Supplement to Effective Carbon Rates 2018

Country profiles

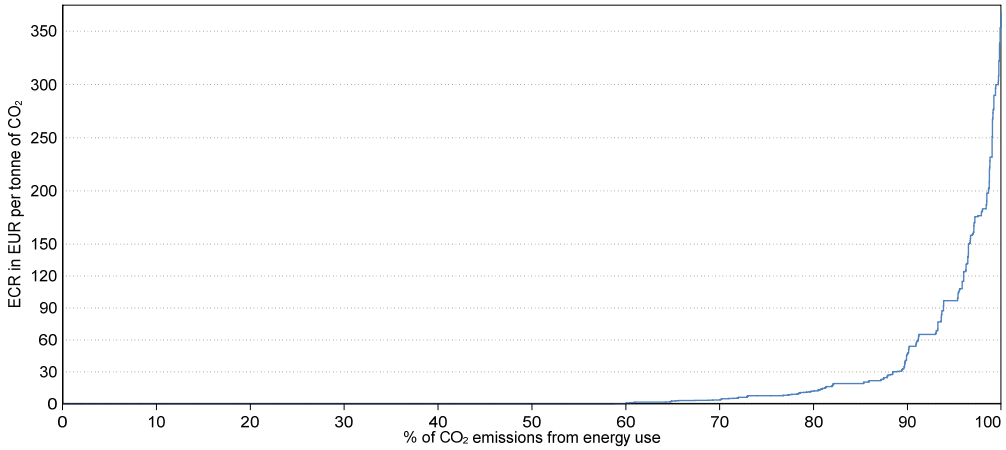
Effective Carbon Rates across 42 countries and on a country-by-country basis

This supplement to *Effective Carbon Rates 2018* (OECD, 2018[1]) presents results on a country-by-country basis. Specifically, it provides detail on the proportion of CO_2 emissions from energy use subject to different effective carbon rates (ECR) in each of the 42 countries, as well as on the level and components of average ECRs in each of the six economic sectors (road transport, off-road transport, industry, agriculture and fishing, residential & commercial, and electricity). To facilitate the interpretation of the graphs on a country-by-country basis, the figures are first presented and explained for the group of 42 countries as a whole.

Distribution of Effective Carbon Rates

Figure 1 presents the full distribution of ECR levels across the 42 economies, sorting CO_2 emissions from energy use according to the ECR at which they are priced, starting at zero. The horizontal axis shows the proportion of CO_2 emissions while the vertical axis shows the ECR in EUR per tonne of CO_2. Figure 1 allows the share of CO_2 emissions from energy use priced at any given ECR to be identified. For example, where the blue line crosses the dashed grey line corresponding to an ECR of EUR 30 per tonne CO_2 in Figure 1, the vertical axis indicates that just under 90% of carbon emissions from energy use across the 42 countries are priced below an effective carbon rate of EUR 30. Similarly, slightly more than 90% of emissions are priced below an effective carbon rate of EUR 60 and about 95% are priced below EUR 90 per tonne.

Figure 1. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in 42 OECD and selected partner economies in 2015



Average Effective Carbon Rates by sector and price instrument

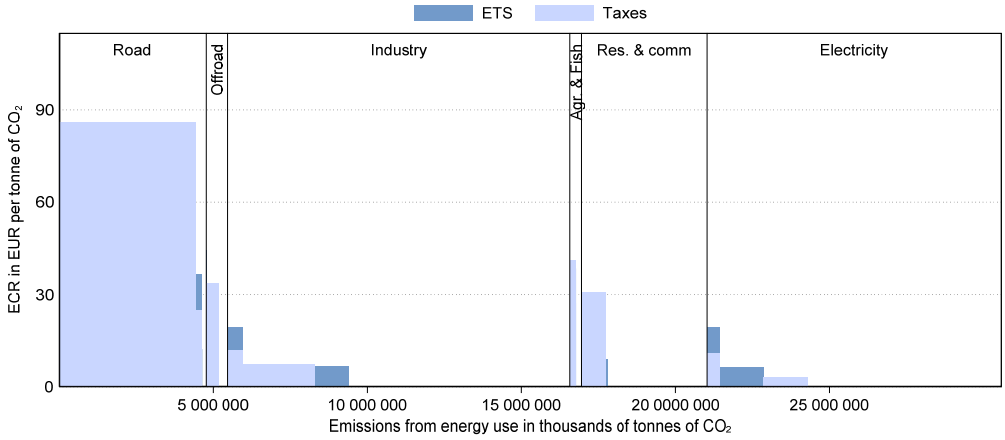
The levels and coverage of effective carbon rates vary widely across different sectors of the economy. This is illustrated in Figure 2, which presents the average ECRs and carbon

emissions from energy use for six sectors of the economy (road transport, off-road transport, industry, agriculture and fishing, residential & commercial, and electricity). The horizontal axis of Figure 2 shows total CO_2 emissions from energy use for each sector in the 42 countries in thousand tonnes of CO_2. The width of each sector along the horizontal axis therefore represents the total carbon emissions from energy use from each sector. The vertical axis shows different levels of ECRs. Within each of the six sectors, the width of the shaded rectangles shows the amount of CO_2 emissions from energy use in that sector subject to each type of price instrument. The height of each shaded rectangle represents the average price signal from that instruments for all emissions priced by that instrument (i.e. zeros are excluded).

Figure 2 allows the components of the average ECR in each sector to be identified. Carbon taxes and specific taxes from energy use are shown in light blue, while the ETS components of average ECRs are shown in dark blue. A tonne of CO_2 emissions can be priced in different ways: only via taxes (a light blue rectangle), only via a tradable emissions permit price (a dark blue rectangle), or via taxes and tradable permits (a light blue rectangle, with a dark blue rectangle on top). Emissions that are not priced are shown in the base, with no light blue or dark blue rectangle.

Figure 2 illustrates the wide variation in the composition of average ECRs in the different sectors of the economy across the 41 countries. Ninety-seven percent of carbon emissions from road transport are priced (shown as the combined width of the two light blue rectangles in the road transport sector). Ninety-three percent of road emissions are priced by taxes alone at an average rate of EUR 86 per tonne of CO_2. Four percent of road emissions are subject to taxes and an ETS (the narrow dark blue bar) at an overall average ECR of EUR 37 per tonne CO_2. CO_2 emissions from off-road transport and from agriculture and fishing – two relatively small sectors in terms of CO_2 emissions – are mainly priced via taxes, but ECR coverage is significantly lower than in the road sector (see the width of the light blue bars), and they are also priced at lower average rates (see the height of the light blue bars). ETS only cover a very small proportion of emissions in each of these sectors, as shown by the almost invisible dark blue bar in these two sectors.

Figure 2. Average effective carbon rates across in 42 OECD and selected partner economies by sector and component



Emissions from industry account for more than a third of carbon emissions from energy use across the 42 countries. Sixty-four percent of industrial emissions are unpriced. Of the remainder, the instrument mix is relatively diverse: 21% of emissions are subject to taxes only (the light blue bar), 10% of emissions are priced via an ETS only (the dark blue bar), and 4% of emissions are priced via both taxes and ETS (the dark blue and light blue bar combined). The overlap between ETS and taxes is thus relatively small in the industry sector, implying that the two pricing instruments often cover different emissions, increasing the total amount of emissions covered by a price.

A similar pricing pattern is observed for carbon emissions from energy used in electricity generation, which also account for a bit less than a third of emissions in the 41 countries on average. While in this sector 66% of carbon emissions are unpriced, 4% of emissions are subject to both a tax and an ETS and face an average combined price from these instruments of EUR 19 per tonne CO_2 (i.e. the light blue and dark blue bar). Taxes on energy use alone (the light blue bar in the electricity sector) apply to 15% of emissions at an average rate of EUR 3 per tonne of CO_2. A similar proportion of emissions (15%) are priced at EUR 6 per tonne of CO_2 on average through an ETS (the dark blue bar). As in the industry sector, the taxes and permit prices often cover different emissions.

The price signal from energy taxes dominates the ECR on carbon emissions from the residential and commercial sector, as it covers a relatively large proportion of the base (19%).

Because different fuels used in one sector may be taxed at very different rates, the average carbon rates presented in Figure 2 may hide significant differences within sectors. For example, a majority of countries tax CO_2 emissions from gasoline used in the road transport sector at much higher rates than those from diesel. Similarly, emissions from coal use are often taxed at rates significantly lower than those applied to emissions from oil products or natural gas. *Taxing Energy Use 2018* (OECD, 2018[2]) provides more detail on the exact distribution of tax rates that underlies the average tax rates shown in Figure 2 and the country versions of this figure presented below.

All figures in the country notes include emissions from biomass. Where emissions from biomass account for a large share of a country's carbon emissions, numbers excluding emissions from biomass are cited in the text accompanying the figures.

Annex A of *Effective Carbon Rates* (OECD, 2016[3]) describes the detailed methodology and the data sources used for calculating ECRs, while Annex A of *Effective Carbon Rates* 2018 (OECD, 2018[1]) provides additional information on estimating coverage and permit prices of emissions trading for calculating ECRs.

Effective Carbon Rates 2018 (OECD, 2018[4]) is available on: http://oe.cd/ECR2018

Argentina

Figure 3. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Argentina in 2015

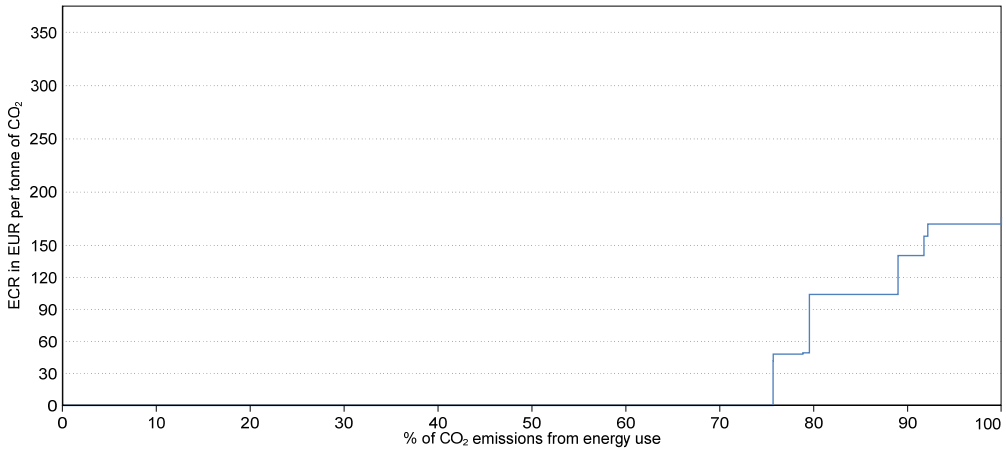
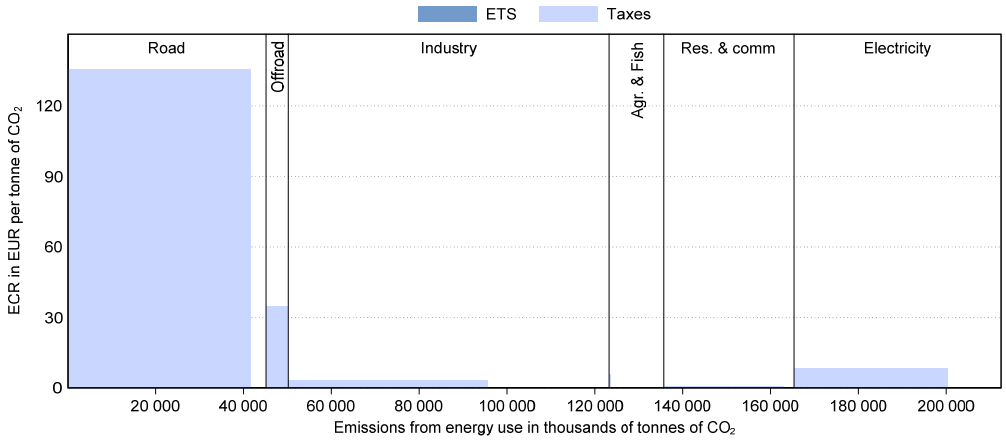


Figure 4. Average effective carbon rates in Argentina by sector and component in 2015



In 2015, effective carbon rates in Argentina arose from specific taxes on energy use. Argentina did not apply an explicit carbon tax or an emissions trading system. Argentina priced 73% of carbon emissions from energy use and 24% were priced at an ECR above EUR 30 per tonne of CO_2 (see Figure 3). Many of these emissions were from the road sector, while the majority of unpriced emissions in Argentina stemmed from energy used in the industry, electricity, and road sector (see Figure 4).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Australia

Figure 5. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Australia in 2015

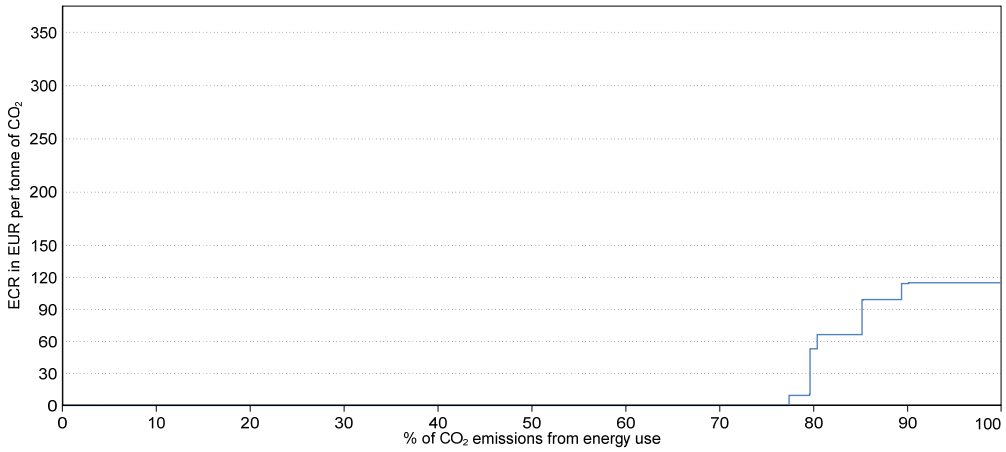
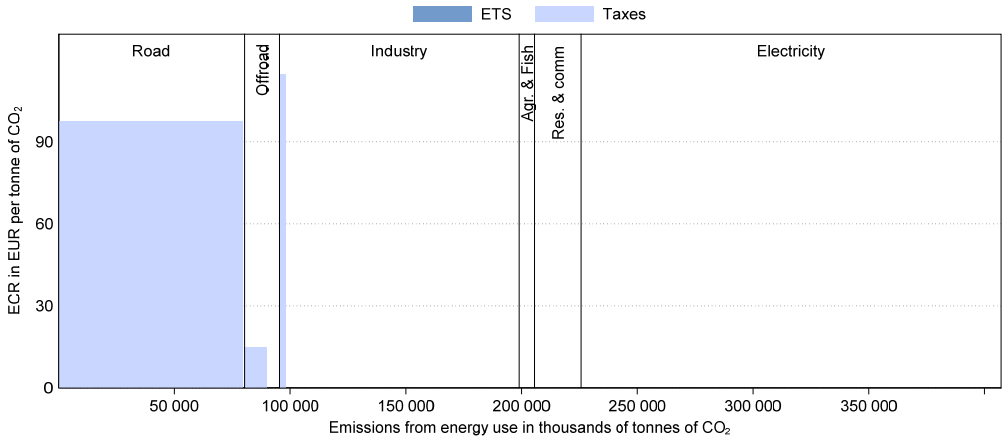


Figure 6. Average effective carbon rates in Australia by sector and component in 2015



In 2015, effective carbon rates in Australia arose from specific taxes on energy use. Australia did not apply an explicit carbon tax or an emissions trading system. Australia priced 23% of carbon emissions from energy use, of which 20% were priced at an ECR above EUR 30 per tonne of CO_2 (see Figure 5). Many of these emissions were from the road sector. The majority of unpriced emissions in Australia stemmed from energy used in the electricity and industry sectors (see Figure 6).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Austria

Figure 7. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Austria in 2015

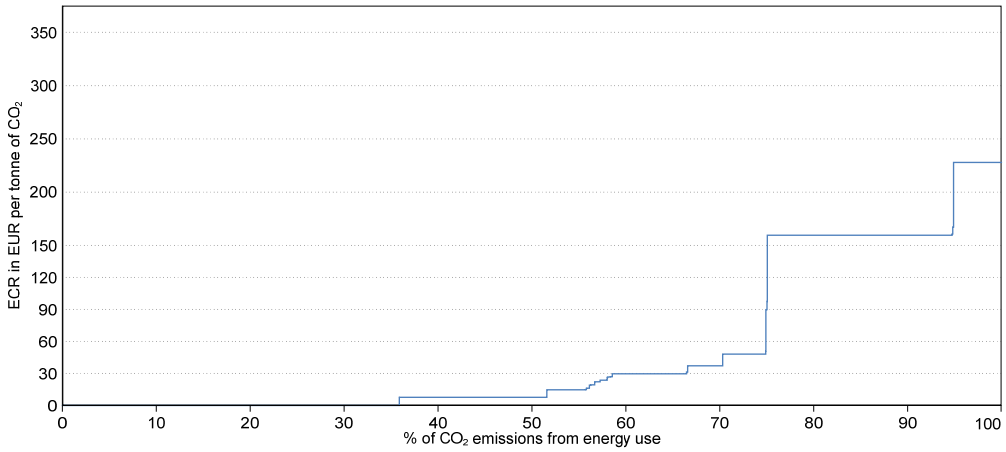
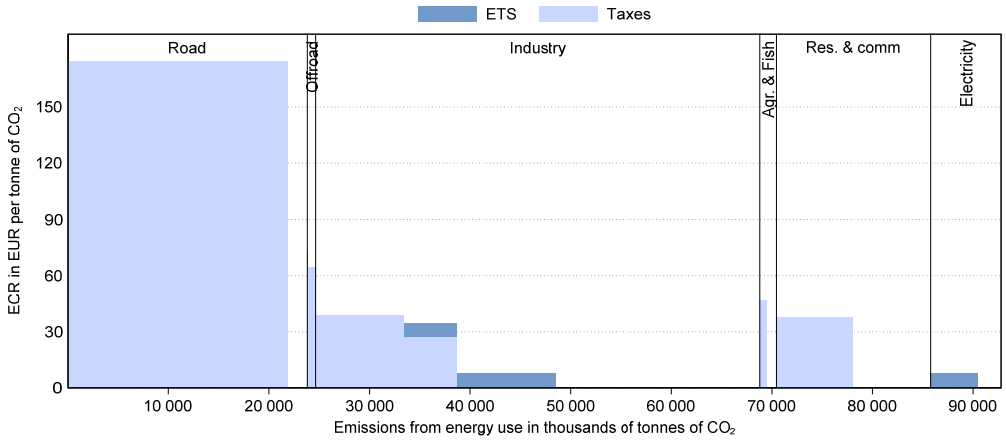


Figure 8. Average effective carbon rates in Austria by sector and component in 2015



In 2015, effective carbon rates in Austria consisted primarily of specific taxes on energy use, and to a small extent of permit prices from the EU ETS. Austria did not have an explicit carbon tax. Austria priced 64% of its energy-related CO_2 emissions and 34% were priced at an ECR above EUR 30 per tonne of CO_2 (see Figure 7); a majority of the latter were from the energy used in the road sector (see Figure 8). Taxes and prices from tradable permits each covered around a fifth of emissions from energy use in the industry sector, while a small portion of emissions were covered by both instruments. Unpriced emissions were primarily emitted by the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Belgium

Figure 9. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Belgium in 2015

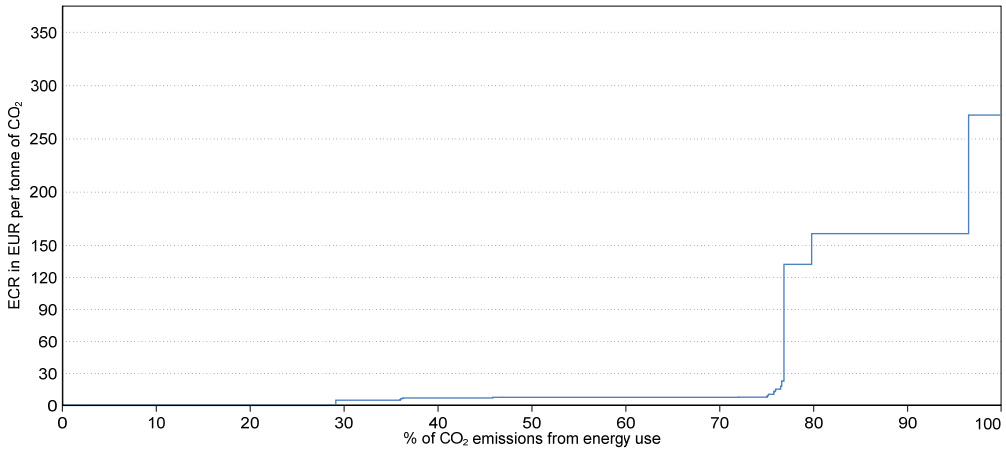
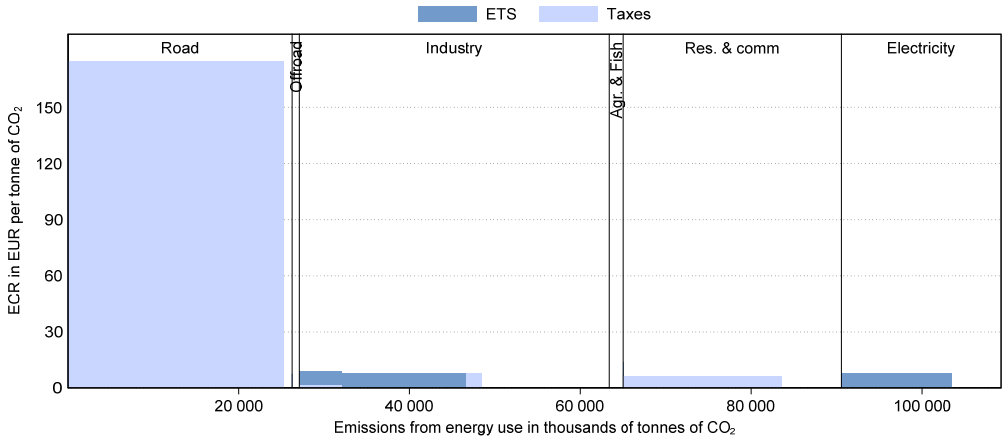


Figure 10. Average effective carbon rates in Belgium by sector and component in 2015



In 2015, effective carbon rates in Belgium consisted primarily of specific taxes on energy use, and to a small extent of permit prices from the EU ETS. Belgium did not have an explicit carbon tax. Belgium priced 72% of carbon emissions from energy use and 23% were priced at an ECR above EUR 30 per tonne of CO_2 (see Figure 9). All of the latter were from the road sector (see Figure 10). The coverage of taxes and prices from tradable permits was largely separate in the industry sector; the EU ETS on its own applied to about 40% of emissions, and taxes on their own to about 5%. Carbon pricing from tradable permits accounts for the nearly the entire effective carbon rate in the electricity sector. Unpriced emissions were primarily emitted by the industry sector, as well as the residential and commercial and electricity sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Brazil

Figure 11. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Brazil in 2015

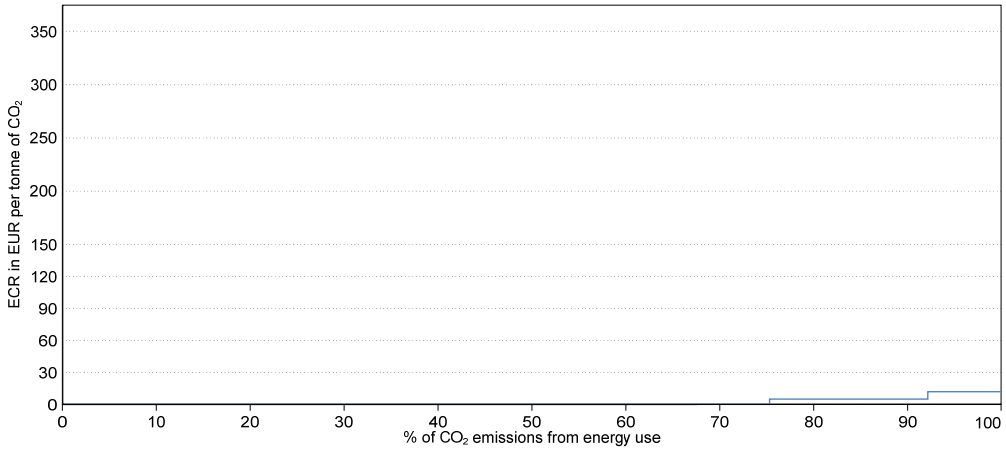
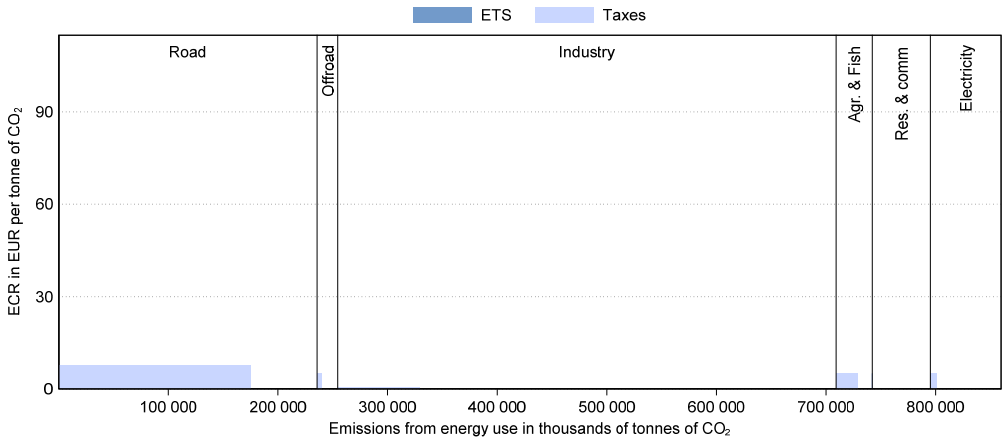


Figure 12. Average effective carbon rates in Brazil by sector and component in 2015



In 2015, effective carbon rates in Brazil consisted entirely of specific taxes on energy use; Brazil did not apply an explicit carbon tax or an emissions trading system. Brazil priced 33% of emissions from energy use; no emissions were priced above EUR 30 per tonne of CO_2 (see Figure 11). The majority of priced emissions were from the road sector, while carbon emissions from the residential and commercial sector were not priced (see Figure 12). The majority of unpriced emissions were from the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Canada

Figure 13. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Canada in 2015

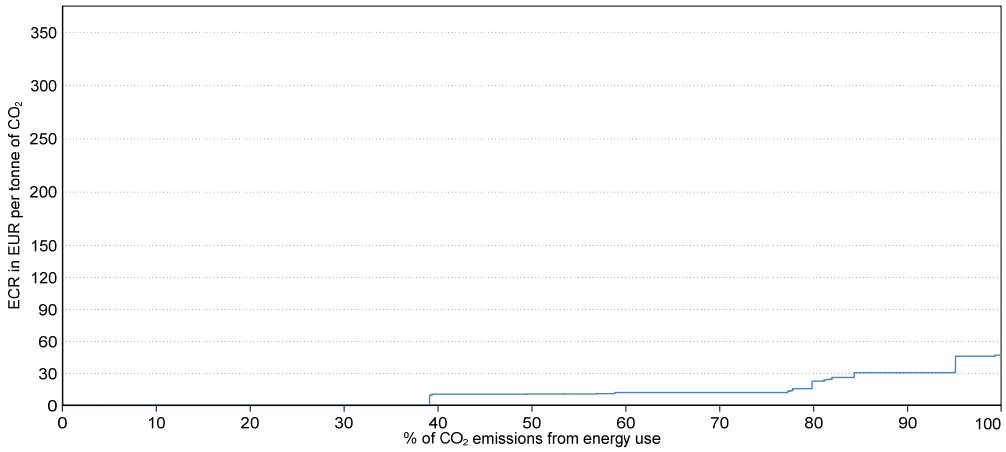
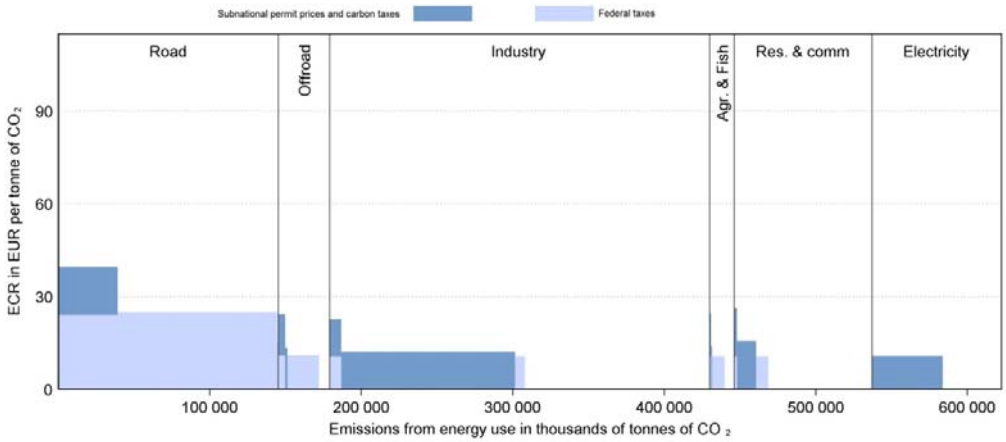


Figure 14. Average effective carbon rates in Canada by sector and component in 2015



Notes: Federal taxes shown in light blue, subnational permit prices and carbon taxes in dark blue

In 2015, effective carbon rates in Canada consisted of specific federal taxes on energy use and subnational carbon taxes, an emission trading system and a tradeable performance standard. More specifically the subnational British Columbia carbon tax, Alberta's tradeable performance standard and the Quebec Cap-and-Trade Program are included in this note. Canada priced 61% of its energy-related emissions and 16% were priced above EUR 30 per tonne of CO_2 (see Figure 13). The majority of emissions priced at this level were from the road transport sector (see Figure 14). The industry sector was the largest emitter of carbon from energy use – and 49% of the industry sector's emissions were priced. The areas shaded in light blue in Figure 14 show the emissions priced through federal taxes, while the areas in dark blue show the emissions subject to a subnational carbon prices.

Since 2015 carbon pricing coverage has significantly broadened in Canada, which is not shown in Figure 13 and Figure 14. In 2017, Ontario started a Cap-and-Trade program and Alberta introduced a carbon levy that covers most emitters that are not large enough to be covered by the tradeable performance standard, which itself was replaced by the similar but more stringent Carbon Competitiveness Incentive Regulation in 2018. In the same year, the federal government also announced a minimum carbon price in those provinces and territories that do not introduce carbon pricing in line with a federal benchmark by 2018 (Environment and Climate Change Canada, 2018[5]). The federal backstop aims to ensure broad coverage and minimum prices that increase over time. Similar to the way carbon pricing is implemented in Alberta (see the Annex on ETS), large emitters will be covered through an output-based system, whereas small emitters and fuel supplies will be covered by a carbon charge. The federal backstop shall apply as of 2019.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Chile

Figure 15. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Chile in 2015

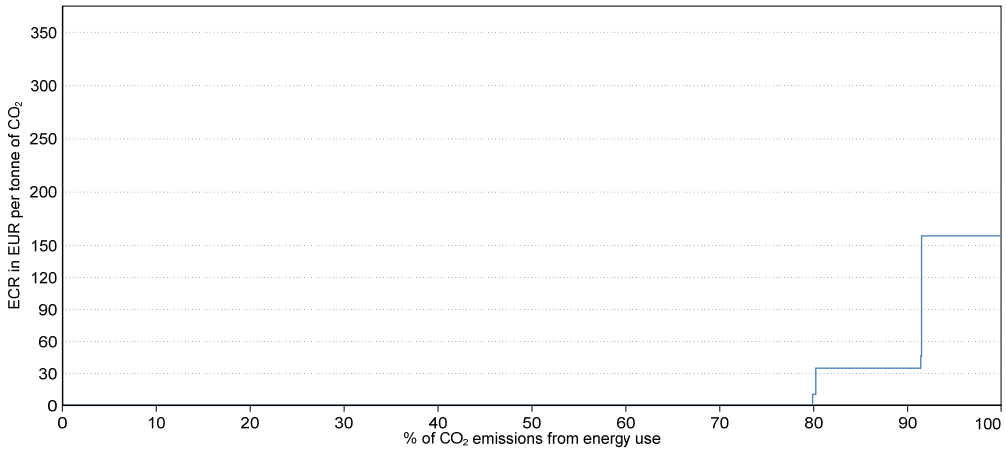
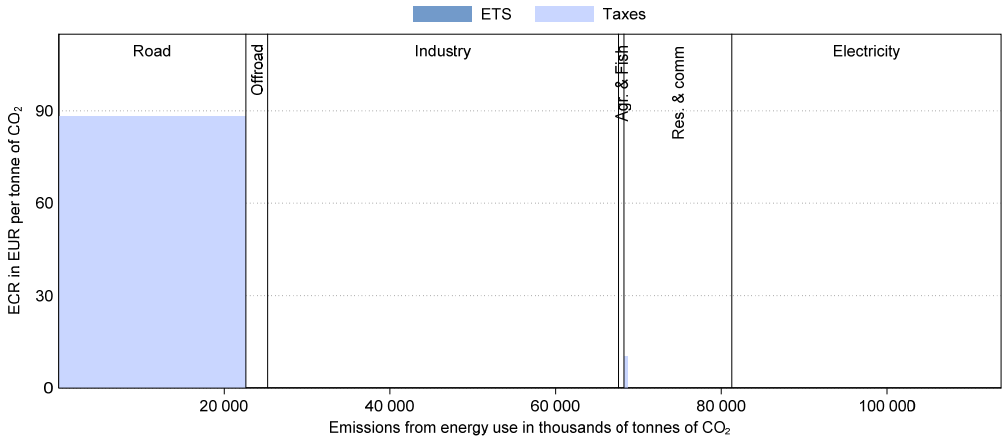


Figure 16. Average effective carbon rates in Chile by sector and component in 2015



In 2015, effective carbon rates in Chile consisted entirely of specific taxes on energy. Chile did not apply an explicit carbon tax or an emissions trading system. Chile priced 20% of emissions from energy use, all of which were priced above EUR 30 per tonne of CO_2 (see Figure 15). Almost all priced energy-related emissions were from the road sector. Emissions from the offroad transport, industry, agriculture and fisheries, residential and commercial, and electricity were not priced in 2015 (see Figure 16). In 2017, Chile introduced a carbon tax that increases the share of priced emissions.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

People's Republic of China

Figure 17. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in China in 2015

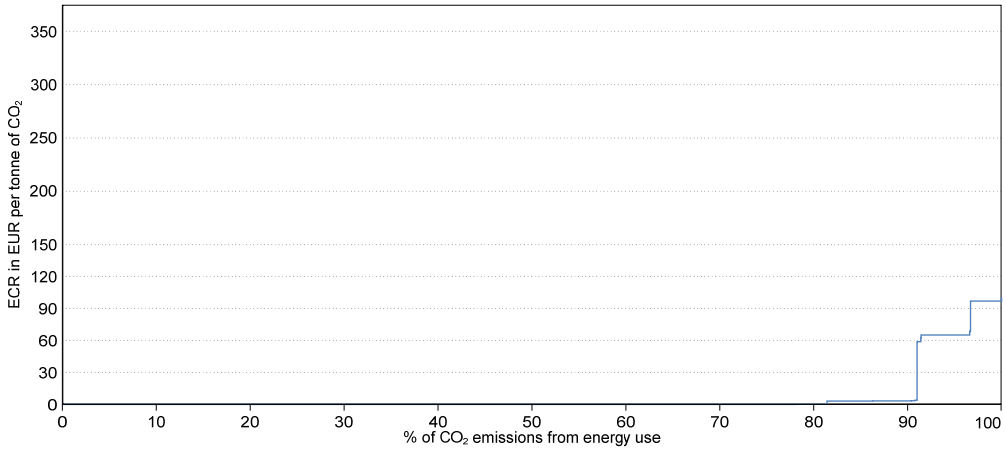
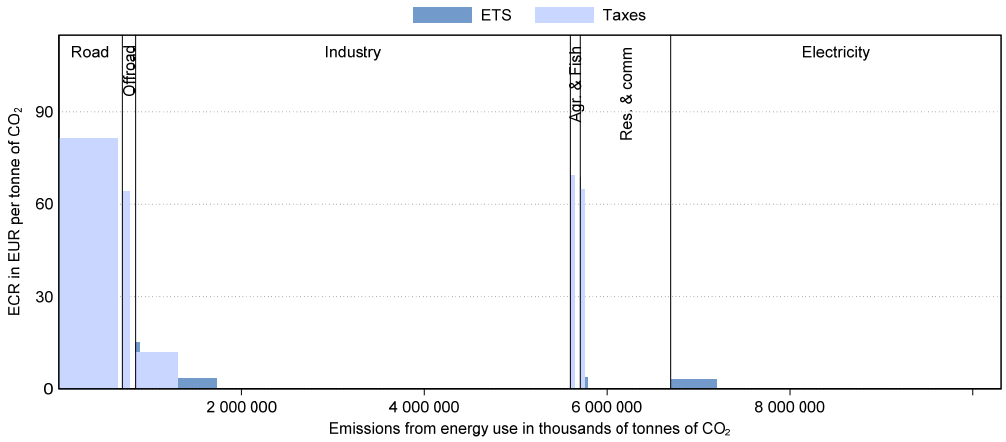


Figure 18. Average effective carbon rates in China by sector and component in 2015



In 2015, effective carbon rates in China consisted primarily of specific taxes on energy use. Five municipalities – Beijing, Chongqing, Shanghai, Shenzen and Tianjin – and two provinces – Guangdong and Hubei – have implemented emissions trading systems. China did not apply an explicit carbon tax. China priced 22% of carbon emissions from energy use and 9% were priced above EUR 30 per tonne of CO_2 (see Figure 17). The majority of the latter stemmed from the road transport sector (see Figure 18). In total, 9% of Chinese emissions were estimated to be covered by the subnational emissions trading schemes. The overlap between the emissions covered by taxes and emissions trading systems was very small. Unpriced emissions were found primarily in the electricity, industry, and residential and commercial sectors.

China announced in 2017 to implement a new national emissions trading systems. It is expected that the new national system will increase the share of priced emissions significantly, first in the electricity sector and later in the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Czech Republic

Figure 19. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in the Czech Republic in 2015

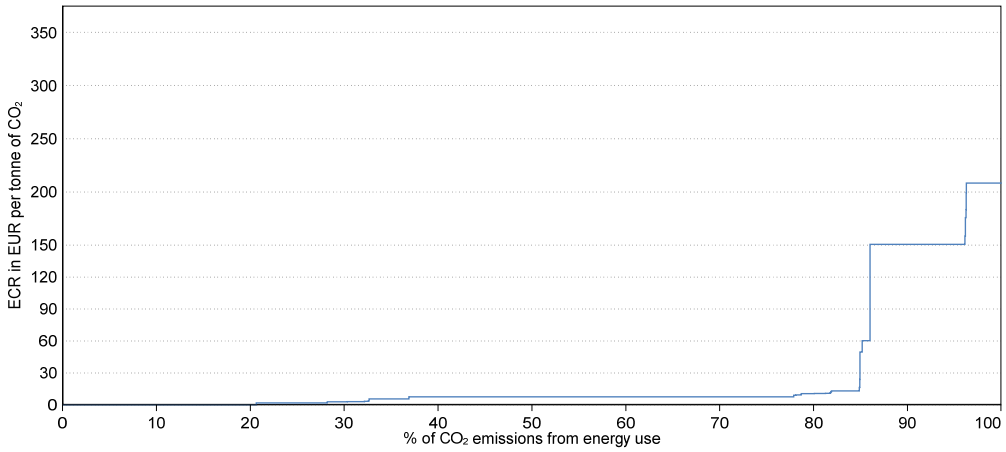
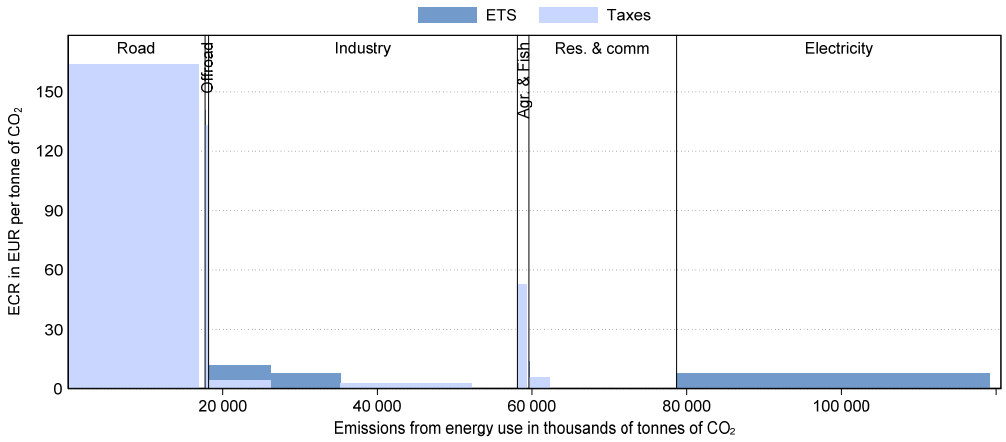


Figure 20. Average effective carbon rates in the Czech Republic by sector and component in 2015



In 2015, effective carbon rates in the Czech Republic consisted primarily of specific taxes on energy use and to a lesser extent of permit prices from the EU ETS. The Czech Republic did not have an explicit carbon tax. The Czech Republic priced 79% of carbon emissions from energy use and 15 % were priced at an ECR above EUR 30 per tonne of CO_2 (see Figure 19). Emissions priced at this level were primarily emitted by road transport (see Figure 20). Around a quarter of emissions from the industry sector were covered by both taxes and the ETS, nearly half were covered by only taxes, and the remainder of priced emissions were covered only by the EU ETS. Permit prices from the EU ETS were a significant component in the ECR in the electricity sector. A small portion of emissions were unpriced, and were emitted mainly by the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Denmark

Figure 21. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Denmark in 2015

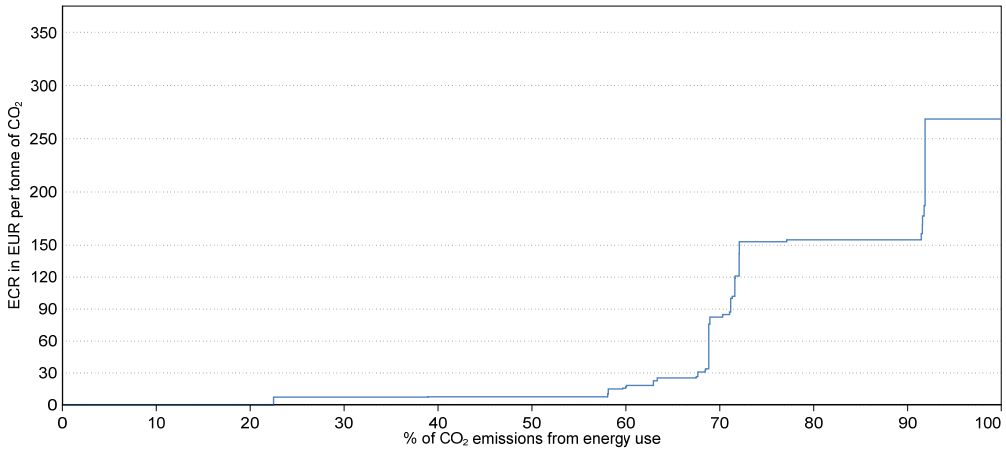
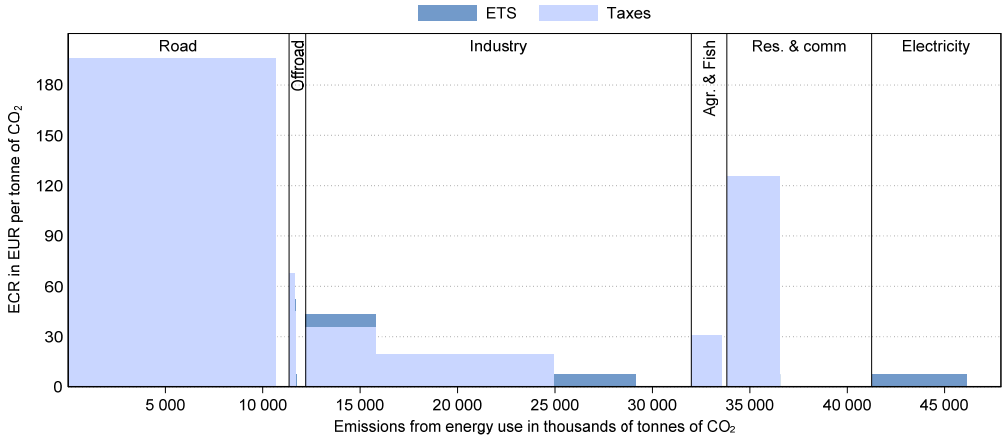


Figure 22. Average effective carbon rates in Denmark by sector and component in 2015



In 2015, effective carbon rates in Denmark consisted primarily of specific taxes on energy use and to a lesser extent of national carbon taxes and permit prices from the EU ETS. Denmark priced 78% of its energy-related CO_2 emissions, and 32% were priced at an ECR above EU 30 per tonne of CO_2 (see Figure 21). Many of these emissions were from the road transport sector (see Figure 22). Taxes and the EU ETS applied to largely separate bases; less than a tenth of emissions from energy use were subject to both taxes and prices from tradable permits. The majority of unpriced emissions were from the residential and commercial sector.

A large share of unpriced emissions was from the combustion of biomass. Excluding emissions from biomass combustion, 98% of CO_2 emissions from energy use in Denmark were priced at a positive rate, and 47% were priced above EUR 30 per tonne of CO_2. When excluding biomass, 99% of emissions in the residential and commercial sector were priced above EUR 30 per tonne of CO_2.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Estonia

Figure 23. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Estonia in 2015

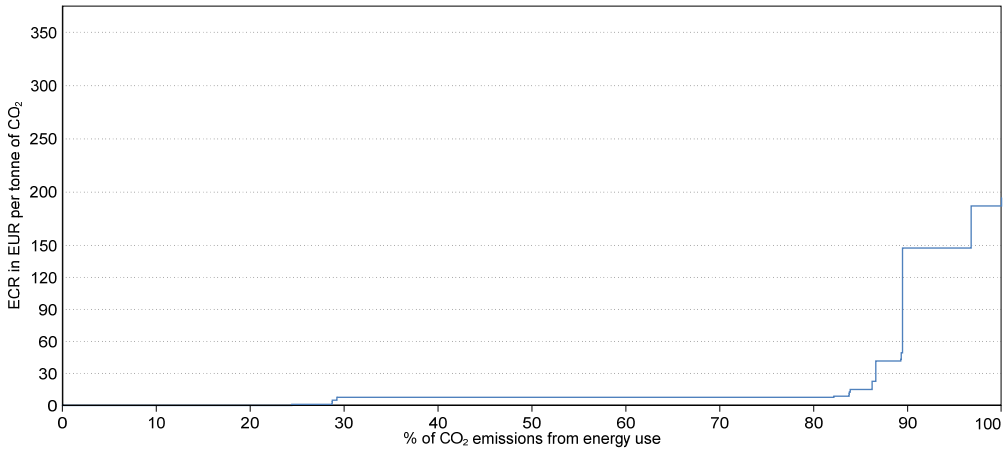
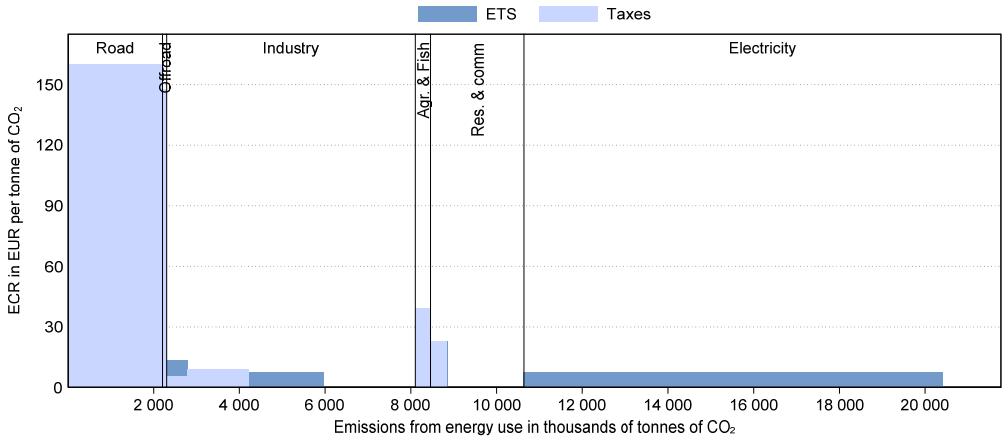


Figure 24. Average effective carbon rates in Estonia by sector and component in 2015



In 2015, effective carbon rates in Estonia consisted primarily of specific taxes on energy use and to a lesser extent of permit prices from the EU ETS. Estonia priced 76% of its carbon emissions from energy use, and 13% were priced at an ECR above EU 30 per tonne of CO_2 (see Figure 23). The majority of emissions priced at this level were from road transport (see Figure 24). Permit prices from the EU ETS accounted for the entirety of the ECR in the electricity sector. Unpriced emissions were primarily emitted by the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Finland

Figure 25. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Finland in 2015

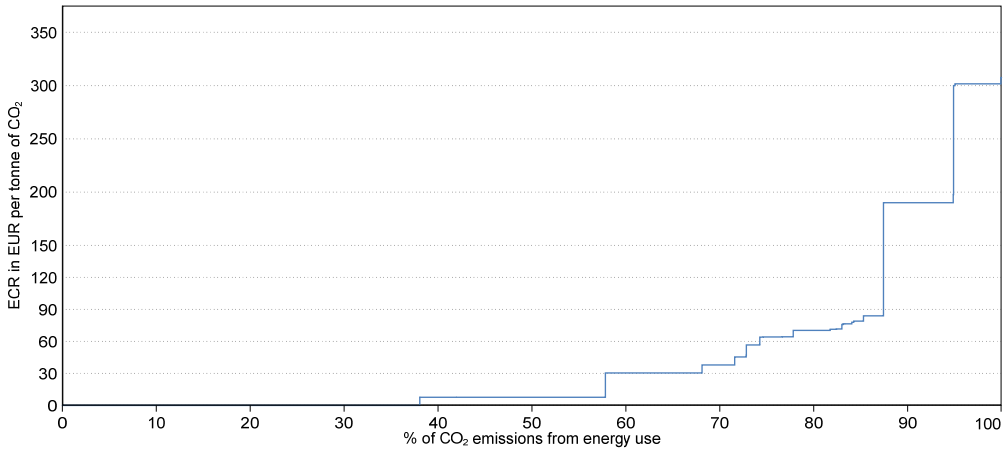
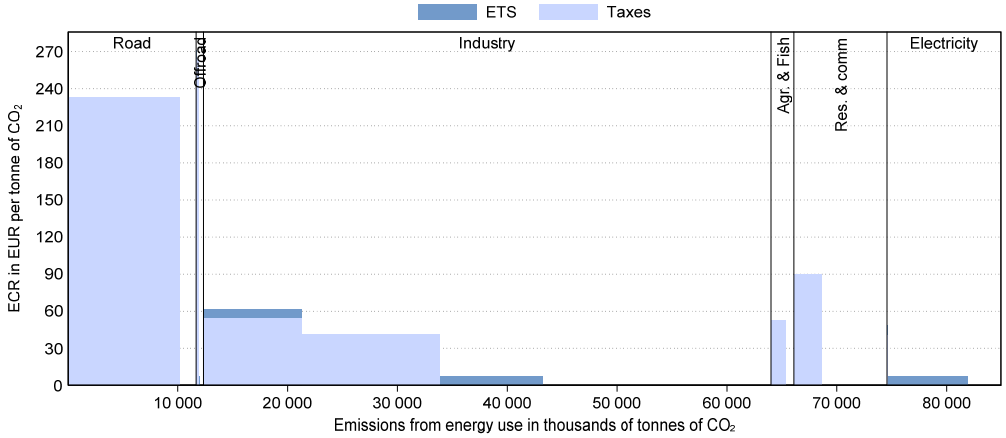


Figure 26. Average effective carbon rates in Finland by sector and component in 2015



In 2015, effective carbon rates in Finland consisted primarily of specific taxes on energy use and to a lesser extent of national carbon taxes and permit prices in the EU ETS. Finland priced 62% of carbon emissions from energy use and 42% were priced above EUR 30 per tonne of CO_2 (see Figure 25). Emissions priced at this level were primarily emitted by the industry and road transport sectors (see Figure 26). The coverage of taxes and prices from tradable emissions permits overlapped by close to a third of priced emissions from industry. The EU ETS accounted for the entirety of the ECR on emissions in the electricity sector. The majority of unpriced emissions were emitted by industry and electricity sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

France

Figure 27. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in France in 2015

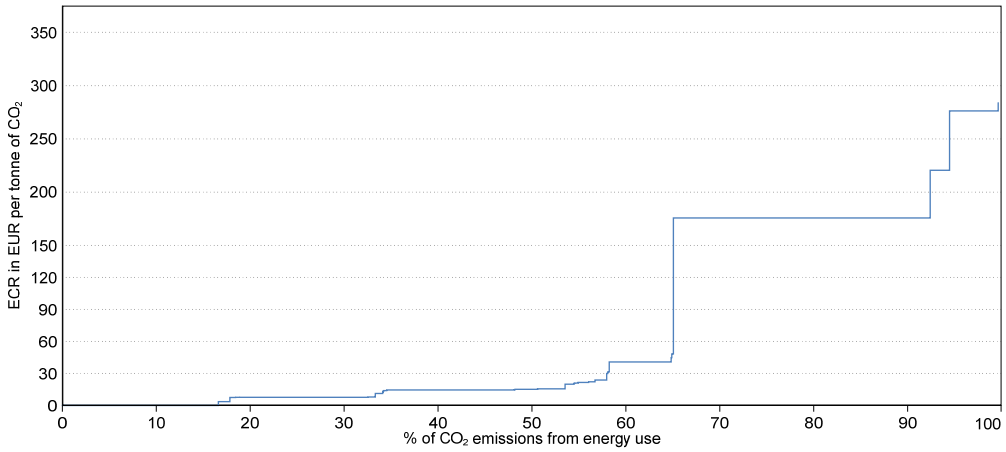
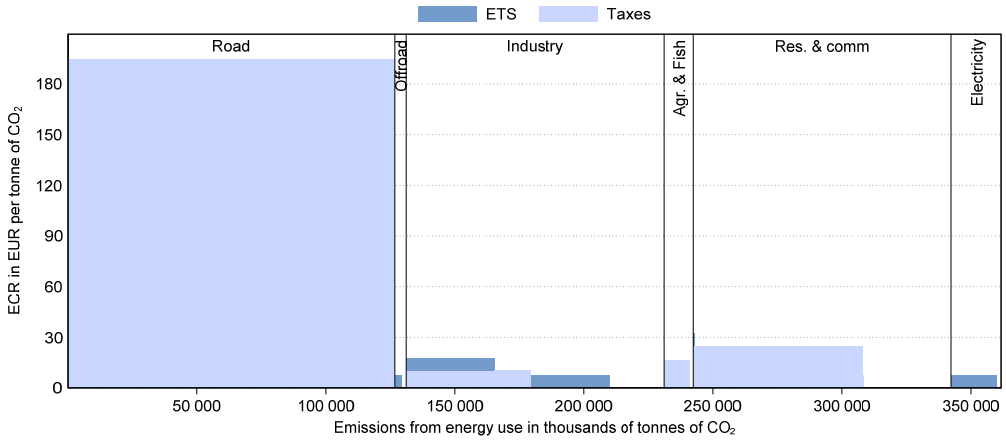


Figure 28. Average effective carbon rates in France by sector and component in 2015



In 2015, effective carbon rates in France primarily consisted of specific taxes on energy use and to a lesser extent of carbon taxes and permit prices in the EU ETS. France priced 83% of carbon emissions from energy use. 42% were priced above EUR 30 per tonne of CO_2 (see Figure 27); these emissions were primarily emitted by the road transport sector (see Figure 28). France priced about four-fifths of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. Unpriced emissions from energy use were primarily emitted by the residential and commercial sector.

Since 2015 the rate of the French carbon tax, which applies primarily to the residential and commercial sector, has increased significantly.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Germany

Figure 29. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Germany in 2015

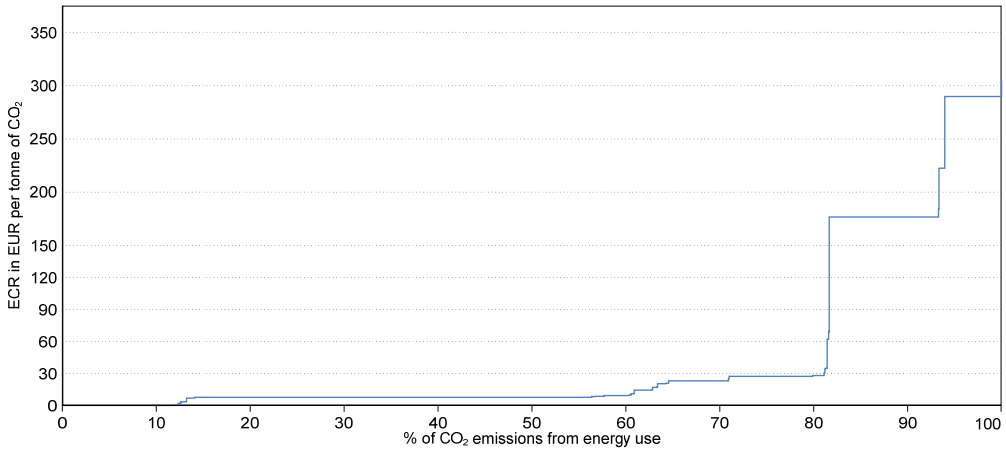
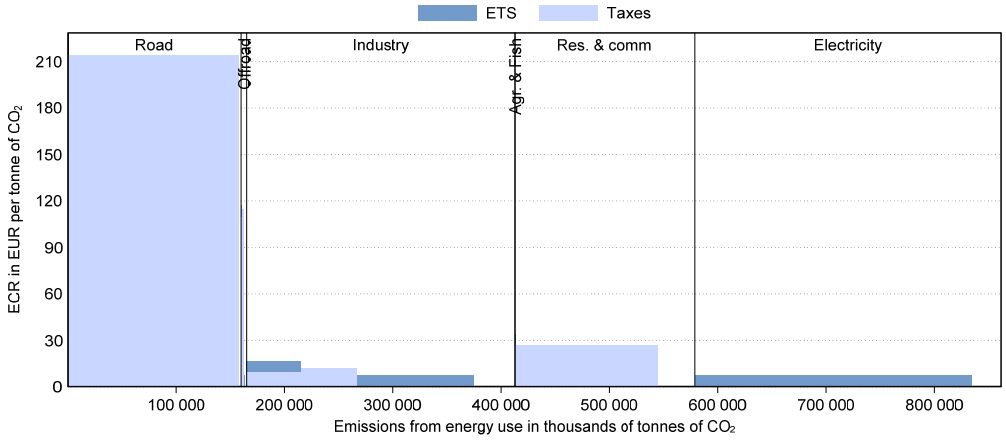


Figure 30. Average effective carbon rates in Germany by sector and component in 2015



In 2015, effective carbon rates in Germany consisted primarily of specific taxes on energy use and to a small extent of permit prices from the EU ETS. Germany did not have an explicit carbon tax. Germany priced 88% of carbon emissions from energy use, and 19% were priced above EUR 30 per tonne of CO_2 (see Figure 29). The vast share of the latter was emitted by the road transport sector (see Figure 30). Germany priced more than four-fifths of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. All priced emissions in the electricity sector were covered by the EU ETS. Unpriced emissions were largely emitted by the residential and commercial, electricity, and industry sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Greece

Figure 31. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Greece in 2015

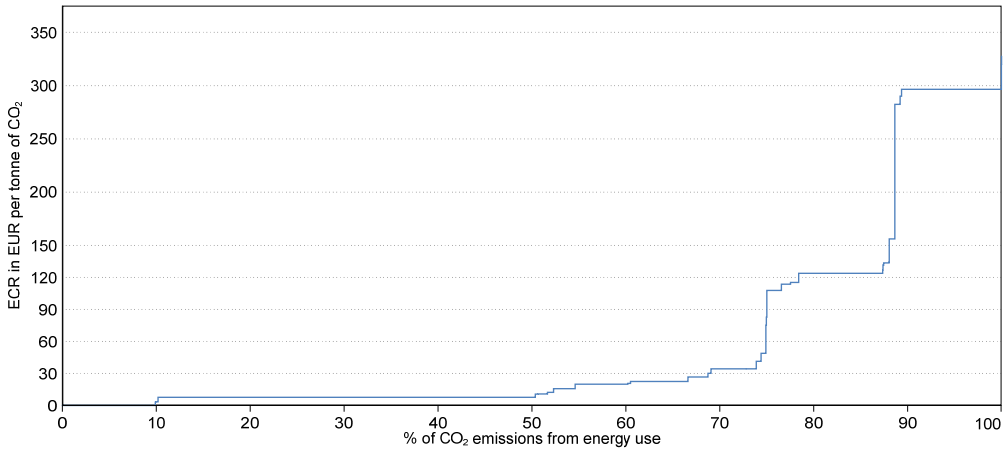
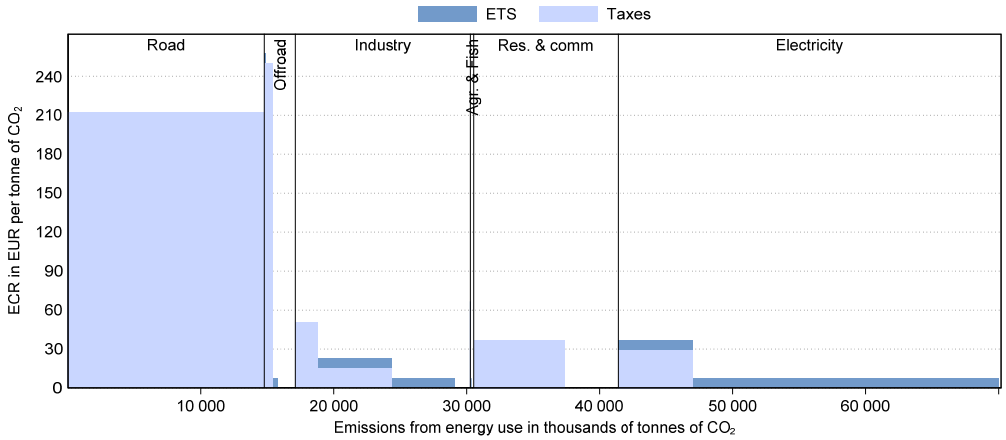


Figure 32. Average effective carbon rates in Greece by sector and component in 2015



In 2015, effective carbon rates consisted primarily of specific taxes on energy use and to a lesser extent of permit prices from the EU ETS. Greece did not have an explicit carbon tax. Greece priced 90% of carbon emissions from energy use, and 31% were priced above EUR 30 per tonne of CO_2 (see Figure 31); a large share of these emissions was from the road transport sector (see Figure 32). The price from tradable permits was a significant component of the ECR in the electricity industry; nearly all emissions in electricity were covered by the EU ETS. Taxes and permit prices applied to over a quarter of emissions in the industry sector, while taxes only applied to about 13% of industry sector emissions. Unpriced emissions were found primarily in the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Hungary

Figure 33. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Hungary in 2015

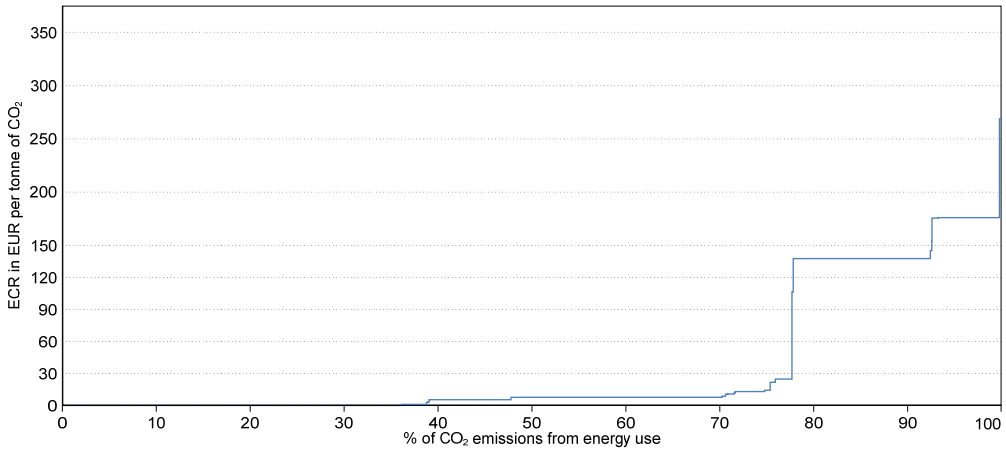
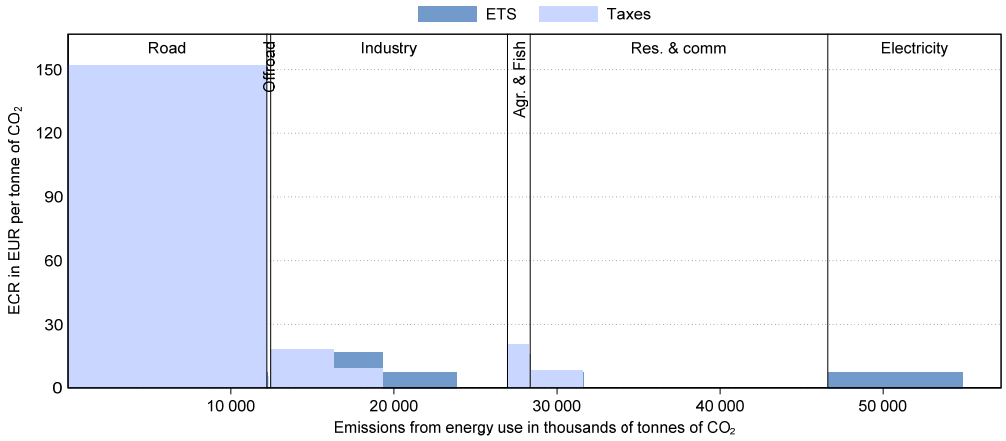


Figure 34. Average effective carbon rates in Hungary by sector and component in 2015



In 2015, effective carbon rates in Hungary consisted primarily of specific taxes on energy use and to a smaller extent of permit prices from the EU ETS. Hungary did not have an explicit carbon tax. Hungary priced 64% of its carbon emissions from energy use, and 22% were priced above EUR 30 per tonne of CO_2 (see Figure 33). Almost all of these emissions were from the road transport sector (see Figure 34). Within the industry sector, taxes and the EU ETS applied to around a fifth of emissions, while the EU ETS alone covered nearly a third of emissions. Within the electricity sector, ETS permits accounted for the entirety of priced emissions. The majority of unpriced emissions were emitted by the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Iceland

Figure 35. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Iceland in 2015

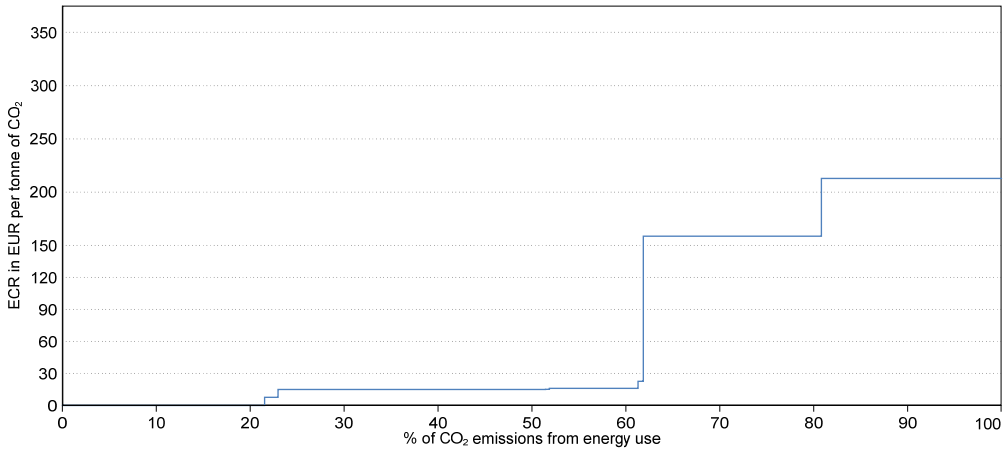
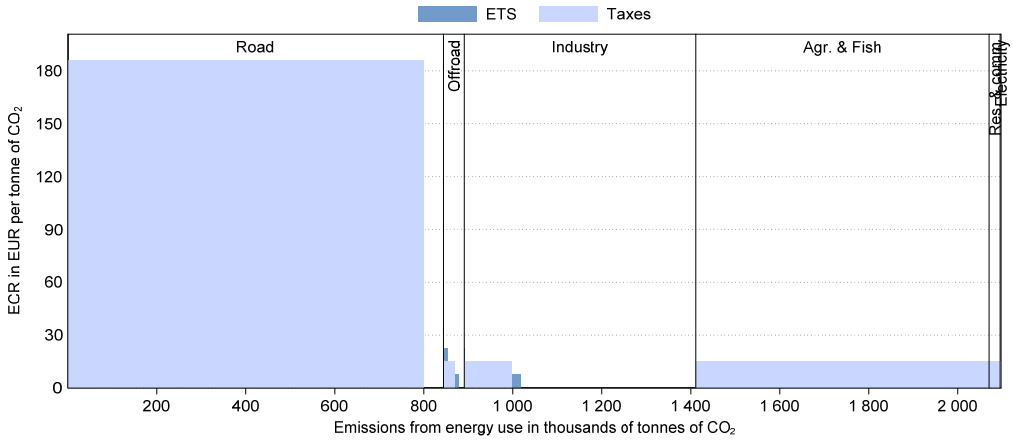


Figure 36. Average effective carbon rates in Iceland by sector and component in 2015



In 2015, effective carbon rates in Iceland consisted primarily of specific taxes on energy use and to a smaller extent of national carbon taxes and permit prices from the EU ETS. Iceland priced 78% of carbon emissions from energy use, and 38% were priced above EUR 30 per tonne of CO_2 (see Figure 35). Almost all of the latter were emitted by the road transport sector (see Figure 36). Taxes and prices from tradable permits were largely applied to different bases in the industry sector. The majority of unpriced emissions were emitted by the industry sector and the agriculture and fisheries sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

India

Figure 37. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in India in 2015

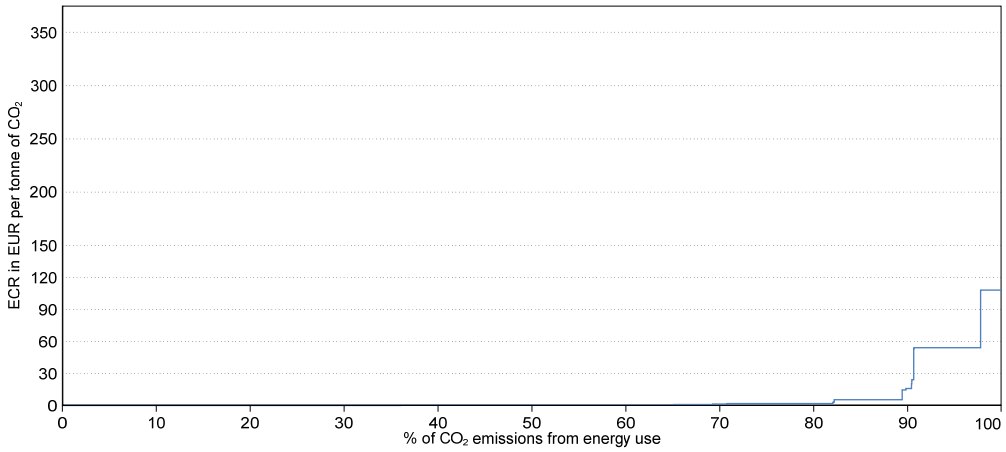
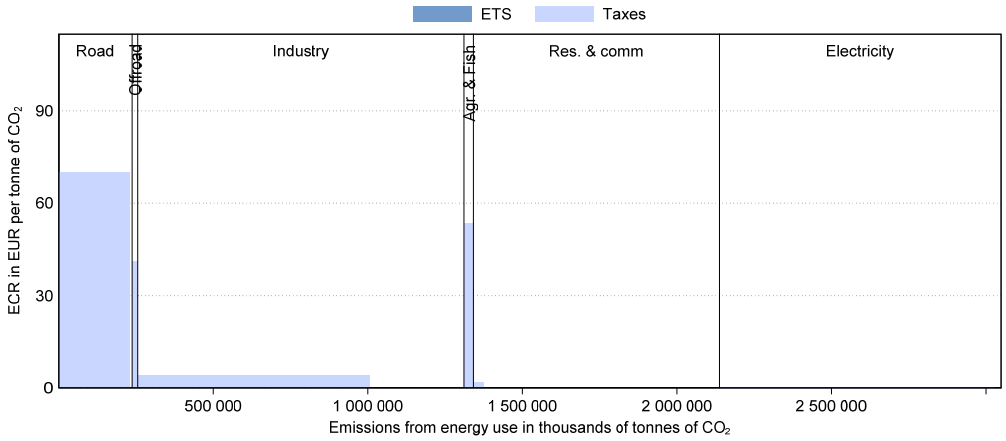


Figure 38. Average effective carbon rates in India by sector and component in 2015



In 2015, effective carbon rates in India consisted entirely of specific taxes on energy use. India did not have an explicit carbon tax or an emissions trading scheme for CO_2 (see Figure 37). India priced 64% of carbon emissions from energy use, and 9% were priced above EUR 30 per tonne of CO_2; the majority of these were from road transport (see Figure 38). The majority of unpriced emissions were from the residential and commercial sector, as well as the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Indonesia

Figure 39. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Indonesia in 2015

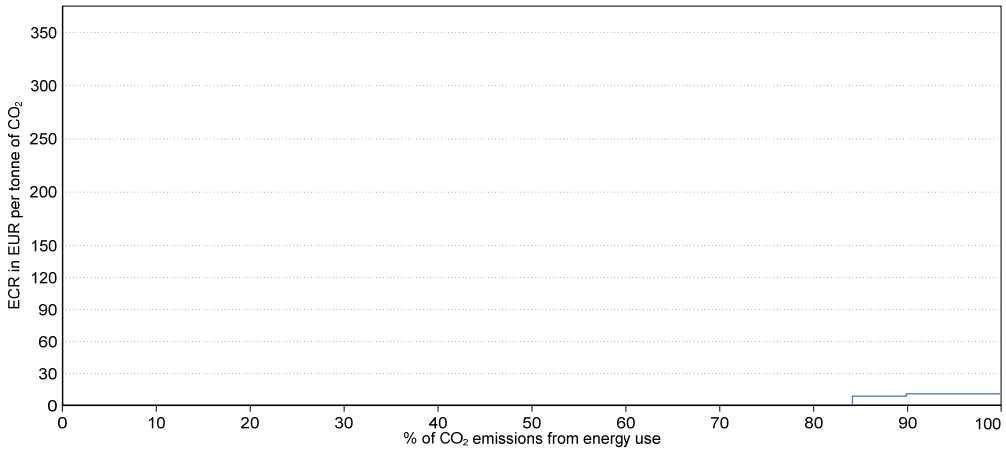
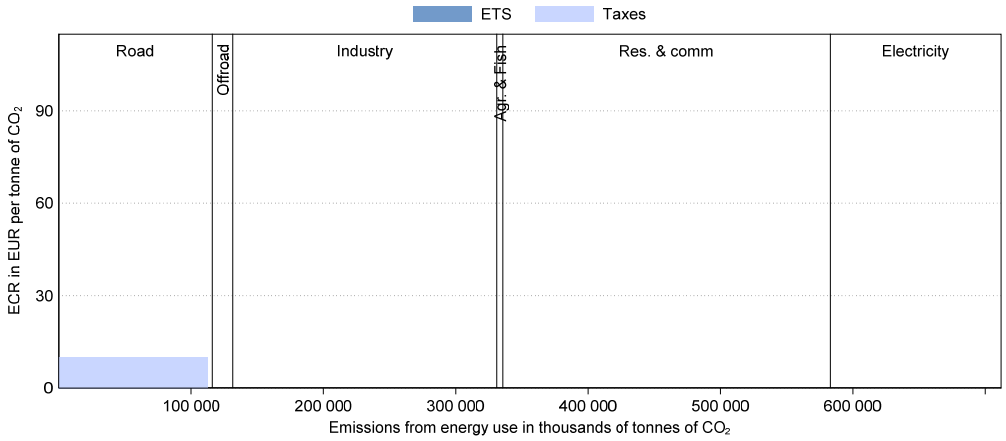


Figure 40. Average effective carbon rates in Indonesia by sector and component in 2015



In 2015, carbon rates in Indonesia consisted entirely of specific taxes on energy use, and they only applied to fuels used in road transport (see Figure 39). Indonesia did not have an explicit carbon tax or an emissions trading system. Indonesia priced 16% of carbon emissions of energy use and none were priced above EUR 30 per tonne of CO_2 (see Figure 40).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Ireland

Figure 41. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Ireland in 2015

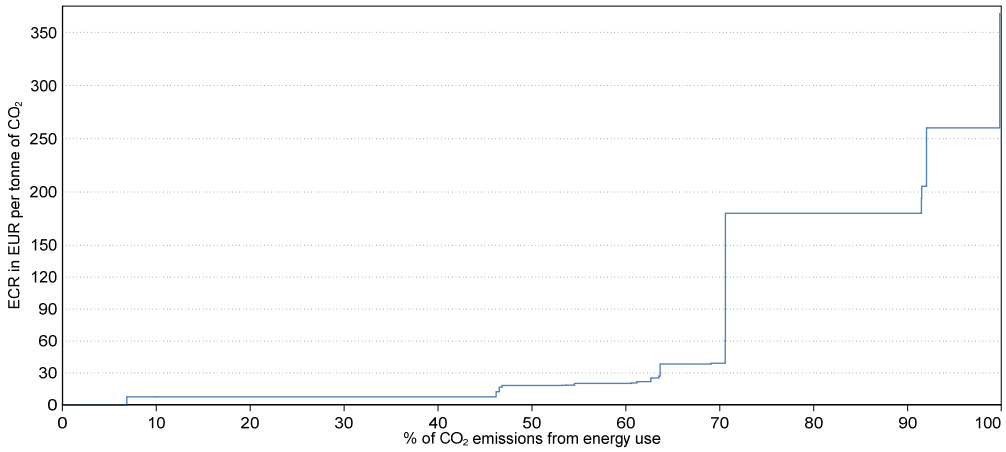
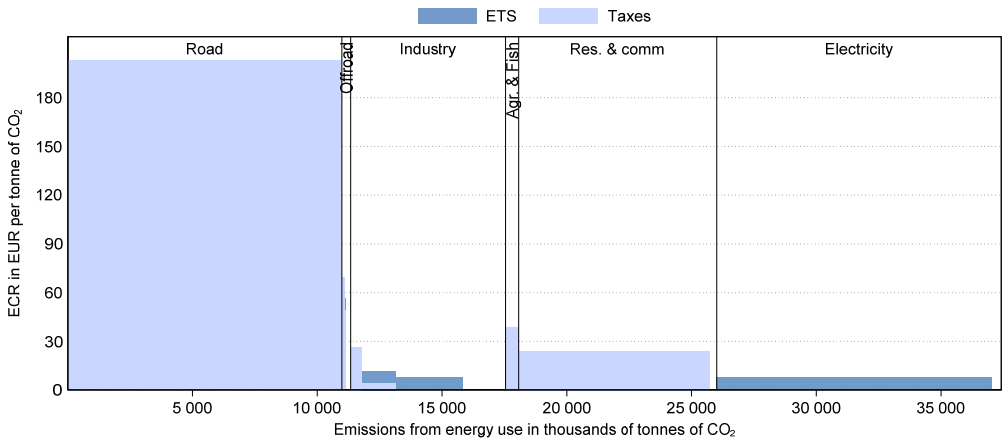


Figure 42. Average effective carbon rates in Ireland by sector and component in 2015



In 2015, effective carbon rates in Ireland consisted primarily of specific taxes on energy use, and to a smaller extent of national carbon taxes and permit prices from the EU ETS. Ireland priced 93% of carbon emissions from energy use, and 36% were priced above EUR 30 per tonne of CO_2 (see Figure 41); a large share of these emissions was from road transport (see Figure 42). Ireland priced more than 70% of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30.The ECR in the electricity sector was entirely due to prices from tradeable emissions permits. The portion of unpriced emissions was very low and the majority were from the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Israel

Figure 43. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Israel in 2015

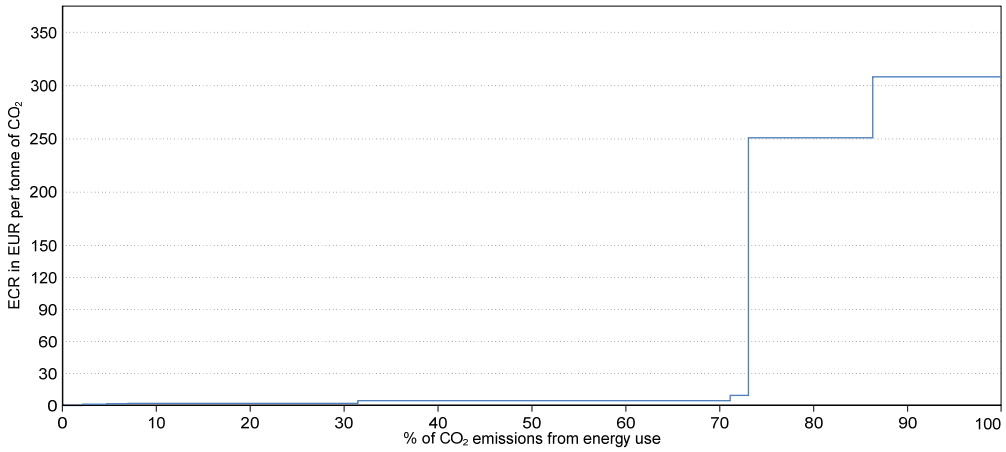
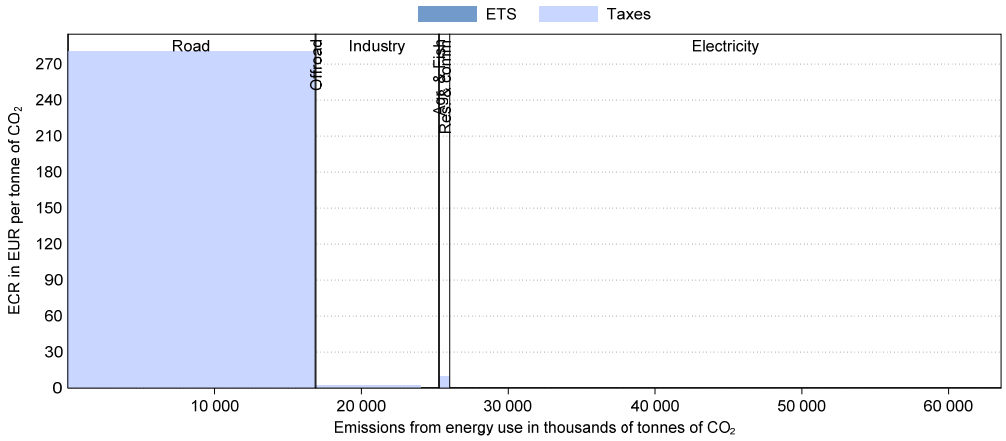


Figure 44. Average effective carbon rates in Israel by sector and component in 2015



In 2015, effective carbon rates in Israel consisted entirely of specific taxes on energy use. Israel did not have an explicit carbon tax or an emissions trading scheme. Israel priced 98% of carbon emissions, and 27% were priced above EUR 30 per tonne of CO_2 (see Figure 43). The majority of emissions priced at this level were from the road transport sector; effective carbon rates outside road transport are generally low (see Figure 44). The share of unpriced emissions was small, and the majority was from the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Italy

Figure 45. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Italy in 2015

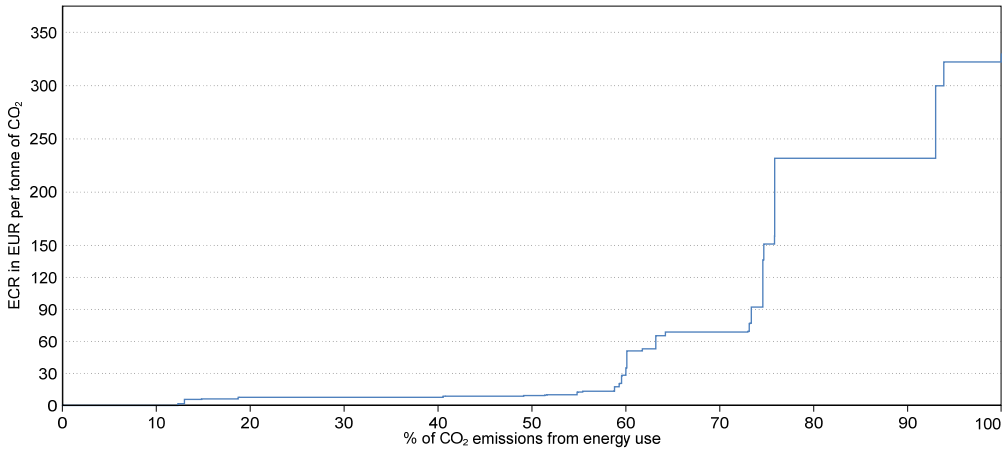
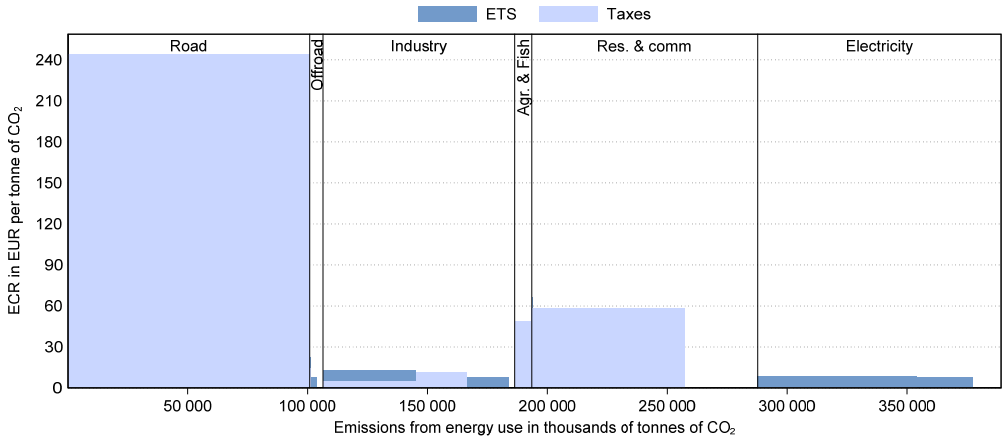


Figure 46. Average effective carbon rates in Italy by sector and component in 2015



In 2015, effective carbon rates in Italy consisted primarily of specific taxes on energy use, and to a smaller extent of permit prices from the EU ETS. Italy did not have an explicit carbon tax. Italy priced 88% of carbon emissions from energy use, and 40% were priced above EUR 30 per tonne of CO_2 (see Figure 45). A large share of emissions priced at this level was from the road and the residential and commercial sectors (see Figure 46). Italy priced nearly all of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. In the electricity sector effective carbon rates consisted primarily of permit prices from the EU ETS. The majority of unpriced emissions were from the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Japan

Figure 47. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Japan in 2015

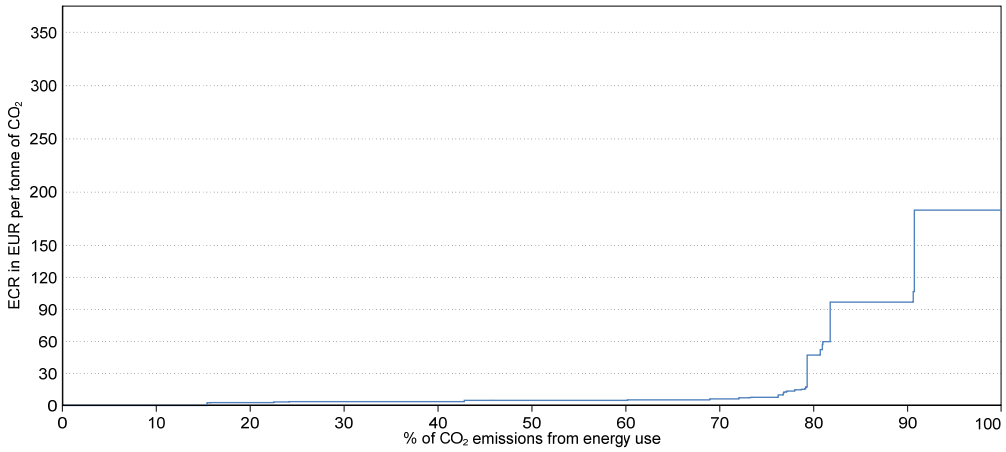
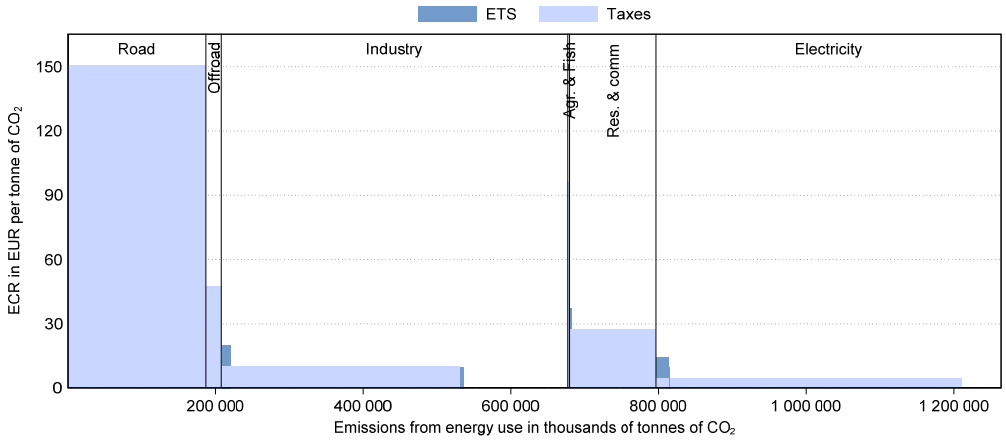


Figure 48. Average effective carbon rates in Japan by sector and component in 2015



In 2015, effective carbon rates in Japan consisted primarily of specific taxes on energy use and a carbon tax. The Tokyo municipality and the Saitama province operated emissions trading systems, but their emissions base was small when comparing to the emissions of the country as a whole. Japan priced 85% of carbon emissions from energy use, and 21% were priced above EUR 30 per tonne of CO_2 (see Figure 47). The majority of emissions priced at this level were emitted by the road transport sector, while the majority of unpriced emissions were emitted by the industry and electricity sectors (see Figure 48).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Korea

Figure 49. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Korea in 2015

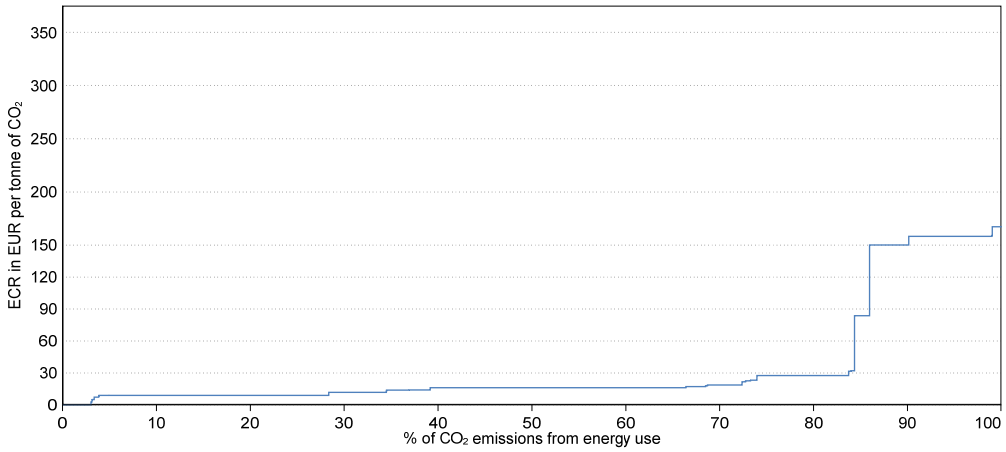
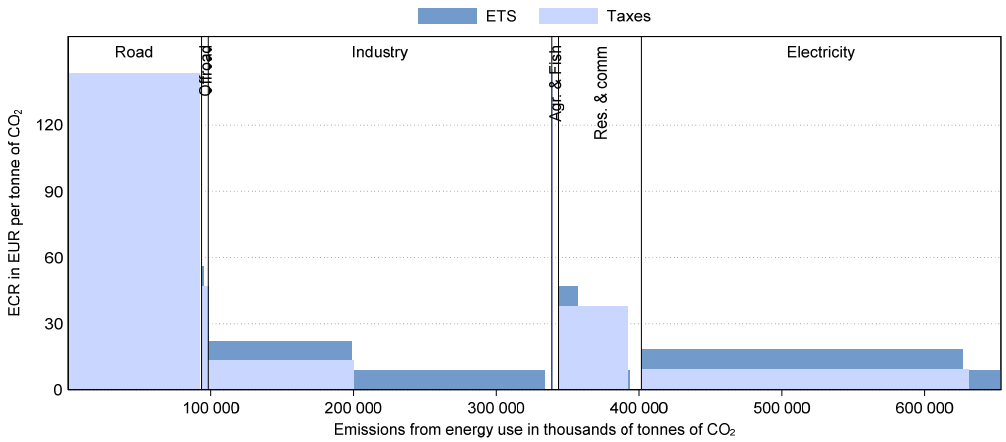


Figure 50. Average effective carbon rates in Korea by sector and component in 2015



In 2015, effective carbon rates in Korea consisted of specific taxes on energy use and permit prices from the ETS. Korea did not have an explicit carbon tax. Korea priced 97% of carbon emissions from energy use, and 16% were priced above EUR 30 per tonne of CO_2 (see Figure 49). The majority of these emissions were from the road transport sector (see Figure 50). The emissions base of the Korea ETS was relatively broad, as it covered around three quarters of emissions from energy use. Given the broad coverage of the ETS, around half of all emissions from energy use were covered by both the ETS and taxes, within the industry sector the overlap was smaller

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Latvia

Figure 51. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Latvia in 2015

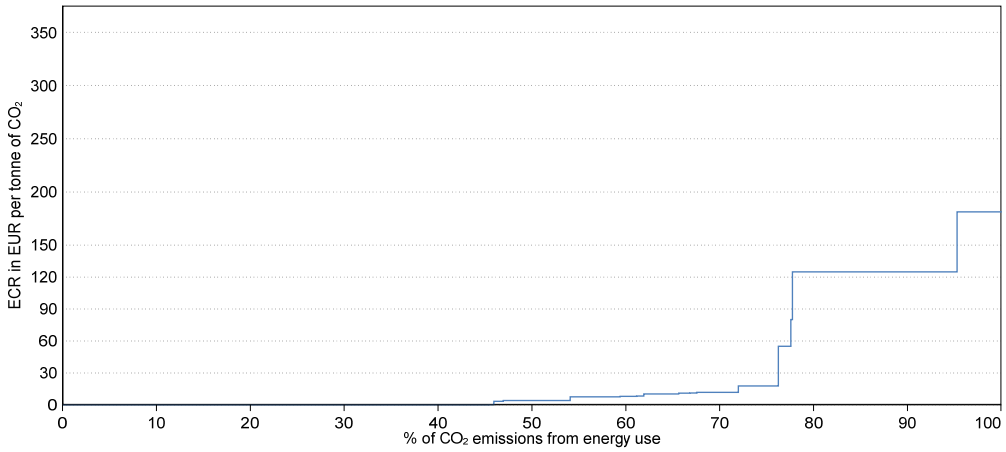
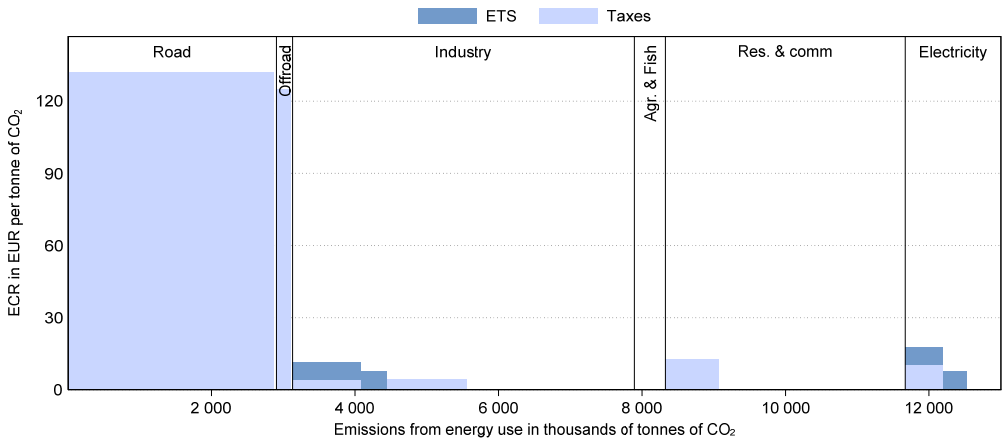


Figure 52. Average effective carbon rates in Latvia by sector and component in 2015



In 2015, effective carbon rates in Latvia consisted of specific taxes on energy use and permit prices from the ETS. Latvia did not have an explicit carbon tax. Latvia priced 55% of carbon emissions from energy use, and 24% were priced above EUR 30 per tonne of CO_2 (see Figure 49). The majority of these emissions were from the road transport sector (see Figure 50). Carbon pricing from the EU ETS covered over a quarter of emissions in the industry sector and nearly two-thirds of emissions in the electricity sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Luxembourg

Figure 53. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Luxembourg in 2015

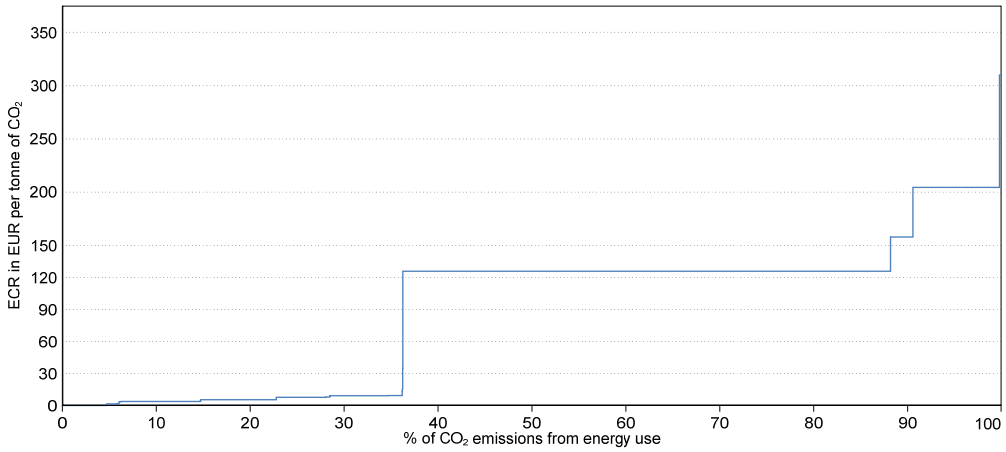
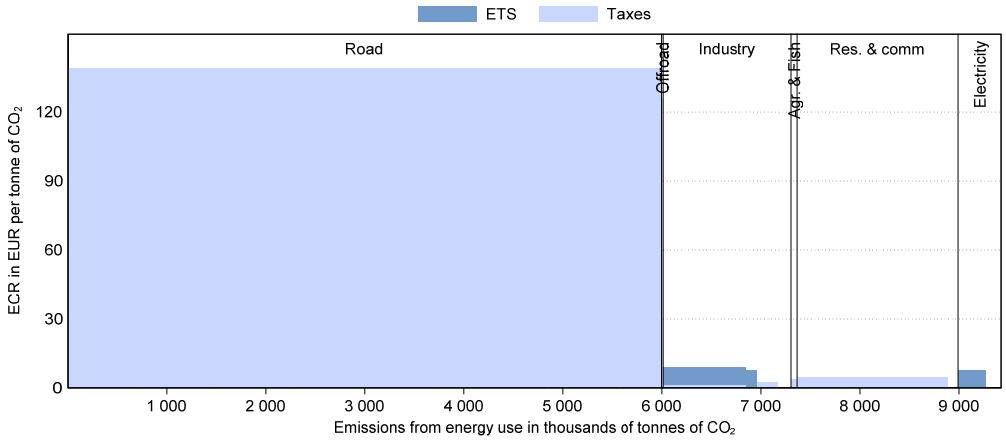


Figure 54. Average effective carbon rates in Luxembourg by sector and component in 2015



In 2015, effective carbon rates in Luxembourg were dominated by specific taxes on energy use, with permit prices from the EU ETS accounting only for a small portion of effective carbon rates. Luxembourg did not have an explicit carbon tax. Luxembourg priced 96% of carbon emissions from energy use, and 64% were priced above EUR 30 per tonne of CO2 (see Figure 53). Emissions priced at this level were almost entirely emitted by the road sector, which accounted for 62% of all carbon emissions from energy use in Luxembourg (see Figure 54). The share of unpriced emissions was small, but stemmed in majority from the electricity, industry, and residential and commercial sectors. The share of transport fuels in the base was very large, and this was mostly because of fuel purchased by non-residents, not because of domestic consumption.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Mexico

Figure 55. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Mexico in 2015

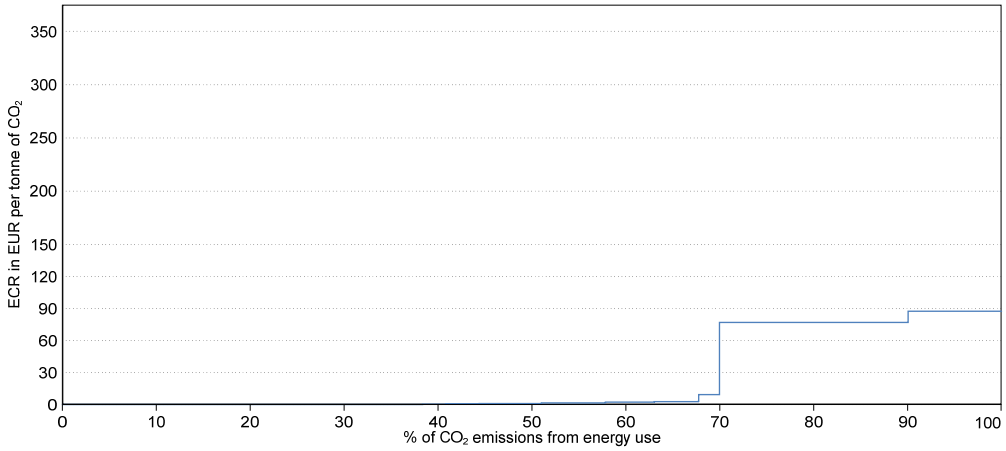
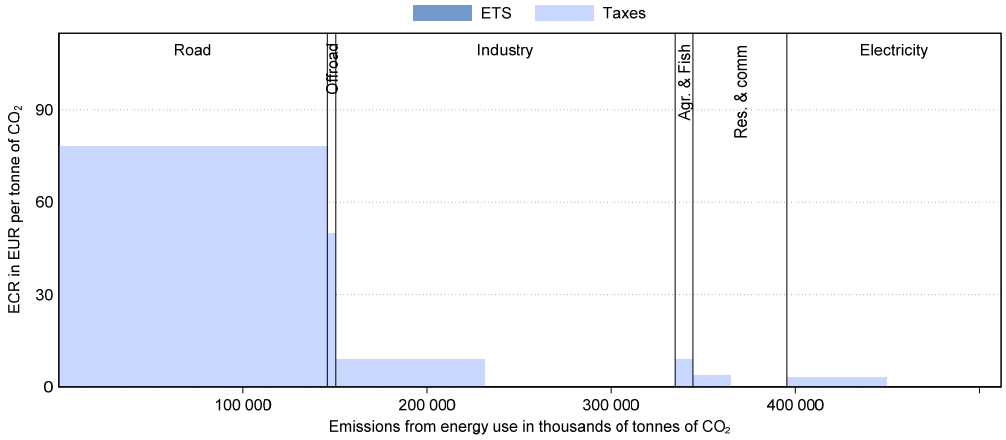


Figure 56. Average effective carbon rates in Mexico by sector and component in 2015



In 2015, effective carbon rates in Mexico consisted entirely of specific taxes on energy use and a national carbon tax. Mexico did not have an emissions trading system. Mexico priced 62% of carbon emissions from energy use, and 30% above EUR 30 per tonne of CO_2 (see Figure 55). The majority of emissions priced at this level were from the road transport sector, and the majority of unpriced emissions were emitted by the industry, electricity, and residential and commercial sectors (see Figure 56).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Netherlands

Figure 57. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Netherlands in 2015

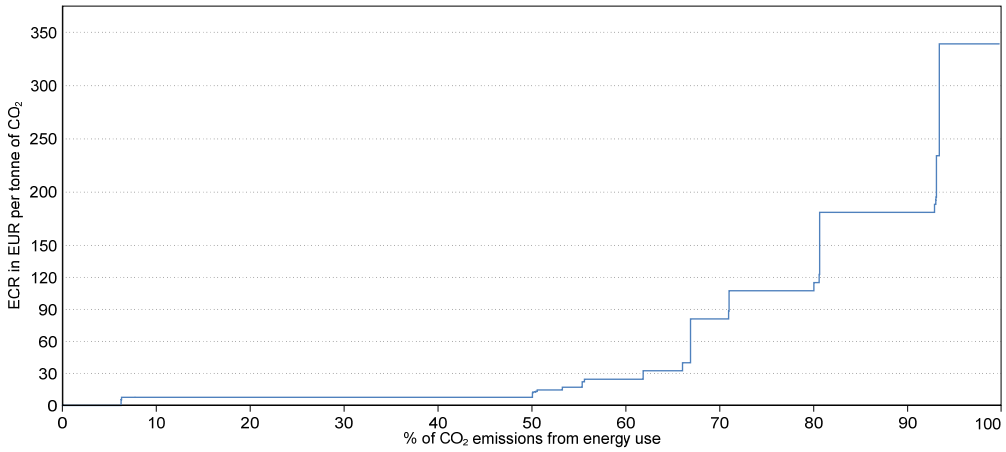
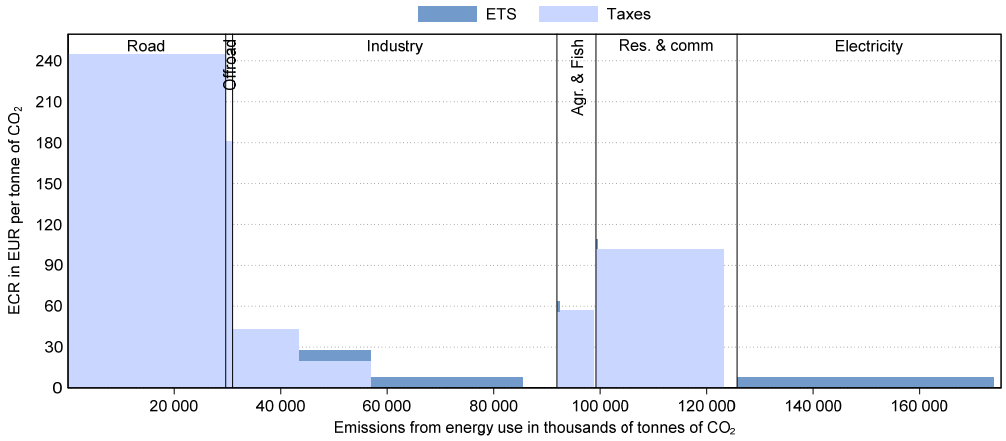


Figure 58. Average effective carbon rates in Netherlands by sector and component in 2015



In 2015, effective carbon rates in the Netherlands consisted primarily of specific taxes on energy use and to a lesser extent of permit prices from the EU ETS. The Netherlands did not have an explicit carbon tax. The Netherlands priced 94 % of carbon emissions from energy use, and 38% were priced above EUR 30 per tonne of CO_2 (see Figure 57). A large majority of emissions in the industry sector is priced, and around a fifth of emissions in this sector were covered by both taxes and permit prices (see Figure 58). Nearly all emissions in the electricity sector were subject to permit prices from the EU ETS. A small share of emissions was unpriced in the Netherlands, the majority of which was from the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

New Zealand

Figure 59. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in New Zealand in 2015

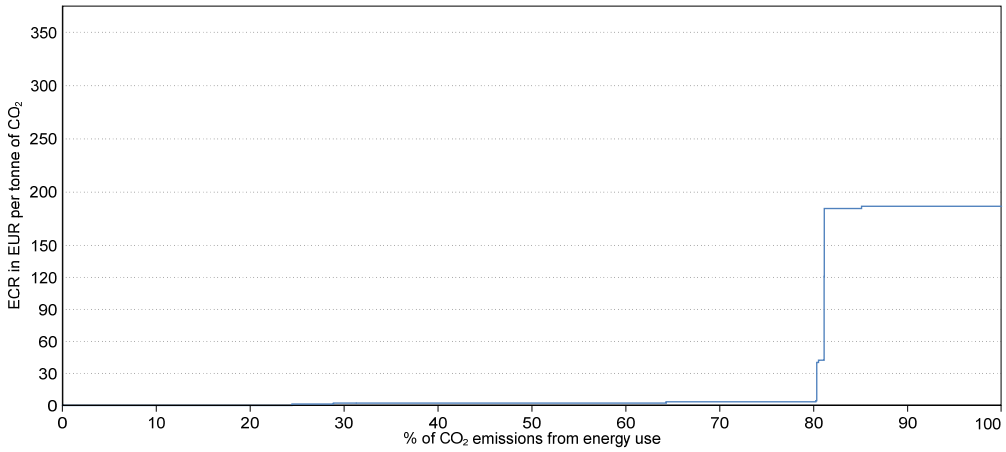
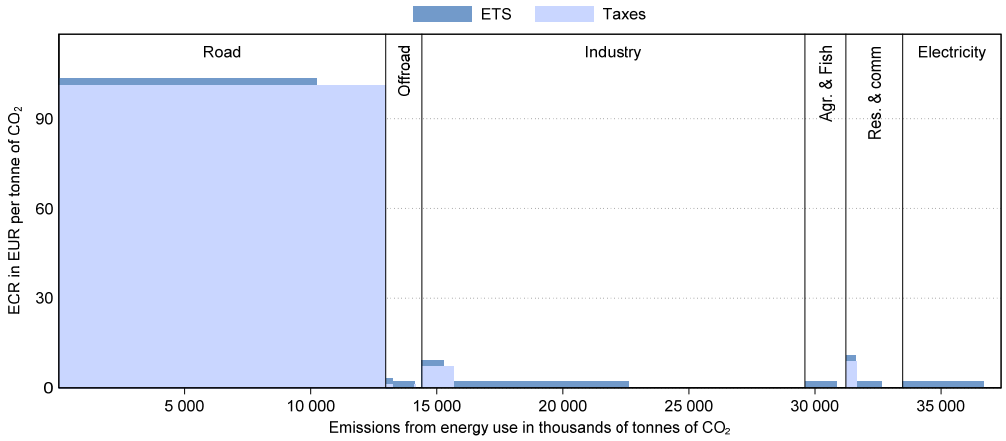


Figure 60. Average effective carbon rates in New Zealand by sector and component in 2015



In 2015, effective carbon rates in New Zealand consisted primarily of specific taxes on energy use and to a small extent of permit prices from the New Zealand ETS. New Zealand did not have an explicit carbon tax. New Zealand priced 76% of its carbon emissions, and 20% were priced above EUR 30 per tonne of CO_2 (see Figure 59). Emissions priced at this level were almost entirely emitted by the road transport sector, while unpriced emissions were primarily emitted by the industry sector (see Figure 60). The coverage of taxes and permit prices in New Zealand was largely separate in the industry sector, and overlapped significantly in the road transport sector. The effective carbon rate on emissions from the electricity sector consisted entirely of carbon prices from tradable permits

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Norway

Figure 61. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Norway in 2015

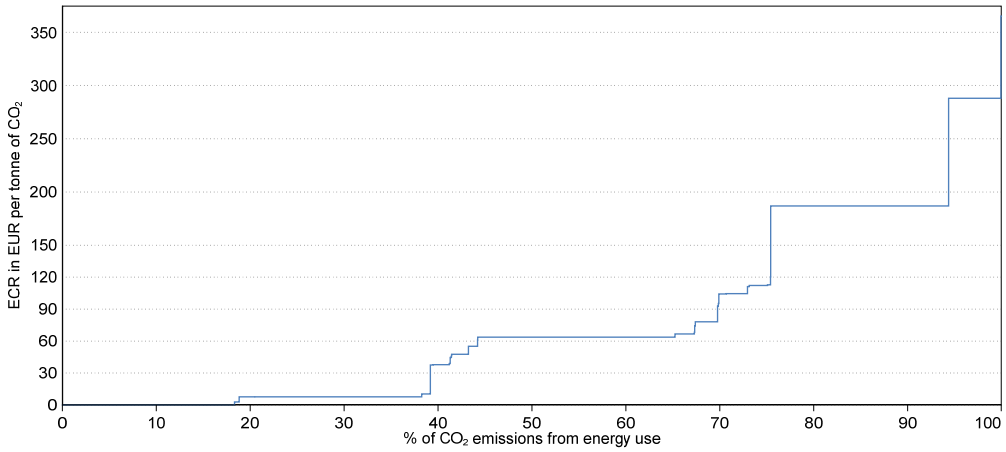
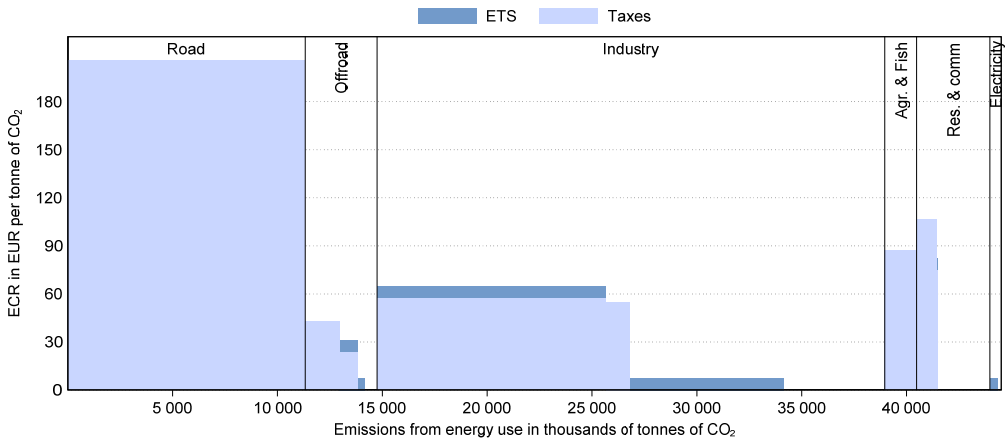


Figure 62. Average effective carbon rates in Norway by sector and component in 2015



In 2015, effective carbon rates in Norway consisted primarily of specific taxes on energy use and to a smaller extent of national carbon taxes and permit prices from the EU ETS. Norway priced 82% of carbon emissions from energy use, and 61% were priced above EUR 30 per tonne of CO_2 (see Figure 61); a significant share of these emissions was from road transport (see Figure 62). Taxes and prices from tradable emissions covered nearly half of emissions of the industry sector, and permit prices alone covered a further third of industry sector emissions from energy use. Unpriced emissions were primarily emitted by the industry and residential and commercial sectors.

A substantial share of unpriced emissions was from the combustion of biomass. Excluding emissions from biomass, 92% of CO_2 emissions from energy use in Norway were priced and 44% were priced above EUR 30 per tonne of CO_2. In the residential and commercial sector, 84% of CO_2 emissions were priced above EUR 30 per tonne of CO_2 when emissions

from biomass were excluded. In the industry sector, 93% of emissions were priced, and 9% were priced above EUR 30 per tonne of CO_2, when emissions from biomass were excluded.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Poland

Figure 63. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Poland in 2015

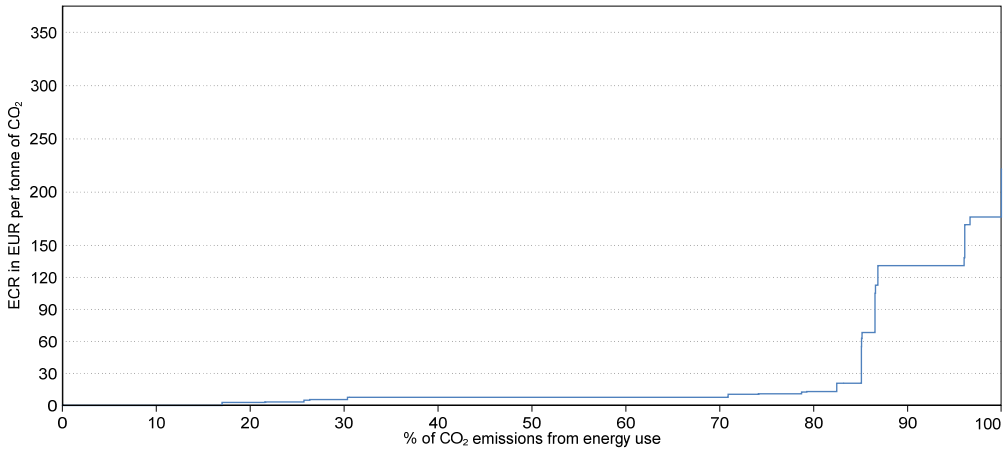
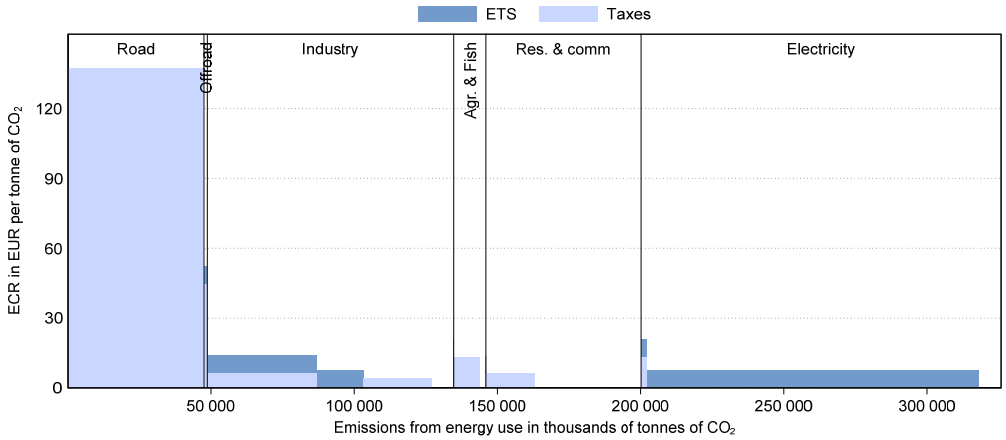


Figure 64. Average effective carbon rates in Poland by sector and component in 2015



In 2015, effective carbon rates in Poland consisted primarily of specific taxes on energy use, and to a small extent of permit prices from the EU ETS. Poland did not have an explicit carbon tax. Poland priced 83% of carbon emissions from energy use, and 15% were priced above EUR 30 per tonne of CO_2 (see Figure 63); the vast majority of these were emitted by the road transport sector (see Figure 64). Poland priced about four-fifths of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. The vast share of electricity emission is priced though permit prices from the EU ETS alone. The majority of unpriced emissions from energy use were emitted by the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Portugal

Figure 65. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Portugal in 2015

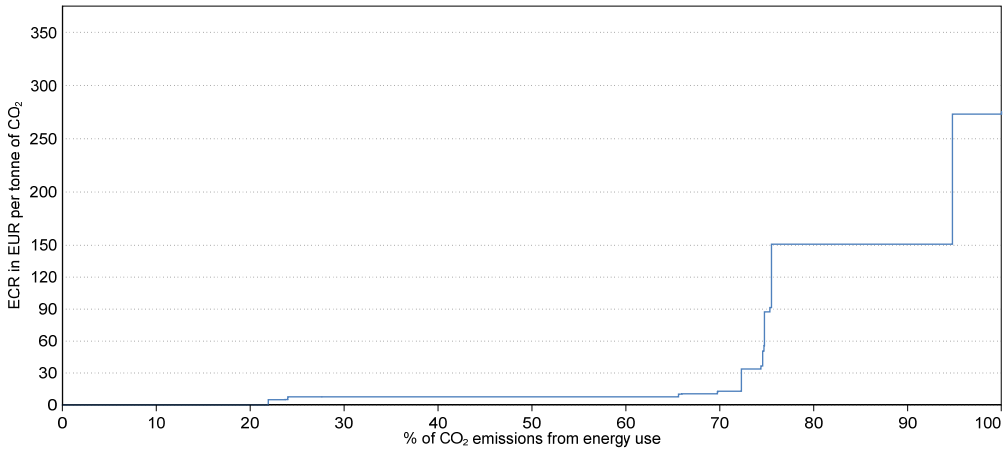
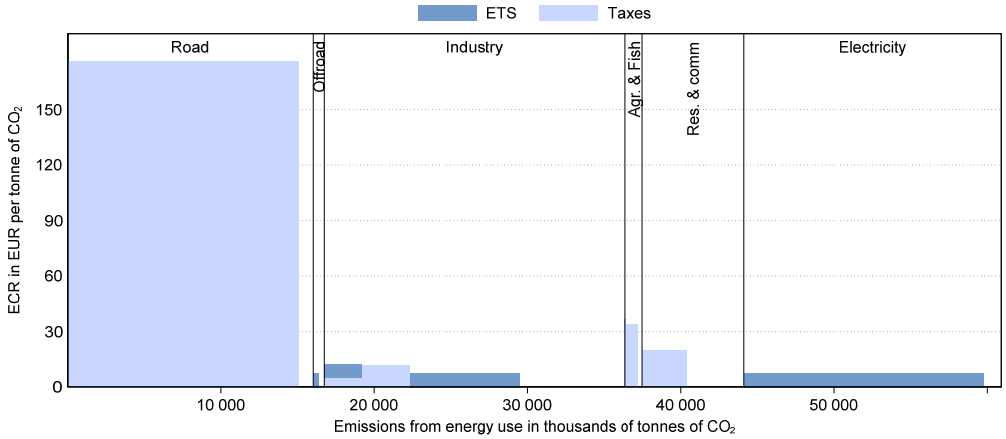


Figure 66. Average effective carbon rates in Portugal by sector and component in 2015



In 2015, effective carbon rates in Portugal consisted primarily of specific taxes on energy use and to a small extent of permit prices from the EU ETS and a carbon tax. Portugal priced 78% of carbon emissions from energy use, and 29% were priced above EUR 30 per tonne of CO_2 (see Figure 65); the vast majority of these emissions were from the road sector (see Figure 66). The coverage of taxes and prices from tradable permits was largely separate in the industry sector. Effective carbon rates in the electricity industry were entirely due to carbon prices from tradable permits. The majority of unpriced emissions were from the industry and residential and commercial sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Russian Federation

Figure 67. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in the Russian Federation in 2015

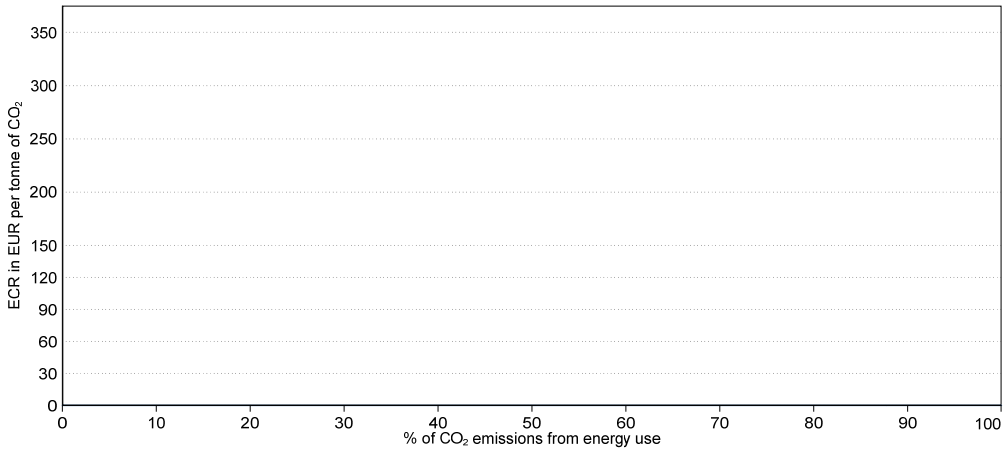
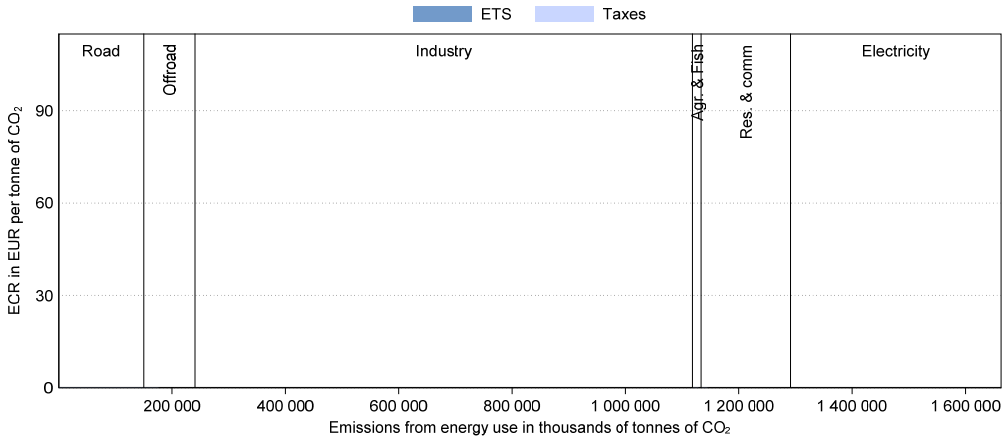


Figure 68. Average effective carbon rates in the Russian Federation by sector and component in 2015



In 2015, effective carbon rates in Russia consisted entirely of specific taxes on energy use. Russia did not have an explicit carbon tax or an emissions trading system. Russia priced 35% of its energy-related CO2 emissions, none of which were priced above EUR 30 per tonne of CO2 (see Figure 67). The majority of unpriced emissions from energy use were emitted by the electricity, industry, and residential and commercial sectors (see Figure 68).

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Slovak Republic

Figure 69. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in the Slovak Republic in 2015

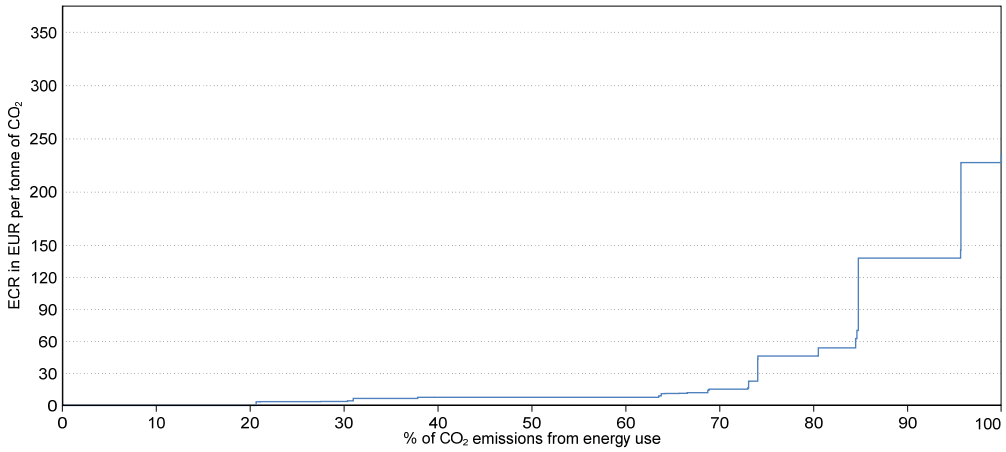
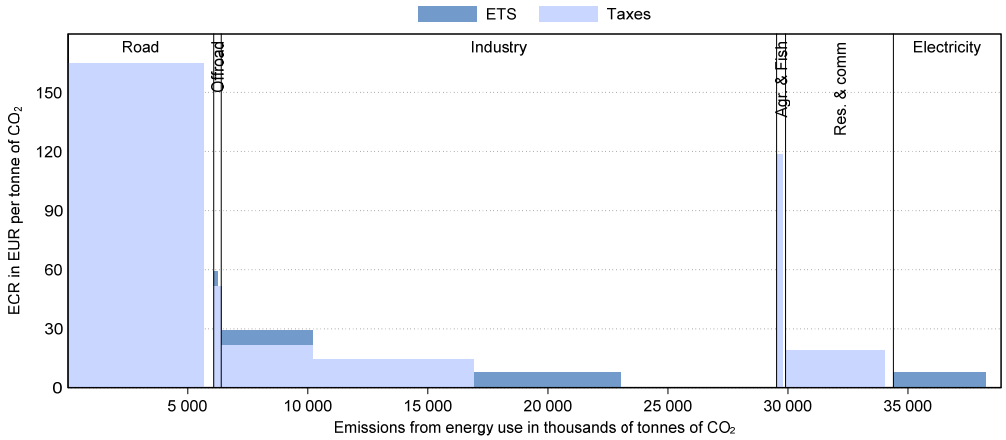


Figure 70. Average effective carbon rates in the Slovak Republic by sector and component in 2015



In 2015, effective carbon rates in the Slovak Republic consisted primarily of specific taxes on energy use and to a small extent of permit prices from the EU ETS. The Slovak Republic did not have an explicit carbon tax. The Slovak Republic priced 79% of carbon emissions from energy use, and 26% were priced above EUR 30 per tonne of CO_2 (see Figure 69). The majority of emissions from energy use that were priced at this level were emitted by the road transport sector (see Figure 70). Taxes and carbon prices from tradable permits covered a large part of the emissions base in the industry sector, with some overlap of the two instruments. The effective carbon rate on emissions from energy use in the electricity sector was entirely composed of prices from tradable permits. Unpriced emissions were primarily in the industry sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Slovenia

Figure 71. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Slovenia in 2015

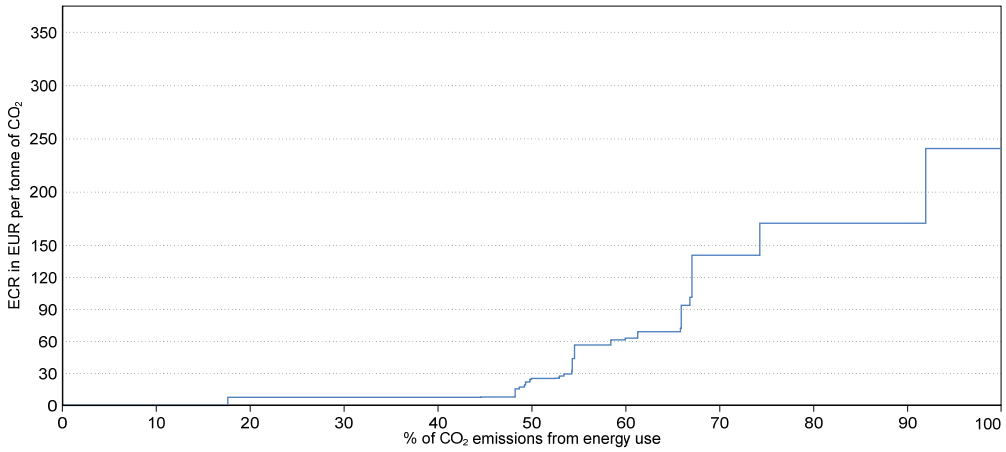
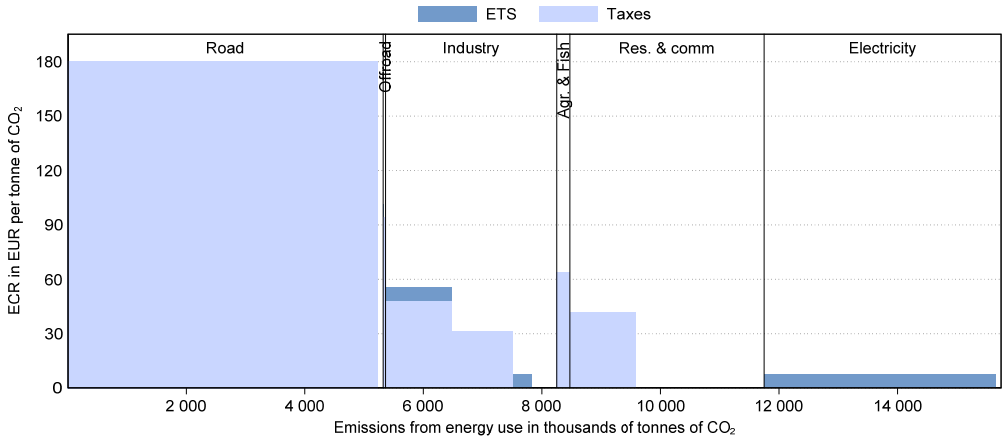


Figure 72. Average effective carbon rates in Slovenia by sector and component in 2015



In 2015, effective carbon rates in Slovenia consisted primarily of specific taxes on energy use and to a lesser extent of national carbon taxes and permit prices from the EU ETS. Slovenia priced 82% of carbon emissions from energy use, and 46% were priced above EUR 30 per tonne of CO_2 (see Figure 71). The majority of emissions priced at this level were from the road sector (see Figure 72). Prices from tradable permits were applied to nearly all emissions from energy use in the electricity sector and half of emissions from energy use in the industry sector. In the industry sector, excise and carbon taxes play an important role. Unpriced emissions were primarily from the residential and commercial sectors.

A substantial share of unpriced emissions was from the combustion of biomass. When excluding emissions from biomass, 100% of CO_2 emissions from energy use in Slovenia were priced, and 56% were priced above EUR 30 per tonne of CO_2. In the residential and

commercial sector, 100% of emissions from energy use were priced and 55% were priced above EUR 30 per tonne of CO_2, when excluding emissions from biomass. In the industry sector, 99% of emissions from energy use were priced and 48% were priced above EUR 30 per tonne of CO_2, when excluding emissions from biomass. In the electricity sector all emissions were priced at an effective carbon rate below EUR 30, when excluding emissions from biomass.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

South Africa

Figure 73. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in South Africa in 2015

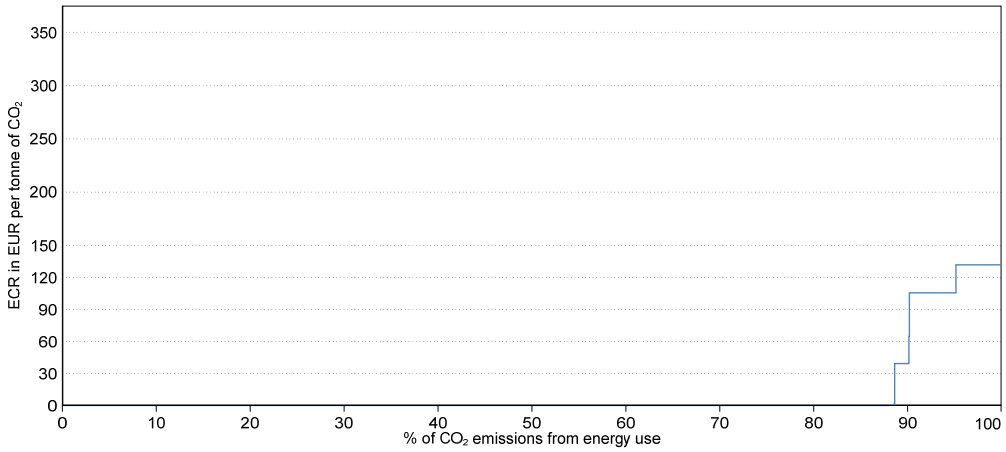
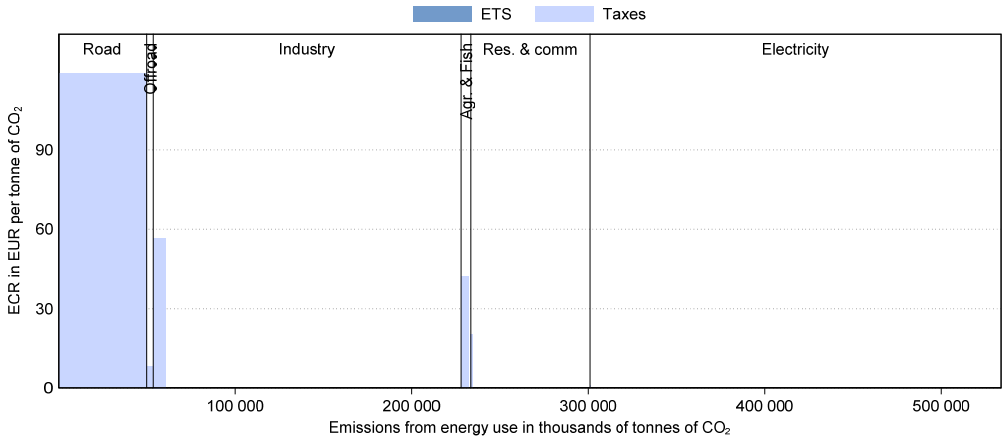


Figure 74. Average effective carbon rates in South Africa by sector and component in 2015



In 2015, effective carbon rates in South Africa consisted entirely of specific taxes on energy use. South Africa did not have an explicit carbon tax or an emissions trading system. South Africa priced 12% of its carbon emissions from energy use, and 11% were priced above EUR 30 per tonne of CO_2 (see Figure 73). The majority of these emissions were from the road sector (see Figure 74). Unpriced emissions were mainly from the electricity, industry, and residential and commercial sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Spain

Figure 75. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Spain in 2015

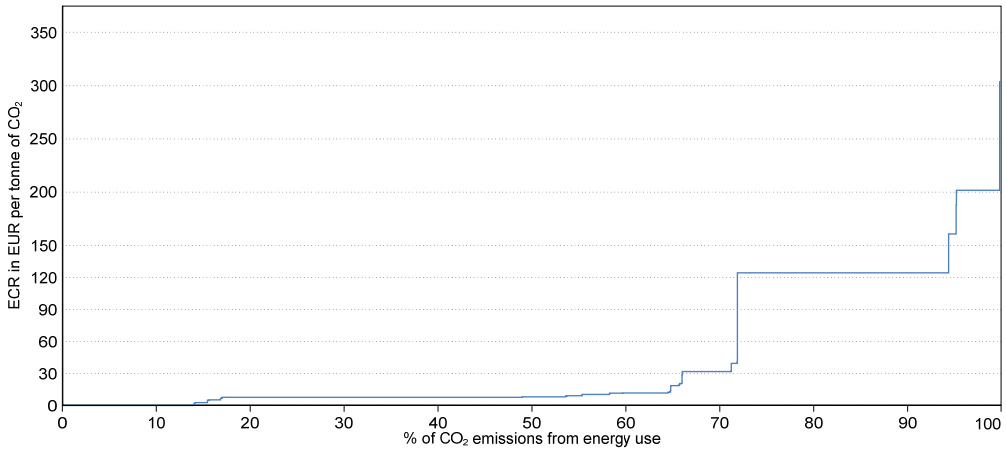
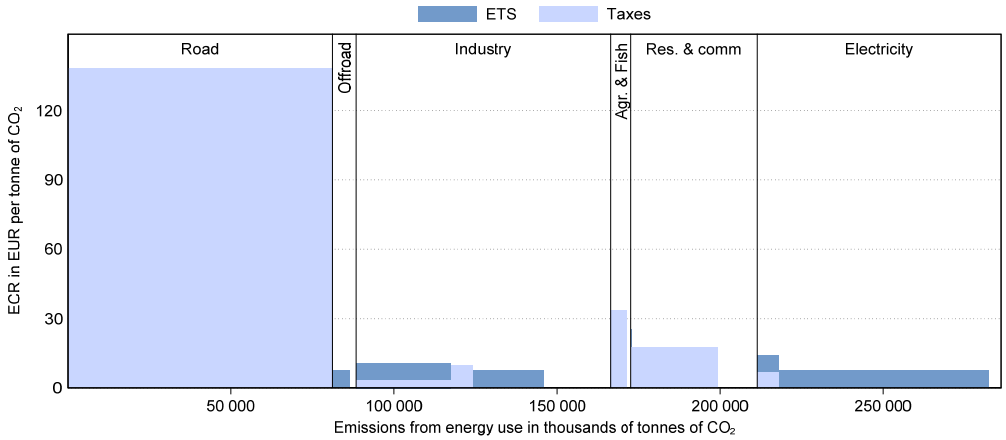


Figure 76. Average effective carbon rates in Spain by sector and component in 2015



In 2015, effective carbon rates in Spain consisted primarily of specific taxes on energy use and to a very small extent of permit prices from the EU ETS. Spain did not have an explicit carbon tax. Spain priced 86% of carbon emissions from energy use, and 34% were priced above EUR 30 per tonne of CO_2 (see Figure 75). The majority of these emissions were from the road transport sector (see Figure 76). Spain priced nearly all of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. Carbon prices from the EU ETS applied to nearly all emissions of the electricity sector. Unpriced emissions were from the industry and residential and commercial sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Sweden

Figure 77. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Sweden in 2015

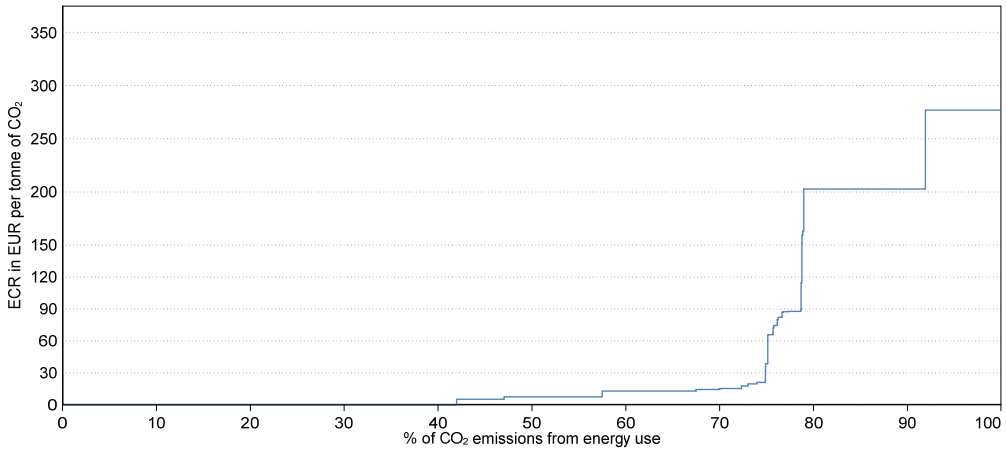
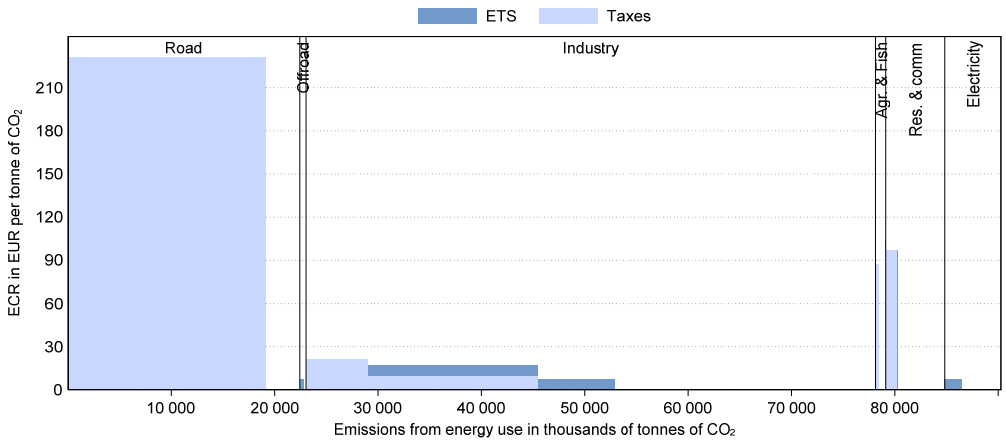


Figure 78. Average effective carbon rates in Sweden by sector and component in 2015



In 2015, effective carbon rates in Sweden consisted of specific taxes on energy use, national carbon taxes and permit prices from the EU ETS. Sweden priced 58% of carbon emissions from energy use, and 25% were priced above EUR 30 per tonne of CO_2 (see Figure 77); the majority of these emissions were from the road sector (see Figure 78). Only prices from tradable permits were applied to emissions in the electricity sector, while both taxes and prices from tradable permits were applied to emissions in the industry sector. Unpriced emissions were primarily emitted by the industry and residential and commercial sectors.

A large share of these unpriced emissions was from the combustion of biomass. When excluding emissions from biomass, 96% of emissions from energy use in Sweden were priced, and 56% were priced above EUR 60 per tonne of CO_2. In the residential and commercial sector, 98% of emissions from energy use were priced above EUR 60 per tonne of CO_2, when excluding emissions from biomass. In the industry sector, 93% of emissions

from energy use were priced and 11% were priced above EUR 60 per tonne of CO_2, when excluding emissions from biomass.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Switzerland

Figure 79. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Switzerland in 2015

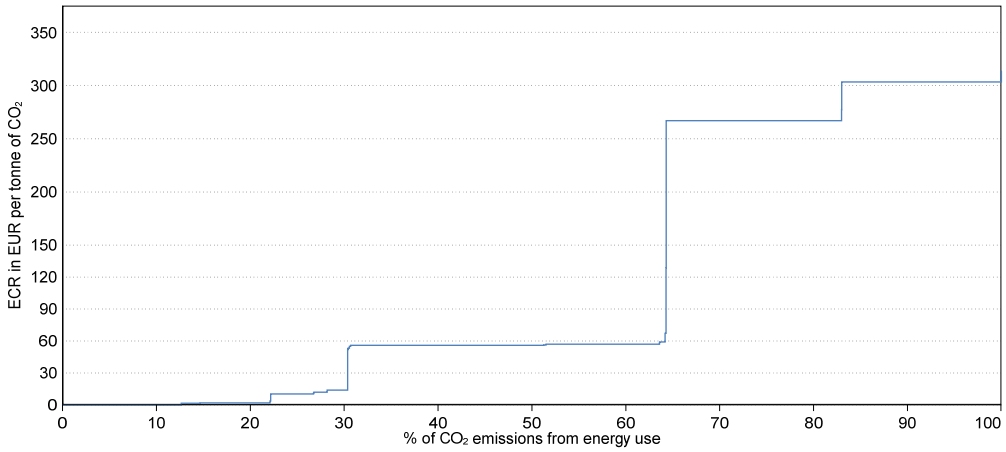
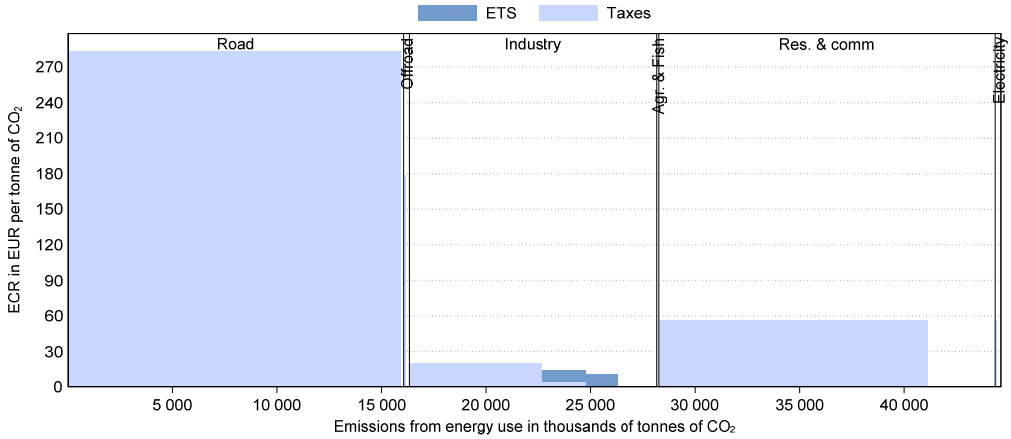


Figure 80. Average effective carbon rates in Switzerland by sector and component in 2015



In 2015, effective carbon rates in Switzerland consisted primarily of specific taxes on energy use and to a smaller extent of national carbon taxes and permit prices from the Swiss ETS. Switzerland priced 87% of carbon emissions from energy use, and 70% were priced above EUR 30 per tonne of CO_2 (see Figure 79). A large share of emissions priced at this level was from the road and residential and commercial sectors (see Figure 80). The Swiss ETS applied to emissions from the industry and offroad transport sectors, however, the latter accounted for very few emissions. Unpriced emissions were largely emitted by the residential and commercial and industry sectors.

The overlap between instruments occurred within the industry sector, between the minerals oils duty (not the mineral oil surtax, as this applied only in transport) and the emissions trading system. This is since the mineral oils tax also applied to fuels used for heating and process use, consistent with the information included in OECD (2018[6]).

The effective carbon rate on road transport energy is mainly the result of mineral oil taxes, the revenues of which are largely earmarked to road infrastructure funding. These taxes are included because the tax base, mineral oils, is part of the tax base covered in the effective carbon rates. Other countries may fund road infrastructure via road tolls, which are not included in the effective carbon rate because road use is not part of the tax base considered in the effective carbon rates.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

Turkey

Figure 81. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in Turkey in 2015

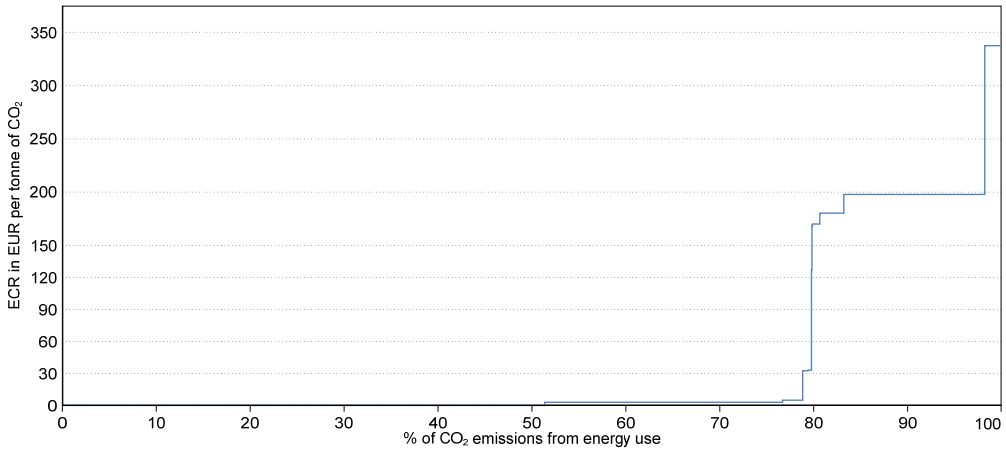
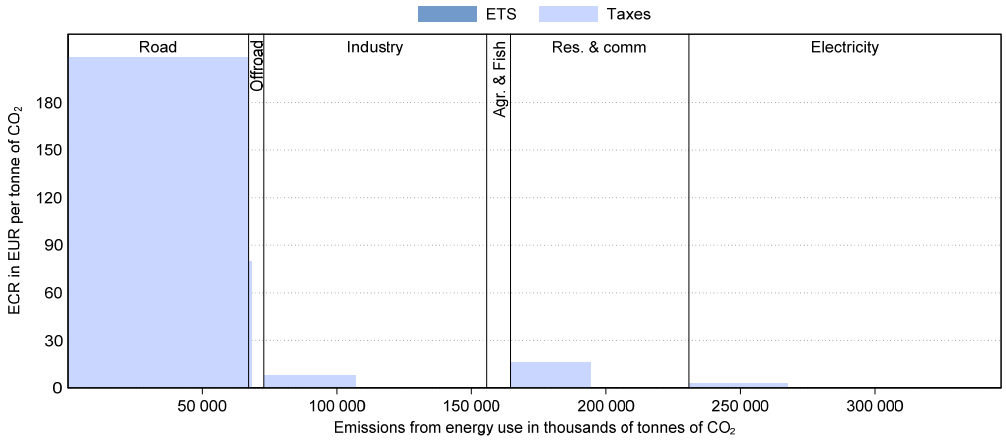


Figure 82. Average effective carbon rates in Turkey by sector and component in 2015



In 2015, effective carbon rates in Turkey consisted entirely of specific taxes on energy use. Turkey did not have an explicit carbon tax or an emissions trading system. Turkey priced 49% of carbon emissions from energy use, and 21% were priced above EUR 30 per tonne of CO_2 (see Figure 81); the vast majority of these emissions were from the road transport sector (see Figure 82). The majority of unpriced emissions were in the electricity, industry, and residential and commercial sectors.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

United Kingdom

Figure 83. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in the United Kingdom in 2015

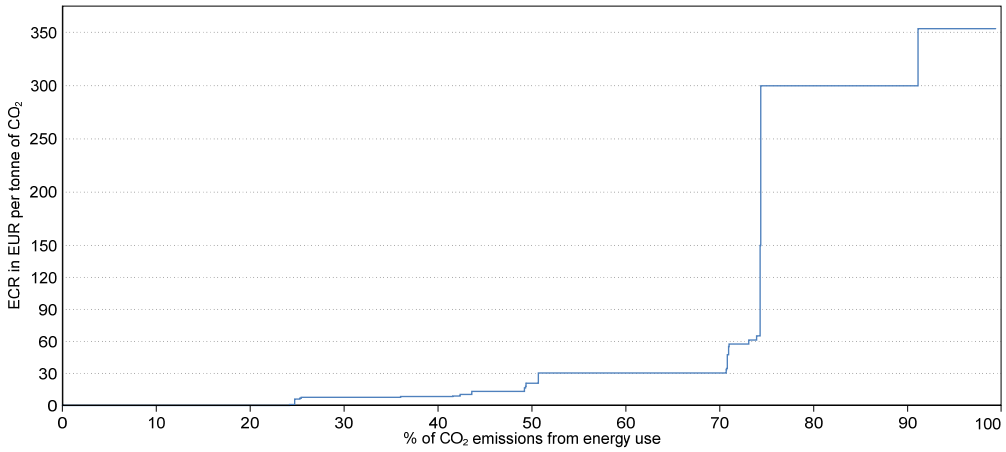
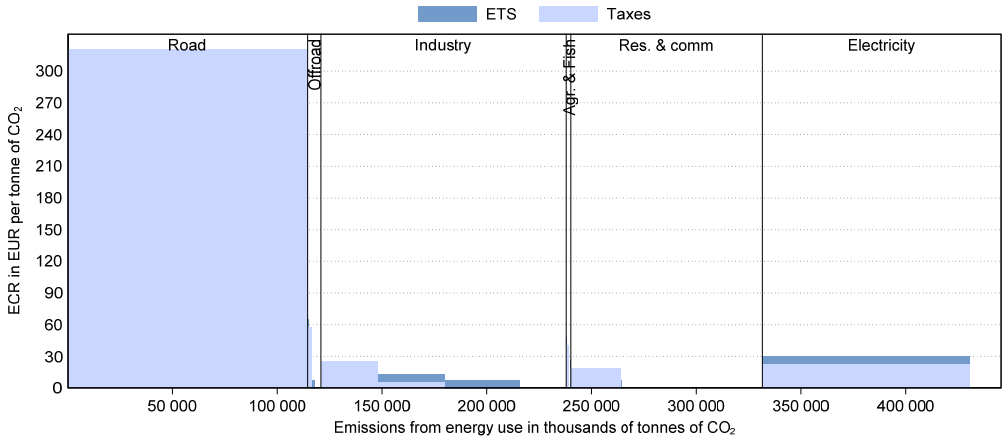


Figure 84. Average effective carbon rates in the United Kingdom by sector and component in 2015



In 2015, effective carbon rates in the United Kingdom consisted primarily of specific taxes on energy use and to a smaller extent of national carbon taxes and permit prices from the EU ETS. The United Kingdom priced 76% of its energy-related CO_2 emissions, and 49% of emissions were priced above EUR 30 per tonne of CO_2 (see Figure 83). The electricity sector accounted for the majority of emissions priced at this level, and all emissions from energy use in the road transport sector were priced above EUR 30 per tonne of CO_2 (see Figure 84). The United Kingdom priced about four-fifth of industry emissions through taxes, permits or both instruments at effective carbon rates below EUR 30. In the electricity sector, the carbon price support, an excise tax that applies in addition to the EU ETS, increased effective carbon rates for most emissions to above EUR 30 per tonne CO_2. Unpriced emissions were mainly from the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

United States

Figure 85. Proportion of CO_2 emissions from energy use subject to different levels of effective carbon rates in the United States in 2015

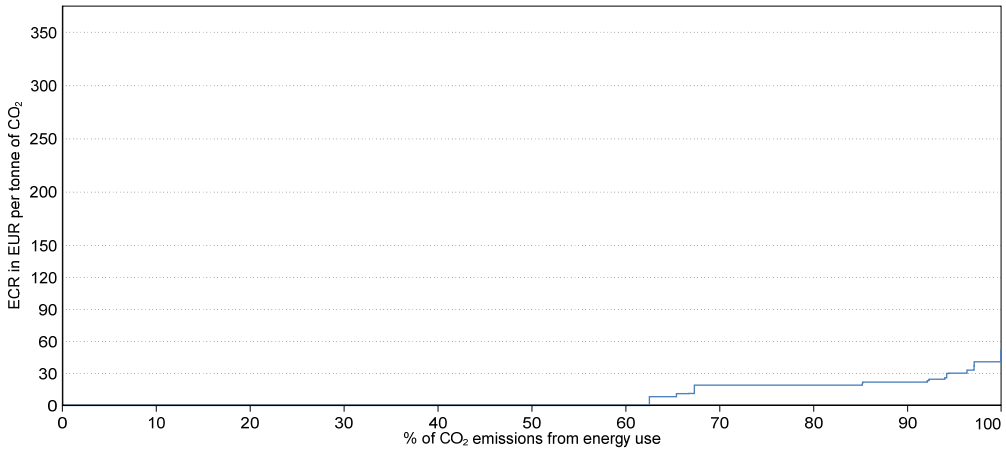
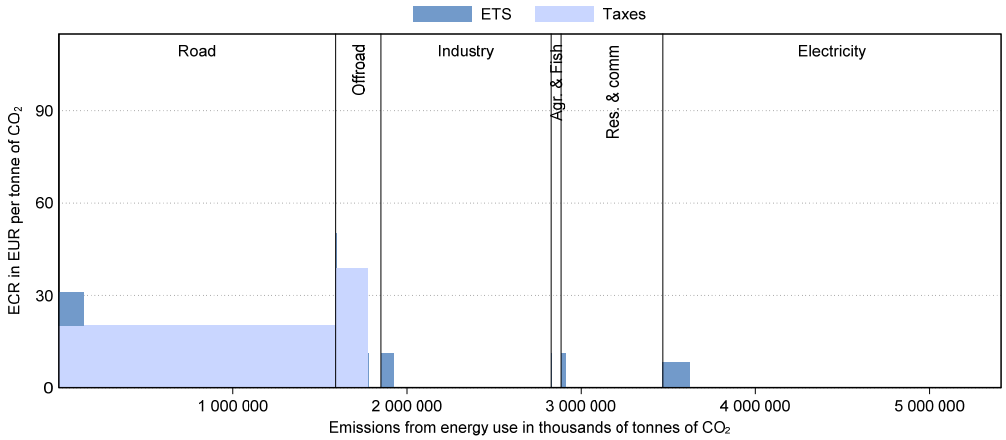


Figure 86. Average effective carbon rates in the United States by sector and component in 2015



In 2015, effective carbon rates in the United States consisted primarily of specific federal taxes on energy use. Other pricing instruments applied at the subnational level: California has implemented an ETS and nine North-East Atlantic states take part in the Regional Greenhouse Gas Initiative (RGGI). The United States priced 37% of carbon emissions from energy use, and 6% were priced above EUR 30 per tonne of CO_2 (see Figure 85).The majority of priced emissions and emissions priced above EUR 30 per tonne of CO_2 were from the road transport sector (see Figure 86). The California Cap-and-Trade Program covered emissions in the industrial, the residential and commercial, the electricity and the road sector. RGGI also covered emissions from electricity generation in nine North-Atlantic states. In total, both emissions trading systems together covered roughly 8% of

CO_2 emissions from energy use in the USA. The majority of unpriced emissions in the USA were from the electricity generation, industry, and the residential and commercial sector.

For additional information to interpret the graphs, see: https://oe.cd/ECR-graph-info
Main insights from the *Effective Carbon Rates* database: http://oe.cd/ECR2018

References

Environment and Climate Change Canada (2018), *Technical Paper on the Federal Backstop*, Environment and Climate Change Canada, Gatineau, QC, https://www.canada.ca/content/dam/eccc/documents/pdf/20170518-2-en.pdf (accessed on 26 February 2018). [5]

OECD (2018), *Effectice Carbon Rates 2018: Pricing carbon emissions through taxes and emissions trading*, OECD Publishing, Paris. [4]

OECD (2018), *Effective Carbon Rates 2018: Pricing carbon emissions trough taxes and emissions trading systems*, OECD Publishing, Paris. [1]

OECD (2018), *Taxing Energy Use 2018: Companion to the Taxing Energy Use Database*, OECD Publishing, Paris. [2]

OECD (2018), "Taxing Energy Use 2018: Switzerland", in *Taxing Energy Use 2018*, OECD, Paris, https://www.oecd.org/tax/tax-policy/taxing-energy-use-2018-switzerland.pdf (accessed on 12 April 2018). [6]

OECD (2016), *Effective Carbon Rates: Pricing CO2 through Taxes and Emissions Trading Systems*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264260115-en. [3]