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Heating Up Inequality?

ETS2 Creates Manageable Heating Cost Increases–And Raises Major Investment Challenges in Housing

Abstract / Executive Summary

The EU's second Emissions Trading System (ETS2) will apply a uniform carbon price to fossil fuels used in buildings and road transport, affecting around half of the EU's 188 million households that rely on fossil heating. At a likely entry carbon price of 60 EUR/t CO_2, average annual heating costs are expected to rise by around 60 EUR per household. Most households are likely to absorb these increases, but a smaller group – mainly low-income, often elderly homeowners in Eastern and Southern Europe – faces potentially unmanageable cost burdens. ETS2 revenues should therefore be used for targeted compensation schemes through national Social Climate Plans that address these vulnerable groups. Although such measures can ease distributional impacts, ETS2 revenues will be insufficient to finance the investments required to shift away from fossil heating. Additional funding will therefore be needed.

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1 | ETS2 and housing: carbon pricing meets its greatest political test

In 2023, EU member states agreed to extend carbon pricing to emissions from road transport, buildings and small industries through a second Emissions Trading System (ETS2). Economically, this step is aligned with the EU's climate objectives. Politically, however, ETS2 has become one of the most sensitive elements of EU climate policy – nowhere more so than in the housing sector.

Housing amplifies the political stakes of ETS2. Households across the EU differ widely in income, building quality, heating technologies and access to finance. Decarbonising housing is not a matter of short-term behavioural adjustment but requires costly and long-lived investments such as heating system replacement or building upgrades. Rising fossil energy prices therefore generate very uneven burdens across households and regions.

Uncertainty further heightens political sensitivity. ETS2 prices are market-based and will fluctuate, with an intended upward trajectory as the emissions cap tightens. Future price levels cannot be predicted ex ante. This has led to a debate that often relies on worst-case scenarios or anecdotal evidence fuelling concerns about affordability, fairness and the risk of overburdening households– particularly in regions with high reliance on fossil heating, lower incomes, and limited financial capacity to invest in clean alternatives. This weakens confidence in both the social fairness and the political feasibility of ETS2.

These concerns have already shaped policy-making. In November 2025, the EU postponed the launch of ETS2 from 2027 to 2028 and strengthened price-stabilisation mechanisms to reduce the risk of abrupt price spikes. Importantly, the planned disbursement of ETS2 revenues – through the Social Climate Fund (SCF) and national revenues – to compensate households and support the transition away from fossil heating remains unchanged.

Against this backdrop, the success of ETS2 increasingly depends on whether accompanying national support policies are targeted, timely and credible. Without them, ETS2 reinforces existing social and regional inequalities – and risks weakening support for climate policy.

The design of such targeted compensation mechanisms and investment support schemes requires granular empirical evidence on the distributional impacts of ETS2 on heating emissions. A basic question remains insufficiently answered: who is affected, by how much, where – and can EU households afford ETS2?

To address this evidence gap, we use a novel microsimulation covering all approximately 188 million EU households (Schwab et al. 2026). We assess two price levels: 60 EUR/t CO_2, likely in the early years of ETS2, and 180 EUR/t CO_2, hypothetically possible in the longer run. The results show that most households can absorb the additional heating costs at both price levels, while clearly identifying regional and socio-economic hotspots of burden.

The findings point to three major policy implications: First, most households do not

need support to cope with ETS2-induced heating cost increases, but some do. This group should be targeted with precision. Second, there is enough revenue generated by the ETS2 to finance such compensation. And third, there will not be enough revenue coming from the system alone to finance all the investment needs to shift to climate-neutral alternatives and insulate buildings.

Concretely, policy makers could act now in three ways to ensure that the ETS2 will be effective and politically acceptable:

1. It is for member states to put in place the technical and administrative infrastructure for targeted compensation of the most vulnerable groups to unmanageable price hikes.

2. The EU Commission should ensure that funds from the Social Climate Fund are used in a targeted way to address precisely these groups.

3. Member states need to put up additional funds to finance investment support to shift to climate-neutral heating alternatives.

2 | Why ETS2 in the housing sector matters

Residential space heating is central to the EU's climate challenge. It accounts for roughly half of final energy consumption (European Environment Agency 2024) and one-third of energy-related carbon emissions (European Environment Agency 2025a) in the EU. Despite its relevance, the housing sector has long lagged behind others in climate policy ambition and delivery.

Decarbonising housing is particularly difficult for policymakers and citizens alike. It requires high upfront investments in energy-efficient buildings and implies long payback periods. Efforts must be coordinated across owners, tenants, tradespeople, utility companies and authorities. Europe's housing stock is also highly heterogeneous: building characteristics, climate conditions and income levels vary widely, leading to substantial differences in both heating demand and households' capacity to invest.

Regional contrasts illustrate the challenge. Southern European households, for example, often have lower heating demand but rely heavily on gas, while Scandinavian households face high heating needs but have largely transitioned to fossil-free systems. These differences shape both the distributional effects of climate policy and its political feasibility.

Progress to date has been slow. Fossil fuels remain comparatively cheap as prices in most countries do not reflect climate effects; regulatory barriers delay renovations; and political ambition has varied widely across member states. Only nine member states currently operate national carbon pricing for heating, and energy taxation differs substantially. As a result, around half of EU households still rely on fossil fuels for heating, with major differences between member states (see Figure 1).

Against this background, ETS2 represents a structural shift. By pricing emissions from gas, oil, and coal used for heating, ETS2 internalises environmental costs, shifts relative prices, and provides a strong incentive to switch to climate-neutral heating.

Experience from the existing EU ETS suggests that carbon pricing can deliver stronger emissions reductions than national target setting combined with decentralised implementation. While emissions in ETS-covered sectors declined by 50% between 2005 and 2024 (EU Commission 2025a), emissions from road transport and housing – currently regulated under the EU Effort Sharing Regulation – fell by only 32% in buildings and 5% in transport (European Environment Agency 2025b). This supports the case for extending carbon pricing to buildings.

3 | ETS 2 will be manageable for most but not for all

A single EU-wide carbon price offers clear advantages in terms of cost efficiency and policy coherence. However, it does not reflect Europe's socio-economic diversity. The same price signal translates into very different effective burdens for households depending on income, heating demand and housing quality.

In addition, ETS2 does not lead to uniform changes in final consumer prices. Where ETS2 replaces existing national carbon pricing schemes, the resulting price increases are mechanically much smaller. Energy taxes and levies that are applied on top of the carbon price and also vary widely across member states.

As a result, a given ETS2 allowance price can translate into sharply divergent changes in retail heating fuel prices. At an ETS2 price of 60 EUR/t CO_2, effects range from negligible changes or even price reductions in member states with pre-existing national carbon pricing to increases up to 70% for certain heat fuels and member states. This highlights the scale of cross-country variation.

Using an artificial population of 188 million EU households that closely mirrors the characteristics of the actual EU population, we assess how building characteristics, heating technologies, income levels, and existing energy expenditures shape households' exposure to ETS2 (for more details, see Schwab et al. 2026).

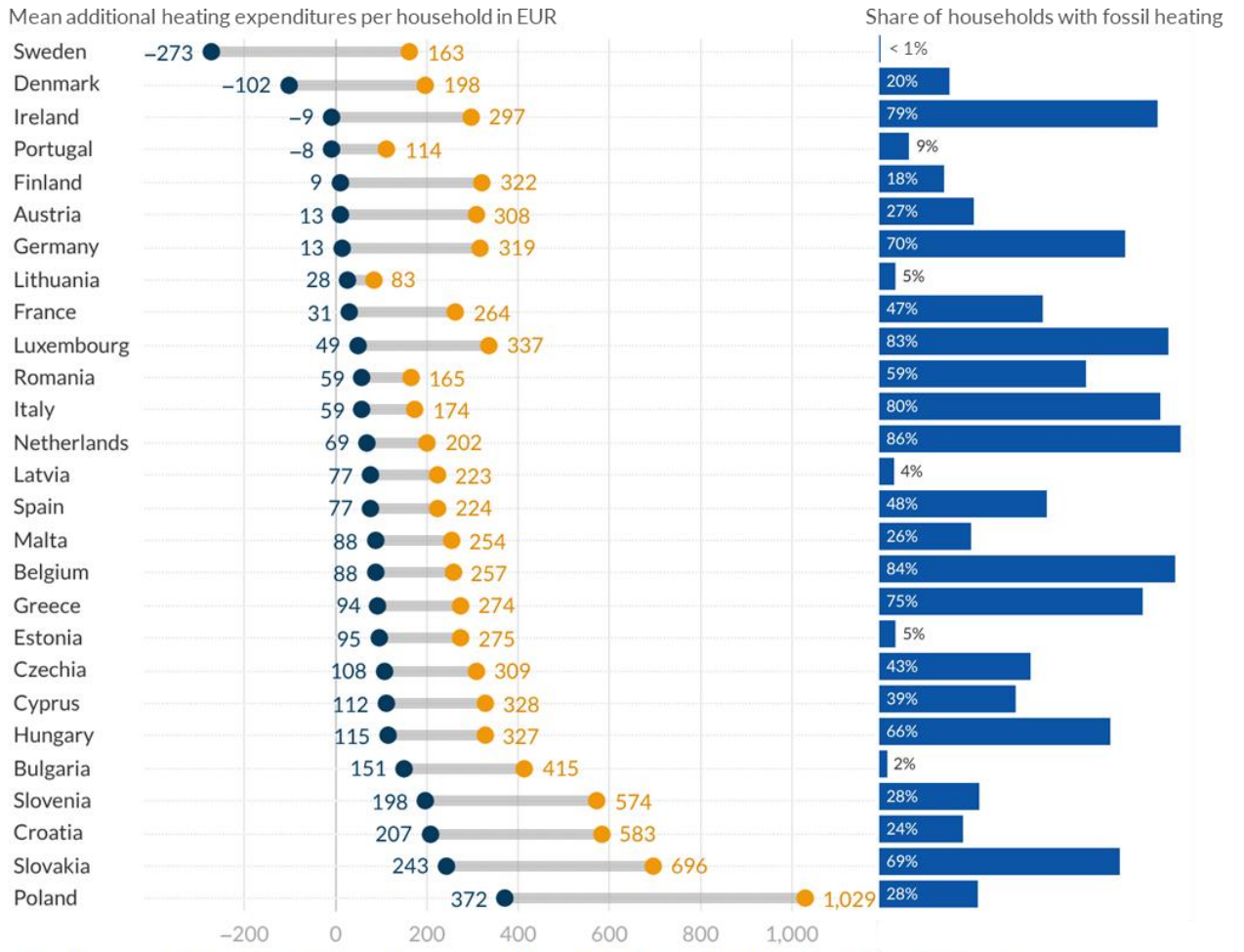
We simulate carbon price effects for two illustrative price levels: 60 EUR/t CO_2 – which, given current expectations, likely approximates a starting price upon introduction – and 180 EUR/t CO_2 as a hypothetical but rather unrealistic long-run price level. While the exact carbon price remains uncertain and may fluctuate, our approach opens up a wide range of possible effects.

3.1 | Fossil heating and socio-spatial disparities in the EU

Across the EU, 55% of households – around 103 million – still rely on gas, oil or coal for heating. Fossil heating is unevenly distributed across member states. Scandinavian and Baltic member states have largely phased it out and in a wide range of others such as Poland or Austria, below a third of households heats directly with fossil fuels. In many of these member states, district heating plays a major role. It is either largely fuelled by renewables (in Scandinavia) or fossil energy (in Poland or the Baltics). Large-scale fossil-based heat generation is already covered by carbon pricing under the EU ETS.

At the same time, dependence on fossil heating systems remains high elsewhere. Gas dominates in many regions, oil heating is

FIGURE 1 **Cost increases vary across member states, with reductions for a few**



Average additional costs per household resulting from an ETS2 price of 60 EUR/t CO2 (left, in blue) and 180 EUR/t CO2 (right, in orange), in euros.

Source: Synthetic population.

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concentrated in parts of Western and Southern Europe, and coal persists primarily in Poland. Fossil heating household shares range between close to zero to 86% (see Figure 1).

Fossil heating is not primarily an income issue: Its use is distributed very evenly across income levels in all member states. However, the higher a household's income, the better it can absorb energy price increases.

Average disposable household income – that is, income a household can spend after taxes and other mandatory contributions – range from 93,000 EUR in Luxembourg to 15,000 EUR and less in parts of Bulgaria and Romania.

Beyond income, heating expenditures and energy cost burdens already to date, differ markedly across Europe. Households with fossil heating systems in Eastern and Northern Europe already spend more than the average EU household on heating: They pay around 1,500 EUR per year for heating compared to roughly 1,000 EUR for the average EU-household.

3.2 | Manageable heating cost increases for most households

At an ETS2 price of 60 EUR/t CO_2 additional annual heating costs amount to 6.27 billion EUR across the EU. This corresponds to an average annual increase in heating costs of about 60 EUR per household. However, these additional burdens are distributed unevenly across the EU (see Figure 1).

In member states with existing national carbon pricing, such as Germany or France, households see little changes as existing national carbon prices are already close to 60 EUR/t CO_2. In Sweden and Denmark, which already apply comparatively high national carbon prices, the introduction of ETS2 may even reduce heating costs.

In Eastern and Southern member states, increases are higher but generally remain below 150 EUR per household. Only in Slovenia, Croatia, Hungary, and Poland do average increases exceed 200 EUR, with Polish households most affected, facing average cost increases of 372 EUR. However, the share of fossil-heaters in these member states is below 30% (except Slovakia) concentrating heating cost increases to a minority of households.

Across the EU, around 89% of households using fossil heating face annual cost increases below 100 EUR, typically corresponding to less than 0.1% of disposable income. Only about 5% of all EU households are expected to face annual price increases of more than 100 EUR.

At a high, long-term ETS2 price level of 180 EUR/t CO_2, the spatial pattern remains similar, but the regional concentration of cost increases is higher. Heating costs rise in all member states, as this price level would exceed existing national carbon prices. Average additional costs range from 83 EUR per household in Lithuania to 1,029 EUR in Poland.

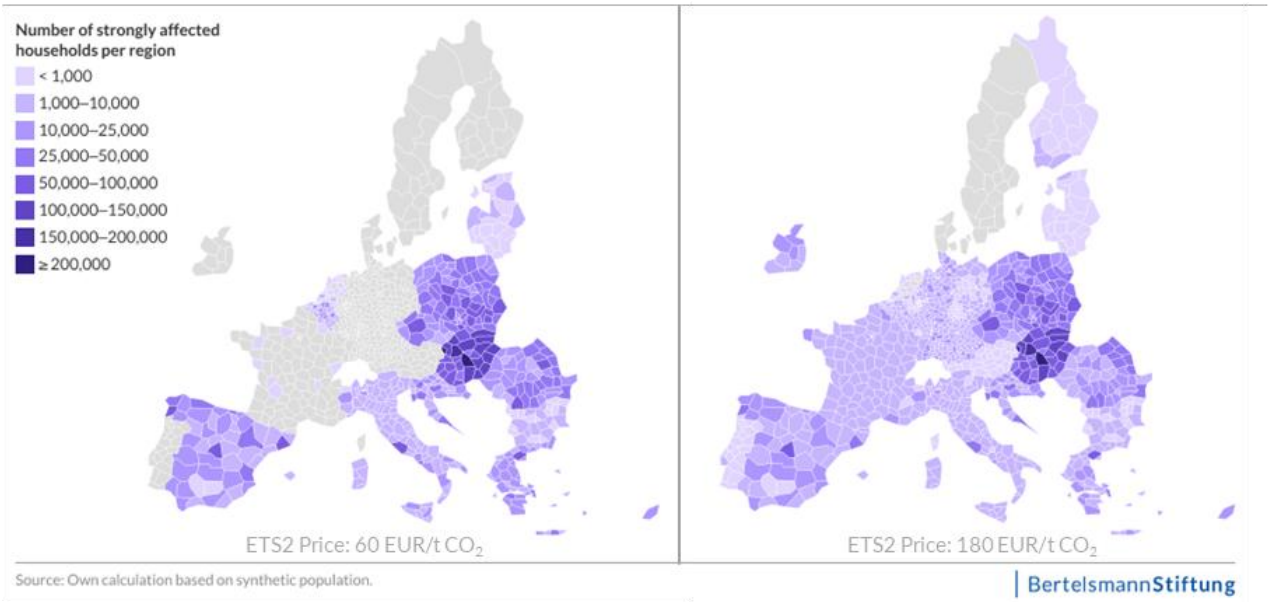
Across all households, heating bills would increase by an average of 285 EUR. Overall, the majority (84%) of households using fossil-based heating would face additional costs of 400 EUR or less.

An ETS2 price of 180 EUR/t CO_2 is unlikely to materialise in the near term but is a potential long-run scenario. It is therefore reasonable to assume that the replacement of heating systems will have progressed by the time such price levels might be reached. As a result, fewer households would be exposed to these cost increases, which would remain manageable in most cases. In addition, as we show below, a higher carbon price also generates larger revenues and hence increases the capacity of member states to cushion the impacts.

3.3 | Some households face high burdens

While the additional financial burden from ETS2 on heating is manageable for large parts of the EU population, the impact is considerably more severe for a smaller group of households. Focusing on the 10% most affected households – roughly 10 million across the EU – these households experience the largest increase in the share of heating expenditures relative to disposable income. Within this group, some households will be confronted with additional heating costs that are difficult to absorb. Understanding their characteristics is therefore particularly important for policy design, as

FIGURE 2 **Most affected households are concentrated in Eastern EU member states**



some of them will require the greatest level of support both to cope with higher heating costs and to overcome fossil-lock-ins.

On average, the 10% most affected households have around half the disposable income of the overall population and already spend 6% of their income on heating. At an ETS2 price level of 60 EUR/t CO_2, their heating cost share increases by more than one percentage point, pushing total heating expenditures above 7% of disposable income. For many households, this might constitute an unmanageable financial burden.

The most affected households are disproportionately owner-occupiers of single-family homes, often older and retired, have more female members and are concentrated in Slovakia, Hungary, Romania and Poland. Notably, member states with existing national carbon pricing schemes have no households among the 10% most affected at an ETS2 price of 60 EUR/t CO_2 (see Figure 2).

The good news: More than enough revenue will be generated by ETS2 to compensate the additional burden for these households.

4 | Revenues are sufficient for compensation

ETS2 will generate substantial public revenues, earmarked for decarbonisation and social mitigation. At a price of 60 EUR/t CO_2, ETS2 revenues from housing, road transport and small industries would total roughly 310 billion EUR over the first six years of the scheme. At a price of 180 EUR/t, revenues would reach more than 960 billion EUR (Agora Energiewende 2023, Graichen and Ludig 2024).

These revenues will be distributed through two channels:

- Social Climate Fund (SCF): Until 2032, up to 65 billion EUR will be distributed among member states, with a larger share directed to Eastern European member states. Member states are

obliged to use most of their allocation for investment support targeting vulnerable households, while direct income compensation must not exceed 37.5% of the funds. Access to SCF resources is conditional on the submission of Social Climate Plans by the member states, which must be assessed and approved by the EU Commission. These plans must be co-financed, with at least 25% of total estimated costs covered by national budgets or national ETS2 revenues.

- National ETS2 revenues: The remaining revenues are distributed largely on the basis of historic emissions and can be used with greater discretion at the national level. While the ETS regulation specifies intended uses for these revenues, enforcement is likely to be limited in practice, as the EU Commission lacks a direct control mechanism comparable to that of the SCF to ensure compliance.

There are two primary ways in which ETS2 revenues can support both the functioning and the acceptance of carbon pricing. First, they can be used to compensate vulnerable households for higher energy costs, effectively differentiating the uniform ETS2 price. Second, they can support the investments required to shift away from fossil heating for those who are unable finance these measures on their own.

Importantly, ETS2 revenues are generated across all covered sectors – transport, heating and small industries – and must therefore address potential financial burdens in each of them. Based on the 18 Social Climate Plans drafted or submitted so far, around 45% of planned spending is earmarked for building-related measures, while roughly 35% is allocated to transport-related investments, with the remainder used for direct or temporary income support and other measures (EU Commission 2025b).

This allocation of funds in the Social Climate Plans suggests that policymakers recognise that needs for investment support in the building sector are more substantial than in road transport and small industries. For our analysis, this supports the reasonable assumption that funds will be primarily channelled into the housing sector.

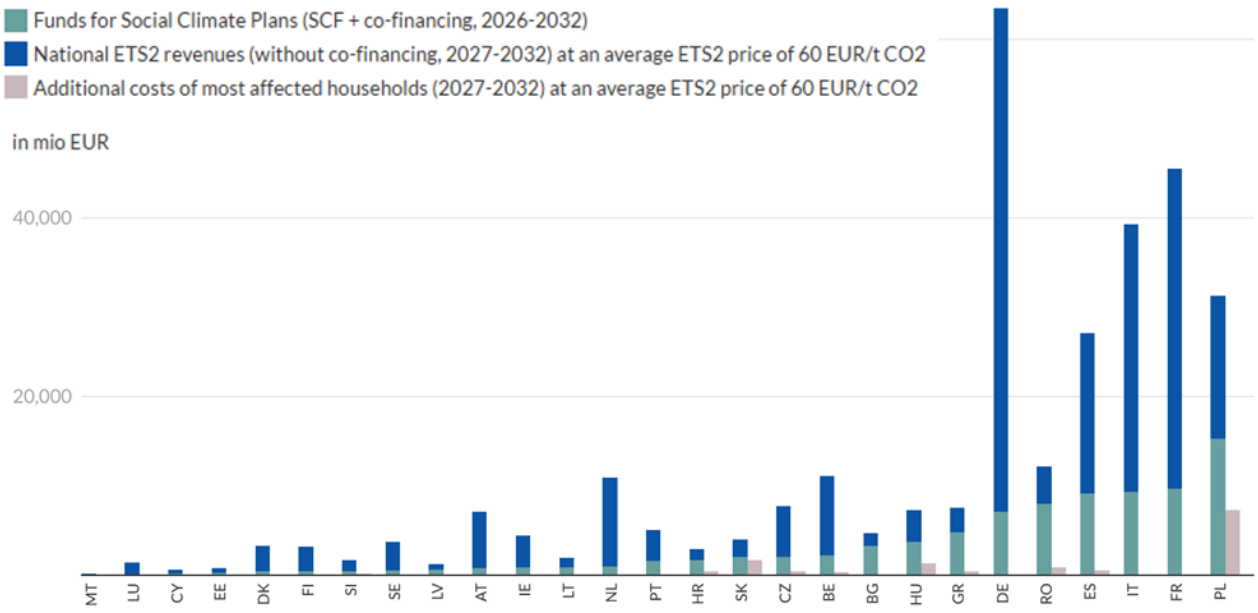
4.1 | Sufficient funds to keep ETS2 manageable for all households

It is possible to compensate the households facing an unmanageable burden in a targeted way. To illustrate this, we estimate the financial resources required to fully compensate the 10% most affected households – those facing, on average, 222 EUR additional costs at a carbon price of 60 EUR/t CO_2 or 717 EUR at 180 EUR/t CO_2. This calculation represents an upper bound of potential financial needs.

In practice, actual compensation requirements are likely to be lower for two reasons. First, not all households within the 10% most affected group will necessarily face unmanageable heating costs, particularly at moderate ETS2 prices. Second, full compensation is neither economically desirable nor consistent with the incentive structure of ETS2, as it would undermine nudging to replace fossil-based heating systems.

Taking these considerations into account, we estimate that fully compensating the 10% most-affected households would require between 13.8 and 44.5 billion EUR over the period 2027-2032. This estimate is necessarily

FIGURE 3 **Sufficient funds for compensating most affected households**



Funds for the Social Climate Plans refer to allocations from the Social Climate Fund plus the mandatory 25 % national co-financing.

Source: SCF allocation based on European Parliament, (2023b), national ETS2 revenues based on Agora Energiewende (2023) and Graichen and Ludig (2024) and additional ETS2 heating costs of most affected households calculated on synthetic population. | BertelsmannStiftung

approximate, as eligibility criteria for compensation – and the definition of what constitutes an "unmanageable" financial burden – are ultimately political decisions and likely to vary across member states.

Given that ETS2-related funds are already allocated to member states, the key question is whether these allocations are sufficient to compensate the most affected households. As shown in Figure 3, no member state faces a shortfall in resources to offset potentially vulnerable households. At a carbon price of 60 EUR/t CO_2, SCF funding alone would be sufficient. At 180 EUR/t CO_2, some member states may need to draw on national ETS2 revenues in addition. Overall, in all scenarios, available funds are more than sufficient to cover the costs of compensating households facing unmanageable increases in heating costs across all member states.

4.2 | Insufficient funds to support investments adequately

Compensation can only provide temporary relief. The actual objective of ETS2 is to incentivise the replacement of fossil-fuel based heating systems with clean alternatives. This requires substantial investments.

The scale of investment needed is hard to determine, as it is highly context-specific and there is no data available allowing for an EU-wide assessment. In addition, it depends on owners' preferences and the availability of alternatives locally feasible (e.g. connection to a district heating network). However, it is clear that connecting to district heating or installing a heat pump involves high upfront costs. For example, installing a heat pump ranges from 10,000 to 30,000 EUR or more (EU Commission et al. 2025, Winkel et al. 2024).

Some property owners can absorb these costs, particularly as such investments often increase property value. For others, however, such investments would bind a large share of their disposable income or even exceed it. As a result, the number of households struggling to finance heating system replacements is substantially larger than the number of households facing unmanageable increases in heating costs that amount to around 3% of their disposable income.

Public financial support for heating system replacement is therefore essential to reach the objectives of ETS2. A stylised calculation shows that even modest investment support – a one-off payment of 5,000 EUR to half of fossil-heating households – would exceed ETS2 revenues in most member states at a carbon price of 60 EUR/t CO_2. Even at 180 EUR/t CO_2, higher revenues remain insufficient once compensation needs and transport-sector investments are taken into account.

ETS2 revenues alone cannot finance heating system replacement at scale, particularly when combined with meaningful, targeted public support programmes.

5 | Policy recommendations

At a likely starting price of around 60 EUR/t CO_2, ETS2 will increase annual heating expenditures by an average of around 60 EUR for every second European household – those relying on fossil heating fuels. In an unlikely scenario in which the ETS2 price rises to 180 EUR/t CO_2, average additional heating costs would increase to 285 EUR. On average, this increase appears manageable. Yet a uniform carbon price translates into highly uneven impacts across both member states and households.

At member state level, effects differ markedly. In some member states with already high national carbon prices (e.g. Sweden with currently 134 EUR/t CO_2), households may even face declining effective burdens. In others, impacts are modest (e.g. Germany, France), while households in member states with a higher reliance on fossil heating and lower incomes (e.g. Poland, Slovakia) face significantly larger cost increases.

Within member states, the variation is even greater. As a result, targeted support is essential to ensure social fairness and public acceptance of ETS2. While ETS2 revenues are sufficient to compensate households for higher heating costs, this requires careful and targeted allocation.

At the same time, compensation can buy only time. It does not deliver the core objective of ETS2: replacing fossil fuel-based heating systems. Achieving this objective requires large-scale and long-term investment support for a much broader group of households than those eligible for compensation. The financial needs for this transition clearly exceed ETS2 revenues alone.

Against this background, three priorities emerge for member states and the European Commission.

1. Member states: Prioritise most affected households for targeted compensation

Beyond debates over ETS2 price levels, our analysis shows that carbon prices between 60 and 180 EUR/t CO_2 translate into manageable cost increases for the majority of European households. However, a distinct

group of households faces high and potentially unmanageable burdens. These households are typically larger, older, more likely to include women, and more likely homeowners. Crucially, they already spend a high share of their disposable income on heating. For these households, targeted compensation is essential to keep heating affordable.

Nevertheless, policy debates in many member states focus on broad, untargeted lump-sum transfers, such as per-capita 'Klimageld' payments. While politically attractive and potentially administratively simple, such measures risk misallocating scarce public resources and fail to adequately protect those households most exposed to ETS2-related cost increases.

Instead, compensation measures should focus explicitly on households with high ETS2-induced heating cost burdens relative to income – and not on low-income households alone. Designing such targeted support is not trivial. It requires:

1. **Granular data** and analysis to identify who is most affected. Our study demonstrates that this is feasible at a high spatial and socio-demographic resolution.

2. **Institutional infrastructure** that allows governments to identify eligible households and reach them effectively. Ideally, governments should proactively approach eligible households – not the other way around.

3. A **pragmatic balance** between precision and administrative complexity, recognising that perfect targeting may be neither achievable nor desirable.

Crucially, ETS2 revenues and Social Climate Plans should compensate only for burdens caused directly by ETS2 itself. While ETS2 must not create new social disparities, it is not responsible for correcting pre-existing structural problems such as high housing costs, tight rental markets, or long-standing energy poverty. These challenges require broader social and housing policies at the national and EU levels. In particular, this involves policies that expand affordable housing supply, strengthen tenant protection and accelerate building renovations, while remaining aligned with climate objectives that ETS2 aims to deliver.

Member states therefore need to rapidly invest in data systems, administrative capacity, and delivery channels for targeted compensation. Without this institutional architecture, ETS2-related support risks remaining blunt, inefficient, and socially ineffective.

2. European Commission: Use the Social Climate Fund as a blueprint for a socially just transition

The design of the Social Climate Fund introduces key innovations for a just transition: a clear focus on vulnerable groups combined with solidarity-based redistribution across member states and a prioritisation of investment over pure compensation. In doing so, the SCF addresses not only short-term affordability concerns but mainly the structural fossil lock-ins that drive long-term vulnerability.

The success of the SCF, however, depends on whether funds are used as intended. Through the approval process for national Social Climate Plans, the European Commission has a powerful lever to ensure targeted

and effective use of SCF resources. Member states must specify how funds will be deployed, whom they will target, and how measures will prevent excessive burdens and enable households to exit from fossil heating. The Commission reviews and approves these plans before funds are disbursed.

This gives the Commission three concrete operational responsibilities:

1. **Enforcement**: Ensure that Social Climate Plans genuinely focus on vulnerable households and do not rely primarily on non-targeted measures.

2. **Alignment**: Require close coordination between SCF spending and national ETS2 revenues to avoid inefficient or contradictory policy mixes.

3. **Capacity-building and learning**: Actively promote cross-country learning as a core, yet underused, strength of the SCF architecture.

Progress to date has been slow. Most member states missed the June 2025 deadline for submitting their Social Climate Plans, and only one plan (Sweden's) has been formally adopted. This reflects the administrative complexity, political uncertainty and unresolved questions around ETS2 implementation.

To overcome these barriers, the Commission should actively facilitate learning and coordination, for example by:

- establishing a public EU-level registry of best-practice SCF measures, including budgets and target groups;
- organizing structured exchanges among member states on shared challenges, such as building renovation for low-income households with limited access to credit.

SCF resources should be deployed primarily to:

- prevent unmanageable ETS2-related burdens for vulnerable households, and
- enable their exit from fossil heating systems.

Ensuring this focus is neither optional nor trivial. The European Commission must check submitted plans by member states intensively and use its approval powers accordingly.

3. Scale up and frontload investment support beyond ETS2 revenues

Support for households facing higher heating costs is necessary—but insufficient. The primary purpose of ETS2 is not compensation, but to accelerate the transition away from fossil heating systems. Achieving this objective requires substantially more investment than ETS2 revenues alone can provide.

Heating systems have lifetimes of several decades. Public policy must therefore provide long-term, reliable financing frameworks that lower upfront investment barriers and, where appropriate, allow for partial repayment over time. Without such frameworks, many households–despite long-term savings and climate benefits – will delay or forgo investment.

Member states and the EU must therefore scale up complementary financing instruments, including grants, concessional loans, and guarantees, to unlock investment at scale. This requires additional funding. While

primary responsibility lies with member states, EU-level resources – most notably cohesion funds – should play a central supporting role in the transition to clean heating systems.

Housing is a stated and overarching priority of the current European Commission. This is reflected in cohesion policy, where affordable housing has been elevated as a renewed priority and supported by incentives to double current funding for housing from currently around 10.5 billion EUR (7.5 billion EUR from cohesion funds plus national co-financing). However, affordable housing also requires affordable heating. Cohesion funding should therefore prioritise energy efficiency and heating replacement, rather than treating housing and energy policy separately.

Looking ahead to the next Multiannual Financial Framework, it will be essential to secure sufficient housing-related resources within National and regional partnership plans (NRRP), the new umbrella framework for cohesion and agricultural funds. This can be achieved through earmarking and by integrating explicit targets for heating system replacement and energy efficiency into output and performance indicators.

Close coordination between different fundings streams and the national Social Climate Plans is essential. The European Commission must ensure alignment, prevent double funding and promote economies of scale. Effective coordination can significantly increase the impact of limited public resources.

Even so, ETS2 revenues and EU funds alone will not meet investment needs. Member states must mobilise additional national resources and strategically combine fiscal resources, national ETS2 revenues, SCF funding and cohesion funds.

At the same time, climate policy — and ETS2 in particular — requires immediate action. Early and targeted investment reduces emissions more quickly, lowers households' long-term exposure to carbon prices, and limits upward pressure on ETS2 prices. Frontloading investment support is therefore both socially and economically efficient — and should be a priority now.

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