



PRICING GREENHOUSE GAS EMISSIONS 2024

Gearing Up to Bring Emissions Down



KINGDOM OF BELGIUM

Federal Public Service

Foreign Affairs, Foreign Trade and Development Cooperation

The OECD is grateful to the Kingdom of Belgium Federal Public Service, Foreign Affairs, Foreign Trade and Development Cooperation for a voluntary contribution that has supported this work.

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries or of the donor country.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Please cite this report as:

OECD (2024), *Pricing Greenhouse Gas Emissions 2024: Gearing Up to Bring Emissions Down*, OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris,
<https://doi.org/10.1787/b44c74e6-en>.

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at www.oecd.org/termsandconditions.

© OECD 2024

Images: © shutterstock.com

Table of contents

Introduction	4
New carbon pricing instruments can increase coverage significantly	5
Fuel taxes declined, carbon taxes and ETS prices remain resilient	6
Revenue potential from raising prices	7
Fossil fuel use faces higher Effective Energy Rates than low-carbon electricity sources	8
As the world is electrifying, energy tax bases are changing rapidly	9
Conclusions and outlook	10
Further Reading	11

FIGURES

Figure 1. Components of Net Effective Carbon and Net Effective Energy Rates	4
Figure 2. Carbon pricing coverage is set to increase	5
Figure 3. Net Effective Carbon Rates have declined	6
Figure 4. Raising Effective Carbon Rates is key driver of additional revenue potential	7
Figure 5. On average, fossil fuels face a higher Net EER than other energy sources	8
Figure 6. The rapid road transport electrification brings substantial tax revenue losses	9

Introduction

Pricing Greenhouse Gas Emissions 2024 is the **most detailed and comprehensive account of how 79 countries, responsible for 82% of global greenhouse gas (GHG) emissions, price emissions.** The **Net Effective Carbon Rate (Net ECR)** is the sum of emissions trading system (ETS) permit prices, carbon taxes and fuel excise taxes, less fossil fuel subsidies (Figure 1), as applied to carbon emissions. The **Net Effective Energy Rate (Net EER)** applies

these same prices to an energy base, and additionally includes electricity excise taxes and subsidies. Together, these indicators give a comprehensive and bottom-up estimate of how emissions and energy use are priced across the globe. Data is leveraged to explore the latest trends and policy developments in the carbon pricing and energy taxation space.

Figure 1: Components of Net Effective Carbon and Net Effective Energy Rates

Net Effective Carbon Rate	Net Effective Energy Rate	Definition component
	Electricity Excise Tax	All excise taxes that are levied on electricity.
	+	
Carbon Tax	Carbon Tax	All taxes for which the rate is explicitly linked to the fuel's carbon content, irrespective of whether the resulting carbon price is uniform across fuels and uses.
+	+	
ETS Permit Price	ETS Permit Price	Average ETS allowance price, resulting from auctioning or the spot market including free allocation.
+	+	
Fuel Excise Tax	Fuel Excise	All excise taxes that are levied on fuels and that are not carbon taxes.
	-	
	Electricity Subsidy	Subsidies that reduce the pre-tax price of the electricity consumed domestically.
-	-	
Fossil Fuel Subsidy	Fossil Fuel Subsidy	Subsidies that lower pre-tax energy prices of fuels and uses domestically.
Emissions (EUR/tCO ₂ e)	Energy (EUR/GJ)	Tax Base

Source: OECD (2024), *Pricing Greenhouse Gas Emissions 2024*



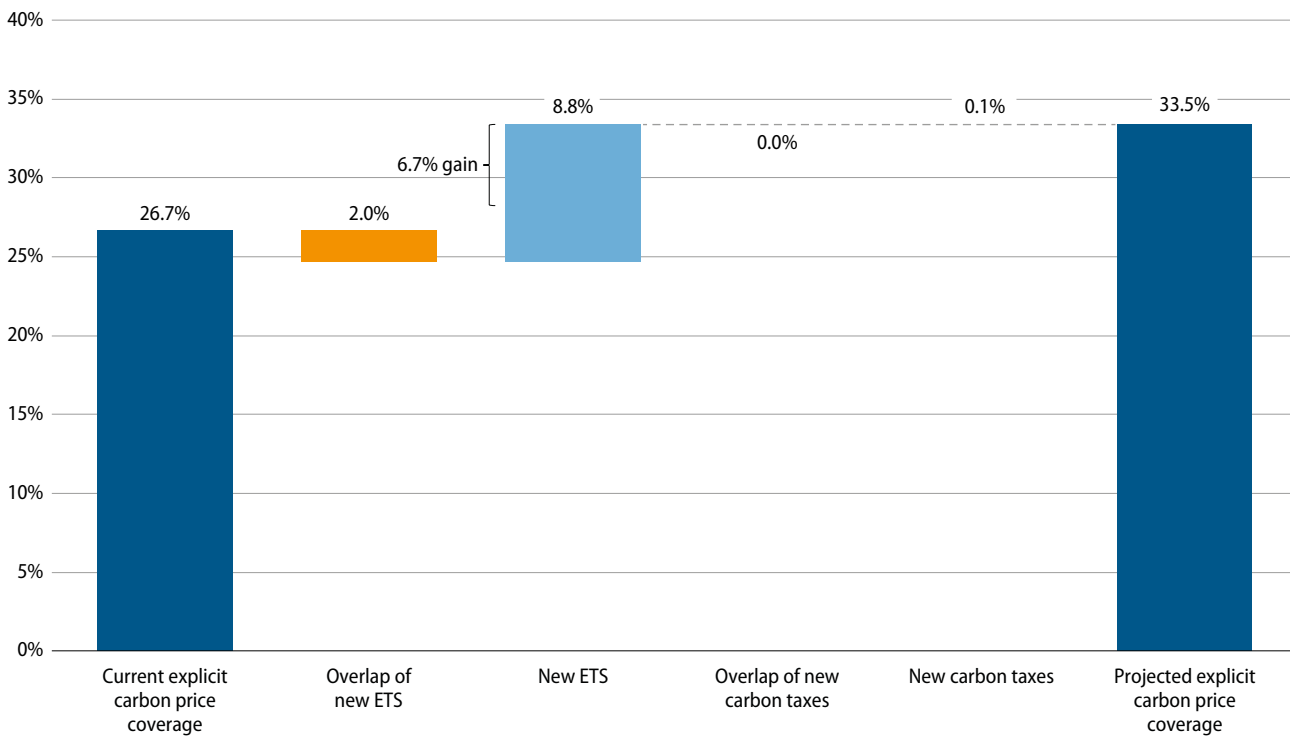
New carbon pricing instruments can increase coverage significantly

The **share of emissions covered by a carbon price** in 2023 has remained unchanged compared with the share of emissions covered in 2021. Across the 79 countries covered, **42% of GHG emissions** are subject to a positive Net ECR.

Explicit effective carbon rates only – carbon taxes and ETS permit prices – cover **27% of GHG emissions in 2023**. The share covered by fuel excise taxes, an implicit form of carbon pricing, is lower at 23%. Fossil fuel subsidies reduce the overall coverage by 8% bringing it down to 42%.

The **introduction of several new carbon pricing instruments is expected over the next five years**. In particular, ETSs are likely to become more widely used and diverse in design, with new systems under development that could lead to an increase in **coverage of global emissions by an explicit carbon price from 27% to 34%** (Figure 2).

Figure 2: Carbon pricing coverage is set to increase



Source: OECD (2024), Pricing Greenhouse Gas Emissions 2024



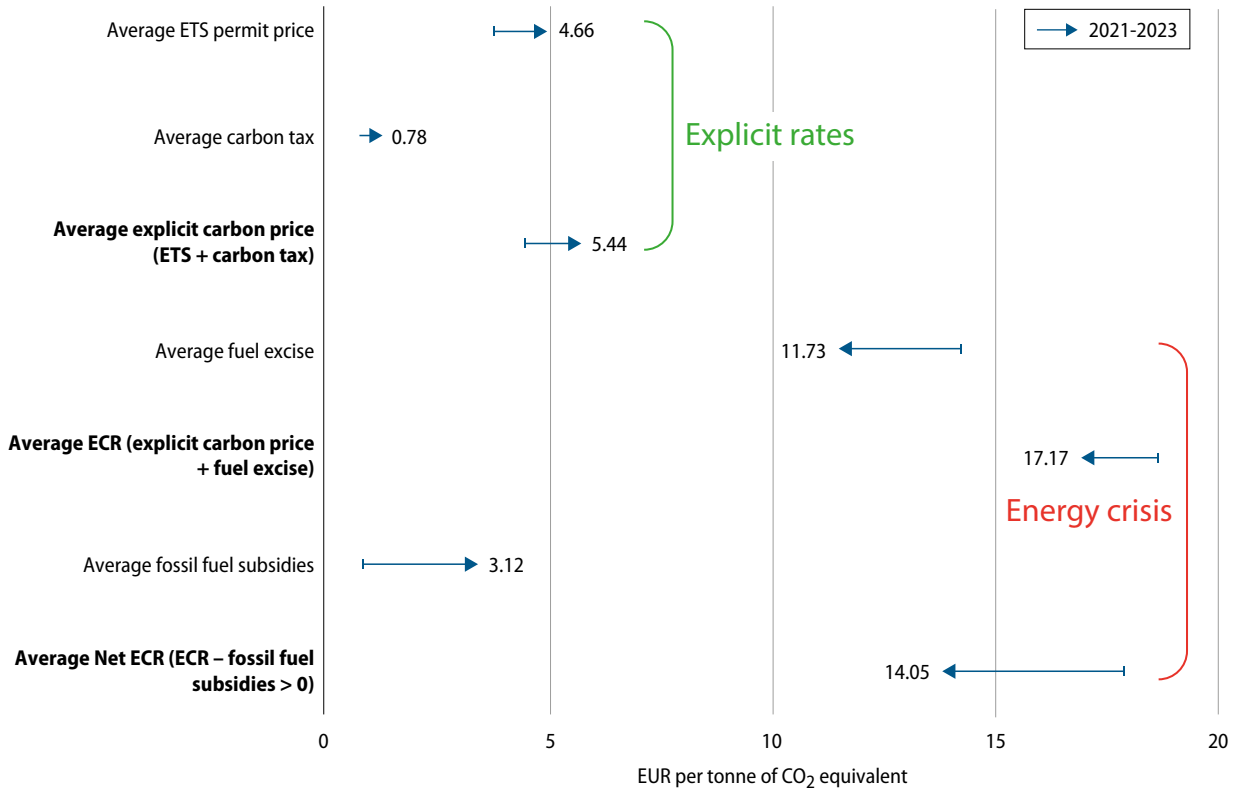
Fuel taxes declined, carbon taxes and ETS prices remain resilient

Changes in Net ECRs have been mixed. Overall, the **Net ECR declined to EUR 14.0/tCO₂e in 2023** from EUR 17.9/tCO₂e in 2021 (Figure 3). Implicit carbon prices in the form of fuel excise taxes decreased while fossil fuel subsidies increased. Together these were the main contributors to the decrease in Net ECR.

To a large extent, the downward shift in Net ECRs reflect countries' responses to the latest energy crisis. As a result, the **Net ECR of road transport, buildings and agriculture strongly declined between 2021 and 2023**. Road transport remains priced at the highest average Net ECR across sectors, despite a substantial decrease of 24%.

At the same time, explicit carbon rates increased modestly, primarily reflecting the increase in average ETS permit price and small carbon tax increases.

Figure 3: Net Effective Carbon Rates have declined

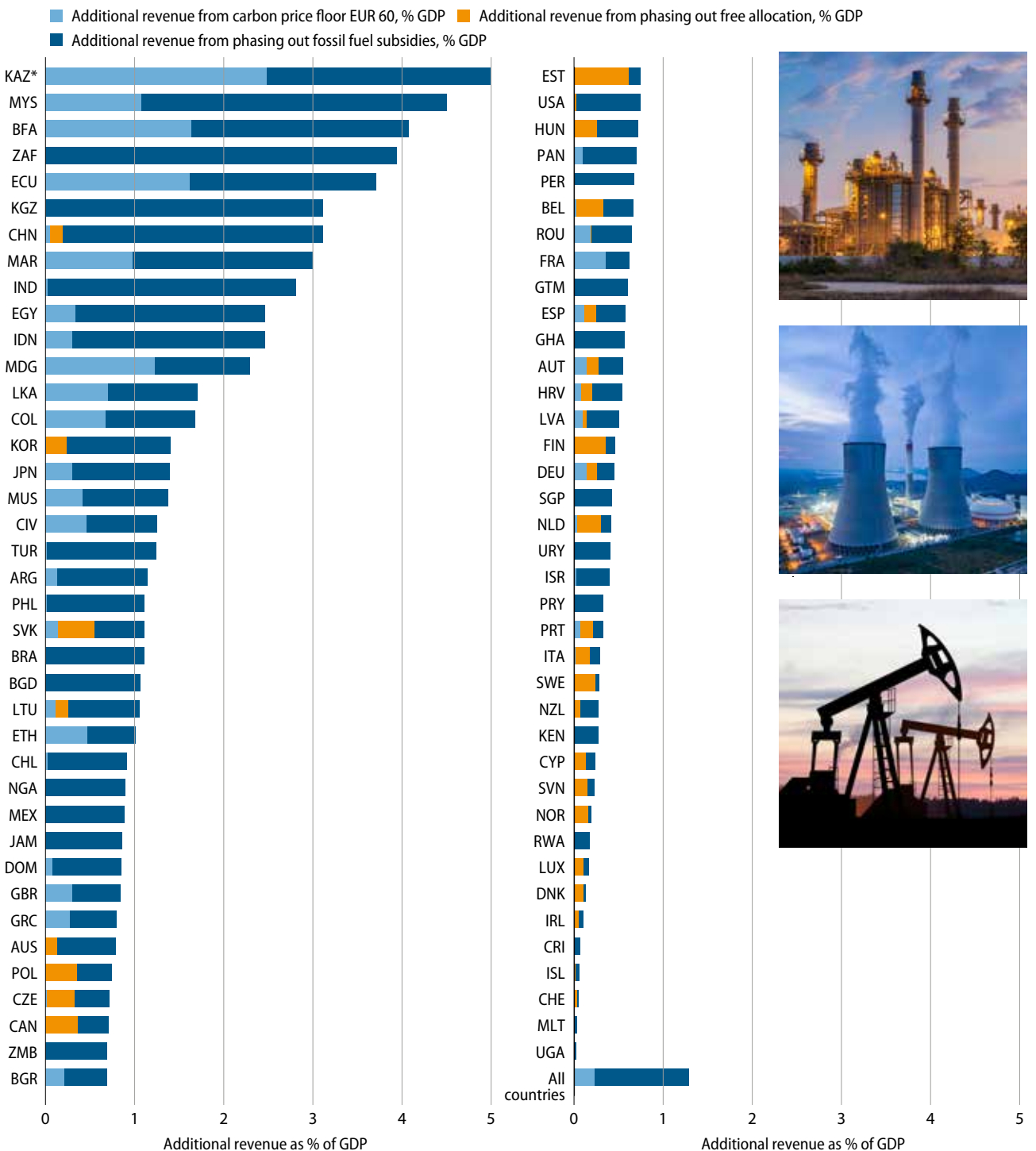


Revenue potential from raising prices

The level of **net carbon revenues remains low, on average just 0.6% of GDP**, however, a comprehensive carbon pricing reform, including setting a minimum effective carbon price at EUR 60/tCO₂, phasing out free allocations of ETS permits and phasing out fossil fuel subsidies, could raise

additional revenue equivalent to 1.1% of GDP (Figure 4). **The vast majority of additional revenue potential comes from raising carbon prices to EUR 60/tCO₂** (0.9% of GDP on average), with a much smaller contribution from phasing out fossil fuel subsidies and free allocations of ETS permits.

Figure 4: Raising Effective Carbon Rates is key driver of additional revenue potential



Fossil fuel use faces higher Effective Energy Rates than low-carbon electricity sources

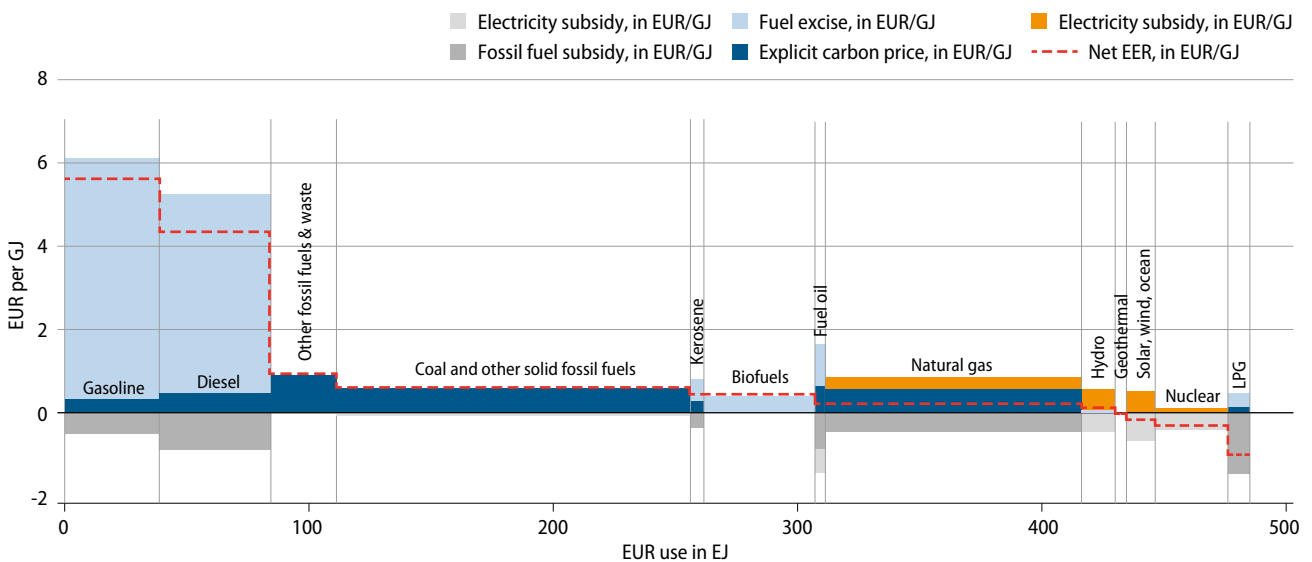
Assessing taxation of fuel and electricity use through the *Effective Energy Rates* (EERs), shows that **more than half of energy use remains untaxed in 2023**. High-income countries taxed energy use at EUR 4.96/GJ in 2023, while low-upper and middle-income economies levied on average EUR 0.54/GJ.

Overall, the **EER's distribution remains heavily skewed** due to differentiated rates across sectors, fuels and consumer groups within a country and differences of tax levels between countries. In particular, **fuel excise**

taxes continue to dominate EERs, which on average contribute to 74% of countries' EERs.

Fossil fuel use is subject to a higher Net EER than low-carbon electricity sources (Figure 5). The road transport fuels, gasoline and diesel, continue to face the highest rate. In 2023, the **Net EER of coal exceeded natural gas due to higher subsidies for the latter**. All low-carbon electricity sources are subject to the lowest Net EERs, with solar, wind and nuclear power effectively being subsidised.

Figure 5: On average, fossil fuels face a higher Net EER than other energy sources



Source: OECD (2023), *Effective Carbon Rates 2023*.





As the world is electrifying, energy tax bases are changing rapidly

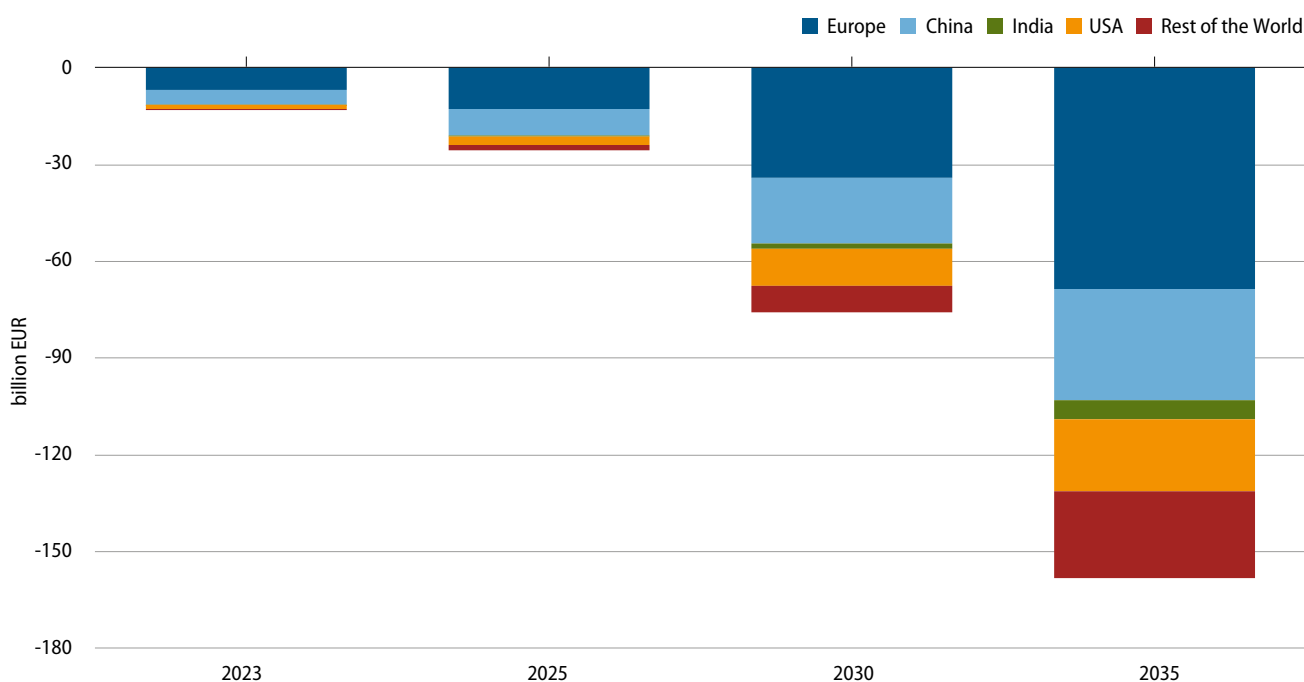
The global energy crisis created in 2022 in the energy sector has **accelerated clean energy transitions**, as governments have responded with stronger non-pricing policies to improve energy security using low-carbon sources.

Fuel excise taxes on gasoline and diesel are an **important source of revenue for many governments**. At the same time, the deployment of electric vehicles has increased in major markets, boosted by subsidies and other measures. Transitioning vehicle fleets from models with an internal combustion engine to electric

ones **may significantly reduce revenues under current tax systems** as additional revenue from electricity taxes tends to be insufficient to cover the revenue loss.

Global revenue losses from displaced oil consumption due to rapidly electrifying road transport could **increase to more than EUR 155 billion in 2035** (Figure 6). There are signs governments have started adjusting policy frameworks, with some recent examples showing a shift from energy taxes towards vehicle-related taxes and distance-based road user charges.

Figure 6: The rapid road transport electrification brings substantial tax revenue losses



Source: OECD (2024), Pricing Greenhouse Gas Emissions 2024

Conclusions and outlook

Pricing Greenhouse Gas Emissions 2024 provides indicators for assessing the progress of carbon pricing and energy taxation.

Progress in carbon pricing has slowed with modest increases in explicit carbon rates and large reductions in overall Net ECRs due to responses to the energy crisis in 2022. However, progress is being made in preparation for the next phase of carbon pricing and energy taxation through the **development and introduction of new carbon pricing instruments – predominantly ETs.**

The Effective Energy Rates (EERs) show that **more than half of fuel and electricity use remains untaxed in 2023** and fossil fuel use is subject to a higher Net EER than low-carbon electricity sources.

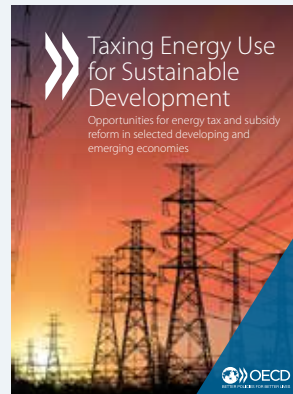
Together, these indicators and developments represent a **global stocktake of the current state of carbon pricing and energy taxation.** As the countries look to 2030 targets and beyond, recent developments point to increased efforts aimed at expanding the role of carbon pricing to meet future climate goals – thus **Gearing Up to Bring Emissions Down.**



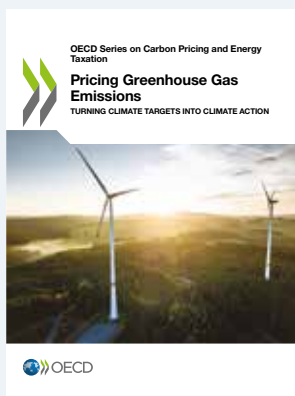
Further reading



OECD (2023), **Effective Carbon Rates 2023: Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading**, *OECD Series on Carbon Pricing and Energy Taxation*, OECD Publishing, Paris, <https://doi.org/10.1787/b84d5b36-en>



OECD (2021), **Taxing Energy Use for Sustainable Development: Opportunities for Energy Tax and Subsidy Reform in Selected Developing and Emerging Economies**, OECD Publishing, Paris, <http://www.oecd.org/tax/tax-policy/taxing-energy-use-for-sustainable-development.htm>



OECD (2022), **Pricing Greenhouse Gas Emissions: Turning Climate Targets into Climate Action**, *OECD Series on Carbon Pricing and Energy Taxation*, OECD Publishing, Paris, <https://doi.org/10.1787/e9778969-en>



OECD (2019), **Taxing Energy Use 2019: Using Taxes for Climate Action**, OECD Publishing, Paris, <https://doi.org/10.1787/058ca239-en>



OECD WORKING PAPERS

D'Arcangelo, F. M., Pisu, M., Raj, A. and Van Dender, K. (2022), **“Estimating the CO₂ emission and revenue effects of carbon pricing: New evidence from a large cross-country dataset”**, *OECD Economics Department Working Papers*, No. 1732, OECD Publishing, Paris, <https://doi.org/10.1787/39aa16d4-en>

Flues, F. and K. Van Dender (2020), **“Carbon pricing design: Effectiveness, efficiency and feasibility: An investment perspective”**, *OECD Taxation Working Papers*, No. 48, OECD Publishing, Paris, <https://doi.org/10.1787/91ad6a1e-en>

Van Dender, K. (2019), **“Taxing vehicles, fuels, and road use: Opportunities for improving transport tax practice”**, *OECD Taxation Working Papers*, No. 44, OECD Publishing, Paris, <https://doi.org/10.1787/e7f1d771-en>



For more information:



ctp.contact@oecd.org



<https://oe.cd/pricing-greenhouse-gas-emissions-2024>



[@OECDtax](https://twitter.com/OECDtax)



[OECDtax](https://www.linkedin.com/company/oecd-tax)

