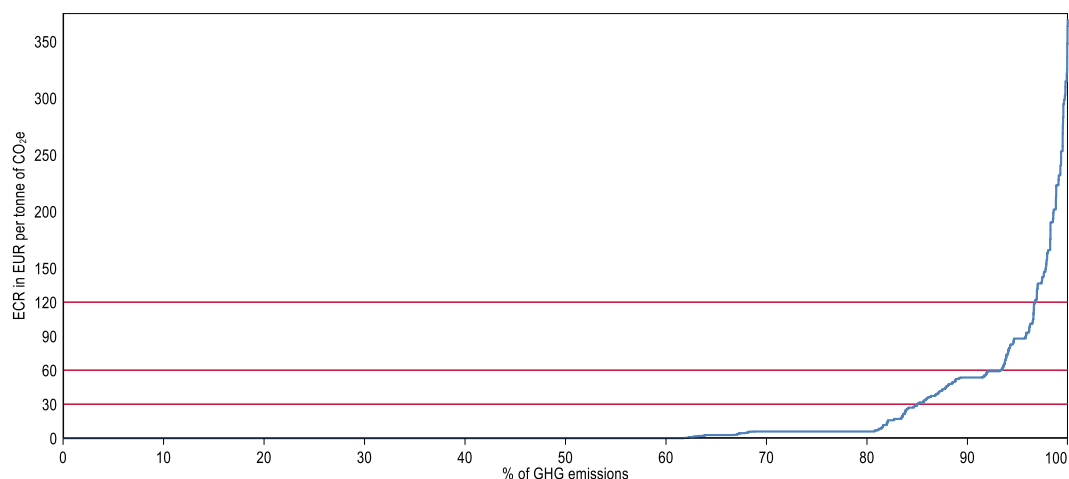


Annex A. Results including CO₂ emissions from biofuel combustion

This Annex presents Effective Carbon Rates (ECRs) results from Chapter 2, as well as ETS country and sectoral coverage (see Chapter 3) when accounting for CO₂ emissions from biofuel combustion. These emissions represent a non-negligible share of CO₂ emissions from energy use (about 13.5%, see Figure A A.4, Panel A). CO₂ emissions from biofuel combustion face low price coverage and levels. Accordingly, when accounting for CO₂ emissions from biofuel combustion, 38% of total GHG emissions are priced (Figure A A.1). Coverage decreases in all six sectors responsible for CO₂ emissions from energy use, and mostly so in the buildings sector, where the share of emissions facing no carbon price goes from 64% when excluding these emissions, to 81% when including them (Figure A A.2). When accounting for emissions from biofuels, the shares of buildings in total GHG emissions goes up from 6.3% to 10.7%. ECRs in this sector are much lower, as fuel excise taxes often exempt or present lower rates on biofuels (biofuels face the second lowest average ECR after coal, see Figure A A.4, Panel A), especially when used for residential and commercial purposes. ECRs in the industry sector are lower as well, since prices in that sector most stem from emissions trading systems (ETS), which generally do not apply to CO₂ emissions from biofuel combustion (except for the German nEHS, which covers biofuels which do not follow certain sustainability criteria) (Figure A A.3). This also explains why ETS coverage is lower in all countries and sectors when accounting for CO₂ emissions from biofuel combustion (Figure A A.5, Figure A A.6). This is especially the case for the buildings and industry sector, which is where biofuels are most used (Figure A A.4, Panel B).

Figure A A.1. Distribution of ECRs, including CO₂ emissions from biofuel combustion

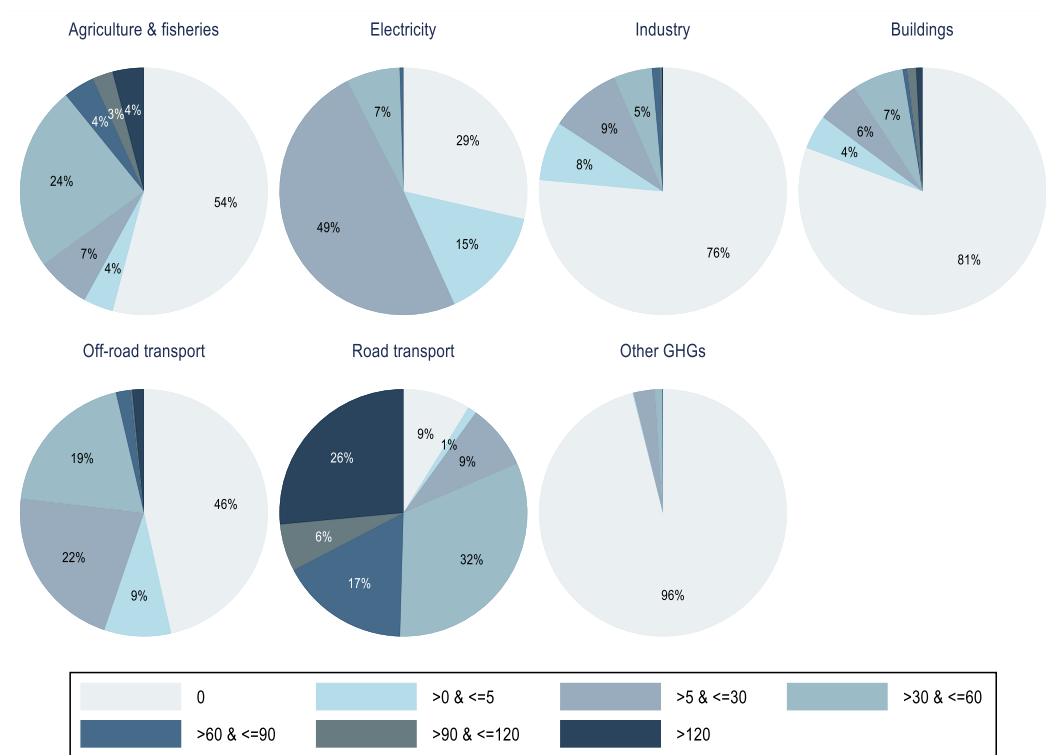
2021, 72 countries



StatLink  <https://stat.link/ur2p78>

Figure A A.2. Proportion of CO₂e emissions priced at different ECR levels by sector, including CO₂ emissions from biofuel combustion

2021, 72 countries



Note: Other GHG emissions refer to emissions from methane (CH₄), nitrous oxide (N₂O), F-gases and process CO₂ emissions excluding LUCF.


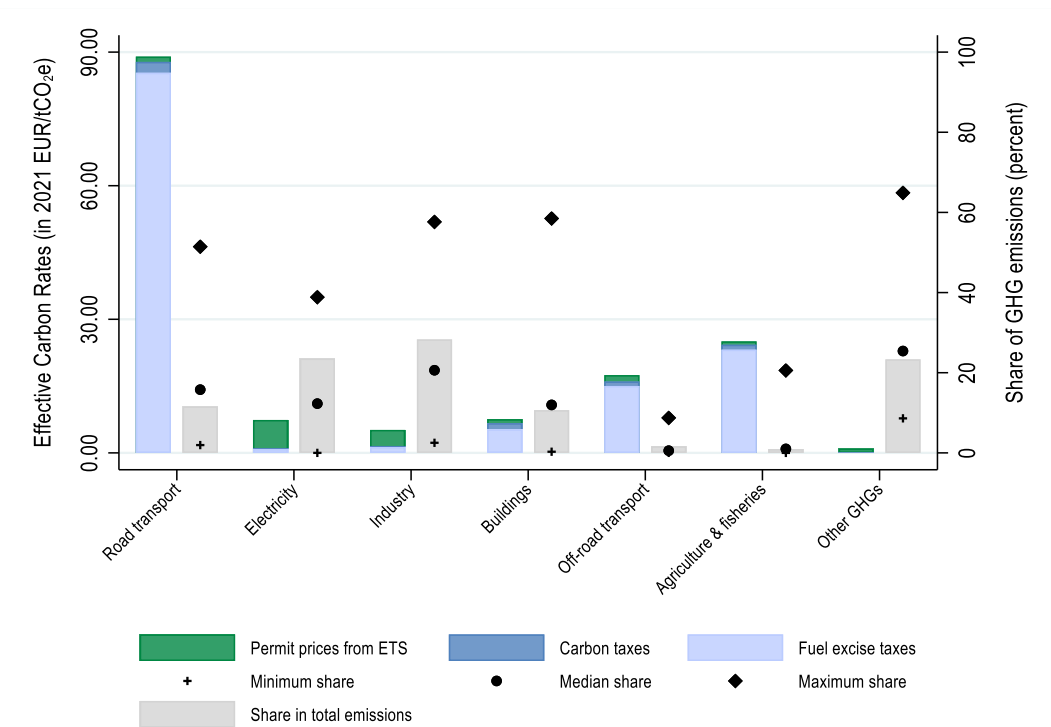
StatLink  <https://stat.link/4uxglw>

Figure A A.3. Carbon pricing instruments and share of GHG emissions by sector, including CO₂ emissions from biofuel combustion

2021, 72 countries

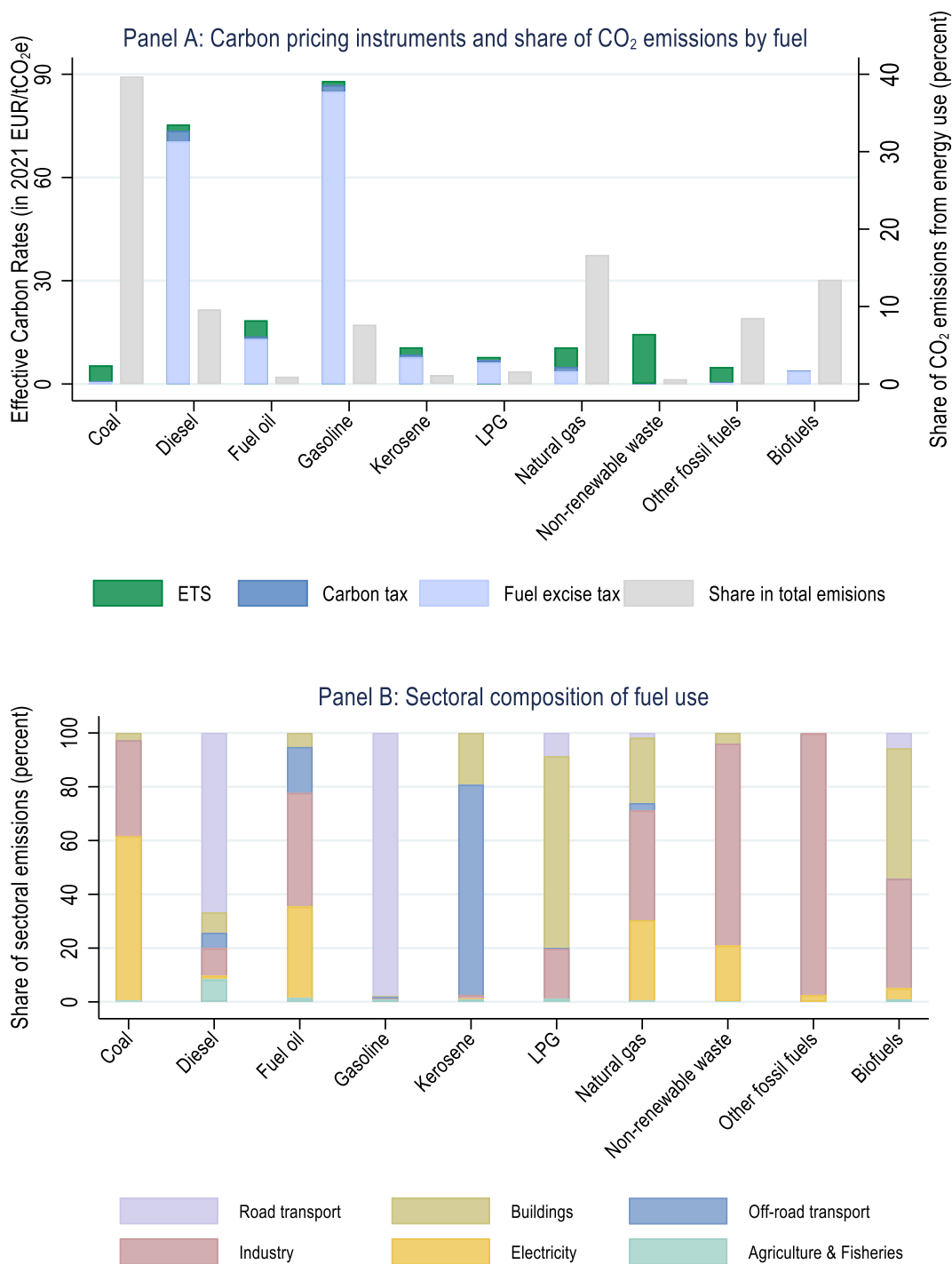


Note: The left-hand side bars of this graph show ECR components by sector. Together, emissions from the road transport, electricity, industry, buildings, off-road transport and agriculture and fisheries sectors make up CO₂ emissions from energy use. Other GHG emissions cover CH₄, N₂O and F-gas emissions as well as CO₂ emissions from industrial process. The right-hand side axis presents shares of emissions from these sectors in total emissions, as well as their country-level variation. “Minimum share” (resp. “Maximum share”) indicates the minimum share this sector may represent in a country’s total GHG emissions. “Median share” is the median of such shares across countries. For instance, the median share in the road transport sector indicates that half of countries in the sample have a road transport sector that accounts for more than 17.5% of national GHG emissions. Other GHG emissions data are from Climate Analysis Indicators Tool (Climate Watch, <https://www.climatewatchdata.org>) while the data on CO₂ emissions from energy use are based on the IEA World Energy Balances (IEA, 2023^[1]).

StatLink <https://stat.link/vlgxme>

Figure A A.4. ECR levels by fuel and sectoral composition of fuel emissions, including CO₂ emissions from biofuel combustion

2021, 72 countries

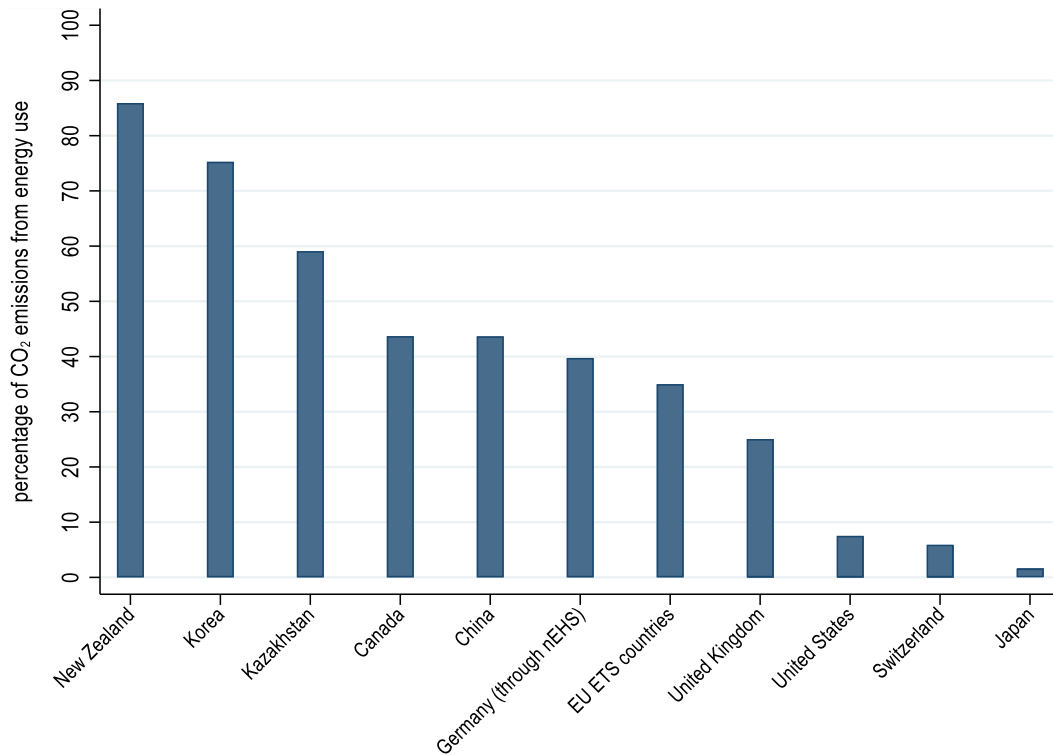


Note: "Coal" stands for "Coal and other solid fossil fuels". Other greenhouse gases are not included here as they are not fuel-based. CO₂ emissions from energy use are based on the IEA World Energy Balances (IEA, 2023₍₁₎).

StatLink <https://stat.link/2jt8kq>

Figure A A.5. Shares of CO₂ emissions from energy use priced by ETSs, including CO₂ emissions from biofuel combustion

In countries or supranational jurisdictions that have an ETS with positive permit prices, 2021

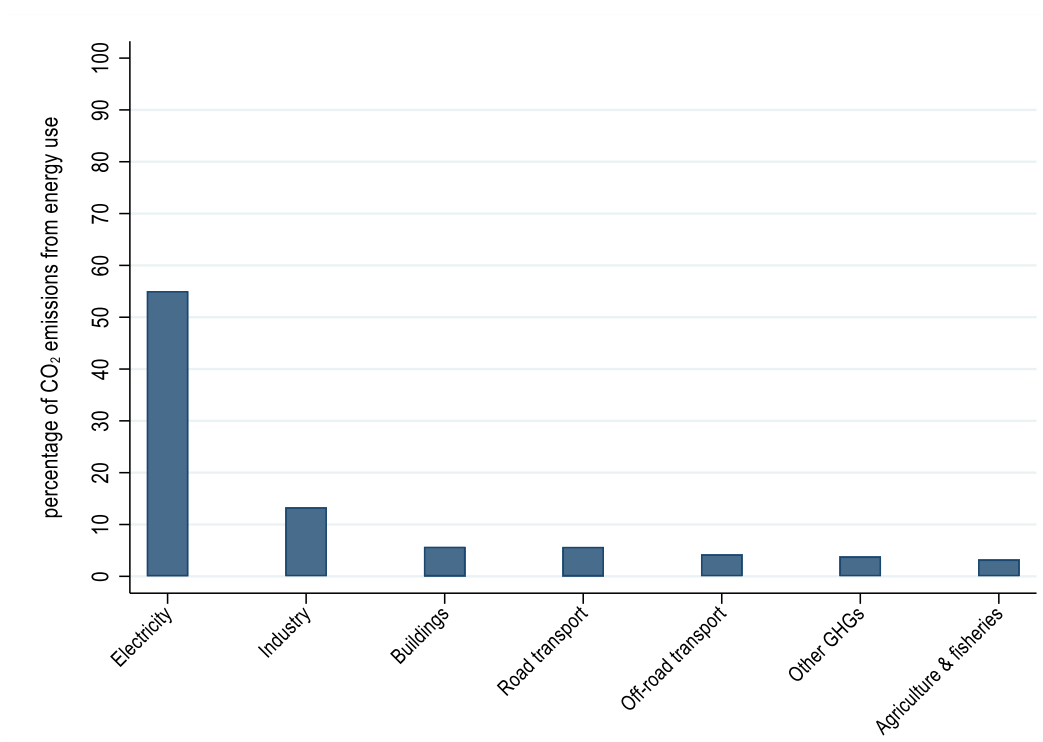


Note: The share presented for Germany separately from the rest of EU ETS countries refers to the share of CO₂ emissions from energy use covered by its national ETS (nationaler Emissionssystem, or nEHS). The share presented for EU ETS countries is the total share over all EU ETS countries covered in this report. The EU ETS applies to all EU countries as well as Iceland, Liechtenstein and Norway. The ECR database in this report does not cover Bulgaria, Croatia, Liechtenstein, Malta and Romania. Mexico's pilot ETS is not presented here because prices were null in 2021. Canada, China, Japan and the United States each have sub-national ETSs, and the country-level share of emissions covered by these systems (along with the national ETS for China) are presented here.

StatLink  <https://stat.link/1k7ctr>

Figure A A.6. Share of sectoral total emissions covered by an ETS, including CO₂ emissions from biofuel combustion

By sector, 2021, 72 countries



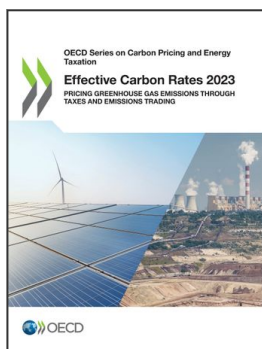
Note: The ETSs considered for the calculations presented in this figure are those present in Table 3.2 (33 ETSs). Description of emission trading systems and country-specific methodology.

StatLink  <https://stat.link/1vynpa>

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IEA (2023), “Extended world energy balances”, *IEA World Energy Statistics and Balances* (database), <https://doi.org/10.1787/data-00513-en> (accessed on 24 November 2023).

[1]



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