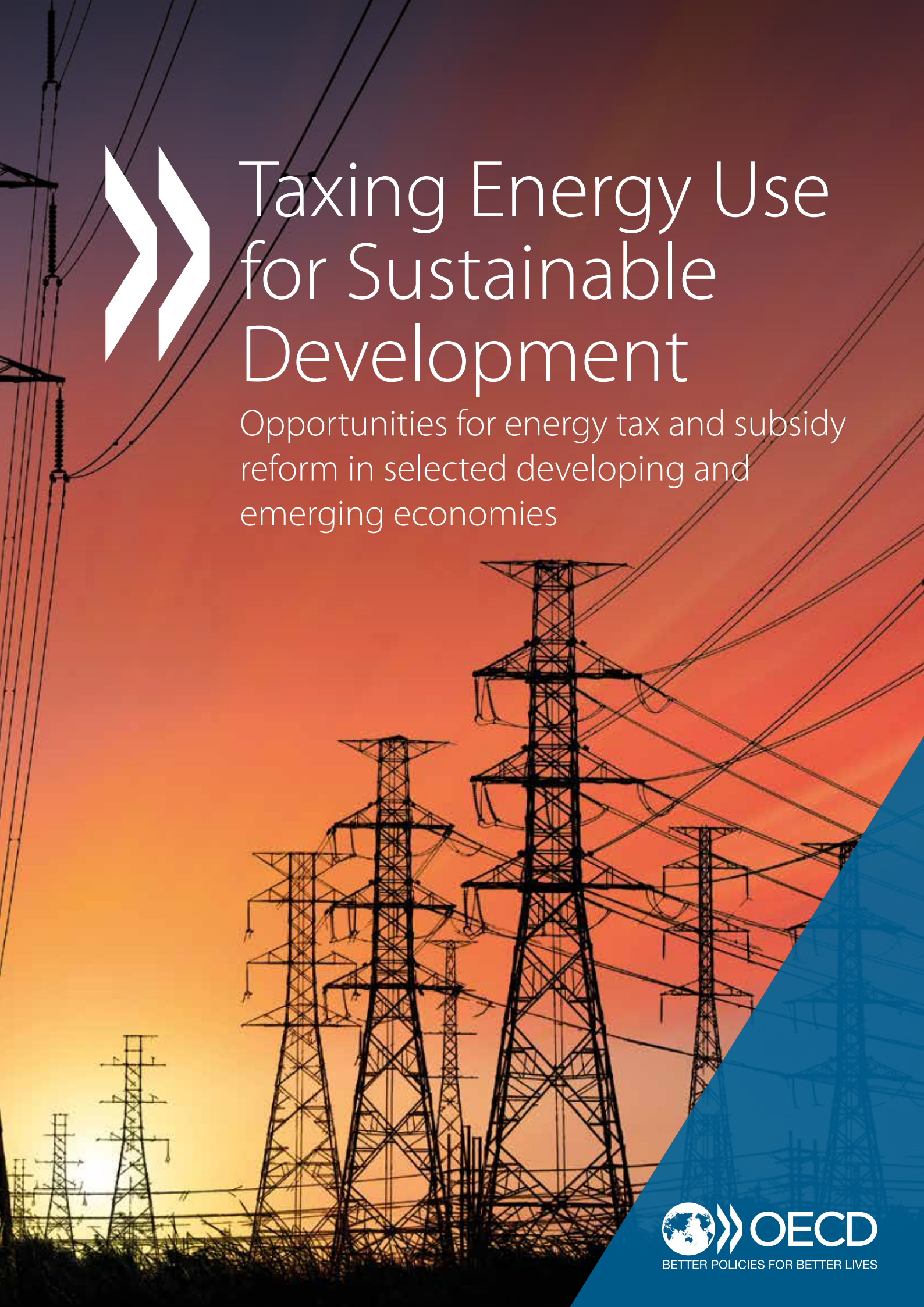


Taxing Energy Use for Sustainable Development

Opportunities for energy tax and subsidy reform in selected developing and emerging economies

OECD
BETTER POLICIES FOR BETTER LIVES


OECD
BETTER POLICIES FOR BETTER LIVES

Contents

1 Energy tax and subsidy reform for a better recovery

KEY MESSAGES

- **Carbon pricing, including fossil fuel subsidy reform, is a powerful tool to encourage low-carbon development choices and contribute to domestic resource mobilisation.**
- **Pricing carbon needs to be accompanied by measures that ensure affordable access to cleaner alternatives.**
- **Potential co-benefits of carbon pricing include reduced local air pollution, reduced informality, and better access to development aid.**

In the absence of carefully crafted policy responses, COVID-19 could reverse decades of progress in sustainable development and the fight against poverty. Among other impacts, COVID-19 has magnified the financing gap to achieve the sustainable development goals (SDGs) in developing countries, which could increase by 70% compared to pre-COVID levels (OECD, 2020b). Impacts have been exacerbated by the fact that too many citizens in the developing world do not benefit from a social safety net, which means that the loss of stable income due to the COVID-19 crisis has increased the risk of not having access to essential energy services (Brosemer et al., 2020). Providing affordable access to clean energy is crucial for a strong recovery. In addition to energy access at the individual level, energy security, which can be defined broadly as the uninterrupted availability of energy sources at an affordable price,[1] is a key enabler of economic growth.

The need for recovery policies after the pandemic offers opportunities for building back better by preparing the ground for cleaner, healthier, more resilient and more inclusive economies. This will require that countries better align national plans, including Nationally Determined Contributions (NDCs) under the Paris Agreement, with sustainable development and climate objectives, while taking the necessary steps to mobilise domestic resources.

Energy tax and subsidy reform is instrumental to achieving the triple objectives of decarbonisation, domestic revenue mobilisation, and access to affordable energy. The transition to a socially inclusive zero-carbon economy can be facilitated by deploying price-based instruments, including energy and carbon taxes. Well-designed taxes incentivise citizens and businesses to make cleaner choices, reducing climate damage and air pollution. Taxes also raise much needed revenue, which

1. https://www.iea.org/topics/energy-security

can be used to fund vital government services and support vulnerable groups to adjust to higher energy prices, including through introducing or strengthening social safety nets. Similarly, reducing fossil fuel subsidies creates fiscal space and encourages more sustainable consumption and production patterns. Energy tax and subsidy reform therefore is at the nexus of several UN Sustainable Development Goals (SDGs), including:

Implementing energy tax and subsidy reforms needs careful design and sequencing to ensure that they are fair, effective and feasible. An important element of successful reform strategies is being transparent about objectives and measuring fiscal effects, a crucial first step towards a more comprehensive assessment of the economic, social and environmental effects. Developing a thorough understanding of the side effects of reform can inform the design and implementation of complementary policies that can mitigate them (Elgouacem, 2020). COVID-19 further highlights the need to invest in policies that better protect and reinforce the resilience of vulnerable groups. Research shows that even without considering the benefits of how the revenues may be used, carbon pricing may lead to progressive distributional outcomes especially in lower income countries (Ohlendorf et al., 2020), but policy makers should not take such outcomes for granted and perceptions of unfairness could in any case arise.

A long term commitment to carbon pricing can guide a sustainable and resilient recovery from the COVID-19 crisis, reducing the risks of stranded assets and stranded jobs. There is a clear demand for measures to guide investment decisions taken by both public and private sector actors. Carbon pricing, including phasing out subsidies on fossil fuel use, is a particularly promising tool that can incentivise investments that are both cost-effective and aligned with the SDGs and the Paris Agreement. Carbon pricing can unlock the power of global financial and capital markets to meet climate challenges and guide a sustainable and resilient recovery from the COVID-19 crisis. Importantly, a long term commitment to carbon pricing has the potential to reduce the risks of stranded assets and stranded jobs as it provides the certainty needed to future-proof long-term infrastructure investments.[2] Carbon pricing can also contribute to funding just transition measures to ensure that those communities that stand to be adversely affected by reform efforts are not left behind. A well designed carbon pricing package can therefore be an important component of ensuring that fiscal policies are progressive, fair and sustainable.[3] A low oil price environment increases the feasibility of carbon price reform (Mintz-Woo et al., 2020).

Carbon pricing can contribute to the broader tax and development agenda in a number of ways. First, carbon pricing has the potential to raise considerable revenues in most countries, which can support domestic resource mobilisation efforts. The developing and emerging economies covered in this study would be able to raise revenue equivalent to approximately 1% of GDP on average if they raised carbon rates on fossil fuels to a benchmark of EUR 30 per tonne of CO_2. The revenue potential differs substantially across countries, reflecting differences in pre-existing tax levels and energy use patterns (see Section 5).

In addition to the potential domestic resource mobilisation benefits, carbon pricing can provide several other benefits for low and middle income countries.

2. The introduction of carbon pricing may also decrease the value of carbon-intensive legacy assets, which may become stranded. However, such a risk can be limited by phasing in carbon prices gradually.

3. On 28 May 2020, Canada, Jamaica and the Secretary-General of the United Nations convened a High-Level Event to join forces with Heads of State and Government, international organisations, and other key partners to discuss financing solutions to the COVID-19 health and development emergency (https://www.un.org/en/coronavirus/financing-development). In the follow-up to the High-Level Event, six Discussion Groups were convened to inter alia discuss how countries could recover better for sustainability (Discussion Group II). This paragraph discusses some of the key highlights of Discussion Group II (https://www.un.org/sites/un2.un.org/files/financing_for_development_covid19_part_ii_hosg.pdf). It should be noted that this is not a negotiated document and reflects a wide array of perspectives and priorities.

For example, carbon pricing can help tackle informality. Informality represents 70% of all employment in developing and emerging economies (OECD/ILO, 2019). Unlike many direct taxes, where firms and individuals can avoid taxation by operating in the informal economy, energy and taxes are generally more difficult to avoid as even informal firms must buy energy from the formal sector (transport fuels, electricity). Shifting to energy and carbon taxes could allow governments to shift the tax mix away from taxes that are only paid by the formal sector, which could reduce the incentives for informality by lowering the relative tax burden of the formal sector. These positive effects have been shown to dominate countervailing effects that could be related to the use of informal fuels in developing countries, such as agricultural residue, paper trash, or firewood, and informal production of energy-intensive goods (Bento, Jacobsen and Liu, 2018). As a result, taxing energy can bring informality benefits, similar to those observed with the VAT, which acts as an input tax on the informal sector to the extent that businesses in the informal sector purchase goods on which VAT has already been paid (Keen, 2008).[4]

Carbon pricing can bring other benefits, especially in the form of reduced local air pollution (West et al., 2013). Carbon pricing can also help to better align development cooperation with the goals of the Paris Agreement. Notably, the pressure is mounting for providers of development co-operation to align their activities with the objectives of the Paris Agreement. However, many still lack the mandates, resources, incentives and strategies to do so (OECD, 2019a). Carbon pricing can facilitate such an alignment as the price signals sent by carbon pricing can help to ensure that aid flows into Paris-compatible projects. Specifically, if a country has introduced carbon pricing in line with the objectives of the Paris Agreement, then the climate part of the environmental impact assessment of an investment should be taken care of as the right decarbonisation incentives are in place. With climate costs priced in, clean investments become relatively more attractive commercially compared to the situation where carbon has not been priced. Paris-incompatible projects, such as coal-fired power plants, become less appealing. The simplicity of a price signal is preferable to an approach that requires a complex case-by-case evaluation of the climate impacts of every individual project.

The Taxing Energy Use for Sustainable Development (TEU-SD) project (Box 1) aims to provide the necessary data and indicators to support carbon pricing reforms. In particular, the project aims to inform policy makers so that they can translate high-level policy ambitions, such as those under the Paris Agreement and the SDGs, into concrete action at the national level. The extension focuses on countries that have shown an initial interest in energy tax and fossil fuel subsidy reform as gauged by participation in initiatives such as the Coalition of Finance Ministers for Climate Action (CFMCA), the Carbon Pricing Leadership Coalition (CPLC) and the Friends of

TEU-SD COUNTRIES

4 The VAT analogy does not imply that "input-excise" should be deductible.

Fossil Fuel Subsidy Reform (FFFSR). The TEU-SD countries span geographies: North and Sub-Saharan Africa, Latin America and the Caribbean, and Asia, with the following countries included in the project:

- **Africa:** Côte d'Ivoire, Egypt, Ghana, Kenya, Morocco, Nigeria, Uganda
- **Latin America and the Caribbean:** Costa Rica, Dominican Republic, Ecuador, Guatemala, Jamaica, Uruguay
- **Asia:** Philippines, Sri Lanka

Additionally, the TEU-SD countries reflect a range of different profiles in terms of their progress in undertaking fossil fuel subsidy reform, with regulated as well as deregulated energy prices. Both fossil fuel importing and oil exporting countries are included.

Box 1. **Project background**

Taxing Energy Use (TEU), an OECD flagship publication, maps energy and carbon taxes applicable to energy consumption, ensuring strict comparability of results across the 44 OECD and G20 countries covered. TEU is the most detailed and comprehensive stocktake of the state of energy taxation currently available, and it is widely used as a tool to identify priorities for energy tax reform.

The Taxing Energy Use for Sustainable Development Project, of which the main results are reported in this brochure, has extended country coverage to 15 developing and emerging economies, while adapting the methodology to the developing- and emerging country context as needed. In addition to providing detailed information on energy and carbon taxes in these countries, the project has also identified the principal subsidies on domestic energy use.[1]

The project aims to enable policy makers and analysts to assess the relative magnitude of taxes and subsidies across all energy sources and users in a variety of countries. The use of a common methodology ensures comparability across countries. Summary indicators facilitate cross-country comparisons.

A key output of the project are country notes highlighting energy taxes and subsidies on energy use. These country notes provide a solid evidence base for in-depth country analysis and allow for the identification of future, country-specific reform priorities. Country notes include estimates of the revenue effects of subsidy removal as well as energy and carbon tax reform.

The project was carried out with the financial support from the governments of Ireland, Japan, Luxembourg, Norway, Sweden and the United Kingdom. Tax and subsidy data was collected via publicly available official sources and consultation with government officials and independent experts who were asked to review and refine the data. Energy use data was adapted from International Energy Agency (IEA), *World Energy Statistics and Balances*.

1. This represents a methodological innovation relative to previous editions of TEU, which only considered one form of government support, i.e. tax expenditures.

2 Starting points differ across countries

KEY MESSAGES

- **The COVID-19 crisis led to a substantial reduction in economic output and energy use, but economies are expected to recover to pre-crisis levels in the coming years. Before COVID-19, the countries newly included in TEU-SD (TEU-SD countries) were growing strongly, with most outperforming OECD countries. Energy needs increased in parallel, albeit at markedly lower rates, and so did energy-related CO_2 emissions, which is a positive sign from a climate and resource efficiency perspective.**
- **TEU-SD countries need an approach that increases energy access, whereas OECD countries mostly need to maintain universal access.**
- **Domestic resource mobilisation is a pressing issue in many TEU-SD countries, as illustrated by relatively low tax-to-GDP ratios compared to most of the OECD.**

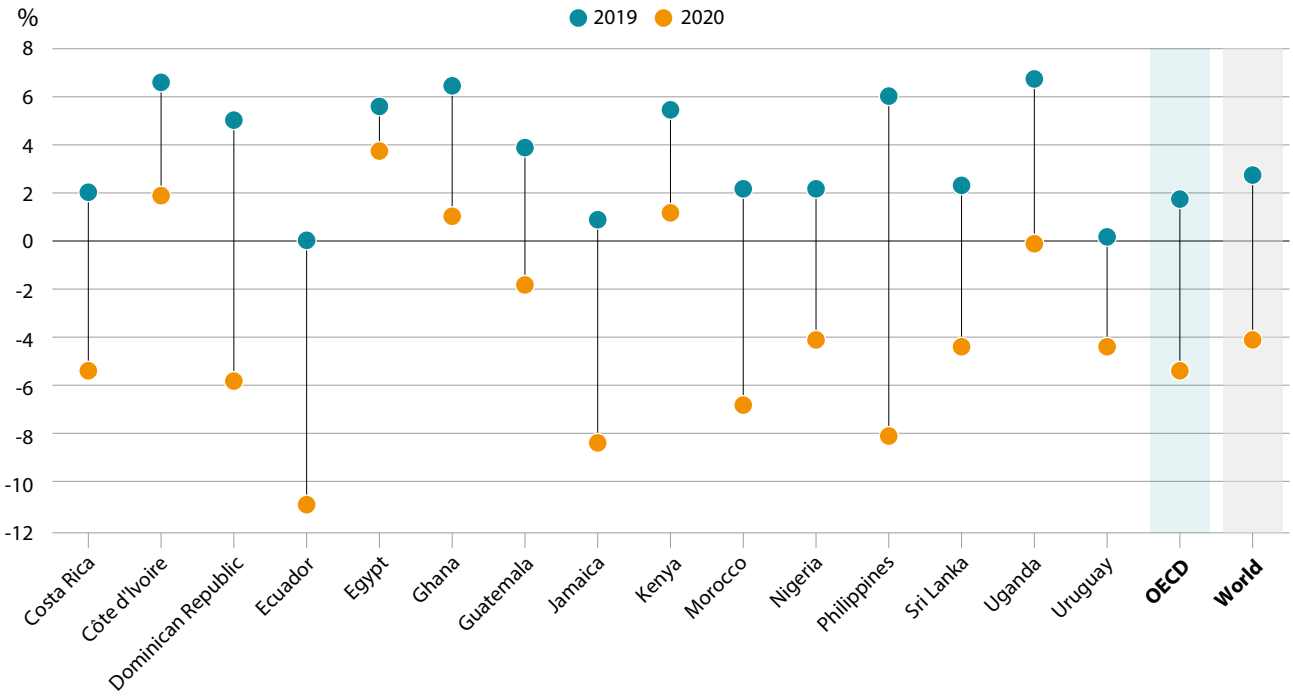
The COVID-19 crisis led to a substantial reduction in economic output and energy use. Figure 1 shows the expected change in real GDP between 2019 and 2020 for all TEU-SD countries, the OECD average, and the world average. Naturally, such a dramatic reduction in economic output has implications for energy use. The IEA expects the immediate effects of the pandemic on the energy system in 2020 to lead to a reduction of 5% in global energy demand, 7% in energy-related CO_2 emissions and 18% in energy investment (IEA, 2020b). Among energy sources, oil is expected to decline the most with its consumption anticipated to decrease by 8% in 2020, followed by an expected 7% fall in coal use, while renewables (especially for power generation) are expected to be less affected.

Lower energy use and emissions due to lower economic activity should not be misinterpreted as progress, especially in developing countries where it can be the symptom of a reversal in the progress made before the crisis in terms of ensuring access to electricity and clean cooking fuels. On average, TEU-SD countries already fell short from providing universal access to electricity and clean cooking (87.4% and 56.8%, respectively) before the crisis (Table 1). This is in sharp contrast to OECD countries where access is mostly universal. Carbon price reform therefore needs to be carefully designed to make sure that it increases access to electricity and clean cooking, and does not make such access more difficult.

Total energy demand could recover to pre-crisis levels by early 2023,[1] but lower income countries are expected to suffer the most as a result of the negative impacts on growth and energy consumption. Constrained access to finance in many developing countries may limit their capacity to develop effective stimulus packages for the post-pandemic recovery. This contrasts sharply with many developed economies that appear to be set for an extended period of very low borrowing costs, leaving much of the developed world with greater fiscal room for manoeuvre. This is accentuated by the fact that tax-to-GDP ratios in TEU-SD countries are substantially lower than in OECD countries. Specifically, the average ratio for TEU-SD countries is 19%, as opposed to the OECD average of 33.9% (Table 1). Considering the relatively low tax-to-GDP ratios in TEU-SD countries, domestic resource mobilisation will be particularly important for financing countries' sustainable development strategies.

1. IEA stated policies scenario (IEA, 2020b).

FIGURE 1. **Real GDP, year-on-year change**



Note: OECD and World totals are weighted averages.

Source: International Monetary Fund, World Economic Outlook Database, October 2020, and OECD Economic Outlook 108, December 2020.

Before COVID-19, TEU-SD countries were growing strongly, with most outperforming OECD countries. Between 2007 and 2017, GDP in TEU-SD countries grew by an average of 4.4% per year in total, and 2.7% per capita compared to 1.5% and 0.9%, respectively, in the OECD. Over the same time period, energy needs and associated CO_2 emissions increased as well, albeit at lower rates than GDP growth. Energy-related CO_2 emissions increased by 2.4% per year in total, and 0.6% per capita in contrast with OECD decreases of 0.4% in total and 1.0% per capita (Table 1).

Energy use patterns vary considerably across countries. The main source of energy-related CO_2 emissions in TEU-SD countries is biofuel use, which is large and often unsustainable. Biofuels (mainly primary solid biofuels and charcoal) accounted for 45.5% of energy-related CO_2 emissions in TEU-SD countries (Table 1). With the notable exception of Uruguay where biofuels are part of a national strategy that promotes their sustainable production for transport and industrial use,[2] in TEU-SD countries the use of biofuels may refer to the traditional use of biomass (Goldemberg and Teixeira Coelho, 2004), which is, for instance, "consumed in inefficient and poorly ventilated cook stoves",[3] making such biofuels a major contributor to household air pollution with negative health impacts including premature deaths. This is in stark contrast to OECD countries where governments tend to use modern biofuels and impose stricter sustainability criteria, and where biofuel use accounts for 18.5% of energy-related CO_2 emissions (Box 2).

One third of TEU-SD countries do not use any coal at present, which is encouraging as coal is generally the most polluting fossil fuel. Accordingly, the average share of coal in TEU-SD countries' energy-related CO_2 emissions is relatively low at 8%, whereas the average share in the OECD is 21%.

2. https://www.tni.org/es/node/12855; https://www.researchgate.net/publication/319209119_Sustainability_assessment_of_biofuels_production_in_Uruguay

3. IEA (2020), SDG7: Data and Projections, IEA, Paris https://www.iea.org/reports/sdg7-data-and-projections

TABLE 1. **Key statistics**	TEU-SD	OECD
Share of total population with access to electricity (2018) SDG 7.1.1	87.4%	100.0%
Share of total population with access to clean cooking (2018) SDG 7.1.2	56.8%	94.6%
Tax-to-GDP ratio (2017/2018)	19.0%	33.9%
GDP growth (annual) (2007-2017)	4.4%	1.5%
Per capital GDP growth (annual, per capita) (2007-2017)	2.7%	0.9%
CO_2 emissions growth (annual) (2007-2017)	2.4%	-0.4%
CO_2 emissions growth (annual, per capita) (2007-2017)	0.6%	-1.0%
Share of coal and other solid fossil fuels in energy-related CO_2 emissions (2017)	8.1%	21.4%
Total energy self-sufficiency (2017)	78.1%	85.0%

Note: Unweighted averages for both groups and compound annual growth rates. Tax-to-GDP ratios are for 2018 for OECD countries and for 2017 for TEU-SD countries (more recent data are available on https://oe.cd/globalrevstats.) GDP is in real terms. Colombia is included in OECD figures.

Source: SDG indicators come from (ESMAP, 2020). The average share of the population with access to clean cooking is a lower bound estimate for the OECD. Tax-to-GDP ratios are from the Global Revenue Statistics database and associated publications e.g. (OECD, 2020b) except for Sri-Lanka (own calculation based on official sources). Tax-to-GDP ratios for OECD countries are from 2018. GDP data are from (OECD, 2019a) for OECD member countries and (IMF, 2020)for the rest. Population data are from (World Bank Group, 2020) Primary energy use and CO_2 emissions are calculated according to the TEU methodology using (IEA, 2019a) and include emissions from combustible renewables. Energy sufficiency indicators are from the same source.

Hydro power is the main low-carbon energy source in TEU-SD countries. TEU-SD countries do not use nuclear power, unlike in a number of OECD countries, where it accounts for the largest share of non-combustible sources.[4] In TEU-SD countries, growth in new renewables, mostly wind and solar, was very strong, albeit starting from a low base. Between 2007 and 2017, the combined increase of solar power generation in TEU-SD countries (including photovoltaics and thermal) was nearly 100-fold, with Morocco being a particularly striking case in point. There was a roughly 9-fold increase in wind, which grew from a higher base as it accounted for about five times as much electricity as solar in 2007 (not shown in Table 1).

TEU-SD countries are rarely self-sufficient in meeting their energy needs. Notable exceptions are oil producers Ecuador, Ghana and Nigeria, which may, however, still need to import refined products, even though they are net oil exporters. Egypt, Guatemala and the Philippines are oil producers as well, but are not self-sufficient. With an average self-sufficiency of 78.1%, the situation across TEU-SD countries is broadly similar to OECD countries, which are 85% self-sufficient on average. Self-sufficiency may be of greater importance in developing countries to the extent that it reduces the call on more limited foreign exchange for meeting energy needs.

4. Unlike wind and solar, a substantial amount of primary energy use from nuclear is wasted in the form of thermal losses. Using primary energy as defined in the IEA energy balances thus overstates the contribution nuclear power makes to meeting countries energy needs (OECD, 2019c).

Box 2. **Composition of energy use and carbon emissions by energy products**

The relative importance of sources of energy use varies substantially across countries. The figure below disaggregates energy use and CO_2 emissions from energy use into five product categories: coal and other solid fossil fuels (including peat and coke), oil products (including fuel oil, diesel, kerosene, gasoline, and LPG), natural gas, biofuels and waste, and non-combustible sources (namely non-combustible renewable sources such as wind and solar, as well as nuclear).

In the majority of TEU-SD countries, oil products are the most widely used product category; this is particularly pronounced in the island nation of Jamaica and oil rich Ecuador. Biofuels and waste are the second most used product category. This is the case for all sub-Saharan countries in TEU-SD and additionally Guatemala and Uruguay for the reasons explained in Section 2.

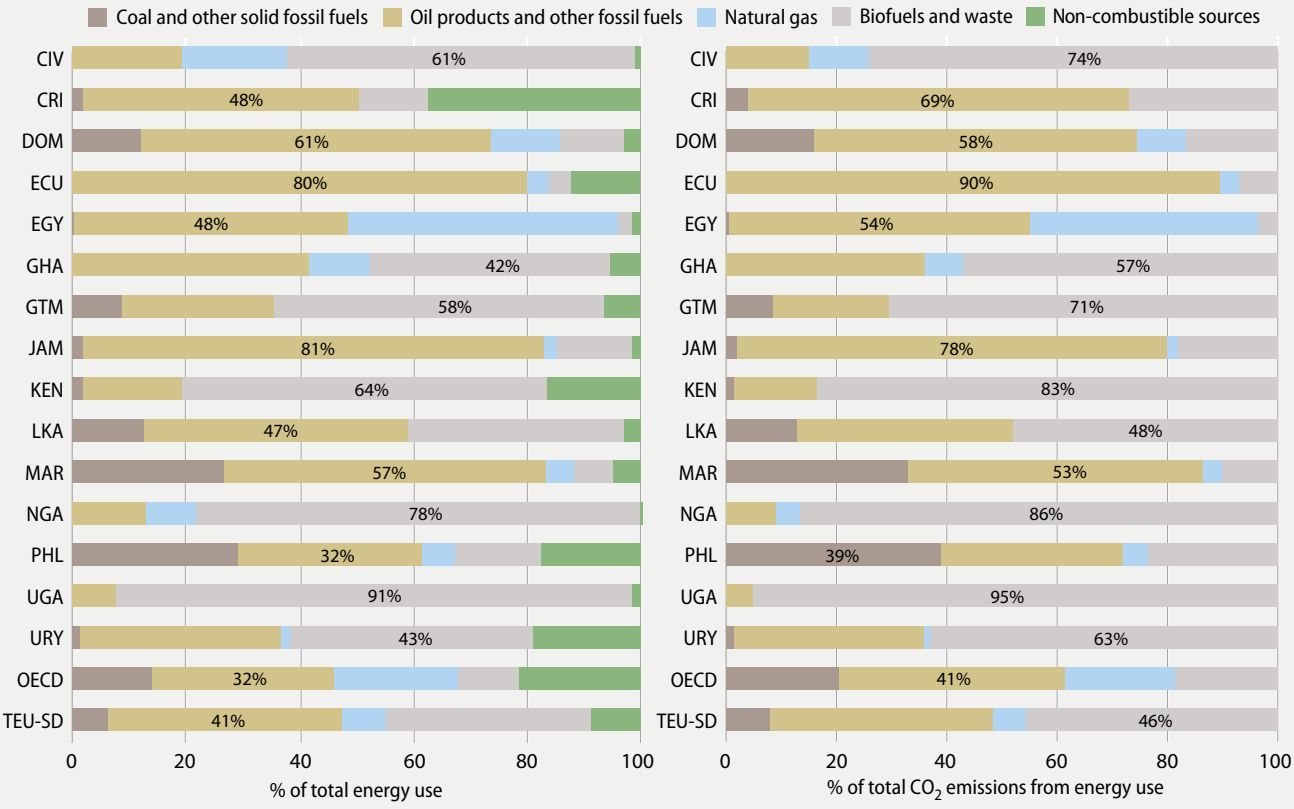
From an environmental perspective, it is encouraging that coal and other solid fossil fuels, the most polluting among the major fossil fuels, are absent from the energy mix of several TEU-SD countries, specifically most TEU-SD sub-Saharan Africa (Côte d'Ivoire, Ghana, Nigeria and Uganda) and oil producing Ecuador. However, coal is still used extensively for electricity generation in the Philippines and Morocco, while Egypt makes use of domestic natural gas reserves to the same end.

Among TEU-SD countries, Costa Rica is the clear leader in the use of non-combustible sources (38% of primary energy use, mostly hydro, but also wind power), followed by Uruguay, the Philippines, Kenya and Ecuador with shares of low-carbon energy sources ranging from 12% to 19% of primary energy use. None of the TEU-SD countries uses nuclear energy. Note that non-combustible energy sources are only visible in the left panel of the figure, as their use is not associated with CO_2 emissions.

Similar to TEU-SD countries, OECD countries on average rely mainly on oil products for their primary energy use, but less so than TEU-SD countries (32% of total energy use in OECD, 41% in TEU-SD). Natural gas is the second most important energy source with a share of 22% just above non-combustible energy sources at 21%. Both natural gas and non-combustible energy sources have been displacing coal in electricity generation which, however, still accounts for 14% of energy use and 21% of energy-related CO_2 emissions; coal thus plays a more prominent role in the OECD than in TEU-SD countries, as also discussed in Section 2. Biofuels and waste have more of complementary role in the energy mix, accounting for 11%, which is considerably lower than in TEU-SD countries (Section 2).

Composition of energy use and CO_2 emissions by energy source

The share of the largest energy product category is labelled with the corresponding percentage



Note: Composition of energy use (left panel) and CO_2 emissions (right panel) by energy source. OECD and TEU-SD refer to a simple arithmetic averages.

Source: Energy use and CO_2 emissions are calculated based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances.

All TEU-SD countries have committed to pursuing inclusive, sustainable economic development policies in their Nationally Determined Contributions (NDCs) under the Paris Agreement. Not all countries are on track to meeting their targets (den Elzen et al., 2019), and collectively NDCs are not yet aligned with the objectives of the Paris Agreement.[5] Greenhouse gas (GHG) emissions reduction targets, shown in Table 2 differ substantially across countries, and are specified in ways that are not directly comparable across countries. Most TEU-SD countries have both an unconditional target, as well as a more stringent conditional target. The conditions of these targets differ across countries, but frequently include access to international aid.

5 https://www.unenvironment.org/resources/emissions-gap-report-2019

TABLE 2. **NDC targets of TEU-SD countries**

	Unconditional Target	Conditional Target
Costa Rica	Maximum budget of net emissions in the 2021-2030 period of 106.53 million tons of CO_2 equivalent (CO_2e); absolute maximum of net emissions in 2030 of 9.11 million tCO_2e.	None.
Côte d'Ivoire	None.	GHG emission reduction of 28% by 2030 relative to BAU.
Dominican Republic	GHG emission reduction of 7% relative to BAU emissions by 2030.	GHG emission reduction of 27% relative to BAU emissions by 2030.
Ecuador	Reduction of energy sector emissions by 20.4-25% below the BAU scenario by 2025.	Reduction of energy sector emissions by 37.5 -45.8% below the BAU baseline by 2025.
Egypt	None.	None.
Ghana	Emission reduction of 12 % and 15 % relative to the BAU emissions in 2025 and 2030, respectively.	Emission reduction of 27% and 45% relative to the BAU emissions in 2025 and 2030, respectively.
Guatemala	GHG emission reduction of 11.2% relative to the base year 2005 by 2030.	GHG emission reduction of 22.6% relative to the base year 2005 by 2030.
Jamaica	25.4% reduction relative to BAU emissions in 2030.	28.5% reduction relative to BAU emissions in 2030.
Kenya	None.	GHG emission reduction of 32% by 2030 relative to BAU emissions.
Morocco	17 % reduction in GHG emissions by 2030 compared to a BAU scenario, with 4 % coming from AFOLU actions. Without AFOLU actions, the reduction target is 13%.	GHG reduction to 42 % below BAU emission levels by 2030, including AFOLU actions. Without AFOLU actions, the reduction target would be 34%.
Nigeria	20% reduction relative to BAU by 2030.	45% reduction relative to BAU by 2030.
Philippines	None.	70% by 2030 relative to BAU scenario*
Sri Lanka	GHG emissions reduction against BAU scenario by 4% in the energy sector and by 3% in other sectors (transport, industry, forests and waste) by 2030.	GHG emissions reduction against BAU scenario by 16% in the energy sector and by 7% in other sectors (transport, industry, forests and waste) by 2030.
Uganda	None.	22% reduction of GHG emissions in 2030 compared to BAU.
Uruguay	24% reduction in CO_2 emissions intensity per GDP unit, 57% reduction in CH_4 emissions intensity per GDP unit, 48% reduction in N_2O emissions intensity per GDP unit by 2025, relative to base year 1990.	29% reduction in CO_2 emissions intensity per GDP unit, 59% reduction in CH_4 emissions intensity per GDP unit, 52% reduction in N_2O emissions intensity per GDP unit by 2025, relative to base year 1990.

Note: Details on the conditions of the targets can be found in the source. BAU (business-as-usual) scenarios vary by country and are not directly comparable. GHG are Greenhouse Gas Emissions. AFOLU stands for Agriculture, Forestry and Other Land Use. This table was last updated on 13 January 2021.
*For the Philippines the target is the one mentioned in its Intended NDC as the First NDC was not available in the registry at the time of writing.

Source: NDCs were retrieved from the official registry (https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx).

3 What is the net effect of energy taxes and subsidies on public finances?

KEY MESSAGES

- **Fourteen out of the fifteen TEU-SD countries collect energy taxes, which raise government revenues and affect incentives for energy use, frequently in environmentally friendly ways.**
- **Several countries also grant subsidies on certain forms of energy use. These put a burden on public finances and change incentives for energy use, often in environmentally harmful ways.**
- **In most TEU-SD countries, tax revenues exceed the cost of subsidies, meaning the net effect is positive for public finances. On average, the overall contribution to public finances and domestic resource mobilisation corresponds to roughly 0.5% of GDP in TEU-SD countries. On average across the OECD, net energy revenues are in the order of 1.6% relative to GDP.**

The selected developing countries and emerging economies covered in this report do not levy explicit carbon taxes, nor do they operate CO_2 emissions trading systems. However, all countries except for Nigeria collect energy taxes, including excise taxes on fuels and on electricity consumption (see Box 3). Such taxes raise government revenues and affect incentives for energy use, frequently in environmentally friendly ways. As in many OECD countries, there is scope for reform that improves performance from an environmental, revenue and social perspective, as further discussed in Sections 4 and 5.

The most common form of energy taxes are fuel excise taxes, but electricity is sometimes also taxed. Fuel excise taxes, even though they are not explicitly linked to a carbon price, are similar to carbon taxes in that the tax liability increases proportionally to fossil fuel use. However, they typically only apply narrowly to certain fuels, e.g. gasoline used for road transport, and thus do not provide a consistent carbon price across the economy. Electricity excise taxes apply to an energy output (electricity) and are typically not distinguished by energy source. Therefore, they tend to make electricity more expensive even when it is produced from clean energy sources (OECD, 2019c).

Several TEU-SD countries do not only tax energy use, they also grant subsidies on certain forms of energy use (see Box 4). Subsidies put a burden on public finances and change incentives for energy use, often in environmentally harmful ways. Some of these subsidies effectively reduce domestic pre-tax fossil fuel prices below supply costs, encouraging excessive fuel use. This is, for example, the case for several liquid fuels in Ecuador, gasoline in Nigeria and LPG in Morocco. Other

countries target the electricity sector more generally, reducing pre-tax electricity prices below cost recovery levels. In the Philippines, for example, the National Power Corporation receives direct budgetary support from the national government, enabling the company to provide electricity below cost.

Governments may be able to use more targeted tools than subsidies on energy use to achieve the important policy objectives of energy access and energy affordability. Subsidies on energy use tend to benefit richer energy users more than poorer ones, especially in absolute terms, and "are generally detrimental to the economic, social, and environmental dimensions of sustainable development" (Rentschler and Bazilian, 2016).

Phasing out subsidies could free up public funds for higher value uses, including targeted support to low-income groups to ensure that such reforms provide not only short-term relief but become a fully integrated component in a country's long-term sustainable development strategy (Rentschler and Bazilian, 2017). The subsidy reform experience of Morocco is an example of where this has happened effectively in the past. In parallel to removing fuel subsidies in 2014, the government introduced new and expanded existing targeted social protection programmes, while providing support for public transport.[1]

1. https://openknowledge.worldbank.org/bitstream/handle/10986/23631/Fossil0fuel0su0g0country0experience.pdf

Box 3. **What kind of taxes are included in the analysis?**

TEU-SD provides information on all specific taxes on energy use. These include carbon taxes, excise taxes on fuels ("fuel excise taxes") and taxes on the consumption of electricity ("electricity excise taxes"). However, none of the countries under study levied explicit carbon taxes in the reference period. In addition, none of the TEU-SD countries operates an emissions trading system. Tax exemptions, reductions and refunds are included by adjusting effective tax rates accordingly.

Certain countries levy production taxes on the harnessing of energy resources (e.g. severance taxes on oil extraction). Since such supply-side measures are not directly linked to domestic energy use, TEU-SD does not cover these taxes.

TEU-SD does not include value added taxes (VAT) or sales taxes. As VAT typically applies equally to a wide range of goods, it does not change the relative prices of products and services, i.e. it does not make carbon-intensive goods and services more expensive than cleaner alternatives. It should be noted that due to differential VAT treatment and concessionary rates, such taxes may not be economically neutral in practice. However, as quantifying the effects of differential VAT treatment would require extensive price information, which is generally not available for all energy products, it is outside the scope of this report. Reduced VAT rates, zero-ratings or exemptions are noted where relevant and data are available.

Import tariffs are not included based on the logic explained for VAT above. But as is the case for VAT, they may affect relative prices of energy products if they do not apply widely to other goods.

The TEU-SD database does not necessarily cover those subnational taxes where revenues from subnational taxes on energy use amount to less than 20% of a country's total revenue from taxes on energy use. Expert judgement is used to decide whether a country's subnational taxes should be included. For the countries covered in TEU-SD, subnational taxes on energy use were judged to be unlikely to have a significant impact, and are not modelled. Where rates are set at a subnational, e.g. municipality level, this is noted in the assumptions and caveats sections of the online technical background notes made available online.

The most common form of energy taxes are fuel excise taxes on road transport fuels.

Not all forms of subsidies on energy use are equally harmful from a climate perspective. Subsidies on electricity use encourage overconsumption, but do not directly encourage fossil fuel use. By contrast, electrification may be a promising decarbonisation option for transport, industry and heating. Keeping electricity costs down could speed up the electrification of these sectors. However, electrification is only a sensible decarbonisation option if the power sector itself decarbonises. In addition, electricity subsidies are a burden on tight public budgets, and their existence may hinder foreign direct investment in the sector, slowing down the transition to a modern power sector capable of serving countries' low-carbon energy needs. Where phasing out subsidies is not feasible, e.g. because more targeted support faces administrative obstacles, subsidies for electricity could be made conditional on greening power generation. Examples of such government support for clean electricity can be found in a number of the policy measures introduced by countries as part of their response to the COVID-19 pandemic. The Colombian government, for instance, has committed to accelerating several strategic renewable energy and transmission projects, as part of its recovery package.[2]

The mix of taxes and subsidies on energy use varies across countries, and so does their net effect on public finances. Figure 2 shows that in eleven out of the fifteen TEU-SD countries tax revenues exceed the cost of subsidies, meaning the overall contribution to public finances and domestic resource mobilisation is positive. On average, net energy tax revenues are in the magnitude of 0.5% of GDP. The contribution relative to GDP is largest in Jamaica where energy taxes raise revenues corresponding to more than 2% of GDP. As a result, energy taxes are the fourth largest source of tax revenues in Jamaica, after general taxes on goods and services, personal income and business taxes (9.3%, 3.1% and 3.1% respectively) and ahead of customs and import duties, taxes on specific services, property and social security contributions.

The cost of subsidies on energy use sometimes exceeds the revenues from energy taxes; the net effect of energy tax policy in this case represents a burden on public finances. In 2018 this was the case in four TEU-SD countries: oil producers Ecuador, Egypt, Nigeria, as well as Sri Lanka, which hopes to start oil production in 2023.[3] The fiscal burden ranges from roughly 0.3% of GDP in Sri Lanka to almost 2.8% of GDP in Ecuador. Net energy tax revenues have since recovered substantially in Egypt, which has carried out ambitious fossil fuel subsidy reform (Egypt Oil & Gas, 2019). Currently, the reform of fuel subsidies in Egypt is being implemented as scheduled and the country is only a step away from eliminating subsidies completely.[4] In June 2020, Nigeria announced that it would phase out fuel subsidies.[5] It is worth noting that Nigeria previously attempted to do so in 2012 but backed down after protests.[6]

2. https://www.energypolicytracker.org/search-results/?_sfm_policy_category=clean%20unconditional&_sfm_sector=Power%20generation&_sfm_mechanism=assumption%20of%20environmental%20liabilities%20(Hybrid)-%2C-budget%20or%20off-budget%20transfer%20(DT)-%2C-debt%20write-offs%20(Hybrid)-%2C-equity%20injection%20or%20nationalisation%20(Hybrid)-%2C-fossil%20fuel%20subsidy%20reform-%2C-loan%20(Hybrid)-%2C-uncategorized

3. https://www.reuters.com/article/sri-lanka-oil-idUSL3N25N2H3

4. Country-specific details are discussed in the online country notes.

5. https://www.economist.com/middle-east-and-africa/2020/10/10/nigerias-president-buhari-is-doing-away-with-petrol-subsidies

6. https://openknowledge.worldbank.org/bitstream/handle/10986/23631/Fossil0fuel0su0g0country0experience.pdf

Pre-tax prices of energy use may fail to reflect the private cost of supply and instead be subsidised by the government in one form or another.

Box 4. **What do we refer to as subsidies in the context of TEU-SD?**

A methodological challenge in developing and emerging countries is that pre-tax prices of energy use may fail to reflect the private cost of supply and instead be subsidised by the government in one form or another.

This report includes subsidies that directly lower energy prices for energy consumed domestically. These subsidies can take the form of direct transfers and be reported in the state budget or financial statements of state-owned enterprises. Alternatively, transfers may be induced via regulated prices and mandated tariffs. It is worth noting that price or tariff regulation per se does not necessarily represent an induced transfer, for example if a regulated maximum fuel price is above private supply costs. TEU-SD maps the subsidies to the domestic energy use that is affected by them.

TEU-SD does not cover subsidies associated with production factors such as labour, land and natural resources (other than energy sources), capital, knowledge and R&D, which may indirectly affect energy prices. Subsidies for infrastructure development including for example rural electrification are equally excluded. Due to data limitations, cross subsidies are not always modelled either. Cross subsidies operate by surcharging a certain group of users, and using the resulting revenues to offer lower prices to other consumer groups.

This publication takes a different approach than the OECD Inventory of Support Measures for Fossil Fuels (the Inventory),[1] which includes a broader range of measures, including many that do not reduce consumer prices. The inventory encompasses direct budgetary transfers and tax expenditures that provide a benefit or preference for fossil-fuel production or consumption, either in absolute terms or relative to other activities or products. The majority of support mechanisms identified in the inventory are tax expenditures.

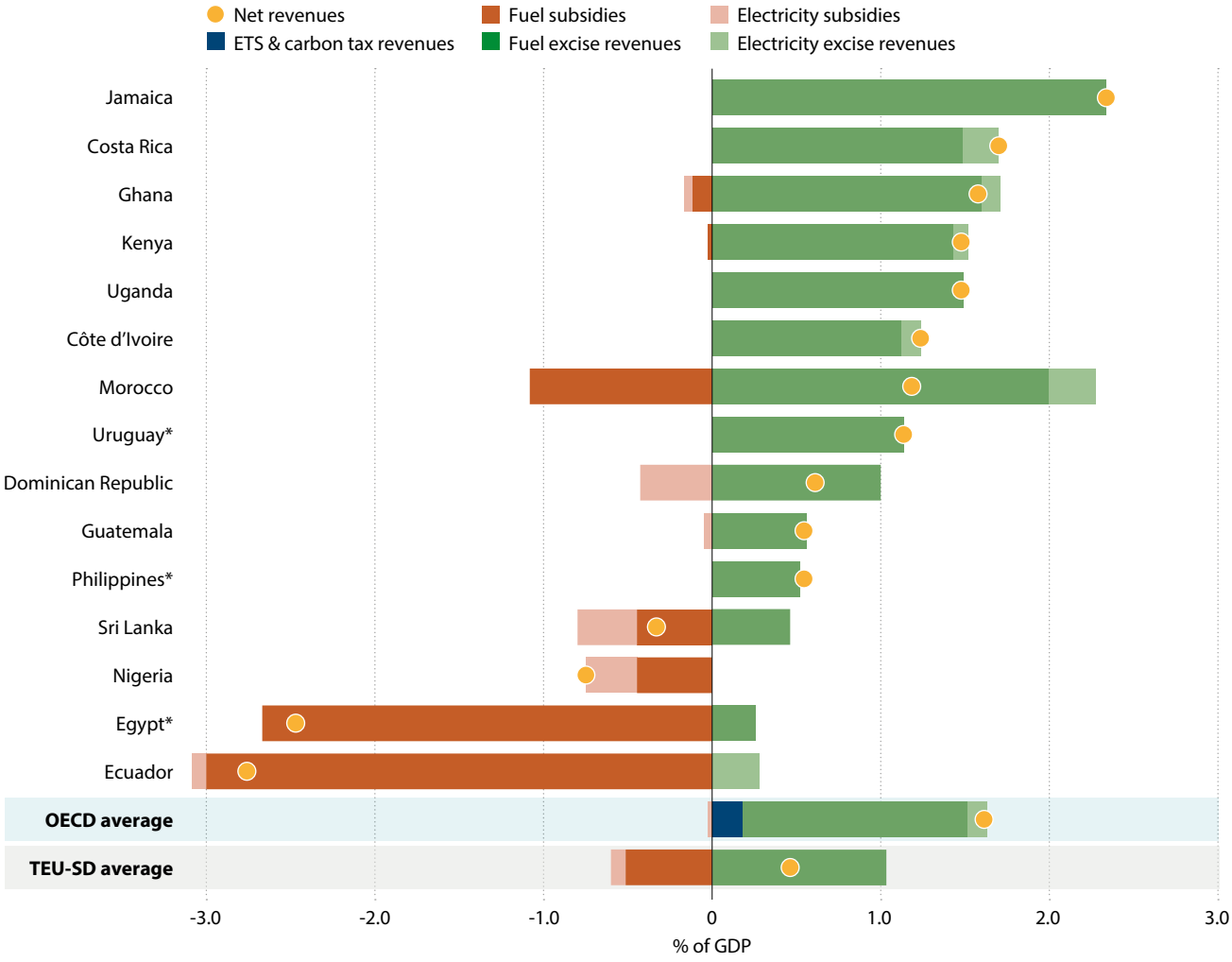
TEU-SD (and TEU) includes tax expenditures pertaining to energy and carbon taxes, which are a subset of the tax expenditures included in the Inventory. However, TEU-SD does not classify these as a form of fossil fuel support, but rather incorporates these tax expenditures in the resulting effective energy or carbon tax rate, which are net of applicable exemptions, rate reductions, and refunds. For example, if a country excludes kerosene used for domestic aviation from its fuel tax and records this as a tax expenditure, in TEU-SD the result would be an effective tax rate of zero for aviation kerosene. In the Inventory, such a measure is classified as a tax expenditure, provided that the government reports it as such.

TEU-SD takes a narrower approach to fossil fuel support than the Inventory. A direct comparison between TEU-SD countries is not possible, as these countries are not covered by the Inventory. For OECD countries, most of the differences between subsidies as classified in TEU-SD and the Inventory are due to the treatment of tax expenditures described above, which account for 81% of the fossil fuel support identified for OECD countries.

Direct transfers account for 19% of fossil fuel support in OECD countries, with 39% of these falling within the narrower scope of TEU-SD and, as a result, are included in this report. More specifically, 63% of the consumer support estimates from the Inventory were included in TEU-SD, 10% of producer support estimates, and 0% of general services support estimates.

1. https://www.oecd.org/fossil-fuels/data/

FIGURE 2. **Net energy tax revenues, 2018**



Note: Net energy tax revenues are a bottom-up estimate of the net revenues resulting from taxes and subsidies on energy. The tax base is calculated based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances. By multiplying the prevailing tax and subsidy rates with the energy base, it is possible to obtain bottom-up estimates of tax revenues from energy use and related subsidy expenditures. Bottom-up estimates do not necessarily correspond to the actual revenue and expenditures, *inter alia* due to differences between the base year and the rate date. ETS revenue estimates are based on the OECD's forthcoming Effective Carbon Rates 2021 publication and exclude private revenues that may result from selling on permits that were allocated for free. The subsidy estimate for the OECD is adapted from OECD (2018b). In Egypt and the Philippines net energy tax revenues have increased substantially since 2018 as Egypt has phased out most subsidies on energy use and the Philippines have implemented a major tax reform. In Uruguay, certain fuels (Diesel, LPG, fuel oil, natural gas) attract VAT and not a fuel excise but for consistency with the TEU approach VAT is not modelled.

Source: TEU-SD.

Taxes on energy use, as well as well as revenues resulting from the sale of emission allowances, make a relatively larger contribution to public finances in OECD countries.

On average, net energy revenues are in the order of 1.6% of GDP. An example of the rare case of subsidies on energy use are payments related to the indirect cost compensation for higher electricity prices resulting from the EU-ETS, classified here as an electricity subsidy.

Fuel subsidies exist too, and mainly take the form of support measures that impact natural gas prices (and occasionally other fuel prices such as diesel and fuel oil) used for heating in the residential sector.[7]

7. Energy subsidies that fit the TEU-SD definition include measures in place in Australia, Chile, Colombia, Greece, Hungary, Poland and the United States. Support in OECD countries is typically means-tested. Household support that is not conditional on energy use, such as the fuel allowance in Ireland, is not considered an energy subsidy in TEU-SD as the recipients are free to spend it for other purposes.

4 Carbon prices are low

KEY MESSAGES

- **Thirteen out of the fifteen TEU-SD countries have experience with fuel excise taxes, and this makes carbon tax reform relatively straightforward from an administrative perspective.**
- **The most polluting fuels, especially coal, are often amongst the lowest taxed.**
- **Fossil fuels used for heating, cooking and lighting are often taxed at lower rates or subsidised. Raising rates on these fuels requires particular caution because of an elevated risk of unintended side effects of higher rates, e.g. charcoal-switching that could worsen health, environmental, and fiscal outcomes. In addition, affordability is a prime concern.**

None of the TEU-SD countries explicitly prices carbon through a carbon tax or an emissions trading system. However, with the exceptions of Ecuador and Nigeria, all TEU-SD countries apply fuel excise taxes, which are economically similar to carbon taxes and exceed fuel subsidies in most countries (see Section 3). Effective carbon rates are therefore generally above zero, and carbon price reform would be relatively simple from an administrative perspective because most TEU-SD countries already have experience with administering fuel taxes (Box 5).

The Effective Carbon Rate (ECR) is the total price that applies to CO_2 emissions from energy use as a result of fuel excise taxes, explicit carbon taxes and emissions trading, net of fuel subsidies.[1]

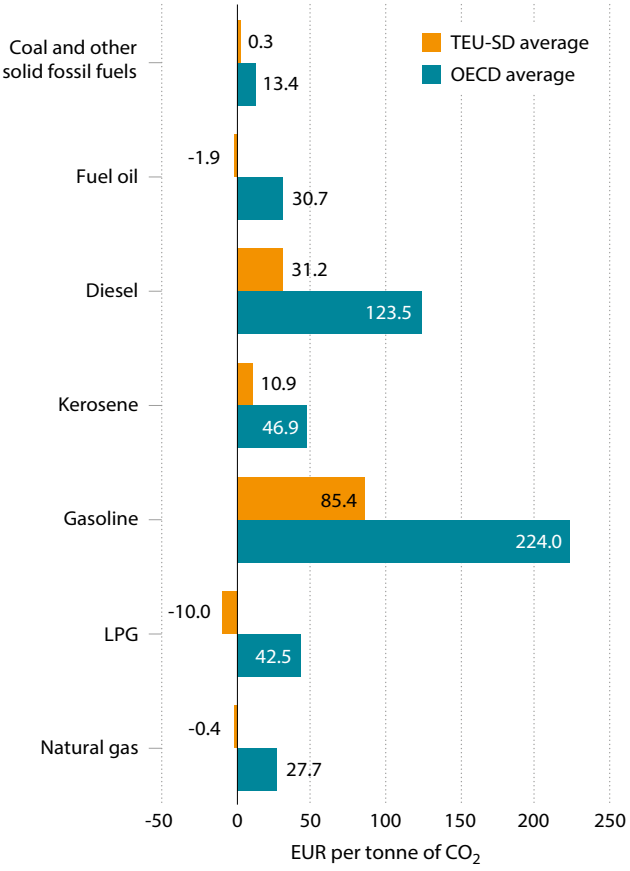
A higher ECR encourages consumers and producers to use cleaner energy sources or reduce energy use, avoiding CO_2 emissions and local pollution, while contributing to domestic resource mobilisation (OECD, 2018a). Figure 3 shows how the ECR differs across fossil fuels and between the TEU-SD countries and the OECD.

Coal and other solid fossil fuels face some of the lowest ECRs in both OECD and TEU-SD countries. Specifically, the average ECR on coal and other solid fossil fuels is EUR 0.3 per tonne of CO_2 in TEU-SD countries, and EUR 13.4 per tonne of CO_2 across the OECD. In both cases, the average ECR is below a commonly used low-end estimate of the damage that CO_2 emissions impose on society (EUR 30 per tonne of CO_2 (OECD, 2018a)), and the carbon prices that would be needed in the near term for consistency with net-zero CO_2 emissions targets (Kaufman et al., 2020). Nevertheless, it should be noted that some of the countries that have led the way by introducing carbon taxes have opted for far lower rates (e.g. around EUR 3 per tonne of $CO_{2)}$ in Singapore, albeit with very broad coverage, than the EUR 30 per tonne of CO_2 benchmark.

Climate change is not the only externality associated with coal use; local air pollution costs are also high, reinforcing the case for raising rates on coal use.

1. Electricity taxes and subsidies are excluded as they generally do not scale in proportion with the carbon content of the underlying energy source that is used to produce the electricity being taxed.

FIGURE 3. **Average effective carbon rates by fuel, 2018**
ECR is the total price that applies to CO_2 emissions from energy use as a result of taxes and emissions trading, net of fuel subsidies



Note: Average refers to the simple, unweighted arithmetic average across countries. The OECD average includes ETS permit prices at the margin, based on preliminary data from forthcoming Effective Carbon Rates 2021 and estimates of fossil fuel-use related subsidies based on the OECD's (2018b) Inventory of Support Measures for Fossil Fuels database. Fossil fuels are ordered by the carbon content per unit of energy. CO_2 emissions are calculated based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances.

Source: TEU-SD.

However, Morocco and the Philippines are the only TEU-SD countries that tax coal,[2] noting that five TEU-SD countries do not use any coal at present (Côte d'Ivoire, Ecuador, Ghana, Nigeria, Uganda, see Section 2). No TEU-SD country subsidises coal use. Coal used for industry and power generation is frequently not taxed in OECD countries either, but there emissions trading systems often provide carbon price signals (OECD, 2019c), as shown in Figure 4. Subsidies on coal use exist in the OECD but are rare and indiscernible in Figure 3 as the average subsidy amounts to only EUR 0.05 per tonne of CO_2.

2. Both countries tax coal used for power generation, but Morocco applies a reduced rate compared to the tax that applies for industrial coal use.

Box 5. Fuel-based carbon tax reform is relatively simple from an administrative perspective

Reforming fuel excise taxes to better align with the climate costs of fuel use would be administratively straightforward. Fuel-based carbon taxes are the most common form of carbon taxation in OECD and G20 countries, including in France, Norway, Sweden and the United Kingdom (OECD, 2019c).

Taking a fuel-based approach means that countries do not tax CO_2 directly, but rather calculate the corresponding rate in common commercial units, for instance by reference to kilograms for solid fuels, litres for liquid fuels, and cubic metres for gaseous fuels.

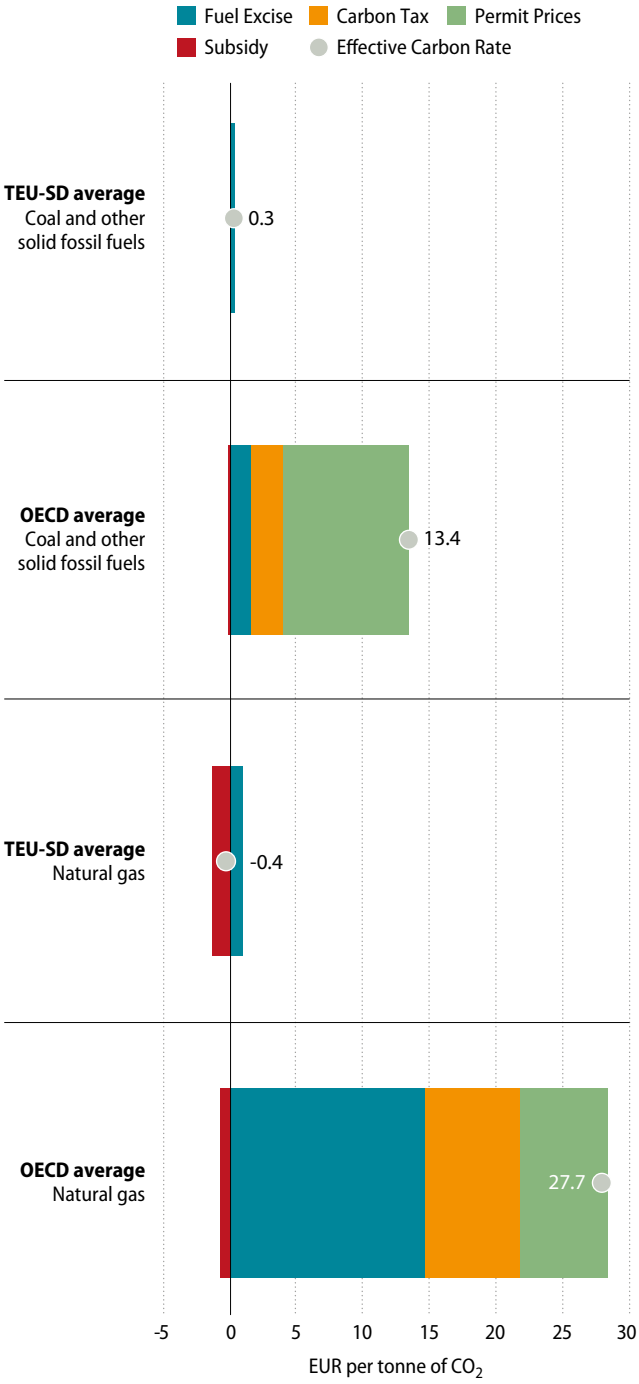
For illustration purposes, the table below shows how high a carbon tax set to EUR 30 per tonne of CO_2, which is a common-low-end benchmark used for OECD and G20 countries (see Section 4), is when expressed in common commercial units. Fuel-based carbon taxes can be collected from fuel suppliers in the same way as existing fuel excise taxes, keeping administrative cost and complexity to a minimum.

What does a carbon tax of EUR 30 per tonne of CO_2 look like in common commercial units?

Energy category	Low-end carbon benchmark (EUR 30 per tonne of CO_2)
Coal and other solid fossil fuels	6.24 eurocent per kilogramme
Fuel oil	8.94 eurocent per litre
Diesel	7.99 eurocent per litre
Kerosene	7.58 eurocent per litre
Gasoline	6.86 eurocent per litre
LPG	4.75 eurocent per litre
Natural gas	5.13 eurocent per cubic metre

Source: OECD (2019).

FIGURE 4. **Composition of average effective carbon rates for coal and natural gas, 2018**



Note: Average refers to the simple, unweighted arithmetic average across countries. The OECD average includes ETS permit prices at the margin, based on preliminary data from the OECD's forthcoming Effective Carbon Rates 2021 and estimates of fossil fuel-use related subsidies based on the OECD's (2018b) Inventory of Support Measures for Fossil Fuels database. Fossil fuels are ordered by the carbon content per unit of energy. CO_2 emissions are calculated based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances.

Source: TEU-SD.

The ECR on natural gas is negative on average in the TEU-SD countries. The negative ECR (EUR - 0.4 per tonne of CO_2) in TEU-SD countries is the result of Ecuador subsidising natural gas use, and most other TEU-SD countries – with the exception of Morocco, Jamaica, the Dominican Republic and Egypt – not taxing natural gas use.[3] By contrast, the OECD average ECR on natural gas is EUR 27.7 per tonne of CO_2 and comes close to the EUR 30 low-end carbon benchmark, despite the presence of EUR 0.62 per tonne of CO_2 in subsidies on average. Fuel excises account for more than half of the carbon price on natural gas, followed by carbon taxes.

Natural gas is taxed at a lower ECR than coal in both TEU-SD and OECD countries, which can be justified from a broader environmental perspective. Natural gas is generally considered the cleanest fossil fuel, provided that methane leakage is under control. From a climate perspective, the ECR per tonne of CO_2 should be the same irrespective of the fossil fuel from which the emissions

3. Taxes on natural gas are relatively low where they exist. Egypt and Morocco do not tax natural gas used for electricity generation. Five out of the fifteen TEU-SD countries do not use any natural gas.

result. Yet, taking a broader environmental perspective suggests that natural gas ought to be taxed at a lower ECR per tonne of CO_2 than coal, as air pollution costs from coal tend to be higher (OECD, 2019c).[4]

Diesel and gasoline face the highest ECRs. In TEU-SD countries, the average ECR on diesel is EUR 30.7 per tonne of CO_2 (compared to the OECD average of EUR 123.5) and EUR 85.4 per tonne of CO_2 on gasoline (compared to the OECD average of EUR 224). In both TEU-SD and OECD countries, diesel and gasoline are the dominant fuels in road transport. On average, the road sector accounts for 22.0% of the TEU-SD countries' emissions from energy use, which compares to 26.1% across OECD countries.

There are good reasons to tax road transport fuels at relatively high rates. Especially in urban road transport, non-climate external costs associated with gasoline and diesel use can be considerable, e.g. because of congestion and local air pollution (Marten and van Dender, 2019); Teusch and Braathen, 2019). Where more targeted policy instruments are not feasible, excise taxes can be effective policy instruments to make polluters pay for these externalities.

From an environmental perspective, diesel merits being taxed at higher rates than gasoline. Climate considerations suggest taxing diesel at the same rate as gasoline per tonne of CO_2, which translates into a higher rate per litre because CO_2 emissions per litre of diesel are higher. In addition, non-climate damage per litre of diesel use tend to be higher than for gasoline use. This damage includes environmental externalities such as air pollution, as well as congestion (Harding, 2014). However, only three (Egypt, Jamaica and Nigeria) out of the fifteen TEU-SD countries tax diesel for road use at a higher effective rate per litre than gasoline, while Ghana applies the same rate (Figure 5). The picture is similar for OECD countries (albeit at much higher and consistently positive tax rates) where Mexico, Switzerland and the United States are the only countries to apply higher rates to diesel (OECD, 2019c).

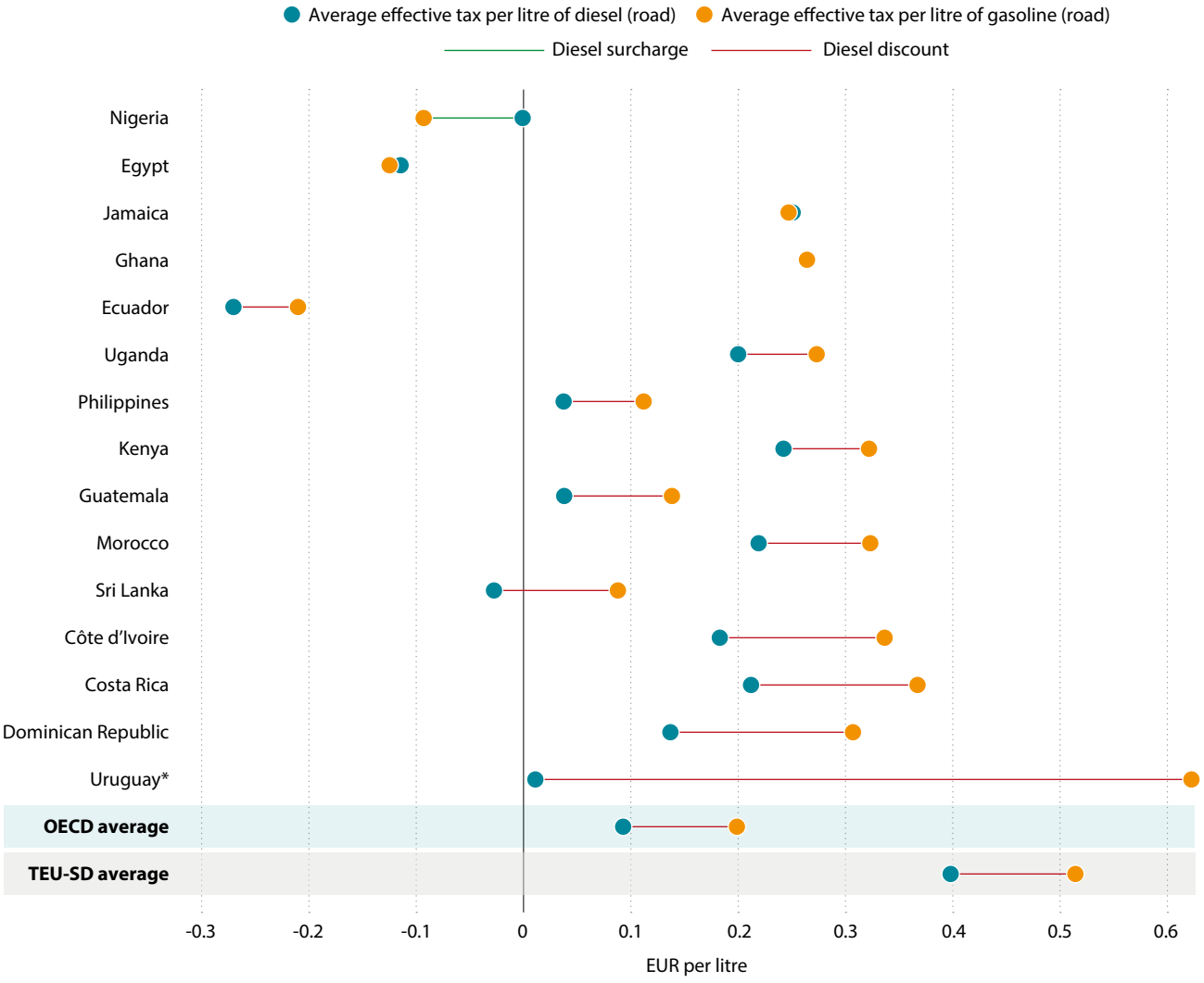
4. Natural gas is taxed at relatively higher rates than coal in OECD countries because natural gas is more commonly used in the residential and commercial sectors, where taxes apply that tend to be higher than carbon prices resulting from ETS.

Only three (Egypt, Jamaica and Nigeria) out of the fifteen TEU-SD countries tax diesel for road use at a higher effective rate per litre than gasoline.

Across TEU-SD countries, heating and cooking fuels are either taxed at very low rates or subsidised. The average ECR on fuel oil is EUR -1.9 (compared to the OECD average of EUR 30.7) per tonne of CO_2, and EUR -10 (compared to the OECD average of EUR 42.5) per tonne of CO_2 for LPG. Encouraging LPG use through the tax and benefits system can make sense to avoid the very high health costs associated with popular alternatives, such as using firewood or charcoal. LPG subsidies are often seen as an intermediate step towards phasing out fossil fuel subsidies and phasing in a more means-tested transfer system.

Energy tax and subsidy reform involving LPG and other fuels used for heating, cooking and lighting needs to be managed carefully, especially in times of COVID-19. A key reform challenge is to ensure access to affordable and (even) cleaner alternatives for heating and cooking, such as electrifying heating and cooking through solar power. In addition, governments need to be vigilant that people do not avoid the tax by switching back to charcoal and similar fuels with even larger negative side effects. Carbon price reform could otherwise have unintended side effects on health, the environment (e.g. deforestation), and tax revenues (Olabisi et al., 2019), as further discussed below.

FIGURE 5. **The diesel discount**



Note: Fuel consumption is based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances. In Uruguay diesel pays VAT (not covered in TEU-SD), but no fuel excise, whereas gasoline is subject to fuel excise, but not VAT.

Source: TEU-SD.

5 How much could carbon price reform contribute to domestic resource mobilisation?

KEY MESSAGES

- **TEU-SD countries would be able to raise revenue equivalent to approximately 1% of GDP on average if they raised carbon rates on fossil fuels to a benchmark of EUR 30 per tonne of CO_2. The revenue potential differs substantially across countries, reflecting differences in pre-existing tax levels and energy use patterns.**
- **Using taxes or other environmental tax policy instruments would allow certain countries to leapfrog coal and other fossil fuels in their energy mix as part of the economic development process.**
- **Pricing carbon will involve fewer social, economic and environmental trade-offs if it is accompanied by measures that ensure affordable access to cleaner alternatives.**

By how much would tax revenues increase if ECRs were raised to reach a carbon benchmark of EUR 30 per tonne of CO_2 for all fossil fuels? The carbon benchmark of EUR 30 is a low-end estimate of the climate damage caused by each tonne of CO_2 emitted (OECD, 2018a), and the carbon prices that would be needed in the near term for consistency with net-zero CO_2 emissions targets (Kaufman et al., 2020).

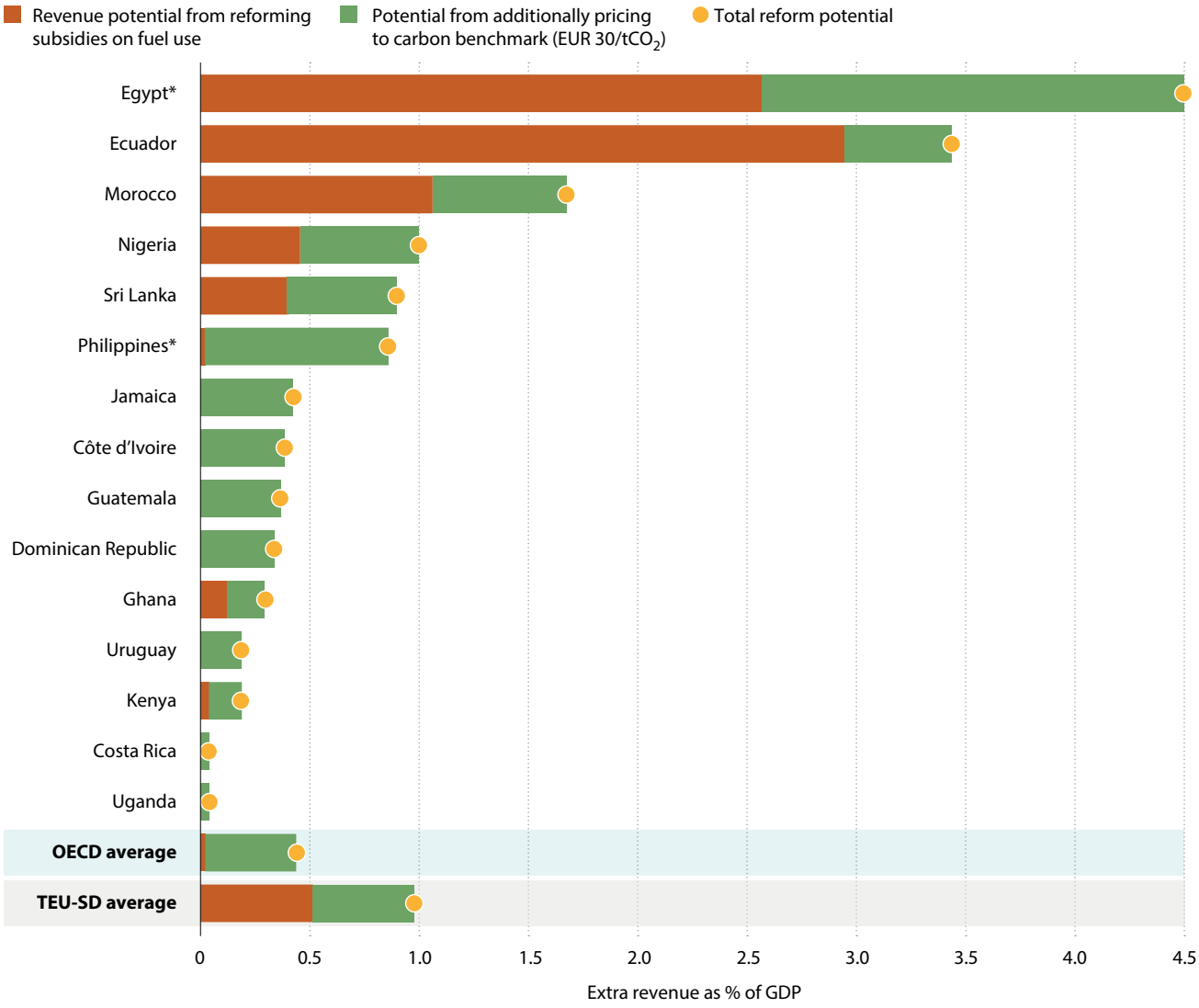
The revenue potential from taxing to the EUR 30 carbon benchmark differs substantially across countries. TEU-SD countries would be able to raise an amount equivalent to approximately 1% of GDP on average, but this average hides the fact that some would barely raise any revenues unless they lifted their tax rates to a higher carbon benchmark (Costa Rica, Uruguay), while others could gain public funds in excess of 1.5% of GDP (Egypt, Ecuador, Morocco), as shown in Figure 6.

The revenue potential differs among countries for two main reasons. First, there are substantial differences in pre-existing carbon prices, whereby higher pre-existing carbon prices reduce the remaining revenue potential from taxing to a given benchmark. In Uganda, for example, where most fossil fuel use occurs in the road sector, prevailing tax rates are already above the low-end carbon benchmark. In Uganda the challenge is to ensure that increased access to energy is green – so there may be less revenue to gain, but the tax system can be used to ensure development follows a green path.

Second, the carbon intensity of energy use varies across countries. In countries that do not use coal at present, tax and subsidy reform, or a simple ban, (Collier and Venables, 2014), will provide incentives for skipping the coal phase in electricity generation and industry. Leapfrogging past coal and other fossil fuels, foregoes carbon revenues, but also avoids stranded assets and helps to build a modern power system.

FIGURE 6. **Revenue potential from carbon price reform**

Potential increase in tax revenues if ECRs were raised to reach a carbon benchmark of EUR 30/tCO_2 for all fossil fuels



Note: Egypt and Philippines have implemented energy tax and subsidy reform in the meantime, reducing the remaining revenue potential from taxing to a EUR 30 benchmark. 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. Revenue potential from fossil fuel subsidy reform only accounts for reforming fuel subsidies as defined in TEU-SD (see Box 4). Current CO_2 emissions are calculated based on energy use data for 2017 for TEU-SD countries and 2018 for OECD, from IEA (2020), World Energy Statistics and Balances.

Source: TEU-SD.

An equitable reform package is critical to ensure that vulnerable groups, which also tend to be those that are disproportionately affected by climate change, will be able to access clean and affordable energy. An important stepping stone for making progress in this regard is to carefully study the distributional effects of reform projects. Such an assessment could enable designing and implementing practical compensation policies that take local circumstances into account to ensure that reforms protect or (better) strengthen the purchasing power of vulnerable groups. One way to do so is to use part of the revenues from carbon price reform to meet social objectives. Reform efforts in the Philippines, for instance, included a transition period where prices were adjusted gradually, and a one-off cash transfer targeted to marginalised electricity consumers.[1]

1. https://doi.org/10.6027/ANP2016-778.

Taxing fossil fuels will encourage some energy users to switch to biofuels. Biofuel switching is only desirable if biofuels are produced sustainably.

A real risk is that biofuel switching leads to deforestation or is otherwise unsustainable, an issue that is of particular relevance in developing countries with weaker institutions to design, implement and enforce countervailing policies and ensure the sustainability of biofuels. It is therefore critical that carbon pricing reform be accompanied by measures to avoid such negative side effects. Whether governments can rely on taxes and payments for ecosystem services or need to look for non-market based instruments to avoid unsustainable biofuel use depends on the local circumstances.

Competiveness concerns will be a key obstacle to reform (Rentschler, Kornejew and Bazilian, 2017), but gradual reform starting at low rates is unlikely to have substantial negative impacts. The evidence from OECD countries, at least at current price levels, is that there are no discernible effects (Venmans, Ellis and Nachtigall, 2020). Novel evidence on the impact of changes in energy prices on manufacturing performance in two large developing economies – Indonesia and Mexico shows that, while increases in electricity prices indeed harmed plant performance, higher fuel price increased productivity and profits of manufacturing plants.[2]

2. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3485923

An equitable reform package is critical to ensure that vulnerable groups, which also tend to be those that are disproportionately affected by climate change, will be able to access clean and affordable energy.

6 Lessons learnt and next steps

- **The time has come to move towards pricing carbon explicitly.**
- **Excise and carbon tax reform considerations could usefully be integrated into the ongoing efforts to implement and improve VAT.**
- **More attention needs to be paid to non-energy greenhouse gas (GHG) emissions to monitor and mitigate negative climate impacts from certain forms of land-use change.**

The analysis of the existing forms of carbon pricing and energy use in the 15 developing and emerging economies revealed that none of these countries currently price carbon explicitly. On the bright side, in most of the countries, subsidies on energy use turned out to be relatively minor. In addition, not all of these subsidies were directly encouraging fossil fuel use, in particular in the electricity sector. Where subsidies did create negative carbon prices, reforms were often underway to phase them out. In addition, some of the remaining subsidies could be justified as a second-best instrument to avoid energy poverty or even more harmful alternatives (LPG subsidies for cooking and heating). As a result, and going against conventional wisdom, it seems clear that in all of these countries there is no need to wait for phasing out subsidies (i.e. ending negative carbon prices), but now is the time to move towards pricing carbon explicitly.

A number of the TEU-SD countries have made substantial progress recently. Egypt has carried out fossil fuel subsidy reform and introduced new taxes on petroleum products. Progress has also been made in the Philippines, which implemented a major tax reform, and the Nigerian government has announced that it will phase out gasoline subsidies.

Estimates suggest that making further progress with carbon pricing could make a sizable contribution to domestic resource mobilisation for many countries, i.e. around 1% of GDP on average. In some countries, carbon price reform or other environmental instruments such as a ban on coal use could mean that these countries could leapfrog the most polluting fossil fuels altogether, as several countries are so far not using coal. In this case, the revenue potential of carbon pricing would be more limited, but it would save taxpayers money in the future as countries avoid stranded assets and stranded jobs once high-carbon assets lose value as the energy transition accelerates.

Challenging conventional wisdom, in most of the TEU-SD countries the administrative capacity for implementing some degree of carbon pricing already exists. This is because almost all of the countries already apply fuel excise taxes, which could be transformed into broad-based carbon taxes without requiring substantial capacity building on the administrative side. Naturally, capacity building support would be needed to design equitable policy packages that include targeted compensation to vulnerable groups and address potential competiveness concerns.

Unlike in OECD countries, where VAT is routinely applied on top of excise taxes, excise taxes sometimes replace VAT in developing countries. This suggests a need to integrate excise and carbon tax reform considerations in ongoing efforts to implement and improve VAT systems. This becomes all the more important considering that estimates of the revenue potential from carbon price reform suggests that, while significant, VAT will continue to dominate carbon pricing revenues in the domestic resource mobilisation efforts of countries.

Land use, land-use change, and forestry (LULUCF), and the associated climate impacts are major issues in many TEU-SD countries, especially considering that traditional biomass use is still common in many of these countries. This publication has only covered energy-related emissions, and it would be important to extend the methodology to also include non-energy greenhouse gas (GHG) emissions. This would allow for the tracking and analysis of how environmental tax policy could be leveraged to mitigate any potential negative impacts from non-energy emissions going forward.

Targeted transfers to vulnerable groups can contribute to an equitable reform package.

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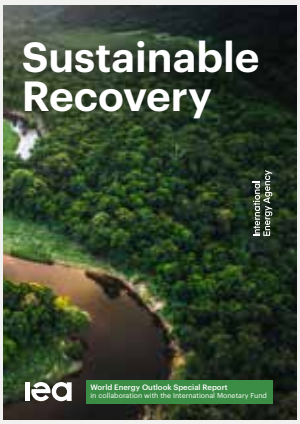

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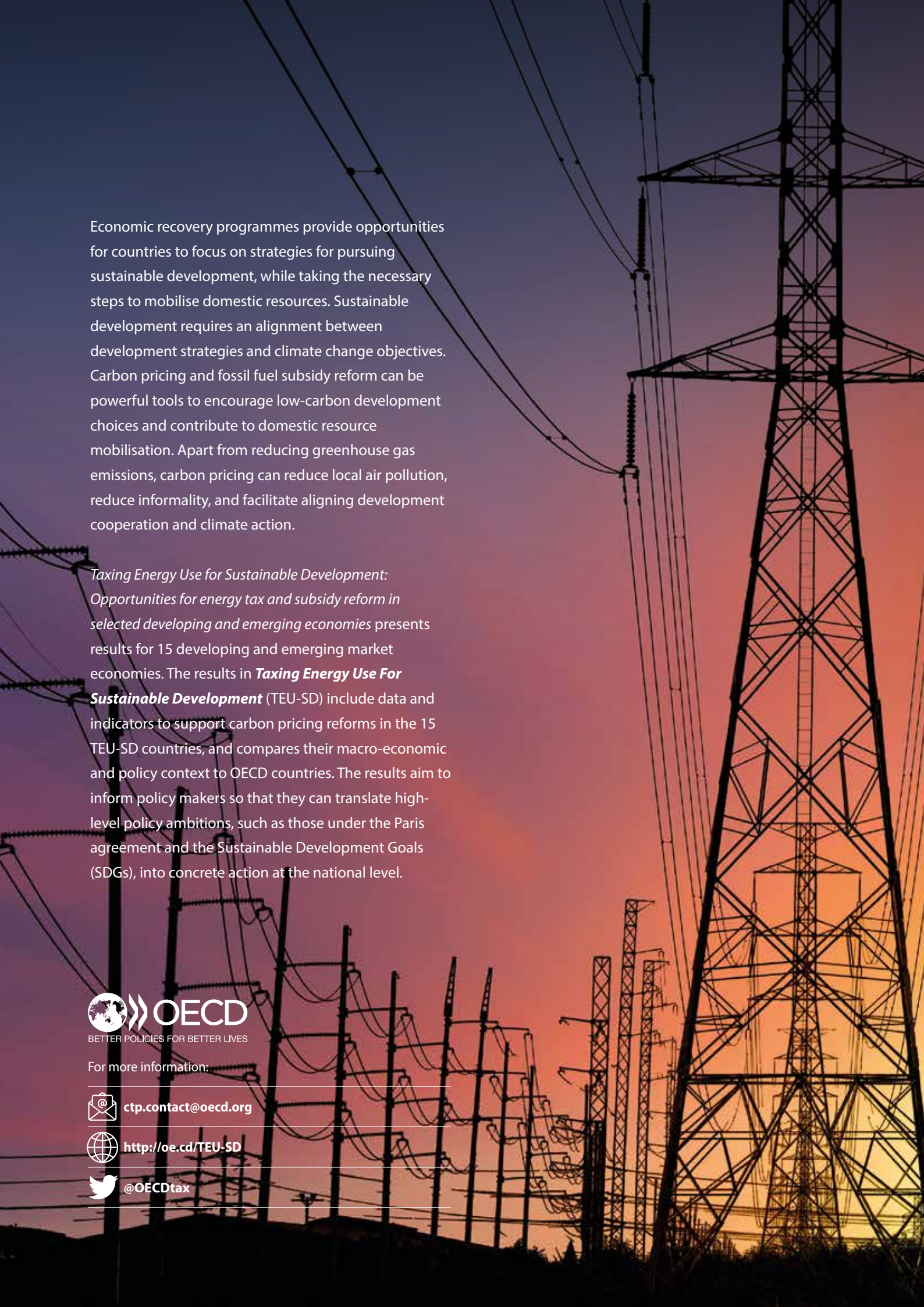

Economic recovery programmes provide opportunities for countries to focus on strategies for pursuing sustainable development, while taking the necessary steps to mobilise domestic resources. Sustainable development requires an alignment between development strategies and climate change objectives. Carbon pricing and fossil fuel subsidy reform can be powerful tools to encourage low-carbon development choices and contribute to domestic resource mobilisation. Apart from reducing greenhouse gas emissions, carbon pricing can reduce local air pollution, reduce informality, and facilitate aligning development cooperation and climate action.

Taxing Energy Use for Sustainable Development: Opportunities for energy tax and subsidy reform in selected developing and emerging economies presents results for 15 developing and emerging market economies. The results in ***Taxing Energy Use For Sustainable Development*** (TEU-SD) include data and indicators to support carbon pricing reforms in the 15 TEU-SD countries, and compares their macro-economic and policy context to OECD countries. The results aim to inform policy makers so that they can translate high-level policy ambitions, such as those under the Paris agreement and the Sustainable Development Goals (SDGs), into concrete action at the national level.

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