Social Impact of European Emissions Trading System 2

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Background and Objectives of the EU ETS 2

EU ETS 2 is a new carbon market established as part of the EU's "Fit for 55" climate package to address greenhouse gas emissions from sectors previously outside the scope of the original EU Emissions Trading System (ETS). Adopted via Directive (EU) 2023/959 in May 2023, ETS 2 expands carbon pricing to fuel combustion in buildings, road transport, and certain additional sectors (mostly small industries). The primary objective is to achieve a 42% reduction in emissions from these sectors by 2030 compared to 2005 levels, contributing to the EU's overall target of at least 55% net emissions reductions by 2030. Policymakers saw these sectors' emissions not falling fast enough and thus designed ETS 2 to provide a market incentive for cleaner choices, such as building renovations and low-emission vehicles.

In essence, EU ETS 2 places a carbon price on road transport and heating fuels to accelerate their decarbonisation, complementing existing national policies and the Effort Sharing Regulation targets for these sectors.

Legally, ETS 2 is implemented as a new separate cap-and-trade system under the umbrella of the EU ETS Directive (2003/87/EC, as amended by Directive 2023/959). This means ETS 2 operates alongside the original ETS ("ETS 1"), but with its own emissions cap and rules tailored to fuel distributors. The regulatory framework for ETS 2 also established a dedicated Social Climate Fund via Regulation (EU) 2023/955 to mitigate social impacts.

EU ETS 2 aims to achieve substantial emissions cuts in a way that is socially just and politically acceptable, by phasing in the system with safeguards and support for vulnerable groups.

Cap-and-Trade Design and Coverage

EU ETS 2 covers CO_2 equivalent emissions from combustion of fuels used in buildings (e.g. heating of residential and commercial buildings) and road transport, as well as certain smaller industrial installations not covered by the existing ETS. In practical terms this means fuels such as gasoline, diesel, heating oil, natural gas, and coal burned in these sectors will fall under ETS 2. Notably, indirect emissions (e.g. emissions from electricity generation or district heating used in buildings) are not covered by ETS 2 since those are already priced under the original ETS.

By encompassing both private and commercial fuel use, the system aims for broad coverage of emissions; earlier debates had considered phasing-in only commercial transport and buildings, but the final design covers all fuel users upstream from the start.

A key design feature is the upstream approach. Compliance obligations fall on fuel suppliers (distributors) rather than end consumers. Thousands of companies that bring fuels to market, such as oil companies, fuel wholesalers, and gas suppliers, must monitor, report, and surrender allowances for the emissions that will result when the sold fuel is combusted. This upstream regulation greatly simplifies administration: instead of millions of car owners or households, a few thousand entities are regulated (initial estimates were about 11,400 entities EU-wide, including ~7,000 fuel depots, 1,400 gas suppliers, and 3,000 coal distributors). Each regulated supplier's emissions are calculated based on the quantity of fuel released for consumption multiplied by an EU-standard emission factor. Suppliers must purchase and surrender one allowance per ton of CO_2 emitted from those fuels.

Although the obligation lies with suppliers, they are allowed to pass on 100% of the carbon costs. It is anticipated that the majority of these costs will be reflected in fuel prices for end users, thereby sending a clear carbon price signal to households and drivers.

Like ETS 1, ETS 2 is a cap-and-trade system, meaning that a total emissions cap is set for the covered sectors and reduced annually. Allowances equal to the cap are issued and suppliers must hold enough allowances to cover their emissions. The ETS 2 cap is calibrated to achieve the 42% reduction by 2030 (vs 2005). An initial annual reduction rate is 5.1%, increasing to 5.38% from 2028 onward, tightening the cap progressively toward 2030. This means the number of allowances available will shrink every year, driving up the carbon price if emissions are not cut accordingly.

All ETS 2 allowances will be allocated via auction considering that there is no free allocation for these sectors. This is different from ETS 1, where certain industries receive free permits to address carbon leakage. In ETS 2, since regulated

fuel suppliers can pass costs to consumers (who cannot relocate to avoid the carbon price), free allocation was found unnecessary.

Governments of Member States will auction allowances on the common EU auction platform, and the revenue is collected by Member States, with a portion assigned to the EU-level Social Climate Fund. The remaining revenue is distributed among Member States for auctioning based on a fixed distribution key reflecting national shares of road and building emissions. Specifically, the majority of allowances are apportioned according to each country's share of average emissions in road transport, commercial/institutional buildings, and residential buildings over 2016-2018. Member States are required to spend ETS 2 revenues on climate- and energy-related purposes, prioritizing measures that address the social impacts on vulnerable households in the road transport and buildings sectors. This obligation is included in the directive to guarantee that the windfall from auctions flows back into emissions reduction, energy efficiency, and cushioning consumers from the policy's effects.

To ensure a stable carbon price and prevent excessive market volatility, the EU ETS 2 will incorporate a set of stabilizing mechanisms starting in 2027. The core element is the Market Stability Reserve (MSR), which will operate similarly to the MSR in the original ETS, allowing for dynamic adjustment of allowance supply based on market conditions.

At its start, 600 million allowances will be placed into the MSR to serve as a buffer against imbalances. The system includes circulation-based thresholds:

- If the total number of allowances in circulation (TNAC) exceeds 440 million, 100 million allowances will be withdrawn from the planned auction volume and moved into the MSR within one year.
- If the TNAC falls below 210 million, 100 million allowances will be released from the MSR back into the market. Should the MSR contain fewer than 100 million allowances at that time, the entire remaining balance will be released.

We expect the first potential release under these rules in 2029, following the 2027 TNAC publication in June 2028, as projections suggest that the lower threshold may be breached in 2028.

In parallel, a price-based mechanism will act as an additional safeguard against extreme cost increases for consumers. A "soft price cap" of EUR 45 per tonne (in 2020 euros) has been introduced for the early years of ETS 2. If the average allowance price exceeds this threshold for two consecutive months, 20 million additional allowances will be released from the MSR. This measure is in place until December 31, 2029, and we expect it to be triggered in 2028 and 2029, potentially reducing annual average prices of the allowances by EUR 2-3. The nominal equivalent of the cap, when adjusted for inflation, is approximately EUR 55 per tonne.

Additionally, two further price escalation triggers have been established:

- From 2027 to 2028, if the average auction price over three consecutive months is 1.5 times higher than the preceding six-month average, the Commission will release 50 million allowances from the MSR. From 2029 onwards, this threshold increases to 2 times the six-month average.
- If the price rises to three times the six-month average over three consecutive months, a release of 150 million allowances will occur.

Once any of these price-based releases take place, no additional allowances may be released under the same mechanisms for at least 12 months, unless the EUR 45 per tonne threshold is breached again during that period. In such a case, the European Commission will reassess the system's effectiveness and may introduce a new strategy.
Finally, to maintain long-term integrity and avoid allowance oversupply, all remaining allowances in the MSR will be invalidated on January 1, 2031. This measure aligns with a scheduled policy assessment on October 31, 2031, which will evaluate the potential for linking EU ETS 1 and ETS 2 in the future.

Safeguard Mechanisms

A related safeguard to ensure economic stability during the introduction of ETS 2 is a potential one-year implementation delay. Specifically, if energy prices remain exceptionally high in the first half of 2026, the start of compliance obligations under ETS 2 may be postponed from 2027 to 2028. According to the legislation, the European Commission will conduct an assessment by 15 July 2026 to determine whether either of the following conditions is met:

- The average front-month TTF gas price between 1 January and 30 June 2026 must exceed the February-March 2022 average of approximately EUR 108/MWh (currently around EUR 36/MWh)
- The average Brent crude oil price over the same six-month period is more than double the average Brent price recorded over the previous five years. Based on data up to March 2025, this means exceeding USD 144/bbl.

The two conditions above were not included in the initial Commission's proposal for the ETS 2 market design. They were submitted as amendments during the legislative procedure to soften the opposition in the Parliament and the Council and served as conditions for the approval of the policy. Nevertheless, the above price levels for European gas and Brent crude oil are highly unlikely and can only occur if Europe enters another significant energy crisis. As a result, they serve merely as a theoretical safeguard mechanism.

In addition, to kick-start liquidity in the market, the first year (2027) will see 130% of the annual cap's allowances auctioned. This one-time oversupply in 2027 helps establish market liquidity and mitigate any initial price shocks, and it will be balanced out by the tighter cap later on. This is a common practice seen in Emissions Trading Systems as initially, a higher number of allowances in circulation is needed for compliance entities to hedge their future exposure in advance. In the EU ETS in 2012 - one year ahead of the complete phase-out of free allowances to the power sector (Phase III) - 120 million of Phase III emission allowances were auctioned for this exact purpose.[1]

Implementation Timeline and Key Milestones

As an EU directive, the ETS 2 provisions had to be transposed into national law by Member States. The transposition deadline was 30 June 2024. This required each country to enact laws or regulations designating the new obligations for fuel suppliers, penalties for non-compliance, and administrative arrangements (e.g. permitting and monitoring). However, most countries struggled to meet the deadline. By 30 June 2024, only one Member State (Austria) had fully transposed the ETS 2 directive into national law; all 26 others had failed to notify complete transposition measures. The European Commission opened infringement procedures in July 2024, sending formal notices to 26 Member States urging them to implement the agreed rules. Austria's early compliance was facilitated by its already-operational national carbon tax system, whereas other governments delayed, raising some doubt about administrative readiness. Germany, for instance, only published a draft law in mid-2024 and passed its transposition law in January 2025, slightly behind schedule. The widespread delay in transposition "sent the wrong signal" about Member States' commitment, according to observers, but by early 2025, most countries were moving to put the necessary laws in place.

Despite transposition hiccups, the operational timeline of ETS 2 remains on track for now. 2024-2026 is a preparation phase. From 1 January 2025, all regulated fuel suppliers must hold a greenhouse gas emissions permit (an extension of the existing ETS permitting system) and have monitoring plans in place. Monitoring and Reporting of emissions begins in 2025, meaning fuel suppliers will start measuring their 2025 fuel sales emissions and report them to authorities by 2026. In 2026, reported 2025 data will be verified for accuracy. No allowances need to be surrendered for 2025 or 2026 - those are monitoring-only years to allow entities and regulators to gear up.

EU ETS 2 becomes fully operational on 1 January 2027 as planned, unless the high energy price delay mechanism is triggered. This means that calendar year 2027 will be the first compliance year in which fuel suppliers incur costs for emissions. Allowance auctions will start in 2027, and regulated companies will need to purchase allowances throughout that year. By 31 May 2028, companies must surrender allowances equal to their verified emissions in 2027. This surrender deadline will be the annual compliance date. In effect, 2027 emissions are surrendered for 2028, 2028 emissions in 2029, and so on.

Key interim milestones around the start include: in mid-2026, the European Commission will assess gas and oil price conditions to decide if the 2027 start should be postponed to 2028. If energy prices have reverted to more normal levels, no delay will occur, and 2027 is firm. In addition, the European Commission has already announced the total quantity of ETS 2 allowances for 2027 (the initial cap), which will amount to 1,036,288,784 allowances. From 2028 onward, the cap will be adjusted based on actual monitored emissions in 2024-26 and then follow the linear reduction path.

[1] https://climate.ec.europa.eu/news-your-voice/news/member-states-agree-auction-120-million-phase-3-allowances-2012-2011-07-13_en

Crucially, 2026 marks the start of the Social Climate Fund (SCF) which will be in place from 2026 to 2032 to ensure vulnerable groups can receive support before ETS 2 costs hit consumers. Member States must submit their Social Climate Plans by 30 June 2025 to access SCF money. This timing is intended to ensure that by the time fuel suppliers begin paying for emissions in 2027 and potentially passing costs on, governments will have programs in place funded by SCF and national resources to assist households and small businesses in need. However, some countries may face challenges with this, Bulgaria, for example, risks losing EUR 2.5 billion from the EU's Social Climate Fund due to delays in preparing its national plan. The government's coordination unit was recently shut down, and with no clear team in charge, meeting the June deadline and securing support for vulnerable households and businesses is uncertain.

Political and Legislative Debates

After adoption, the political debate shifted to implementation and potential pushback. In late 2023 and early 2024, the surge in energy prices from the Russia-Ukraine war subsided, but inflation and cost-of-living remained in focus. Some politicians, especially in Central-Eastern Europe, began calling for reconsideration or delay of ETS 2 ahead of its launch. Notably, Poland - which had initially agreed to the ETS 2 proposal in the Council - saw renewed opposition with a change of government in 2023. In January 2025, Polish Prime Minister Donald Tusk called for a review of all Green Deal laws and warned against the rapid introduction of ETS 2, suggesting that if energy prices continue to rise it would have a "disastrous political impact". Poland, together with the Czech Republic, is advocating to postpone ETS 2 by at least one year. These governments argue that their populations need more time, warning that a 2027 start could fuel public discontent, as many households still depend on coal or expensive imported gas for heating. Hungary's leadership has similarly been critical of passing costs to consumers; during negotiations Hungary, Poland and Slovakia threatened to block the whole Fit for 55 package over ETS 2. While the law is passed and changing it would require another full legislative process, such political signals affect long-term decarbonization efforts.

France has joined the ETS 2 debate by proposing targeted adjustments instead of a delay. Rather than reopening the full ETS Directive, Paris has proposed specific reforms to the Market Stability Reserve (MSR), aiming to enhance market predictability and protect social cohesion.

The core of the French proposal is to bring forward the start of the MSR for ETS 2 from 2028 to 2027, allowing earlier injection of allowances. Paris also advocates for a smoother and more gradual release of permits in response to market price fluctuations, to mitigate abrupt threshold effects and bolster price stability. French officials argue that because the MSR is governed under a separate legislative act, these modifications could be pursued without triggering a full revision of the ETS Directive. France mentioned that a revision of the MSR Decision before 2027 is both "realistic and timely."

France's caution is shaped by past experience, most notably the 2018 "Gilets Jaunes" (Yellow Vests) protests, which erupted in response to a modest carbon tax on road fuels. The backlash, which led to significant political unrest, remains a potent reminder of the risks of poorly calibrated climate measures on household finances and public trust.

In this context, the French government has also suggested the introduction of indicative carbon price trajectories, although this element was raised verbally and not included in the official document. French Climate Minister Agnès Pannier-Runacher emphasized the value of price signals that could guide investor expectations and support a smoother market entry.

Additional technical adjustments proposed by France include modifying the MSR's operational parameters, such as extending its duration beyond 2031, refining threshold levels that trigger allowance injections, and increasing the frequency of interventions. According to several reports, approximately 15 EU member states have expressed support for the French initiative, suggesting growing interest in a compromise path that balances climate ambition with political feasibility.

EU-Level Revenues and the Social Climate Fund

One distinctive feature of ETS 2 is the political coupling of the carbon market with a large social compensation mechanism at the EU level. Auction revenue from ETS 2 is projected to be substantial, on the order of hundreds of billions of euros in the first years. At an assumed carbon price around EUR 45/tCO2eq (in line with the soft cap), total ETS 2 auction proceeds

could reach about EUR 260 billion in 2026-2032. Unlike the original ETS (where most revenue goes into national budgets with only indirect EU oversight), ETS 2 has a more structured approach to revenue allocation:

- Member State Climate Investments: 75% of ETS 2 auction revenue remains with Member States, allocated according to the share of allowances they auction.

National governments are legally required to spend these funds on climate and energy-related purposes, with an emphasis on addressing the impacts on low-income households and financing the green transition (e.g. building insulation programs, heat pump roll-outs, public transport, etc.). Member States must report on how they use the money, ensuring transparency and accountability.

- Social Climate Fund: 25% of ETS 2 revenues (up to a fixed cumulative of EUR 65 billion) is allocated into a new EU-level Social Climate Fund.

The SCF is financed by ETS 2 auctions (and a smaller contribution of 50 million allowances from the existing ETS), which are treated as “assigned revenue” in the EU budget. Each country will receive an allocation from the SCF based on a formula that accounts for factors like population, GDP per capita, and share of emissions to benefit lower-income and coal-dependent states. For example, Poland is expected to be the single largest beneficiary (roughly 17.5% of the fund), followed by France (~11%), Italy (~11%), Spain (~10.5%), and Romania (~9%).

Over the 2026-2032 period, the SCF will provide about EUR 86.7 billion in total support, with around EUR 65 billion coming from auctioning 150 million EU ETS 2 allowances over 2027-2032, the auctioning revenue of 50 million EU ETS 1 allowances in 2025 and the remaining amount covered by a mandatory 25% co-financing from Member States. In other words, this means that while the SCF will cover up to 75% of the funding, mostly sourced from ETS 2 revenues, Member States must contribute the remaining 25% from national funds, resulting in a funding structure where projects are approximately 75% EU-financed and 25% nationally co-financed. Eligible measures include direct income support (e.g. cash transfers or energy vouchers to help pay bills), temporary compensation for higher fuel costs, and, importantly, structural investments in energy efficiency, cleaner heating, and mobility. For instance, SCF money can finance home insulation for low-income households, heat pump installations, rooftop solar panels, public transit expansion, car-sharing or e-mobility programs, and other projects that reduce fossil fuel use by vulnerable populations. Each Member State must detail these measures in its Social Climate Plan (submitted in 2025) and get Commission approval to receive its share of funding.

The Social Climate Fund is different from the Innovation Fund in the EU ETS, which collects auctioning revenues and channels them to industrial decarbonization projects. In contrast to the SCF, the Innovation Fund does not feature a ceiling for collected revenue - instead, it has a dedicated number of allowances to be auctioned in each phase and the revenue collected goes into the fund. In the Social Climate Fund, the auctioning revenue of 150 million allowances over 2027-2032 is capped at EUR 65 billion.

To mobilize EUR 65 billion solely from the 200 million ETS 2 allowances initially earmarked for the Social Climate Fund would require an average carbon price of approximately EUR 325, a highly unlikely figure under current market conditions. However, this figure reflects a theoretical breakeven point only. The regulation allows the volume of auctioned allowances to exceed 150 million as needed, making it likely that significantly more allowances will be allocated from ETS2 auctions to reach the SCF’s funding target.

Challenges Facing the Social Climate Fund

Is the SCF Big Enough?
One of the main critiques is that the SCF may be too small to fully protect low-income households from rising energy and fuel prices. Climate Action Network Europe pointed out that the fund’s limited size, EUR 65 billion from ETS 2 revenues plus 25% mandatory co-financing from Member States, doesn’t offer a comprehensive buffer against the social impact of climate policies. If carbon prices and consequently energy costs rise faster than expected, the current funding will likely be insufficient. In that case, rather than enabling investment in decarbonization, the policy risks placing a disproportionate financial burden on vulnerable citizens.

Widespread Energy Poverty

The urgency of the issue is underscored by the fact that, as of 2023, around 47 million Europeans were living in energy poverty, struggling to heat their homes properly. Past fuel price spikes have already triggered unrest, such as France's Yellow Vests movement. If ETS 2 leads to higher energy bills without timely and adequate support, the social backlash could be severe.

Timing and Readiness
While SCF funding starts in 2026, questions remain about whether countries will be ready to use it effectively by 2027. Some Members of the European Parliament have warned that if governments don't start preparing now, ETS 2 risks becoming a "social trap." There are even calls to allow early access to revenues through bridge financing in 2025 so that home upgrades and support schemes can begin sooner.

Design and Fairness of Distribution
The SCF prioritizes support for poorer Member States, which many agree is fair. However, there is debate over whether this leaves low-income people in wealthier countries under-supported. Some argue that a more balanced approach is needed to protect all vulnerable groups, regardless of national income levels.

Price forecast and Market Balances

EU ETS 2 Model structure and balances outlook

We have developed a bottom-up model to assess supply and demand in the EU ETS 2, drawing from national data, the European Environment Agency, and the European Commission. This model helps us derive market balances and forecast allowance prices for ETS 2.

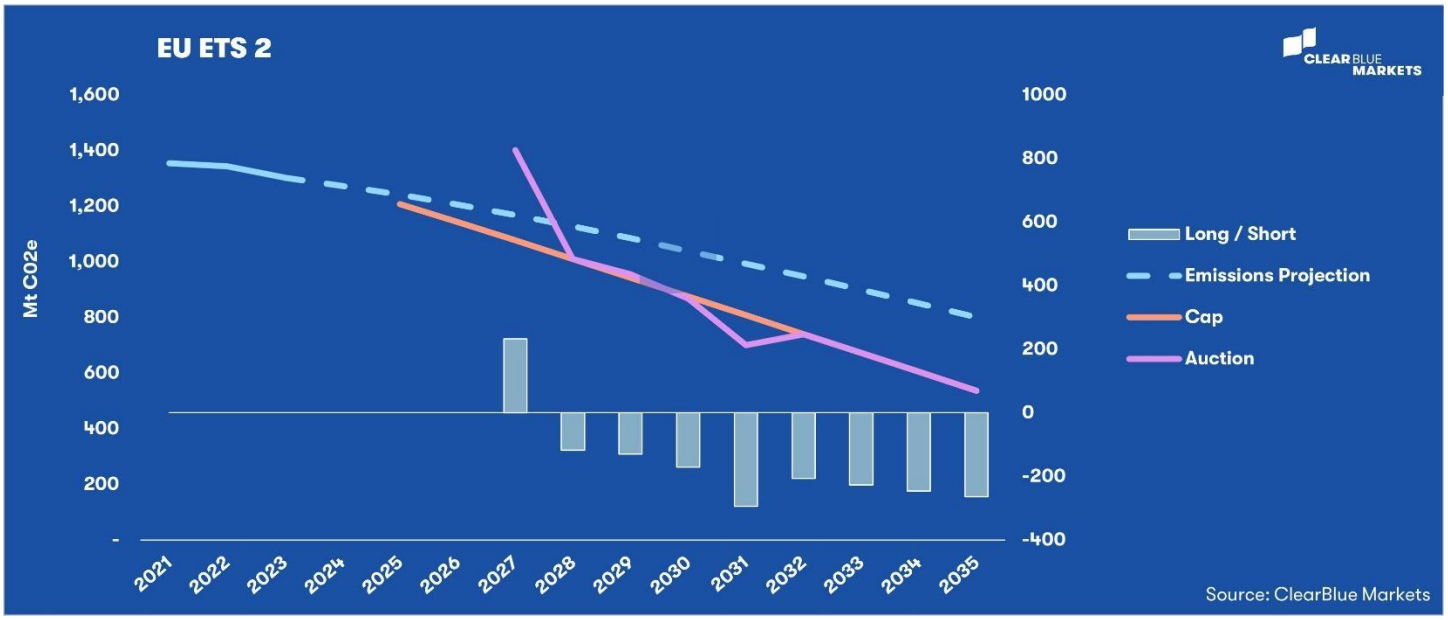
Demand plays a pivotal role in shaping the balances and potential pricing in EU ETS 2. With the latest updates, we have refined our emission projections. Demand in EU ETS 2 is divided into three main sectors: road transport, buildings, and smaller industrial activities below the 20 MW threshold. According to European Environment Agency data, road transport emissions in 2023 were approximately 749 Mt of CO2.

To project road transport emissions, we analyzed vehicle sales trends (including cars, vans, trucks, and buses) within the EU, along with annual vehicle retirement rates. Emission factors were modeled for internal combustion engine (ICE) vehicles, hybrids, plug-in hybrids, and zero-emission vehicles, considering the increasing demand in each EU country. This analysis integrates overall car sales, EV sales trends, and each country's EV adoption targets. We also factored in projected emissions reductions from increased biofuel use in ICE vehicles and changes in average vehicle travel distances. Our model forecasts a 17% decrease in road transport emissions from 2023, down to approximately 620 Mt by 2030, representing a conservative scenario with about 40 million EVs on EU roads by 2030.

Emissions from the buildings sector were around 377 Mt in 2023. By 2030, we project these emissions will decline by about 24%, reaching approximately 287 Mt. This aligns with the EU's plan to install 10 million additional heat pumps by 2027, aiming for nearly 50 million heat pumps by 2030.

Small industrial activities emitted approximately 175 Mt in 2023. By adopting decarbonization measures similar to those in EU ETS 1, we expect emissions to decrease by 25% to 131 Mt by 2030.

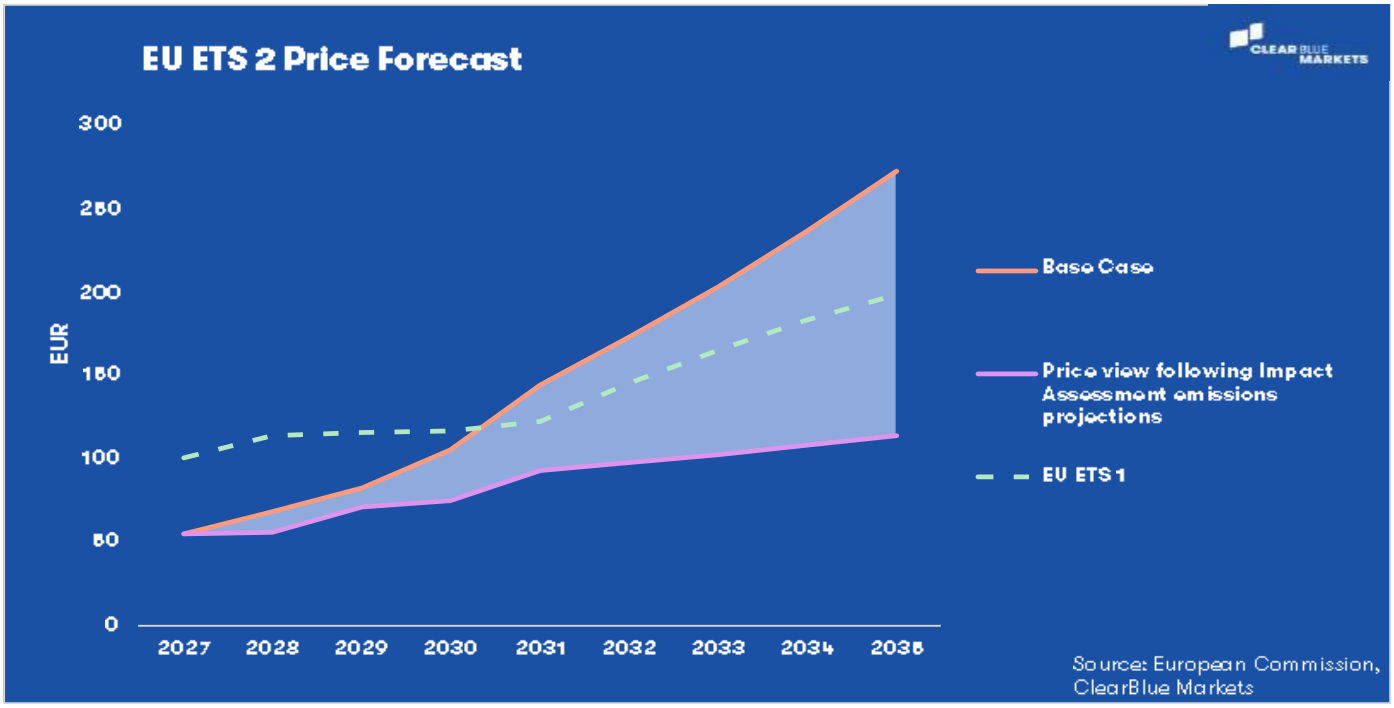
Overall, emissions from sectors covered by EU ETS 2 are projected to fall from approximately 1,303 Mt in 2023 to 1,039 Mt by 2030, a 20% reduction. However, the European Commission's recent impact assessment for its 2040 Climate Target outlines a more ambitious 33% reduction by 2030, which would lower emissions to around 860 Mt. This more aggressive scenario incorporates enhanced EU targets, including nearly 58 million heat pumps and around 50 million EVs on the road by 2030, alongside deeper emission reductions from small industries.



The graph above integrates all the factors discussed in the report, along with updated emission projections, to illustrate our most probable scenario. The "Emissions Projection" line represents ClearBlue's projection of total emissions covered by ETS 2 up to 2035. The "Cap" line indicates the emissions limit set by the European Commission, while the "Auction" line shows the annual volume of allowances to be auctioned. The Long/Short bar chart highlights whether the market is expected to have an annual surplus (long) or a deficit (short).

Importantly, in the initial year of EU ETS 2, the market is anticipated to have a surplus, as the number of allowances auctioned is expected to exceed the verified emissions.

ETS 2 Price Forecast



ClearBlue has developed a price forecast methodology for EU ETS 2, set to start in 2027, based on supply-demand projections. Our approach was based on analyzing the price elasticity of the cumulative position of market participants in the EU ETS during the most recent years. We applied the same elasticity to predict price movements in EU ETS 2, using expected cumulative position developments.

With frontloading (auctioning 130% of allowances at the start of EU ETS 2), we expect the initial supply to significantly exceed demand. As a result, we project prices to be around the EUR 45 benchmark set by the European Commission in the ETS directive, equivalent to approximately EUR 55 when adjusted for 2024 inflation. Assuming an average annual inflation rate of 2% from 2024 to 2027, the price could reach approximately EUR 60 by 2027.

After the first year, we expect demand to gradually surpass supply, reducing the cumulative positions of participants and driving prices upward. By 2028, we anticipate that the TNAC will fall below 210 Mt, prompting a release of 100 million allowances in 2029. Our model projects an average EU ETS 2 price of EUR 68 in 2028, increasing to EUR 83 in 2029. Since these projected prices exceed the EUR 45 (EUR 55 in 2024 values) threshold, an additional release of 20 million allowances per year from the MSR will be triggered for both 2028 and 2029. TNAC is expected to remain below 210 Mt in 2029, leading to another release of 100 million allowances in 2030. For 2030, we forecast prices to reach around EUR 105.

Market Stability in EU ETS 2

In EU ETS 2, the Total Number of Allowances in Circulation (TNAC) and the Market Stability Reserve (MSR) are key mechanisms to manage market balance and mitigate price fluctuations. Starting in 2027, the MSR will hold 600 million allowances to stabilize the market by deducting allowances when TNAC exceeds 440 million or releasing them when TNAC falls below 210 million. Adjustments of 100 million allowances occur over a 12-month period beginning each September 1. Any allowances remaining in the MSR by 2031 will be invalidated.

Under the EU Commission's emissions outlook, which forecasts a nearly 17% reduction in emissions, prices are expected to be lower. In this scenario, the average price in 2028 is projected to be EUR 57, EUR 11 lower than our base scenario. For 2029, the price is expected to be EUR 72. In this lower-emissions scenario, we anticipate TNAC to fall below 210 Mt only by 2029, leading to a one-time release of 100 million allowances in 2030. Consequently, we project prices in this scenario to reach nearly EUR 75 by 2030.

Impacts on Road Transport sectors' policies

A faster adoption of biofuels or electric vehicles would reduce emissions in this sector, subsequently lowering the demand for allowances from entities regulated under ETS 2, which would be bearish for prices. Conversely, slower adoption would have the opposite effect, driving demand and supporting higher prices. However, the pace of this shift is heavily dependent on subsidies and national policies, adding significant uncertainty to the outlook.

Competition of Biofuels among sectors

The EU has set an ambitious renewable energy target for all transport sectors (RES-T) for 2030, but without a specific target for road transport, the biofuel market faces uncertainties. Under the revised Renewable Energy Directive (RED III), the 2030 target for advanced biofuels in transport has increased from 3.5% to 5.5%, with at least 1% from renewable fuels of non-biological origin (RFNBOs). This increased target is expected to be primarily absorbed by the aviation and maritime sectors (covered by ETS 1), as these industries require substantial renewable energy for decarbonization and have limited electrification options. This focus reduces the availability of biofuels for road transport.

Further complicating the landscape, new caps and restrictions on certain feedstocks, such as crop-based and mature biofuels, restrict the supply pool for road transport, making significant biofuel expansion in this sector more difficult. Beyond 2030, the policy framework for biofuels remains uncertain, especially for road transport, which is expected to rely more on electrification for decarbonization.

Current Biofuel Contribution and Constraints

The European Commission has highlighted that biofuels derived from food and feed crops offer limited decarbonization benefits. As a result, revisions to the Renewable Energy Directive (RED) prioritize advanced biofuels and sustainable waste-based alternatives over crop-based sources. By 2022, the renewable energy share in transport (RES-T) for the EU-27 reached 9.6%, including multipliers that allow certain biofuels and renewable electricity to count more than once toward targets. This was a slight 0.5% increase from 2021 but still 0.6% below 2020 levels. These variations are linked to recent biofuel caps and a rebound in transport energy use after the COVID-19 crisis. Without multipliers, the true RES-T for road and rail transport was only 7.0% in 2022.

Biofuels represented over 88.4% of renewable transport energy, with crop-based fuels making up 48.4%, down from 54.3% in 2021. Advanced biofuels accounted for 15.2%, while mature biofuels and biogas contributed 16.7%. Renewable electricity comprised 11.6% of the RES-T (7.7% in rail and 1.3% in road), with road-specific renewable electricity representing only 0.1% of total transport energy use.

Under RED II, certain biofuel volumes, such as those exceeding national crop caps and mature biofuels surpassing the 1.7% limit, were excluded from the targets. This led to approximately 1.1 million tonnes of oil equivalent (Mtoe) of sustainable biofuels being unaccounted for.

Challenges and Progress in Advanced Biofuels

The European Commission acknowledges considerable obstacles in scaling up the deployment of advanced biofuels to meet the 2030 targets, primarily due to limited availability and insufficient technological development. Data from 2021 highlighted that six member states did not report any consumption of advanced biofuels. By 2022, only eight EU member states had managed to exceed the 10% Renewable Energy Sources in Transport (RES-T) benchmark, which was initially set as the 2020 target under the Renewable Energy Directive I (RED I). Of these, only Finland and Sweden had reached the more ambitious 14% RES-T target established by the Renewable Energy Directive II (RED II) for 2030. Conversely, numerous other member states remain significantly reliant on fossil fuels.

Achieving the Renewable Energy Directive III (RED III) target, recently revised under RED II and pending transposition into national laws, of either a 29% RES-T or a 14.5% reduction in greenhouse gas (GHG) emissions by 2030 will require the EU to triple its share of renewable energy in the transport sector from 2022 levels. This presents a substantial challenge for the biofuel industry, highlighting the need for accelerated investment, policy support, and technological advancements to facilitate this transition.

Between 2010 and 2021, the EU-27 achieved only a 5.5% reduction in the greenhouse gas (GHG) intensity of road fuels, falling short of the 6% target set for 2021 under Article 7a of the Fuel Quality Directive. By 2020, only 13 member states met the GHG reduction target, while major countries such as Spain, France, and Italy lagged behind.

EU Member States' Incentives and external tariffs for Biofuels

France incentivizes biofuel use by applying reduced tax rates to various biofuel types, including Ethanol-Diesel (ED95) and Diesel B100. **Ireland** supports biofuel adoption through an exemption from the Mineral Oil Tax, covering both excise duty and carbon tax. **Latvia** encourages the use of biofuels by offering reduced excise taxes on high ethanol-content fuels, such as E85, and biodiesel. **Denmark** promotes cost-effective biofuel consumption by implementing lower CO_2 tax rates that vary based on the biofuel content in fuel blends, favoring higher biofuel mixes. **Luxembourg** fully exempts biofuels from energy taxes, enhancing their economic appeal and market competitiveness. **Sweden** provides a strong incentive for biofuel use by exempting high-blend biofuels like E85 and HVO100 from both energy and CO_2 taxes, significantly reducing consumer prices and driving up demand.

Tightening Biofuel Supply: Impact of Tariffs and Shifts in Market Dynamics

Previously, the availability of low-cost imports from China had supported the EU's regulatory compliance; however, with the new import limitations, European producers must now either expand domestic production or source alternative materials from other regions.

The European Union has recently imposed tariffs between 23.7% and 36.4% on biodiesel and hydrotreated vegetable oil (HVO) imports from China, effective as of August 16, 2024. This decision aims to address the significant inflow of low-cost Chinese biodiesel, primarily derived from waste materials, which has been lowering prices within the EU since late 2022. In 2023, China's biodiesel exports to the EU surged to around 1.8 million tons, creating a competitive challenge for European producers who subsequently reduced production due to price pressures. As of 2022, nearly 13 million tons of biodiesel were consumed in the EU. With China exporting around 1.8 million tons of biodiesel to the region, these imports represented a significant 14% share of the EU's total biodiesel consumption. The Netherlands was the main importer, receiving 84% of these shipments. However, as anti-dumping tariffs loom, Chinese biodiesel supply to the European Union has sharply decreased. In the first half of 2024, exports from China to the EU fell by 51% year-on-year to 567,440 tons, with June volumes dipping to just over 50,000 tons, the lowest monthly shipment since mid-2019.

These tariffs are expected to reshape the EU biofuel industry, compelling local companies to adapt quickly to meet the RED III requirements, which mandate a threefold increase in biofuel usage by 2030 relative to 2020 levels.

Previously, the intense competition for feedstocks led to rising prices as producers scrambled to meet biofuel targets, only for prices to fall with the influx of cheaper Chinese biofuels. By limiting these imports, the EU aims to reinforce its biofuel industry and establish a foundation for sustainable, long-term projects.

In response to the import gap left by restricted Chinese supplies, EU producers will likely prioritize the growth of biodiesel and HVO production using advanced, sustainable feedstocks. The EU's biofuel sector now has an opportunity to expand as competition from low-cost imports decreases, allowing European producers to boost local biodiesel and HVO production to offset the import drop. This shift supports enhanced energy security and reduces dependency on external sources. Additionally, to meet the EU's RED III biofuel targets, producers may focus on using advanced, sustainable feedstocks for biodiesel and HVO production. This approach aligns with the EU's commitment to low-carbon solutions, especially in sectors like heavy transport, where electrification remains challenging.

On the other hand, in the short term, countries may struggle to meet renewable targets without affordable Chinese biofuels. Additionally, the tariffs might not be enough to stimulate sufficient growth in EU biofuel production, possibly resulting in a future shortfall in biofuels, which could then lead to increased emissions from the transport sector.

Ban on ICE: delay will affect EV penetration and lift ETS 2 emissions

The European Union's ambitious 2035 ban on new internal combustion engine (ICE) vehicle sales is central to its "Fit for 55" initiative, aiming for zero-emission transportation. Yet, some industry leaders, like BMW's CEO, have argued that the timeline is "unrealistic" without significant upgrades in charging infrastructure and incentives to make EVs accessible. Automakers such as Volkswagen and Renault argue that, without adequate infrastructure and market conditions, consumers might not be ready to fully adopt EVs by 2035, which could pressure policymakers to reconsider or modify the deadline. As these dynamics play out, a review scheduled for 2026 will assess the feasibility of meeting the 2035 target, potentially opening the door for adjustments if progress falls short.

Should the ban be postponed, it would likely result in higher demand for EU ETS 2 emissions allowances, as ICE vehicles would remain on the roads longer, keeping emissions elevated.

In a recent statement to the European Commission, Wopke Hoekstra, Commissioner-designate for Climate Action, outlined his approach to the EU's ambitious 2035 ban on internal combustion engines. Hoekstra reaffirmed his commitment to the ICE ban, while highlighting a practical, technology-neutral path to achieving it. Hoekstra plans a 2026 review to assess the feasibility of the transition, ensuring that the policy can adapt to real-world challenges while keeping the 2035 goal intact. This flexibility, particularly around the inclusion of e-fuels, could ease the transition for certain means of transport. Understanding the potential financial impact on lower-income groups and specific industries, Hoekstra advocates for support measures from the Social Climate Fund. This fund aims to offset the costs of transitioning to greener alternatives, helping to protect vulnerable groups and maintaining public support for the ban.

In addition to the EU's 2035 ICE ban, several European countries have set even more ambitious targets for phasing out internal combustion engine vehicles, reinforcing the region's leadership in climate action. Norway, which already has nearly 90% EV sales out of total car sales, is leading with the earliest goal, aiming to end sales of new ICE vehicles by 2025. This makes it the first country with a near-total transition to electric vehicles. The Netherlands, where EV sales currently account

for 43% of total car sales, and Denmark, with 46% EV sales, both plan to phase out new ICE car sales by 2030. The United Kingdom has also advanced its timeline, targeting 2030 for the end of petrol and diesel car sales, with hybrids allowed only until 2035. Ireland has committed to banning the sale of new ICE vehicles by 2030 as part of its Climate Action Plan.

Tariffs and trade policies related to transport

The European Union is advancing toward a significant shift in its automotive sector, moving away from internal combustion engine vehicles in favor of electric vehicles by 2035. However, this transition brings complex challenges, including high production costs and intensified global competition, that affect the EU's EV ambitions.

While some EU production facilities have adapted to manufacture EVs, most are still oriented towards ICE vehicles. One of the EU's main hurdles is the high cost of EV battery production. Batteries made within the EU are significantly more expensive than those produced in regions like China, with production costs in Europe about 50% higher. This price gap has opened the market to Chinese imports, which now make up nearly 20% of EV sales in the EU. As a result, European automakers are increasingly competing with lower-priced Chinese EVs, which are attractive to EU consumers seeking affordable options.

To reduce dependency on imports, the EU has focused on building a domestic lithium-ion battery industry since 2017. EU production increased sharply from 2 GWh in 2019 to more than 60 GWh by 2023, with plans for an additional 500 GWh by 2030.

Despite these gains, the industry is experiencing a slowdown, with leading European battery producers, such as NorthVolt, delaying expansion plans and announcing job cuts. Likewise, the Chinese battery manufacturer SVOLT recently withdrew its planned investment in Germany, and Umicore, Europe's largest cathode materials producer, anticipates low profitability due to reduced demand. On top of that, car sales in Europe remain about 20% below their pre-pandemic peak, putting car manufacturers under financial strain. Major companies like Volkswagen AG are planning to close at least three factories to cut costs, which may further reduce potential car output in Europe.

These challenges are reflected in a 5.8% decline in battery electric vehicle sales between January and September 2023. Germany, one of the largest EV markets, saw the steepest drop, with a 28.6% reduction year-on-year, which impacts the EU's overall EV outlook.

It is also worth mentioning that the U.S. Inflation Reduction Act has pulled battery manufacturing investments toward the U.S., adding pressure on the EU to enhance its competitive edge. For example, Volkswagen has put on hold its plans for a battery factory in Eastern Europe, which was anticipated to be the next facility in the area and is instead focusing on establishing a plant in North America. As a result, China is set to build 160 more gigafactories by the decade's end, while Europe plans to add only 36.

In response to concerns over lower-cost imports, the European Commission is introducing new import tariffs in 2024, building on the current 10% tariff for non-EU car imports. The goal is to lessen the cost advantage of Chinese EVs and encourage European sales of locally-produced models. However, these tariffs also affect international automakers with EV production in China.

The table of tariffs:

Companies	Additional Tariff
Tesla	7.8%
BYD	17%
Geely	18.8%
SAIC	35.3%
Other cooperating companies	20.7%

Although these measures aim to protect the EU's automotive sector, they bring mixed outcomes. In the short term, tariffs could delay some Chinese brands from establishing a presence in the EU market. Over time, however, Chinese automakers might respond by setting up production within the EU to prevent these costs. Yet, for EU consumers, these tariffs will increase EV prices, potentially decreasing the number of EVs on the road.

Additionally, the EU is planning to review the applicability of CBAM (Carbon Border Adjustment Mechanism). If indeed CBAM will be imposed on finished products as well, this will de-incentivize even more foreign EV brands to enter the market. Consequently, it will also be a bullish driver at least in the short term.

With Chinese brands like BYD targeting substantial market shares by 2030, competition will only grow more intense. The EU's protective steps aim to strengthen its industry but could also strain efforts to keep EV prices affordable and improve competitiveness in the long term. As a result, European and international automakers are accelerating their transition to EVs in Europe. By 2026, Ford aims to make its entire European lineup either electric or hybrid, with a goal to go fully electric by 2030. The company is investing substantially in new EV models and building battery production facilities across the EU. Nissan aims for full electrification of its European fleet by 2030, Nissan is refining its flagship EV models to align with European consumer preferences. Alfa Romeo is committed to a rapid electrification timeline, Alfa Romeo plans to sell only electric models in Europe by 2025, with full electrification of its lineup by 2027. Vauxhall (Opel) plans to offer electric versions of all its models by 2024, aiming for a full transition to EVs by 2035. Alongside these automakers, German parts supplier Schaeffler AG is adjusting to the EV transition with planned cuts of 4,700 jobs across Europe, aiming to save EUR 290 million annually by 2029. Despite these cuts, Schaeffler is expanding in the EV market through its EUR 3.6 billion acquisition of Vitesco Technologies, a leader in EV components.

Additionally, trade dynamics between China and the EU may further impact the market. China has filed a complaint with the WTO over EU tariffs on Chinese EV imports, arguing that these tariffs violate fair trade rules. If China's complaint succeeds, it could lead to an increase in cheap Chinese EVs in Europe, accelerating the transition to electric mobility.

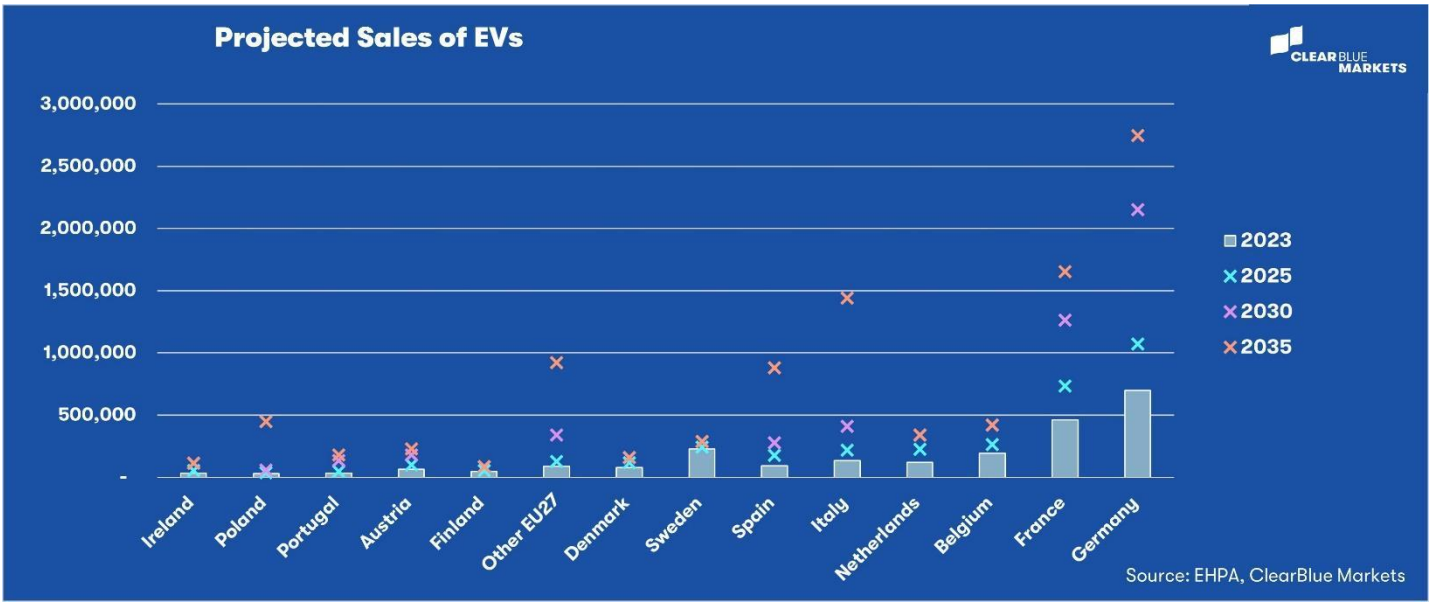
Incentives in EV deployment:

The sales decline is partly due to Germany's sudden cut in EV purchase subsidies. The government decided to end the environmental bonus program ahead of schedule. This change followed a court ruling that withdrew EUR 60 billion from the Climate Fund, reducing 2024 subsidy funds.

While all EU member states offer some form of tax benefit for EVs, significant disparities and fragmentation exist among these schemes. Furthermore, five EU countries still lack direct purchase incentives. Countries like Bulgaria, Denmark, Slovakia, Finland and Latvia only offer tax benefits.

While Germany's EV market experienced a sharp decline in sales after subsidy cuts, other countries have opted to reduce or end subsidies as a strategic response to market maturity. In Sweden, for instance, EV subsidies were removed because electric vehicle prices have become more competitive, and EVs now make up nearly half of the market. The government saw this as an indicator that subsidies were no longer essential to maintain growth. France, however, is taking a dual approach in its 2025 budget proposal. On the one hand, it is scaling back EV purchase incentives, arguing that advancements in battery technology and reduced vehicle prices have made EVs more accessible without heavy government aid. On the other, France is tightening regulations with additional penalties on higher-emission vehicles: starting with a threshold of 5g CO_2/km in 2025, which will lower to 7g CO_2/km in 2026 and 2027.

Countries that also offer substantial EV incentives include Austria, Hungary and Italy, where purchase bonuses vary from EUR 5,000 to EUR 13,750.



EV sales across Europe are expected to surge, with Germany, France, Italy, and Spain leading the growth. Germany's EV sales are projected to rise from around 524,000 units in 2023 to over 2.7 million by 2035, and France's from 329,000 units in 2023 to about 1.65 million by 2035. Italy and Spain will also see major increases. In contrast, Finland, Denmark, and Sweden are expected to experience more moderate growth, as EVs already make up 40% to 50% of total car sales in these countries. After 2030, EV sales growth is likely to accelerate as the ICE vehicle ban approaches. We expect nearly 40 million EVs on European roads by 2030, doubling to 80 million by 2035.

The European Commission has set a target of installing 3.5 million EV charging points across the European Union by 2030. This objective is part of the EU's broader strategy to reduce CO_2 emissions from passenger cars by 55% by 2030, as outlined in the "Fit for 55" legislative package.

The European Automobile Manufacturers' Association (ACEA) estimates that to accommodate the anticipated growth in EV adoption, approximately 8.8 million public charging points will be necessary by 2030. Meeting this higher demand would require the installation of about 1.2 million chargers per year, or roughly 22,438 per week, which is eight times the current installation rate.

Impacts from Buildings' sector's policies

Similar to the policies in the road transport sector, the overlapping policies to drive up energy efficiency in buildings would also affect emissions and resulting allowance demand from regulated entities in ETS 2. The key factor here is the update of heat pumps, which also faces an uncertain outlook depending on support schemes and policies.

The European Union stands as a global leader in the heat pump industry, holding the third-largest manufacturing capacity worldwide, representing approximately 20% of the global total, and the third-largest base of installed systems, about 15% globally. Heat pumps have become the standard choice for heating in new buildings that are not connected to district heating systems, especially in regions where they offer a cost-effective alternative to fossil fuels. Until 2019, the EU exported more air-to-water heat pumps than it imported, with limited imports mainly from China and Southeast Asia. However, recent years have seen imports from these regions increase significantly, making the EU a net importer of heat pumps. In 2023, approximately two-thirds of all heat pumps installed in Europe were manufactured domestically. The shift comes from demand, which outpaced the growth in European manufacturing capacity. Heat pump sales doubled between 2019 and 2023, driven by high gas prices after Russia's invasion of Ukraine and the broader transition from natural gas heating.

Chinese manufacturers, producing at roughly half the cost of European manufacturers, have met much of this rising demand, adding competitive pressure to the European market. In response, some EU countries are beginning to implement measures to prioritize quality standards for imports and support locally produced heat pumps. Poland, for example, restricts its Clean Air Programme subsidies to heat pumps certified in Europe, aiming to maintain standards and encourage domestic production. If low-cost Chinese heat pumps gain a larger market share in the EU, this could challenge European manufacturers. In response, the EU might consider imposing tariffs on Chinese heat pumps, similar to the recent tariffs on electric vehicles. However, any tariffs could reduce the total number of heat pumps available in the EU, potentially increasing emissions from buildings.

Owing to rising installation rates, soaring natural gas prices, and favorable market conditions, since 2021 many new heat pump manufacturing facilities have been announced in the EU. Over the past three years, investment commitments for new heat pump factories have exceeded EUR 3 billion, with an additional EUR 4 billion allocated for component manufacturing and R&D programs. If these expansions proceed as planned, the EU's heat pump manufacturing capacity could more than double by 2030, supporting the REPowerEU plan and Green Deal targets to install 10 million additional heat pumps by 2027 and at least 30 million by 2030. This growth also aligns with the Energy Performance of Buildings Directive (EPBD) target for all new buildings to be Zero Emissions Buildings by 2030, with existing buildings meeting this standard by 2050.

Nevertheless, heat pump sales slowed in 2023, and in the first half of 2024, sales dropped by 47% compared to the same period last year. This decline is attributed to limited supportive policies, inflation, and lower gas prices. Manufacturers announced nearly 3000 job cuts in 2023. With current annual sales at 3 million units, about 45 million heat pumps would be in operation by 2030, falling 25% short of the EU's decarbonization target of 58 million heat pumps. This shortfall is equivalent to missing five years of sales at current rates, potentially leading to about 70 million tons of CO_2 emissions. Political uncertainty further threatens EUR 7 billion in planned investments for the sector from 2022 to 2025.

In response, the European Commission is developing a Heat Pump Action Plan. However, the Commission postponed the Action Plan's release, initially planned for early 2024, to after the EU elections in June 2024. Although 15 Member States requested its publication in May 2024, no release has occurred to date.

Incentives for the Building sector

In October, the European Commission released its first guidance document to help EU member states implement the updated EPBD into national legislation. A key aspect of this guidance is the requirement in Article 17 (15), which mandates that starting January 1, 2025, no financial incentives should support the installation of new stand-alone boilers powered by fossil fuels. This means that grants, preferential loans, or tax breaks cannot be applied to boilers fueled by natural gas, oil, or coal, whether part of a renovation or a new installation. Public funding from national, regional, or local authorities is also prohibited for purchasing or installing such boilers. The directive aligns with the EU's objective of phasing out fossil fuel boilers entirely by 2040. The guidance also outlines acceptable incentives, allowing hybrid systems that combine a boiler with renewable energy sources to qualify if the renewable share is substantial, while also promoting incentives for heat pump adoption.

France, currently leading in heat pump installations, provides significant incentives through its 'Subsidies for Residential Heat Pumps in Europe' program. French property owners can receive up to EUR 15,000 for a ground source heat pump and EUR 9,000 for an air source heat pump in existing properties. In 2022, this program helped drive the installation of over 620,000 units. In September 2023, the French Minister for Ecological Transition announced plans to further increase subsidies, allowing low-income families to buy heat pumps at costs comparable to gas boilers. The French government also aims to develop a domestic heat pump industry with a target production capacity of one million units per year. The government plans to use the green industry tax credit, totaling around EUR 246 million. Germany also offers substantial incentives, as of January 1, 2024, subsidies allow property owners to receive up to EUR 21,000 per installation. The German government reports a marked rise in interest, with nearly 350,000 funding applications received in 2022. In Spain, households can receive up to EUR 3,000 for air-source heat pumps, covering 40% of the installation cost, while grants of up to EUR 13,500 are available for ground-source systems. Spain's subsidy program will run until 2026. Other EU countries provide various levels of financial support:

The German Bundestag passed a revised heating law aimed at reducing CO_2 emissions, originally set to ban new gas and oil boilers by 2024 in favor of renewable-powered systems. The plan, led by Green Party minister Robert Habeck, faced

strong public and political backlash. To gain approval, the law was amended to allow more time, subsidies, and exemptions for low-income and elderly citizens, and shifted responsibility to municipalities for implementing renewable heating plans. Despite the changes, Habeck defended the law, although, his ministry admitted that the watered-down version means the building sector is likely to miss its 2030 emissions reduction targets.

In Italy, heat pump sales have seen a significant decline in 2024, mainly attributed to the reduction of government incentives and the decrease in the price of natural gas. In the first six months of 2024, sales decreased by 47% compared to the same period in 2023, going from 1.44 million to 765,000 units sold, mostly due to the end of the Superbonus 110%. Although Ecobonus remains available, offering tax deductions of 50% to 65% for high-efficiency heat pumps, the lack of subsidies has made these incentives less accessible for some consumers.

Heat pump installations across Europe are anticipated to expand rapidly, with France, Italy, Germany, Spain, and Sweden driving the growth. France's heat pump stock is expected to grow from around 6 million units in 2023 to over 16 million by 2035, while Italy's stock is projected to increase from 4.1 million units to approximately 10.6 million. Germany and Spain are also set for considerable growth, with Germany projected to reach nearly 9 million units and Spain around 7 million units by 2035. In contrast, Finland, Denmark, and Austria are expected to see more moderate growth as they already have a high adoption rate of heat pumps relative to their population size.

After 2025, heat pump growth is likely to accelerate as EU policies come into effect. The Heat Pump Action Plan and the gradual removal of subsidies for fossil boilers are expected to bolster demand. By 2030, the total heat pump stock in the EU is projected to reach 50 million units, nearly doubling to 80 million by 2035.

However, while the projected expansion signals strong policy momentum, practical limitations, particularly related to building readiness and affordability, pose significant challenges to widespread adoption

Heat pumps operate most efficiently in well-insulated buildings. Poor insulation can lead to increased energy consumption and reduced system performance. A study by the European Insulation Manufacturers Association (EUMEPS) highlights that inadequate insulation not only hampers heat pump efficiency but also escalates operational costs, making the technology less accessible to economically disadvantaged groups.[2]

Furthermore, the Buildings Performance Institute Europe (BPIE) introduced the Heat Pump Readiness Indicator (HPRI) to assess a building's suitability for heat pump installation. Their findings indicate that a significant portion of the EU building stock lacks the necessary insulation and infrastructure, thereby limiting the feasibility of heat pump adoption in these structures.[3]

The upfront costs associated with heat pump installation, coupled with the expenses for necessary insulation upgrades, can be prohibitive. The European Heat Pump Association (EHPA) notes that despite the long-term cost savings, the initial investment remains a significant barrier, particularly for low-income households. For heat pumps to be economically competitive, electricity prices should ideally be no more than twice the price of gas.

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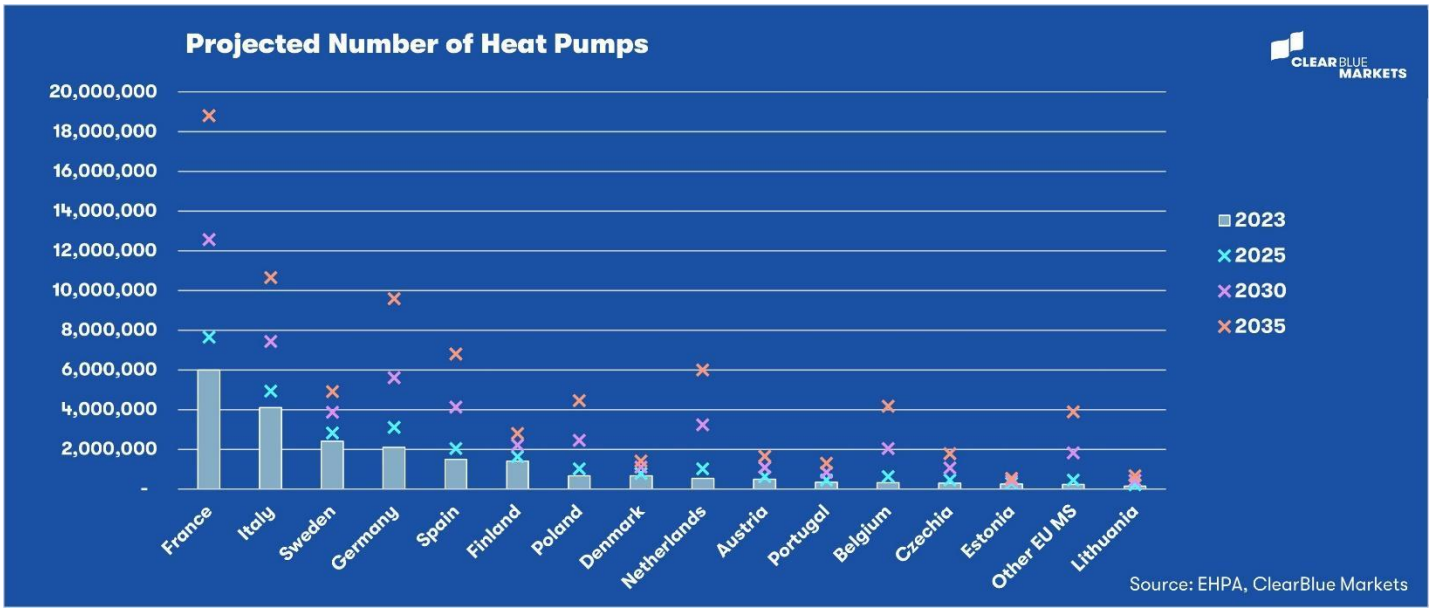
[2] https://eumeps.eu/images/newsroom/publications/Studies/Insulation_and_heat_pumps/2023_FIW_Thermal_insulation_and_Heat_Pumps_ENG.pdf

[3] https://www.bpie.eu/wp-content/uploads/2023/04/Full-report_Introducing-the-heat-pump-readiness-indicator.pdf



Regulatory Update: delay in member states' adoption

Croatia

As of early 2023, Croatia had fewer than 6,000 battery-electric vehicles, accounting for just 0.33% of the national car fleet. Projections suggest this number could grow to approximately 35,000 by 2030, assuming current growth trends and improved incentives. Despite this anticipated increase, Croatia's share of electric vehicles remains modest in the EU context. By 2035, however, all new vehicle sales in the EU are mandated to be zero-emission.

In terms of residential heating, Croatia still heavily relies on wood and gas. The adoption of heat pumps remains limited but is expected to grow due to generous government subsidies covering 40-80% of installation costs (up to EUR 6,500). These incentives, financed through the Environmental Protection Fund, are encouraging households to replace outdated heating systems with efficient heat pumps. While no specific 2030 unit target has been released, heat pumps are expected to play a significant role in renewable heating by that time, though Croatia will likely fall below the EU average in terms of penetration.

Road Transport

National stakeholders have organized workshops to prepare fuel suppliers for ETS 2 compliance. The government's Green Transition Plan (2025-2030) allocates EUR 53 million in 2025 alone for alternative-fuel vehicles and charging infrastructure. While Croatia has expressed concern about ETS 2's timing, alongside other Central European nations advocating for a delay until 2030, it will proceed with implementation as scheduled. Additional measures, such as reduced VAT on fuel and EV subsidies, aim to mitigate the impact of rising fuel prices.

EU Buildings Sector

Currently, natural gas dominates urban heating, while firewood is prevalent in rural areas. The government is investing EUR 2.3 billion by 2030 to renovate buildings and improve energy efficiency, aiming to transition to high-efficiency or net-zero structures.

The expanded "Green Homes" program offers subsidies, up to EUR 9,240 per household, for heat pump and solar water heater installations. Funded by the EU Recovery and Resilience Facility, these grants are designed to assist homeowners in transitioning away from fossil fuels ahead of ETS 2 enforcement. District heating systems, particularly in cities like Zagreb,

will also be upgraded to incorporate renewables and heat pumps. As a result, we expect Croatia to install up to 50,000 Heat Pumps by 2030.

Impacts on Low-Income Groups

Low-income households are particularly vulnerable to the effects of ETS 2. Over 60% of Croatian households at risk of poverty rely on firewood, which, although not priced under ETS 2, underscores their limited access to modern heating. Those using fossil fuels like LPG or coal may experience significant cost increases.

In response, the Croatian government has earmarked EUR 25 million in 2024 for energy upgrades targeting vulnerable households. These include insulation and heat pump installations. Further relief is planned via the EU Social Climate Fund starting in 2026, which will finance additional support such as retrofit grants or energy vouchers. To support mobility among low-income citizens, many of whom rely on older vehicles, the government continues to offer fuel tax discounts and incentives for used EVs. Potential future measures include direct cash transfers or higher minimum income benefits to buffer ETS 2's regressive impacts.

Effects on Social Services

Social service institutions such as hospitals, schools, and care homes, often housed in older, gas-heated buildings, will face increased operational costs due to ETS 2. To address this, Croatia is investing EU funds in retrofitting public buildings with modern heating systems. Many schools, especially in Zagreb, are scheduled to replace gas boilers with heat pumps by the late 2020s.

In the interim, the government may shield essential services from energy price shocks through temporary VAT reductions or emergency financial aid. Notably, the Croatian government has proposed an extension of the reduced 5% VAT 4 rate on energy sources such as natural gas, firewood, pellets, briquettes, wood chips, and district heating until the end of March 2026. This measure, currently under parliamentary consideration, is part of a broader initiative to ensure energy affordability for citizens and essential public services during the implementation of ETS 2. According to Finance Minister Marko Primorac, the goal is to protect households and mitigate the financial burden associated with rising energy prices. The government estimates that the continuation of this reduced VAT rate will lead to a revenue shortfall of approximately EUR 53 million annually.

Urban-Rural Impact Differences

ETS 2's effects will vary geographically. Urban residents, especially in cities like Zagreb and Split, are better positioned to adapt due to access to district heating, electric buses, and public infrastructure. Conversely, rural areas face more significant challenges. With limited public transport, rural populations are more dependent on private vehicles and fossil heating fuels like LPG or heating oil.

Recognizing this disparity, the government has tailored some incentives specifically for rural areas, including higher subsidies (up to 80%) for heat pump installations in underdeveloped regions. The national EV charging network is also expanding into rural highways and towns. Despite these efforts, urban areas are expected to benefit more from the clean energy transition by 2030. To counteract growing regional disparities, Croatia plans to utilise the Social Climate Fund to finance rural community heating projects and subsidised transport systems.[5]

Czech Republic

Heat Pump & EV Rollout
The Czech Republic is significantly expanding its adoption of electric vehicles and heat pumps as part of its 2030 climate strategy. The government's updated Clean Mobility Plan targets 500,000 EVs and approximately 1,200 electric buses on Czech roads by 2030, a substantial increase from around 27,000 EVs in 2021. Industry projections indicate that over 50% of new car sales in Czechia will be electric shortly after 2030, in line with the EU's mandated 2035 phase-out of combustion engine vehicles.

[4] https://www.sabor.hr/en/press/news/parliament-discuss-extension-reduced-vat-rate-heating
[5] https://mingo.gov.hr/UserDocsImages/UPRAVA%20ZA%20ENERGETIKU/NECP_Update%20_CRO_EN_Revised.pdf

In parallel, the country is accelerating the shift from coal and gas boilers to heat pumps. After years of stagnation, installations have surged due to subsidy programs. The Czech Renewable Energy Chamber forecasts that more than one million heat pumps could be installed by 2030, a dramatic rise from roughly 40,000 units in 2020. This transformation is largely driven by the ongoing phase-out of outdated coal furnaces and enhanced incentives under the Kotlíkové dotace subsidy scheme. Official projections expect heat pumps to provide over one-third of residential heating by 2030. By 2035, further reductions in gas boiler usage are anticipated, in response to tighter EU building efficiency regulations.

By 2030, EVs are projected to represent 15-20% of the Czech vehicle fleet, and heat pumps are expected to be installed in approximately one in four homes, compared to negligible levels a decade earlier. These transitions are critical for reducing emissions and decreasing dependence on imported fossil fuels.

Road Transport
The ETS 2 has prompted significant policy responses in Czechia. In late 2024, Prime Minister Petr Fiala announced the government would advocate for at least a one-year delay of ETS 2 due to concerns over fuel price increases. While the outcome depends on EU consensus, Czechia is preparing mitigation strategies, including a potential reduction in fuel excise duties if ETS 2 significantly raises pump prices.

The government has expanded its Čistá doprava (Clean Transport) program, offering grants to municipalities and businesses for EV purchases and charging infrastructure. In anticipation of higher driving costs under ETS 2, Czechia is also investing over CZK 3 billion from its Recovery Plan into modernizing rail and bus fleets, including the procurement of electric trains and battery buses. The highway toll system may also be restructured to reflect emissions-based pricing in line with the "polluter pays" principle. These combined efforts aim to reduce transport-related CO_2 emissions by up to 50% by 2030 vs 2020 levels.

Buildings
Czech households still heavily rely on gas and coal. To change it, the Czech government has reinforced its building decarbonization policies accordingly.

The Kotlíkové dotace program (2014-2024) supported the replacement of old coal boilers, especially in low-income and senior households. In its final phase, it offered grants up to CZK 180,000 (~EUR 7,500) for switching to heat pumps or clean biomass systems. This amount covered the full cost of heating system replacement for eligible applicants, but did not include broader energy efficiency measures like insulation. Broader building efficiency measures, such as thermal insulation, window replacement, or other envelope improvements are instead supported under separate schemes, notably the Nová zelená úsporám (New Green Savings) program. The Czech Republic has not yet published its official Social Climate Plan. However, the European Commission mandates that all Member States, including Czechia, submit their Social Climate Plans by June 2025. These plans will detail how each country intends to utilize SCF resources to support vulnerable households and micro-enterprises, particularly in the context of the ETS 2 implementation.

Historically, Czechia has allocated revenues from the existing EU ETS 1 to the Nová zelená úsporám program. [6] Given this precedent, it is reasonable to anticipate that Czechia may continue to channel funds from the SCF and ETS 2 revenues into the New Green Savings program post-2026. However, until the official Social Climate Plan is released, this remains uncertain.

Building standards have also tightened: since 2023, all new buildings must meet near-zero energy standards. For existing buildings, the government is considering mandatory boiler efficiency inspections and a potential coal heating ban by 2030.

Roughly one-third of the Czech population lives in rural households. They often reside in detached homes with individual coal or gas boilers, which are directly targeted by ETS 2. To ease the transition, the government launched the Oprav dům po babičce (“Renovate Grandma’s House”) program in 2023, offering up to 95% subsidies for home energy renovations in rural areas.

Impacts on Low-Income Groups

[6] https://www.raponline.org/wp-content/uploads/2023/09/rap-sunderland-czech-policy-brief-2019-sept-final.pdf

Low-income households are especially vulnerable to ETS 2-driven energy cost increases. Although the national "energy poverty" rate was low in 2022 (approximately 3%), regional disparities remain, particularly in areas like Ústí nad Labem, where lignite heating persists.

To address this, the final round of Kotlíkové dotace was targeted exclusively at low-income households, resulting in thousands of free heat pump installations between 2022 and 2024. Additionally, interest-free eco-loans with potential forgiveness are available to help finance insulation and energy-efficient systems.

In transport, low-income Czechs are less likely to own cars, and those who do often drive older, inefficient vehicles. Public transport is heavily subsidized and, in some cities, free for seniors and students, providing a buffer against rising fuel costs. The government also plans to use part of the estimated EUR 1.5 billion Social Climate Fund allocation for direct aid, including increases to housing allowances or a new "climate bonus."

To prevent disconnection, regulators are considering expanding the "protected customer" category, shielding vulnerable users from service shutoffs due to unpaid energy bills.

Effects on Social Services
Public institutions such as schools, hospitals, and nursing homes typically occupy older buildings that are expensive to heat. Without intervention, ETS 2 could strain local budgets. Czechia is proactively renovating these facilities through its National Recovery Plan, including investments in insulation, solar installations, and heating system upgrades.

By 2025, hundreds of public buildings will be fitted with heat pumps or biomass boilers via programs like OP Environment. Large institutions, such as hospitals, are being integrated into modernized district heating networks. For example, Brno's hospitals will source energy from a new waste-to-energy plant, avoiding ETS 2-related costs on gas.

The government allocated CZK 14 billion to compensate regional authorities for energy cost surges in 2022-2023, and may repeat such measures if ETS 2 causes similar financial pressures. Public transport fleets are also being modernized, with cities like Prague targeting a fully electric bus system by 2030.

The Czech government has proposed delaying the implementation of ETS 2 until at least 2028 to mitigate its potential financial impact on essential public services such as schools, hospitals, and social institutions[7]. Prime Minister Petr Fiala stated in December 2024 that the aim is to ensure climate goals do not come at the expense of economic stability. He emphasized that Czechia will seek consensus within the EU to postpone ETS 2, allowing more time for energy prices to stabilize and for national protective measures to be put in place.

Estonia

Heat Pump & EV Rollout
Estonia has set ambitious electrification goals. By 2030, experts predict around 100,000 electric cars on the road, up from just a few thousand today, meaning EVs could form 10-15% of the vehicle fleet. The government aims for 50% of new car sales to be electric by 2030 and nearly 100% by 2035, aligning with EU regulations. To support this shift, Estonia plans to deploy 60,000 public and private charging stations by 2030, including coverage for remote areas.

In heating, Estonia already uses renewables extensively, about half of all heating comes from biomass, both in district systems and individual stoves. The remainder mostly relies on fossil gas or oil shale-based electricity. The country is pushing heat pumps to replace direct electric heating and legacy fossil systems. By 2022, over 80,000 air-source heat pumps had been installed in private homes, and this number is expected to double. The National Climate Plan anticipates an additional 900 GWh of heat from heat pumps by 2030. Many households are upgrading from resistive heaters, and large-scale heat pump projects (e.g., Tallinn's 33 MW plant) are being added to district heating. By 2035, most buildings could be heated using biomass, heat pumps, and electric boilers, eliminating oil heating altogether.

Road Transport

[7] https://www.euractiv.com/section/politics/news/czechia-wants-to-delay-ets-2-until-at-least-2028/

Estonia supports EU climate initiatives and is preparing for ETS 2 on transport fuels. The country already has a carbon tax as part of its eco-tax system, so EU-wide pricing aligns well with existing policy.

In addition to the 60,000 EV charger target, the government also provides EV subsidies of up to EUR 4,000. Public transit improvements are also underway, Tallinn offers free city-wide transit (since 2013), and other municipalities are lowering fares.

Buildings
ETS 2 will primarily affect homes using natural gas, LPG, or light fuel oil. Estonia is already phasing these out, its "Kuristikuta" initiative aims to eliminate oil heating by 2030 and significantly reduce gas reliance. Grants of up to EUR 15,000 are available for replacing fossil boilers with heat pumps or biomass systems. During the 2022 energy crisis, these grants were highly popular.

Estonia also has a high share of direct electric heating, especially in newer apartments and older rural homes. Subsidies for heat pumps are tied to energy efficiency upgrades (e.g., insulation requirements), ensuring overall system performance.

District heating networks are being pushed to shift fully to renewables. Many already use wood chips or peat; those still using natural gas (e.g., in Tartu) are being nudged toward solar thermal or large heat pumps. Estonia's strategy is clear: electrify heating, expand renewables, and minimize exposure to fossil-based carbon costs.

Impacts on Low-Income Groups
Energy poverty is a concern, especially as over 60% of at-risk households heat with untaxed firewood, the fallback for those who can't afford alternatives. While firewood won't be priced under ETS 2, any general energy price increase could affect these groups (e.g., through rising wood demand). Estonia aims for targeted protections for low-income households. Already during the 2022 energy crisis, Estonia introduced fixed-price electricity schemes to stabilize energy costs for households and small enterprises, providing protection against volatile market conditions.[8] In March 2025, the Estonian Parliament authorized the Ministry of Climate to engage with the European Commission and other EU member states to advocate for the repeal or postponement of ETS 2[9]. This decision comes from concerns about the administrative burden and potential financial impact on vulnerable populations. If repeal is not feasible, Estonia aims to delay implementation until at least 2028 or seek to exclude road transport from the system's scope.

Means-tested winter heating allowances are already in place and may be boosted with ETS 2 revenue. The Social Climate Fund will also help: low-income households won't be expected to pay carbon prices, they'll receive heat pumps or district heating access. During the 2022 crisis, the government covered up to 80% of excessive energy bills, a model that could return if ETS 2 sparks similar spikes.

Car ownership is low among the poorest, especially in cities like Tallinn, where free transit is widely used. In rural areas where car use is essential, Estonia is piloting EV car-sharing and exploring subsidies for e-bikes or compact EVs. Pensioners, often low-income, are another focus group, many received energy aid in 2022, and that precedent will continue.

Effects on Social Services (Public Institutions)
Social services, schools, hospitals, care homes are mostly municipally managed but have benefited from EU-funded retrofits. Many schools now use modern heating systems. Between 2014 and 2020, Estonia funded 82 projects aimed at converting heating systems in apartment buildings and schools to renewable energy sources, including heat pumps[10]. ETS 2 will pressure those still relying on fossil fuels to switch.

A major flagship is the new Tartu University Hospital, being built to passive-house standards with geothermal heat. Existing hospitals in Tallinn and Ida-Virumaa will be connected to new geothermal district systems. The state has also invested CO_2 revenue into a Municipal Building Renovation Fund, supporting low-carbon upgrades across public buildings.

[8] https://economy-finance.ec.europa.eu/system/files/2023-06/ip230_en.pdf
[9] https://www.argusmedia.com/en/news-and-insights/latest-market-news/2670874-estonian-climate-ministry-to-push-for-eu-ets-2-repeal
[10] https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-estonia.pdf

Urban vs. Rural Impact Differences
Urban Estonia, mainly Tallinn, Tartu, and Pärnu, is relatively well-prepared. District heating is common (e.g., Tallinn serves 60% of residences) and increasingly renewable. Shorter travel distances, free transit, and better incomes make the transition easier. EU-funded upgrades (e.g., for Soviet-era apartment blocks) support rapid heat pump and EV charger adoption.

Rural Estonia faces more challenges. Villages often lack gas infrastructure, relying on wood or oil. Residents typically drive longer distances, and average incomes are lower. Recognising these differences, the government has offered enhanced rural heat pump subsidies (up to 50% higher), and EV charging infrastructure is expanding to small villages.

Rural areas may retain legacy systems longer, meaning they use biomass to protect them from upcoming ETS 2 costs. The state is watching closely to avoid increased wood burning harming air quality, modern pellet boilers with filters are being promoted as an interim solution.[11] Under the KredEx subsidy scheme, households can receive up to EUR 8,900 for the purchase and installation of a pellet or firewood boiler, provided it replaces an outdated solid-fuel device.

Romania

Romania currently relies heavily on natural gas and biomass for heating. Romania's draft energy & climate plan envisions heat pumps supplying 25% of heating needs by 2030. A 2024 Energy Policy Group (EPG) study modeled four HP adoption scenarios for Romanian homes by 2030: from a minimal 500,000 units up to an optimistic 1.1 million units installed. For context, even the ambitious 1.1 million scenario would replace a large share of individual gas boilers. The study found upfront costs of EUR 6,000 - EUR 18,000 per HP system for houses. Critically, at current energy prices (with electricity over 4 times more expensive per kWh than gas), running an air-source heat pump can cost more annually than a gas boiler.

Electric Vehicles
In the transport sector, Romania has seen rising EV adoption, supported by generous incentives. The "Rabla Plus" program offers one of Europe's largest EV purchase bonuses (approximately EUR 10,000 per battery EV, though reduced to ~EUR 5,100 in 2023). EV sales have grown quickly: in 2022 Romania registered ~15,000 new electric cars, and in 2023 sales were projected to reach ~19,600 (about 12.7% of all new cars sold). Industry forecasts see this growth continuing; annual EV sales might exceed 50,000 by 2030. Cumulatively, this could mean more than a hundred thousand EVs on Romanian roads by 2030, a major jump from roughly 42,000 battery EVs on the road at end of 2023.
Romanian authorities are also investing in charging infrastructure: the National Recovery Plan funds thousands of charging stations, and officials spoke of installing up to 18,000-20,000 chargers by mid-2020s. Ambitious scenarios indicate that by 2030, electric vehicles might need to comprise around 50% of new car and van sales in Romania to align with EU climate goals. Likewise, all new city buses should ideally be electric by 2030, according to Transport & Environment's analysis for Romania.

Impacts on the Road Transport Sector and Policy Responses
Fuel Price Increases: Starting in 2027, fuel distributors in Romania must buy ETS 2 carbon allowances for the CO_2 from petrol and diesel they sell, likely passing costs onto drivers. The direct impact on pump prices in the initial years is projected to be moderate but notable. At a carbon price of EUR 45, analyses suggest an increase of about EUR 0.10 per liter of gasoline and EUR 0.12 per liter of diesel. Current price of diesel in Romania is around EUR 1.4. A Romanian study by Energy Policy Group likewise found that a 45 EUR price would add ≈ 12 cents. ClearBlue Markets forecasts that the price of ETS 2 allowances will reach EUR 105 by 2030, resulting in an increase of approximately EUR 0.30 per liter in diesel prices, based on 2025 price levels. By 2035, the expected ETS price of EUR 269 could raise diesel prices by around EUR 0.72 per liter.

Road transport is Romania's third-largest source of greenhouse gases, and emissions have grown since 1990 with rising car ownership. Several Romanian cities (Bucharest, Cluj, Timișoara, etc.) have invested in electric public transport, often using EU funds. For example, municipalities have begun procuring electric buses and trams to modernize fleets. Cluj-Napoca has notably introduced dozens of electric buses, aiming for a fully electric public transport network in coming years. Bucharest's city government, albeit facing challenges, has also started adding electric buses and trolleybuses to cut urban pollution. These local initiatives complement national programs like "Rabla Clasic" (which gives vouchers to

[11] https://kredex.ee/et/kutteseadmete-toetus

scrap old, high-polluting cars in exchange for newer ones) and “Rabla Plus” (incentivizing EV purchases), both meant to renew the vehicle fleet. As a result, Romania’s car market is rapidly electrifying - EVs made up about 10% of new car sales in 2023, and targets foresee 30% or more in the mid-2020s. Still, millions of older diesel and gasoline cars will remain on the road through 2030, so fuel affordability and social impact are key concerns.

Policymakers recognize that unmitigated fuel price hikes could face public backlash, so Romania is planning cushioning measures. The EU’s Social Climate Fund is the primary tool to offset ETS 2’s impact on transport and heating fuel prices for vulnerable groups. Romania is set to receive EUR 5-6 billion from the SCF in 2026-2032 for its Social Climate Plan- one of the largest allocations in the EU, reflecting Romania’s sizable population and needs. At least 62.5% of that funding must go into structural measures like building renovations, electric vehicle incentives, public transport improvements, and support for zero-emission mobility, while up to 37.5% can fund temporary income support. This means Romania can channel billions into, for example, subsidizing EVs or e-bikes for low-income users, expanding rural bus services, or cutting the upfront cost of switching from old cars to cleaner models. The draft Romanian Social Climate Plan (due by June 2025) is expected to include such measures.

Buildings Sector
EPG estimates that at EUR 45/t CO_2, a household consuming 100 m³ of gas per month would pay about EUR 8.2 extra per month (roughly 40 RON added to the monthly bill). While EUR 8-10/month may not be dramatic initially, it adds up over a heating season and will increase if carbon prices climb further. Households using heating oil or coal which are less common in Romania would similarly see higher costs. By 2030, carbon costs could exceed 25% of the fuel price for gas heat under a high price scenario (80 EUR /t). Importantly, Romania’s fuel usage differs by income and region - only about 36% of homes are connected to the gas grid, largely in urban areas and among middle-to-higher income groups. Poorer and rural households often heat with firewood or biomass, which is not covered by ETS 2. According to Bucharest-based non-profit, independent think-tank Energy Policy Group (EPG) - “the highest incidence of ETS 2 will be on the minority of households on the gas network, which generally are not the lowest-income”.[12] Many wealthier urban households with gas boilers will face modest cost increases - for these, investing in heat pumps or efficiency becomes more attractive over time. Meanwhile, about 80% of rural households rely on wood for heating. In urban areas, centralized district heating serves parts of cities like Bucharest - these systems, if upgraded to modern combined heat and power or large heat pumps, could provide lower-carbon heat at scale.

Romania’s building stock is old and energy-inefficient - over 90% of residences were built before 1989, and many have minimal insulation. Space heating accounts for the bulk of energy use (around 55% in apartments and up to 80% in detached houses). Consequently, improving building efficiency is a top priority to reduce emissions and shield households from energy cost increases. Romania’s current renovation rate (~0.5% of buildings per year) is very low, but the national goal is to ramp this up to ~3.5% per year by 2030- a sevenfold increase, aligning with EU renovation wave targets. The Long-Term Renovation Strategy and Recovery Plan allocate significant funds for insulation, window replacements, and efficient heating systems in both residential and public buildings.

There is also discussion about phasing out subsidies for gas boilers and instead incentivizing heat pump installations. The Romanian Energy Strategy 2023 emphasizes increasing the share of heat pumps in heating and reducing reliance on natural gas and biomass gradually. By 2030, under the NECP projections, biomass will still dominate residential heating (around 39% share, down from 54% in 2022) but heat pumps will jump to around 25% share, reflecting large-scale adoption of clean electric heating.

Effects on Low- and Middle-Income Groups
There is a strong link between income level and heating source in Romania. Lower-income households (especially in rural areas) predominantly use firewood for heating, often in old stoves. In fact, the poorest deciles are largely rural and rely mainly on wood. This means many low-income families won’t directly pay ETS 2 carbon costs for heating. Middle-income households in cities are more likely to have gas-fired heaters or boilers, making them directly subject to ETS 2’s price on gas. As noted, those using ~100 m³ of gas monthly could see about EUR 8 added to their bill initially- not catastrophic, but non-negligible for a family on a modest income. Many such families are above the threshold for existing heating aid, yet an extra few hundred lei each winter could strain budgets. Higher-income households can generally absorb these costs more easily, and they are also more able to invest in heat pumps, solar panels, or home insulation to reduce future expenses.

[12] https://www.enpg.ro/the-social-climate-plan-in-romania-bridging-climate-energy-and-social-policy/

Poland

Poland is projected to be the largest beneficiary of the EU's Social Climate Fund, receiving an estimated EUR 9.6-11.4 billion (17.6% of the total fund) for 2026-2032, or up to ~EUR 15 billion including required national co-financing.[13] However, Polish authorities have expressed concern about the pace of implementation. In late 2024, the government proposed delaying ETS 2 by 3 years to 2030, citing fears of additional costs on households and a need for more time to mitigate price impacts. Poland's climate ministry argued that households "already hurt by energy costs" should be given more time and support to transition to clean options.

Poland's national climate targets for the non-ETS sectors which include transport and buildings are relatively modest - a 17.7% emissions reduction by 2030 compared to 2005 under the EU Effort Sharing Regulation.[14] Yet even this may be challenging: by 2022 Poland's total non-ETS emissions were only 2% below 2005 levels.

Poland is also planning complementary policies to achieve deeper cuts. For example, Poland's Energy Policy 2040 sets goals to phase out coal heating in cities by 2030, meaning around 3 million houses will need to be renovated by that time. Poland also aims to phase out coal from rural areas by 2040 and replace it with "low-emission sources" or district heating.
Heat Pumps and Electric Vehicles

Poland historically relied on coal and gas for heating, but recent trends show a surge in heat pump adoption. In 2022, Poland became Europe's fastest-growing heat pump market - sales of heat pumps more than doubled (up 120-137% year-on-year) with over 200,000 units sold in 2022.[15] This boom was spurred by high natural gas prices and government incentives, leading many homeowners to seek alternatives.

Policy targets

Poland's Energy Policy 2040 (PEP2040) sets a target to eliminate coal furnaces in cities by 2030 and achieve all heating from "low-emission sources" or district networks by 2040. While an exact heat pump target by 2030 isn't explicitly stated in PEP2040, the strategy implies hundreds of thousands of installations per year are needed. The government's flagship Clean Air program has been subsidizing household boiler replacements and insulation; as of 2023 it had contracted PLN 29 billion (~EUR 6.9 bn) for such upgrades. Even so, heat pumps remain a small fraction of Poland's ~5.5 million residential heating systems - meaning huge growth is still ahead.

By 2030 Poland could see hundreds of thousands of heat pumps installed annually, making electric heating a new norm - a stark change from today, where Poland still accounts for 87% of all coal burned in EU households. To support this electrification shift, the country plans to significantly expand its renewable energy capacity, aiming for 36 GW of solar, 19 GW of onshore wind, and 6 GW of offshore wind by the end of the decade, resulting in 56% of electricity coming from renewables.[16] This expansion is intended to ensure that a growing share of electricity demand can be met with clean, domestically produced energy. Poland is also advancing its nuclear energy program, with plans to construct two nuclear power plants totaling 6–9 GW of capacity by 2040.[17]

Poland today lags in EV adoption. As of January 2025, there were only about 146,000 electric cars on Polish roads, around 74,000 full battery EVs and the rest plug-in hybrids. This is just 0.2% of all passenger cars, the joint-lowest EV share in the EU. The average car in Poland is old (14.5 years on average) and most new registrations are second-hand imports, not new EVs.[18] Recognizing this, PEP2040 set a goal of 600,000 electric/hybrid vehicles by 2030. While that includes hybrids, it indicates a policy push for electromobility. The government has launched subsidy programs: for instance, a new EV purchase incentive was rolled out in Feb 2024, offering up to PLN 40,000 (~ EUR 9,500) per electric car using EU Recovery Fund money. Additionally, Poland is expanding charging infrastructure, just under 9,000 public charge points existed in early 2025.

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[13] https://www.euki.de/wp-content/uploads/2024/03/Country-Report-Poland.pdf
[14] https://www.cleanenergywire.org/factsheets/clew-guide-upcoming-election-will-shape-direction-and-pace-polands-energy-transition
[15] https://www.ehpa.org/news-and-resources/news/port-pc-2022-was-the-year-of-heat-pumps-in-poland
[16] https://www.gov.pl/web/climate/national-energy-and-climate-plan
[17] https://world-nuclear.org/information-library/country-profiles/countries-o-s/poland
[18] https://www.euki.de/wp-content/uploads/2024/03/Country-Report-Poland.pdf

EV outlook

ETS 2 will increase the cost of petrol and diesel, albeit modestly at first. In 2027, a carbon price is expected to translate to about EUR 0.06 per liter of gasoline and EUR 0.08 per liter for diesel. By 2030, this surcharge is projected to roughly double to around EUR 0.12 per liter for petrol and EUR 0.14 per liter for diesel.[19] While this is a noticeable increase, it's important to note that fuel taxes in Poland are already around EUR 0.50-0.60 per liter.

Poland is investing in zero-emission public transport, such as electric buses. The country aims for zero-emission public transit in all major cities by 2030.

Buildings and Heating

The buildings sector in Poland (homes and offices) is a major focus of ETS 2 because heating is still dominated by fossil fuels. Buildings account for about 10.7% of Poland's GHG emissions directly.[20] What stands out is Poland's heavy reliance on solid fuels for heating: millions of households burn coal in boilers and stoves. Natural gas heating has been on the rise, accounting roughly for 25% of all buildings. Notably, until recently Polish households burned 87% of all the coal used for residential heating in the EU.

A fundamental issue is that about two-thirds of buildings in Poland have low energy efficiency.
The government has a Building Renovation Strategy that sets a target of renovating 236,000 buildings per year from 2020 to 2030.

Progress has been made with EU funds and programs like StopSmog targeting poor communities, but the annual renovation rate is still well below the target. The Clean Air program is Poland's largest effort, providing grants for both insulation and replacing heat sources. As of late 2024, however, Clean Air encountered a setback: it was suspended due to irregularities in November 2024 and scheduled to resume in March 2025.

Under ETS 2, the cost of heating fuels will rise. Households using coal for heating are likely to experience the largest percentage cost increases. The Solidarity trade union calculated that an average family heating with coal could pay an extra EUR 220 in 2027 due to ETS 2, and nearly EUR 420 by 2030 in additional costs.[21] Over the period 2027-2035, a coal-heating household might incur a cumulative carbon cost of approximately EUR 2,200 if they do not switch to cleaner heating systems. In contrast, a family heating with natural gas might face around EUR 1,350 in total additional costs during 2027-2035. These are considerable burdens, especially for low-income households (several thousand złoty is a large share of yearly income for many families).

Poland has been subsidizing heat pump installations up to 90% for the poorest households in some cases.[22] This support includes not only the purchase and installation of heat pumps but also insulation upgrades, with maximum grants reaching EUR 18,600 per household.[23] Furthermore, the government has introduced price freezes for fuels during the recent energy crisis.

By 2030, Energy Performance of Buildings Directive will ban the installation of new fossil-fuel boilers and require higher efficiency standards. Though Poland has resisted any outright "gas boiler ban" in the short term.

Energy poverty
Energy costs already take up a larger share of income for poorer households. On average, Polish households spend about 10% of their expenditures on energy (home heating, hot water, electricity).[24] But this burden is very unequal: the

[19] https://www.solidarnosc.org.pl/najwieksze-koszty-sytemu-ETS 2-poniesie-polska/
[20] https://www.cleanenergywire.org/factsheets/clew-guide-upcoming-election-will-shape-direction-and-pace-polands-energy-transition
[21] https://www.solidarnosc.org.pl/najwieksze-koszty-sytemu-ETS 2-poniesie-polska
[22] https://www.iea.org/policies/16518-2022-clean-air-plus-programme-extension
[23] https://www.gov.pl/web/premier/premier-o-programie-czyste-powietrze-jestem-wdzieczny-za-to-jak-polska-staje-sie-ekologiczna
[24]https://www.euki.de/wp-content/uploads/2024/03/Country-Report-Poland.pdf

poorest deciles spend as much as 12-13% of their budget on energy, while the richest decile spends around 7%. This means low-income families are more than twice as vulnerable to energy price increases, since a bigger slice of a smaller income goes to utilities. Crucially, the type of heating fuel correlates with income. Poorer households are far more likely to use cheap but carbon-intensive fuels like coal, often in old inefficient stoves. The share of heating expenses going to coal is for lower-middle class and below. Wealthier households, in contrast, more often use cleaner heat sources - many high-income urban families live in apartments with district heating or have gas boilers, and some have begun installing heat pumps.

Middle-income households are also a concern. The analysis in Poland suggests that "low-income, and to some extent middle-low, households will certainly need direct support" in the first years of ETS 2. For instance, a family with an old gas boiler and average income might not be "poor" by official definition, but an uptick in gas bills due to carbon pricing could strain their budget if they also have other debts or expenses. Thus, the Polish government is considering broad-based support, not just narrowly targeting the absolute poorest.
It's also worth noting a rural dimension here: rural low-income households often have the worst housing conditions (old, uninsulated farmhouses) and lack access to gas grids or district heating, leaving them with coal as default fuels. Many seniors in villages fall into this category (often living alone on small pensions in big old houses).

Transport poverty

Car ownership in Poland also reflects an income divide. Higher-income households tend to own more cars (and newer ones) and drive more kilometers, whereas many low-income households either don't own a car or use one very sparingly because of cost. The statistics show that the share of household spending on motor fuel actually increases with income - near-poor families spend under 4% of their budget on transport fuels, while upper-middle families spend about 6%. This indicates that wealthier households not only have cars, they drive them a lot, consuming more fuel. Paradoxically, this means a carbon price on fuel is progressive in usage - the rich will pay more total carbon cost since they burn more fuel. If petrol becomes more expensive, wealthier drivers will pay more in absolute terms, but they can likely absorb it or switch to an EV over time. Lower-income drivers - those who do own an old car out of necessity - may find it even harder to afford fuel. In extreme cases, some might be priced out of car ownership entirely.

Another challenge comes from source of power in Poland. Electricity prices in Poland are indirectly affected by the original ETS, as about 70% of Poland's electricity is still coming from coal and gas. In 2023, roughly 40% of Poland's power price was attributed to ETS 1 costs passed through.[25] So Polish consumers are already paying "hidden" carbon costs in their electric bills. Adding ETS 2 means they will also pay carbon costs in direct fuel purchases.

Hungary

Heat Pumps & EVs

Hungary's climate strategy anticipates a major scale-up of heat pump installations by 2030. The government's goal is to reach 100,000 installed heat pump systems (around 400 MW capacity) by 2030, up from about 148 MW in 2019.[26]
Electric Vehicle

Hungary has seen accelerating growth in electric vehicles, although from a low base. Between 2012 and 2021, the number of registered EVs climbed from just 107 to nearly 12,000 - still only about 0.5% of the total passenger car fleet by 2021. By 2023 the electric fleet exceeded 45,000 battery-electric cars (a dramatic rise from under 760 in 2016), and by mid-2024 it was approaching 60,000. This growth has been supported by government incentives, such as purchase grants (up to HUF 2.5 million per EV, roughly EUR7,000) and other e-mobility programs.[27]

Impacts on the Buildings Sector and Road Transport

[25] https://www.komputerswiat.pl/artykuly/redakcyjne/podatek-od-ogrzewania-kontrowersyjna-oplata-coraz-blizej-szykuj-sie-na-podwyzki/smv0jsr?utm_source=chatgpt.com_viasg_komputerswiat&utm_medium=referal&utm_campaign=leo_automatic&srcc=undefined&utm_v=2
[26] https://iea.blob.core.windows.net/assets/9f137e48-13e4-4aab-b13a-dcc90adf7e38/Hungary2022.pdf
[27] https://iea.blob.core.windows.net/assets/9f137e48-13e4-4aab-b13a-dcc90adf7e38/Hungary2022.pdf

The building sector will likewise be encompassed by EU ETS 2, bringing household and commercial heating fuels under carbon pricing. Hungary's building stock is currently heavily reliant on natural gas for heating - about 60% of heating demand is met by gas in Hungary - as well as a mix of district heating, electricity, and solid fuels.

Recognizing that millions of homes are energy-inefficient, the government's National Energy and Climate Plan notes that roughly 2.6 million dwellings in Hungary need some level of energy modernization, and it is "justified to promote this with financial incentives."[28] Government policies also acknowledge the need to retrofit public buildings (schools, hospitals, social housing) for efficiency. Many of these facilities operate on tight budgets, and exposure to carbon-priced energy could strain local governments and service providers. During the recent energy crisis, some Hungarian municipalities saw "10- to 20-fold" increases in their gas bills when market prices spike.[29]

Lower-income households in Hungary are especially vulnerable to rising heating and transport costs. There is a clear correlation between income level and the type of energy used. Hungary has one of the highest incidences of energy poverty in the EU, with a very high share of low-income families burning solid fuels to stay warm. Recent turmoil in energy markets underscored this reality: in 2020 only 15% of Hungarian households primarily heated with firewood, but by late 2022 that share skyrocketed to 37% of households as gas became unaffordable for many.[30] While burning wood is not directly priced under EU ETS 2 (since it targets fossil fuels), this shift highlights how the poorest adapt to energy price pressures - often in ways that pose health and environmental risks.

Hungary experienced a sharp run-up in energy costs in 2021-2022, linked to global market disruptions. Natural gas prices for households roughly increased by 46% in late 2022 (from EUR 7.8 to EUR 11.4 per 100 kWh). The Hungarian government responded by partly scaling back its decade-long universal utility price freeze. Since August 2022, households pay subsidized low rates for gas and electricity up to a certain usage level, but consumption above that threshold is charged at the full market price. This two-tier "rezsicsökkentés" system means that families with higher usage (often those in large or inefficient homes) now face extremely high marginal tariffs for extra consumption.[31] For example, using gas beyond the limit can cost eight times more per unit than the subsidized rate. This policy has greatly influenced behavior - many households have cut back energy use or switched fuels to avoid the punishing above-cap prices.
On the other hand, if Hungary succeeds in expanding nuclear and renewables (the country aims for 90% carbon-free electricity by 2030, electric heating and transport will become relatively cheaper and shielded from carbon costs.

Urban vs. Rural Impact Differences

Where a person lives in Hungary will significantly shape how EU ETS 2 affects them. Urban and rural populations experience energy use and price changes differently, leading to varied impacts:

- Mobility: Rural residents are generally more car-dependent. Outside of Budapest and a few major towns, public transport options are limited, so people in villages and small towns often rely on private cars to reach jobs, schools, or shops. Many rural low-income households drive second-hand cars that are inefficient, making them especially sensitive to fuel price hikes. By contrast, urban residents (particularly in Budapest) benefit from extensive public transit networks (buses, metro, trams) and shorter travel distances. A city-dweller can more easily switch to public transportation, biking, or walking if driving becomes too expensive. Thus, a carbon price on fuel is felt more acutely in rural areas, where it can exacerbate transportation poverty and isolation.
- Heating and Housing: Urban housing in Hungary often consists of apartments or homes connected to district heating systems. Large district heating plants already fall under the existing EU ETS, meaning some urban heating costs have indirectly reflected carbon prices for years. Rural homes, on the other hand, are typically individual houses, many of which use standalone gas boilers, propane tanks, or wood stoves. These will all now incur carbon costs (except wood). For a rural household using gas, ETS 2 will make heating more costly unless they retrofit or switch fuels. Moreover, rural homes are often older and less insulated on average, meaning higher consumption and bigger bills. In some impoverished rural areas (particularly in the northeast region), even though gas pipelines exist nearby, families cannot afford the connection fee or the heater upgrade, leaving them stuck with wood or coal heating. These households won't

[28] https://commission.europa.eu/system/files/2023-09/HUNGARY%20-%20DRAFT%20UPDATED%20NECP%202021-2030%20_HU.pdf
[29] https://dailynewshungary.com/new-utility-bills-to-comply-with-new-rules-arrive-for-the-first-time-in-hungary
[30] https://www.uni-corvinus.hu/post/hir/one-million-hungarian-households-struggle-with-energy-poverty/?lang=en
[31] https://www.feantsa.org/public/user/Resources/reports/2024/heat/Brief_v2.pdf

pay carbon costs on firewood, but they suffer from severe energy poverty and pollution issues - and they are effectively left out of the cleaner energy transition unless aid is provided to connect or retrofit them.

Lithuania

Transport

The transport sector is the largest contributor of greenhouse gases in Lithuania, with a share of 30%. Nevertheless, Lithuania has set the goal to reduce GHG emissions from non-ETS sectors (including transport) by at least 25% compared to 2005 levels. As per Lithuanian Energy Institute's report from 2020, the average age of vehicles is around 15 years, and 69% of passenger vehicles are powered by diesel. The challenge to reduce the transport sector's emissions in Lithuania is exacerbated by insufficiently attractive public transport, a lack of policies around polluting vehicle usage as well as lack of promotion of zero-emission vehicles. Regarding the latter, Lithuania's transport and communications development strategy until 2050, approved in 2020, aims to create a sustainable transportation system. The plan includes promoting the purchase of EVs, alternative fuels infrastructure, reducing traffic congestion, creating low-emission zones in cities, and expanding the electric car charging infrastructure amongst others. Some concrete goals by 2030 include[32]:

- Ensuring 5% of final energy consumption in the transport sector comes from biomethane and green hydrogen.
- Installing 6,000 public electric vehicle (EV) charging points.
- 230,000 EVs by 2030
- Reaching 10% electric car share in the total vehicle fleet and 50% in new sales.

The above is planned to be reached by providing subsidies for EVs, large-scale investment in charging infrastructure and biogas/hydrogen fueling stations, and introducing CO_2-based vehicle registration taxes. The plan has so far proved to be successful as the total number of EVs in Lithuania has increased by more than 5-fold over 2020-2024[33]. Over the same period, 1420 new public charging stations have been built, while private charging stations reached a total of 4000.

However, while EV expansion in Lithuania has accelerated in the last couple of years, high upfront costs limit them to high-income groups. According to the European Anti-Poverty Network, as of 2022, around 21% of Lithuania's population was below the poverty line threshold set at EUR 510 per month for a single person. [34]Despite this, Lithuania is among the top countries for car ownership in the EU, with 643 passenger cars per 1000 inhabitants in 2022 compared to the EU's average of 560.[35] Moreover, road transport dominates the means of transportation in Lithuania, accounting for ~97% of all passenger movements. [36]Given that most of these vehicles are older models and the average age of vehicles is high, diesel dominates the transport fuel use at 74% in 2018. As a result, ETS 2 will heavily impact on low- and middle-income groups in Lithuania.

Residential Heating

A large portion (~53% in cities) of Lithuanian households rely on district heating[37]. While installations above 20MW are already covered by EU ETS 1, most district heating plants in Lithuania fall under this thresholds and, thus, will be affected by the EU ETS 2. During the energy crisis of 2022-2023, the number of residents relying on district heating has increased further amid lower costs. [38] In addition, energy poverty remains at high levels in Lithuania, with 27.9% of the population

[32] https://enmin.lrv.lt/en/news/lithuania-to-start-preparations-for-a-rapid-development-of-electromobility/
[33] https://ceenergynews.com/transport/lithuania-sees-fivefold-growth-in-electric-vehicles-and-charging-stations/
[34] https://www.eapn.eu/wp-content/uploads/2023/10/eapn-EAPN-LT-English-version-2023-PW-5819.pdf
[35] https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20240117-1
[36] https://sumin.lrv.lt/en/sector-activities/roads-and-road-transport-1/about-the-sector/
[37]https://enmin.lrv.lt/uploads/enmin/documents/files/Teisin%C4%97%20informacija/Teis%C4%97s%20aktai/Bendrieji%20energetikos%20strateginiai%20dokumentai/NECP/Lietuvos_Respublikos_nacionalinis_energetikos_ir_klimato_srities_veiksmu_planas.pdf
[38] https://lsta.lt/wp-content/uploads/2023/10/LSTA-Silumine-technika-2023-Nr-2-88-dragged.pdf

living in households that do not have enough income to heat their homes in 2018. [39] In rural areas, firewood and wood waste remain the main fuel for heating, with their usage only reduced by 4.88% over 2016-2020.[40] In 2023, these sources still amounted to 32.8% of the total fuel consumption in households in Lithuania. Hard coal usage for residential heating has reduced by 57.49% over the same period, while gas usage increased by 8.94%.

According to Lithuania's National Energy and Climate Action Plan, the country aims to reduce citizens' energy bills by renovating 3% of multi-apartment buildings a year and using the Social Climate Fund revenues to provide direct income assistance to the most vulnerable households and subsidize heat pump installations. Regarding the latter, Lithuania aims to replace 50,000 household boilers with heat pumps by 2030 by subsidizing up to 50% of the cost. The NECP plan stresses that already in 2017, heat pump sales in Lithuania increased 5.7 times compared to 2016.[41] Altogether, heating efficiency plans are projected to save 200 GWh per year or 11 TWh by 2030.[42]

Assessed effects of ETS 2 in Lithuania

Besides our identified and discussed above effects of ETS 2 on Lithuanian population, there is some analysis conducted by the Environment Ministry of Lithuania for the NECP plan. According to the paper, in 2022, 19% of energy consumed by Lithuanian households and 93.8% of fuels consumed in road transport would fall under the scope of ETS 2. They estimate that at ETS 2 allowance price of EUR 45/tCO2eq - the soft "ceiling price" - fuel prices might increase by around EUR 0.07 to EUR 0.22, resulting in an average cost increase of ~1.1% for the Lithuanian population (0.9% for transport and 0.2% for heating).[43] While these percentages might not appear high, the Ministry also stresses that ETS 2 is projected to be regressive and have significant impacts on low-income households. This effect is expected to dominate via the transport fuel prices since many low-income households, residing in urban areas, use firewood to heat their homes. Meanwhile, passenger car ownership is very high even in rural areas of the country.

Sweden

Residential Heating

As of 2022, Sweden's heating sector has reached a 69% renewable energy share, making it the frontrunner in the EU. This was achieved with the help of a carbon tax that the country implemented in 1991, which amounts to SEK 1510 (EUR 134) in 2025.[44] The Swedish carbon tax is likely to coexist with the ETS2 scheme at least at the start, as the ETS2 allowance price is projected to be significantly below the current levels of the Swedish carbon tax.

By 2030, Sweden has set the goal to have a completely fossil-free heating sector.[45] As Sweden's heating sector is already dominated by district heating, heat pumps, electric heating powered by renewable electricity, and biofuels, the impact of ETS2 on households' heating bills is expected to be limited even in the long term. [46]

Transport sector

While Sweden's transport sector's goals are somewhat below the heating sector, the country remains the leader in the EU. It aims to reduce the sector's 2030 emissions by at least 70% below 2010 levels.[47] Between 2005 and 2023, the country has already successfully reduced this sector's emissions by 35% via the high adoption of EVs and biofuel use. The latter is regulated by the Swedish government, with fuel suppliers obliged to lower GHG emissions through biofuel blending.

[39]https://enmin.lrv.lt/uploads/enmin/documents/files/Teisin%C4%97%20informacija/Teis%C4%97s%20aktai/Bendrieji%20energetikos%20strateginiai%20dokumentai/NECP/Lietuvos_Respublikos_nacionalinis_energetikos_ir_klimato_srities_veiksmu_planas.pdf
[40] https://osp.stat.gov.lt/lietuvos-aplinka-zemes-ukis-ir-energetika-2021/energetika/kuro-ir-energijos-suvartojimas
[41] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/690683/EPRS_BRI%282021%29690683_EN.pdf
[42] https://www.iea.org/policies/12474-national-plan-2021-30-replacing-boilers-with-more-efficient-technologies?country=Lithuania
[43] https://commission.europa.eu/document/download/e4569d35-7ab0-4445-8fa6-017357d04546_en?filename=LT_FINAL%20UPDATED%20NECP%202021-2030%20%28English%29.pdf
[44] https://www.government.se/government-policy/taxes-and-tariffs/swedens-carbon-tax/
[45] https://www.energiforetagen.se/4901de/globalassets/dokument/fardplaner/roadmap-heating-sector-summary-dhc.pdf
[46] https://www.energiforetagen.se/4901de/globalassets/dokument/fardplaner/roadmap-heating-sector-summary-dhc.pdf
[47] https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/767174/EPRS_BRI(2024)767174_EN.pdf

Regarding vehicle electrification, almost 60% of newly registered cars in Sweden in 2023 were electric. However, EV adoption has somewhat slowed down amid the government support phase-out and changes to fuel taxation. In 2024, BEVs comprised 40.8% of new passenger cars, with PHEVs adding 22%. Light trucks also registered a 21.3% share while heavy ones – 6.3%. 71.2% of new buses were also electric.[48] In 2023, the average lifespan of passenger cars in Sweden was 11 years – below the EU average of 12.5 years old.[49]

Just like in the heating sector, the impressive decarbonization progress in Sweden was reached with the help of the carbon tax, which also covers fossil fuels in transportation. As discussed above, since it is higher than ETS2 and the systems will likely coexist, ETS2 implementation is not expected to significantly (or at all) impact Swedish households.

Luxembourg

Residential Heating

Luxembourg has set a goal for a 40.3% renewable energy share in the heating sector by 2030, mainly to be achieved through biomass. [50] In 2023, this share was at 15.48% while in 2022, at 14.83%. [51] In addition, 2.7% of existing buildings are planned to be renovated annually to improve energy efficiency, and heat pumps are being promoted. In 2022, only 4 heat pumps were installed per 1000 residents, despite the subsidies of up to 50% of the cost.

Luxembourg has its own carbon tax, introduced in 2021, which already covers fossil fuels in the heating sector. It started at EUR 20 per tonne of CO_2 equivalent in 2021 and is increasing by EUR 5 annually. As a result, in 2027, the first year of ETS2 compliance, the carbon tax will equal EUR 50 in Luxembourg. So far, the country's government has not concluded whether its carbon tax will be replaced by the ETS2 – they plan to assess the effectiveness of ETS2 and decide whether it exceeds the effectiveness of their own carbon tax.

Given the existing carbon pricing, households in Luxembourg will likely not feel a significant impact of ETS2 implementation, if its government chooses to opt in. Moreover, low-income households in Luxembourg have the possibility to receive additional assistance from municipalities and several energy suppliers such as Enovos and SUDenergie.[52]

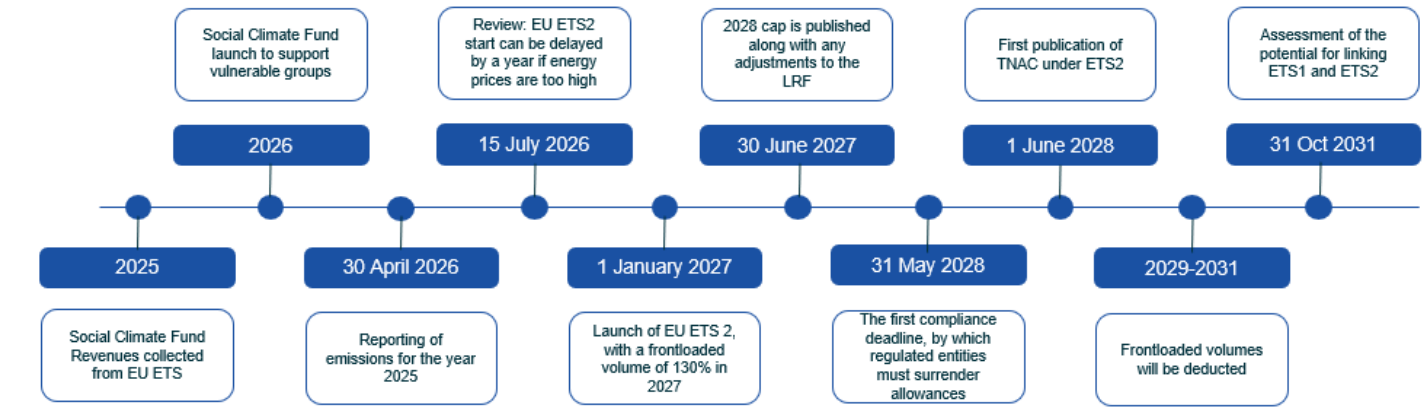
Transport

In the transport sector, Luxembourg aims to reduce greenhouse gas emissions by 55% by 2030 compared to 2005 levels. One of the measures is the expansion of public transport capacity and infrastructure, and making it free of charge since 2020. Moreover, the country's National Integrated Energy and Climate Plan outlines that it aims for 49% of all vehicles to be electric by 2030. In 2022, electric vehicles in Luxembourg accounted for 23% of new car registrations, while the first half of 2024 saw 6,436 new EV registrations. In contrast, in the same period, petrol car registrations amounted to 7,948 and hybrid – 6,071.[53] Buyers of electric cars can currently receive support of up to EUR 6,000 depending on the model. Luxembourg also has an extensive EV charging point network, with 308 charging points per 100,000 inhabitants in 2022.

Looking at the existing fleet, Luxembourg has the lowest average passenger car age in the EU - 8.5 years, while the average is 12.5 years.[54] Considering this and all of the above, households in Luxembourg are not anticipated to be highly impacted by the ETS2 implementation, even if the country decides to stop its carbon pricing and commit to ETS2.

[48] https://alternative-fuels-observatory.ec.europa.eu/general-information/news/sweden-35-bev-market-share-2024
[49] https://www.aut.fi/en/statistics/international_statistics/average_age_of_passenger_cars_in_european_countries
[50] https://energy-cities.eu/countries/luxembourg/
[51] https://www.ceicdata.com/en/luxembourg/renewable-energy-share-by-energy-balance
[52] https://www.eurofound.europa.eu/sites/default/files/2024-09/ef24051en.pdf
[53] https://www.luxtimes.lu/luxembourg/luxembourg-car-market-shifts-gears-as-motorists-go-green/15857049.html
[54] https://en.wikipedia.org/wiki/Plug-in_electric_vehicles_in_Luxembourg?

Timeline: Key events to watch



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Glossary

Bearish - Investors who believe that a market price will decline are said to be bearish.

Bullish - Investors who believe that a market price will increase over time are said to be bullish.

CBAM - Carbon Border Adjustment Mechanism; a Potential new Policy that would impose the same carbon price paid by domestic European producers of goods and services on their extra-EU counterparts when the latter tries to sell goods into the EU.

Compliance Period - the one-year period for which the compliance obligation is calculated for covered entities.

Cooling Degree Days - A cooling degree day (CDD) is a measurement designed to quantify the demand for energy needed to cool buildings. It is the number of degrees that a day's average temperature is above 18o Celsius.

ESR - The Effort Sharing Regulation. This is the second current pillar of European climate policy, and is based upon individual member states choosing their own incentive schemes to accomplish certain European emissions reductions goals.

European emissions allowance (EUA) - A limited tradable authorization to emit up to one metric tonne of carbon dioxide equivalent that can be used as compliance for the Cap & Trade program governed by the EU ETS.

EU ETS - The EU emissions trading system (EU ETS) is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively. It is the world's first major carbon market and remains the biggest one.

ESMA - The European Securities and Markets Authority (ESMA) is an independent EU Authority that contributes to safeguarding the stability of the European Union's financial system by enhancing the protection of investors and promoting stable and orderly financial markets.

Heating Degree Days - A heating degree day (HDD) is a measurement designed to quantify the demand for energy needed to heat a building. It is the number of degrees that a day's average temperature is below 18o Celsius, which is the temperature below which buildings need to be heated.

Hedge - A risk management technique used to reduce any substantial losses or gains suffered by an individual or an organization.

Long - The situation that occurs when there are less realized emissions that require compliance than there are emission allowances available in the market.

LULULCF - Land Use, Land Use Change and Forestry. This is the term used to collectively describe land-based (emissions) activities, most prominently those arising from e.g. the Agricultural and Forestry Sectors.

MSR - The Market Stability Reserve is a supply-adjusting mechanism used to improve the EU ETS system’s resilience to major shocks by adjusting the supply of allowances to be auctioned.

NOAA - The National Oceanic and Atmospheric Administration is an American scientific agency within the United States Department of Commerce that focuses on the conditions of the oceans and the atmosphere.

Offset or Offset Credit - Tradable compliance instruments, issued by a specific governing jurisdiction to projects outside of the Cap & Trade system that conform to specific protocols, which represents a GHG reduction or GHG removal enhancement of one metric tonne of CO2e.

Offset protocols - The set of rules that must be followed for a project to be eligible to apply for offset credit creation.

Short - The situation that occurs when there are more realized emissions that require compliance than there are emission allowances available in the market.

tCO2e - Carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO2 that would create the same amount of warming.

TNAC - Total Number of Allowances in Circulation is the total supply of allowances net demand and reserve holdings. There are three different elements that determine the TNAC: first, the supply of allowances since 1 January 2008; second, the demand for allowances (number of allowances surrendered and cancelled); and third, the holdings of the reserve. The methodology to determine the TNAC is the following: TNAC = Supply - (Demand + allowances in MSR)