INTERNATIONAL MONETARY FUND

SELECTED ISSUES PAPER

Emerging Climate and Energy Transition Issues

Ian Parry, Nate Vernon-Lin, Alberto Garcia-Huitron, Cristian Chagalj, and Sunalika Singh (FAD)

SIP/2025/147

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on June 30, 2025. This paper is also published separately as IMF Country Report No 25/198.

2025
NOV

© 2025 International Monetary Fund SIP/2025/147

IMF Selected Issues Paper
European Department

Emerging Climate and Energy Transition Issues

Prepared by Ian Parry, Nate Vernon-Lin, Alberto Garcia-Huitron, Cristian Chagalj, and Sunalika Singh (FAD)

Authorized for distribution by Fabian Bornhorst
November 2025

***IMF Selected Issues Papers* are prepared by IMF staff as background documentation for periodic consultations with member countries.** It is based on the information available at the time it was completed on June 30, 2025. This paper is also published separately as IMF Country Report No 25/198.

ABSTRACT: This chapter examines two key challenges for the Netherlands: distributional impacts of EU ETS reforms and the fiscal, environmental and power sector effects of road transport electrification. Expanded carbon pricing through ETS2 and CBAM affects households via multiple channels, with broadly even consumption impacts but shifting incidence from pass-through and free-allowance changes. The current vehicle electrification rate, while essential for emissions goals, erodes transport tax revenues, increases grid demand, and yet still leaves road emissions above targets. Policy options—road-user charging, fuel tax adjustments, congestion pricing, and targeted support—can address equity concerns, stabilize revenues, and manage non-climate externalities while sustaining progress toward climate targets.

RECOMMENDED CITATION: Parry, I., Vernon-Lin, N., Garcia-Huitron, A., Chagalj, C., & Singh, S. (2025). Emerging climate and energy transition issues. IMF Selected Issues Paper No. 25/147. Washington, D.C.: International Monetary Fund.

JEL Classification Numbers:	H21, H22, H23, Q41, Q51, Q52, Q58, R41, R48
Keywords	Distributional Impacts, Transport, Climate Mitigation.
Author's E-Mail Address:	iparry@imf.org; nvernon@imf.org; agarcia5@imf.org; cchagalj@imf.org; ssingh9@imf.org

SELECTED ISSUES PAPERS

Emerging Climate and Energy Transition Issues

Kingdom of The Netherlands—The Netherlands

Prepared by Ian Parry, Nate Vernon-Lin, Alberto Garcia-Huitron, Cristian Chagalj, and Sunalika Singh

INTERNATIONAL MONETARY FUND

KINGDOM OF THE NETHERLANDS—THE NETHERLANDS

SELECTED ISSUES

June 30, 2025

Approved By
European Department

Prepared By Ian Parry, Nate Vernon-Lin, Alberto Garcia-Huitron, Cristian Chagalj, and Sunalika Singh (FAD)

CONTENTS

EMERGING CLIMATE AND ENERGY TRANSITION ISSUES ____ **2**

A. Introduction ____ 2

B. Distributional Implications of ETS Reforms ____ 3

C. Results ____ 8

D. Economic, Fiscal, and Power Sector Impacts of Road Transportation Electrification ____ 12

E. Conclusion ____ 18

FIGURES

1. Household Budget Share for Main Fuels and ETS Impact ____ 8
2. Distributional Impacts Across Scenarios ____ 10
3. Emissions, Revenue, Welfare, and Electricity Demand Under Current Policies ____ 14
4. Emissions, Revenue, Welfare, and Electricity Demand Under Policy Reform in 2030 ____ 17

TABLES

1. Summary of Key Road Transportation Policies ____ 13
2. Overview of Analyzed Reform Options ____ 15

ANNEX

I. Methodology to Estimate Distributional Impacts ____ 19

References ____ 21

EMERGING CLIMATE AND ENERGY TRANSITION ISSUES[1]

New macroeconomic issues are emerging as the Netherlands progresses towards its ambitious energy transition targets. Specifically, the scaling up of mitigation policies and diffusion of clean technologies may interact adversely with existing policies and raise distributional and acceptability concerns. This chapter covers two specific issues related to the expansion of the EU Emission Trading System (ETS) and electrification of road transportation.

A. Introduction

1. Over the next several years, the EU ETS will expand in coverage and stringency, requiring governments to proactively understand and manage distributional impacts. Over the remainder of the decade, free allowances for heavy industry will be phased out and the Carbon Border Adjustment Mechanism (CBAM) phased in, while a separate ETS will be introduced for road transportation and building fuels. In the Netherlands, these policies efficiently reduce emissions and raise additional revenue (0.7 percent of GDP in 2030), but at the same time put upward pressure on the cost of emitting activities (1.9 percent decrease in purchasing power in 2030).[2] To maintain acceptability of these ambitious policies, the government needs mitigating policies that mitigate adverse distributional outcomes if they materialize.

2. Achieving nationwide emissions targets requires continued electrification of the vehicle stock, but this raises potential fiscal, power sector, and economic issues. Taxes on vehicle purchases and fuel use currently raise around 1.5 percent of GDP but this is projected to nearly halve by 2035 with improving fuel economy and switching to more lightly taxed EVs. These trends will further strain the power grid (a nine percent nationwide increase in demand is projected due to EVs alone by 2030) and worsen road congestion. Still, emissions by road transportation, the Netherland's second largest emitting sector, are projected to exceed targets under current policies.

3. The chapter is structured as follows. It first explores the distributional impacts of upcoming changes to the EU ETSs, finding that impacts take place through different transmission channels, including via consumption, passthrough, "pass back" and free allowances. Impacts are broadly homogenous across the income distribution and for rural vs. urban households via consumption, although free allowances, passthrough and CBAM implementation change this distribution. Considering the redistributive fiscal system in the Netherlands, compensating measures should be weighed carefully against potentially gaining fiscal space for other productive activities. The second section projects fiscal and power sector impacts, non-climate externalities, and emissions in the road transportation sector. Additional policies are needed to maintain sectoral revenue, manage power sector demand, meet emissions targets and correct for non-climate

[1] Prepared by Ian Parry, Nate Vernon-Lin, Alberto Garcia-Huitron, Cristian Chagalj, and Sunalika Singh (FAD).

[2] IMF Staff based on CPAT.

externalities like congestion. Road user charges, potentially coupled with fuel tax increases, EV subsidies, and congestion pricing, are a promising option.

B. Distributional Implications of ETS Reforms

4. Several policy changes are set to affect the EU climate landscape in the next years. The combined effects of CBAM, free allowances, and the expansion of the EU ETS through ETS2 will shape carbon pricing impacts, but the ultimate distributional outcomes will vary significantly by country. These differences depend on national economic structures, sectoral carbon intensity, energy consumption patterns, and the extent to which governments use tax and transfer systems to redistribute income. In countries with higher reliance on coal or less efficient housing and transport infrastructure, such as Poland or some Southern and Eastern European member states, household exposure—especially among the more vulnerable—may be greater than in countries like the Netherlands or Germany, where energy efficiency is higher and tax-benefit systems are more redistributive. The literature emphasizes that policy design, including how revenues are recycled,[3] is critical in mitigating regressive effects and maintaining public support for carbon pricing.[4]

Introduction and Background

5. The EU ETS, introduced in 2005, is a cornerstone of the EU's climate policy. The EU ETS aims to reduce greenhouse gas (GHG) emissions through a cap-and-trade mechanism. As the world's first large-scale GHG emissions trading scheme, its initial three trading phases progressively expanded coverage and tightened emissions caps to enhance effectiveness, while structural reforms were introduced to stabilize permit prices.

6. The EU ETS targets aims to reduce GHG emissions by 62 percent by 2030 relative to 2005, with planned adjustments to increase carbon prices over time. Now in its fourth trading phase (2021–30), the system regulates emissions from power generation, manufacturing industries and aviation, accounting for approximately 45 percent of the EU's total GHG emissions. Permit prices fluctuate across and within years and averaged €65 per metric ton in 2024. As the supply of allowances tightens, and as the market reserve absorbs surplus allowances, prices are expected to rise to nearly €150 per metric ton[5] by 2030.

7. Concerns regarding the competitiveness of trade exposed sectors and carbon leakage led to allocating free allowances across sectors. The cost increase associated with permit prices

[3] The Dutch budgetary rules are based on separation of revenues and expenditure budgeting. Following good public financial management practices, the suggested revenue recycling alternatives do not encourage earmarking of expenditure. Instead, the expenditure decisions should be taken independently, in line with the Dutch budgetary rules. In the Dutch context, revenue recycling would imply that the increased fiscal space from higher carbon price revenue could be used in part to manage distributional effects on the vulnerable households, hence increasing public support for climate reforms.

[4] See Kanzig (2023), Dabla-Norris et al. (2023), Antosiewicz et al. (2022).

[5] Bloomberg NEF, for example, forecasts allowance prices to reach €149 per metric ton in 2030, while Morgan Stanley forecasts prices reaching €135 per metric ton.

led to widespread concerns regarding potential loss of market share to foreign firms that did not face the same price for emissions embedded in their production processes. Therefore, firms in sectors with high trade openness were granted free allowances. During its first phase (2005–07), allowances were allocated through grandparenting. In its second phase (2008–12), 90 percent of allowances were allocated for free. In the third phase (2013–20), 57 percent of allowances were auctioned, although there were variations across sectors and countries; free allowances were provided in the power sector of lower income member states and in industries classified as energy-intensive and trade-exposed. In its fourth phase, the percentage of auctioned permits remain consistent with that of the third phase, while free allowances continue to be granted to mitigate carbon leakage concerns, contingent upon the implementation of energy efficiency measures.

8. To address competitiveness and carbon leakage concerns, the EU designed the Carbon Border Adjustment Mechanism (CBAM). CBAM allows to level the playing field between EU industries subject to carbon pricing and foreign producers that are not. It imposes a carbon price on certain goods imported to the EU, equivalent to what domestic producers pay. Initially covering cement, iron, steel, aluminum, fertilizers, electricity and hydrogen, CBAM will be gradually phased in, with full implementation expected in 2026. CBAM is also designed to recognize explicit carbon taxation in foreign countries such that a country with the same carbon price as the EU would not need to pay at the point of import. Therefore, from a theoretical perspective, CBAM prevents carbon leakage, protects exposed EU industry and incentivizes global decarbonization by providing incentives to implement domestic carbon pricing as opposed to paying a carbon price to the EU.

9. The EU plans to coordinate the elimination of free allowances with an expansion of CBAM-covered goods. Free allocation is set to be gradually phased out from 2026 to 2034, coinciding with CBAM's introduction. Simultaneously, the EU plans to review CBAM, potentially expanding CBAM's scope to include all sectors covered by the EU ETS by 2030. CBAM is currently in a transitional phase which will be over in end 2025 in which importers are required to report the embedded emissions of their imports on a quarterly basis but are not required to pay yet. Starting in 2026, importers must purchase and surrender CBAM certificates corresponding to the embedded emissions in their imported goods minus domestic carbon pricing.

10. The ETS is set to expand to the transport and building sectors with implementation of the ETS2, which will be supported by the establishment of a Social Climate Fund. In 2023, a separate ETS was approved, designed to reduce emissions from fuels used in buildings and road transport by 42 percent by 2030, relative to 2005 levels. Allowance trading under the ETS2 is expected to begin in 2027. Similar to the original ETS, it will have a rule-based market stability reserve to manage allowances, either eliminating excess or increasing supply based on market developments. Unlike the original ETS, however, the ETS2 will focus on upstream emissions, meaning that the responsibility to surrender allowances will rest with fuel suppliers. Given that the impact on households and micro-enterprises is expected to rise with the operationalization of ETS2, a Social

Climate Fund (SCF) to support a fair transition to climate neutrality will be created, and EU countries can access its resources by submitting Social Climate Plans.[6]

11. Most EU-level climate policies, including the ETS, CBAM, and ETS2, have been enacted through directly applicable EU regulations. Once such regulations enter into force, member states are required to align national legislation and administrative frameworks to ensure effective implementation. In the Netherlands, the ETS has been primarily implemented through the Environmental Management Act and its accompanying regulations and decrees. Implementation of ETS2 will require the Dutch authorities to establish or revise national systems for emissions monitoring and reporting, administer the auctioning and revenue collection of allowances, and operationalize a Social Climate Plan to address the distributional impacts of carbon pricing. Regarding CBAM implementation and enforcement, the Dutch government needs to ensure that CBAM obligations are integrated into import procedures and manage CBAM reporting, certificate surrender and compliance monitoring.

Methodology

12. We assess the distributional impact of the EU ETS, modeling the existing system, the introduction of CBAM and the expected effects of higher permit prices and expanded sectoral coverage. First, we evaluate the impact of the current ETS based on the 2024 average allowance price. Second, we model the introduction of an expanded CBAM by 2030, covering all sectors under the ETS. Third, we assume a gradual increase in allowance prices to €100 per ton of CO_2e by 2030. Fourth, we assess the impact of the introduction of the ETS2, which expands the coverage to the transport and building sectors. The scenarios we model are additive and can be summarized as follows:

- **Baseline scenario.** This scenario models the impact of the current EU ETS with a permit price of €65 per ton of CO_2e.
- **Expanded CBAM scenario**. This scenario models the impact of the introduction of an expanded CBAM by 2030, covering all products in the ETS.
- **CO_2e price increase scenario.** This scenario models the impact of the existing ETS, the introduction of the expanded CBAM (scenario b), with a gradual price increase to €100 per ton of CO_2e by 2030.

[6] The SCF was established to support a fair transition to climate neutrality by mitigating the social and economic impacts of the revisions to the EU ETS, particularly for those affected by energy and transport poverty. Member States will develop National Social Climate Plans outlining targeted measures and investments. The SCF will be financed through auction revenues, supplemented by a mandatory 25 percent contribution from Member States, with a goal of mobilizing at least €86.7 billion from 2026 to 2032 according to the European Commission. Social Climate Plans must include measures on energy efficiency, building renovations, zero- or low-emission mobility and transport, the reduction of greenhouse gas emissions and a decrease in the number of vulnerable households, micro-enterprises and transport users. Temporarily, they can also use the Fund to provide targeted direct income support to vulnerable households and transport users, as long as structural measures are still being developed or have yet to take effect.

- **ETS2 scenario.** Additional introduction of the ETS2 with expanded coverage to transport and buildings.

13. For each scenario, we assess the distributional impact of different transmission channels, including both direct and indirect effects on household consumption, the role of free allowances and cost passthrough. We use data from the Netherland's Household Budget Survey (HBS)[7] to estimate the share of household spending on fuels and other goods and services across income groups. This is combined with GTAP's Input-Output (IO) matrix to capture the carbon intensity of each sector, which allows to estimate emissions embedded in the consumption bundles of households by income level. Additionally, the impact of the ETS on consumer prices depends on the extent to which firms pass increased carbon costs onto prices. We account for sector-specific passthrough to estimate resulting price changes. For costs not passed on, we apply a framework of firm behavior: firms may absorb these costs by reducing wages, cutting employment or lowering profits, which varies by trade intensity of the firm's industry. The distributional effect therefore also depends on the income composition (labor vs capital) of each income decile in the Netherlands. We call this effect the pass-back. The effects of pass-back are, however, eliminated when pass-through increases. Since CBAM would allow for a higher passthrough, we assume that ETS-covered sectors would be able to fully reflect the costs of the ETS in their prices once CBAM is implemented.[8] Finally, when free allowances are granted and firms are nonetheless able to increase prices, it creates windfall profits which mostly benefit high income households, which own the vast majority of capital in the country. See Annex 1 for further methodological details.

14. The modeled results represent an upper-bound estimate of the distributional impacts, as they do not account for the structural transformation expected from the EU ETS and related reforms. While the methodology incorporates household-level behavioral responses to price changes across fuels and products, it does not capture deeper, longer-term shifts in the economy. The analysis could also be strengthened by incorporating more recent microdata on household consumption patterns and by controlling for households' capacity to adapt to higher energy prices by income level. The cost pass-through and passback methodology could be enhanced by accounting for sectoral market concentration, distinguishing between white- and blue-collar workers, and integrating more granular data on market frictions and wage stickiness across sectors.

15. The overall distributional impact also depends on how carbon pricing revenues are recycled. Well-designed revenue recycling can make carbon pricing both growth-enhancing and progressive. Revenue use involves trade-offs among policy goals and may influence public support for the reform. In the Netherlands, support for energy-poor households has fluctuated. In 2022, the Dutch government introduced a temporary price cap in connection with the increase of energy prices following Russia's invasion of Ukraine; this was a lump sum transfer through energy providers

[7] European Household Budget Survey for the Netherlands, 2015.

[8] If the coverage of CBAM goods is not extended in 2030, the impacts of passback for non-covered CBAM goods would continue affecting households negatively, although the impact through the consumption channel would be smaller considering the lower level of passthrough.

for all households in November and December, equal to €380 per household. In 2023, the government introduced a price cap on gas and electricity below a certain use,[9] after which households would pay the market price. Nonetheless, the support was not explicitly linked to the EU ETS and has been discontinued. While these allowances expired in 2024, an increase in the energy tax reduction for households, companies and institutions of €200 million in 2026–28 was included in the 2025 Spring Memorandum. The Dutch government also implemented, starting in 2010, the *Energiesprong* program, a sustainable housing program which retrofitted social housing to achieve net-zero standards by installing insulating material, renewable energy systems and increasing overall energy efficiency.

16. How the government decides to support households will greatly determine the overall distributional impact of climate-related policies. In the analysis that follows, we assume that 8 percent of the ETS revenues are allocated to targeted cash transfers for vulnerable households.[10] This support is directed to the lowest income quintile, reflecting that around 7 percent of the population is in energy poverty,[11] with others in the same group at risk. In addition, once the Social Climate Fund is operationalized, the Dutch government will be required to increase support to vulnerable populations. We assume the Dutch government will increase its targeted cash transfers by an amount equal to its share of the Social Climate Fund[12] as defined by EU guidelines.[13] We also discuss trade-offs between alternative delivery mechanisms.

17. The best instrument to support households must be assessed against the progressivity of the tax-benefit system and the broader social protection system in the Netherlands. The literature suggests that the Dutch tax system (including tax expenditures but before transfers) is regressive overall, primarily due to high consumption taxes and relatively low taxation on capital income. However, the regressivity of the tax system is compensated by government spending, which results in a reduction in income inequality achieved through cash transfers that are strongly targeted at the bottom of the income distribution.[14] This also signals a robust capacity to provide well-targeted support. The average tax rate is relatively flat across the income distribution, ranging from approximately 45 percent to 48 percent of pre-tax income across deciles. In contrast, the benefit rate is highly progressive, reaching 85 percent for the poorest decile and only around 5 percent for the richest (Bruil et al. (2022))

[9] For electricity: €0.40 per kWh up to an annual use of 2900 kWh; for gas: € 1.45 per m^3 up to an annual use of 1200 m^3

[10] Based on 2023 data from the European Environmental Agency (EEA).

[11] See Mulder et al. (2023). Energy poverty is measured through a multidimensional approach, with households facing high energy costs, with low quality insulation and low income, classified as energy poor. Additionally, the study also suggests that 48 percent of households in the Netherlands are unable to participate in the energy transition on their own. Energy poverty is a useful metric in the context of the Netherland's climate-related reforms because energy-poor households (i) are more vulnerable to energy price increases and (ii) the social safety net already has programs targeting vulnerable households using other poverty metrics, not necessarily specific to energy.

[12] Including a required co-financing of 25 percent of the cost of activities included in the Social Climate Plan.

[13] Based on Jungling et al (2025).

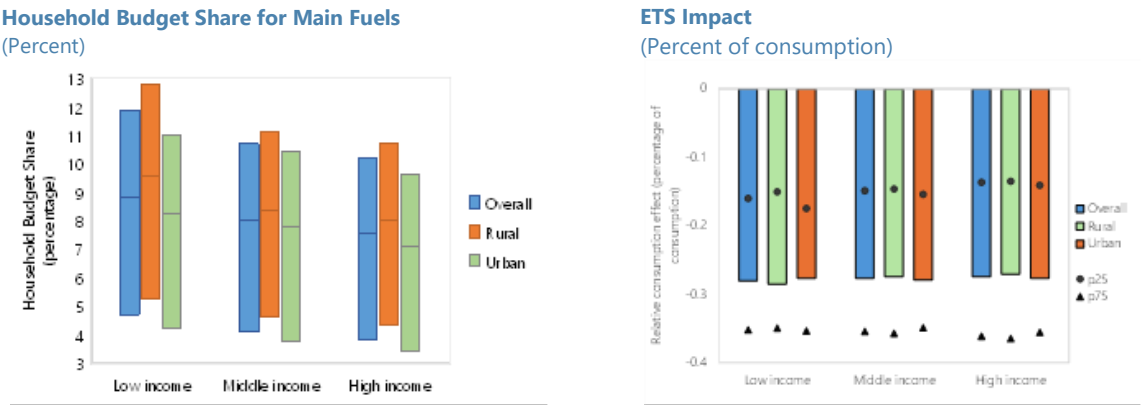
[14] See Bruil et al. (2022).

C. Results

Baseline Scenario

18. The reduction in household purchasing power from the EU ETS currently in place is relatively uniform across income groups when looking exclusively at the consumption channel (Figure 1). In line with similar analysis performed for Belgium in 2023,[15] there are two effects that offset each other, causing the overall impact to be homogeneous. On the one side, lower-income households spend a higher share of their budget on fuels (direct effect)—about 9 percent compared to 7.5 percent for higher income households. On the other side, total emissions embedded in consumption are higher for wealthier groups (indirect effect)**.** There is also a clear rural-urban divide. Rural households typically spend more on fuels, partly due to more limited access to alternatives like public transport. For example, a low-income rural household in the 75th percentile spends about 12.5 percent of their total consumption on fuels, compared to 10.6 percent for a similarly placed urban households, and around 7.3 percent for a high-income urban household. The opposite happens with the indirect channel, as the bundle of goods consumed by higher income households use more fuel in its production process vis a vis lower income households. The overall impact of the ETS across income groups, therefore, remains broadly similar, at around 0.3 percent of household's purchasing power across income groups and types of households, once both direct and indirect consumption channels are considered.

Figure 1. Household Budget Share for Main Fuels and ETS Impact



Source: IMF Staff using CPAT.
Note: the graph in the left-hand side shows the interquartile range; the difference between the first and the third quartile. Main fuels: Electricity, Gasoline and Natural Gas. The graph in the right-hand side shows the relative consumption effect.

19. The impact of the ETS becomes more progressive when accounting for pass back. When accounting for imperfect pass-through of carbon costs, the distributional impact of the current ETS becomes more progressive (Figure 2). This is because higher-income households face greater losses from reduced capital income, which is concentrated in higher-income deciles. The main driver of the impact is firm's limited ability to pass increased carbon costs onto prices and

[15] See Vernon-Lin (2023).

subsequent reductions in wages/employment and profits as firms pass back the increase of input costs. We estimate that 37 percent of total profit losses fall on the top income decile and 23 percent on the ninth. In this case, profit losses due to pass back are estimated to be higher than windfall profits from free allowances, which accrue to higher income deciles but are estimated to be small. In addition, we assume that labor costs from pass back affect households uniformly.[16]

20. If the Dutch government implements compensatory cash transfers benefitting the most vulnerable households, the distributional impacts of the EU ETS would be more progressive. Based on the European average, our model considers that 8 percent of EU ETS revenues in the Netherlands are used to compensate households via cash transfers,[17] introducing another channel of progressivity. However, such transfers would not be enough to fully offset the negative impact of the ETS for the two more vulnerable income deciles. A qualitative discussion of different types of support and its trade-offs can be found in the next section.

Expanded CBAM Scenario

21. Implementing an expanded CBAM, covering all ETS-covered sectors by 2030, without a full phaseout of free allowances, planned for 2034, would have a regressive impact in the income distribution (Figure 2). CBAM would allow for higher passthrough which increases the impact through the consumption channel, albeit it remains modest—averaging 0.5 percent of household spending. Higher passthrough, in turn, would eliminate the negative impacts of pass-back and open the space for windfall profits[18] in sectors that receive free allowances.[19] Such additional profits would equal the value of the allowance net of the average corporate income tax. Since capital ownership is concentrated among higher-income households, these gains disproportionately benefit wealthier households, hence the more regressive overall impact in this scenario. Such regressive impact can be offset for the two most vulnerable household groups which is modelled via cash transfers. In this scenario, if the Dutch government used 8 percent of the ETS revenue to compensate vulnerable households, the support would nearly offset the negative impact for the two lowest income deciles.

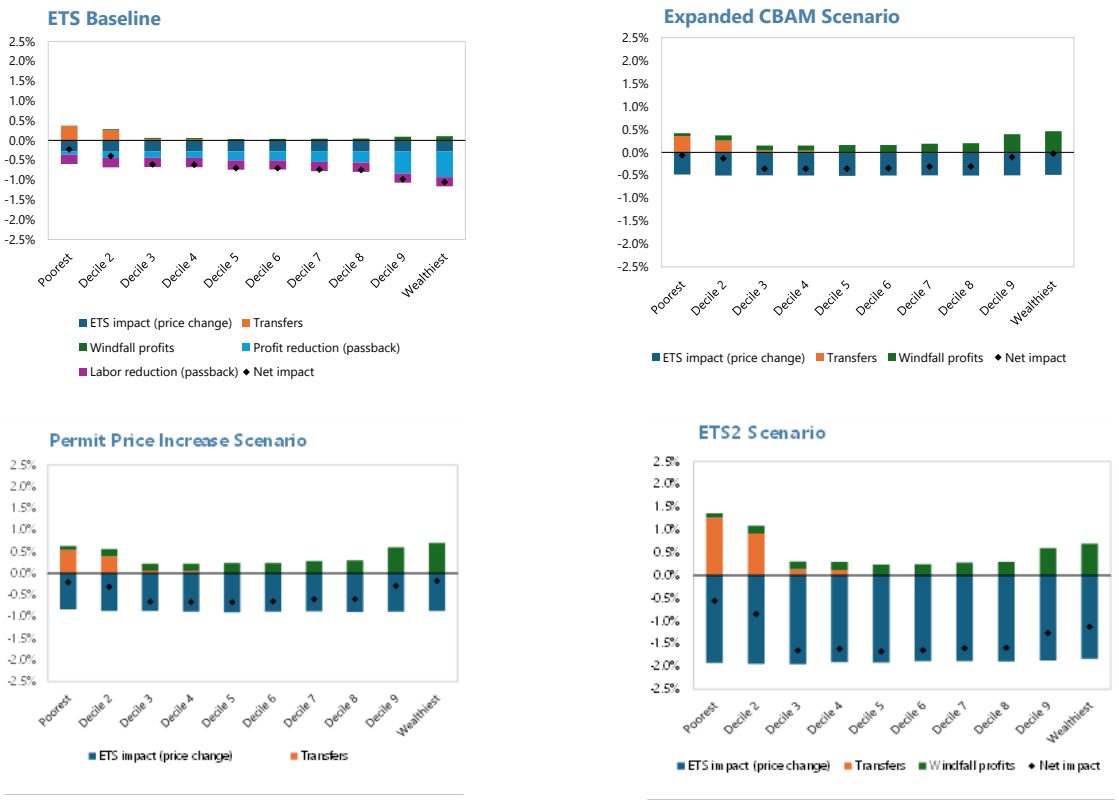
[16] A potential improvement to the methodology would differentiate between high-skilled and low-skilled workers across deciles, as different types of workers are set to be affected differently. In this case, we would expect lower income households to bear a higher share of labor costs from pass back.

[17] We further assume that transfers are targeted towards the two more vulnerable deciles.

[18] If European firms increase prices domestically, they might lose market share in foreign markets and their profit margins would be, therefore, affected. In such case, the benefits from windfall profits would be lower and could potentially become negative depending on the difference between the elasticities of foreign vs domestic consumption.

[19] Despite CBAM is designed to account for the percentage of free allowances per sector, the difficulty in measuring passthrough at a granular level complicates free allowance targeting (See Verde et al. (2019)), with indeed evidence of some firms that have nonetheless been able to increase prices (See Cludius et al. (2020) and Liang et al. (2013)).

Figure 2. Distributional Impacts Across Scenarios
(Percent of consumption)



Source: IMF Staff using CPAT.
Note: the y-axis in the graphs measure the relative consumption effect. That is, the amount of consumption that households would forego considering the new energy prices.

CO_2e Price Increase Scenario[20]

22. Raising the allowance price roughly doubles the impact through the consumption channel which nonetheless remains homogeneous (Figure 2). The third scenario assumes a gradual increase in allowance prices, reaching €100 per ton in 2030 alongside expanded CBAM implementation. Considering the increase in prices, the average burden on household consumption increases, with the impact rising to 0.9 percent of household spending.[21] In this scenario, 8 percent of ETS revenues are used to compensate lower income households, which partially protects households in the first two deciles from the negative impacts of rising energy prices. Additionally,

[20] Both for Scenarios 3 and 4, the costs of passback are canceled as passthrough in each sector increases due to the implementation of an expanded CBAM.

[21] Designing Comprehensive Climate Mitigation Strategies, IMF (forthcoming) estimates average distributional impacts via the consumption channel for other high-income countries of the additional implementation of a carbon tax of $75 per ton of CO2e. Results are broadly aligned with the estimates presented in this paper. For example, it finds Italy would see an average impact of -1.53 percent of household's purchasing power, Japan of -2.24, UK of -1.46 and US of -2.71. The allowance price increase modelled in the third scenario of this SIP is €100 per ton, €35 more vis a vis the baseline scenario.

windfall profits benefit high income households in sectors that receive free allowances and are nonetheless able to increase prices. In aggregate, the distributional effect follows a U-shaped pattern: higher income households benefit more from windfall profits, while lower-income households are partially protected through targeted transfers, meaning that households in the middle of the income distribution are, on net, more affected.

ETS2 Scenario

23. Expanding the EU ETS to cover transport and buildings significantly increases the impact through the consumption channel, but also allows for larger compensation given the increase in revenues (Figure 2). When the coverage extends to residential, road, rail, and domestic shipping sectors, the negative impact on household consumption increases to an average of 1.9 percent. The 1 percentage point increase compared to Scenario 3 is primarily driven by direct effects as the ETS2 now covers gasoline, diesel and natural gas, primarily used for residential heating. While we take into account that revenues to protect vulnerable households increase considering the operationalization of the Social Climate Fund, model estimates suggest that additional support would be required to offset losses for the two most vulnerable deciles.

Policy Implications and Key Takeaways

24. The distributional impacts of the EU ETS in the Netherlands affect households through multiple transmission channels, and all need to be accounted for to understand the net impact of carbon pricing policies. This analysis looked at how households are affected through direct and indirect consumption channels across the current ETS (baseline) and three modelled scenarios—the introduction of an expanded CBAM, higher allowance prices and ETS2 implementation. These estimates were complemented with a model of firm behavior in the absence of full passthrough, which can ultimately affect different population sectors due to cost pass back.

25. Reforms to the ETS have a relatively neutral effect across income groups when accounting for the consumption channel in the Netherlands, and thus, the overall distributional impact depends largely on cost pass back, windfall profits and compensatory mechanisms. Across the baseline and the three modeled scenarios, impacts on consumption rise as passthrough, prices, or coverage expand—from 0.3 to 2 percent of household's expenditure. Still, when both direct and indirect consumption are considered, effects remain broadly uniform across deciles. In the baseline scenario, limited passthrough results in a progressive outcome due to cost pass-back. In contrast, CBAM increases passthrough and enables windfall profits in sectors receiving free allowances. Higher allowance prices and ETS2 follow the same trend, with stronger effects on household purchasing power. In all scenarios, cash transfers are modeled as one policy option to help protect vulnerable households. However, the regressive effect of windfall profits raises questions about whether additional compensation is needed for lower-income groups, especially as higher-income households may benefit until free allowances are phased out. The high trade intensity of goods and concentration of capital ownership among higher income deciles in the Netherlands suggests that pass backs mainly impact higher income deciles.

26. The policy decisions behind the operationalization of the Social Climate Fund and Social Climate Plan need to be analyzed in light of the overall progressivity of the tax-benefit system and tradeoffs between different delivery mechanisms. For instance, the Netherlands can use its robust social benefit targeting methodologies to appropriately compensate affected households via cash transfers. Nonetheless, support via cash transfers should only be considered in Social Climate Plans on a temporary basis, as they would potentially increase the complexity of the social protection system, especially if new programs are created. In a context of relatively high inflation, decreasing payroll taxes would not only increase the efficiency of the tax system, but would stimulate labor supply and, therefore, offset the inflationary impact of rising energy prices. However, as discussed before, a reduction in payroll taxes would be mildly regressive as households in the top quintile would benefit the most, foregoing the benefit of adequate targeting. Alternatively, the government could reinvigorate the *Energiesprong program* and extend it to private households—generating a permanent increase in energy efficiency, relaxing electricity demand and pressures on the electricity grid, but at the cost of a higher capital cost per retrofitted house vis-à-vis compensation via cash transfers. The remaining share of revenue could be used to finance investment projects that would have positive impacts on economic growth or increase the economy's resilience to shocks.

D. Economic, Fiscal, and Power Sector Impacts of Road Transportation Electrification

27. In the road transport sector, additional policies are needed to avoid falling revenue and worsening congestion, while achieving climate targets and managing electricity demand. The sector currently generates a significant amount of fiscal revenue but this is projected to slowly decline with improved fuel economy and the shift to more lightly taxed electric vehicles (EVs). These trends increase driving levels, worsening road congestion, and further strain the electricity grid. Meanwhile, road transport CO2 emissions are projected to exceed the sectoral target by around 10 percent under existing policies (PBL 2024). Thus, new policies are needed to achieve the (at times competing) objectives of stabilizing revenue, emissions reductions, electricity demand management, and non-climate externalities. This section provides quantitative analysis of policy options to balance tradeoffs and meet road transport sector objectives. It starts with a review of existing and planned policies and then proposes reform options.

Existing and Planned Policies

28. There are several existing and planned EU and national road transport policies, ranging from fuel economy standards to taxes and subsidies. Key domestic policies include taxes on vehicle ownership (MRB) and purchase (BPM), which have rates varying with CO2 emissions rates and other factors; excises and VAT on road transportation fuels; and, starting in 2026, a tax per kilometer driven that varies with the CO2 emissions class of heavy goods vehicles. The most significant EU-level policies are vehicle fuel economy standards, progressively tightened to reach zero-emissions by 2035 for passenger vehicles, and an ETS that applies to road transport and building fuels starting in 2027. The 2025 Tax Plan includes significant reforms of existing policies

including phase-outs of the MRB and BPM tax exemptions for EVs and a discontinuation of EV subsidy schemes. See Table 1 for details on key existing policies.

Table 1. The Netherlands: Summary of Key Road Transportation Policies

Policy Name	Policy Details
Private Motor Vehicle and Motorcycle Tax (BPM)	€600 plus a variable rate that increases with the vehicle's emissions (shadow carbon price of ~€700 per ton); one-time payment at time of vehicle registration for private vehicles; EV exemption removed in 2025
Motor Vehicle Tax (MRB)	~€400 for petrol and EVs and ~€800 and increases with vehicle weight; paid annually; 75% discount for EVs starting in 2025, declining to 0% in 2030
Energy excises/subsidies	€0.79 and €0.52 per liter for gasoline and diesel, respectively, and €-0.086 and €0.03 per kWh for electricity used by households and industry, respectively; gasoline and diesel excises expected to increase by ~€0.10-0.20 per liter in 2026
EU ETS II	Capped at €45 per ton of CO2 (in real 2020 prices) until the end of 2029
VAT	21 percent on gasoline, diesel, and electricity
EV charging subsidies	The SPRILA reimburses 20–40% of costs related to EV charging points and the SPULA supports publicly accessible charging for heavy-duty EVs.
Heavy goods fixed payment and distance tax	€191–€2,404 annually in 2025 depending on emissions class and axles, transitioning to a distance-based charge that varies with emissions class in 2026 (shadow price of EUR 175 per ton of CO2); payable to road fund.
Passenger and light vehicle standards	95 g of CO2 per km (2020–2024), 93.6 (2025–2029), 49.5 (2030–2034), and all zero-emission after 2034 for passenger vehicles; higher emissions rates for vans
Heavy goods standard	45 percent reduction in emissions per km for new vehicles by 2030 relative to 2019–2020 levels, 65 percent for 2035, and 90 percent for 2040
Added Taxable Income Rate (Bijtelling)	22% and 17% of the list price for ICEVs and EVs company cars for private use, respectively, added to taxable income to be unified at 22% by 2026
Zero emission zones	Zero emission zones established in 15 cities for urban logistics. Some exemptions in place with the expectation that they will be phased out over time.

Sources: Ministry of Economic Affairs and the Ministry of Interior and Kingdom Relations, Government of the Netherlands (2025)
Notes: electricity excises vary with the user's electricity consumption (lower excises apply to higher usage)

29. Emissions, fiscal revenue, and other macroeconomic indicators are projected under current policies using a model that captures turnover of the capital stock, declining EV costs, and all major policies.[22] The model performs separate calculations for light-duty vehicles (cars and light commercial vehicles) and heavy-duty vehicles, with further disaggregation between used and new vehicles and internal combustion engine vehicles (ICEVs) and EVs, given the variation in policies and economics across vehicle types. The analysis captures interactions across policies, which is important given the web of EU and domestic road transport policies.

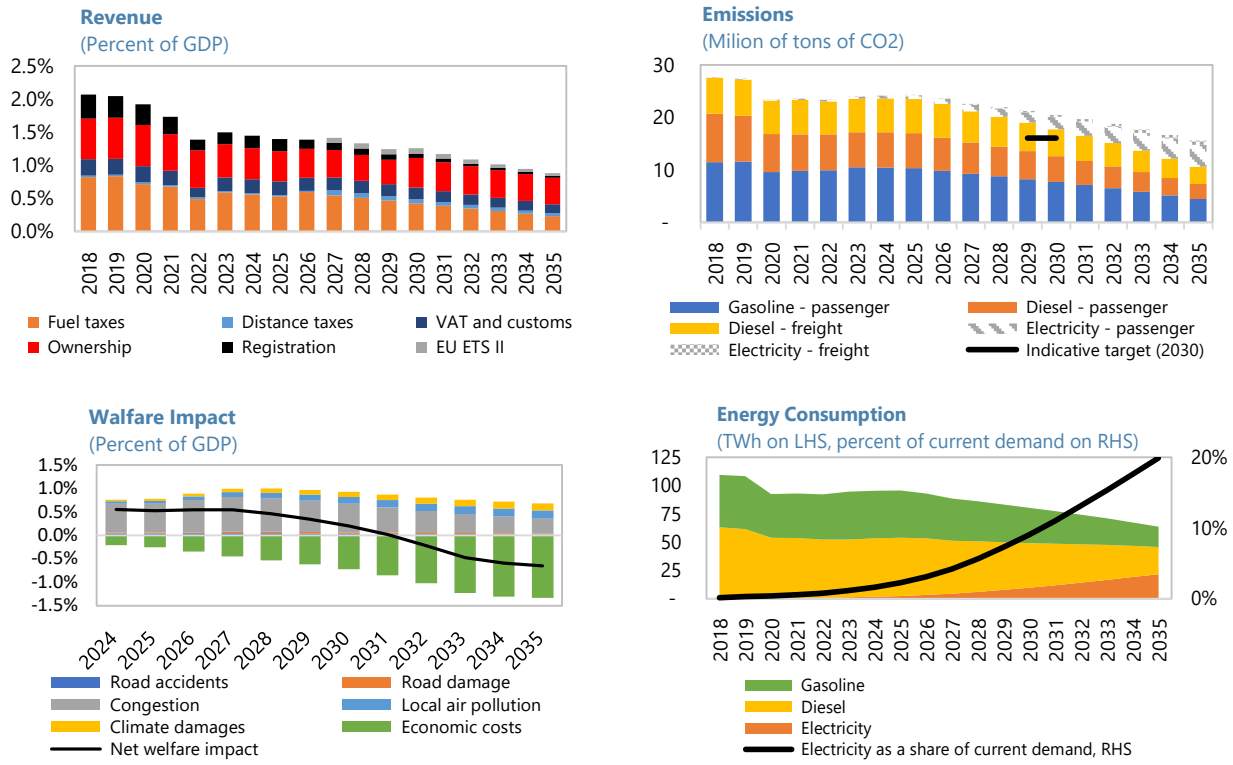
30. Fiscal revenues initially stabilize as new charges on fuels are introduced but then structurally decline over the next decade. Revenue from taxes on vehicles, electricity, and fuel is projected to remain at around 1.5 percent of GDP in 2027 due to the EU ETS II introduction (raising 0.2 percent of GDP) and removal of temporary fuel excise reductions (0.05 percent of GDP). This is followed by a long-term decline in revenue as ICEV fuel economy improves, resulting in lower fuel

[22] See Vernon-Lin 2024 for a complete description of the model applied to France and Black and others forthcoming for cross-country analysis.

excises, and as relatively lightly taxed and more energy efficiency EVs make up a growing share of the vehicle fleet.[23]

31. Meanwhile, emissions fall but still exceed targets, congestion worsens, and electricity demand grows (Figure 3). Emissions from road transport fall by 15 and 35 percent by 2030 and 2035, respectively, below current levels primarily due to the shift to EVs but still exceed targets. Policies generate net welfare gains of 0.5 percent of GDP in 2024 but gains erode over the next decade from worsening congestion as EVs are driven more than ICEVs due to lower costs per kilometer and as tightening of the fuel economy standards generate larger economic distortions. EV electricity demand reaches 10 and 20 TWh by 2030 and 2035, respectively, compared to current demand across all sectors of 110 TWh, which could further strain the electricity grid and increase prices without demand side management policies (e.g., time of use pricing) and increased supply.

Figure 3. Emissions, Revenue, Welfare, and Electricity Demand Under Current Policies



Source: IMF staff estimates.
Notes: EU ETS II price assumed to stay at EUR 55 after 2030, in line with PBL 2025. The indicative emissions target does not include emissions from generating electricity used to power electric vehicles.

[23] EVs require around three times less energy to travel one kilometer than do ICEVs. From a fiscal perspective, this is compounded by relatively low excise rates on electricity compared to fossil fuels. However, there is a strong economic rationale for lower excises on electricity since electricity does not directly cause externalities whereas fossil fuels do through pollution.

Analysis of Reform Options

32. A policy package can be designed to meet climate targets while reversing adverse fiscal, power sector, and congestion impacts. Road user charges (RUC),[24] which charge drivers per kilometer travelled, provide a revenue source that is resilient to electrification and more efficiently regulate driving related externalities.[25] RUCs can be applied to EVs in isolation, given the relatively low taxation of electricity, or all vehicles. Ideally, RUCs would be combined with congestion pricing in cities, which directly addresses urban, peak hours congestion and lowers the economywide RUC needed to address non-urban congestion. The planned increases to fuel excises and the EU ETS2 adequately price pollution related externalities, but in the absence of RUCs and congestion pricing, higher charges on diesel and gasoline are needed to address congestion from passenger ICEVs. As an EV-only RUC without corresponding increases in fuel taxes encourages switching to ICEVs, it could be coupled with an EV subsidy that, ideally, declines as the fleet electrifies and EV costs fall. A higher RUC on emitting heavy goods vehicles would promote further decarbonization and more closely align with the Eurovignette in nearby countries (e.g., Germany, Denmark).

33. Six road transportation policies options are analyzed (Table 2). The analyzed policies cover: (1) an EV-only RUC of €0.04 per km to align taxes per km driven for EVs and ICEVs and, in policy (2), combined with a EV subsidy of €400 per ton of CO2, (3) extending the €0.04 per km RUC to ICEVs, (4) a combination of the EV-only RUC and raising excises on diesel and gasoline to economically efficient levels[26] of €2.14 and 1.43 per liter, respectively in 2030, (5) increasing the heavy goods RUC for more emitting vehicles combined with a €0.04 per kilometer policy for all passenger vehicles, and (6) the RUC of €0.03 per km on all passenger vehicles and plus congestion pricing in cities. In all proposed cases, EU level policies are maintained, which has important implications for the design of domestic policies (e.g., the level of efficient fuel excises). Existing domestic policies (e.g., vehicle ownership and registration taxes, energy taxes) are also maintained.

Table 2. The Netherlands: Overview of Analyzed Reform Options

1. EV-only RUC	RUC of €0.04 per kilometer for passenger EVs only; €0.04 per kilometer is a similar rate to existing diesel and gasoline fuel excises
2. EV-only RUC with subsidy	RUC of €0.04 per kilometer for passenger EVs only with subsidy of €400 per ton (~€4,000 per EV in 2026, declining to €2,400 in 2030 and €720 in 2035)
3. All RUC	RUC of €0.04 per kilometer for all passenger vehicles

[24] RUCs for passenger vehicles are present or under consideration in New Zealand, Israel, Iceland, Utah, Oregon, and Virginia. They are implemented through odometer readings (New Zealand and Iceland), GPS (Utah), or both (Israel, Oregon, Virginia). Odometer readings may help address privacy and acceptability concerns.

[25] Fine-tuned instruments are more efficient but outside the scope of this analysis, with the exception of congestion pricing. These include charges that vary based on real-time congestion levels (e.g., differing charges of on and off peak hours in urban areas) to address congestion, insurance that charges per kilometer driven and varies with the riskiness of the driver, and distance taxes for heavy goods based on axles and weight (which will be introduced in the Netherlands in 2026).

[26] Economic efficiency requires that gasoline and diesel users consider full social costs, inclusive of congestion, local air pollution, and other externalities, when consuming the fossil fuels. See Black et al 2023 for more on efficient fuel taxes.

Table 3. The Netherlands: Overview of Analyzed Reform Options (concluded)	
4. EV-only RUC and higher excise	RUC of €0.04 per kilometer for passenger EVs only; diesel and gasoline excises increase to efficient levels of €2.14 and 1.43 for gasoline and diesel, respectively, in 2030
5. Increased heavy goods RUC and policy 2	RUC of €0.04 per kilometer for all passenger vehicles with a €360 per ton of CO2 RUC for heavy goods
6. All RUC with congestion pricing	RUC of €0.025 per kilometer for all passenger vehicles and congestion pricing during peak hours in cities of €0.13 per kilometer.
Source: IMF staff. Notes: RUC = road user charge. All monetary values are in constant 2024 US dollars.	

34. The evaluated policies can generate up to 0.4 percent of GDP in additional fiscal revenues in 2030 (Figure 4). EV road user charges of €0.04 per km lead to the smallest increase in revenue (0.15 percent of GDP or no change when combined with EV subsides) as EVs make up only a modest share of vehicles given slow turnover of the vehicle stock (~35 percent in 2030). Policies that additionally apply RUCs to ICEVs (policies 2, 4, 6) or increase fuel excises (policy 3) offer more resilient and larger fiscal revenue. Congestion pricing raises around 0.2 percent of GDP in revenue; this may accrue to municipal governments, and at least a portion is likely needed to improve public transport for efficiency and acceptability reasons. The fiscal cost of EV subsidies in policy 2 is around 0.15 percent of GDP but this could be reduced, while promoting equity and acceptability, by making a portion of the subsidy means-tested and potentially location based to address resistance in rural areas. Over the long-term, unless tax rates continue to increase, revenue (as a share of GDP) under all policy options slowly declines as driving levels increase at a slower rate than GDP.[27]

35. Emissions increase under the EV-only RUC, while all other policies allow the Netherlands to achieve its 2030 sectoral target. The EV-only RUC increases the relative cost of EVs, reducing EV shares of sales by 11 percentage points in 2030 and increasing emissions by three percent. Emissions still exceed targets when the EV-only RUC is combined with a sizable EV subsidy (€4,000 in 2025), highlighting the need for policies that reduce driving levels of ICEVs in addition to electrification. RUCs applied to all passenger vehicles (policy 3) achieve targets as emissions fall due to reduced driving of ICEVs. Increasing fuel excises to efficient levels (policy 4), rather than applying a RUC to ICEVs, results to slightly greater emissions reductions, although this could lead to increased fueling in neighboring countries (which is not an issue under the RUC). The higher RUC on emitting heavy goods' vehicles (policy 5) slightly reduces emissions without this risk of cross-border leakage. Well-designed congestion pricing (policy 6) is extremely effective in reducing driving in congested areas, leading to a large decline in emissions even though the RUCs in non-congested areas are lower than under other policies.[28]

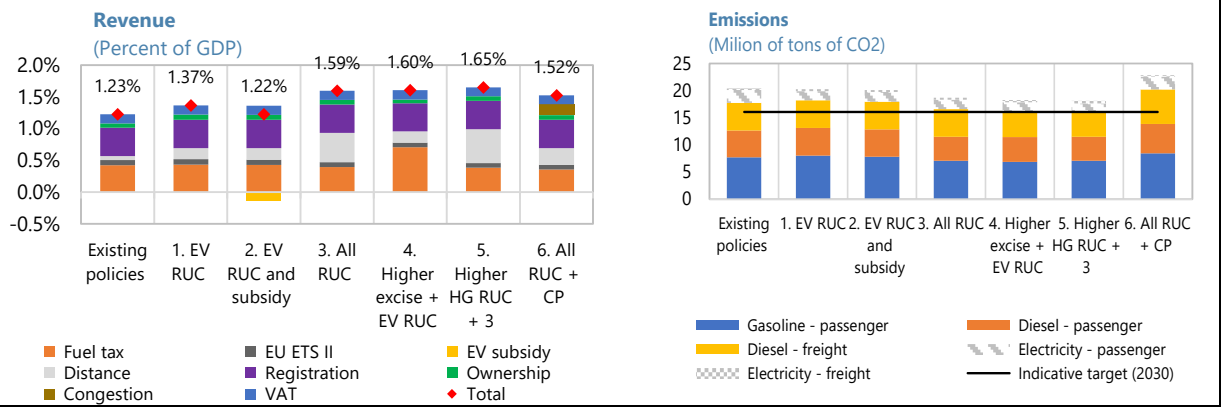
[27] Tax rates per km should optimally increase, in line with congestion costs (value of time), road accidents (value of statistical life), and road maintenance costs.

[28] It is assumed that drivers do not increase driving in non-congested areas and times to avoid the congestion charge. Some drivers will likely shift to driving in urban areas during non-congested times, which is not captured in this analysis and would result in smaller emissions reductions and higher fiscal revenue.

36. The evaluated policies can increase welfare by up to €11 billion in 2030 (0.7 percent of GDP) above current policies and reduce strain on the electricity grid. Under the EV-only RUC, congestion caused by EVs declines and economic distortions are marginal resulting in welfares gains of around 0.25 percent of GDP—these gains are offset by the distortions caused by EV subsidies (policy 2). Policies with RUCs applied to all vehicles or higher fuel excises (3–5) lead to greater reductions in congestion, local air pollution and climate damages, which more than offset larger economic distortion. Congestion pricing achieves the greatest welfare benefit by a large margin (0.7 percent of GDP) due to its efficiency in reducing congestion. Under all policies, reduced EV driving due to the RUC and/or congestion pricing reduces electricity demand by 2–3 percentage points relative to current national demand.

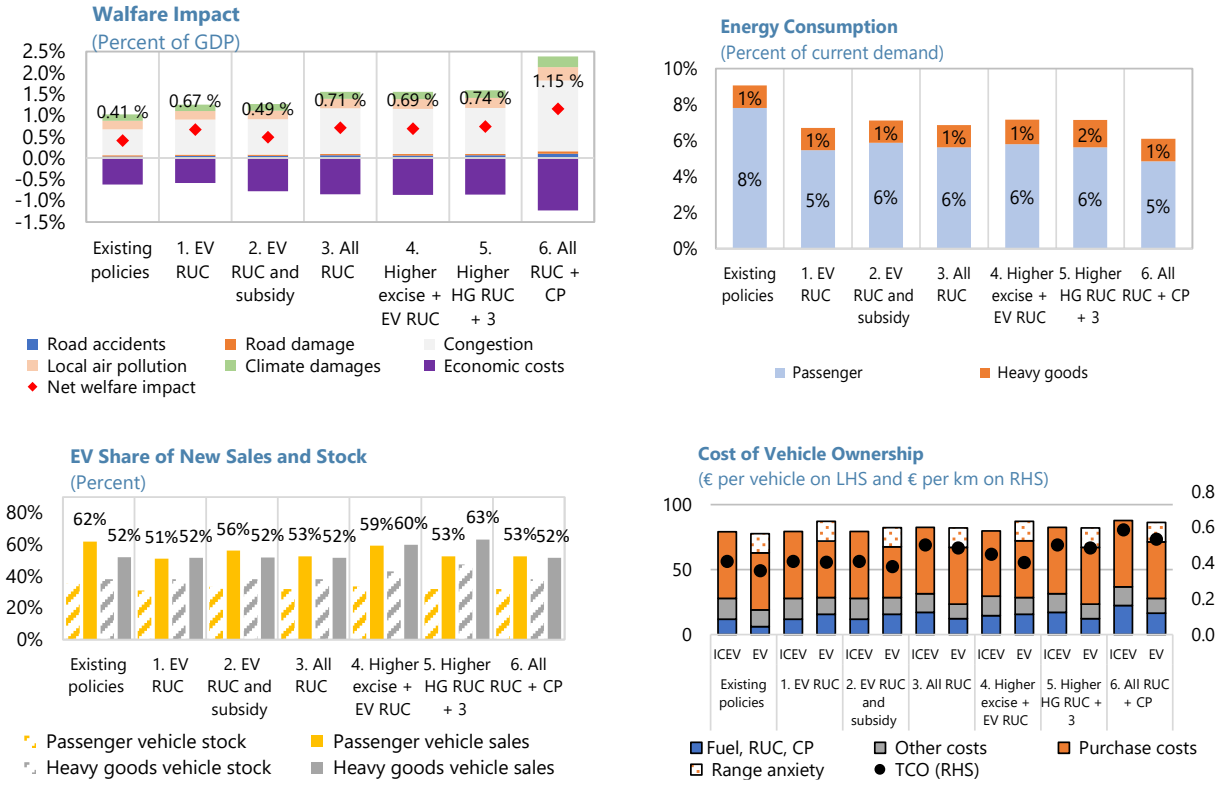
37. The total cost of vehicle ownership (TCO) over the vehicle's lifecycle increases under all proposed policies, with potential distributional implications.[29] The TCO increases by about €8,000 with a RUC of €0.04 per km or excises at efficient levels but purchase costs still dominate overall expenses, making up around 60 percent of the TCO compared to about 20 percent each for fuel and other costs (mainly maintenance and insurance). Understanding the distributional impact of these cost increases requires more detailed analysis—for example, while Figure 4 offers some understanding of economy-wide welfare impacts, distortions will be higher for some households and firms and lower for others. Prior to the introduction of any new reform, a comprehensive analysis of these distributional impacts should be undertaken so that they may be proactively managed. Redistribution of a portion of expected gains to vulnerable households and firms made worse off, accompanied by a careful communication strategy and phase-in of the policy reform, can support political acceptability and promote equity. For example, investments (or higher subsidies) in locations that lack charging stations and higher EV subsidies for poor or rural households could help improve acceptability while making the energy transition more equitable.

Figure 4. Emissions, Revenue, Welfare, and Electricity Demand Under Policy Reform in 2030



[29] The total cost of vehicle ownership captures all expenses related to owning and using a vehicle. Namely, the purchase price, insurance, fuel, maintenance, taxes, fees, and depreciation over the vehicle's lifespan.

Figure 4. Emissions, Revenue, Welfare, and Electricity Demand Under Policy Reform in 2030 (concluded)



Source: IMF staff estimates.
Note: The indicative emissions target does not include emissions from generating electricity used to power electric vehicles. Other costs primarily include insurance and maintenance. The purchase cost per kilometer increases for ICEVs under the RUC because kilometers driven per vehicle declines and the purchase cost in € terms remains constant. RUC = road user charge. CP = congestion pricing. TCO = total cost of ownership.

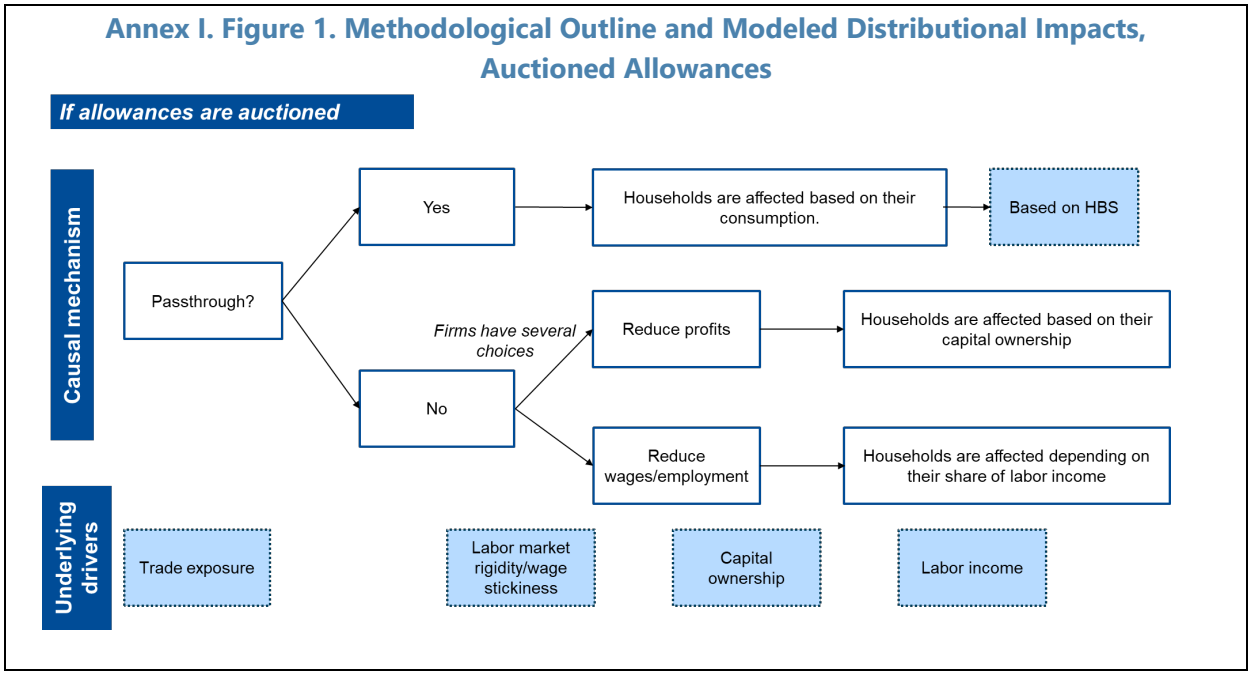
E. Conclusion

38. Transitioning to road user charges can help achieve fiscal, climate, and non-climate goals but requires managing distributional impacts. A RUC applied to all vehicles allows revenue to increase substantially (0.4 percent of GDP) and for the Netherlands to meet climate targets, while lessening congestion and electricity demand, but requires managing impact on vulnerable households. Increasing fuel excises coupled with a RUC only on EVs provides similar outcomes. A RUC applied only to EVs increases emissions, provides about half of the revenue benefits, and limits both congestion benefits and price increases for ICEVs. Combining a RUC with an EV subsidy (a potentially means tested) may improve distributional outcomes, while maintaining most of the welfare and fiscal benefits. RUCs would ideally be complemented with congestion pricing in urban areas to more efficiently reduce congestion and reduce the needed economywide RUC. There also is scope to progressively increase the stringency of the heavy goods RUC's CO2 component.

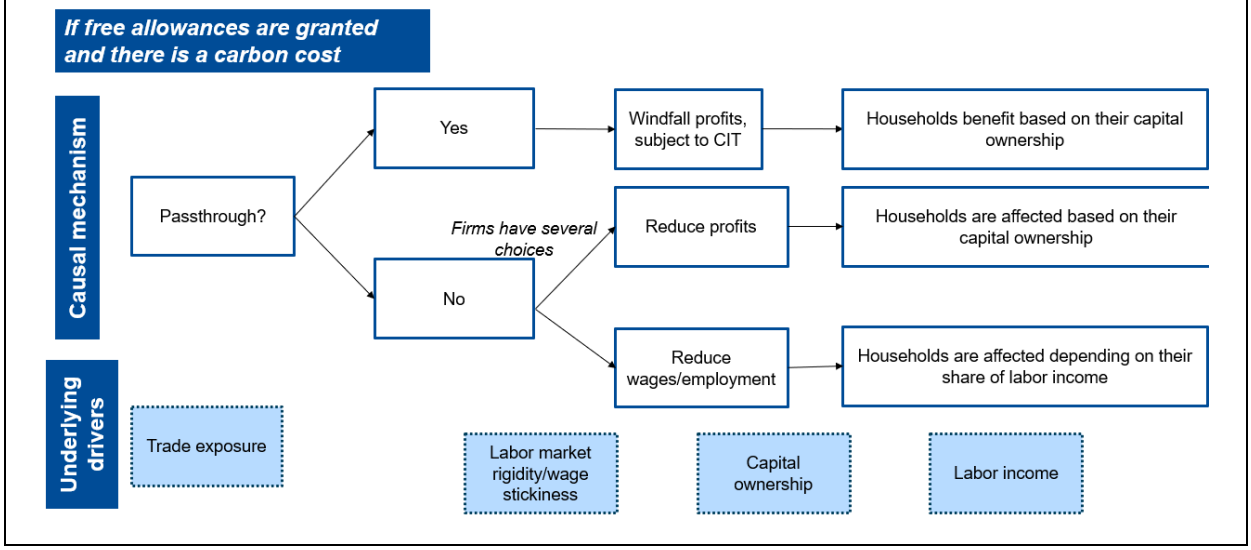
Annex I. Methodology to Estimate Distributional Impacts

1. The distributional impact of the current ETS is largely driven by the allocation of free allowances and the degree to which firms in different sectors can pass on price increases to consumers. Economic theory predicts that companies will increase their prices even if allowances are freely allocated because they are factoring in its opportunity cost. Nonetheless, several factors can influence whether a firm is able to pass on costs, such as its exposure to trade and market structure. Particularly, firms that are highly exposed to trade stand to lose market share if they increase prices, so passthrough can be limited. Regarding market structure, passthrough tends to be lower for less concentrated markets as they aim to maintain high output and large profits. The interaction between these variables will ultimately determine the final distributional impact, as cases in which firms both receive free allowances and are able to increase prices generate windfall profits – defined as the market value of the permit price minus the corporate income tax. Windfall profits, in turn, benefit capital owners which are mostly concentrated in higher income deciles. We assume that windfall profits, defined as the non-taxed gross operating surplus, will benefit each decile according to their share of capital ownership. In contrast, if firms are unable to increase prices, they face a trade-off between labor and capital, both at the intensive and extensive margins. That is, firms would either see a reduction in profits, a reduction in wages, a reduction in employment, or a combination of the previous options. This decision will also affect the ultimate distributional impact and is driven by several variables such as profit margins, wage stickiness and overall rigidities in the labor market. Our methodology is summarized by Figure 1 and Figure 2, which consider the cases of auctioned versus free allowances and the different transmission channels through which the ETS has distributional implications.

Annex I. Figure 1. Methodological Outline and Modeled Distributional Impacts, Auctioned Allowances



Annex I. Figure 2. Methodological Outline and Modeled Distributional Impacts, Free Allowances



2. We used the household budget survey and input-output matrix for the Netherlands to estimate distributional impact, as well as estimates from the literature to assess sectoral passthrough levels to build the impact of the ETS at the baseline. First, we estimate the effects of the ETS on consumer prices across different expenditure categories using input-output tables. To do so, we estimated passthrough to be inversely correlated with trade exposure.[1] For instance, we assigned low passthrough levels for sectors that are highly tradable and, conversely, high passthrough levels for sectors that are not tradable. We used the share of traded aggregate value with respect to total aggregate value to assess sectoral trade exposure based on the Netherlands' input output table. Second, we map these price changes to household income groups by linking them to budget shares for fuels and other goods, based on household expenditure surveys. The assessment captured both direct and indirect impacts through the consumption channel and accounts for revenue recycling but does not incorporate changes in factor income or employment.

3. The introduction of CBAM changes the ability of firms to pass on costs to consumers. Before the introduction of CBAM, firms in trade-exposed sectors that were negatively impacted by an increase in its costs could hardly pass the cost into higher prices, as local demand could easily switch consumption to foreign goods. This limits both passthrough and, therefore, the impact on household's consumption decisions. With the introduction of CBAM, foreign firms that were previously not subject to cost increases will now experience an equivalent increase in costs, either by paying at the EU border or domestically to avoid such payment, increasing the international market price for goods traded in Europe and, therefore, the ability of domestic firms to increase prices without fear of demand switching to foreign goods. Thus, we model CBAM as a shock to passthrough, whereby CBAM-covered sectors experience full passthrough. CBAM is expected to go through a revision of covered goods, with expectations that it will apply to all goods covered by the EU ETS in 2030.

[1] Tradability was measured according to the next formula, based on the Netherlands Input-Output table: (Exports + Imports) / Output.

References

Antosiewicz, Marek, Fuentes, Rodrigo, Lewandowski, Piotr and Jan Witajewski-Blatvilks. Distributional effects of emission pricing in a carbon-intensive economy: The case of Poland, 2022. Energy Policy 160(1): 112678.

Black, Simon, Parry, Ian, Vernon-Lin, Nate and Karlygash Zhunussova. Designing comprehensive climate strategies (forthcoming). IMF, Washington DC.

Black, Simon, Victor Mylonas, Ian Parry, Nate Vernon, and Karlygash Zhunussova, 2023. "The IMF-WB Climate Policy Assessment Tool (CPAT): A Model to Help Countries Mitigate Climate Change." Working paper, IMF, Washington DC.

Black, Simon, Antung Liu, Ian Parry, and Nate Vernon. "IMF Fossil Fuel Subsidies Data: 2023 Update." Washington, D.C.: International Monetary Fund, 2023a. https://www.imf.org/en/Publications/WP/Issues/2023/08/22/IMF-Fossil-Fuel-Subsidies-Data-2023-Update-537281.

Bruil, Arjan , van Essen, Celine, Leenders, Wouter, Lejour, Arjan, Mohlmann, Jan, and Simon Rabat. Inequality and Redistribution in the Netherlands, 2022. CPB Netherlands Bureau for Economic Analysis.

Cludius, Johanna, de Bruyn, Sander, Schumacher, Katja and Robert Vergeer. Ex-post investigation of cost pass-through in the EU ETS—an analysis for six industry sectors, 2020. Energy Economics, Volume 91, 104883,

Dabla-Norris, Era, Helbling, Thomas, Khalid, Salma, Khan, Hibah, Magistretti, Giacomo, Sollaci, Alexandre and Krishna Srinivasan. Public Perceptions of Climate Mitigation Policies: Evidence from Cross-Country Surveys, 2023. IMF, Washington DC.

Jungling, Eva, Sgaravatti, Giovanni Tagliapetra, Simone and Georg Zachmann. Making the best of the new EU Social Climate Fund., 2025. Policy Brief 14/2025, Bruegel.

Känzig, Diego R., The Unequal Economic Consequences of Carbon Pricing, 2023. NBER Working Paper No. w31221.

Liang, Tim, Sato, Misato, Grubb, Michael and Claudia Comberti (2013). Assessing the effectiveness of the EU Emissions Trading System, 2013. Centre for Climate Change Economics and Policy (Working paper No. 126) and Grantham Research Institute on Climate Change and the Environment (Working paper No. 106).

Mulder, Peter, Dalla Longa, Francesco and Koen Straver. Energy poverty in the Netherlands at the national and local level: A multi-dimensional spatial analysis, 2023. Energy Research & Social Science, Volume 96, 2023, 102892.

Statistics Netherlands (CBS). (2024, July 2). *Energy poverty reduced by compensation and energy savings*. https://www.cbs.nl/en-gb/news/2024/27/energy-poverty-reduced-by-compensation-and-energy-savings

Verde, S., Teixido J., Marcantonini C. and Labandeira, X. Free allocation rules in the EU Emissions Trading System: what does the empirical literature show?, 2019. Universitat de Barcelona, Barcelona, Spain.

Vernon-Lin, Nate. Fiscal policy options to accelerate emissions reductions in Belgium, 2023. Selected Issues Paper No. 530525. IMF, Washington DC.

Vernon-Lin, Nate. "Balancing Environmental, Fiscal, and Welfare Impacts of Transportation Decarbonization in France." Washington, D.C.: IMF, 2024. https://www.imf.org/en/Publications/WP/Issues/2024/07/10/Balancing-Environmental-Fiscal-and-Welfare-Impacts-of-Transportation-Decarbonization-in-551694.