UPDATE ON RECENT PROGRESS IN REFORM OF INEFFICIENT FOSSIL-FUEL SUBSIDIES THAT ENCOURAGE WASTEFUL CONSUMPTION

Contribution by the International Energy Agency (IEA) and the Organisation for Economic Co-operation and Development (OECD) to the G20 Energy Transitions Working Group in consultation with: International Energy Forum (IEF), Organization of Petroleum Exporting Countries (OPEC) and the World Bank

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Summary

This report discusses recent trends and developments in the reform of inefficient fossil-fuel subsidies that encourage wasteful consumption, within the G20 and beyond. G20 member countries continue their commitment to phase out inefficient fossil-fuel subsidies, as reiterated in the Energy Ministers Communiqué of June 2018, in Argentina.[1]

The latest estimates of support for fossil fuels show that progress in reducing subsidies and government support for fossil-fuel production and use has slowed down in 2017. According to the combined IEA-OECD estimates, which cover 76 economies, the 2013-16 downward trend in support for fossil fuels, was reversed with an increase of 5% in 2017 compared to 2016, reaching USD 340 billion. Nevertheless, countries around the world have continued to implement energy-pricing reforms. For example, Argentina, India, Indonesia, and several MENA countries took important steps towards reducing their energy subsidies.

On the production side, the subsidised hard-coal industry in Western Europe has been phased out and efforts to end state aid to coal-fired power generation in the European Union are continuing. A recent EU decision sets 2025 as the target date for ending state aid to high-emission power plants, effectively eliminating subsidies to coal. At the same time, the oil and gas sector continues to benefit from government incentives in several countries, mostly through tax provisions that provide preferential treatment for cost recovery. Such policies could go against domestic efforts to reduce global greenhouse gas (GHG) emissions.

While reforms of inefficient fossil-fuel subsidies have translated in reduced fiscal deficits and a better alignment of prices with costs, recent policy developments show that such gains might be under threat, depending particularly on the evolution of oil prices. Volatility in international oil prices, as happened in during 2018, renders reform more difficult to implement, as increases in domestic energy prices may have adverse distributional consequences.

Increasing transparency on the use of scarce public resources is one way to maintain the momentum for fossil-fuel subsidy reform. Six G20 member states have completed voluntary peer reviews of inefficient fossil-fuel subsidies and collectively evaluated more than 100 government interventions relating to both the consumption and production of fossil fuels. Two more member states, Argentina and Canada, are now in the preparatory phase of a peer review. These peer reviews bring to the fore issues around fossil fuel

[1]. The G20 work focuses on the phasing out of *inefficient* fossil-fuel subsidies that *encourage wasteful consumption* over the medium term. These important qualifications (in italics) are central to the update. Still, for reasons of succinctness and readability in the text, the update may refer to fossil-fuel subsidies without the additional qualifications.

support and the formidable task of undertaking energy subsidy reforms while providing targeted support for the poorest.

Further efforts to improve transparency are underway. For example, countries are joining the newly established OECD Paris Collaborative on Green Budgeting, which aims to support governments in using national expenditure and revenue processes to support climate and environmental goals towards developing sustainable and resilient societies.

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Introduction

The Energy Transitions Working Group (ETWG) of the G20 requested that an update "that captures recent progress in countries, the peer review process and other developments to phase out inefficient fossil-fuel subsidies that encourage wasteful consumption" be prepared by the International Energy Agency (IEA) and the Organisation for Economic Co-operation and Development (OECD), in consultation with the International Energy Forum (IEF), the Organisation of the Petroleum Exporting Countries (OPEC), and the World Bank. The report was to be made available for the ETWG meeting, in Toyama, Japan, on 18-19 April 2019. This document responds to that request.

Under the recent G20 presidency of Argentina, member states reiterated their commitments, in the medium term, to rationalise and phase out inefficient fossil-fuel subsidies that encourage wasteful consumption, while providing targeted support for the poorest, thus upholding their pledge of the 2009 Pittsburgh Communiqué. The effort to reform fossil-fuel subsidies qualified as inefficient remains voluntary and country-led, recognising the need to provide affordable and reliable energy access to the poor.

A continued, concerted commitment by G20 membership to reform their inefficient fossil-fuel subsidies is instrumental in enabling a global transition towards a lower-emissions energy system.[2] Inefficient fossil-fuel subsidies can hinder progress in a country's transition as they distort prices, induce economic inefficiencies and poor environmental outcomes, and put pressure on scare public resources. They can encourage the use and production of fossil fuels and the accumulation of carbon intensive assets.

The rationalisation and phasing out of inefficient fossil-fuel subsidies can unduly penalise vulnerable populations and economic sectors. Therefore, successful and resilient reform processes ought to ensure that commensurate mitigating policies ensuring affordable energy access for all are part of the package. The *inefficiency* criterion for reforming fossil-fuel subsidies remains elusive precisely because G20 members differ along several dimensions. The membership includes both fossil-fuel-resource-rich countries and importing countries, developed and emerging economies; the energy transition and the subsidy reform process will depend on national circumstances.

Since the last progress report, submitted to the ETWG in June 2018, progress towards reduction in subsidy levels has slowed down and in some cases subsidies were on the rise in 2017, in part due to higher global oil prices. While several countries took advantage of slumping oil prices in 2014-16 to either de-regulate their domestic prices, increase their excise or carbon taxes, or bring their electricity tariffs above cost recovery, more recent periods in which there has been an upward trend in prices has rendered such changes less

[2]. See footnote 1.

palatable and more difficult to implement. Insofar as we may be entering a period of greater oil price volatility, this could delay or dilute the momentum behind pricing reforms.

The report documents the latest developments in the reform of fossil-fuel subsidies within the G20 context, other multilateral fora, and countries outside the G20 membership. The first section discusses progress made in the G20 voluntary peer review process, followed by a summary update on reform efforts around the world. Last, the report provides information on activities in different multilateral fora and institutions that work towards advancing this agenda.

G20 voluntary peer reviews of inefficient fossil-fuel subsidies

The 2018 G20 Energy Ministers Communiqué encouraged all G20 members that have not yet done so to initiate a peer review of inefficient fossil-fuel subsidies that encourage wasteful consumption as soon as feasible. [3] Countries volunteering to undergo peer reviews jointly decide on terms of reference (ToR) that establish the scope of the measures reviewed and the timeline of the review process. They then select a review panel, comprised predominantly of G20 member states, produce a *self-report*, in which they enumerate the measures to be reviewed and provide some context and background on their implementation and possible reform (or phasing-out).

At their discretion, G20 countries under review implemented the peer review process, thus far, by forming a review panel to include government representatives from G20 countries that have undergone a peer review and those that might consider volunteering to undertake the exercise. The review panels have sometimes included third-party experts from academia, inter-governmental organisations, and non-governmental organisations (NGOs). Government representatives from the G20 country undergoing the review and the review panel convene in person to discuss a country's policy framework and the individual subsidy measures. A final report, agreed to by all parties, is then prepared and issued. The OECD has acted as the Secretariat for the completed six peer reviews by chairing the in-person meetings of the review panels, co-ordinating the review processes and drafting the final report in consultation with panel members.

Table 1 summarises progress with peer reviews to date. In 2015, the People's Republic of China (hereafter "China") and the United States stepped forward as the first two G20 countries to undergo this process. Review teams were comprised of representatives from Germany, Indonesia, the United States, the IMF, and the OECD for the review of China; and of Germany, Mexico, and the OECD for the review of the United States. The review panels met in Beijing and Washington, D.C. in, respectively, April and May 2016, and the peer-review reports were published in September 2016.

Germany and Mexico followed suit by announcing their engagement in a reciprocal peer review under the auspices of the G20. The review panel included representatives from China, Indonesia, Italy, New Zealand, the United States, and the OECD. The two

[3]. In September 2013, the G20 Leaders *welcome[d] the development of a methodology for a voluntary peer* review *process and the initiation of country-owned peer reviews and…encourage[d] broad voluntary participation in reviews as a valuable means of enhanced transparency and accountability*.

countries under review also participated in each other's review panels. The panel met in Berlin in February 2017 and the final reports were made public in November of that year.

Indonesia and Italy first announced their commitments to undergo the peer review process in the Berlin February 2017 meeting, and the review is being completed in April 2019. Both review panels, for Indonesia and Italy, included several G20 country representatives and third-party experts from NGOs and academia. For Indonesia, China, Germany, Italy, Mexico, New Zealand, IEA, the International Institute for Sustainable Development (IISD), the World Bank, and the OECD were part of the panel. For Italy, the panel was comprised of Argentina, Canada, Chile, China, France, Germany, Indonesia, the Netherlands, New Zealand, IEA, IISD, Green Budget Europe (GBE), European Energy Retailers (EER), University of Pavia, and the UN Environment Programme. Argentina and Canada will be the fourth pair of G20 countries to undergo this process.

Table 1. Summary of G20 peer reviews

G20 Member State	Peer review panel	Date of completion
1. Argentina*	-	-
2. Canada*	-	-
3. China	Germany, Indonesia, the United States, IMF, the OECD (chair)	2016
4. Germany	China, Indonesia, Mexico, Italy, New Zealand, the United States, the OECD (chair)	2017
5. Indonesia	China, Germany, Italy, Mexico, New Zealand, IEA, IISD, the World Bank, the OECD (chair)	2019
6. Italy	Argentina, Canada, Chile, China, France, Germany, Indonesia, the Netherlands, New Zealand, IEA, IISD, GBE, European Energy Retailers, EER, University of Pavia, UN Environment, OECD (chair)	2019
7. Mexico	China, Germany, Indonesia, Italy, New Zealand, the United States, the OECD (chair)	2017
8. The United States	China, Germany, Mexico, the OECD (chair)	2016

Note: * Argentina and Canada announced their engagement in the peer review process under the auspices of the G20 in June 2018. They are at a very early stage in the process.
Source: Authors' elaboration.

Lessons learned from voluntary peer reviews of inefficient fossil-fuel subsidies

Under the six completed peer reviews, more than a hundred government policies were discussed and evaluated. Subsidies reviewed were mostly direct transfers and tax expenditures, two-thirds of which were directed to end-users of fossil fuels. On the production side, subsidies often took the form of preferential tax provisions of upstream oil and gas projects. For the downstream sectors, subsidies were, in large part, either in the form of transfers to producers for selling their products below market rates (i.e. consumer price support), or tax benefits for fuel use in specific end-user sectors (e.g. energy intensive industries, residential sector).

The peer reviews of inefficient fossil-fuel subsidies are a mechanism for information generation and sharing, knowledge exchange, and an invaluable commitment to transparency. They encourage capacity building in the measurement and tracking of government policies that may confer a benefit to the use and production of fossil fuels.

For countries under review, the peer reviews create an opportunity for cross-ministerial co-ordination and discussion on policy coherence.

The peer reviews bring to light, for both countries under review and participating panel members, the task for governments to regularly evaluate subsidies' effectiveness and efficiency, and therefore their relevance, as policy instruments. The review processes also provide successful examples of reforms and point to the importance of complementary policies to alleviate adverse effects on a country's vulnerable populations and the competitiveness of their industries.

Recent global progress in fossil-fuel subsidy reform

This section discusses recent estimates of fossil-fuel subsidies as measured by the IEA and the OECD. It also reports on recent developments in the reform of fossil-fuel subsidies in G20 countries and around the globe. Lastly, it documents initiatives taken by several international organisations working in this policy area.

OECD Inventory of Support for fossil shows a slowdown in the decline of support among OECD member countries and partner economies

The OECD produces an inventory of individual government budgetary programmes and tax provisions, the *OECD Inventory of Support Measures for Fossil Fuels* (*Inventory* hereafter), that provide preferential treatment to both consumers and producers of fossil fuels. The OECD approach includes government policies that extend beyond those that directly impact fuel prices and tracks support to both the consumption and production of fossil fuels provided mostly through direct budgetary spending programmes and tax benefits.

The 2019 edition of the OECD *Inventory* now includes ***Lithuania***, the newest OECD member country, having joined in 2018. It also extends coverage to 26 sub-national entities in China. Overall, 44 countries, 36 OECD member states and eight partner economies (Argentina, Brazil, China, Colombia, India, Indonesia, Russia, and South Africa) are covered, with almost 1 200 individual measures reported. (OECD, 2019[1]).

According to results from the 2019 OECD *Inventory,* OECD member states and partner economies provided around USD 140 billion in support for fossil fuels in 2017, 40% lower than the highest level in 2013 (Figure 1). Total government support in OECD and selected partner economies decreased by 9% between 2016 and 2017, a smaller decline compared to the 12% decrease between 2015 and 2016, and 19% between 2014 and 2015.

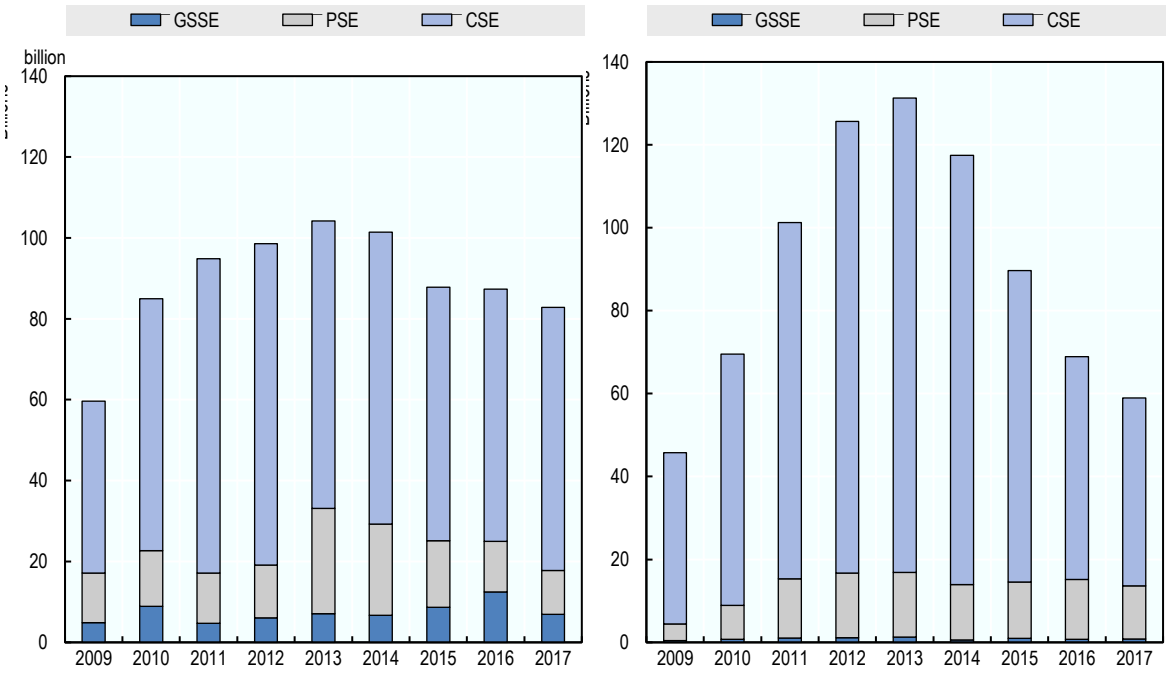
The recent decrease in support is in large part explained by reductions in general services support estimates (GSSE) and consumer support estimates (CSE) as illustrated in Figure 5. Most of the support in the OECD and selected partner economies (80%) goes to the consumption of fossil fuels, and in particular petroleum (Figure 6). For several OECD countries, estimates of support pertain exclusively to consumption, a feature that has much to do with geological factors and the decline in coal production observed throughout Europe. In the cases of countries possessing abundant fossil resources, the share of producer support tends to be higher.

There have been several gains from reforms in pricing and better targeting of subsidies, particularly in partner economies. On the production side, progress towards reform has been the most pronounced in the coal sector, with a complete phase-out of subsidised

hard coal in Western Europe. The next two subsections hone in on recent developments in consumption and production as documented by the OECD *Inventory*.

Figure 1. Reductions of government support for fossil fuels continue but at a slower pace in the OECD and selected partner economies

Total support for fossil fuels in OECD countries (left) and selected partner economies* (right) by year and indicator (in constant USD billion**)



Note: General Support Services Estimates (GSSE) represents the value of transfers arising from policy measures that create enabling conditions for the fossil fuel sector through the development of private or public services, institutions and infrastructure regardless of their objectives and impact on fossil fuel production and or consumption. It includes policies where fossil fuels are the main beneficiaries, but does not include any payments to individual producers. GSSE transfers do not directly alter producer receipts or costs, or consumption expenditures, although they may affect production or consumption of fossil fuels in the long term. The Producer Support Estimate (PSE) indicator measures the annual value of transfers from consumers and taxpayers to producers of fossil fuels. Consumer Support Estimate (CSE) reflects the value of transfers to consumers of fossil fuels regardless of their nature, objectives or impacts on consumption.
*Selected partner economies are Argentina, Brazil, China, Colombia, India, Indonesia, Russia, and South Africa.
**Total Support Estimates (TSE) are expressed in constant 2017 US dollars.
Source: (OECD, 2019[1]).

Consumption-related support measures

Recent developments in consumption-related support include ***Argentina***'s paring down of several of its consumption subsidies, mainly in the power sector and for transport fuels. After peaking in 2016, total consumption subsidies decreased by 35% in 2017. This is mainly explained by reforms in electricity prices that aimed to bring them closer to cost-reflecting levels. Similar reforms were implemented for natural gas prices, but a social tariff provision was introduced to mitigate the impact of price increases on low-income households, thus keeping government outlays related to natural gas high.

In ***Indonesia***, energy-pricing reforms generated substantial reduction in subsidies, although recent price freezes resulted in renewed pressure on the country's fiscal balance. Petroleum pricing reforms have persisted in ***China***, cutting down central and provincial-level government outlays significantly, by 50% and 90%, respectively, between 2014 and 2017.

India's fuel price liberalisation reduced government outlays to oil-marketing companies by 80% between 2013 and 2017, and at the same time, India continues its effort to increase access to affordable energy by providing a direct benefit transfer for LPG users (under the PAHAL-DBTL scheme). Since the inception of the programme, government transfers have grown five-fold. At the same time, the Indian government has made efforts to improve the targeting of its subsidised LPG. The GiveItUP campaign has led 10 million households to voluntarily opt out of the subsidies scheme, representing 5% of total active LPG connections in 2018 (GSI, 2018). To further rationalise the PAHAL programme, the government instituted a mandatory exclusion of high-income individual that declare incomes of INR 1 million (USD 15 000) per year or above to the Ministry Petroleum and Natural Gas (Soman et al., 2018[2]). Recently, the introduction of the Goods and Services Tax (GST) reforms in India led to a concessional GST rate (at 5%) on domestic LPG and discontinuation of the excise duty exemptions (an untargeted subsidy) on domestic LPG. This led to overall increase in subsidies for LPG in FY 2018 from previous years (Soman et al., 2018[2]).

In ***Mexico***, fuel price reforms led to a better alignment of domestic prices with international market prices. By January 2018, maximum fuel prices were lifted, but at the same time, the Ministry of Finance and Public Credit announced that a "fiscal stimulus" will maintain to cushion fluctuations in reference prices and exchange rates. An increase in oil prices might trigger the use of this fiscal stimulus thus introducing subsidies through the floating-tax mechanism, *Impuesto Especial sobre Producción y Servicio* (IEPS). More recently, the current administration announced a price freeze for 2019 (Elizabeth Albarrán, 2018[3]).

Total tax expenditures stagnated for the OECD over the 2011-17 period, resulting in an average of USD 80 billion in transfers through the tax code annually. Since changes in the tax laws occur less frequently than changes in budgetary spending programmes, changes in tax expenditure estimates are more modest. Between 2016 and 2017, only one-third of the decrease in support (USD 5 billion) is due to reductions in tax expenditures. ***Norway***, for example, eliminated the differential in CO_2 taxation of mineral oil relative to petrol. The preferential tax rate amounted to a revenue foregone estimate of NOK 2.3 billion (USD 280 million) between 2013 and 2016.

Production-related support measures

According to the 2019 edition of the OECD Inventory, support for the production of fossil fuels is 12% lower in 2017 (USD 24 billion) compared to 2016 (USD 27 billion), and down by 43% from its highest level in 2013. This sustained decrease in government support is largely due to hard-coal phase out in Western European countries and fiscal consolidation efforts in countries like Argentina and Indonesia. In this context, uncompetitive mines and coal-fired power plants face an increasing risk of becoming stranded assets.

In accordance with European Union rules, only two hard-coal mines remain in operation in Western Europe. As set out in the European Council Decision 2010/787/EU, countries had to wean off uncompetitive coal mines from state-aid for complete closure by

31 December 2018, at the latest. ***Germany***'s last hard-coal mine was officially closed in 2017, eliminating completely subsidised coal in the country, which had cost the government EUR 12 billion between 2010 and 2017. Spain closed all but one mine by the end of 2018, *La Escondida*, with the hope to exploit remaining coal deposits without government help (Steenblik and Mateo, 2019, forthcoming[4]). Spain's outlays to its coal industry are half their 2010 levels.

The ***European Union*** continues its efforts to reduce high-emissions electricity generation. At the end of 2018, the EU established 2025 as the cut-off for state aid to power plants emitting more than 550g of CO_2 per kilowatt-hour. A grandfathering clause was also introduced that exempts contracts signed before 31 December 2019 from the new emissions limits (Council of the EU, 2018[5]).

Canada and the ***United Kingdom*** launched the Powering Past Coal Alliance (PPCA) at COP23 in 2017. Since then, they have garnered the support of 28 additional countries and 22 sub-national governments, committed to end unabated coal-power generation (PPCA, 2018[6]). In 2017, the United Kingdom coal-power generation declined to a new low of just 7%. In 2018, the United Kingdom was powered for more than a thousand hours without coal. ***Slovakia*** has recently announced to wind down its coal production by 2023. ***Chile*** will no longer build coal-power plants unless they are fitted with carbon-capture and storage technology. ***Germany*** will phase out its coal-powered power plants by 2038.

Production subsidies decreased by 37% in ***Argentina*** between 2016 and 2017 as some incentive measures came to expiry. However, the introduction of a new incentive programme in 2017 to stimulate production in unconventional resources, *Programa de Estímulo a las Inversiones en Desarrollos de Producción de Gas Natural proveniente de Reservorios no Convencionales*, has already resulted in an upsurge in government outlays. The programme ensures a price floor of USD 7.5 per million British Thermal Units (mmBtu) for producers of tight gas and shale gas in the Vaca Muerta formation, where market prices hover around USD 4 per mmBtu. Plans announced at the beginning of 2019 to decrease these subsidies introduce a decreasing price schedule for the price floor, and a complete phase out of subsidies by 2021.

Shale gas in ***China*** also benefitted from subsidies totalling CNY 7 billion (USD 1 billion) but the government continues to pursue a stepwise reduction in its per-unit subsidies, with the aim to gradually phase them out. In 2018, China introduced a 30% reduction of the resource rent tax on oil and gas to incentivise the production of shale oil; it is due to expire in 2021.

In 2018, the ***United Kingdom*** changed the treatment of decommissioning cost in the Petroleum Revenue Tax (PRT) regime and the transfer of tax history. These amendments make it easier for investors to acquire mature oil and gas assets in the United Kingdom and the UK Continental Shelf. Additionally, newly added measures to the United Kingdom's *Estimate Costs of Relief 2019* edition includes estimates of the income tax relief on decommissioning cost and first-year capital allowance, which total GBP 24 billion between 2013 and 2017.

Canada has completed the rationalisation of one of its support measures for the fossil-fuel upstream sector. As of January 2018, the Canadian Exploration Expense (CEE) provision no longer applies to expenses related to bringing into production new wells, they are now included under a different provision, the Canadian Development Expense (CDE), which allows a 30% annual deduction instead of the 100% deduction the year they are incurred. Under the newly established Accelerated Investment Incentives, the oil

and gas sector benefits from specific allowances, such as a first-year enhanced allowance on expenses eligible for a CDE.

IEA price-gap estimates of consumer price support show an increase in subsidies to fossil fuels

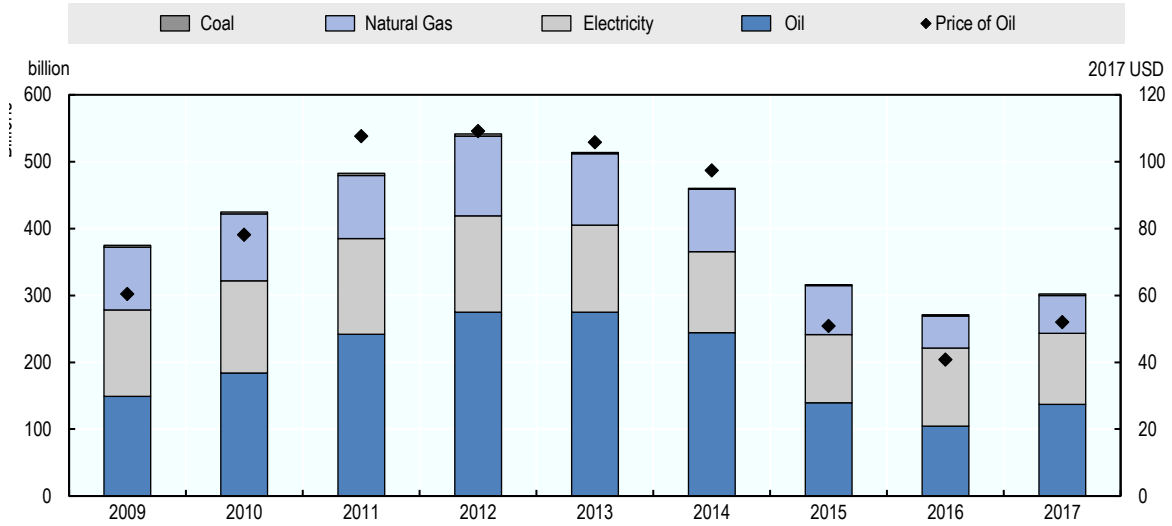
The IEA employs the price-gap approach to capture the transfer to consumers resulting from government policies that maintain domestic fossil-fuel price below reference prices, i.e. import-parity or export-parity prices for fuels, and electricity tariffs below cost recovery or annual average-cost pricing for electricity in each country. [4] Based on the price-gap method,[5] the estimated IEA value of fossil-fuel consumption subsidies, covering 40 countries, showed a 12% increase in 2017 compared to 2016, to more than USD 300 billion, reflecting in large part the higher price for oil (which, if a low regulated end-user price remains the same, increases the estimated value of the subsidy) (Figure 2). Oil and electricity subsidies each constitute around 40% of global subsidies, with natural gas accounting for almost all of the remainder (IEA, 2018[7]).

[4]. As was noted in the previous update report, OPEC re-iterates that the price-gap approach "does not distinguish between efficient and inefficient energy subsidies. For example, oil-producing economies in developing countries may use their oil resources in a way that effectively promotes their general economic development, and this approach could more than offset the notional loss of value by selling the resource internally at a price below international prices… Therefore, OPEC considers that the benchmark price to be used in the case of countries that are well-endowed with energy resources should be the cost of production." (IEA and OECD, 2018[19])

[5]. The IEA measures subsidies based on the amount by which the price of a given fuel falls short of its reference price, which corresponds to the international market price, adjusted for the costs of transportation and distribution and value-added tax (VAT), or where appropriate the full cost of supply. The estimates cover subsidies to fossil fuels consumed by end-users and subsidies to fossil-fuel inputs to power generation. For countries that import a given product, the estimates represent net expenditures resulting from the domestic sale of imported energy (purchased at world prices in hard currency), at lower, regulated prices. For countries that export a given product, the estimates represent the opportunity cost of pricing domestic energy below market levels.

Figure 2. Value of fossil-fuel consumption subsidies from the IEA price-gap estimates indicate an increase of 12% between 2016 and 2017

(in 2017 USD)



Note: Price of oil is the IEA average crude oil import price (right axis). The IEA price-gap approach identifies consumption subsidies (i.e. consumer price support) in 40 economies, among which are some G20 fossil-fuel exporting economies and countries in the MENA and Central Asia regions.
Source: (IEA, 2018[8]).

In 2016, for the first time, the value of subsidies to fossil-fuelled electricity was higher than for oil. The 2017 data sees oil return as the most heavily subsidised energy carrier. Applying the price-gap method, the IEA has identified 40 economies as subsidising fossil-fuel consumption through price interventions. In total, these countries account for over half of global energy consumption. The value of subsidies as a share of the total GDP of these countries averages 1%. Ten countries accounted for over three-quarters of the global total of fossil-fuel consumption subsidies in 2017. The Middle East, where many countries increased prices for gasoline and diesel, remains the region with the largest share of total subsidies (around 35% of the total).[6]

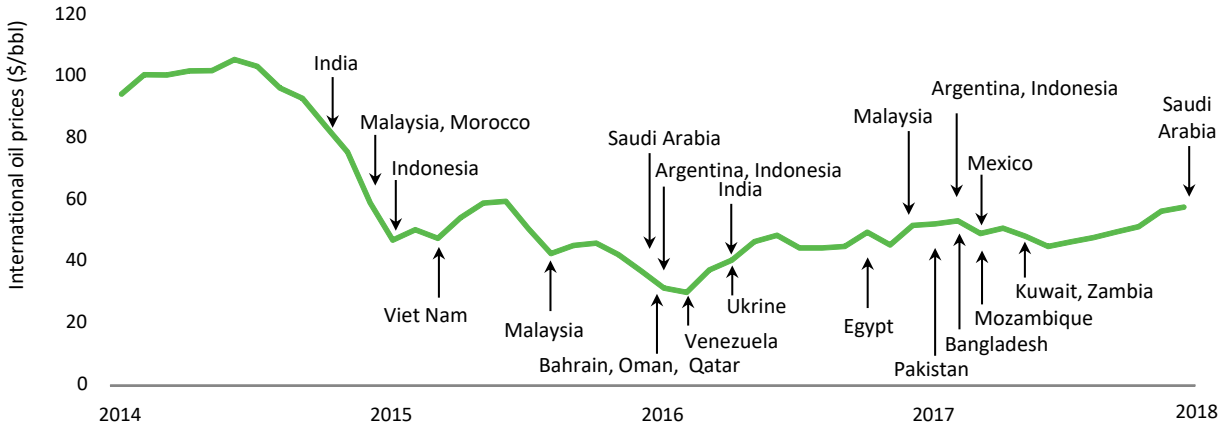
The period of high oil prices from 2010-14 provided strong motivation for many oil-importing countries to pursue subsidy reform. Since government outlays to support domestic consumption are pro-cyclical, they can weigh heavily on public finances when oil prices increase for these countries or when domestic currencies weaken vis-à-vis the US dollar. The fall in prices that began in 2014 presented the opportunity. A host of countries, from ***India*** to ***Indonesia*** and from ***Mexico*** to ***Malaysia***, have implemented pricing reforms in recent years.

Pricing reforms have also gained ground among fossil fuel exporters. ***Kuwait***, ***Oman***, ***Qatar***, ***Saudi Arabia*** and the ***United Arab Emirates*** have all increased domestic prices for gasoline, natural gas and electricity in recent years (Figure 3). In many cases,

[6]. Some developing countries that are energy exporters are of the opinion that the reference price in their markets could be based on their cost of production rather than on import- or export-parity pricing.

subsidies represent an opportunity cost, i.e. foregone revenue, rather than an explicit financial burden, but the straitened circumstances of many oil and gas exporters in recent years gave impetus to changes in energy pricing. Exposure to oil-price volatility represents a fundamental challenge for oil-exporting countries. Their ability to shield their economies from these fluctuations is intimately linked to their capacity to diversify away from oil revenues. Low-international oil prices coupled with growing domestic demand for fuels place strong downward pressure on government revenues. Pricing reforms therefore can contribute to fiscal sustainability and diversification programmes.

Figure 3. Policy developments to reduce consumption subsidies



Note: Consumption subsidies covered in this time line refer to consumer price support.
Source: International Energy Agency.

Any rise in international fuel prices, as occurred in the second half of 2018, could set back efforts to phase out fossil-fuel subsidies. Consumers in many oil-importing countries faced a hike in retail prices, particularly in developing economies with depreciating local currencies against US dollar. Facing these pressures, some countries started pushing back their reform schedules by postponing price increases or otherwise protecting consumers from their efforts – while in most cases keeping the overall policy goal of market-based pricing in place. For example, ***Indonesia*** and ***Malaysia*** have maintained domestic prices at the previous levels, while India has cut the excise duty on gasoline and diesel, and ***Brazil*** has increased its subsidy on diesel.

The combined IEA-OECD estimate of support for fossil fuels indicates a slight increase in 2017

The IEA and OECD have been tracking government support separately for several years, using complementary estimation approaches describe above. The combined estimate of support for fossil fuels is the total resulting from merging IEA price-gap estimates and OECD Inventory estimates.[7] For countries that are covered by both IEA and OECD estimates (Argentina, China, Colombia, India, Indonesia, South Korea, and Russia), double counting of subsidies is eliminated using the method explained in (OECD, 2018[9]). Output-based support to the electricity sector is not included in the combined

[7]. See footnote 4.

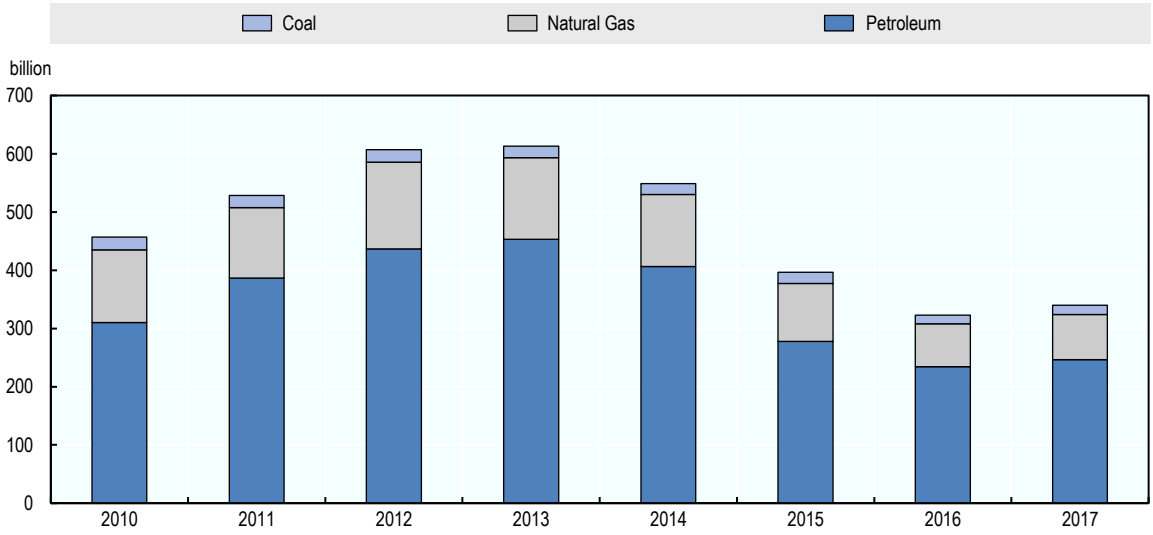
estimates, but support measures for input fuels used in power-generation are counted and categorised under the input fuel to which they correspond.

Combined estimates of government support for fossil fuels measured by the IEA and OECD show an increase in subsidies in 2017 (Figure 4). The 2013-16 downward trend in support for fossil fuels, which was driven by the momentum to deregulate fossil-fuel prices and rationalise subsidies, was recently reversed with an increase of 5% in 2017 compared to 2016 levels. Support for fossil fuels stands at USD 340 billion in 2017.

The recent trend can be explained by several factors. With the increase in international oil prices, some countries re-instated stronger price controls on fossil fuels. Higher oil prices made it difficult for some governments to continue their energy pricing and taxation reforms. Additionally, support can increase because hikes in statutory fuel tax rates, due to higher carbon or excise taxes, often led to higher tax expenditures as documented by the OECD *Inventory*.[8]

Figure 4. IEA-OECD combined estimate of support for fossil fuels show that progress has slowed down

(2017 USD)



Note: The combined estimate of support for fossil fuels is the total resulting from merging IEA price-gap estimates (see below) and OECD Inventory estimates. For countries that are covered by both IEA and OECD data (i.e. Argentina, China, Colombia, India, Indonesia, Mexico, South Korea, Russia), double counting of subsidies is estimated and eliminated using the method explained in (OECD, 2018[9]). Output-based support to the electricity sector is not included in the combined estimates, but support measures for input fuels used in power-generation are counted and categorised under the input fuel to which they correspond.
Source: (IEA, 2018[8]), (OECD, 2019[1]).

[8]. Tax expenditures are often calculated as the *revenue forgone* due to deviations of applied tax rates from a country-determined benchmark tax system. Increases in the benchmark tax rates lead to a mechanical increase in tax expenditure estimates.

Increasing transparency on support measures for fossil fuels

Several new developments have taken place on the reporting of government policies that encourage the use and consumption of fossil fuels. Estimating and openly reporting the extent of government support is a first building block toward reform of fossil-fuel subsidies. ***Indonesia*** has continued its efforts towards enhanced transparency and tracking of government expenditures. It published its first tax expenditure report, which includes, among others, tax provisions that give preferential treatment to fossil fuel consumption and production (Indonesia Ministry of Finance, 2018[10]). The ***United Kingdom*** included additional tax expenditures in 2019 to its regular reporting of tax expenditures. A government decree issued by the Ministry of Finance in ***Colombia***, in August 2018, seeks to bring greater clarity on the definitions and inputs used in the formula for its price stabilisation mechanism, *Fondo de Estabilización de Precios de los Combustibles* (FEPC).

The OECD launched the Paris Collaborative on Green Budgeting at the One Planet Summit in December 2017 as a platform for countries to share experiences and good practices in tracking their efforts to align budgetary practices with environmental objectives, underlining the linkages between budgetary, fiscal and environmental policy objectives.

Transparency on the use of government resources is an important element in aligning government policies to enable a transition towards a low-emissions energy system. OECD's efforts to track support for fossil fuels contributes to this end. Other organisations, such as the IEA, IMF, and the World Bank, among others, have also developed complementary information to improve the collective knowledge about fossil-fuel support. In order to explore ways to harness the potential synergies among these repositories of information, the OECD has initiated discussions with several IOs on the development of an Inter-agency Consortium for measuring government support to fossil fuels.

Developments in the reform of fossil-fuel subsidies in other IOs

This section reports on developments in other international organisations (IOs). It incorporates contributions provided by the World Bank and the Organisation of the Petroleum Exporting Countries (OPEC).

APEC peer reviews

In parallel with the G20 peer reviews of IFFS, peer reviews have also taken place under the auspices of the Asia-Pacific Economic Cooperation (APEC) Energy Working Group (EWG). Four peer reviews have been completed by APEC's member economies: ***Peru*** (2014), ***New Zealand*** (2015), ***Philippines*** (2015), and ***Chinese Taipei*** (2017). The peer review for ***Viet Nam*** is forthcoming. APEC economies that have undergone the peer reviews agree that any measure that encourages wasteful consumption is inefficient and should be reformed in order to meet the government's objective of energy security and sustainable development.

The Friends of Fossil Fuel Subsidy Reform

The Friends of Fossil-fuel subsidies Reform Group, a group of nine countries (***Costa Rica, Denmark, Ethiopia, Finland, New Zealand, Norway, Sweden, Switzerland, Uruguay***), was formed in 2010 to support the efforts of the G20 and APEC to phase out

IFFS. Since its inception, the group has played a central role in encouraging countries to accelerate their plans to meet their commitments of phasing out IFFS. The Friends have participated and contributed to events and international processes at the Conference of Parties meetings of the UNFCCC, the World Bank and IMF "Spring" meetings, the UN Sustainable Development processes, and the Clean Energy Ministerial. In December 2017, on the occasion of the 11th WTO Ministerial Conference, twelve countries endorsed a Fossil-fuel subsidies Reform Ministerial Statement (WT/Min(17)/54) developed by the Friends affirming their commitment to rationalising and phasing out inefficient fossil-fuel subsidies (WTO, 2017[11]). [9]

The World Bank

The Energy Subsidy Reform Facility[10]

Countries considering the reform of their energy subsidies have highlighted the need for support in dealing with the complexities of this issue. In response, in 2013 the World Bank's Energy Sector Management Assistance Program (ESMAP) launched the Energy Subsidy Reform Facility (ESRF). This USD 20 million Facility supports World Bank client governments in the design and implementation of their proposed or ongoing energy subsidy reform efforts.

To this end, the Facility mobilises experts from across the World Bank's range of sectors: energy, macro-economic and fiscal management, firm-level economics, poverty analysis and policy, social protection, governance, communications and consultations, the environment, and climate change. The ESRF also collaborates closely with other organisations that produce analysis and research and advocate for energy subsidy reforms. These include the Global Subsidies Initiative (GSI), the International Energy Agency (IEA), the International Monetary Fund, and the Organisation for Economic Co-operation and Development (OECD).

Advancing reform through technical assistance

Since its creation in 2013, the ESRF has provided technical assistance through 6 060 engagements in 5 252 countries, including country and regional engagements. In addition to analysis of subsidies, technical assistance is provided for the assessment of distributional impacts of reform at the household and macroeconomic levels, communication and consensus building strategies, as well as targeting and delivery mechanisms and energy pricing frameworks, transition plans, and social protection and other mitigation mechanisms.

In Egypt, for instance, where energy subsidies represented 7% of GDP and 22% of the national budget in 2013 – significantly more than health and education expenditures combined – the ESRF provided analytical inputs to the reform process and capacity-building to various ministries. These inputs informed the government of socially sensitive

[9]. Signatory countries to the Fossil-fuel subsidies Reform Ministerial Statement are Chile, Cost Rica, Iceland, Liechtenstein, Mexico, the Republic of Moldova, New Zealand, Norway, Samoa, Switzerland, Chinese Taipei, and Uruguay.

[10]. Note that this technical-assistance facility is just one of the instruments the World Bank Group offers to support countries with subsidy reform.

ways of reforming. Within three years, Egypt managed to cut subsidies by more than half and channelled freed-up resources for health and education priorities. ESMAP support also laid the groundwork for broader dialogue that led to World Bank budget support over three years for a broad agenda of energy-sector reform, including reduction of subsidies, and a multi-donor initiative to support the scale up solar energy.

In Serbia, the ESRF supported the government's program of subsidy reduction ensuring a focus on minimising the impact on household energy expenditure, especially for the poor and the elderly under a USD 200 million World Bank loan for public expenditure and utility reform. As a result, successive increases in residential electricity tariffs over 2015-17 were accompanied by an increase in the budget of the Energy Vulnerable Program to enhance its coverage. Other examples are described in country briefs available on ESMAP's website.

A practical guide to help government assess subsidies

The ESRF also supports clients by producing tools for assessment and decision making on energy subsidy reform. Through a collaboration of experts from across global practices at the World Bank, the Facility has supported the development of a comprehensive analytical toolkit and framework for assessing energy subsidies, the impact of their reduction or removal, and the political environment within which reform is taking place. The *Energy Subsidy Reform Assessment Framework* ((ESRAF) is a practical handbook that describes tools, methods and practices that can be used to identify, analyse and facilitate the various aspects of energy subsidy reform as input into policymakers' decisions on sequencing and prioritisation of subsidy reform.

Facilitating energy subsidy reform through peer exchange

The Facility also offers World Bank client governments that are embarking on energy subsidy reforms, the opportunity to learn from peers. The *Energy Subsidy Reform Online Community* (ESROC) is a members-only virtual community aiming to share knowledge among key stakeholders to facilitate energy subsidy reforms worldwide. ESROC hosts knowledge-exchange webinars to connect government officials and experts across the world for peer-to-peer dialogue about the technical and political challenges of reforming energy subsidies.

For example, in June 2017, ESROC organised a webinar connecting the governments of Morocco and Egypt. During the event, the architects of the fuel-pricing reform in Morocco presented their experience and answered questions from an audience of Egyptian counterparts who were going through a similar process. The webinar provided an opportunity for Egyptian government officials to learn from the Moroccan experience, as they proceeded in the planning and implementation of their own reforms.

To further disseminate the knowledge exchanged within ESROC, ESMAP has also developed the Practitioner Exchange Series, which is a series of short guidance notes, capturing insights on important aspects of subsidy reform from the exchange. In addition, the Facility supports and organises regional workshops and conferences.

More recently, in October 2018, ESRF organised the ESMAP Knowledge Exchange Forum in Geneva in partnership with Switzerland's State Secretariat for Economic Affairs. Over two days, 100 plus participants from over 40 countries took part in a lively discussion on the challenges and opportunities of reforming energy subsidies. They

listened to peers from other countries talk about their programs, shared their own perspectives, and discussed what it takes to make or break reforms.

Organization of the Petroleum Exporting Countries (OPEC)

The G20 has been instrumental in fostering a more balanced understanding that inefficient fossil-fuel subsidies can lead to wasteful energy consumption. In the closing statement of the 2016 G20 summit in Hangzhou, China, the G20 countries reiterated their full and undivided commitment to "rationalize and phase out inefficient fossil-fuel subsidies that encourage wasteful consumption over the medium-term, recognising the need to support the poor".

Be that as it may, fossil fuel consumption subsidies are unique in every country and are subject to energy policies designed to adhere to a set of priorities and needs specific to each country. OPEC Member Countries are actively evaluating, assessing and modifying their energy subsidy policies, especially where these are considered inefficient. This process is both complex and necessary. This is particularly evident for oil exporting countries where striking a balance between ensuring optimal use of their finite energy resources and ensuring energy access to all regardless of income but at the same time discouraging wasteful consumption is a delicate matter.

Furthermore, energy policies in energy-exporting developing economies have been created in tandem with other economic policies, as a means to effectively promote economic development and ensure energy access to the most vulnerable. This methodology has been used in numerous places as way of using societal gains to offset the theoretical value loss of selling their energy resources on domestic markets at prices below those in international markets.

Although the process of tackling inefficient energy subsidies is complicated, certain Member Countries have developed sophisticated energy governance structures that are currently being used to adapt to market changes and phase out subsidies deemed inefficient. A broad spectrum of recent events and global/country-specific trends have fed into the new and developing energy policies. These factors are even more evident when examining growth in domestic energy demand, the subsidies that have contributed to this demand growth and the increased pressure from climate change in these countries. Hence, a broad range of recent energy pricing reforms is emerging amongst OPEC Member Countries. One such example is the promotion of a national renewable energy plan focusing on expanding the use of renewable electricity generation, especially in rural areas that are not connected to the electric grid. This underscores these governments' commitment to providing energy access to the most vulnerable segments of society while also limiting dependence on subsidised fossil fuels.

Additionally, select Member Countries have initiated and enacted policies to scale back some end-use fossil-fuel subsidies over the past few years and to raise their domestic gasoline prices by 50% (and in some countries even 100%). These reforms are part of a set of measures aimed towards the eventual removal of all subsidies for gasoline and jet fuel. This constitutes living proof that energy subsidy reforms in certain OPEC Member Countries are on a trajectory to reduce and even phase out certain fossil-fuel subsidies.

The impact of fossil-fuel subsidies is of massive proportions, nationally and globally. This is evident when examining the impact of these subsidies on energy demand and the economy at large. Fossil-fuel subsidies can represent a major expense for governments

and the budget needed to maintain these subsidies is often equivalent to a relatively large proportion of the country's GDP.

Last but not least, OPEC Member Countries are taking into account that the stability and advancement of their economies is of the utmost importance when examining and planning their fossil fuel subsidy reforms. Therefore, the effort of the G20 Summit towards sharing knowledge and best practices is much appreciated and is an invaluable contribution to these initiatives.

IEA country reviews

The ***Slovak Republic*** has domestic coal production that is uncompetitive against imported coal. Although coal mining in itself is not subsidised, the electricity generation from domestic coal is. Such subsidies are allowed under EU law for reasons of security of supply. In the In-depth review of the Slovak Republic, the IEA recommended the government to eliminate the subsidies of the coal sector (IEA, 2018[12]). With two new nuclear units about to come online in 2018-19, the security of supply for electricity cannot motivate the coal power subsidy. At the end of 2018, the Slovak government committed to the phase-out of the coal power generation subsidies until 2023, which was sooner than previously expected (Jancarikova, 2018[13]).

Morocco has maintained the phase-out of energy subsidies, an important step in encouraging more efficient energy use and reducing GHG emissions. Morocco took advantage of a period of low oil prices in 2014-15 to successfully phase out fossil-fuel subsidies with the exception of butane. Since December 2015, the prices for most refined products are now free (and follow international prices). Butane gas, largely used by households and agriculture, remains subsidised. In 2017, the energy subsidy bill stood at nearly EUR 1 billion due to the increase in international oil prices and higher consumption, constituting a significant strain on the national budget. While some programmes are being implemented - Morocco has launched a national solar pumping programme in agriculture, to save water and energy, and to improve the output and productivity of farmers - the commercial and agriculture sectors still largely rely on butane, notably in rural areas. The 2019 IEA in-depth review encourages the government to improve the targeting of the subsidies (IEA, 2019, forthcoming[14]).

The Government of ***India*** has undertaken an ambitious and successful effort to provide access to energy to its entire population, bringing access to electricity and clean cooking fuels to hundreds of millions of people. To ensure the efficiency of its effort, the Government of India has embarked on a course of rationalising fossil-fuel subsidies, starting with the area of clean cooking. The PMUY (Pradhan Mantri Ujjwala Yojana) scheme targets subsidies to women in below poverty line (BPL) households and provide them with a stove and subsidised cylinders of liquefied petroleum gas (LPG), providing for a 'Blue Flame Revolution' with 60 million new LPG connections at the end of 2018. The program expanded the target to 80 million households by March 2019. This is improving health, especially of women and children, by reducing exposure to indoor air pollution from burning traditional biomass and eliminating time collecting fuelwood. A good example for subsidy reform is the better targeting of LPG support. To control subsidies, the GoI introduced the Direct Benefit Transfer (DBT) in LPG (PAHAL scheme) and launched the '#GiveItUp' campaign which was successful in motivating LPG users who can afford to pay the market price to voluntarily surrender their LPG subsidy, which have saved some USD 4.6 billion of subsidies.

OECD country reviews

Economic Surveys

The OECD publishes *Economic Surveys* every two years for each of its member countries and for non-member countries, including Argentina, Brazil, China, India, Indonesia, Russia, and South Africa,. The Economic Surveys discuss regularly issues relating to fossil-fuel subsidies and taxes, often with recommendations related to the liberalisation of energy markets, the pricing and taxation of carbon-based fuels and electricity.

A summary of selected OECD Economic surveys published in 2018-19 that have discussed fossil-fuel subsidies or fuel taxation are listen in Table 2.

Table 2. OECD *Economic Surveys* that discuss support to fossil fuels

(March 2018 to March 2019)

Country and date of the survey	Comments and recommendations relating to fossil-fuel subsidies or taxation
Australia (2018)	Since the last *Economic Survey*, Australia has made little progress in reducing its environmental footprint. Frequent changes in core climate-change instruments have created uncertainty for emitters, and has also discouraged energy sector investment. Energy taxation notably comprises comparatively low tax rates on transport fuels in international comparison. Fossil fuels are untaxed in industrial use and in electricity generation. This also applies to coal, which is used heavily in electricity generation. Pricing the carbon content of fossil fuel use consistently, and transport fuels at higher rates, would reduce demand for carbon-intensive energy.
Canada (2018)	A key recommendation of the *Survey* is to progressively increase the carbon price to the extent necessary to meet Canada's GHG abatement objectives, and eliminate redundant abatement measures. The Survey points out that, while Canada's emissions of GHGs are among the highest in the OECD in per capita term, the country has overlapping and potentially expensive measures to reduce carbon emissions, many of which would be redundant if all emissions were adequately priced. Revenues from environmental taxes (at all levels of government) are considerably lower than in most other countries, largely because of low energy taxation. While the average tax rate on motor fuel is higher than in the United States, it is much lower than in Europe. Diesel is taxed at a lower rate than gasoline, even though its environmental externalities are higher. New measures were undertaken to help Canada meet its COP21 target of cutting emissions to 30% below 2005 levels by 2030. Federal, provincial and territorial governments, in consultation with Indigenous peoples, launched the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) in 2016. It outlines a country-wide approach to pricing carbon emissions to ensure that they are subject to a minimum price across the country, which is to rise from CAD 10 per tonne of CO_2 equivalent in 2018 to CAD 50 by 2022, or subject to cap-and-trade systems with adequate emissions-reduction targets and declining caps over time. The PCF also announced specific measures to reduce emissions and build resilience to adapt to a changing climate, including: accelerating the phase-out of traditional coal-fired electricity; reducing methane emissions from the oil and gas sector by 40-45% by 2025; support for communities to adapt to climate change; and funding to foster clean technology solutions. With the exception of Saskatchewan, all federal, provincial and territorial jurisdictions have signed up. In provinces and territories that do not meet the minimum carbon price, the federal government will impose a federal back-stop carbon pricing system consisting of a charge on fossil fuels and, for large emitters, an output based pricing system (cap and trade with free allocation of permits up to the industry standard) and return the direct revenues to the provincial/territorial jurisdiction of origin. Now that the two largest provinces have included transport fuels in their cap-and-trade system, bringing them into line with Alberta and British Columbia and more generally with the federal carbon-pricing benchmark, setting a tight cap on emissions could, as prices rise, eventually make many other overlapping and potentially expensive policies redundant, such as targeting transport emissions using incentives for zero-emission cars, fuel standards and vehicle economy standards. To contain the risk that a tight cap results in a politically unacceptable carbon price, a limit on the price of allowances could be set.
Czech Republic (2018)	The 2017 "Czech Republic 2030" strategy defines priorities for implementing the 2030 Agenda. However, the economy remains among the most energy- and carbon-intensive in the OECD, and the population is exposed to high levels of air pollution due to reliance on coal. Strengthening political commitment to a low-carbon economy and aligning the State Energy Policy with the Paris Agreement objectives are key priorities. The *Survey* analyses the potential for a review of the tax structure to better align economic and environmental objectives. Pricing carbon will help in tackling climate change and air pollution cost-effectively. It could contribute to improving energy affordability. No action has been made so far to follow the recommendations from the previous *Economic Survey* concerning carbon taxation. Those recommendations were to support implementation of carbon taxation at the EU Level, to realign the excise tax rate on all fossil energy sources and products, based on their carbon content and other environmental externalities, notably by increasing the relative taxation of diesel, and to remove several excise tax reliefs on fuel use.

Country and date of the survey	Comments and recommendations relating to fossil-fuel subsidies or taxation
	The introduction a carbon component in energy taxation for carbon emissions outside the EU system is a key recommendation of this *Survey*.
Denmark (2019)	A CO_2-tax, levied on most fuels in proportion to their carbon content, already rectifies part of the gap to the ETS for transport. In addition, private transport is heavily taxed both through fuel excise duties and through high taxes on purchase of new vehicles. In June 2018, a political agreement was reached on the future energy policy with a strong focus on cost-efficiency. On the subsidy side, the idea is to move towards a technology-neutral scheme. On the tax side, the main element is a reduction of electricity taxes, which will support the transition away from fossil-based heating and a better use of the rising Danish production of renewable energy. Nevertheless, more needs to be done to equalise the price of CO_2-emission across all types of energy use and across households and businesses
Germany (2018)	The revenue from environmentally related taxes accounts for 2% of GDP, only about half of what is raised in Denmark according to OECD data. The structure of Germany's energy taxation sends inconsistent carbon abatement signals across fuels, as argued in previous *Economic Surveys*. Carbon intensive fuels are often taxed at lower rates per tonne of CO_2 compared to low-carbon fuels. For example, diesel is taxed at a lower rate than gasoline on a per litre basis. However, burning diesel emits higher levels of CO_2 per litre. Tax rates differ widely across energy users and fuels. Coal use is taxed at lower rates than natural gas use. Certain energy-intensive production processes are partially or fully exempt from energy taxes. Tax expenditures for environmental harmful activities could be gradually phased out, energy tax rates could be aligned with carbon intensity and taxation of nitrogen oxide emissions could be introduced, as recommended in the 2016 Economic Survey.
Greece (2018)	The *Survey* points out that, even though per-capita greenhouse gases emissions are below the OECD average, fossil fuel support measures are high. According to OECD's data, Greece is one of the OECD countries with the largest fossil fuel support measures (i.e. measures encouraging the production and consumption of fossil fuels) as a share of government spending and total taxes. Consequently, the phasing-out of fossil-fuel support measures is a key recommendation of the *Survey*. The *Survey* underlines that the tax on diesel fuel is less than half that on petrol. Greece grants several excise tax and VAT reductions for fossil fuels used in industrial and residential sectors. Greece also provides support to the development of coal-fired electricity plants, locking in carbon-intensive capital assets and increasing the risk of stranded assets. According to the *Survey*, phasing out fossil-fuel support measures would accelerate the shift towards renewable energy and facilitate the implementation of the new EU Emission Trading System Directive and the Industrial Emissions Directive. The *Survey* estimates that the phasing-out fossil-fuel subsidies would result in a decrease of fiscal expenditure by 0.32% of annual GDP in 2019 (-0.12 in 2030).
Indonesia (2018)	There is scope to better use taxes for health and environmental aims. Indonesia has one of the lowest tax rates on energy among OECD and G20 countries. Phasing out fuel subsidies would be a first step towards more cost-reflective energy pricing. It would help make the implicit price of emissions positive. Following that, an explicit carbon tax should be introduced, initially at a low level. Following the recommendation of the 2016 *Economic Survey* to phase out all remaining energy subsidies, electricity subsidies were removed for non-poor households with 900 volt-ampere connections in 2017. Indonesia has made important progress in reducing energy subsidies, which is a first step towards better pricing of the externalities associated with its use, including carbon emissions. However, the government has decided to freeze administered energy prices for 2018-19 and the reform of energy subsidies has stalled. As a result, the cost energy subsidies has increased in 2018. Subsidies for production and consumption, price caps and tax exemptions still serve to lower the relative price of energy. Tax rates on energy and associated CO_2 emissions, and associated revenues, are among the lowest across OECD and G20 countries. There is no fuel excise tax at the national level and only a low tax at the provincial level, which is charged on fuel for road transport and capped to maintain competitiveness. There is also a small sub-national electricity tax ("street lighting tax") with a capped rate. Because of the close link between the carbon content of fuels and the associated CO_2 emissions, higher fuel taxes would

Country and date of the survey	Comments and recommendations relating to fossil-fuel subsidies or taxation
	be an efficient tool to reduce these emissions. In the near term, the cap for regional governments could be raised. Coverage could eventually be extended to off-road fuel usage, taking into account effect on poorer households.
Israel (2018)	Green taxes are already fairly high in Israel, but the *Survey* points out that raising diesel and/or other taxes on fossil fuels and eliminating the tax break for company car purchases would help reduce pollution. In order to allow higher public expenses, one key recommendation of the *Survey* is to raise more revenue by taxing carbon in the form of fossil fuels. Previous *Surveys* recommended to reduce the structural deficit and pursue a gradual debt-reduction strategy by raising fiscal revenues, preferably by removing inefficient tax expenditures, raising environmental taxes, exploiting immobile tax bases and fighting against tax evasion. To further develop environmental levies was another recommendation. Since then, a gradual increase in excise tax on diesel fuel was proposed by the government to the Knesset. However, no action was taken to implement an economy-wide carbon tax on the existing excise tax on primary fuels, as recommended by past Surveys.
Korea (2018)	Korea's per capita greenhouse gas emissions have risen above the OECD average. It aims to cut total emissions by 37% from a business-as-usual baseline by 2030, in part through its emissions trading system. Average air quality is the worst in the OECD and deteriorating. Low, regulated electricity prices hamper efforts to reduce energy demand and act as a barrier to renewables. Renewable energy's share of primary energy supply is the lowest in the OECD. Moreover, Korea provides substantial subsidies to fossil fuels. Revenue from environmentally-related taxes, at 2.6% of GDP in 2014, is above the OECD average, with almost all generated by levies on energy and vehicles. Nevertheless, tax rates in real terms on motor fuel have fallen since 2009, as a partial realignment of tax on diesel with that on petrol was achieved by lowering the tax on petrol.
Netherlands (2018)	The *Survey* points out that the Netherlands has one of the highest revenues from environmentally-related taxation (as a share of GDP) in the OECD, although some of these taxes do not provide the proper incentives to address environmental concerns. For instance, the discrepancy between the lower tax rate on diesel and higher tax rate on petrol fuel should be reduced by raising the former.
Poland (2018)	While revenues from environmental taxation are close to the OECD-country median, this is mainly attributable to high fuel intensity due to a large and heavily polluting car fleet. Tax rates on air and water pollution and on CO_2 emissions are low, and many environmentally harmful fuel uses are exempt from taxation. The *Survey* points out that a way to raise revenues, to provide stronger incentives to invest in green infrastructure and to promote well-being would be to increase environmental taxes. Bringing taxes more into line with environmental externalities could help raise substantial revenues and provide stronger incentives to replace ageing and highly coal-intensive infrastructure and heating equipment in homes with greener alternatives and promote environmental innovation, which remains low. A key recommendation to boost innovative investment is to reform tax incentives in order to foster the demand for innovative and green investments. In particular, raise taxes on fossil fuels to help finance investment in and the demand for green innovation.
Portugal (2019)	Pricing of carbon emissions in Portugal remains low and uneven. More consistent pricing of energy consumption according to its environmental impact would prepare the country for meeting longer-term environmental targets. One of the key recommendations of the *Survey* is therefore to raise taxes on diesel fuel, and increase energy taxes on coal and natural gas.
Slovak Republic (2019)	Environmentally related tax revenue is low in Slovak Republic, while environmental outcomes need to improve. One of the key recommendations of the Survey is therefore to increase energy taxes and align the implicit taxation on emissions of CO_2 and other pollutants across different fuels and uses. The 2017 *Economic Survey* recommended to consider introducing a CO_2 tax in sectors not covered by the EU- ETS and raising the tax rate on diesel fuel. However, no action was taken in that direction so far.

Country and date of the survey	Comments and recommendations relating to fossil-fuel subsidies or taxation
Spain (2018)	Spain raises less revenue as a share of GDP and revenues from environment-related taxes than the OECD average. There remains room to raise tax rates on fuel for road transport, particularly with respect to diesel. The 2017 *Economic Survey* recommended to encourage better allocation of capital and investment decisions by improving pricing signals reform taxation of fuels so that the tax per unit is based on the amount of emissions and other pollutants per unit. However, no action was taken in that direction so far.
Turkey (2018)	A key recommendation of the *Survey* is to assess the additional impact on carbon emissions and to use economic instruments such as harmonised pollution taxes and emission permits to reduce them. Turkey remains one of the lowest per capita emitter of CO_2 in the OECD. In the past, this was partly because carbon intensity in Turkey was well below most other countries, but it has increased in Turkey and fallen greatly in the OECD area. Revenue collected from environment-related taxation is significantly higher than elsewhere and, contrary to most countries, has increased since 2000. Almost all such revenue is raised from either fuel or vehicle taxes. Turkey has the highest taxes on motor fuel in the OECD but the tax per litre on petrol is 30% higher than on diesel, even though diesel produces more pollution per litre. The taxation of different sources of fossil fuel pollution should be harmonised.
United States (2018)	A key recommendation of the *Survey* is to ensure that harmful emissions, such as carbon and particulate matter, are priced appropriately. The *Survey* estimates that an increase of the excise tax on motor fuels by USD 35 cents and index for inflation (a recommendation of the Survey) would increase the fiscal balance by 0.24% of GDP. Notably, the gasoline tax is the major source of dedicated revenue for the Highway Trust Fund, which supports highway and intermodal infrastructure assets as well as mass transit. The gasoline tax has proven resistant to uprating and remains amongst the lowest in the OECD; as a result, revenues have fallen short of outlays, threatening the Fund's solvency.

Environmental Performance Reviews

The OECD publishes Environmental Performance Review for member countries and key partner economies, such as Argentina, Brazil, China, Indonesia, and South Africa. The reviews occur in cycles, and countries are now being reviewed for the third time. A summary of the Environmental Performance reviews published since 2018 that have discussed fossil-fuel subsidies or fuel taxation is provided in Table 3.

Table 3. OECD *Environmental Performance Reviews* that discuss support to fossil fuels

(March 2018 to March 2019)

Country and date of the review	Comments and recommendations relating to fossil-fuel subsidies or taxation
Australia (2019)	In the past decade, revenue from environmentally related taxes declined as a share of GDP, mostly due to the decreasing contribution of energy taxes to tax revenue – except when carbon pricing was in effect in 2012 and 2013. Energy taxes do not reflect climate costs: fuels are largely untaxed outside of transport, and coal is fully untaxed. Vehicle taxes have provided increasing revenue with growth of the fleet but they do not generally take account of CO_2 and other emissions. There are no longer any significant measures supporting fossil fuel production. However, support to fossil fuel consumption has increased significantly, representing 43% of energy-related tax revenue in 2016, a high share by OECD standards. This is mainly due to the Fuel Tax Credits programme, which refunds off-road users the full amount of excise tax and gives a partial rebate to on-road heavy transport. Mining industries are the main beneficiaries, followed by transport and agriculture. In addition, most states and territories provide rebates to low-income households to compensate for the cost of heating or cooling, in addition to bill assistance. Providing direct support to vulnerable households, decoupled from energy use, and setting tax rates at levels that better reflect the environmental cost of energy use would be more efficient in addressing environmental and equity concerns. There is no comprehensive information on potentially environmentally harmful subsidies and tax expenditure in Australia.
Czech Republic (2018)	The *Review* points out that the pathway to green growth requires increasing carbon prices. Environmentally related tax revenue rose from 2.4% of GDP in 2000 to 2.9% in 2011 before declining to 2.6% in 2015, well above the OECD average of 1.6%. Taxes on energy products account for the bulk of these receipts (78% compared with the 70% OECD average). The government has been considering a carbon tax for years but has never adopted one. Although taxes on natural gas, solid fuels and electricity were introduced in 2008 to comply with the EU Energy Taxation Directive, rates were set at relatively low levels and were not adjusted for inflation. Several tax exemptions reduce incentives to save energy or to switch to cleaner fuels. To promote investment in low-carbon technology, the Czech Republic should also increase more rapidly the share of permits auctioned in the power sector under the EU Emissions Trading System and set a stable support framework for renewable development. More than 75% of CO_2 emissions from energy use are priced via energy taxes and the EU Emissions Trading System (EU ETS). However, when considering the combined price signal from taxes on energy and allowance prices, in 2012 only 16% of emissions were priced above EUR 30 per tonne of CO_2 (a conservative estimate of the climate damage from one tonne of CO_2 emissions), and emissions priced at this level were primarily from road transport. Carbon pricing instruments thus do not provide an adequate price signal corresponding to the external costs of fuel use, in particular outside the road sector. The government outlined the principles of an environmental tax reform in 2007. The plan was to implement it gradually over ten years, and it was expected to be revenue neutral. The first step was implementation of the EU Energy Taxation Directive in 2008, associated with the introduction of a single personal income tax rate and a reduction of corporate income tax rates. The second phase was supposed to include a carbon tax but its introduction has been postponed. Contrary to the principle of the reform, the implicit tax rate on energy has declined since 2011, while implicit tax rates on labour increased. Since 2004, subsidies to the coal industry have been framed by EU rules, and state aid is allowed only for mine closure, treatment of health damage to miners and remediation of environmental liabilities related to past mining. In 2009, the Ministry of Finance allocated CZK 40 billion to fund environmental clean-up projects on abandoned mines. Support measures for fossil fuels in the Czech Republic mainly consist of tax expenditure related to energy consumption. Several tax exemptions applied to various fuel uses decrease end-use prices and reduce incentives to save energy or to switch to cleaner fuels. For example, exemptions apply to natural gas used for residential heating and coal and natural gas used in combined heat and power plants and part of the excise tax on diesel used in agriculture is refunded. It has been estimated that these provisions resulted in revenue losses equivalent to 5% of energy tax revenue in 2014 (CZK 4.1 billion). There is no comprehensive information on potentially environmentally harmful subsidies and tax expenditure in the Czech Republic.

Country and date of the review	Comments and recommendations relating to fossil-fuel subsidies or taxation
Hungary (2018)	The *Review* points outs that Green taxes could provide additional revenue for much-needed investment. Hungary has long applied a wide range of environmentally related taxes and charges and has further extended their use. However, their design needs to be improved, and their rates should be better aligned with environmental costs. Rates should also be regularly increased to provide stronger incentives for sustainable consumption, resource efficiency and pollution abatement, as well as to maintain revenue. The country needs significant investment in residential energy efficiency, renewables, and sound waste and material management. To meet these needs, it should make better use of economic instruments and scale back state aid to environmentally harmful sectors. The revenue from environmental taxes is relatively high in international comparison, although it has grown at a lower rate than GDP and total tax revenue since the mid-2000s. It accounts for about 7% of total tax revenue and almost 3% of GDP. However, these taxes mainly raise revenue; there is no evidence that they have delivered tangible environmental outcomes. The government recently raised tax rates on energy products, but the carbon price signal remains weak. To stabilise revenue from consumption taxes, the standard tax rates on petrol and diesel temporarily increase when the world oil market price is below USD 50/barrel. Tax rates on energy products do not fully reflect the estimated environmental costs of carbon emissions: tax rates on transport fuels are relatively low; rates on other fuels are set at or only slightly above the EU minimum rates; and fuel use in some sectors is fully tax exempt. Tax rates are not systematically adjusted for inflation. All this puts Hungary among the ten OECD member countries with the lowest effective tax rate on energy on an economy-wide basis. Hungary's level of support for fossil fuel consumption is in line with the OECD average. Total revenue foregone has declined to around HUF 80 billion annually since 2012 or about 10% of the revenue collected through taxes on energy products. Hungary supports fossil fuel consumption in several ways. These include support for electricity production from coal, for fuel used in agriculture and for residential use of heat. In addition, since 2013 the government has cut prices of natural gas, heating and electricity for households at levels below costs, while raising those for industrial users. Energy price and subsidies for residential use of heat aim to address increasing risks for energy affordability. While these risks are common to other Central and Eastern European countries, they seem to be more acute in Hungary, where over a fifth of households spend more than 10% of their income on energy and fall under the poverty line after paying their energy bills. However, below-cost energy prices and subsidies for energy use are not an effective way of increasing energy affordability. They risk locking households into fuel poverty, as artificially low prices do not encourage efficient energy use. Moreover, these types of support for energy bills do not target the people most in need. Government-imposed price controls benefit all users, including well-off households. These subsidies could be removed, and the resulting budget savings used for cash transfers to poor households.
Turkey (2019)	The *Review* points out that better tax incentives and reduced harmful subsidies will stimulate cleaner energy production and use. Turkey has among the highest rates of environmentally related taxes as a percentage of gross domestic product in the OECD, largely as a result of high taxes on gasoline and diesel fuel. Energy taxes in other sectors of the economy, including industry, remain low. Turkey continues to provide substantial environmentally harmful subsidies. A subsidy for water use in agriculture has been eliminated, but fuel tax exemptions for petroleum products and a new fuel price stabilisation mechanism are counterproductive. Subsidies for poor families to use coal for heating remain significant despite the ongoing transition to natural gas heating. Gradually phasing out fossil-fuel subsidies would help to promote investment in cleaner alternatives. Some actions were taken to phase out fossil-fuel subsidies. Support for coal heating in poor households, which represents the most significant form of support, will be phased out as communities gain access to natural gas. All provinces will be supplied with natural gas by the end of 2018. However, substantial fossil-fuel subsidies remain, in the form of fuel tax exemptions and subsidies for coal production and use. The *Review* recommends to replace coal aid to poor families with support for transition to cleaner alternatives.

The Green Action Task Force Reviews

The OECD Green Action Task Force provides reviews of fossil-fuel subsidies in countries of Eastern Europe, Caucasus and Central Asia. In June 2018, the Green Action Task Force published the *Inventory of Energy Subsidies in the EU's Eastern Partnership Countries* (OECD, 2018[15]), which provides analysis of energy subsidies, including support to fossil fuel production and consumption, in six partner economies (Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine). This survey reveals that government support to fossil fuel are relatively small in Armenia and Georgia, amounting to respectively 0.4% and 1.4% of GDP, substantial in Belarus, Moldova and Azerbaijan where they amount to 2.1-2.3% of GDP, and particularly high in Ukraine where they made up 12.8% of GDP in 2014. The weight of these measures compelled the Ukrainian government to decrease fossil-fuel subsidies from USD 17 billion in 2014 to USD 7 billion in 2015. It undertook radical reforms and more particularly increased gas tariffs, which reached their market level in 2016.

OECD work on energy taxation and effective carbon rates

The OECD's tracks developments in energy taxation and environmental fiscal reforms in OECD countries and most G20 economies. By putting a price on polluting emissions from fuel combustion, taxes and tradable permit systems incentivise emissions abatement at the lowest possible cost. The OECD investigates to what extent countries harness the power of taxes and tradable permit systems for environmental and climate policy

Taxing Energy Use

Through its Taxing Energy Use database, the OECD provides analysis that compares coverage and magnitude of specific taxes on energy use across 42 OECD and G20 economies, which together represent approximately 80% of global energy use and CO_2-emissions associated with energy use (OECD, 2018[16]). The latest results indicate that fuel taxes increased between 2012 and 2015 in some large countries, and first steps towards removing lower tax rates on diesel compared to gasoline are taken, but apart from that there are no signs that the polluter pays principle determines the energy tax landscape much more strongly in 2015 than in 2012. Taxes continue to be poorly aligned with environmental and climate costs of energy use, across all countries.

In road transport, 97% of emissions are taxed. The share of emissions taxed above climate costs increased from 46% in 2012 to 50% in 2015, and rates exceed EUR 50 per tCO_2 for 47% of emissions in 2015, compared to 37% in 2012. In the non-road sectors, which collectively account for 85% of carbon emissions from energy use, 81% of emissions are untaxed, and rates are below a truly low-end estimate of climate costs of EUR 30 per tCO_2 for 97% of emissions.

Effective Carbon Rates

In its Effective Carbon Rates (ECR) publication, which considers emissions trading systems as well as taxes, the OECD measures the 'carbon pricing gap', which indicates how much the 42 countries, together as well as individually, fall short of pricing emissions in line with low-end estimates of levels needed for decarbonisation (OECD, 2018[17]). It notes that this gap is declining over time, but only very slowly. The report finds that 46 % of CO_2-emissions from all energy use in the 42 countries are not subject to an ECR at all, and only 12% to a rate of at least EUR 30 per tonne. Hence, 88% of emissions are priced below a very conservative low-end estimate of the costs of CO_2-

emissions to society, being EUR 30 per tonne. Countries' carbon pricing gaps ranged from 27% to 100% in 2015. Countries with a low gap tend to emit fewer emissions than countries that hardly price any emissions. Low-gap countries also emit less CO_2, per unit of GDP and are better prepared for the low carbon economy.

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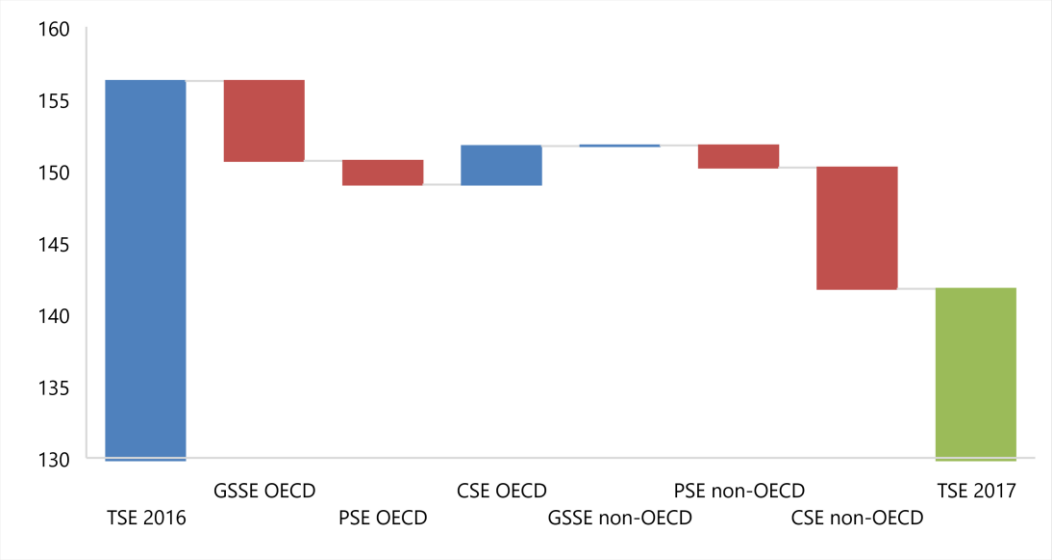
Annex A. Additional OECD data on support for fossil fuels

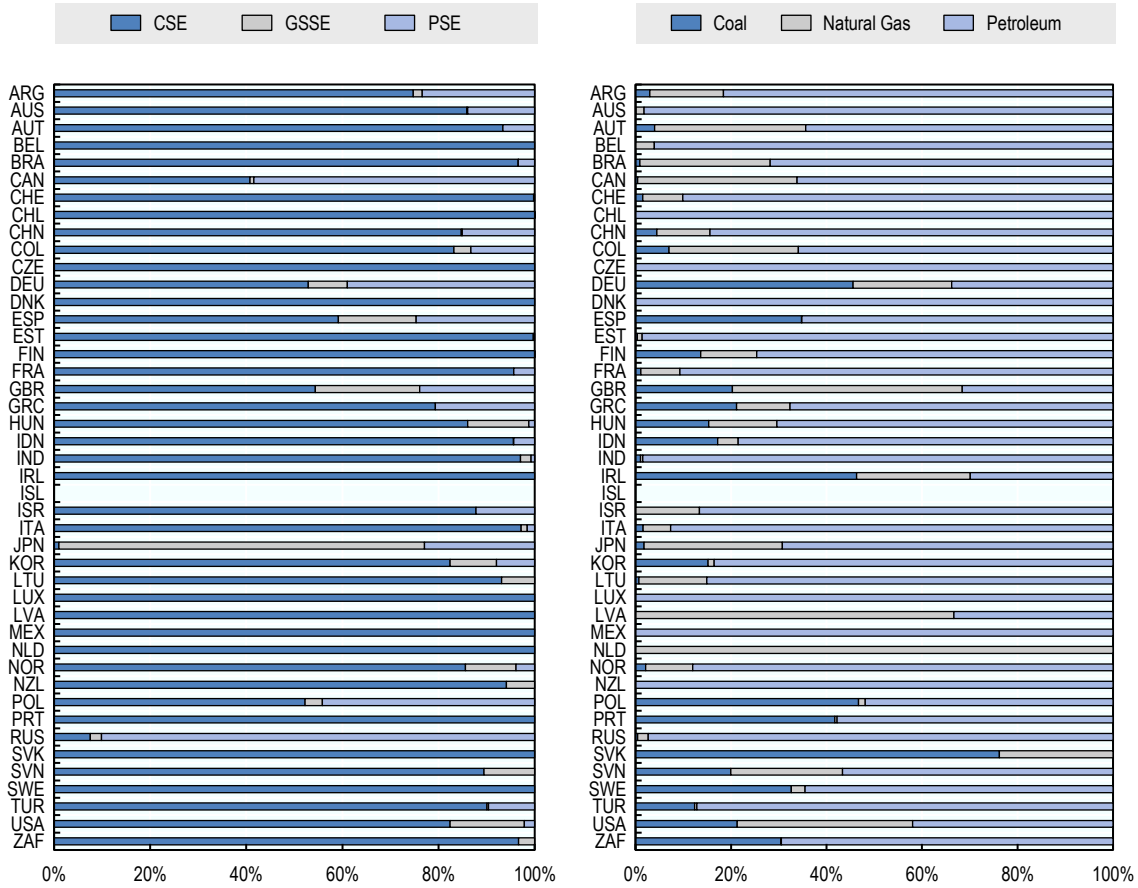
Figure 5. Decomposition of change in government support for fossil fuels for OECD and selected partner economies between 2016 and 2017

(in constant USD billion)



Note: General Support Services Estimates (GSSE) represents the value of transfers arising from policy measures that create enabling conditions for the fossil fuel sector through the development of private or public services, institutions and infrastructure regardless of their objectives and impact on fossil fuel production and or consumption. It includes policies where fossil fuels are the main beneficiaries, but does not include any payments to individual producers. GSSE transfers do not directly alter producer receipts or costs, or consumption expenditures, although they may affect production or consumption of fossil fuels in the long term. The Producer Support Estimate (PSE) indicator measures the annual value of transfers from consumers and taxpayers to producers of fossil fuels. Consumer Support Estimate (CSE) reflects the value of transfers to consumers of fossil fuels regardless of their nature, objectives or impacts on consumption.
*Selected partner economies are Argentina, Brazil, China, Colombia, India, Indonesia, Russia, and South Africa.
**Total Support Estimates (TSE) are expressed in constant 2017 US dollars.
Source: (OECD, 2019[1]).

Figure 6. Shares of fossil-fuel support by indicator and by fuel type in 2017



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Source: (OECD, 2019[1]).

http://oe.cd/fossil-fuels