Carbon Pricing in Times of COVID-19

WHAT HAS CHANGED IN G20 ECONOMIES?

OECD

BETTER POLICIES FOR BETTER LIVES

KINGDOM OF BELGIUM
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BETTER POLICIES FOR BETTER LIVES

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ABSTRACT

There is a growing awareness among countries that a transition to net zero greenhouse gas (GHG) emissions by around the middle of the century is essential for containing the risks of dangerous climate change. Many countries have responded with ambitious emission reduction targets. Now is the time to translate the long-term ambitions into concrete policy packages that deliver the necessary transformational change.

Carbon pricing is a powerful tool that can help countries meet climate objectives and support a green recovery. This report takes stock of how carbon prices have evolved across G20 economies[1] between 2018 and 2021. It estimates carbon prices resulting from carbon taxes, emissions trading systems, and fuel excise taxes. G20 countries account for approximately 80% of global GHG emissions.

KEY FINDINGS

- **Almost half of all CO_2 emissions from energy use in G20 economies are now priced – with 49% of emissions priced in 2021, up from 37% in 2018.**
  - The coverage increase is largest for emissions trading systems, with the new Chinese national emissions trading system for the power sector as the main driver.
  - Coverage continues to vary widely across sectors, with recent changes concentrated in the electricity sector.
  - The share of emissions that is covered by carbon prices varies substantially across G20 economies. Recent changes in coverage are most pronounced for Canada, China, Germany, Mexico and South Africa, where new explicit forms of carbon pricing have been introduced.
- **Carbon prices have increased across G20 economies.**
  - Explicit carbon prices have increased to an average of EUR 4 per tonne of CO_2: emissions trading systems prices are now at EUR 3, up from EUR 1 in 2018; carbon taxes continue to be less than EUR 1 on average.[2]
  - Across G20 countries the average effective carbon rate – the sum of explicit carbon prices and fuel excise taxes – has increased to EUR 19, up approximately EUR 2 since 2018.
  - Despite recent progress with explicit carbon prices, effective carbon rates continue to be dominated by fuel excise taxes. Fuel excise taxes amount to EUR 15 on average, down slightly relative to 2018 in real EUR.
- **Carbon prices increasingly diverge across G20 countries.**
  - Countries with the highest effective carbon prices to begin with have seen prices rise further.
  - By contrast, there has been little change in carbon prices in countries where rates were relatively low in 2018.

1. This report includes all G20 countries except Saudi Arabia. It does not include the European Union (EU) as a whole, only EU member states that are direct G20 members.
2. Unless otherwise stated, prices are expressed in real 2021 EUR per tonne of CO_2.

From commitments to action

There is a growing awareness among countries that a transition to net zero greenhouse gas (GHG) emissions by around the middle of the century is essential for containing the risks of dangerous climate change (IMF/OECD, 2021). The first instalment of the Sixth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC), released in August 2021, made it clear that "unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach." Against this background, it is encouraging that more and more countries, including many G20 countries, have committed to the target of carbon neutrality by mid-century, with countries' net zero pledges accounting for around 70% of global CO_2 emissions and GDP (IEA, 2021).

What remains challenging is to translate long-term ambitions into concrete policy packages that deliver on climate and the economy in the short and medium term. Recent analysis by the United Nations Framework Convention on Climate Change (UNFCCC), synthesising the nationally determined contributions (NDCs) submitted by the Parties to the Paris Agreement, concluded that there was an "urgent need for either a significant increase in the level of ambition of NDCs between now and 2030 or a significant overachievement of the latest NDCs, or a combination of both" (UNFCCC, 2021). Similarly, many countries have committed to a "green recovery" from the COVID-19 crisis – "a unique window for finance ministers across the world to act fast and put investment in sustainable growth" (Coalition of Finance Ministers for Climate Action, 2020). However, OECD analysis shows "overall, recovery packages are not currently set to deliver the transformational investments needed" (OECD, 2021c).

Carbon pricing can help countries meet climate objectives and support a green recovery. Explicit carbon pricing (through carbon taxes and emissions trading systems) encourages citizens and investors to make cleaner choices, while mobilising government revenue (Box 1). Carbon pricing therefore reinforces and enables green stimulus measures and helps align traditional stimulus with climate objectives (OECD, 2020b).

Box 1. STRENGTHS OF EXPLICIT CARBON PRICING

- Provides across-the-board incentives for firms and households to reduce carbon-intensive energy use and shift to cleaner fuels: This occurs as carbon pricing increases the price of carbon-intensive fuels, electricity, and consumer goods produced with such fuels and electricity.
- Provides the essential price signal for mobilising private investment in clean technologies: Pricing levels the playing field for emissions-saving technologies and helps to avoid lock-in of fossil fuel intensive investments (like coal generation plants), contributing to cost-effective abatement.
- Is more flexible than regulatory approaches: Unlike energy efficiency standards and other regulations, prices leave households and businesses a wide range of choices on how to cut emissions. This greater flexibility reduces costs because the government is generally less well informed about the options available to emitters, particularly where different emitters would prefer different responses.
- Provides ongoing mitigation incentives: In the case of some policy tools, such as standards, the pressure to reduce emissions disappears once compliance with a standard is reached, whereas prices continue to induce mitigation effort as long as emissions are positive.
- Reduces rebound effects: Some instruments, such as energy efficiency standards, lead to increased energy usage. For example, improving the energy efficiency of an air-conditioning unit makes it cheaper to run and may therefore result in it being used more often, undoing some of the energy savings from the efficiency improvement, unless the price of energy use or of the emissions from energy use increase simultaneously.
- Mobilises government revenue: Unlike most other mitigation instruments, carbon pricing raises government revenues, and administrative costs of revenue collection can be lower than for many other fiscal instruments.
- Generates domestic environmental co-benefits like reductions in local air pollution mortality: Pricing carbon, like other mitigation instruments, results in cleaner air, which is a tangible and immediate benefit of reduced combustion of coal and motor fuels, especially in metropolitan areas.

Source: IMF/OECD (2021).

A recent review of the empirical literature confirms that "carbon pricing has significant and relatively large normalized effects (i.e. accounting for the low level of prices so far), in terms of emissions reduction in general (through behavioural change, technology adoption and substitution) as well as pure innovation impacts" (van den Bergh and Savin, 2021). Accordingly, carbon pricing is among the frequently indicated mitigation options in countries' NDCs (UNFCCC, 2021).

Carbon pricing is not the only game in town. As emphasised by the US Secretary of the Treasury, Janet L. Yellen, at the G20 Finance Ministers and Central Bank Governors Meeting's High Level Symposium on International Tax in July 2021: "there are numerous policy levers and paths that countries will take to create incentives for decarbonisation".[3] In that regard, a joint IMF/OECD Report for the G20 Finance Ministers and Central Bank Governors emphasised that a *"key challenge at the domestic level is to balance explicit carbon pricing and other reinforcing sectoral instruments, like feebates and regulations, which can be less efficient but likely have greater public acceptability due to their smaller or less direct impact on energy prices. Other supporting elements include public investment and technology policies; productive and equitable use of carbon pricing revenues; just transition assistance for vulnerable households, workers, and regions; measures to address industrial competitiveness"* (IMF/OECD, 2021).

The balance between explicit carbon prices and other policies that put an implicit price on carbon emissions varies across countries. Carbon taxes and emissions trading systems result in explicit carbon prices (Box 2). Fuel taxes, registration and circulation taxes (e.g. on cars powered by internal combustion engines) as well as regulations that disadvantage or prohibit carbon-intensive activities (e.g. a ban on coal) lead to implicit carbon prices, as does subsiding clean technologies (e.g. electric vehicles or bicycles). Countries' policy mixes of implicit and explicit price instruments tend to reflect specific circumstances, including the level of economic development, access to clean technologies, and political economy factors. Implicit carbon prices from regulations are typically less visible than explicit carbon prices, but they too are ultimately paid by someone, and abatement costs per tonne of CO_2 tend to be higher (OECD, 2013). Unlike tax-based instruments, regulations do not raise government revenue; subsidies require government expenditure.

3. https://home.treasury.gov/news/press-releases/jy0266

This report takes stock of how G20 countries price carbon emissions from energy use through explicit carbon pricing and implicit carbon prices in the form of fuel excise taxes, comparing the situation in 2021 to 2018. G20 countries account for approximately 80% of global GHG emissions[3], with energy-related CO_2 emissions making up around 80% of the G20's total GHG emissions. Through its inclusion of fuel excise taxes, this stocktake already takes a first step towards going beyond explicit carbon pricing when assessing the landscape of mitigation incentives. In the future, this work could be complemented with measures of the percentage of emissions subject to other climate policies (e.g. GHG regulations, standards) or related clean energy policies (e.g. energy efficiency portfolio standards, renewable energy mandates). The OECD is also preparing to undertake work to estimate the carbon-price equivalent of implicit carbon pricing instruments.

4. OECD (2021a) provides 2018 data on effective carbon rates for all OECD countries; OECD (2021a) additionally includes 15 developing and emerging economies. Box 3 explains why carbon pricing is more than good climate policy for developing and emerging economies as well, even though their current emissions pale in comparison to G20 countries. World Bank (2021) provides an overview of the state and trends of explicit carbon pricing around the world, including international, national and subnational initiatives.

Box 2. BACKGROUND ON EFFECTIVE CARBON RATES

Carbon pricing discussions are often limited to carbon taxes and emissions trading systems, but when it comes to emissions from energy use, fuel excise taxes play an important role as well. Fuel excise taxes are effectively levied on the same base as carbon taxes. Effective carbon rates, i.e. the sum of any applicable emission permit prices, carbon taxes and fuel excise taxes, capture this broader view of abatement incentives resulting from price-based policies.*

Effective carbon rates measure the prevailing carbon price signal. They describe the policies to take into consideration when seeking energy pricing reforms that strengthen carbon price signals or more broadly the environmental performance of taxes on energy use and emissions trading systems. This report discusses effective carbon rates for G20 countries (except for Saudi Arabia), representing about 80% of CO_2-emissions from energy use.

Carbon taxes: By imposing a charge on the carbon content of fossil fuel supply, carbon taxes are a straightforward carbon pricing instrument from an administrative perspective. They can be comprehensively applied, for example, at the point of processing or refining for coal, petroleum products, and natural gas. In addition, carbon taxes can provide certainty over the future trajectory of emissions prices and raise revenues.

Emissions trading systems: Under an emissions trading system (ETS), firms must remit allowances to cover their emissions. The government fixes the supply of allowances, and allowance trading establishes the emissions price. Although trading systems to date have largely been applied to power generators and large industries, they could be extended midstream to include heating and transport fuels (which are already being covered in a number of systems, including the new German ETS). Mechanisms like price floors can reduce price uncertainty and allowance auctions can generate government revenues.

Fuel excise taxes: Fuel excise taxes create economic incentives similar to those of carbon taxes and emission permit prices, even if their primary objective may be to raise revenue. The strength of price-based incentives to reduce emissions depends on the rate and the base of the incentive, and on fuel price responsiveness, not on the stated policy intention. Fuel excise taxes can be seen as implicit carbon taxes. Fuel excise taxes are similar to carbon taxes in that the tax liability for a given fuel increases proportionally to the use of the taxed fuel. However, as rates are not linked to a carbon price, they do not provide a consistent carbon price across fuels with different carbon intensities. In addition they typically only apply narrowly to certain fuels, e.g. diesel and gasoline used for road transport.

* Effective carbon rates in this report account for fossil fuel support in the form of carbon tax and fuel excise rate reductions or exemptions. Other subsidies can also affect these rates and this will be considered in future work that integrates the relevant budgetary transfers from the OECD's Inventory of Support Measures for Fossil Fuels (OECD, 2021d).

Progress with carbon pricing is strong but uneven

THE SHARE OF EMISSIONS THAT IS COVERED BY A POSITIVE CARBON PRICE HAS INCREASED IN SEVERAL G20 COUNTRIES

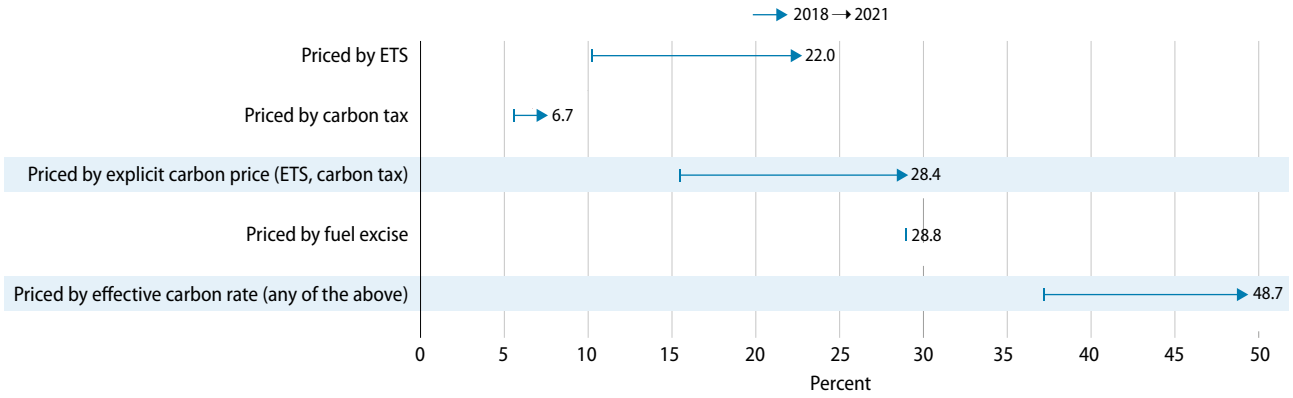
Almost half of CO_2 emissions from energy use in G20 economies are now priced – with 49% of emissions priced in 2021, up from 37% in 2018. Figure 1 shows the change of emissions coverage between 2018 and 2021 across G20 economies for each component of the effective carbon rate indicator (see Box 2). With roughly 12 percentage points, the coverage increase is largest for emissions trading systems, driven by new emissions trading systems in Canada, China and Germany. Carbon tax coverage also increased by around 1 percentage point due to the introduction of carbon levies in Canada and the South African carbon tax from 2019. As a result, 28% of emissions are now covered by an emissions trading system (ETS), a carbon tax, or both. The share of emissions covered by fuel excise taxes, an implicit form of carbon pricing most common in the road transport sector, remains essentially unchanged.[5] Due to the progress with explicit forms of carbon pricing, the share of emissions covered by carbon taxes or emissions trading systems (or both)[6] is now almost as large as the share covered by fuel excise taxes.

Coverage by carbon pricing instruments continues to vary across sectors, with recent increases concentrated in the electricity sector. Figure 2 shows how emissions coverage across G20 countries between 2018 and 2021 has evolved by sector. In road transport, coverage by excise continues to be near complete at 94%. In this sector, the main change is that Canada, Germany and South Africa have introduced explicit carbon pricing schemes that apply in addition to pre-existing fuel excise taxes. In the electricity sector, coverage is now at 64%, up from 31%. The increase is driven by the introduction of the Chinese national ETS for the power

5. The overall increase in coverage by any of the three instruments is slightly lower than the sum of the change in each instrument. The reason is that sometimes several instruments apply to the same emissions. Both the German ETS and the South African carbon tax, for instance, also apply to emissions from the road transport sector that are equally covered by pre-existing fuel excise taxes.

6. In the UK electricity sector, for instance, the carbon price support, a carbon tax, applies in addition to the ETS.

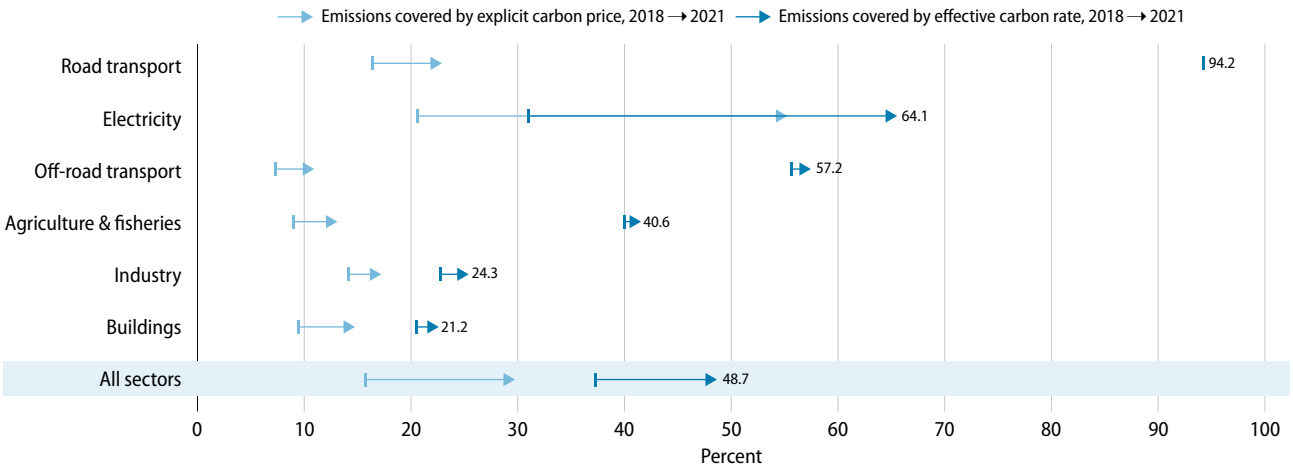
Figure 1. **Emissions coverage across the G20 by instrument, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Priced means that a positive price applies after correcting for tax reductions and refunds. Due to overlapping coverage between instruments, the sum of components is larger than the summary indicators (explicit carbon prices, effective carbon rates). Taxes are those applicable on 1 April 2021. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Percentages are rounded to the first decimal place.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

Figure 2. **Emissions coverage across the G20 by sector, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Priced means that a positive price applies after correcting for tax reductions and refunds. Taxes are those applicable on 1 April 2021. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Percentages are rounded to the first decimal place.

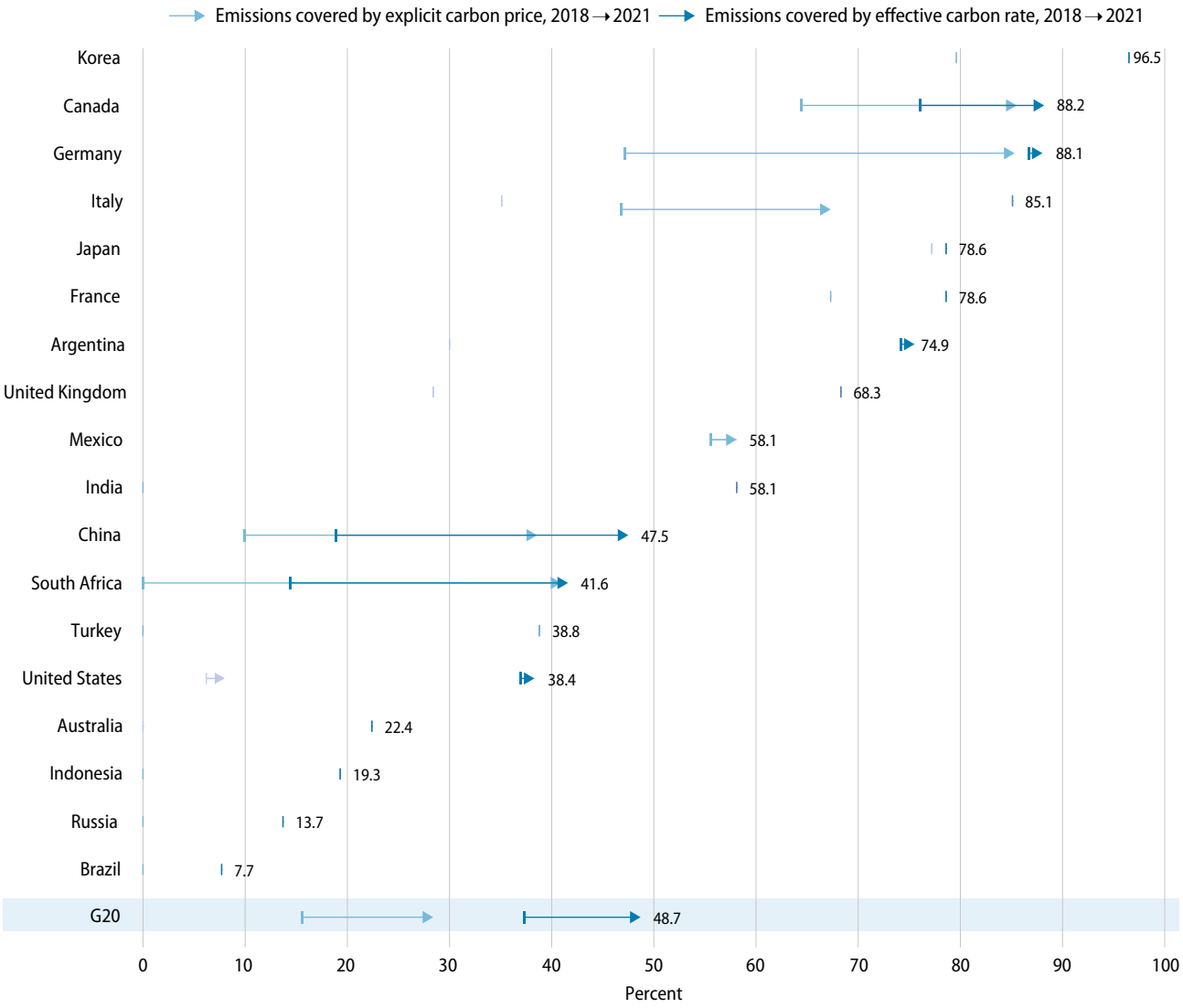
Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

sector, as well as the expansion of carbon pricing in Canada, boosting the share of emissions covered by an explicit form of carbon pricing from 20% to 54%.[7] Emissions coverage has changed relatively little in off-road transport, agriculture & fisheries, and industry. With 21%, overall coverage is lowest in buildings. Coverage has increased in this sector, however, mostly through the explicit carbon pricing initiatives in Canada and Germany.

The share of emissions that is covered by carbon prices varies substantially across G20 economies. With 97%, Korea continues to price the largest share of emissions. Recent changes in coverage are most pronounced for Canada, China, Germany, Mexico and South Africa, where new explicit forms of carbon pricing have been introduced. In total, 12 G20 countries now have explicit carbon pricing instruments in place at either the national or subnational level or participate in the European Union's ETS.

7. In addition, US coverage in the electricity goes from ca 7% to almost 10% as the Regional Greenhouse Gas Initiative (RGGI) expanded to Virginia and New Jersey. Carbon price reform at the subnational level in Mexico increased electricity sector coverage from 45% to 49%.

Figure 3. **Share of emissions priced, G20 economies, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Priced means that a positive price applies after correcting for tax reductions and refunds. Taxes are those applicable on 1 April 2021. In Brazil, the PIS/Cofins and ICMS were not classified as fuel excise taxes and are hence not included in the figure. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Due to data constraints, the recent changes of the Korean ETS that have increased coverage by around 2 percentage points (ICAP, 2021) are not modelled. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Percentages are rounded to the first decimal place.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

CARBON PRICES HAVE INCREASED CONSIDERABLY IN SOME G20 COUNTRIES, BUT PROGRESS HAS BEEN UNEVEN

In some G20 countries, explicit carbon prices have increased considerably. EU ETS prices exceeded EUR 60 per tonne of CO_2 for the first time in August 2020, which is almost four times the average EU ETS price of 2018. Allowance prices of the newly established UK ETS are trading at similar and at times considerably higher levels. Rates have increased substantially in Canada, with the backstop carbon price now at CAD 40 (around EUR 27).

The new national ETS in China, initially covering the power sector, started trading at CNY 53 (around EUR 7) per tonne of CO_2. Emissions covered by the new German national ETS for emissions not covered by the EU ETS are currently priced at EUR 25 per tonne of CO_2.

The change in average explicit carbon prices across the G20 as a whole is less pronounced. As shown in Figure 4, explicit carbon prices have increased to an average of EUR 4: ETS prices are now at EUR 3, up from EUR 1 in 2018. Carbon taxes continue to be less than EUR 1 on average, up 14 eurocents since 2018. The reason is that more than

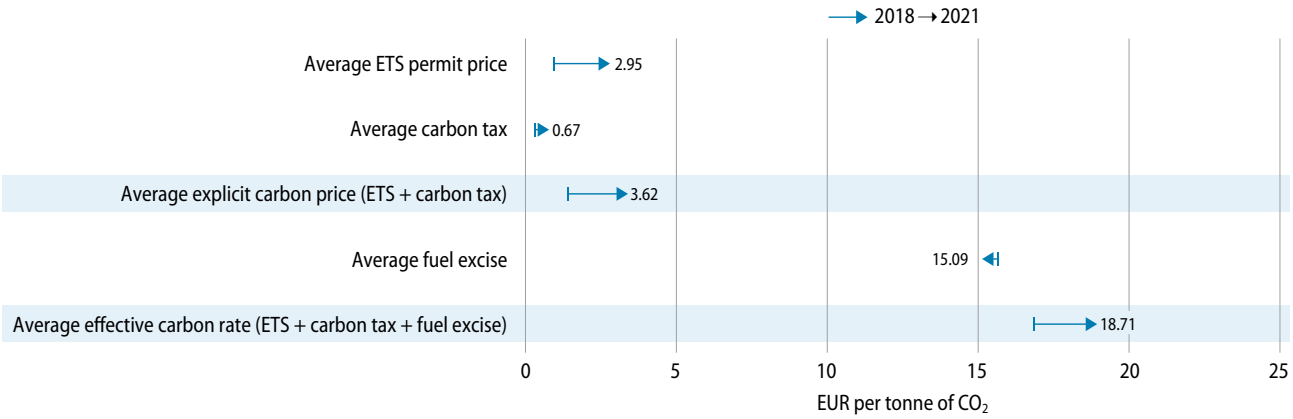
70% of emissions are not yet covered by an explicit carbon price (see Figure 1), and that explicit carbon prices continue to be relatively low in several large G20 countries.

Despite recent progress with explicit carbon prices, effective carbon rates continue to be dominated by fuel excise taxes. Fuel excise taxes amount to EUR 15 on average, down slightly relative to 2018 in real 2021 EUR. Across G20 countries, the average effective carbon rate – the sum of explicit carbon prices and fuel excise taxes – has increased to EUR 19, up approximately EUR 2 since 2018.

Effective carbon rates continue to be highest in road transport and lowest in the industry and electricity sectors. As shown in Figure 5, the average effective carbon rate across G20 countries in road transport is EUR 88 per tonne of CO_2, up EUR 1 since 2018. This is because of the relatively high rates of excise taxes in this sector, and the broad coverage discussed above. In other sectors, average effective carbon rates are much lower, with the lowest averages in electricity and industry (where inter-country heterogeneity is large, however). Explicit carbon prices have been on the rise in all sectors. The increase is largest in electricity where they increased by EUR 4 per tonne of CO_2 between 2018 and 2021.

In the electricity and industry sectors, emissions pricing mostly takes the form of emissions trading systems, as illustrated in Figure 6. In all other sectors, fuel excise taxes continue to dominate compared to explicit carbon prices. In buildings, there is a roughly even split between emissions trading systems and carbon taxes.

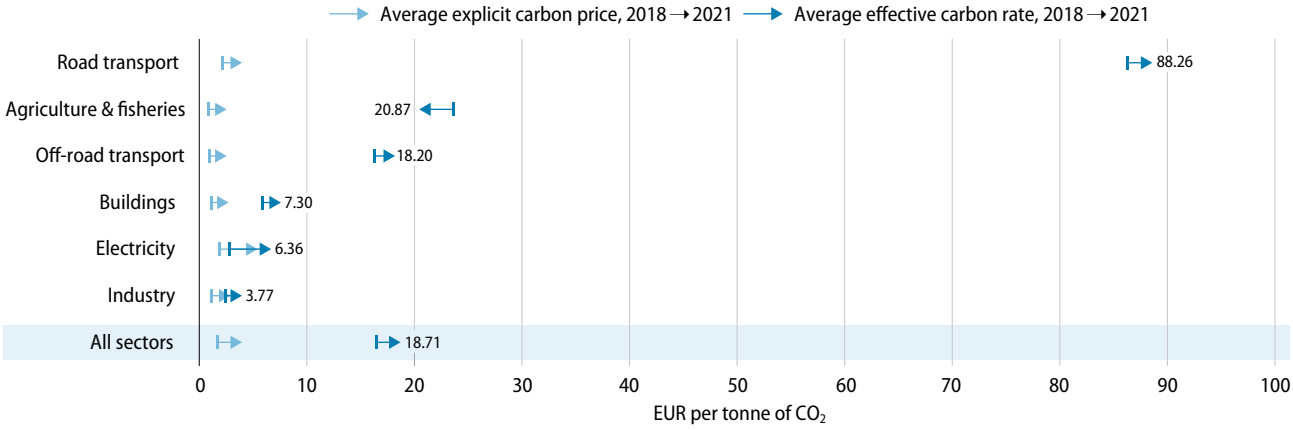
Figure 4. **Average carbon prices by instrument, G20 economies, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Taxes are those applicable on 1 April 2021. The ETS price is the average ETS auction price for the first semester of 2021, with the exception of China and the UK where it is based on information for the period in which they were operational (China: 16/07/2021, UK: 19/05/2021-30/06/2021) and the U.S. RGGI and Massachusetts and Tokyo subnational systems where, due to data limitations, the 2020 average was used. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Carbon prices are averaged across all energy-related emissions from G20 countries, including those that are not covered by any carbon pricing instrument. All rates are expressed in real 2021 EUR using the latest available OECD exchange rate and inflation data; change can thus be affected by inflation and exchange rate fluctuations. Prices are rounded to the nearest eurocent.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

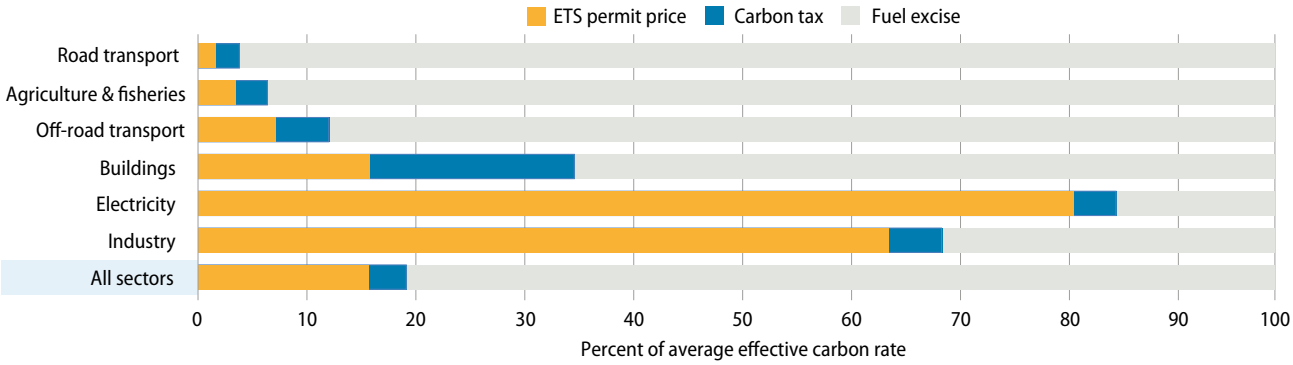
Figure 5. **Average carbon prices by sector, G20 economies, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Taxes are those applicable on 1 April 2021. The ETS price is the average ETS auction price for the first semester of 2021, with the exception of China and the UK where it is based on information for the period in which they were operational (China: 16/07/2021, UK: 19/05/2021-30/06/2021) and the U.S. RGGI and Massachusetts and Tokyo subnational systems where due to data limitations the 2020 average was used. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Carbon prices are averaged across all energy-related emissions from G20 countries, including those that are not covered by any carbon pricing instrument. All rates are expressed in real 2021 EUR using the latest available OECD exchange rate and inflation data; change can thus be affected by inflation and exchange rate fluctuations. Prices are rounded to the nearest eurocent.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

Figure 6. **The composition of effective carbon rates by sector, G20 economies, 2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Taxes are those applicable on 1 April 2021. The ETS price is the average ETS auction price for the first semester of 2021, with the exception of China and the UK where it is based on information for the period in which they were operational (China: 16/07/2021, UK: 19/05/2021-30/06/2021) and the U.S. RGGI and Massachusetts and Tokyo subnational systems where due to data limitations the 2020 average was used. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. The figure includes CO_2 emissions from the combustion of biomass and other biofuels. Carbon prices are averaged across all energy-related emissions, including those that are not covered by any carbon pricing instrument.

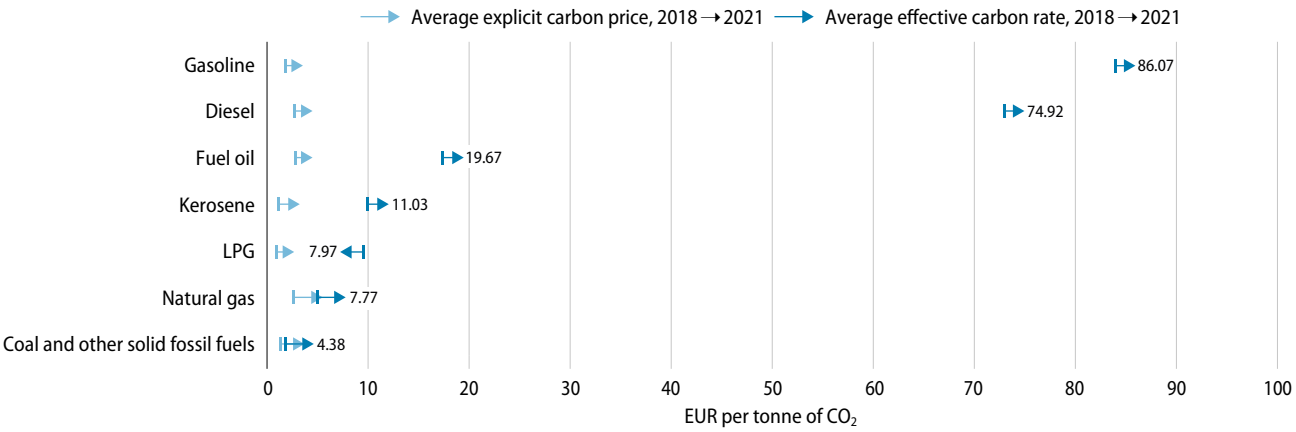
Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

Effective carbon rates have increased across most fossil fuels,[8] as shown in Figure 7. Recent increases, driven by higher explicit carbon prices, are largest for coal and natural gas. However, effective carbon rates on fuels that are predominantly used in road transport continue to be significantly higher than those on other fuels, with coal subject to the lowest rate on average (at EUR 4 per tonne of CO_2, up from EUR 1 in 2018).

Carbon price developments across G20 countries have diverged since 2018. Figure 8 shows that countries with the highest effective carbon prices to begin with have seen prices rise further. By contrast, there has been little change in carbon prices in countries where rates were relatively low in 2018. Lower rates do not always mean that countries have actively reduced carbon prices; sometimes they are the result of inflation and exchange rate fluctuations (in particular, Argentina, Turkey).

8. The drop for LPG is mostly driven by Turkey where rates are relatively high, and inflation and exchange rate depreciation have reduced them when expressed in real 2021 EUR as in the figure.

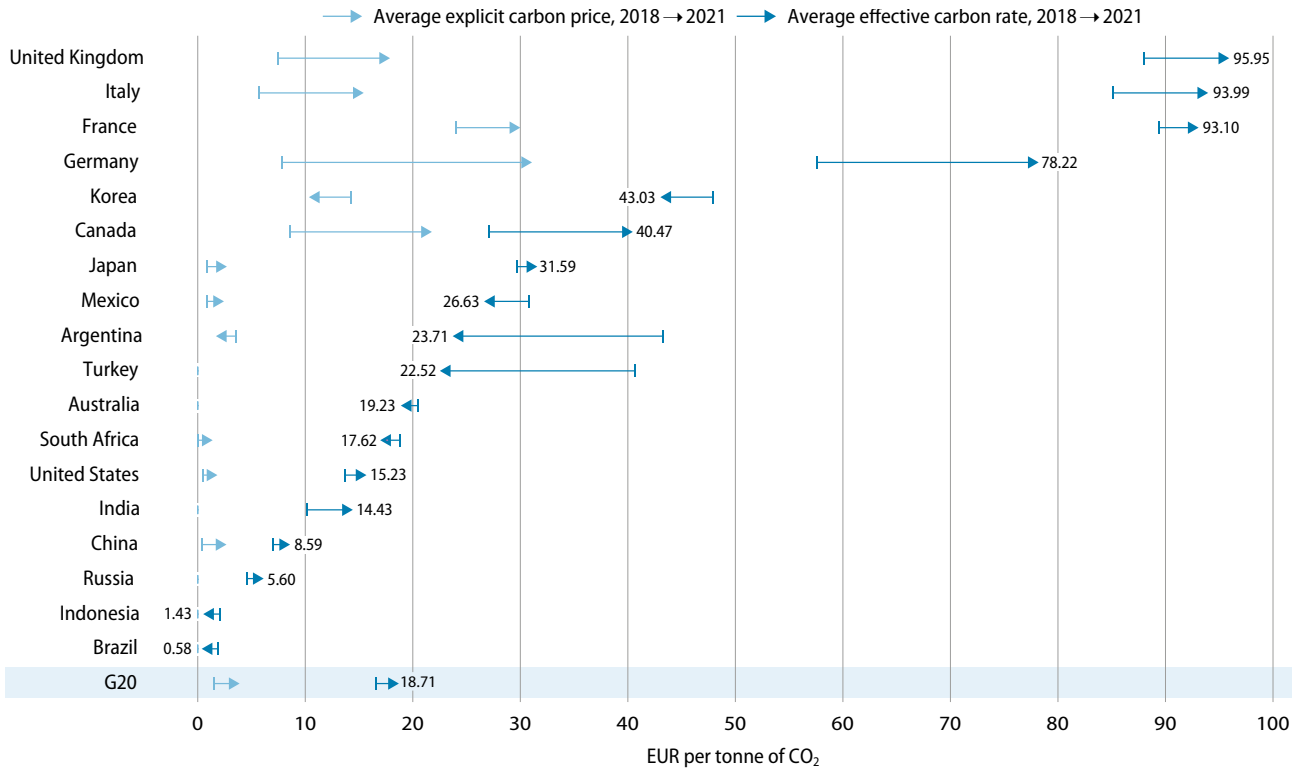
Figure 7. **Average carbon prices by fossil fuel, G20 economies, 2018-2021**



Note: G20 includes all G20 countries, except Saudi Arabia. Taxes are those applicable on 1 April 2021. The ETS price is the average ETS auction price for the first semester of 2021, with the exception of China and the UK where it is based on information for the period in which they were operational (China: 16/07/2021, UK: 19/05/2021-30/06/2021) and the U.S. RGGI and Massachusetts and Tokyo subnational systems where due to data limitations the 2020 average was used. ETS coverage estimates are based on the OECD's (2021a), *Effective Carbon Rates 2021*, with ad hoc adjustments to account for recent coverage changes. Emissions refer to energy-related CO_2 only and are calculated based on energy use data for 2018 from IEA (2020), World Energy Statistics and Balances. Carbon prices are averaged across all energy-related emissions from G20 countries, including those that are not covered by any carbon pricing instrument. All rates are expressed in real 2021 EUR using the latest available OECD exchange rate and inflation data; change can thus be affected by inflation and exchange rate fluctuations. Prices are rounded to the nearest eurocent.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

Figure 8. **Average carbon prices by country, G20 economies, 2018-2021**



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Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

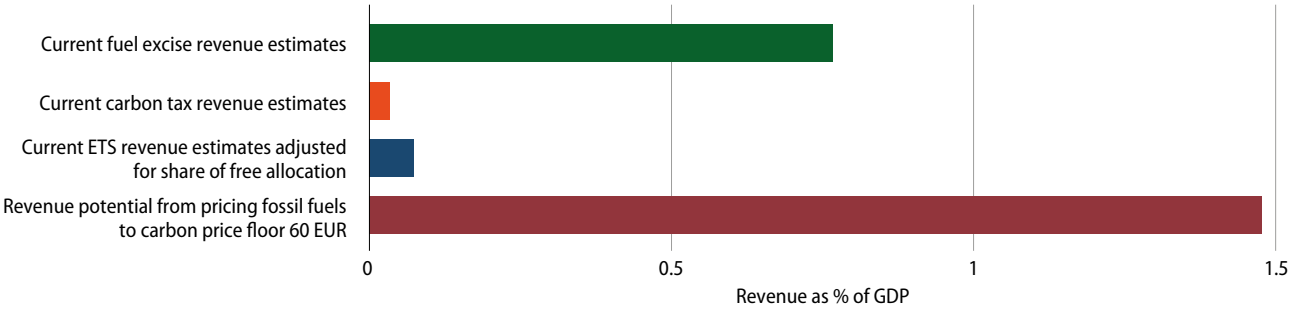
INCREASING CARBON PRICES COULD RAISE SUBSTANTIAL REVENUES, WHILE CUTTING EMISSIONS

By how much would revenues increase if effective carbon rates (ECRs) were raised to reach a carbon benchmark of EUR 60 per tonne of CO_2 for all fossil fuels? The carbon benchmark of EUR 60 is a low-end estimate of the climate damage caused by each tonne of CO_2 emitted in 2030 and the carbon prices that would be needed by then for consistency with net-zero emissions targets.[9] It is also a mid-range benchmark of current carbon costs (OECD, 2021a).

The revenue potential from pricing to the EUR 60 carbon benchmark differs substantially across countries. Figure 9 shows that G20 countries would be able to raise an amount equivalent to approximately 1.5% of GDP on average. This average hides the fact that some would only raise revenues of 0.2-0.3% of GDP (France, Germany, Italy, and the United Kingdom), while others could raise revenues in excess of 2% of GDP (China, India, Indonesia, Russia, and South Africa). The figure also shows that doing so would increase the revenues from current carbon pricing instruments by more than 70% on average. There too cross-country differences are considerable, however.

The revenue potential differs among countries for three main reasons. First, there are substantial differences in pre-existing carbon prices (see Figure 8). Higher pre-existing carbon prices reduce the remaining revenue potential from taxing to a given benchmark. Second, some countries price carbon through emissions trading systems, where free allocation remains common in industry and to a lesser extent in electricity. Phasing out such free allocation would generate substantial revenues and could increase the effectiveness of emissions trading systems at reducing emissions (Flues and van Dender, 2017). Third, the carbon intensity of GDP varies across countries.

Figure 9. **Revenue potential from introducing a EUR 60 price floor across all CO_2 emissions from fossil fuels across G20 countries**



Note: G20 includes all G20 countries, except Saudi Arabia. Revenue estimates account for behavioural responses using the carbon price elasticities estimated by Sen and Vollebergh (2018). Revenue estimates include auctioning revenues that could be raised by phasing out the free allocation of ETS permits where applicable.

Source: OECD (2022), *Taxing Energy Use 2022* (forthcoming).

9. IMF/OECD (2021) additionally reports estimates of the explicit carbon prices that would be consistent with achieving countries' mitigation pledges for 2030. These vary substantially across G20 countries because the stringency of pledges varies substantially across countries and because the price responsiveness of emissions differs across countries.

Looking ahead

Progressively increasing carbon prices to substantially higher levels will be essential to match countries' long-term ambitions on climate and better reflect the true cost of carbon emissions. The share of emissions that is covered by carbon prices has increased in recent years as a number of G20 countries introduced or extended explicit carbon pricing schemes. Nevertheless, significant further progress is needed. Around half of all emissions in G20 countries remain unpriced, and price levels are not high enough for a successful transition to net zero (Carbon Pricing Leadership Coalition, 2021; OECD, 2021a).

Strategically deploying the revenues from carbon pricing will make climate policy more inclusive and effective. Embedding carbon price reforms in broader policy packages can cushion adverse short-term impacts by delivering immediate benefits to vulnerable groups – whether households, workers, firms or regions. Equitable reform packages are critical to ensuring a just transition that does not leave behind vulnerable groups (see Box 3). The most productive revenue use will depend on the local circumstances (IMF/OECD, 2021; OECD, 2021b; Marten and van Dender, 2019).

Competiveness and carbon leakage concerns often hold back carbon price reform. The evidence from OECD countries is that at historical price levels there are no discernible effects (Venmans, Ellis and Nachtigall, 2020).[10] However, prices are low and in emissions trading systems permits (allowances) are often allocated for free, especially in the electricity and industry sector (OECD, 2021a). The rules for free permit allocation too often provide an advantage to carbon-intensive technologies, effectively muting carbon price signals (Flues and van Dender, 2017). These and other existing measures to address potential impacts of carbon pricing on competitiveness and leakage are therefore difficult to reconcile with the long-term ambition to reach net zero. Auctioning off more ETS allowances would strengthen abatement incentives, while raising government revenue to support a green and inclusive transition. Yet, increased policy stringency in some jurisdictions that is not matched by similar policies in other countries could amplify competiveness and carbon leakage concerns for a limited number of carbon-intensive and trade exposed sectors, such as steel (OECD, 2020a).

10. Evidence on the impact of changes in energy prices on manufacturing performance in two G20 economies – Indonesia and Mexico shows that, while increases in electricity prices did have some adverse impacts on plant performance, higher fuel prices increased productivity and the profits of manufacturing plants (Cali, et al., 2019).

International co-ordination could unlock comprehensive climate action across the world. Border carbon adjustments (BCAs) have been proposed as one tool to address competitiveness and leakage concerns. Depending on their design, BCAs create incentives to introduce explicit carbon prices in jurisdictions where they do not yet exist. However, as BCAs would only price a fraction of CO_2 emissions embodied in traded goods, their potential to unlock comprehensive action on climate change mitigation is limited (Parry, Black and Roaf, 2021). By contrast, international co-ordination, for example over minimum carbon prices, has the potential to spur more widespread climate action. Co-ordination needs to be fair and account for countries differentiated responsibilities and respective capabilities. It also needs to be pragmatic and recognise that countries start out from very different economic and political realities, which implies that they will rely on different combinations of mitigation policy instruments (IMF/OECD, 2021).

Improving the measurement of different mitigation policy instruments and approaches could be an important enabler to build a broad and inclusive coalition for co-operation on climate change mitigation. Making international co-ordination on climate change mitigation a success will likely require going beyond explicit carbon prices and implicit carbon prices from fuel excise taxes – the instruments covered in this report.

Box 3. TAXING ENERGY USE FOR SUSTAINABLE DEVELOPMENT: WHY CARBON PRICING IS MORE THAN GOOD CLIMATE POLICY

There are many reasons why well-designed carbon price reforms can be in the best interests of developing and emerging economies, enabling them to respond to multiple pressing challenges beyond climate change. For example, carbon pricing can help tackle local pollution and can support the mobilisation of domestic revenue needed to finance vital government services. While the low level of emissions generated by developing and emerging countries can mean that their ability to slow down climate change in the near future through their own actions is limited, making progress with carbon pricing would help put pressure on large polluters to step up their game. It would also increase developing countries' ability to participate successfully in a decarbonising global economy.

Carbon taxes or emissions permit trading encourage cleaner investment and consumption choices for all public and private spending, which is not only an effective and efficient way to reduce CO_2 emissions, but can also future-proof investments. A long-term commitment to carbon pricing and phasing out fossil fuel subsidies ensures that investments will flow into assets that are aligned with low-carbon development objectives and that those assets will remain valuable once the transition to a carbon-neutral economy accelerates around the world.

Furthermore, there are fewer dirty legacy assets in developing countries than in the developed world. Countries like Côte d'Ivoire, Ecuador, Ghana, and Uganda for example, are not currently using coal. This means that by committing to gradually rising carbon prices in the aftermath of the pandemic, developing countries can avoid many of the transition costs that the developed world is facing today, such as stranded assets and stranded jobs in coal regions. Carbon price reform or other environmental instruments such as a ban on coal use, could even enable some countries to leapfrog the most polluting fossil fuels altogether.

Equally, carbon pricing can strengthen efforts to improve domestic revenue mobilisation. While the revenue potential varies across countries, the analysis of 15 developing and emerging economies finds that, on average, these countries could generate revenue equal to around 1% of GDP if they set carbon rates on fossil fuels equivalent to EUR 30 per tonne of CO_2. With tax-to-GDP ratios averaging 19% in the 15 countries, carbon pricing could increase tax revenues by around 5% on average, but with large differences across countries.

Revenues from carbon pricing could be used to provide targeted support to improve energy access and affordability, enhance social safety nets, and support other economic and social priorities. For example, in Egypt, where a successful fossil fuel subsidies reform generated fiscal savings, the government was able to allocate more funds to education and health and implement an economic stimulus package to recover from the crisis. The potential use of carbon pricing revenues to support improvements in social safety nets is all the more relevant in the context of the COVID-19 crisis, where the impacts faced by the developing world have been exacerbated by the fact that too many citizens do not benefit from an adequate social safety net.

In addition, cutting carbon emissions substantially reduces local air pollution, and these co-benefits counterbalance some of the short-term costs of climate action, e.g. related to higher energy and food prices. Carbon pricing is also appealing for revenue raising in the presence of high levels of informality in developing countries, where 70% of all employment is informal (OECD/International Labour Organization, 2019), as carbon taxes are harder to avoid than direct taxes on personal or corporate income.

In short, carbon pricing is more than good climate policy. Carbon pricing, and energy tax and subsidy reform in general, is at the nexus of several UN Sustainable Development Goals (SDGs). While carbon pricing, including fossil fuel subsidy reform, contributes to responsible production and consumption (SDG 12) and climate action (SDG 13), it also supports good health and well-being (SDG 3) and affordable and clean energy (SDG 7) and, with the right design, leads to reduced inequalities (SDG 10) and more sustainable cities and communities (SDG 11).

If carbon pricing has so many benefits, why do we not see more of it? The barriers are not administrative: almost all countries have experience with fuel excise taxes, meaning that the implementation of carbon price reform is within reach in administrative terms. Governments simply need to align excise taxes with the carbon content of the fuels. A carbon tax of EUR 30 per tonne of CO_2, for instance, corresponds to a gasoline tax of 7 eurocents per litre of gasoline, and a coal tax of some 6 eurocents per kg. Such fuel-based carbon taxes could be collected from the fuel suppliers in the same way as existing excise taxes.

The barriers to carbon pricing lie in making sure that change is equitable and aligned with the country's development objectives, which is also critical to building broad public support for carbon price reform. Egypt's success with fossil fuel subsidy reform is encouraging as it shows that adverse impacts on vulnerable households and businesses can be alleviated. Naturally, carbon pricing is not the silver bullet and needs to be part of a larger portfolio of climate and fiscal policies. Kenya, for instance, is currently taking steps to ensure that people and businesses will have affordable access to cleaner alternatives. Broader efforts at encouraging electrification were highlighted as one promising avenue. Kenya does not have a carbon tax, but levies fuel excise taxes and has successfully phased out most fuel subsidies.

Source: https://oecd-development-matters.org/2021/02/17/why-should-developing-countries-implement-carbon-pricing-when-even-advanced-economies-fall-woefully-short/

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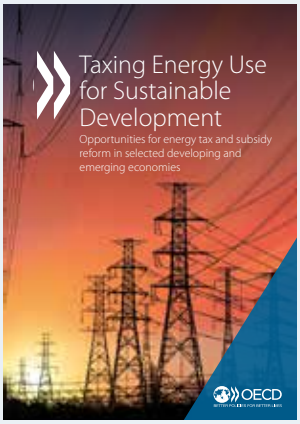

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