' by contributing to the gaping investment gap that threatens to undermine the achievement of EU climate and energy goals. It should be pointed out, however, that the precise investment needs for each Member State will depend on circumstances, such as the share of fossil heating and the investment costs of the heating equipment.

In support of this common finding:

- The IEECP<sup>a</sup> has found that the revenues from ETS2, including those that go into the SCF, received by each Member State would be sufficient to cover the investment needs and increased energy costs for the 25% lowest income households in the 10 lowest income Member States covered by the study, assuming heat pump and insulation costs reduce in line with expectations from economies of scale.

In the absence of such support, emissions reductions would most likely be achieved through suboptimal use of energy by lower income households, negatively impacting health and wellbeing, rather than structural changes.

- RAP<sup>c</sup> has highlighted the double dividend effect of carbon pricing on driving down emissions if revenues are used to support further decarbonising investments in the target sectors, especially if targeted where such investment would otherwise

<sup>11</sup> See, "[Housing Europe's ambition to renovate 4 million affordable homes by 2030](#)" November 2020

<sup>12</sup> European Commission services non paper states, 'The role of the new ETS for road transport and buildings (ETS2) in achieving the 55% target', March 2022.

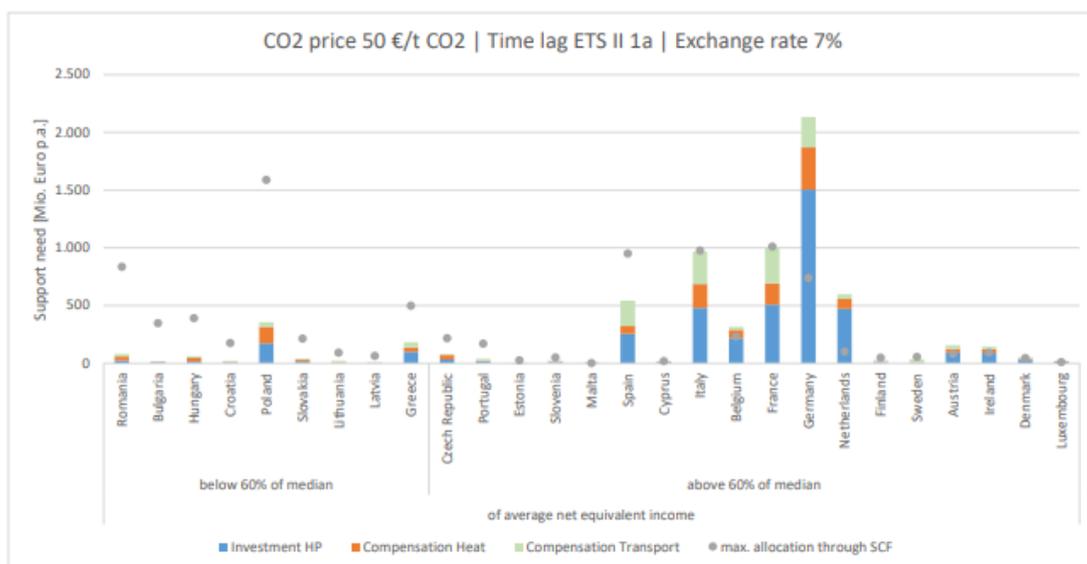
<sup>13</sup> Assuming 5747 emissions allowances between 2026 and 2032. See Oeko Institut.

experience the greatest barriers - such as for households who lack the financial or other means to make upfront investments.

- Oeko Institut<sup>f</sup> modelled the investment needs to replace the heating systems of vulnerable households across the EU and identified that just over €1.5 billion would be needed each year for an annual heating system replacement rate of 3%, and €4 billion would be needed to up that to 7% a year. A higher replacement rate reduces the need for compensation to lower households for carbon prices as it likewise reduces their exposure.

Crucially, even with a replacement rate of 7%, low-income Member States would only need between 5% and 36% of their allocated SCF budget to compensate for the investment in heat pumps, as well as CO<sub>2</sub> costs, although the budget would be breached for several high-income Member States.

**Figure 16** Average yearly support needs per MS including investment needs for heat pumps considering an exchange rate of 7%



Source: Own calculations

Figure 3 (Figure 16 from study): average yearly support needs per Member State including investment needs for heat pumps considering an annual heating system exchange rate of 7%.

**Energy efficiency improvements, paid for with carbon revenues, will reduce exposure of households to high energy costs, while bringing additional health and climate co-benefits.**

Energy poor households often cannot afford to heat their homes' adequately and suffer from linked challenges, including damp, mouldy homes and stress. Investments in energy efficiency can reduce their energy demand, while improving thermal comfort as less energy is wasted, meaning their energy spending 'goes further'. Where they are still dependent on

fossil fuel -based systems, this demand reduction reduces the exposure of households to volatile and expensive fossil fuel prices.

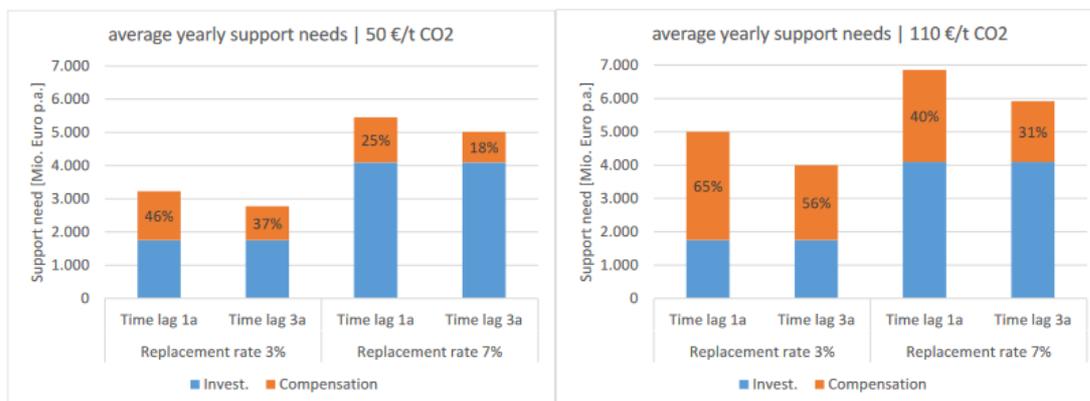
Likewise, investments in energy efficiency reduce energy demand and can improve air quality, where heating and other energy uses rely on polluting modes of energy generation; while investments in solutions such as heat pumps can improve air quality by ending the direct use of fossil fuels in homes and preparing the ground for a renewable-energy based system. Reducing energy demand through energy efficiency investments likewise reduces emissions, bringing direct climate benefits.

Moreover, the positive health and economic impact of energy efficiency measures is greater for lower income households, as these households spend a greater proportion of their incomes on energy and are often least able to invest themselves to escape polluting and health-harming heating systems.

Finally, energy efficiency investments reduce the need to compensate households for high energy or carbon prices by reducing their exposure to them. This can mean there is more money available for investment in further structural decarbonisation solutions.

In support of this common finding:

- Oeko Institut<sup>f</sup> modelled the investment needs to replace the heating systems of vulnerable households across the EU to replace fossil fuel based boilers with heat pumps. They identified that at higher replacement rates, the **compensation needs were lower** and were **lower still if those replacements occurred with a greater time lag** before carbon pricing (see figure 14 from study below).



Source: own calculations Oeko-Institut

Figure 4 (figure 14 from study) shows the yearly compensation and heat pump investment support needs for EU27

For instance, at a replacement rate of 7% a year starting 3 years before carbon pricing, investment needs were €4 billion, but the compensation rate for additional burden from a CO2 price for vulnerable households was just 18% of the total support. With a time lag of just 1 year, the compensation rate was higher at 25% of total support. At higher CO2 prices, compensation needs will be higher. At a lower replacement rate, compensation

needs as a proportion of total support were higher still, at 37-46% of total support, depending on the time lag. Moreover, a lower replacement rate would mean it takes longer to reduce the overall exposure of households and the overall cost of the transition - and the support for it - will be higher.

- The IEECP<sup>a</sup> has found that, **in the absence of targeted support, emissions reductions** driven by policies like carbon pricing would most likely be **achieved through suboptimal use of energy by lower income households**, negatively impacting health and wellbeing, rather than structural changes.

IEECP<sup>a</sup> also points out that Minimum Energy Performance Standards (MEPS) can be very powerful in improving the structural situation for low-income groups. They further point to the 'split incentive' challenge whereby landlords - as they are not paying energy bills - have no or little incentive to invest in energy efficiency measures, while low income tenants may be unable or not permitted to invest themselves.

## **The ETS2 is needed to drive down emissions, but additional policies are needed to address market barriers and to limit the distributional challenges of a carbon price.**

An overview of relevant studies indicates that the introduction of carbon trading to buildings and road transport across the EU is necessary, if Union international commitments and internal climate and energy targets are to be met by 2030 and beyond.

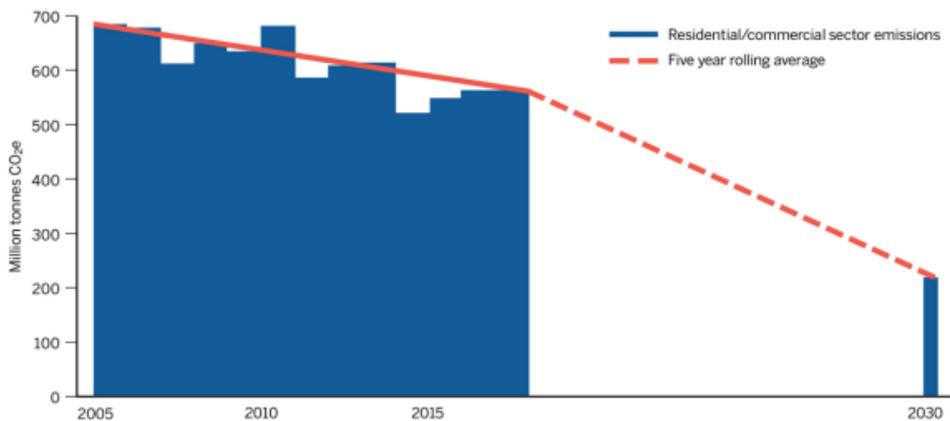
Indeed, the European Commission's rationale for introducing an ETS2 stems from the fact that transport and buildings emissions have simply not followed a sufficiently steep downward trajectory. Transport emissions, even excluding aviation and shipping, increased compared to 1990 (by 23%) and building renovation depth and rates remain well-below what is needed<sup>14</sup>. The Commission identifies a lack of economic incentives to decarbonise transport and buildings emissions and hails an ETS in these sectors as a means to bridge this gap. According to the Commission's estimations, the ETS2 would significantly contribute, providing around 45% of the additional emission reduction required in the road transport and buildings sectors to reach the new EU 2030 target<sup>15</sup>.

In addition to an incentive gap, there is also a significant investment gap that will hamper efforts to achieve emissions reductions unless addressed. This is explored in another common finding of the studies above, but in summary, without additional measures - including targeted investment measures - that support in particular the lowest income households and people in the most vulnerable situations, emissions reductions would most likely be achieved through suboptimal use of energy by lower income households, rather than through structural (lasting)

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<sup>14</sup> European Commission impact assessment accompanying the 'Climate Target Plan' ("Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people"). September 2020 (SWD/2020/176 final)

<sup>15</sup> European Commission services non paper, 'The role of the new ETS for road transport and buildings (ETS2) in achieving the 55% target', March 2022. The same document shows that without an ETS2, stronger national and regulatory policies would be needed to cover around 10% of the additional emission reduction effort required to reach the 55% target in 2030.



Source: European Environment Agency. (2019). *Greenhouse gas emissions by aggregated sector*

decarbonisation. Therefore, without a holistic approach, a two-speed transition could ensue, locking the lowest incomes into emissions-intensive fuels for longer.

(Left) Figure 5 (figure 1 from RAP's study). The current emissions trajectory in buildings is insufficient to meet the 2030 targets. The graph illustrates the necessity for emissions to fall in the residential sector at almost three times the rate we have seen since 2005.

All policies need to pull in the same direction in order for the ETS2 to be most effective at supporting decarbonisation in line with EU climate and energy objectives. While the ETS2 can ensure that polluters pay and appears necessary to achieve emission reductions (both for its incentive and signal effect, as well as for the potential to use revenues to support the necessary investments to achieve emissions reductions), additional measures are needed to unlock the full potential.

In support of this headline:

- IEECP<sup>a</sup> found that the **ETS2 can help to drive structural decarbonisation of buildings and transport, if it works in combination with other policies such as Minimum Energy Performance Standards** and the phase out of fossil fuel boilers in households.

Key to this is that the revenues from ETS2, including those that go into the SCF, received by each Member State would be sufficient to cover the investment needs and increased energy costs for the 25% lowest income households in the 10 low income Member States covered by the study, assuming heat pump and insulation costs reduce in line with expectations from economies of scale. Underlining the importance of targeted investment support, they found that the SCF would be needed to support the implementation of other measures such as MEPS and fossil fuel boiler phase out) regardless of the introduction of the ETS2.

That the revenues are sufficient to cover the investment needs and increased energy costs for the 25% lowest income households is important, because otherwise emissions reductions are likely only due to suboptimal energy usage by households, rather than due to investments being made that contribute to structural decarbonisation.

Therefore, ETS2 and the SCF can play a vital role in helping achieve the structural decarbonisation of buildings and transport.

- FOS and FEST<sup>b</sup> found that the **ETS 2 can be an effective part of a climate policy mix to reach the EU's 2030 targets**. The current climate policy mix is not sufficient for achieving climate targets and the ETS2 can provide an incentive for cost-effective emissions reductions, provide revenues to support necessary investments and produce a long-term political signal which can also drive positive market decisions.

But the ETS 2 needs to work with other policies and measures - such as policies that mandate and support the right investments, to be effective. In order to guarantee effectiveness, they also propose the introduction of a steadily increasing price floor (at least until the effects of frontloading are predictable, and prices in the ETS 2 are less volatile). The price floor would help to retain ecological effectiveness by preventing the price from dropping below predefined levels and, if set sufficiently high, still sends a credible signal to investors to finance low-carbon projects and technologies. Given the uncertainties concerning the distributional effects, they further propose the introduction of an (increasing) explicit price ceiling, enforced via the MSR, and of a warning price, which would be below the maximum price and upon which direct increased efforts and measures to reduce carbon emissions by the EU and its Member States should follow.

- RAP<sup>c</sup> produced a report in June 2021 exploring the role of carbon pricing in delivering rapid and deep building decarbonisation across the EU. The report aligns with the two reports above by pointing to the necessity of ETS2, while **recognising it is insufficient to deliver the needed emissions reductions alone**, largely due to the high carbon prices this would entail and the barriers thrown up by the negative distributional impact on households (notably on their ability to invest).

As such, the conclusions suggest that all revenues should be recycled for investments that decarbonise buildings\*, targeting in particular lower-income households. This would generate a **'double dividend' of emission reductions from carbon pricing**.

This does not eliminate the need for accompanying financial measures to offset the impact of carbon pricing on low-income households. However, the RAP study highlighted the larger size of the required investments in buildings decarbonisation relative to the likely revenues raised by ETS 2.

- Cambridge Econometrics <sup>d</sup> compared scenarios raising ambition in the current non-ETS sectors to contribute to the agreed 55% economy-wide emissions reduction target. The conclusion was that such a **raised emissions reduction ambition can provide substantial benefits to the European economy**, but the policy design and implementation is important; not all paths are equal.

The study compared the creation of a parallel ETS for current non-ETS sectors to a path where the target is reached through a mix of policies with a greater focus on

regulation (and with no explicit pricing of carbon in the non-ETS sectors). The study found that economic benefits are of a similar scale, but the **outcome is heavily dependent upon how the revenues from the ETS are recycled**. In addition, these revenue recycling options have implications for the resultant ETS price.

**Recycling revenues back to consumers - via tax reductions or lump sum transfers - leads to better economic outcomes**, creating increased consumer demand, leading to higher GDP and employment, but also puts upwards pressure on ETS prices – in both the existing ETS and ETS2, as more economic activity is forced to conform to fixed emission caps. Conversely, using a portion of ETS revenues for public procurement of low carbon technologies and investment in energy efficiency reduces technology costs, and therefore **makes the shift to low-carbon alternatives cheaper for consumers and industries**, leading to lower costs in both the main and parallel ETS. Without any revenue recycling, the parallel ETS has a negative impact on output measured through GDP and employment across Europe.

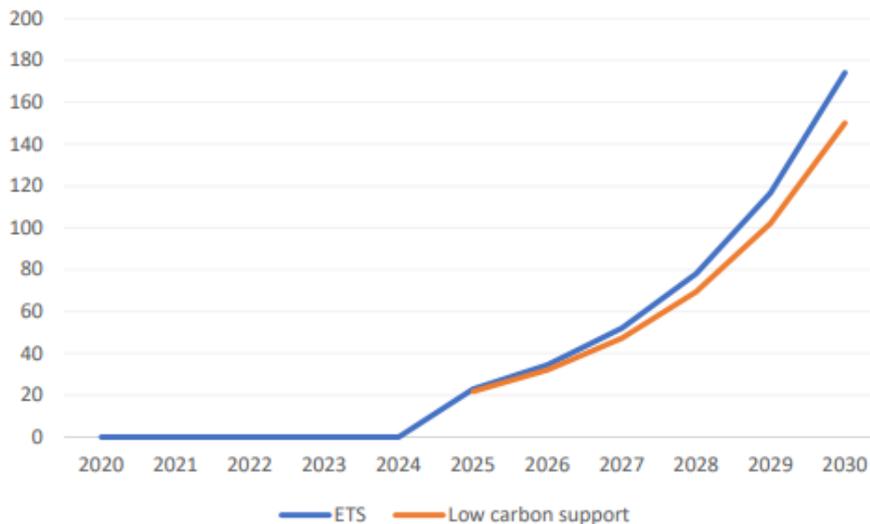


Figure 6 (figure 2.1 from study) showing that carbon costs are reduced if a quarter of the revenue are recycled for supporting 'low carbon technologies' and energy efficiency.'

## Section 2: impact of ETS2 on households across the EU

The impact of ETS2 on disposable household income varies considerably, depending on Member State and household specificities. But a carbon price on heating can be particularly regressive without accompanying measures.

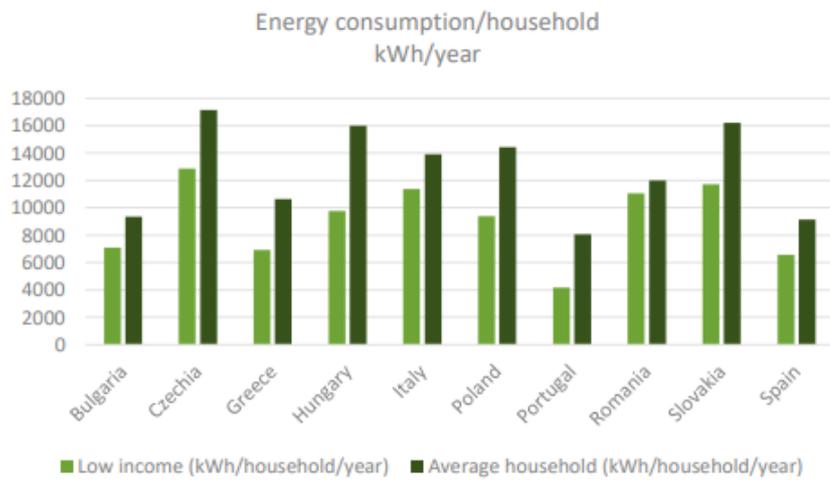


Figure 7 (figure 5 from IEECP WS2 study report) shows that lower income households typically consume less energy.

accompanying measures, lower income households can suffer disproportionately greater impacts on household expenditure.

In some Member States, in addition to households on the lowest incomes, certain groups risk being particularly negatively affected, such as rural and even suburban households in France, due to their reliance on private cars and sometimes oil or other fossil-based heating systems.

However, it is worth pointing out that the very lowest-income households have very low elasticity of demand, especially for heating, as they may already be close to - or in - energy poverty. This means that should the carbon price elicit a reduction in emissions from these households, they may be simply reducing thermal comfort, with subsequent negative impacts on health and wellbeing. These households will also be less able to cope with sudden energy price spikes, a risk that could be aggravated by a carbon price.

Moreover, any increase in the burden on lower income households may be problematic, even if it is relatively less than for richer households. This is because these households spend significantly more of their income on basic needs and typically have lower savings, meaning they are more vulnerable. Richer households are more likely to be able to 'bear' the burden.

Because richer households have a higher income, it might be expected that they would be less impacted by an ETS2 price. However, this is not observed by the studies overall. This is because household energy consumption is higher on average in these groups, especially for transport (as richer households are more likely to be able to afford a car) - but it is weaker for heating. See graph on the left.

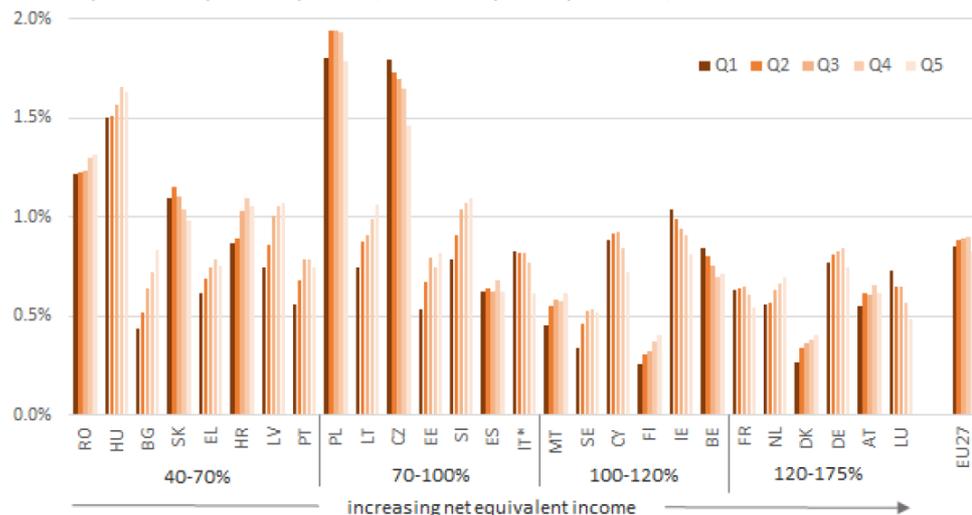
However, as heating demand is typically less elastic, studies suggest that, without

suffer disproportionately greater

In support of this headline:

- FOS/FEST<sup>b</sup> found that the relative burden of EU ETS 2 on each income quintile for households varies in the different Member States. For some Member States, households experiencing the greatest relative impact as a share of consumption are the middle income groups (e.g. Poland), whereas for most others it is the higher income quintiles (most Member States), although for countries such as Czechia, Slovakia, Ireland, Belgium and Luxembourg it is the lowest and second lowest income quintiles.

Figure 7: Relative burden of EU ETS 2 for households with CO<sub>2</sub>-price of 55 €/t as share of consumption expenditures by income quintiles (% of consumption expenditures)

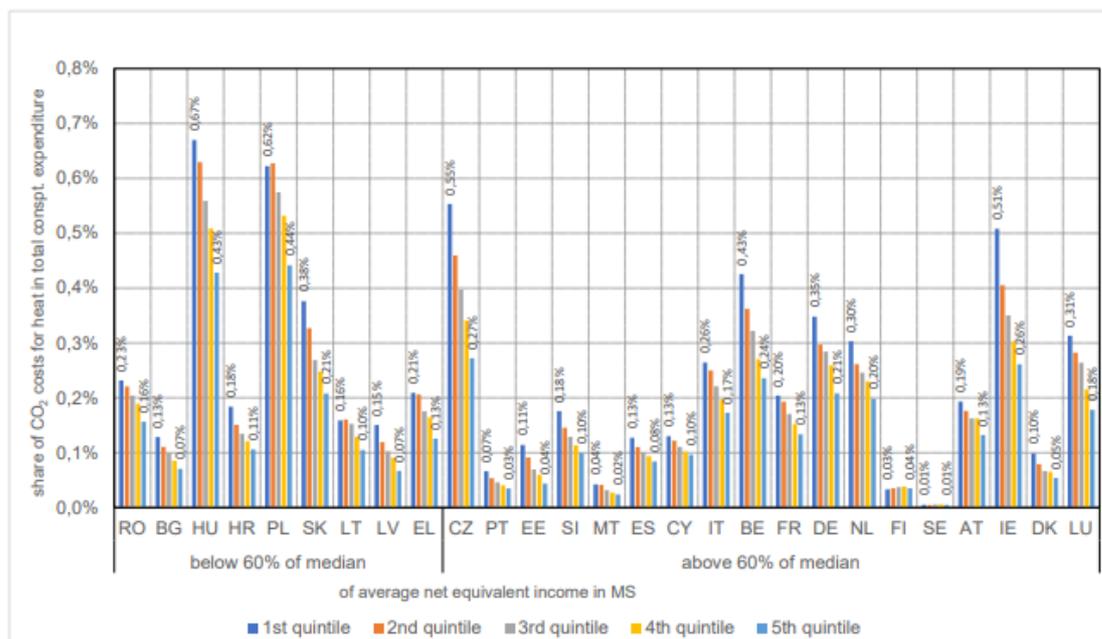


\* partially based on 2005 data due to data gaps

Figure 8 (figure 7 from study) shows the relative burden of EU ETS2 for households with a CO<sub>2</sub> price of €55 per tonne as a share of consumption expenditures by income quintiles across Member States with increasing net equivalent income per capita from left to right.

The trend is somewhat reversed for heating alone, whereby the impact of EU ETS 2 for households is higher in the lowest income quintile in all Member State income-level groups. It is higher on average for lower-income Member States (ranging from 0.8% of consumption expenditure on average for the lowest income quintile in the lowest income Member States to 0.3% for the higher income quintiles in the richest Member States on average). For transport alone, the relative burden is increasing with income.

- Oeko Institut shows (see Figure 9 of study) that the share of household CO<sub>2</sub> costs for heating by income quintile is significantly regressive in nearly all Member States (except Finland) for the lowest income groups. At a CO<sub>2</sub> price of €50/tonne, the impact in Poland is 0.62% of total consumption expenditure in the lowest 20% income group, while it is 0.44% for the highest income quintile; this changes to 1% and 0.9% respectively at €100/tonne. Likewise, for Ireland, it is 1.12% (lowest income quintile) and 0.22% (highest income quintile) at €50/tonne and for France it is 0.45% (lowest income quintile) and 0.29% (highest income quintile).



Source: Own calculation based on Eurostat emissions data [env\_ac\_ainah\_r2], year 2019; Structure of consumption expenditure by income quintile and COICOP consumption purpose [hbs\_str\_t223]; Final consumption expenditure of households by consumption purpose [nama\_10\_co3\_p3]; Mean consumption expenditure by income quintile [HBS\_EXP\_T133].

Figure 9 (figure 9 from Oko study) demonstrates the share of household CO2 costs for heating by income quintile in total consumption expenditure. Lower income households are typically harder hit.

- Based on a microsimulation from the Basque Centre for Climate Change (BC3), IDDRI<sup>h</sup>, peripheral and rural households would be particularly negatively impacted by a carbon price on heating and road transport, although this can be significantly reduced and even reversed for the 50% lowest income households if the ETS2 revenues, including the allocation from the SCF, are recycled in a targeted way to these groups.
- IEEP<sup>9</sup> also found that without revenue recycling, the welfare impact of an ETS2 with a carbon price of €45/tonne would be negative for all income groups, with greatest impacts the 2nd and 3rd income deciles (around -0.8% on average, versus -0.5% for the highest income 10%).
- Using the same simulation from the BC3<sup>16</sup> modelling team as IDDRI, IEEP also found that the combined impact on welfare of the ETD reform and ETS2 at €45/tonne carbon exceeded 0.8% for rural households in the 1st, 2nd, 3rd and 4th income deciles. For peri-urban households, it exceeded around 0.8% for the 2nd and 3rd income deciles. Therefore, the negative impacts on welfare without revenue recycling are greatest for rural and peri-urban households.

<sup>16</sup> Basque Centre for Climate Change

## The ETS2 typically has greater relative impacts on household disposable income in lower income Member States with more carbon intensive heating systems.

The impact of the ETS2 on household income will vary between Member States, with the greatest relative impacts on household income typically in the lowest income Member States. Moreover, it is the Member States with the most emissions intensive heating systems on average that see the greatest impacts (typically those reliant on coal-fired heating systems, such as Romania, Hungary, Poland and Czechia).

In support of this headline:

- Oeko Institut's<sup>f</sup> study pointed out that there are massive differences in household income levels between Member States. The highest income quintile (20%) in Romania and Bulgaria still earns less than the lowest income quintile in richer Member States (Luxemburg, Denmark, Ireland etc.), as shown in Figure 6 of the study. The relative impact of a carbon price is therefore likely to be felt more strongly in lower income Member States across all income quintiles than in higher income Member States.

This effect is compounded by the difference in carbon intensity of the heating systems in the Member States. In Poland, the share of household CO<sub>2</sub> costs in total consumption expenditure at €50/tonne CO<sub>2</sub> is 0.5% for heating, but is just 0.1% in Bulgaria (where heating is more reliant on fossil gas). For transport, the share in Poland and Bulgaria is 0.3%. By contrast, in France, the share of household CO<sub>2</sub> costs in total consumption expenditure is 0.2% for heating and 0.3% for transport.

The share of CO<sub>2</sub> costs in total consumption expenditure ranges from 0.2% to 1.1% across Member States and is typically higher in lower income Member States.

- FOS/FEST<sup>b</sup> found that a carbon price of €55/tonne would increase household consumption expenditures by around 0.4-0.8% in most high-income Member States. Other Member States face increases of up to almost 2%, especially in the low- to middle-income Member States (Poland: 1.9%, Hungary, Czech Republic: 1.6%, Romania: 1.3%). It also found that heating burden is much more variable than transport, with a particularly high impact of a carbon price in Romania, Hungary, Poland, and Czech Republic because heating systems (with different CO<sub>2</sub>-intensities) and vary widely within and between countries, while petrol and diesel are the main motor fuels in all countries.

**Figure 3: Relative burden of EU ETS 2 for households with CO<sub>2</sub>-price of 55€/t as share of consumption expenditures (% of consumption expenditures)**

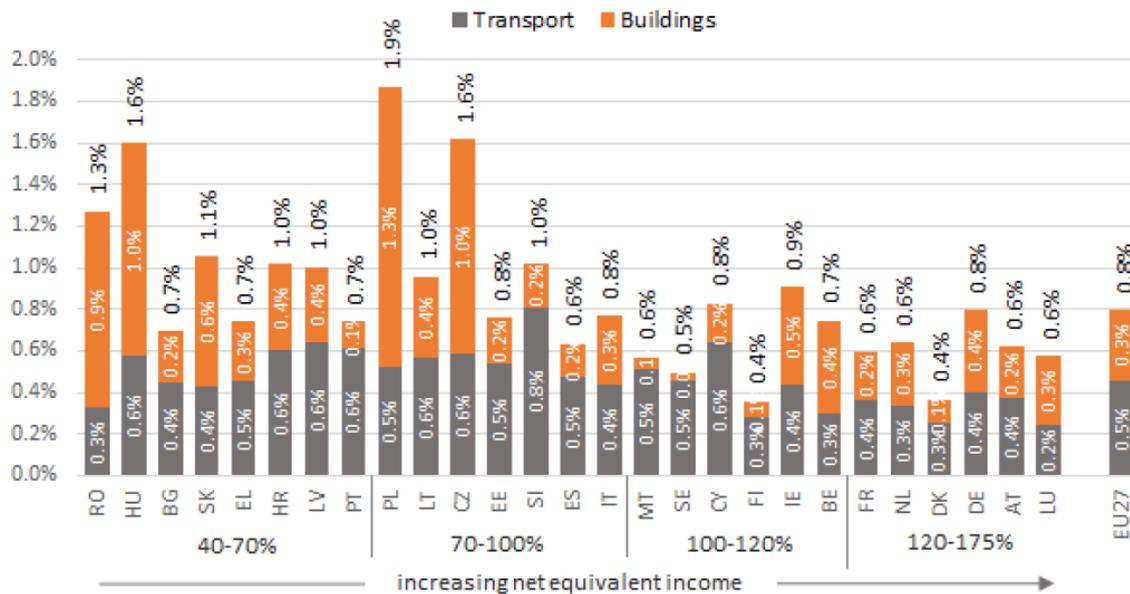


Figure 10 (figure 3 from study) demonstrates the share of household CO<sub>2</sub> costs for heating by income quintile in total consumption expenditure. Lower income households are typically harder hit.

- IDDRI<sup>h</sup> used models that highlighted how the relative impact of the combined effect of ETD reform and ETS 2 without revenue recycling would have the greatest impacts on household disposable income, especially in Central Europe. For example, in Hungary and Latvia, the price of fossil gas heating could increase by 37%, fuel by 32% in Belgium and in Poland the price of coal would increase by 91%, leading to an impact on household disposable income of 2.1% in Poland and 1% in most other central and Eastern European countries. It should be noted however that much of this increase is likely to be driven by the ETD.
- IEEP<sup>9</sup> found that without revenue recycling, the welfare impact of an ETS2 with a carbon price of €45/tonne would be negative for all income groups, with greatest impacts the 2nd and 3rd income deciles (around -0.8% on average, versus -0.5% for the highest income 10%).

Across the Member States, Poland sees the most negative welfare impact (measures as impact on total expenditure) exceeding 2% when there is no revenue recycling and the effects of the ETS2 and Energy taxation directive reform are combined. This is typically observed across the other Central Eastern European Member States due to their often more carbon-intensive household consumption, lower currency energy tax rates and relatively high energy expenditure shares. Meanwhile, for Sweden, France and Denmark, existing national carbon taxes are close to or above the modelled ETS2 price and so the effect on welfare is positive thanks to the electricity tax reductions from the reformed ETD.

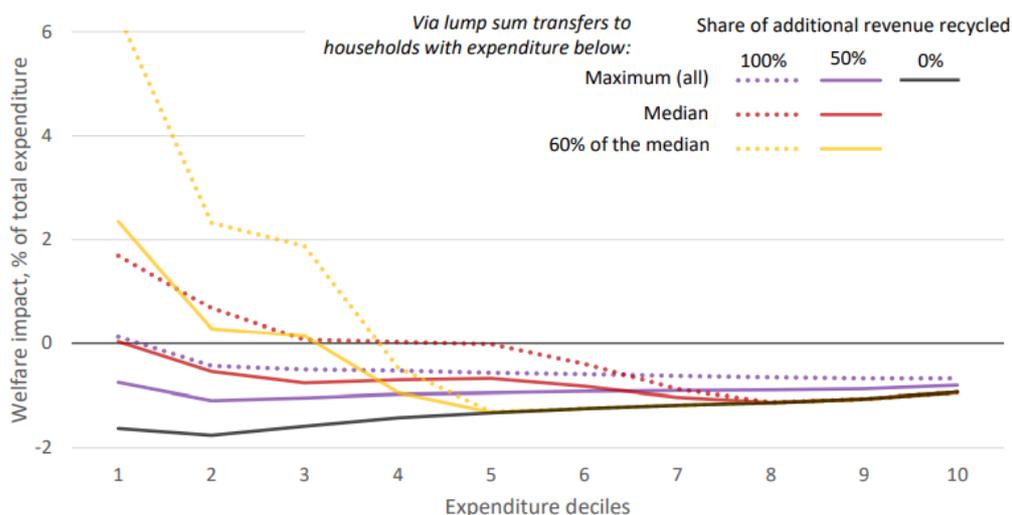
## Section 3: ETS2 revenue use

The ETS 2 can be progressive, if revenue is recycled to households. The ETS 2 has the most progressive effect when revenue recycling is targeted to the most vulnerable households, including those with the lowest incomes.

Multiple studies, including the European Commission’s own impact assessment<sup>17</sup>, show that recycling revenues (in the case of the impact assessment, as lump sum transfers), will have relative progressive effects on welfare (measured as a percentage of total household expenditure). This is because the lump sum will be worth relatively more for lower income households compared to their expenditure. Moreover, because emissions tend to increase with income or relative wealth, richer households in some cases pay more as a result of carbon price and so contribute more to the overall revenue.

However, as shown in the Commission’s impact assessment, if the lump sum transfers themselves are not targeted to the lower income households, all households except the poorest 10% see a negative welfare impact overall, even if all ETS revenues are recycled in this way. As the lowest income households are also likely to be in the most precarious situations already, any reduction in welfare is unlikely to be acceptable and can indicate that such households may be at risk of, or in, energy poverty already. See extract from Commission Staff Working Document below showing the impact of lump sum transfer for different expenditure deciles.

*Figure 2. Distributional impacts across household income groups in the EU. Source: JRC-GEM-E3 analysis. Assumptions: MIX; Fragmented action; Perfect labour market; Profit Maximisation; Shadow value in non-ETS; Free allowances in ETS (except electricity generation).*



*Figure 11 (figure 2 from Staff Working Document, SWD (2021) 452 final, accompanying the Proposal for a Council Recommendation on ensuring a fair transition towards climate neutrality).*

<sup>17</sup> [Staff Working Document](#) accompanying the December 2021 proposal for a Council Recommendation on ensuring a fair transition towards climate neutrality

Furthermore, lump sum transfers are unlikely to achieve the desired impact on emissions reductions as they may serve only to suction the carbon price and dampen the carbon price signal. At worst, they may simply increase demand by increasing consumption, without facilitating the structural investments needed to decarbonise the target sectors - the amount transferred is unlikely to be sufficient to enable lower income households to invest.

Therefore, in order to have the greatest progressive effect, revenue needs to be recycled in a targeted way to the lowest income households and those most negatively impacted by carbon pricing. This could be either through direct income support or targeted investments to decarbonise transport and buildings, but targeted investments are most likely to achieve the long-term structural changes required.

The studies that inform this headline include:

- a. FOS and FEST<sup>b</sup> found that **ETS 2 revenues can sufficiently compensate the poorest 40% of households across the EU with just 23.4% of the revenues.** With 47.0% it would be possible to compensate the lower 60% (quintile 1 to 3) of EU households as well as the 4th quintile (60-80%) in the lower-income Member States.

This echoes the findings of the IEECP study, outlined below.

**Table 3: Estimates of the burdens on/revenues from households by EU ETS 2 (% of total burden/revenue)**

Groups of Member States* (based on their NEI)	Q1 (0-20%)	Q2 (20-40%)	Q3 (40-60%)	Q4 (60-80%)	Q5 (80-100%)	Total (0-100%)
lower-income MS: 40-70% (RO, HU, BG, SK, EL, HR, LV, PT)	1.4%	2.4%	3.4%	4.4%	6.4%	<b>18.0%</b>
mid-income MS: 70-100% (PL, LT, CZ, EE, SI, ES, IT)	2.1%	3.3%	4.4%	5.6%	7.5%	<b>22.8%</b>
higher-income MS: 100-120% (MT, SE, CY, FI, IE, BE)	2.6%	4.0%	5.3%	6.8%	9.0%	<b>27.6%</b>
high-income MS: 120-175% (FR, NL, DK, DE, AT, LU)	3.1%	4.5%	6.1%	7.7%	10.2%	<b>31.5%</b>
<b>Total (all MS)</b>	<b>9.2%</b>	<b>14.2%</b>	<b>19.1%</b>	<b>24.4%</b>	<b>33.0%</b>	<b>100%</b>
possible to compensate with revenue share of 25% (23.4%)						
additionally possible to compensate with revenue share of 50% (+23.5%=47.0%)						

\*grouped by their average net equivalent income (NEI) in purchasing power standards (PPS) in relation to the EU27 average.

Table 3 from the FOS/FEST study shows the estimated burden and generation of revenue under the ETS2 from each household income quintile.

- b. IEECP<sup>a</sup> found that the revenues from ETS 2 would be sufficient to cover the investment needs, as well as the costs, for the 25% lowest income households, arising from the introduction of MEPS, ETS 2 and a phase-out of fossil fuel boilers as a standalone policy.
- c. Oeko Institut<sup>f</sup> also recognised that around 25% of all ETS2 revenue should be sufficient to offset price increases for low-income households. They recommend that the SCF should be financed by a percentage of ETS 2 revenue (e.g. 25%, not as a fixed amount of money as the Commission proposed and the Council agreed). It is important to ring-fence some revenues to the most vulnerable, to avoid problems of previous funds where support mostly reached middle- and high-income households.
- d. IEEP<sup>g</sup> identified that the poorest 10% of EU households can be the biggest beneficiaries, if revenues are recycled between & within Member States. The ETS2 & ETD reforms are especially progressive in CEE MSs, which are big net recipients from SCF. For example, Poland sees the poorest 20% becoming net winners with recycling of just SCF revenues. The poorest 50% are big winners with recycling remaining ETS2 revenues too. Note: Women-headed households, single parent and elder single households - in which women are disproportionately represented - are among least impacted of all, and biggest beneficiaries of recycling.

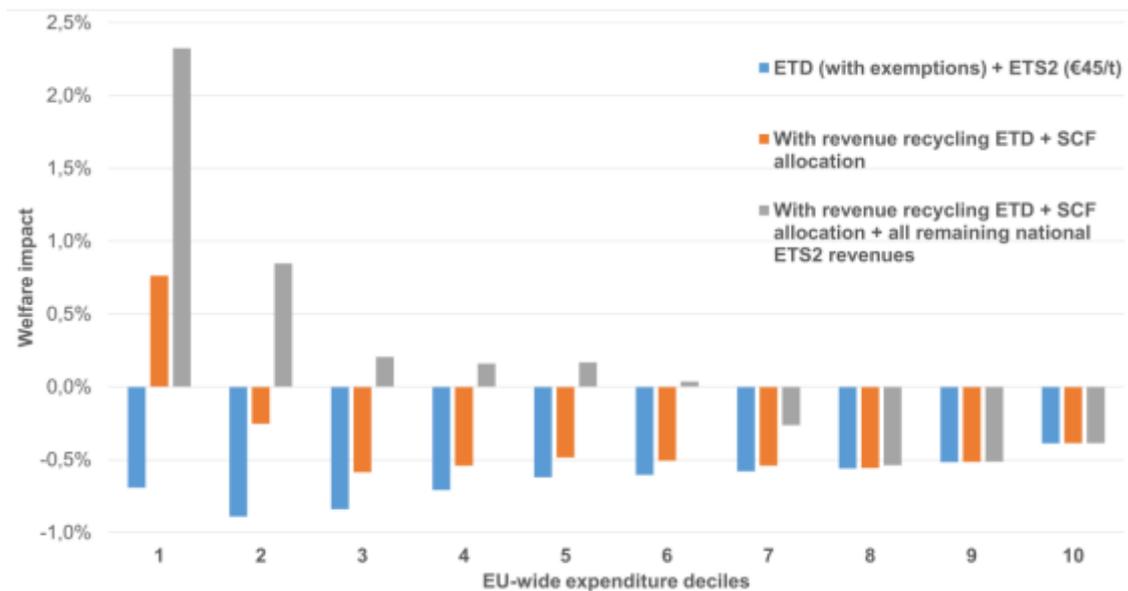


Figure 12 (figure ES1 from study) shows the welfare impact (% household expenditure) EU-wide from ETD reform and ETS2 without and with revenue recycling options.

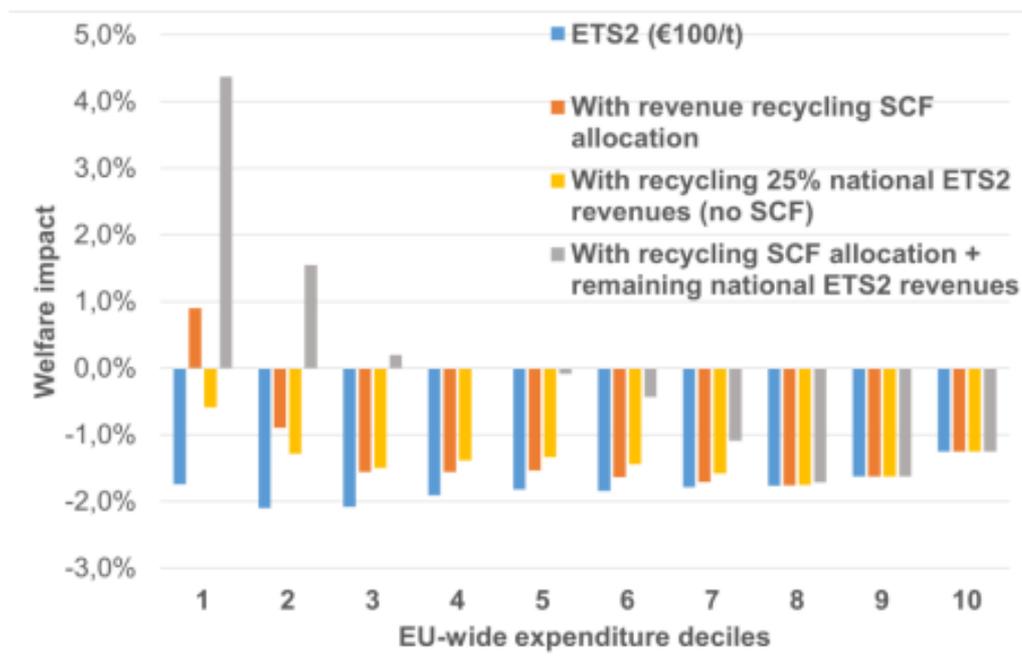


Figure 13 (figure from Annex 5 of study) showing the impact on 'welfare' as an impact on disposable income at a carbon price of €100 /tonne.

- e. IDDDRI: At a CO<sub>2</sub> price of €100 per tonne, the impact would be greatest on rural households and those in the middle classes (4th-8th income deciles), but if redistribution of revenues is targeted to the poorest 50% of households, the impact on their welfare (as available household income) can be positive.
- f. Cambridge Econometrics<sup>d</sup> compared the creation of a parallel ETS for current non-ETS sectors to a path where the emissions reduction target is reached through a mix of regulation (and with no explicit pricing of carbon in the non-ETS sectors).

Recycling revenues back to consumers via tax reductions or lump sum transfers puts upwards pressure on ETS prices – in both the main and parallel ETS, as more economic activity is forced to conform to fixed emission caps. Conversely, using a portion of ETS revenues for public procurement of low carbon technologies and investment in energy efficiency reduces technology costs, and therefore makes the shift to low-carbon alternatives cheaper for both consumers and industries, leading to lower costs in both the main and parallel ETS.

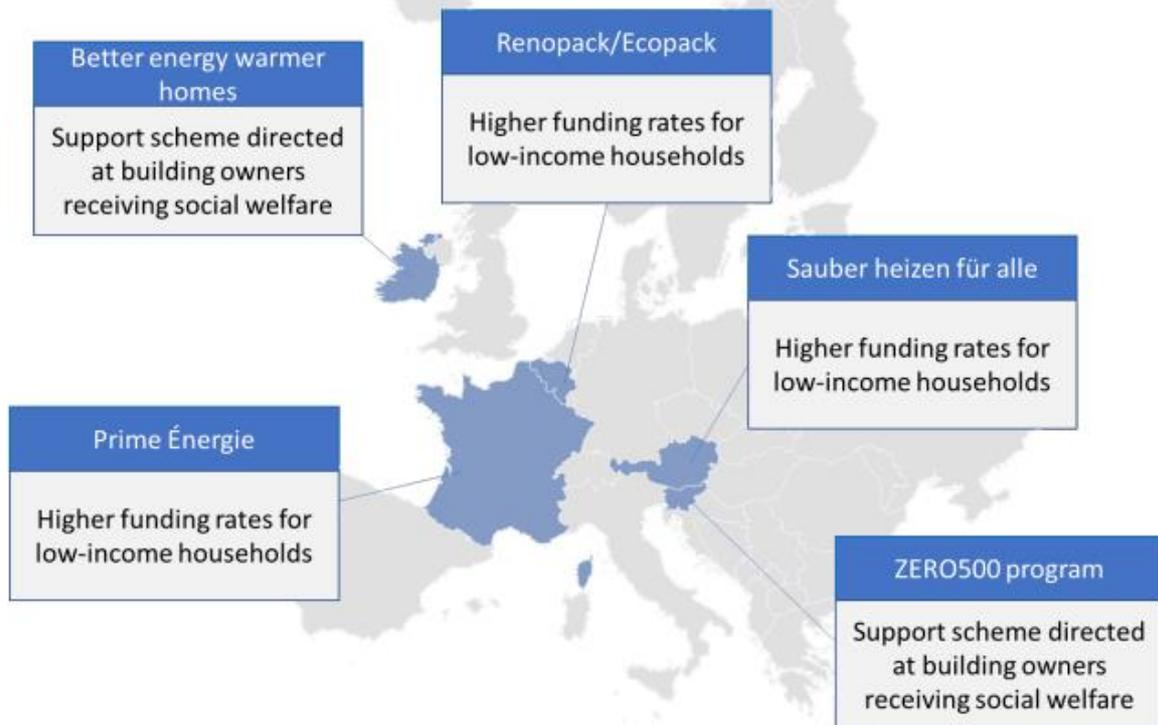
Without any revenue recycling, the parallel ETS has a negative impact on output measured through GDP and employment across Europe.

**Using ETS2 revenues to support investments in energy efficiency or renewable energy tends to benefit the middle and high income groups the most, unless investment support is targeted.**

Due to their capacity to co-finance upfront investments and the greater ‘agency’ inherent in higher income groups, society-wide investment support, such as non-targeted grants or loan schemes, tend to benefit the middle to higher income groups, while remaining inaccessible to those on the lowest incomes or in the most vulnerable situations.

The studies that inform this headline include:

- RAP highlights that “revenues should be spent on large-scale, targeted support for low-income and otherwise heavily burdened households — for example, those using coal or oil for heating — to improve the efficiency of their homes and switch to sustainable renewable heating fuels”. They note that **lump sum payments or other transfers fail to address the existing agency and horizontal inequities, as well as the root causes of energy poverty**. Without accompanying measures to decarbonise the most vulnerable households then, **financial payments need to be made in perpetuity** and they must likewise increase with an escalation of the carbon price, simply to balance the household budgets.
- Cambridge Econometrics<sup>d</sup> pointed to the contrasting effect of recycling revenues being recycled back to consumers (through either tax cuts or lump sum transfers) and the difference if a proportion of those revenues were instead targeted by the government into low carbon and energy efficiency investments. With simple redistribution through tax cuts or lump sum subsidies the consumers are likely to spend the additional revenue on additional goods and services that then leads to rebound effects on economic activity and emissions, which puts upwards pressure on ETS allowance permit prices across the period to 2030. By contrast, when revenues are recycled through measures supporting take-up of low-carbon technologies, this reduces the costs to households for lowering their emissions, and therefore leads to more rapid take-up of these technologies: and faster decarbonisation.
- Oeko<sup>f</sup> reviews selected funding schemes in different member states that specifically target low income households, demonstrating the different means and methods of targeting support at the households that need support most, including vulnerable households. They argue that a clear framework is needed to ensure that funding is targeted at vulnerable households and that clear criteria to operationalise vulnerability and to ensure that funding is directed at these households is needed



Source: Oeko-Institut.

Figure 14 (figure 17 from study) shows selected funding schemes specifically targeting low-income households across 5 EU Member States.

- IEECP, in its WS2 report, points to research showing that households respond very strongly to the carbon price signal, unless they are in the low income group. Due to high upfront costs acting as a barrier to investment, and the fact that the carbon price has a disproportionately higher impact on their expenditure, these vulnerable households use a higher discount rate in comparison to average households due to their use of the discounting gap, meaning that they prefer short term solutions.

Without target support and accompanying policies like MEPS, households may simply reduce their thermal comfort instead of investing in long-term sustainable solutions.

**25% of the revenue from ETS2 will be sufficient to offset the additional cost of the ETS2 for the poorest 40% of all households across the EU.**

**However, the actual proportion of ETS2 revenue received by the Member State and needed to compensate the poorest 40% of households will differ, depending on the Member State concerned.**

If revenue is recycled to households in a targeted way, studies have consistently identified that just under 25% of the revenue would be sufficient to compensate for the carbon price for the poorest 40% of households in all Member States. This is equivalent to using the endowment of the SCF (without co-financing) for direct income support to these lowest income households.

Assuming revenues were used in this way, this leaves more than 75% of the revenues for investments that directly decarbonise transport and buildings across the EU. With co-financing the SCF should therefore be sufficient to provide both direct income support and finance investments.

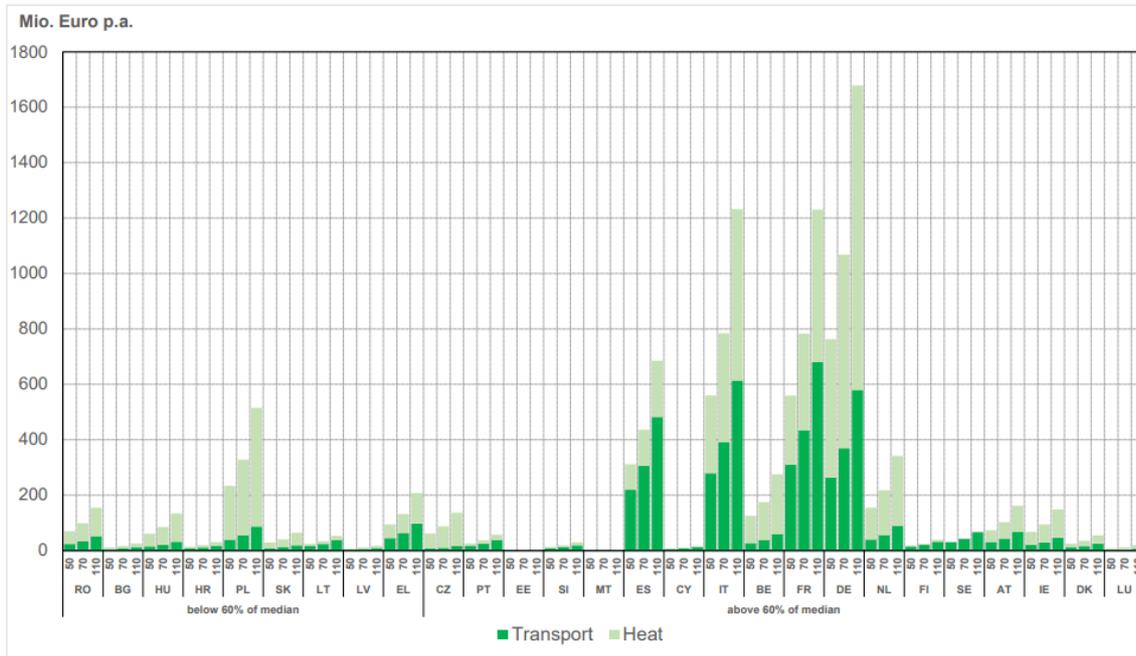
Because of the difference in average household revenue between the different Member States (for example, the highest income quintile in Romania and Bulgaria still earns less than the lowest income quintile in the richer Member States) and because the average emissions intensity of transport and buildings (and therefore exposure to a carbon price) differs between Member States, the proportion of ETS2 revenue needed to compensate the poorest 40% of households will differ. This is compounded further where lower income households have greater exposure to the carbon price due to typically more emissions-intensive heating systems, for example.

The studies that inform this headline and the sub-headline include:

- FOS/FEST<sup>b</sup> highlighted that carbon emissions increase with income and that households' greenhouse gas emissions per capita relevant for EU ETS 2 are lowest in Bulgaria (the lowest income Member State and highest in Luxembourg (the highest income Member State), with 298 kg/capita/year on average and 2,627 kg/capita/year respectively. Due to the distribution of allowances being based on emissions in 2016-2018, this means that lower income Member States will typically have lower revenues from the ETS2. However, due to factors such as the relative carbon intensity of heating systems and that lower cost households tend to be most impacted by the carbon price in heating costs, not transport costs, the proportion needed for compensating the poorest 40% in each Member State might differ.
- Oeko Institut<sup>f</sup> found that the CO2 costs for vulnerable households (defined as those households 'at-risk-of-poverty') varied between Member States, with the highest costs per year being identified in Germany, Italy and France.

However, the study also found that for heating lower income households, especially in lower income Member States, are substantially more affected by CO2-related costs than higher income households.

**Figure 11** Transport- and heat-related CO<sub>2</sub> costs for vulnerable households at different prices



Weighted quintile approach: For each MS, all households below the poverty line (i.e. below 60% of median equivalent disposable income) are included. 50, 70 and 110 within the x-axes refer to euro/t CO<sub>2</sub>. Own calculation based on Eurostat emissions data [env\_ac\_ainah\_r2], year 2019

Figure 15 (figure 11 from study) shows transport- and heat-related CO<sub>2</sub> costs for vulnerable households at different prices

- IEEP<sup>9</sup> identified that the combined impact of ETS2 & ETD reforms with revenue recycling are especially progressive in CEE MSs, which are big net recipients from SCF. For example, Poland sees the poorest 20% becoming net winners with recycling of just SCF revenues. The poorest 50% are big winners when the remaining ETS2 revenues are also recycled. The poorest 10% of EU households can be the biggest beneficiaries, if revenues are recycled between & within Member States.

## Section 4: Social Climate Fund

**A fixed budget will mean the SCF budget will decline in relative size compared to ETS2 revenues as carbon prices rise. A budget of €72.2 billion would mean there is less than 25% of the ETS2 revenue available at a carbon price above €50/tonne**

If the ETS2 price increases, but the SCF budget is capped, the relative value of the SCF as a proportion of ETS2 revenues will decline. This means that households will pay a higher carbon price, but receive the same total support from the SCF. Given that around 25% of ETS2 revenues are required to compensate the poorest 40% of households, the demand for compensation may begin to exceed the amount of money available in the SCF budget - and therefore reduce or even eliminate the money in the fund available to support targeted investments.

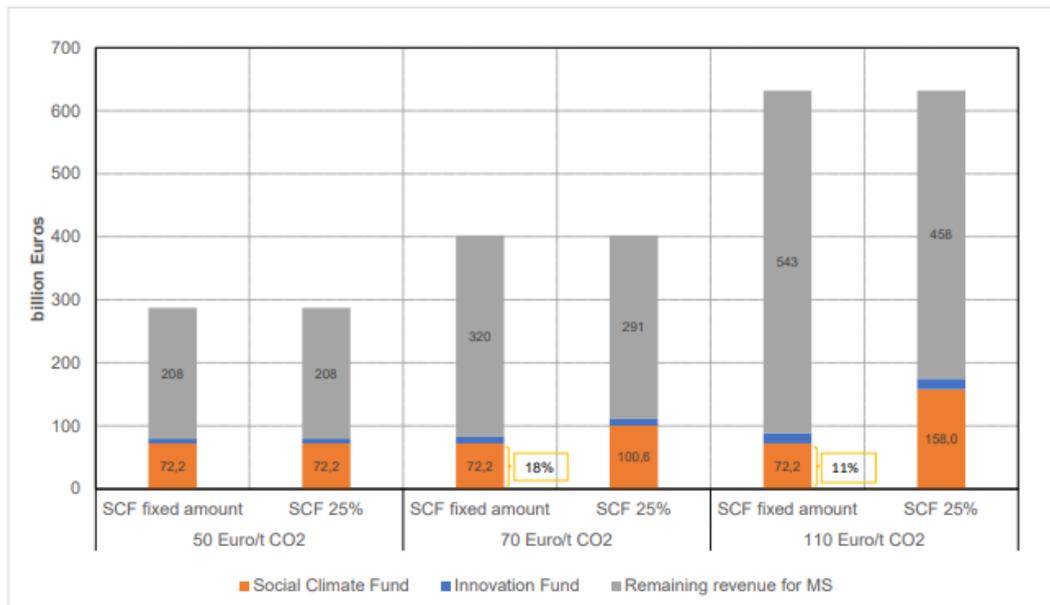
€72.2 billion corresponds to 25% of the ETS2 revenue only if the carbon price remains €50 per tonne<sup>18</sup>. At €100 per tonne, the SCF would be worth only 12.5% of the ETS2 revenue amount. Estimates vary about the level of the carbon price necessary to achieve emissions reductions needed<sup>19</sup>.

The studies that inform this headline and the sub-headlines include:

- FOS/FEST<sup>b</sup> models the revenue from ETS2 that would be sufficient to achieve 'social compatibility' - i.e. the compensation for the lowest income households in different Member States. Comparing the emissions from different household groups in different Member States in the relevant sectors, they show that the **revenue needed to compensate the lower 40% income households across the EU is 23.4% of the revenues from ETS2 - not a fixed amount of revenue**. See Table 3 from the study on page XX for further information.
- Oeko Institut<sup>f</sup> directly demonstrated that at €50/tonne CO<sub>2</sub> the share of the SCF, fixed at €72.2 billion over 8 years as a proportion of total auctioning revenues is about 25%, but the budget as a proportional equivalent to ETS2 revenues significantly declines with rising carbon prices. They note that this would mean relatively lower funding would be available to support vulnerable groups.

<sup>18</sup> Assuming 5747 emissions allowances under the ETS2 between 2026 and 2032. See Oeko Institut.

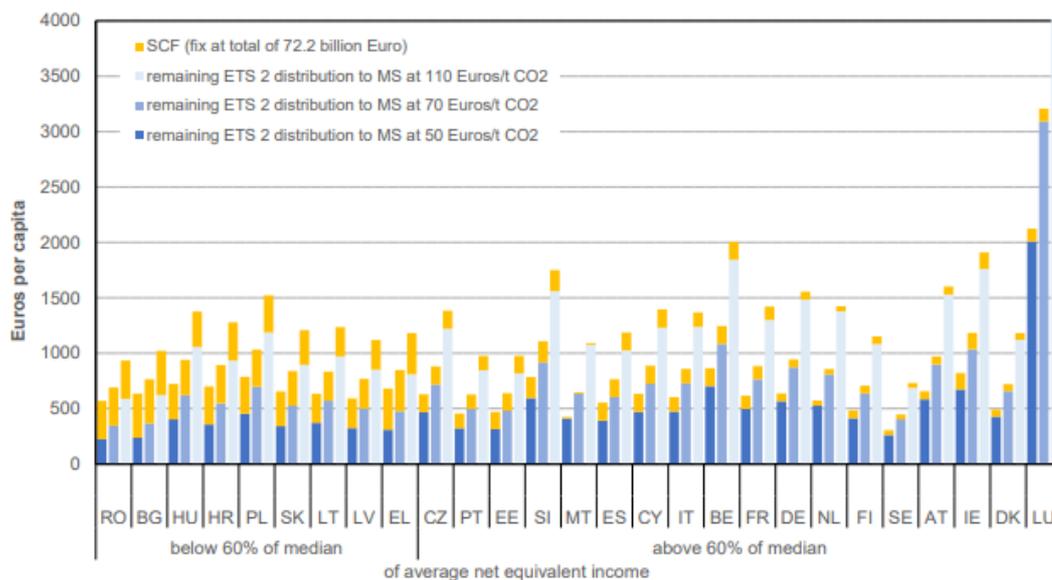
<sup>19</sup> See table 36, in SWD(2021) 601 final, p. 64



Source: Own calculation

Figure 16 (figure 2 from study) showing the revenue allocation with a fixed amount of SCF and fixed ratio of SCF at different CO2 price assumptions (2025/6-2032)

Perhaps more tellingly still, they look at what this would mean for per capita revenue allocation to Member States under different CO2 price assumptions with a fixed total amount of SCF - showing that when SCF declines as a proportion of ETS2 revenue, per capita revenue allocation tends to increase more for the richer Member States



Source: Own calculation based on European Commission (EC) (2021b) and European Commission (EC) (2021a)

Figure 17 (figure 4 from study) showing per capita revenue allocation to Member States under different CO2 price assumptions with a fixed total amount for SCF.

**The SCF plays a vital role in ensuring sufficient revenue is available to compensate the poorest households and to support investment in the lowest income Member States, thanks to its redistributive function between Member States.**

The SCF ensures that the lower income Member States - who face the greatest challenge to invest and yet would otherwise receive the lowest emissions allowances and therefore revenues - receive sufficient revenue to both compensate their citizens and to invest in decarbonisation solutions.

Incentivising investment increases the financial support needs of vulnerable households in the short term but investments are essential to deliver the structural changes needed to decarbonise transport and buildings. However, the need for compensation should decrease over time with investment.

In support of this headline and the sub-headlines:

- FOS/FEST<sup>b</sup> found that households' emissions per capita relevant for EU ETS 2 are significantly lower in Member States with lower-income, being the lowest in Bulgaria with 298 kg/capita/year; compared to Luxembourg at 2627 kg/capita/year. High income Member States will contribute much more revenue. Therefore, the SCF is necessary to redistribute revenues to these poorest Member States to ensure they can finance the necessary investments to decarbonise their transport and heating sectors. Figure 6 shows that with SCF, Bulgaria and Romania double the revenue received if they were to auction allowances according to their emission in 2016-2018.

**Figure 6: Distributional Effects of Social Climate Fund with CO<sub>2</sub>-price of 55€/t (% of revenue w/o SCF)**

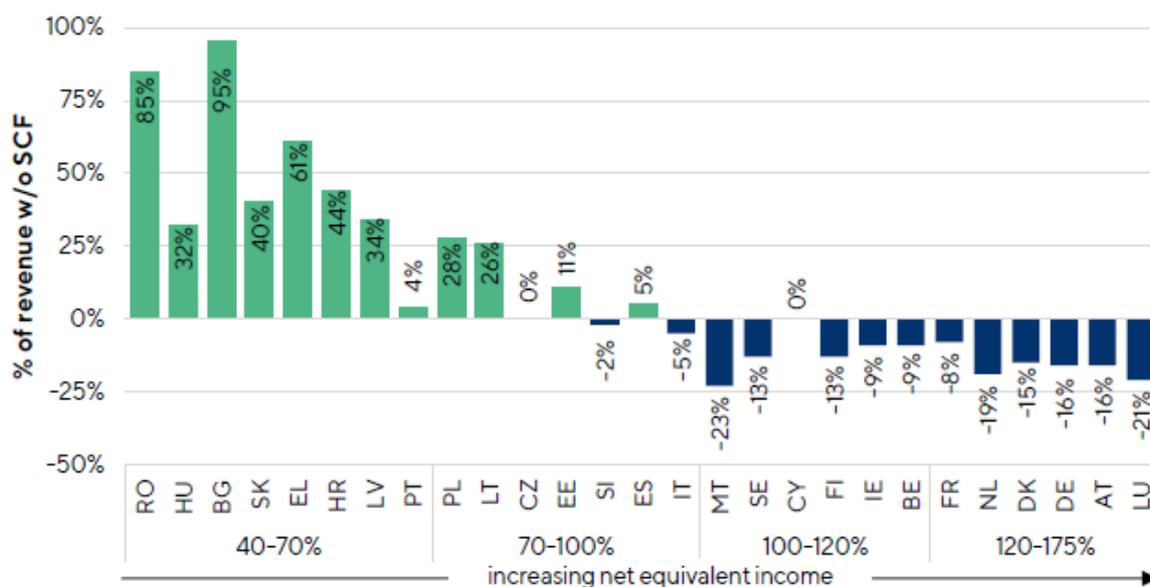


Figure 18 (figure 6 from study) shows the distributional impacts of the SCF at a CO<sub>2</sub> price of €55/tonne.

- Oeko Institut<sup>f</sup> found that even with a fast-track replacement rate of heating systems of 7%, low-income Member States would only need between 5% and 36% of their allocated SCF budget to compensate the investment in heat pumps and CO<sub>2</sub> costs, while for several high-income Member States, the budget is reached or extended (not considering additional support needs for building insulation and transport).

## **The governance of the SCF should ensure some EU oversight of spending, according to subsidiarity and proportionality principles**

This headline is informed by the findings of the Ariadne projekt<sup>e</sup>. The project looked at models for the institutional structure governing revenue use. Taking the perspective of the subsidiarity principle, as embedded in the EU Treaties, as well as the risk to achieving EU climate targets of the different options, they found that the two 'intermediary options' they examined were most compatible with delivering the objectives of extended emissions trading to road transport and buildings. Specifically, without some level of EU oversight, either as an SCF where payments are made on the achievement of milestones, or as a kind of 'Social Climate Mechanism' (similar to the Recovery and Resilience Facility), there is a real risk that revenues would not be used consistently or in a sufficiently redistributive way and the targets might not be achieved.

Moreover, FOS/FEST point to experience with the Recovery and Resilience Facility regulation (RRF), among others, showing that EU funds have not always been used for the intended purposes. This is backed up by evidence from WWF looking at the use of existing ETS revenues by Member States from their mandatory reporting - not all revenues are used for climate action and some revenues reported as climate action are disputed by the WWF analysis. FOS/FEST and WWF both point to the need for stronger European Commission monitoring capacities. FOS and FEST suggest "a solid legal framework that is binding for Member States to effectively tackle the social risks of additional CO<sub>2</sub> prices" is needed, in addition to further safeguards.

# Summary

We can't achieve emissions reduction goals without ETS2 - combined with SCF, ESR and strong regulation. We also can't achieve the emissions reduction targets without **massive public and private investment** - for which the ETS2 revenue will only be able to contribute a part. In essence, the ETS2 revenue must support decarbonisation as much as possible, through national allocation but also through SCF and co-financing; however, investments will also need to be complemented with other revenue from other sources, such as the existing ETS. A progressive ETS2 is possible, provided it is accompanied by redistribution of revenues.

Analysis made by the studies in this review concerning the impact of a carbon price on road transport and buildings per income group and per Member State shows that, while the price will be harmonised across the EU, the burden will be uneven and relatively higher for the households in the first income deciles and in the EU countries with GDP per capita below 60% of the EU average.

On the other hand, **high income households and high income countries are those polluting the most and will consequently contribute more to the ETS2 revenues**. These income groups will however be better placed to absorb the cost and react to the carbon price by investing in clean energy solutions for mobility, heating and cooling. As a consequence, revenue recycling should focus on the expenditure and investment challenges faced the most by low income households in low income Member States.

**The studies find the most progressive outcome if the ETS2 revenues are recycled to target the needs of the lowest income deciles** (the poorest 40% of households). Support to low income and vulnerable groups will need to take the form of investment support and compensation, including direct income support and reduction of electricity or labour taxation. This is the conclusion made for example by Oeko Institute in its study investigating investment needs for installing heat pumps in buildings. Asymmetries in income levels and emission intensity of transport and heating and cooling in each Member State show that the portion of the ETS2 revenues needed to compensate the poorest 40% of households differs across Europe and cannot be uniformly set.

Estimates made of the financial needs for both direct compensation targeted at lower income groups and massive investments in heating, cooling and transport, show that **all the ETS2 revenues – those channelled through the SCF and those allocated to the Member States – will be needed to fill an investment gap**. It should be noted that there is a significant investment gap characterising the road transport and buildings transition towards carbon neutrality even without an ETS2 carbon price.

## ETS2 impacts in the context of current high energy prices

The crucial question concerning the ETS2 and the SCF interaction with energy prices was not investigated by the studies because they were initiated before the energy prices crisis. Consequently, price estimations modelled before the energy price spikes that followed the Ukraine war might be outdated.

Energy and carbon prices respond to two different market price dynamics<sup>20</sup> where the carbon price is usually only a small marginal portion of the energy price. The current spikes in the price of gas are mainly due to the impact of geopolitical events on the international markets. However, the rise of gas prices started before the war in Ukraine, already during Q3 of 2021<sup>21</sup>.

At the moment, the gas price drives up the cost of wholesale and retail electricity, especially in the European electricity market where the method of marginal pricing is applied and the marginal unit – usually gas<sup>22</sup> - sets the price at which the market clears. The ETS component of the energy price is minimal and, according to the European Commission, amounts only to around 1/5th of the final energy price<sup>23</sup>. For electricity, the main components of the price are taxes, levies and VAT (35%); networks (30%); and energy (35%)<sup>24</sup>. As the energy commodity component of the final electricity price increases, the relative weight of the carbon cost on the final price decreases, meaning that the price signal for final consumers is mainly given by the commodity price.

**Thus, in the current situation, staggering prices of fossil fuels are the primary cause of high retail prices**, while the impact of the carbon price on the final consumer price is negligible when other components make-up the largest share of the final price.

The European Commission Impact Assessment for the ETS2 modelled the effect of the ETS2 carbon price on consumer fuel costs in the EU27. The findings are different for each EU country as the result is significantly determined by the existing level of taxes and levies on fossil fuels used for heating and transport in that country<sup>25</sup>. Where the tax component is small, the cost increase due to the carbon price may be relatively higher compensating for a lack of a price signal for fossil fuels<sup>26</sup>.

The conclusion to draw is that the ETS2, through its carbon price, provides the certainty of a price signal when energy prices decrease below the current level - or when a pre-existent price signal is lacking - and ensures compliance with the decreasing emission cap. In a balanced policy mix, where the carbon price is complemented by regulations and investments financed via the SCF, households transition to clean technologies and abandon fossil fuels. As the Commission's estimates show, when this decarbonising effect of carbon pricing is realised, lower carbon prices and energy prices can be expected in the long term.

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<sup>20</sup> See: [https://www.ceps.eu/wp-content/uploads/2021/09/PI2021-13\\_Energy-costs-and-ETS-price.pdf](https://www.ceps.eu/wp-content/uploads/2021/09/PI2021-13_Energy-costs-and-ETS-price.pdf)

<sup>21</sup> When the main factors driving up energy prices were supply disruptions (e.g. in Siberia producing sites), a tight LNG global market, post-pandemic economic recovery, Asian competition to access energy, and a particularly cold winter, signalling a long-term trend in high fossil fuel supply and costs challenges

<sup>22</sup> This can be different in countries such as Poland where the marginal generating unit is coal. However, as high gas prices induce a higher demand for coal, shortages of coal supplies drive up the cost of coal too.

<sup>23</sup> See: [Energy Crunch Should Spur Green Shift, EU Climate Chief Says - Bloomberg](#)

<sup>24</sup> See: [https://acer.europa.eu/en/The\\_agency/Organisation/Documents/Energy%20Prices\\_Final.pdf](https://acer.europa.eu/en/The_agency/Organisation/Documents/Energy%20Prices_Final.pdf). When it comes to the ETS2, the carbon price would fit into 'the taxes, levies and VAT' component of the final price. This is because in the ETS2 the carbon price is paid by suppliers when the fuel is put in the market.

<sup>25</sup> Figures 11, 12 and 13 of Commission's IA for ETS2, part 1, p. 125.

<sup>26</sup> It must be noticed that a carbon price on the fossil fuels used for heating and cooling of buildings and for road transport would create a level playing field with electricity as this is normally subject to higher taxation than fossil fuels and electricity generation is already covered by carbon pricing. The ETS2 would also interact with the revised Energy Taxation Directive which would introduce updated minimum excise duty on fuels used for motor, heating and electricity on the basis of the carbon content. Commission's IA for ETS2, SWD(2021) 601 final, part 2, p.134

# Annex

## Studies and reports that have informed this paper:

- a. Policies to decarbonise residential buildings in Central, Eastern and Southern EU: impact on energy poverty and mitigation strategies, Institute for European Energy and Climate Policy (IEECP), May 2022 ([link](#) and [summary](#)) (May 2022) - A study broken into a series across 3 work streams
- b. Criteria for an effective and socially just EU ETS 2, FOS and FEST, January 2022 ([link](#))
- c. Pricing is just the icing: The role of carbon pricing in a comprehensive policy framework to decarbonise the EU buildings sector, RAP, June 2021 ([link](#))
- d. Assessment of the impacts of an ETS2 for transport and buildings, Cambridge Econometrics, February 2022 ([link](#) and [report](#))
- e. Report: A Fair and Solidarity-based EU Emissions Trading System for Buildings and Road Transport, Ariadne projekt, June 2022 ([link](#))
- f. The Social Climate Fund – Opportunities and Challenges for the buildings sector, Oeko Institut, June 2022 ([link](#) and [blog](#))
- g. Can Polluter Pays policies be progressive?, IEEP, March 2022 ([link](#))
- h. Fit for 55 package: analysis of the distributional impact on European households of energy pricing in buildings and transport, IDDRI, March 2022 ([link](#) in French)

## Outstanding questions

Some questions are not addressed by this paper, but are worthwhile highlighting. Some of these have also not been addressed by the studies forming the basis of this paper:

- What is the capacity of households in each income decile to absorb the additional costs from ETS2? How does this differ between Member States?
- How long do the investments needed to decarbonise transport and buildings take to happen and to mitigate ETS2 price impact?<sup>27</sup>
- Who benefits [most] from investments? How can investments be more targeted to the poorest households?

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<sup>27</sup> The Oeko Institut study, “The Social Climate Fund – Opportunities and Challenges for the buildings sector”, looks specifically at heat pumps to replace fossil heating technologies for vulnerable households. Even with an optimistic replacement rate of 7% it would take 14 years to completely replace fossil heating systems in vulnerable households. Cars typically have shorter lifetime than heating systems so it should be faster to replace them, but building insulation, for example, might take longer

- Limiting the ETS2 to commercial operators only until 2029<sup>28</sup>:
  - How could this work in practice?
  - What costs would still be passed onto households?
  - What distributional impacts would this entail between member states and between households?
  - What would be the impact on ETS2 revenue of limiting the ETS2 to commercial operators only until 2029?

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### For further information:

#### Katie Treadwell

Senior Energy Officer, WWF  
European Policy Office

ktreadwell@wwf.eu

#### Alex Mason

Head of Unit Climate and Energy,  
WWF European Policy Office

amason@wwf.eu

<sup>28</sup> As proposed in the [European Parliament's adopted position](#)