

UPDATE ON RECENT PROGRESS IN REFORM OF INEFFICIENT FOSSIL-FUEL SUBSIDIES THAT ENCOURAGE WASTEFUL CONSUMPTION 2021



Contribution by the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) to G20 Environment, Climate and Energy Ministers, in consultation with the Organization of Petroleum Exporting Countries (OPEC)

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Update on recent progress in reform of inefficient fossil-fuel subsidies that encourage wasteful consumption 2021

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Note by Turkey

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Note by all the European Union Member States of the OECD and the European Union

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Executive summary

The Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) traditionally provide update reports to the G20 on progress in phasing out fossil-fuel subsidies. Since the last progress report, several countries have committed publicly to carbon neutrality targets, consistent with the Paris Agreement. However, some countries have also increased subsidies as part of rescue and recovery packages to the pandemic-induced crisis. Revitalising G20 action on fossil-fuel subsidy reform to meet mounting climate ambition and to support a just transition, the Italian Presidency has commissioned the OECD Secretariat with documenting lessons learned and addressing the political dimension of reform through this report.

Since 2013, G20 countries have developed and implemented a methodology for voluntary, country-led peer reviews of fossil-fuel support as a “valuable means of enhanced transparency and accountability” (G20, 2013^[1]) and an important avenue for knowledge exchange (OECD, 2021^[2]). Chaired by the OECD, peer review panels have evaluated over 140 government support measures to date, enabling an assessment of challenges and good practice in reform. However, there has not yet been a concerted, comprehensive attempt to document “scalable” lessons emerging from country experience as reflected in the growing body of peer reviews. With the assistance of the OECD, there is scope for G20 countries to systematically track and share lessons and experience of reform. Good practices include, among others, accompanying industrial transition to improve social acceptability of reform, “pro-poor” reform for a just transition, market-based pricing to limit price-control challenges, spending reviews to improve expenditure prioritisation, strengthening the evidence base and communicating challenges to all stakeholders.

The peer reviews also delve into the political challenges that governments face in implementing enduring reform. This report provides an overview of political economy findings from OECD and broader international literature to enhance the outcomes of government intervention across employment, households, and firms. Such guidance can inform careful design of reform, anticipate and address roadblocks, prevent political backlash and backsliding, and support enhanced ambition and durability of fossil-fuel subsidy phase-out. All too often, perceived impacts on economic growth, employment and income from energy price increases across end-users can deter reform in developed and emerging economies alike, without full pursuit of evidence of likely adverse effects of reform, and alternative means of government intervention or possible mitigating measures. This report serves to bridge knowledge gaps by considering alternative and complementary policies to enhance economic, fiscal and social outcomes of government intervention, and help governments more effectively address fossil-fuel subsidy reform.

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1 Introduction

The Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) have provided several update reports to the G20 on progress in phasing out fossil-fuel subsidies, both in-country, and through the G20 peer review process and other international fora (OECD/IEA, 2019^[3]), (OECD/IEA, 2018^[4]), (OECD/IEA, 2017^[5]). The report has traditionally been prepared in consultation with the Organisation of the Petroleum Exporting Countries (OPEC), and the World Bank. This year, the Italian Presidency has requested that the OECD and IEA enhance the report to include analysis of “scalable” lessons and good practice emerging from reform efforts, as well as the political challenges of reform and how they might be addressed, to drive progress. This document, delivered to the Climate and Energy Joint Ministerial Meeting in Naples on 23 July 2021, responds to that request.

G20 member countries reaffirmed their commitment to rationalise and phase out “inefficient fossil-fuel subsidies that encourage wasteful consumption” over the medium term, while ensuring targeted support for the poorest, in the Riyadh Leaders’ Declaration of 22 November 2020 (G20, 2020^[6]). First made at the Pittsburgh summit in 2009, the G20 commitment has been reiterated at multiple subsequent summits, including Cannes (2011), Los Cabos (2013), Saint Petersburg (2013), Brisbane (2014), Antalya (2015), Hangzhou (2016), Hamburg (2017) and Osaka (2019). Nevertheless, G20 country support levels remain unchanged in nominal terms to those of a decade ago, at USD 159.3 billion in 2020 compared to USD 161.8 billion in 2010.

G20 countries represent around three-quarters of global total energy supply (TES) and are responsible for 81% of the world’s annual greenhouse gas emissions (2018). Concerted action by G20 countries to reform fossil-fuel subsidies is essential to enable the global transition to a low-emissions energy system. Fossil-fuel subsidies undermine efforts to mitigate climate change. They are distortive, generating inefficiencies in the production and use of energy economy-wide and skewing capital long-term investment towards fossil-fuel producers or fossil-fuel intensive industry, enhancing the risk of lock-in. Fossil-fuel subsidies are also costly, either increasing public expenditure or reducing tax revenue – and this at a time when resources are urgently required to fund recovery and stimulus measures for economies battered by the COVID-19 crisis.

Although the chance remains to use the recovery from the COVID-19 crisis as an opportunity to promote greener economic growth, results from the initial data do not appear promising. The OECD Green Recovery Database, covering 43 countries (including OECD members and partners), found that only 17% of the total spending was supporting “green” economic activity, with an equal proportion likely to be negative or mixed in its environmental impact. The Energy Policy Tracker found that, as of 16 June 2021, G20 economies have committed USD 649.2 billion in energy spending, with at least USD 295.2 billion supporting fossil fuel energy, of which USD 245.5 billion is unconditional (Energy Policy Tracker, 2021^[7]).

Since the last progress report, submitted to the second meeting of the Energy Transitions Working Group in Toyama, 18-19 April 2019, several countries have committed publicly to carbon neutrality targets, consistent with the Paris Agreement. At the same time, some countries have also increased subsidies as a response to the COVID-19 pandemic adverse economic effects, which may eventually more than offset the observed mechanical declines – as opposed to actual policy choices – in producer and consumer support due to drops in fuel price and demand. Section 2 of this report provides further detail on reform efforts around the world and recent trends in reform.

The Italian Presidency is taking multiple steps to revitalise G20 action on fossil-fuel subsidy reform, as an integral component of country efforts to meet mounting climate ambition and better target support for the poorest. Its request to more clearly document lessons and experience of reform through this report (Section 3) sheds light on the role of the G20 peer review mechanism as a vehicle for enhanced transparency and change. To this end, a fourth and fifth set of peer reviews are currently underway. Remaining in a preliminary phase, Argentina and Canada announced intent to undertake a reciprocal peer review during the June 2018 G20 Energy Transitions Ministerial Meeting in Bariloche, Argentina. France and India announced their commitment to proceed as the next peer review pair in August 2019, during an official visit to France by Prime Minister Narendra Modi.

Peer review panels have evaluated over 140 government support measures to date, enabling an assessment of challenges and good practice in reform, but also ways in which the peer review process might be enhanced. The peer reviews also provide insights into the political challenges that governments face in seeking to implement enduring reform. The focus on the political dimensions of reform (Section 4) draws on OECD and broader international literature to provide an overview of recent evidence on possible winners and losers of reform and how governments might craft alternative or complementary policies to enhance the outcomes of government intervention.

The Italian Presidency has also placed the role of tax and fiscal policy to reducing greenhouse gas emissions – including through synergies with fossil-fuel subsidy reform and greenhouse gas pricing – squarely before G20 Finance Ministers. Finance Ministers are well-placed to advance dialogue on incentive and revenue use aspects of emissions pricing, energy taxation and fossil-fuel subsidy reform and to play a complementary role to the longstanding efforts of G20 Energy and Environment Ministers, along with G20 Sherpas, to promote subsidy reform.

The final section of the report documents the latest efforts to enhance transparency of support for fossil fuels in international fora beyond the G20, crucial to spread best practice and sound policy-making.

2 Preliminary findings on trends in fossil fuel subsidies in 2020

In March 2021, the OECD published the OECD Companion to the Inventory of Support Measures for Fossil Fuels 2021 (OECD, 2021^[2]) (hereafter as “Companion”). Drawing from the 2020 OECD Inventory of Support Measures for Fossil Fuels database, the Companion tracks the latest trends among the more than 1 300 government budgetary transfers and tax expenditures providing preferential treatment for the production and consumption of fossil fuels in OECD, G20 and European Union Eastern Partnership (EU EaP) economies in 2019. Fifty economies overall were covered by the Companion. A massive factor in 2020 was the COVID-19 pandemic giving rise to mobility restrictions and consequently, its ensuing economic impacts.

Preliminary 2020 data indicate a decline in consumer support, driven primarily by a plunge in fossil fuel consumption following COVID-19 mobility and economic restrictions, as well as the historic drop in average fuel prices. While preliminary data indicates a decline in production support (an outcome of sluggish energy demand driving record low production volumes of oil and natural gas), there were several instances of large government sums devoted to fossil fuel production support. These were mainly in the form of hefty bailouts to state oil and electricity companies, and may come to offset the mechanical decrease in production support once these transfers are officially reported in the governments’ budgets.

This section summarises the trends in fossil fuel subsidy reform identified in 2019, compares them to what the preliminary data for 2020 indicates, and examines the impact of the COVID-19 crisis as well as recent developments such as the rising number of countries and major international oil companies making net-zero pledges.

Trends from 2019

Support for fossil-fuel production rose 30% in 2019: Looking at the 2019 data, a noteworthy change was the reversal of a 5-year downward trend in support for fossil fuel production. Across the 50 economies covered in the Companion, encompassing around 80% of global GHG emissions, the total fossil fuel support rose by 5% year-on-year, climbing to USD 178 billion. The key driver of this reversal was a 30% rise in direct and indirect support for fossil fuel production, primarily recorded in OECD countries. In particular, the oil and gas sector received direct budgetary support (to pay off corporate debt and finance fossil fuel infrastructure projects), as well as benefitted from tax provisions providing preferential treatment for capital expenditures for fossil-fuel production, driving producer support estimates to rise by 9% compared to 2017 levels. In non-OECD partner economies, fossil fuel support declined. Information gaps as well as the smaller proportion of government support to fossil fuels in relation to OECD countries, limit a more detailed analysis at this stage.

At a more specific level, 51% of the increase in OECD support in 2019 was due to measures undertaken in North America. In Mexico, the government tripled fossil fuel support between 2017 and 2019 mainly in the form of producer support. The new government, which took office in December 2018, provided direct transfers to PEMEX, Mexico’s state-owned petroleum company, to pay down debt and pension liabilities and build new infrastructure, including a refinery in the state of Tabasco. Combined with additional tax

deductions, the direct budgetary disbursements recorded in 2019 raised Mexico's total fossil fuel support estimate to USD 17.1 billion.

Government support in the US increased by 28% between 2017 and 2019 but mainly through pre-existing measures from before 1990. Providing depletion allowances, tax deductions for exploration and production, and tax credit for investments in enhanced oil recovery, these laws, with one dating back almost a century, demonstrate the need to review legislation to fit in evolving societal contexts.

In the UK support to fossil fuels increased 37% between 2017 and 2019 mainly driven by the “Ring-fence” corporate income tax related to extraction activities in the North Sea (enabling a 100% first-year capital allowance for capital expenditures to be deducted from corporate profits) and an associated measure that allows capital expenditures associated with the decommissioning of fields to be deducted in full from corporate profits in the year in which they are incurred.

European efforts to reduce the size of the solid fossil fuel sector continue: although not significant compared to increases in production support in OECD member countries in 2019, one encouraging trend has been the ongoing decline in European support for the solid fossil fuel sector, particularly with coal, in conjunction with their efforts to reduce its size. Ireland, for instance, as part of its commitment to phase out all peat power generation by 2028, closed two peat-fired power plants in 2020, and stopped subsidising the purchase of peat-generated power by the Irish Electricity Supply Board. Norway has also reduced support for solid fossil fuel production. At the end of 2017, the country stopped propping up the state-owned Store Norske coal mining company, with no support measures registered in 2018 – although support for decommissioning was set to continue through 2020. Germany and Spain have also seen developments. Germany completed the phase-out of budgetary support for domestic hard-coal production in North Rhine-Westphalia in 2018, closed its last black coal mine in December of that same year, and is planning to phase out its shrinking lignite production, although with a timeline extending to 2038. Spain closed all its coal mines by the end of 2018 and shut down more than half of its coal-fired plants by mid-2020. In these countries however, several big government spending packages are in the pipeline to alleviate the burden on regional economies and coal power plant and mine operators due to these closures.

These changes are part of the broader transition away from coal power in Europe, as most countries in the region are now members of the Powering Past Coal Alliance and are committed to phasing out unabated coal power by 2030. These trends are reflected at the OECD level, where coals' share of gross OECD electricity production fell from 34% in 2010 to 22% in 2019, while the generation mix from renewables and natural gas saw a corresponding increase (from 18% to 28% and 24% to 30% respectively).

The combined OECD-IEA numbers show a significant decline in 2019: The OECD's Fossil Fuel Inventory catalogues budgetary and tax expenditures, while the International Energy Agency (IEA) derives its estimates of consumption support from the “price-gap approach”, which compares observed domestic energy prices versus international reference prices (import- or export-parity). The OECD and the IEA have been producing an annual joint estimate of support for fossil fuels since 2018 (OECD, 2018[8]) to provide a more robust assessment than either of the two approaches individually. The OECD-IEA joint estimate series goes as far back as 2010.

The measures included in the OECD's Inventory showed stable support for fossil fuel consumption in 2017-2019, ranging between USD 125 and USD 131 billion annually. Rather than under-pricing fuel, support for the consumption of fossil fuels in OECD countries tends to come through other means such as preferential tax treatments by fuel or usage type. This reduces the impact of oil price shifts on Inventory estimates.

The IEA estimates showed a drop in consumption subsidies in 2019, reflecting the drop in oil prices, as a lower oil price equates to a lower amount of subsidies needed to maintain an artificially lower price to end users, all other things being equal. For the first time in four years, the numbers have trended downwards

in 2019, after three consecutive years (2016-2018) of oil price increases. The reduction in consumption support in the IEA price gap estimates in 2019 is thus assessed to be largely the outcome of price fluctuations, rather than policy reforms. Overall, when the combined OECD-IEA data is considered, due to the relatively larger amount of support recorded by countries covered in the IEA's fossil fuel subsidy estimates, the 2019 estimate show a significantly drop .

For some non-OECD countries, 2019 did see declines in other consumer support measures. The People's Republic of China (hereafter "China") continued to reduce the subsidisation of fuel for the domestic fishing fleet, a process which was first announced in 2015. Support also fell in other countries, including Egypt, Iran, Kazakhstan, Libya, Ukraine and Zimbabwe. Other countries such as Argentina, India and Indonesia, however recorded increased support for fossil fuel consumption during the period. In Argentina, the drop in the value of the Argentinian peso in August 2019 saw the Government implementing a price freeze in the retail fuel market as well as an associated producer support). India's support for fossil fuel consumption took a different form, as it continued to expand its means-tested Pradhan Mantri Ujjwala Yojana liquefied petroleum gas (LPG) programme to cover more participants towards improving the cooking facilities of families below the poverty line. Meanwhile, Indonesia suspended its fuel pricing reforms and froze domestic fuel and electricity prices in 2018, as a reaction to rising international fuel prices and the weakening of its national currency, the rupiah.

Declining fuel demand and prices during the Covid-19 crisis had both positive and negative impacts on fossil fuel subsidy reform

Beginning in early 2020, lockdown measures in most major economies have had a significant impact on fossil fuel subsidies, largely through mechanical adjustments. The mobility restrictions that were imposed – as well as its ensuing economic effects – led to a decline in fuel demand, a massive drop in fuel prices, and a corresponding decline in subsidisation. Countries had less need to intervene to keep prices artificially low for consumers, which narrowed the gap between the price paid and the actual market price, and lower fuel use reduced the tax base of many consumption support measures tracked in the OECD Inventory. Consumption support in the Inventory is mainly in the form of tax expenditures calculated per volumetric unit of fuel consumed. Thus, the lower the consumption, the less revenue forgone by governments.

Aside from the apparent decline in associated support measures, the low fuel prices could have had another potential benefit – by removing the need for price support at least temporarily, they provided governments with the needed fiscal space to phase out subsidies that support fossil-fuel consumption without having an immediate impact on the public. Results have been mixed however. Nigeria's decision to phase out petrol subsidies (announced in June 2020) will save the country USD 2 billion annually, if maintained. Costa Rica and India have increased tax on transport fuels towards raising funds for COVID-19 recovery programmes, and Tunisia introduced a price adjustment mechanism in April 2020 to better align pump prices for gasoline and diesel with international fuel prices. In contrast, some countries raised price support, particularly for electricity consumers (e.g. Armenia, Indonesia, and Kazakhstan) and natural gas (e.g. Argentina). And in countries where the oil and gas industry is a significant employer, record low oil prices led governments to provide support to shore up firms and prevent job loss - although in some cases such support was part of a wider economic support measure not targeted specifically at the fossil fuel production sector (See Table 2.1).

Table 2.1. Selected support measures for the fossil-fuel sector announced or implemented as part of COVID-19 recovery packages

Country	Measure (date announced)	Total amount (USD)
Argentina	Introduction of oil price floor (USD 45/barrel) to prop up production and investment in Vaca Muerta shale field in northern Patagonia (May 2020)	N/a
	Four-year price subsidy programme for gas producers to revive Vaca Muerta and avoid jump in imports; companies to receive maximum of USD 3.70 per million British thermal units, with the government to cover the gap with current consumer prices (USD 2.30) (October 2020)	USD 5.1 billion
Australia	The Commonwealth Government will provide multi-million dollar funding to support a 'gas-fired recovery' with programmes to accelerate gas development in priority geographic basins, funding the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Gas Industry Social and Environmental Research Alliance and initiatives to reset the East Coast Gas market, among others. (September 2020)	USD 39.9 million over 4 years
	The State Government of Queensland introduced a multi-million dollar package of tax and fee exemptions in aid of coal and gas exploration. These includes: a 12-month waiver of rent on exploration land due between 1 April and 1 September 2020; a freeze on fees and charges until 1 July 2021; releasing almost 7 000 km ² of land for gas and mineral exploration; advancing AUD 2.8 million in grant funds for innovative exploration in the North West Minerals Province (May 2020)	USD 2.1 million
Brazil	Reduction of royalties (up to 5%) for fields granted to small or medium-sized companies engaged in the exploration, development and production of oil and natural gas (July 2020)	N/a
	Expansion of fuels subjected to preferential PIS/COFINS tax rates. As of March 2021, LPG has been included in the fuels with PIS/COFINS exemption. Diesel has also been subjected to temporary tax exemption for two months. The exemption for LPG is envisaged to be more permanent nature intended to support low-income households currently forming the most vulnerable group affected by the pandemic. (March 2021)	USD 100 million
Canada	Federal government budgetary transfer to the governments of Alberta, Saskatchewan and British Columbia, and to the Orphan Well Association, to clean up orphan and inactive oil and gas wells (April 2020)	USD 1.3 billion
	Financial Assistance Agreement to Support the Closure and Restoration of Oil and Gas (O&G) Sites in British Columbia (BC). Funding will be provided to support O&G dormant sites for environmental clean-up and remediation work in BC. (July 2020)	USD 32.3 M over 3 years
	Relief for the oil and gas sector in Saskatchewan measures provide funding to reduce the industry portion of the Oil and Gas Administrative Levy by 50%, extends a series of filing on routine oil and gas sector reporting activities, and extend by a year mineral rights that were scheduled to expire in 2020. (April 2020)	USD 21 M
	Newfoundland and Labrador Offshore Oil and Gas Recovery Assistance Fund aims to accelerate offshore installation's return to normal production operations disrupted by the COVID-19 pandemic. (September 2020)	USD 205.7 million
	COVID-19 tax exemptions for oil and gas producers. In response to COVID-19, the Government of Alberta decided to eliminate the Well Drilling Equipment Tax, an extension of a 35% assessment reduction on shallow gas wells, lowering tax assessments for less productive wells, and a three-year tax exemption for companies building new pipelines or drilling new wells. (October 2020)	N/a
	The Government of British Columbia lowered the amounts payable for levies that companies pay to produce natural gas (from CAD 0.85 per 1,000 m ³ of marketable gas produced, to CAD 0.77). The Government noted that this change was meant to compensate for an increase in the orphan well levy. The orphan well levy was also suspended in the wake of COVID-19. (May 2020)	N/a

	<p>Saskatchewan Associated Natural Gas Royalty Moratorium. With the 2021-22 Budget, the Saskatchewan Provincial Government is meeting this commitment by implementing a royalty rate of 0% per cent for a period of five years on all natural gas produced in association with oil. (April 2021)</p> <p>Economic Recovery Rebate for SaskPower customers provides a 10% rebate to electrical charges from December 2020 to November 2021 covering basic monthly, energy and demand charges. The Canadian province of Saskatchewan's electricity mix is at least 83% of fossil fuel origin. (December 2020)</p>	<p>USD 3.07 million</p> <p>N/a</p>
China (P.R. of)	The government supported coal mines in Wuju, Pinliang and Xinjiang and subsidised air freight, rewarding flights which kept running through the pandemic. (June 2020)	USD 1.63 billion
Colombia	<p>Increase of 10% in natural gas subsidies for users of strata 1 and 2 in the wake of COVID-19 pandemic. Strata 1 residential users who had been receiving a 60% subsidy will be increased to 70%, while the 50% subsidy received by strata 2 will increase to 60% for an additional billing cycle. (October 2020)</p> <p>Reduction of fuel prices by Colombian national government through direct transfers. Through direct transfers, the price of gasoline drops by COP 1,200 (-13%) from an average price of COP 9 159 to COP 7 958 average per gallon and diesel by COP 800 (-9%) from an average of COP 8 952 to COP 8 152 per gallon. (March 2020)</p> <p>Companies in the hydrocarbons and mining sector can execute infrastructure projects in exchange for reduced royalties. Companies can develop agreed infrastructure projects in regions where they operate, in exchange for reduced royalties payments. (February 2020)</p>	<p>USD 1.1 million</p> <p>N/a</p> <p>N/a</p>
Germany	Compensation package for utilities operating lignite power stations. The German government will pay operators of lignite-fired power plants in return for an accelerated shutdown of their assets. It was listed as a conditional measure because despite the end goal of phasing out coal, polluters will be paid public funds.	USD 5.2 billion (programme total)
Indonesia	<p>Cash compensation bailout for PT Pertamina (Persero) (oil and gas state-owned enterprise [SOE]) with support instalments through 2022 (May 2020)</p> <p>Cash compensation and state capital injection for Perusahaan Listrik Negara (power utility SOE) for 2020 (May 2020)</p> <p>PLN Free Electricity Incentive. The government rolled out PT PLN's (National Electricity Company) electricity bill waiver from April-July 2020 for 450 VA residential customers and a 50% discount for 900 VA subsidised residential customers. Indonesia's electricity mix is chiefly of coal origin. (March 2021)</p> <p>Free royalty for companies that engage in coal derivatives industry. The Indonesian Government announced that coal producers who expand their businesses into the derivatives industry could be given a 0% royalty rate. The Government of Indonesia also expanded the business sectors that are eligible to receive various fiscal incentives to reduce the impact of COVID-19 on the economy through fiscal stimulus package Volume II. The mining and coal industries were also included to receive the following fiscal incentives to reduce COVID-19 impacts: an exemption from import tax for 6 months, a reduction in income tax by 30% for 6 months, personal income tax borne by the government, and accelerated restitution with the limit raised to IDR 5 billion. (October 2020)</p> <p>Industrial gas price reduction to USD 6/MMBTU. The Indonesian Government regulates the gas price for industrial uses to USD 6/MMBTU by covering the difference for prices higher than USD 6/MMBTU. The concerned industry applies for price reduction through policy Permen ESDM No.8/2020 and the Government will conduct administrative, technical, economic evaluation prior to grant the reduction. (April 2020)</p>	<p>USD 3.12 billion</p> <p>USD 2.51 billion</p> <p>USD 6.54 billion</p> <p>USD 983 million</p> <p>N/a</p>
Italy	Extension of tax fillings for natural gas and electricity sector. The submission of the 2019 tax year returns for natural gas and electricity was extended with penalties waived. (June 2020)	N/a

	Holder of tax deposit of energy products were allowed paperwork simplifications, extended deadlines for submission or payment, and negotiation of number of instalments of the excise duty on natural gas and electricity debt (May 2020)	N/a
	Reduction of instalments for the payment of excise duty on natural gas and electricity. In response to COVID-19, this measure provides for a reduction in the number of instalments of the excise tax on natural gas and electricity from May to September 2020, up to 90% of the total amount due. (May 2020)	N/a
Ireland	The Commission for Regulation of Utilities (CRU) has put in place emergency credit levels for all gas prepayment customers from EUR 10 to EUR 100. The emergency credit is for use in a genuine emergency, and will have to be paid back at a later date. (March 2020)	N/a
Mexico	Tax cut to state-controlled Pemex, decreasing Pemex's tax burden from 58% to 54% of profits (April 2020).	USD 2.6 billion
	Tax benefit for gasoline consumption in the southern border. The legislative text cites the fall in oil prices in 2020 and the marked fuel price differential between the Southern States of Mexico and bordering Guatemala as the rationale for its implementation (December 2020).	N/a
	Tax credit for Pemex shared utility tax. The shared utility tax, PEMEX's largest single payment toward the government, was reduced from 65% to 58% in 2020 with plans to further reduce it to 54% in 2021 (April 2020).	N/a
	Increase in electricity subsidies for residential consumers during the COVID-19 pandemic in 2020. As a response to residential consumers being classified into the Domestic High Consumption Tariff (DAC) category due to increased consumption during covid-19 lockdowns, the Federal Electricity Commission (CFE) will not subject the increased electricity consumption to the higher DAC tariff rate (April 2020).	N/a
Netherlands	Car owners and corporations benefit from a deferral for a CO ₂ -based tax for passenger cars and motorcycles beginning March 2020 with application extended in August 2020 (March 2020).	N/a
	Coal users in industrial and utility sector are granted a deferral on coal taxes in light of the corona crisis. Applications under this measure are further extended up until August 2020 (March 2020).	N/a
	Corporations benefit from energy tax deferral from April – October 2020 with businesses having to repay in December (April 2020).	N/a
Norway	Temporary oil and gas industry tax relief increasing deductions for new investments, to lower break-even prices for future exploration projects and fast-track new projects on the Norwegian continental shelf over the next two years (June 2020)	USD 10.8 billion
	Exemption from CO ₂ tax on natural gas and LPG for chemical reduction or electrolysis, metallurgical and mineralogical processes, will be re-introduced from April 2020 to Jul 2021 at the earliest with the rate of 25% applying afterwards (April 2020).	N/a
Spain	Subsidies for compensation for maritime and air freight transport for agricultural and industrial products in non-capital islands outside peninsular Spain (September 2020)	USD 649 million
South Africa	Deferral of first carbon tax payment. The South African Government announced a three-month deferral for the filling and first payment of carbon tax liabilities to October 2020 with the rationale that many industries have to close during the lockdown and will be emitting reduced carbon emissions during that period (April 2020).	N/a
Turkey	Deferral of State share payments. Oil and natural gas firms' share payments (State share payments) and filing deadlines to the Turkish government were extended. Licence liabilities (drilling, etc.) were also postponed for 6 months (April 2020).	N/a
	The Turkish Ministry of Energy and Natural Resources announced that it would cover the financial costs resulting from the postponement (up to 1 year maximum) of accrued electricity and or natural gas bills (resulting penalties and interests but excludes the principal amount) as a response to the COVID-19 pandemic.	N/a

United States	<p>Royalty rate reductions for oil and gas operators with some states applying rates as low as 2.5% in lieu of the standard 12.5% royalty rate (April 2020).</p> <p>Competition for bids to establish coal product innovation centres, for manufacturing “value-added, carbon-based products from coal” and developing new methods for extraction and processing of “rare earth elements and critical minerals from coal” (July 2020).</p>	<p>N/a</p> <p>USD 122 million</p>
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Sources: (Mander, 2020^[8]), (Wood Mackenzie, 2020^[9]), (Gilbert, 2020^[10]), (Commonwealth of Australia, 2020^[11]), (Queensland Government, 2020^[12]), (Belchior, Duarte and Leite, 2020^[13]), (Presidência da República, 2020^[14]), (Government of Canada, 2020^[15]), (Government of Canada, 2021^[16]), (Government of British Columbia, 2021^[17]), (Government of Saskatchewan, 2020^[18]), (Government of Alberta, 2020^[19]), (BC Oil and Gas Commission, 2020^[20]), (Government of Saskatchewan, 2021^[21]), (Government of Saskatchewan, 2020^[22]), (Reuters, 2020^[23]), (Seetao, 2020^[24]), (SXCoal, 2020^[25]), (Colombia Ministerio de Energía, 2020^[26]), (Colombia Ministerio de Energía, 2020^[27]), (Reuters, 2020^[28]), (IDN Financials, 2020^[29]), (Reuters, 2020^[30]), (Indonesia Cabinet Secretariat, 2021^[31]), (Indonesia Ministry of Energy and Mineral Resources, 2020^[32]), (Italy Customs Agency, 2020^[33]), (Italy Customs Agency, 2020^[34]), (Italy Customs Agency, 2020^[35]), (Ireland Commission for Regulation of Utilities, 2020^[36]), (Webber, 2020^[37]), (S&P Global Platts, 2020^[38]), (Reuters, 2020^[39]), (Mexico Official Journal of the Federation, 2020^[40]), (Mexico Secretariat of Finance and Public Credit, 2020^[41]), (Netherlands Ministry of Finance, 2020^[42]), (Netherlands Tax and Customs Administration, 2020^[43]), (Rystad Energy, 2020^[44]), (Adomaitis and Solsvik, 2020^[45]), (Government of Canary Islands (Spain), 2020^[46]), (South Africa Ministry of Finance, 2020^[47]), (Brown, 2020^[48]), (Meyer, 2020^[49]), (Lefebvre, 2020^[50]), (U.S. DOE, 2020^[51]), (Matheson, 2020^[52]), (Dlouhy, 2020^[53]).

Trends from the preliminary 2020 OECD Inventory data for G20 countries and OECD-IEA combined estimates for 52 economies

Analyses of the trends below are presented with the caveat that the data for 2020 remains preliminary. The full 2021 update of the OECD Fossil Fuel Support Inventory database with definitive 2020 data for OECD, G20 and EU EaP economies is endeavoured for release in the 4th quarter of 2021.

COVID-19 had a mixed impact on fossil fuel support measures for production: production support in the Russian Federation registered declines during 2020 as an outcome of heavily reduced fossil fuel production volumes during 2020. The majority of the country’s producer support measures are dependent on the Mineral Extraction Tax, where the amount of revenue foregone is directly proportional on the volume of extracted fossil fuels, chiefly oil and natural gas. With international crude oil prices falling in 2020 to unprecedented levels, OPEC+ countries made a deal to cut production in response to the pandemic-depressed demand, driving oil production in the Russian Federation to reach its lowest level since 2011, thereby mechanically lowering revenue foregone amounts of fossil fuel production support.

In Mexico, the substantial direct budgetary transfers made to PEMEX in 2019 to help pay down liabilities on pensions, corporate debt, and programmes on combatting fuel smuggling did not record any significant disbursements in 2020, which led to a substantial decrease in producer support. However, new support measures for PEMEX amounting to approximately USD 3.5 billion are being earmarked for 2021, with an aim to shore up the heavily-indebted state-owned petroleum company.

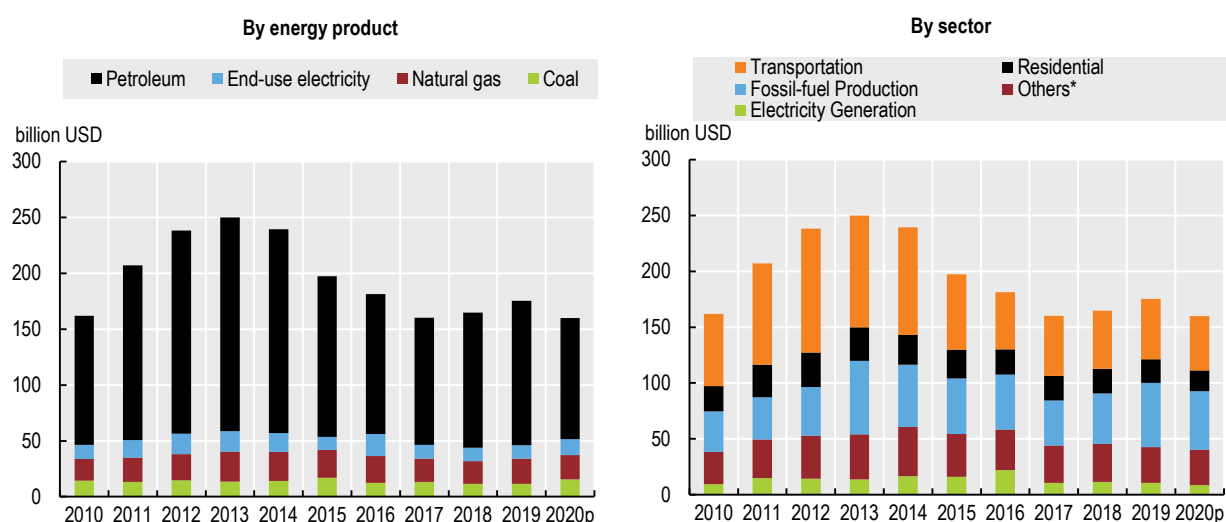
In contrast, Indonesia increased fossil fuel production sector support, with the Government transferring USD 2 billion worth of bailout funds to the state-owned oil company Pertamina and USD 3.2 billion to the state electricity company PLN, which chiefly generates electricity from domestically-mined coal.

While a mixed trend in producer support could be drawn from preliminary 2020 data, it is however important to emphasise that delays in budgetary reporting or in the approval of legislated COVID packages could make official figures to be captured only later on, or to be only disbursed in 2021 or even in succeeding fiscal years. Several instances of large government sums devoted to fossil-fuel production support, namely in the form of hefty bailouts to state oil and electricity companies have been provisionally commissioned.

As a result, these amounts, when officially released in government budgets, may come to offset the mechanical decrease in production support discussed above.

Figure 2.1. Observed falls in petroleum and transportation sector support in the advent of COVID-19 drive a decrease in total support levels in G20 countries for 2020

Total support in G20 economies by energy product (left) and by economic sector(s) benefitted (right)



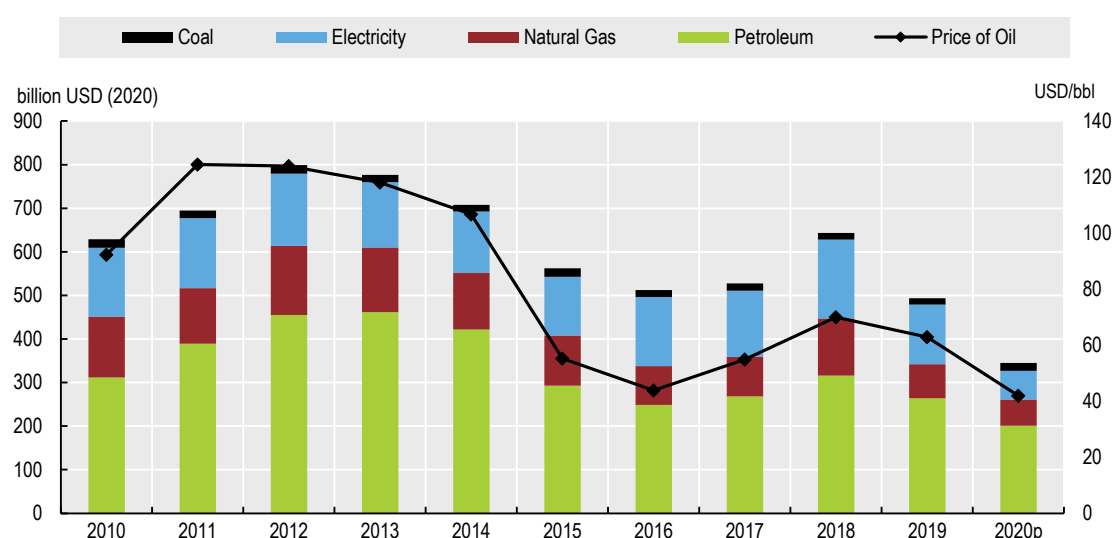
Note: (i) Figures exclude G20 member Saudi Arabia. (ii) USD in nominal value. (ii) Other sectors includes measures that support the use of fossil fuels in energy transformation other than electricity and heat generation: industrial and manufacturing; commercial and public services; agriculture, forestry and fisheries; and non-energy use.

Compensation payments to scale back on solid fossil fuels gathers pace in Europe: measures granting direct payments to encourage the closure of uncompetitive coal mines and expenditures on mine decommissioning in the hard-coal mining Länder of North Rhine-Westphalia saw amounts more than double at EUR 1.932 billion in 2020 from EUR 939.5 million in 2019 (Federal Ministry of Finance (Germany), 2020_[54]). Ramped-up spending of a similar nature is expected in succeeding years as the German Government recently earmarked EUR 4.32 billion worth of compensation payments to be disbursed to lignite-fired power plant operators for an accelerated shutdown (Reuters, 2020_[28]). The OECD Inventory accounts these measures as support, in line with the “polluter-pays-principle”, as the mine decommissioning and other associated environmental and economic costs are effectively externalised to public funds, through these compensatory measures.

Support to the transport sector in G20 economies decreased significantly, driven for the most part by decreased consumption of transport fuels during COVID-19 induced mobility restrictions: Confinement restrictions that were put in place around the world in 2020 to reduce the spread of COVID-19, as well as international border closures severely disrupted international travel, resulting in major declines in support for the transport sector for the G20 economies (from USD 54 billion in 2019 to USD 49 billion in 2020, representing -10% year-on-year decrease). Analogous to the declines recorded in the Russian Federation’s production support, the fall in support in the transport sector was driven largely by external factors, which will likely be significantly less of a concern as the global pandemic situation improves and economies eventually open up. With the progressive easing of pandemic restrictions, it is expected that these decreases will be reversed in 2021 without intentional policy interventions to reduce support through policy.

The OECD-IEA combined preliminary estimates for 2020 show that with the exception of coal, support for all fuels declined in 2020, due primarily to the collapse of oil prices and the steep decline in fuel consumption. Preliminary combined estimates of government support for fossil fuels measured by the IEA and OECD for 52 G20 and emerging economies show a decline in subsidies, from USD 494 billion in 2019 to USD 345 billion in 2020 (Figure 2.2). Support for all fuels declined, with the exception of coal. Coal support increased from USD 14.6 billion (2019) to USD 17.7 billion (2020), with the aforementioned spending in Germany on mine closure and remediation as a major contributor. Electricity in particular saw a very significant decline, going from USD 138.9 billion in 2019 to USD 66.3 billion in 2020, owing to the drop in electricity use from the industry and service sectors and the drop in coal, oil and natural gas used for power generation; while petroleum equally declining from USD 263.9 billion to USD 201.1 billion. For these trends, COVID-19 related lockdown measures precipitating a decline in fuel consumption and a consequent fall in energy prices are the key drivers for the steep declines. However, the rebounding fuel prices and energy use, coupled with hesitant progress on pricing reforms, are likely to push subsidy values higher again in 2021 as pandemic conditions improve and economies start to re-open.

Figure 2.2. OECD-IEA combined estimates show a 30% decline in overall support from 2019, driven by the impact of the historic fall in oil prices and COVID-19 induced plunge in fossil fuel consumption



Note: The OECD-IEA combined estimates projected above covers 52 economies, of which 18 are G20 members and 42 are emerging economies, with several overlapping economies between the two sources. The combined estimate of support for fossil fuels is the total resulting from merging IEA price-gap estimates and OECD Inventory estimates for G20 economies. Note that while the graph above covers a smaller set of coverage compared to the full 81-economy coverage of the OECD-IEA combined estimates published in the (OECD, 2021^[2]), the 52 economies included represent around 90% of global total energy supply (TES) from fossil fuels.

Source: Author's aggregations from OECD Inventory (2021), IEA Energy Subsidy data (2021).

Implications of COVID-19 pandemic for reform of fossil-fuel subsidies

It is necessary to distinguish between rescue and recovery measures in order to differentiate between short and long-term implications of the pandemic for subsidy reform. Rescue measures are by nature temporary, and include liquidity measures, life and livelihood measures, and tax and payment relief measures. By contrast, recovery measures are focused on shaping incentives, and generating and directing investments. As rescue measures favouring the consumption and production of fossil fuels tend

to be socially regressive and environmentally harmful in nature and design, reform should veer towards recovery measures.

During the COVID-19 pandemic, there has been a surge of net-zero pledges from governments, businesses and investors alike. Although some remain mere pledges many others take concrete steps towards eliminating fossil-fuel subsidies. For example, Greece pledged to end coal generation by 2025 instead of 2028 (Simon and Karaoulanis, 2021^[55]), and Spain enshrined in law the ending of fossil-fuel production by 2042, as well as banning all new exploration and production permits with immediate effect (Gerretsen, 2021^[56]). A number of major oil and gas majors have made Net Zero pledges, though they vary in degree of commitment and in degree of scope, as according to the Greenhouse Gas Protocol. For example, the European oil refining industry association, Fuels Europe, whose members includes Shell, BP, ENI, Total, Preem and Neste, outlined on a EUR 650 billion plan to decarbonize transport fuels by 2050 (Maniatis, Chiaramonti and van den Heuvel, 2021^[57]).

The pandemic has also disrupted data collection processes and introduced exceptional implications to consider when analysing trends in support during the pandemic. Transparency and timeliness of reform are determining factors. Oxford University's Global Recovery Observatory (Oxford University, 2021^[58]) points towards the "spending-expenditure" anomaly, the difference between fiscal spending listed in ratified plans and actual amounts disbursed in the context of COVID recovery spending. This is likely to apply to fossil-fuel subsidies, for which it will be necessary to record the evolution of expenditures against fiscal spending, as well as noting the date of announcement of subsidy measures. Furthermore, depending on a country's budget schedule, COVID-related measures may not appear for up to two years later. Added to the delay in recording specific measures, the publication of budget accounts as a whole has also faced deferrals in certain countries. Pandemic disruptions have jeopardised data collection processes globally, as statistical offices have faced closures worldwide (UN, 2020^[59]). This has also had an impact on the transparency of COVID-related spending, as processes to monitor and evaluate government spending have been delayed (Thompson, 2020^[60]).

Due to the exceptional nature of emergency relief measures and recovery packages, fossil-fuel support has flowed through alternative channels than the ones traditionally addressed in the OECD Inventory of support measures for fossil fuels. The inventory collects information on budgetary programmes and tax provisions through official sources such as government budgets. However, extra-budgetary measures (Rahim, Allen, Barroy, Gores, and Kutzin, 2020^[61]) have been a hallmark for COVID-related interventions, for a number of reasons. Firstly, the simplified execution and procurement procedure for the disbursement of extra-budgetary funds makes it more suited to the needs of a pandemic than is possible within the conventional budget process. Secondly, a COVID-19 extra-budgetary fund is better placed to receive voluntary contributions from the private sector and development partners. Thirdly, relief and recovery funds tend to span a large number of sectors, including health, social services, internal and border security, at both the local and national levels. Many COVID-related funds have been provided through public finance institutions, diversifying the range of sources from which fossil-fuel subsidies can originate. For example, Export Development Canada (EDC) and the Business Development Bank of Canada (BDC), have both been primary vehicles for the provision of credit support during the pandemic. Analysis from the Canadian Broadcasting Corporation (CBC) found that EDC provided around CAD 1.2 billion in transfer of risk measures for the oil and gas sector in early December 2020 (Bakx, 2020^[62]). Also the government's Business Credit Availability Program and Reserve-Based Lending for small and medium-sized oil and gas firms (EDC, 2021^[63]).

The cross-sectoral and cross-fuel nature of COVID-related fossil-fuel subsidies presents an impediment to determining the scale of support. The share of fossil-fuel support embedded in non-sector-specific programmes such as the Canada Emergency Wage Subsidy (Government of Canada, 2021^[64]), aimed at maintaining employment, are hard to quantify. Even when targeting the energy sector, many funding announcements are unclear about the share of support directed towards fossil and renewable energy. For example, Brazil's BRL 7.3 billion investment in energy infrastructure through auctioned Annual Permitted

Revenue is cross-fuel in nature, impeding the precise measurement of support towards fossil fuel production (ANEEL, 2020^[65]). This is also the case with measures in which the green conditionality fine print plays a role, such as carbon capture, utilisation and storage (CCUS) measures.

3

“Scalable” lessons and good practice from reform: voluntary peer reviews of fossil-fuel subsidies

Since 2013, G20 countries have developed and implemented a methodology for voluntary, country-led peer reviews of fossil-fuel support as a “valuable means of enhanced transparency and accountability” and important complement to periodic self-reporting on progress (G20, 2013^[1]). China and the United States were the first pair to undertake the reciprocal peer review (completed 2016), with two sets of paired peer reviews conducted since: Germany and Mexico (completed 2017), and Indonesia and Italy (completed 2019). A fourth and fifth set are underway. Argentina and Canada announced intent to undertake a reciprocal peer review in conjunction with the June 2018 G20 Energy Transitions Ministerial Meeting in Bariloche, Argentina. After national elections in both countries in October 2019 and a change of administration in Argentina, the timeframes for release of both countries’ self reports and peer reviews remains under discussion. France and India announced their commitment to proceed as the next peer review pair in August 2019, during an official visit to France by Prime Minister Narendra Modi. The process for these countries remains in a preliminary phase.

A degree of consensus has emerged on the process for undertaking peer reviews (OECD, 2021^[2]), (OECD/IEA, 2019^[3]) – although G20 countries may of course seek to adjust this process for subsequent reviews, given the voluntary nature of the peer review mechanism. Major steps include agreeing to the terms of reference on the scope of measures for review and the review timeline, and selecting a peer review panel. Development of both an initial self-report by the country under review and a final report follows. The OECD Secretariat has developed the final reports, as chair of the review process for all six completed peer reviews, in consultation with peer review panels. Similarly, there is general recognition of the value of the peer review mechanism in underscoring the economic and environmental rationale for reform, enhancing understanding of the motivation for specific support policies and whether that rationale still holds or could be more effectively or efficiently met by other means, and building country ability to measure and track support policies.

The peer reviews are also recognised as an important avenue for knowledge exchange and enhancing transparency on country support policies (OECD, 2021^[2]). The terms of reference developed by peer review countries have explicitly flagged sharing lessons and experience of relevant reform as a main purpose of G20 peer reviews (OECD/IEA, 2019^[3]), (OECD, 2018^[66]). Peer review panels have also recognised the role of the panel in showcasing examples of recent successful reform and pointing to lessons learned (OECD, 2017^[67]). However, there has not yet been a concerted, comprehensive attempt to document “scalable” lessons and examples of good practice emerging from country experience as reflected in the growing body of peer reviews.

The OECD Companion to the Inventory of Support Measures for Fossil Fuels 2021 (OECD, 2021^[2]) provides an initial analysis of reform efforts associated with G20 peer reviews. It concludes that more systematic tracking and sharing of lessons and experience of reform generated by the peer review process, through for example a compendium of good practice arising from the reviews, could help

disseminate outcomes and build on progress to date. This section of the update report expands on that analysis as requested by the Italian G20 Presidency.

Through the Asia-Pacific Economic Cooperation (APEC) forum, additional countries have undertaken similar peer reviews. They are Chinese Taipei (2017), Peru (2015), the Philippines (2016) and New Zealand (2015).¹ The APEC reviews broaden the scope of country experience available to extract lessons and good practice of reform, as does a peer review of the Netherlands' efforts to phase out support for fossil fuels facilitated by the OECD and IEA in 2019 and modelled on the G20 review process.² Like G20 peer reviews, APEC economy reviews explicitly refer to the value of the peer review mechanism in assisting countries identify reform options, disseminate best practice, and complement and strengthen voluntary reporting to APEC leaders. The APEC reviews recognise the challenge of identifying and implementing fossil-fuel subsidy reform – despite the potential benefits to the reforming country – and aim to respond to that challenge.

Together, the G20, APEC and Netherlands' reviews evaluate over 140 government policies, with dozens of suggestions from peer review panels (Table 3.1). Around two-thirds of the measures evaluated in G20 reviews and the Netherlands review benefit end-users of fossil fuels. The measures are predominantly tax expenditures, but also include direct budgetary measures and risk transfer mechanisms. With the exception of New Zealand, which selected measures for review following the OECD Inventory approach to provide for a “broader selection of measures than just those affecting consumption”, the APEC economy reviews assess solely consumer support measures. These generally serve to hold domestic fuel prices at levels below international reference prices.

Table 3.1. Summary of APEC, G20 and Netherlands reviews

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
China (P.R. of)	2016 (G20)	Germany, Indonesia, United States, International Monetary Fund, OECD (chair)	9 measures, USD 15.5 billion (2016)	Direct budgetary transfers (1 set), tax expenditures (8)	Measures span the fossil-fuel supply chain, from upstream exploration and development of fossil-fuel resources to refining and their use in power and heat generation, transport, and the residential sector.	<p>Reform fossil-fuel subsidies as a necessary step towards the goal of more market-based prices and taxes that better reflect environmental damage from economic activities, thereby contributing to pollution reduction while removing one major source of price distortions in the economy.</p> <p>Continue efforts to ensure that the most vulnerable segments of society are not adversely affected by reform.</p> <p>To enhance transparency of fossil-fuel subsidies:</p> <ul style="list-style-type: none"> • Enhance information on fossil-fuel subsidies, their environmental effects, and their beneficiaries to facilitate identification of necessary reforms and more efficient policies. • Encourage provinces to provide information and data on support measures (at least to the same degree as that available for central government level). • Improve and provide information on taxes applicable to energy producers and consumers, and relevant tax revenues, to enhance understanding of potential fiscal gains from reform. • Provide more information on rules used to set energy prices, where still regulated. <p>Ensure price reform goes beyond eliminating the identified fossil-fuel subsidies, to capture environmental</p>

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						consequences of production and consumption of fossil fuels through efficient pricing.
Chinese Taipei	2017 (APEC)	International Institute for Sustainable Development (IISD), Institute for Global Environmental Strategies (Japan), Petroleum Institute of Thailand, United States (lead); ICF, Nathan Associates (secretariat for the panel)	5 measures	Direct transfer (2), tax expenditure (2), direct transfer that would also constitute an induced transfer for the purposes of the IEA price gap methodology (1)	End-users in the agricultural sector (3 “small-sized” measures), of transit fuels on offshore islands (1 measure), and by street light owners, to promote public safety (1 measure)	<p>Consider a holistic approach to providing benefits (e.g. congruence with current sectoral strategies/ green growth policies; whether alternative/ better ways to serve social and economic needs of target beneficiaries; undertake comprehensive cost-benefit analysis to assess economic impacts and possible opportunities to improve on existing approaches).</p> <p>Conduct a review of who is receiving current subsidies, their income, expenditure, and activities to determine whether subsidies are fulfilling their purposes/ adequately targeted</p> <p>To enable successful reform, consult stakeholders on needs and preferences; inform beneficiaries and the broader public of the rationale for reform.</p> <p>Cross-cutting recommendations for agricultural sector support:</p> <ul style="list-style-type: none"> • Review costs (including administration costs, to enable assessment of operational costs and efficiencies, and improve efficiency) and benefits (including alignment with stakeholder preferences and needs; whether best method to deliver relief from fuel prices/promote farmer productivity; whether most equitable way to deliver benefits to farmers; and distribution of benefits), and how to better communicate them. • Consider options for reform (e.g. conversion to cash transfer, agricultural input vouchers, rebates on new farming

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>equipment) to provide more flexibility to target beneficiaries, discourage wasteful consumption, and remove most market distortions).</p> <ul style="list-style-type: none"> • Fund any programmes through budgetary line items through the Council of Agriculture (rather than cross-subsidisation) to enable full assessment of costs and benefits and holistic planning of use of taxpayer resources. <p>Measure-by-measure recommendations:</p> <ul style="list-style-type: none"> • Sales Tax Exemption of agricultural machinery-related oil and electricity: consider enhancing targeting, conversion to cash benefit, complementary measures to promote efficiency/ reduce market distortions. • Preferential Electricity Pricing for Agricultural Motors: consider reform to help level the playing field across rate-paying entities; consider converting to a cash benefit or energy efficiency incentives to reduce market distortions. • Petroleum Product Price Subsidy for Agricultural Machinery: consider converting to equivalent cash benefit, more efficient targeting; complementary measures to promote efficiency and reduce market distortions (e.g. technical assistance on fuel and electricity efficiency, rebates for purchase of clean and efficient agricultural machinery). • Sea freight subsidy for oil products shipped to offshore islands: consider phase-out in favour of targeted investments to reduce demand for fossil fuels on offshore islands (e.g. energy efficiency, electric vehicles, public

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>transportation), or conversion to cash transfers to local governments to fund higher-priority social objectives; assess design and cost efficiency.</p> <ul style="list-style-type: none"> • Preferential electricity pricing for street light operators: consider removal/ reform to promote energy efficiency and budgetary savings (e.g. greater targeting; review of authorities' ability to pay full price; conversion to cash subsidy; replacement with energy efficiency incentives including LED installation, with a sufficient grace period).
Germany	2017 (G20)	China (P.R. of), Indonesia, Mexico, Italy, New Zealand, United States, OECD (chair)	22 measures, EUR 15 billion (USD 17.9 billion) (2016)	Direct budgetary transfers (2), tax expenditures (20)	Bulk of measures are energy and electricity tax preferences for agriculture, manufacturing and transport sectors; 2 measures favour upstream activities (extraction of coal).	<p>Assess the sensitivity of industry competitiveness and carbon leakage to reform (quantify effects on volumes of production, trade and price, and therefore GDP, and associated environmental and social costs), to test the assertion that tax benefits granted to industrial and agriculture sectors ensure the competitiveness of German industry and prevent carbon leakage (and are therefore not "inefficient"):</p> <ul style="list-style-type: none"> • Carry out periodic quantitative assessments of competitiveness and carbon leakage effects of energy-tax preferences, including state-of-the-art empirical evidence. • Improve data on sectoral distribution of beneficiaries of support measures. • Publish more detailed information on energy efficiency performance of industries and distribution of tax benefits corresponding to performance. • Review support measures to ascertain

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						role in energy transition. Consider alternative, less distortive measures, to help maintain industry competitiveness and prevent emissions relocation, lighten environmental and social costs incurred, and help ensure economic and climate policy objectives are aligned.
Indonesia	2019 (G20)	China (P.R. of), Germany, Italy, Mexico, New Zealand, German Corporation for International Co-operation (GIZ), IEA, IISD, OECD (chair), World Bank	12 measures, USD 9 billion (2016)	Direct budgetary transfers (5), tax expenditures (7)	Two main categories of beneficiaries: end users of petroleum fuels and electricity, and oil and gas industry upstream and downstream segments (preferential tax treatment for exploration, development and extraction, and refining and processing).	Continue petroleum fuel and electricity pricing reform by harnessing socio-economic information in the unified poverty database (which gathers socioeconomic information on the poorest households), to provide targeted support to poor households and establish a fiscally sustainable energy access policy. Enhance data collection to better understand the behavioural impacts of pricing reforms on consumption, health, and congestion. In addition to focusing on reducing the number of beneficiaries of subsidised electricity and LPG cylinders, decouple social support from fossil-fuel consumption as a longer-term goal (e.g. through means-tested cash transfers). Avoid the erosion of reform by political intervention (e.g. government deviation from automatic adjustments in fuel prices, maintenance of fixed fuel and electricity prices to the end of 2019 to shield citizens from increasing international oil prices/weakening rupiah), which increases the likelihood of potential losses by state-owned fuel and electricity companies and fiscal pressure on government, and

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>appears incoherent with overall energy and climate policy.</p> <p>Develop a comprehensive inventory of fossil-fuel support measures and associated costs to government, including direct transfers, preferential tax treatment and government credit assistance.</p> <p>Systematically measure tax incentives that encourage national production of crude oil, natural gas and refined petroleum products (for which no reform plans exist) and planned expansion of tax incentives to industrial users of fossil fuels (longer duration, increasing eligible sectors, simplified application procedures), to foster greater transparency and accountability, ensure measures achieve objectives in the most cost-effective way, and eventually facilitate reform.</p> <p>Assess how incentives to fossil-fuel producers might distort exploration, development and extraction decisions, and result in support for fossil fuels.</p> <p>Isolate data on transport and distribution costs for fuels by region to help indicate the extent of cross-subsidisation resulting from the “one price policy” harmonising energy prices across regions.</p>
Italy	2019	Argentina, Canada, Chile, China (P.R. of), France, Germany, Indonesia, Netherlands, New Zealand, Bocconi University, IEA, IISD, European Energy Retailers, Green Budget Europe, OECD (chair), University of Pavia,	39 measures, EUR 13 billion (USD 15.5 billion) (2016)	Tax expenditures (35); direct budgetary spending (4) (and 1 risk transfer mechanism, Export Credit Guarantees for coal, gas-fired and nuclear power plants in third countries, not quantified)	Heterogeneous set of measures (e.g. targeting households, energy producers, public services), inventoried by main benefiting sector (energy, industry, transport, households and public services, and agriculture). Transport benefits	<p>The recommendations made by the peer review panel in the Italian peer review respond specifically to a request by the Italian authorities to offer suggestions for how to structure the country’s fossil-fuel subsidy reform process.</p> <p>Enhance the existing catalogue of environmentally harmful and</p>

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
		UN Environment			from more than half of amounts estimated, and more than a quarter of measures (11).	<p>environmentally friendly subsidies:</p> <ul style="list-style-type: none"> • Indicate distributional impacts of inventoried measures. • Report available evidence on environmental and health impacts of fossil fuels and their relationship with subsidy levels, and potentially evaluate cost implications for the economy; add regional- and city-level surveys. • Analyse support mechanisms other than direct budgetary and tax expenditure measures. • Describe the initially intended objective of support measures, details on delivery mechanisms, assess quantitative value and whether objectives are met. <p>Publish and disseminate widely the results of novel inclusion of macroeconomic assessment of fossil-fuel support phase-out (CGE modelling) in self-review report, to inform public debate.</p> <p>Prioritise measures for reform (e.g. measures whose intended policy objective is defunct, or that are not efficiently meeting their objectives):</p> <ul style="list-style-type: none"> • Eliminate direct subsidies and tax expenditures allocated to fossil-fuel producers or distributors that are not fulfilling any desired policy objectives efficiently. • Phase out longstanding subsidies targeted at particular industries and not aligned with current social needs and policy objectives (e.g. subsidies to taxis, magnesium production from seawater, public services).

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<ul style="list-style-type: none"> • Consider reducing or eliminating differences in the rates of excise taxation on diesel and gasoline. • Develop detailed plans for phasing out major tax expenditures on road freight transport, maritime transport, aviation and agriculture that are inefficient. <p>Assess potential equity, poverty and competitiveness impacts, and possible transition measures. Accompany reform with a well-designed communication strategy.</p>
Mexico	2017 (G20)	China (P.R. of), Germany, Indonesia, Italy, New Zealand, United States, OECD (chair)	10 measures, USD 26 billion (2016)	Direct budgetary transfers (for fossil fuels used in transport. agricultural and fishing activities); tax expenditures	Producer support (1 measure); downstream support for fossil fuels used in transport; and farmers, fishing vessels, or public transport.	<p>To finalise energy-sector reforms, fully liberalise diesel and gasoline prices, and further stimulate competition in the energy sector, ensuring a high-level of transparency and regulatory certainty. Consider using additional revenues raised from reformed taxes for social compensation measures to address any distributional impacts of changes to taxes or subsidies.</p> <p>Address the problem of high levels of tax avoidance and evasion associated with informal coal operations.</p> <p>Consider increasing the recently introduced carbon tax to better reflect the social costs of carbon and the different fuels' respective carbon contents (in view of coal being taxed at much lower rates than other fuels, and natural gas being fully exempted from the carbon tax).</p> <p>Consider the impact of support for electricity consumption (currently considered a different, although linked</p>

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						issue from fossil-fuel subsidies) on the demand for natural gas, petroleum products and coal, as likely indirectly increasing final consumption of fossil fuels. Review fuel-tax concessions (reduced energy excise tax for fishers and farmers; carbon tax exemptions and reductions) – not currently considered subsidies by Mexico – recognising that they could be leading to more consumption and pollution than would have otherwise been the case, and perhaps causing other distortions. Look for alternative and less distortive ways of benefiting the targeted activities.
Netherlands	2020 (OECD/IEA review)	IEA, OECD (chair) Contributions from a stakeholder consultation held on 1 October 2019 with academics and representatives of civil society organisations and government (CE Delft, CIEP, IISD, the Netherlands Environmental Assessment Agency (PBL), Milieudefensie, UEF and VU Amsterdam) were taken into account in drafting the review	13 measures, estimate of EUR 4.48 billion (USD 5.02 billion) (2019) for 7 of 13 measures	Predominantly tax expenditures from reduced rates, refunds and exemptions from excise duties and energy taxes	Both producers (2 measures) and consumers of fossil fuels (11 measures, across energy-intensive industries and other energy-consumer groups [electricity generation, international flights and maritime transport, “other” end-users])	Maintain a broad scope for the inventory of fossil-fuel subsidies/ periodic policy evaluations, considering a full complement of subsidies for both production and consumption. Take into account the negative externalities of the use of fossil fuels when evaluating the energy taxation and public finance supporting the use and consumption of fossil fuels, including to ensure alignment of public financial flows with energy and climate objectives and international commitments (Paris Agreement, EU NECP, UN SDG process). Incorporate tax exemptions and refunds that are under the purview of the EU ETD (e.g. exemption to aviation and maritime transport, and fuels used in electricity) in tax expenditure reports/ periodic evaluation of tax expenditure/ subsidy programmes. Broaden the scope of periodic policy reviews to include other tax and non-tax

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>measures that can influence the use and production of fossil fuels and help the country achieve its climate targets.</p> <p>Include the impact of energy taxation, alternative measures and reforms in the [then pending] policy review of energy taxation to ascertain how the final burden is shared among consumer groups and interactions with other policy measures proposed in the Climate Agreement.</p> <p>Continue to assess the sectors that are most at risk of carbon leakage in order to better target subsidy programmes and identify alternative measures.</p>
New Zealand	2015 (APEC)	China (P.R. of), Indonesia, OECD, Philippines, Thailand, USA (lead)	8 measures, partly quantified (e.g. NZD 103 million [2014] [USD 85.5 million], indemnity for mining land reclamation; fuel excise duty refunds – NZD 38.5 million [2014] [USD 31.9 million])	Tax expenditures (4 measures), direct budgetary spending (3), risk transfer mechanism (1)	Predominantly oil and gas upstream segments (5 measures, for off-shore drilling and seismic ship operators, petroleum exploration and development, natural gas production), with 1 general support measure (R&D funding for the petroleum industry) and 2 measures aimed at supporting consumers (off-road vehicle excise tax reduction, funding of international oil-stock obligations)	<p>In view of an overarching finding that “none of the eight measures reviewed constituted “inefficient subsidies that encourage wasteful consumption”, limited, measure-by-measure recommendations made:</p> <ul style="list-style-type: none"> • Non-resident offshore drilling rig and seismic ship tax exemption and tax deduction for petroleum-mining expenditures: conduct reviews of the measure with a lead-time of at least a year prior to expiration of the exemption, to provide greater certainty to the petroleum industry • R&D funding for the oil industry: review effectiveness and usefulness in terms of the impacts on petroleum exploration and production on a regular basis; inventory non-petroleum industry data users to include impacts in programme evaluation; leverage funding with contestable funding (coordinating research programs at universities, research institutes, and

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						industry) <ul style="list-style-type: none"> • Motor spirit excise duty refund: better target by reviewing eligible vehicle types and fuels on a regular basis/ placing a cap on each refund recipient; collect more data to enable an analysis of the impacts on consumption; review on a regular basis the effectiveness of the measure and the broader question of tax rates and incentives for fuel efficiency.
Peru	2015 (APEC)	Cambodia, Indonesia, New Zealand, United States (lead); ICF, Nathan Associates (secretariat for the panel)	3 measures	Direct transfer (1), tax expenditure (1), direct transfer that would also constitute an induced transfer for the purposes of the IEA price gap methodology (1)	End-users in Amazon regions, of certain fuels (LPG for domestic purposes or packaged in 10 kg cylinders, diesel for vehicle use, and diesel and residual petroleum fuels used by isolated electricity generation systems) and of LPG for residential and transportation purposes (vulnerable or low-income segments of the population)	General recommendation: <ul style="list-style-type: none"> • Continue broader fossil-fuel subsidy reform efforts, using well-established mechanisms for interministerial coordination to develop a coherent plan with specific implementation strategies. Measure-specific recommendations: <ul style="list-style-type: none"> • Preferential Value-Added Tax (VAT) Exemption (promulgated to promote economic development in Peru's Amazon Region): eliminate and replace the exemption by targeted social and regional development programmes (e.g. to improve schools, hospitals, transportation and other infrastructure), drawing on positive outreach and communication methods implemented for the Social Inclusion Fund (see below). • Fuel Price Stabilization Fund: depoliticise fuel pricing and continue to remove the fund in a phased manner, accompanied by appropriate offsetting measures targeted to vulnerable population segments. • Social Inclusion Fund (designed to protect Peru's most vulnerable populations and improve their access to commercial

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						LPG fuels): continue current efforts to examine methods for improving the programme; expand to segments of the population not currently served; undertake full cost-benefit analysis to help identify economic cost of cross-subsidy.
Philippines	2016 (APEC)	IEA, Indonesia, New Zealand, United States; ICF, Nathan Associates (secretariat for the panel)	5 measures	Direct transfer (2), tax expenditure (2), direct transfer that would also constitute an induced transfer for the purposes of the IEA price gap methodology (1), including an oil price stabilisation fund, a mechanism for cash transfers to public transport operators to minimise fare increases and a cross-subsidy programme to support electricity access in remote areas	General (1) or more targeted measures (4) in support of fossil fuel consumers, including users of public transport, “socially sensitive” fuels, in remote areas or with self-generating facilities.	<p>Measure-specific recommendations:</p> <ul style="list-style-type: none"> • Oil Price Stabilization Fund: refrain from re-instating the fund (no longer active, but under consideration for re-instatement), regardless of oil price; consider alternate means to address fuel and transit price affordability concerns (e.g. efficiency improvements, fuel diversification). • Pantawid Pasada Public Transit Assistance Program: do not reintroduce the limited cash-transfer mechanism (that operated 2011-2013) for public transport operators to limit transit fare increases due to rise in oil prices; move towards deregulated fares in a phased manner; consider alternate means to address fuel and transit price affordability concerns. • Excise Tax Exemptions: reform differentiated excise tax regime (several “socially sensitive” fuels exempted from excise taxes – kerosene, diesel, LPG and fuel oil) to introduce taxes on all petroleum products, remove distortive preferential tax regimes among similar fuels and help address negative externalities from fuel consumption; develop a strategy on how to use the proceeds, including for poor and vulnerable populations. • Universal Charge for Missionary Electrification to support Small Power

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>Utilities Group: undertake detailed cross-benefit analysis to evaluate the impacts of the cross-subsidy; structure the regulated tariffs closer to the deregulated price; expand electricity utility's mandate to allow for capital investment to promote power plant efficiency; provide better-targeted support measures for those in need.</p> <ul style="list-style-type: none"> • Universal Charge Exemption for Self-Generating Facilities (SGFs): undertake detailed cross-benefit analysis to evaluate the impacts of the exemption; lift the exemption to remove inefficiencies and market distortions, compensating benefits from SGFs distinct from the universal charge and accompanied by complementary measures to ensure a smooth transition (e.g. a phased lifting, fostering alternative energy/ efficient generators).
United States	2016 (G20)	China (P.R. of), Germany, Mexico, OECD (chair)	17 measures, USD 8.2 billion (2016); value of liability cap on natural resource damage not quantified	Direct budgetary transfer (1), tax expenditures (15), risk transfer mechanism (1)	<p>Upstream activities (exploration, development and extraction), grouped in the peer review report according to the branch of government responsible for reform.</p> <p>Focus on federal subsidies to hydrocarbons and coal (i.e. not all possible forms of fossil-fuel subsidies).</p> <p>1 measure supporting fossil-fuel use in the residential sector.</p>	<p>Pursue reform of the 16 measures identified as "inefficient" in the US self-report on the grounds that their original purpose was found to be outdated or inappropriate.</p> <p>Improve the existing reporting process, make necessary reforms easier to identify and engender more efficient policies by:</p> <ul style="list-style-type: none"> • encouraging states to provide at least the same degree of transparency and information that applies to federal measures • undertaking research on the beneficiaries of subsidies, improving data and understanding of environmental

Country	Date of completion (forum)	Peer review panel	Number and self-declared value of measures reviewed (where quantified)	Transfer mechanisms	Beneficiaries	Main suggestions of the peer review panel
						<p>impacts of subsidies</p> <ul style="list-style-type: none"> encouraging further research into possible support not identified in the course of the review (e.g. preferential loan-guarantees, investment incentives, regulations favouring fossil-fuel producers or fossil-fuel-based power generators). Dedicate additional effort to convincing citizens of the need for fossil-fuel subsidy reform, to contribute to pollution reduction while removing an important source of price distortion, and facilitate the passage of reform measures through Congress. Take price reform beyond eliminating subsidies, to move towards internalising the environmental damage that arises from the production and consumption of fossil fuels through efficient energy taxation. Reassess the financing structure of inland waterways, in particular the levels of user fees and fuel excise taxes: the costs of constructing, operating and maintaining inland waterways are largely borne by the taxpayer, and more than half of the volume of freight transported concerns fossil fuels, but no subsidy for bulk transportation of fossil fuels by rail and barges was identified in the peer review.

Notes: (1) The panel suggestions reflected in Table 3.1 are abridged. Readers should refer to the relevant peer review reports for the full set and text of panel suggestions. (2) See the *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2018* for a full explanation of the IEA approach to estimating fossil fuel consumption subsidies (OECD, 2018^[66]).

Source: G20 peer reviews, available at www.oecd.org/fossil-fuels/publication/; (APEC Secretariat, 2017^[68]), (www.apec.org/Publications/2017/07/Peer-Review-on-Fossil-Fuel-Subsidy-Reforms-in-Chinese-Taipei);

(OECD/IEA, 2020^[69]) (www.oecd.org/fossil-fuels/publication/2020-OECD-IEA-review-of-fossil-fuel-subsidies-in-the-Netherlands.pdf);

(APEC Secretariat, 2015^[70]) (www.mbie.govt.nz/assets/7250f5135f/peer-review-fossil-fuel-subsidy-reforms-nz.pdf);

(APEC Secretariat, 2015^[71]) (www.ewg.apec.org/documents/Peru_peer_review_of_fossil_fuel_subsidy_reforms_Nov102014_FINAL.pdf);

(APEC Secretariat, 2016^[72]) (www.slideshare.net/andreweil/apec-ffsr-peer-review-report-philippines-july-2016-final71416); (APEC Secretariat, 2016^[73]).

“Scalable” lessons are emerging from voluntary peer reviews

The challenge of defining fossil-fuel subsidies

Both the G20 and APEC fora are yet to adopt a formal definition of any of the three elements of the mandate to reform “inefficient fossil-fuel subsidy that encourages wasteful consumption” – what constitutes a fossil-fuel subsidy, what kind of measures might be deemed inefficient or what can be considered wasteful consumption – despite their importance in determining the scope and ambition of reform.³ Reviewed countries themselves identify which policies to subject to review and which support measures they propose to reform, consistent with a country-led process.

The challenge of defining what constitutes an “inefficient fossil-fuel subsidy that encourages wasteful consumption” is therefore a common issue emerging from discussion in the peer reviews, which dedicate considerable space to this issue. Nevertheless, the process provides an important first step towards possible future common definitions by shedding light on differences in interpretation between reviewed countries.

Cross-country differences extracted from the G20 peer reviews include the following examples. Germany’s definition covered direct budgetary transfers and tax expenditures (OECD, 2017^[67]), while Mexico’s referred only to direct budgetary transfers – although its self-report included discussion on tax expenditures, identifying five additional measures providing fiscal incentives for fossil-fuel producers and consumers in the aim of transparency (OECD, 2017^[74]). China (OECD, 2016^[75]), Germany and Italy (OECD, 2019^[76]) included in fossil-fuel subsidies those providing support to fossil fuel-based electric power production and consumption; Mexico and the United States did not. Italy classed every subsidy to fossil-fuel production and consumption as inefficient, including 39 measures in its self-review. China and the United States signalled their intent to phase out specified measures benefiting fossil-fuel production, recognising that the reduction in prices resulting from these measures encouraged “wasteful consumption”. Germany offered a similar motivation for reform of measures propping up domestic hard-coal production.

G20 peer review panels have provided commentary and recommendations relating to countries’ definitions of the terms, interpreting their mandate as going beyond merely documenting those definitions. For example, the panel in the German review questioned Germany’s assertion that industry support measures were efficient because they were aimed at maintaining the competitiveness of German industry and avoiding carbon leakage to countries with less-stringent environmental regulations. The panel noted that to properly distinguish subsidies that might enhance the well-being of an economy from inefficient subsidies, it would be necessary to weigh their social costs and benefits. This would imply assessing not only the design of relevant fuel-tax exemptions and reductions compared with alternatives, but also whether they were periodically adjusted to reflect changing priorities and circumstances. The panel recommended that Germany assess the sensitivity of industry competitiveness and carbon leakage to fossil-fuel subsidy reform and possible (potentially less distortive) alternatives, to test the assertion of the “efficiency” of these measures, and set out a number of potential steps to this end. The panel highlighted a lack of consensus in international literature on the impact of environmental regulation on firm and industry performance.

The panel for the Mexican review noted that Mexico did not consider any of its tax exemptions and reductions in support of production and consumption as inefficient (and therefore in need of reform), because they did not decrease prices below marginal costs. The panel pointed to the fact that the term “inefficient” as used by many G20 members covers such measures. China and the United States, for example, reported “mainly features of their tax codes that favoured fossil-fuel producers” as inefficient measures for reform. The panel noted that by taking into account solely the burden on welfare of taxing energy products, Mexico failed to take into account the welfare impact of environmental consequences of

fossil-fuel consumption. The impact of the reductions or exemptions in question on the overall efficiency of the tax system, including administrative costs, was also relevant. While commending Mexico's transparency in including the measures in its self-report, panel members urged the country to review its fuel-tax concessions to see whether they were increasing consumption and pollution levels, and leading to other distortions. They also encouraged Mexico to include support for the use of fossil fuels for electricity generation when assessing electricity subsidy reform priorities, as likely indirectly increasing final consumption of fossil fuels. The overarching conclusion of peer review panels has been that further dialogue on definitions could help G20 member states reach agreement on what should be considered an inefficient subsidy for the purposes of the G20 reform commitment.

Definitional issues similarly arise in the context of the APEC reviews. The panel in the Philippines review, for example, adopted a literal interpretation of the APEC commitment to phase out inefficient fossil-fuel subsidies that encourage wasteful consumption in defining subsidies as “policy instruments that lower the price paid by energy consumers”. Taking the approach that differences in tax rates “may not be helpful for undertaking an [APEC] evaluation of fossil fuel subsidies”, the panel determined that excise tax exemptions for fuels deemed as socially sensitive were not subsidies, despite having been proposed for review by the government. Oil price deregulation efforts meant that fuel prices were closely tied to international benchmark oil price movements. Similarly, the panel did not consider a universal charge exemption for self-generating facilities a subsidy, because operators continued to bear full fuel and electricity costs as determined by the market. The review panel nevertheless acknowledged that the relevant APEC guidelines provided flexibility for volunteer economies in nominating policies for review and provided an assessment of the efficiency and effectiveness of the identified policies in meeting their intended objectives.

A different approach was adopted in the New Zealand review. The government nominated multiple tax expenditure measures for review as subsidies potentially encouraging wasteful consumption, which were duly assessed by the peer review panel. The panel acknowledged a lack of consensus on how to define and value fossil-fuel subsidies and emphasised the need for a flexible approach to choosing methodologies for the purposes of the peer reviews – one taking into account the reform objectives and requirements of the country under review. It saw the decision of which element of the overarching APEC commitment to emphasise for the purposes of a review as “the first critical task” for the relevant economy. The notion of “wasteful consumption” was the guiding criterion for New Zealand government's selection of policy instruments for review. On this basis, none of its nominated policy measures were deemed to be inefficient subsidies requiring reform. Tax deductions for expenditures related to petroleum exploration and development, for example, were considered unlikely to affect consumption through lower oil prices “since New Zealand is a price taker on world markets”. Despite the potential for the measures to increase future production, the panel recommendation focused on ensuring certainty for industry, through sufficient lead-time for implementation of any changes to the concessions.

The Peruvian government, by contrast, put forward three measures intended to support vulnerable segments of the population, picking up the acknowledgment in the overarching APEC mandate of the “importance of providing those in need with essential energy services”. It requested that the panel focus on the effectiveness of the subsidies in reaching their intended objectives rather than focus on inefficiency, noting that the term has multiple meanings and that economists tend to view all subsidies as inefficient. Similar to the conclusion of G20 peer review panels – and despite the value of a flexible mechanism able to accommodate different country views on what might constitute support for fossil fuels – there is potential benefit to further dialogue on definitional issues, including helping advance reform in APEC economies.

Designing the reform process

Reviewed countries generally propose reform options in their self-reports to frame review panel discussions. This approach recognises reform as a sovereign issue tied to country-specific

circumstances and priorities. Nevertheless, analysis in the peer reviews provides insight into how countries might go about the reform process. The peer review on Italy, for example, provided several suggestions for the structuring and sequencing of reform, and possible reform measures, after the Italian government requested help in identifying priorities for phasing out subsidies. The government had not specified any concrete plans for subsidy phase-out. The review panel canvassed literature on international experience with reform and noted that identifying subsidy measures, their intended objective and whether this is being met, and how measures are delivered (e.g. direct transfers, tax incentives, transfers of risk to government, induced transfers), are first steps to formulating a comprehensive and coherent reform effort. The process can be a challenging one, not least because of potential inter-Ministerial differences on what might constitute a subsidy. The review panel noted in this regard lack of a consensus view within the Italian administration on whether VAT reductions or exemptions constitute support.

Determining the quantitative value of support measures is also essential, ideally through a complete cost-benefit analysis or, if that is not feasible, through estimates or qualitative discussion of budgetary cost, as well as impacts on households, firms, the environment and public health. The panel commended existing efforts by Italy to enhance transparency on environmentally related subsidies and their impact through a regularly updated Catalogue of Environmentally Harmful and Environmentally Friendly Subsidies (ICES). Reported for the first time in 2017, the ICES specifies budgetary cost and rationale for implementation of measures in most cases. The panel emphasised the ICES, which informed development of the Italian self report, as an important tool for evidence-based reform. The reviewers nevertheless made several suggestions to enhance the value of the ICES, including by determining which types of households and firms benefit most from measures, how progressive or regressive they are, and expanding the categories of measures inventoried (Table 3.1).

Once fossil-fuel support measures have been identified and quantified as much as possible, measures for reform need to be prioritised. Eliminating all measures in a single “big bang” reform could have major economic and social impacts, and be technically and politically difficult. The review panel suggested ways to set reform priorities, noting the framework provided by a 2014 delegation of power from the Italian Parliament enabling the Government to adopt norms “reducing, eliminating or reforming tax expenditures that appear, fully or partly, unjustified or obsolete in the light of social or economic needs”. These ranged from removing measures that no longer serve a valid policy objective or efficiently meet their intended objective, including because better ways to reach them have become available, to searching for more effective, alternative measures to reach intended policy aims, and assessing and addressing possible impacts of reform on equity or poverty, as well as sectors or firms. It also highlighted careful design of a public communication strategy targeted towards key reform stakeholders, and ensuring consistency with the broader policy environment, as vital to building social support for reform. The review panel then tailored these approaches to the Italian context, to make specific recommendations on possible measures for reform.

The Italian example is exceptional in going into significant detail on reform options, but other peer review reports also touch on ways reviewed countries might enhance and accelerate reform processes. For example, the China review panel praised the notable transparency of the China self-review report as an “unprecedented, government-led look at policies supporting the production and consumption of fossil fuels in China”. The report raised multiple policies, ranging from direct transfers to high fuel use end-users in the fishing, forestry and public transport industries, to tax expenditures to support use of petroleum products by refiners and upstream industry. China’s openness in responding to questions from the panel, including on subsidies going beyond those listed in its self-report, meant that the peer review process itself served to advance transparency. The panel nevertheless highlighted several ways China could build on that progress to further improve reporting on subsidies, their effects and their beneficiaries, and thereby make it easier to identify needed reforms and enhance policy efficiency. Enhanced province-level information, information to support understanding of potential fiscal gains from reform, and

clarity on rules used to set energy prices in residual, regulated markets were among potential ways to further promote transparency.

Similarly, the panel in the United States review (OECD, 2016^[77]) made several suggestions about how the country might improve existing processes. It recommended the country seek to enhance understanding of support measures not addressed in the peer review, and improve efforts to convince citizens of the need for reform as a means to help steer reform measures through Congress, given its track record of blocking fossil-fuel subsidy reform. It noted that the bulk of measures proposed for reform in the half-decade preceding the review were production support measures, and therefore “complex or obscure to the average citizen” when compared to consumption subsidy reform. An effective communication strategy could help clarify the rationale for reform and potential benefits (e.g. reallocation of funds to other priorities in infrastructure development, education or other more socially advantageous goals).

The panel in the review of Chinese Taipei flagged that the majority of the subsidies under consideration had been operational for several years. Moreover, their implementation aimed to control fuel and electricity prices without taking into account “whether this objective is the best way for the government to serve the social and economic needs of the target beneficiaries”. The review panel urged the authorities to adopt a holistic approach and consider congruence with current sectoral and overarching green growth objectives, as well as the kind of benefits the target beneficiaries actually need. Whether alternative support policies could address these needs more fully while avoiding the distortive impacts and negative externalities associated with subsidies was an equally pertinent question. The panel noted that comprehensive consultation of stakeholder needs and preferences in designing reform was a major factor in determining success.

The team reviewing Peru, for its part, acknowledged the country’s long-standing, progressive reform efforts and well-established mechanisms for inter-ministerial coordination in recommending the country develop an implementation strategy for the panel’s recommendations, building off the mechanisms already in place. It urged the government to develop and put into place “a coherent plan with specific implementation strategies” through these mechanisms, flagging also linkages across the team’s measure-specific recommendations. The linkages meant that a “tandem consideration” of measure-specific reform strategies would best serve the panel’s recommendations. Chapter 2 of the *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2021* (OECD, 2021^[21]) builds in part on the advice in peer reviews to set out in detail how OECD and G20 governments might adopt a robust sequential approach to designing fossil-fuel subsidy reforms. The intention is to help governments assess and address the effects of fossil-fuel support measures and their reform, and spur enduring change.

Vulnerability of reform to the prevailing political environment

A further lesson arising from G20 peer reviews is the potential fragility of reform processes to the prevailing political environment. The panel reviewing Indonesia, for example, commended the Indonesian government for the “remarkable accomplishment” of 2014-17 reforms to fuel and electricity subsidies. After several decades of heavy end-user subsidisation, the reforms brought the country’s energy prices more into line with international oil price movements and generated significant savings for reallocation to other government priorities (e.g. social and infrastructure programmes) (OECD, 2019^[78]). But the team also noted recent erosions to fuel pricing reform efforts, including a 2018 presidential order to hold prices stable despite rising international oil prices, with the stated objective of preserving purchasing power and sustaining growth. The review panel flagged the increased risk of losses by state-owned fuel and electricity companies stemming from the order, and potential implications for government expenditure. It noted that the pending presidential election was “not inconsequential” to the policy revisions, and cautioned against possible renewed fiscal pressure, reinforced energy price distortions and further encouragement for wasteful consumption. A jump in energy subsidies for kerosene, LPG and electricity of almost IDR 50 trillion (USD 3.5 billion) had already occurred from 2016 to 2018 (IDR 106.8 trillion to

IDR 153.5 trillion). The panel team observed that these developments underlined the political environment as a “major deciding factor for the resilience of reforms” and urged the government to avoid backtracking on its recent successes in reform.

The peer review report on China also flags the risk of subsidy reinstatement spurred by fuel-price increases (or conversely that of enhanced support for producers in times when crude-oil prices slump), noting the need for continued monitoring by the G20 and other organisations, and ongoing efforts to improve transparency of support. Similarly, in noting that officials had signalled intent to reform 16 of the 17 policy measures identified in the United States’ self-report, the peer review panel nevertheless cautioned that reform was subject to complementary intention and action by the US Congress. Of 11 proposals to Congress for fossil-fuel subsidy reform from 2010 to development of the report in 2013, Congress had failed to pass enabling legislation on any. Enhancing clarity on potential winners and losers from reform

The peer reviews demonstrate that gaining clarity on potential winners and losers from reform remains an ongoing challenge and – often – an impediment to fossil-fuel subsidy phase-out. The discussion in the German review on the merits of maintaining tax benefits in favour of industrial and agricultural sectors as a means to ensure international competitiveness and avoid carbon leakage, raised above, is one example. The question of the need to move beyond “taking stock” of the support measures in question to assess likely impacts of reform on competitiveness and leakage, and less-distortive alternative means to pursue the government’s policy objectives, became a central point of discussion between Germany and the review panel. The government recognised that many of these measures promoted the consumption of fossil fuels, but did not have comprehensive quantitative evidence on sensitivity of industry competitiveness or carbon migration to reform. The panel had multiple suggestions for how the government might improve the existing reporting process to assess the magnitude of competitiveness and leakage concerns, including by developing state-of-the-art empirical evidence on the impacts of energy-tax preferences and enhancing data on the sectoral distribution of benefits from fossil-fuel subsidies, including links with energy efficiency performance of industries.

The OECD/IEA review of the Netherlands flagged the country’s “very degressive tax structure” and tax exemptions and reductions for energy-intensive industry, maintained “to provide an international level playing field” for domestic industry and reduce the risk of carbon leakage. The panel recognised the role of the EU Energy Tax Directive (EU ETD) in driving some of the country’s tax exemptions or reductions, but flagged that industrial users in the Netherlands were subject to lower natural gas prices than those in many other IEA countries, including fellow EU member states. The low tax rates and benefits also meant cross-subsidisation from domestic to industrial end-users. The review panel recommended the government undertake further assessment of sectors subject to competitiveness and carbon leakage concerns “to better target its subsidy programmes and identify alternative measures”, highlighting that no clear view on the impacts of energy prices on competitiveness and carbon leakage emerges from the international literature. In addition, it flagged that because the government did not consider lower tax rates on natural gas for energy-intensive consumers to be a tax expenditure, there was no accounting for fiscal cost and a lack of established benchmark tax rate to assess revenue forgone. This meant that there was also no way to determine the distributional impact of the household to industry cross-subsidisation under the energy tax structure. The panel considered the inclusion of the tax structure in the self-report of the Netherlands as a “first step towards assessing the effectiveness and efficiency of this policy in alleviating the tax burden on energy-intensive industries while placing a heavier one on households”.

Enhancing awareness of potential winners and losers from reform was of particular concern in the Peruvian review, given the government’s focus on the effectiveness of the selected subsidies in providing for those in need. The team reviewing Peru determined that the government should work towards removing two of the three subsidies nominated for review, including because the measures tended to benefit richer population groups rather than the poor. The blanket VAT exemption intended to promote economic development in the Amazon had primarily benefited heavy fuel users, and hence higher income population groups. Targeted programmes would better meet the government’s social, in addition to developmental

goals for the region. The Fuel Stabilisation Fund was similarly poorly targeted, with no mechanism to funnel support for transport diesel and packaged LPG to most vulnerable segments of the population. The panel recommended the government implement targeted offsetting measures for these population segments in conjunction with phasing the fund out. Section 4 of this report goes into detail on potential political barriers to reform and potential ways to assess and address them, informed by recent OECD and broader international analysis.

Anchoring reform in the broader policy context

Ensuring discussions on fossil-fuel subsidies and potential reform are anchored in the broader policy context is a final challenge that peer reviews illuminate, including the need to heed complementarities, redundancies and consistency with climate, energy and fiscal policies. To take Germany and the Netherlands as examples once again, both reviews raised the issue of alignment with national climate objectives. The tax benefits for German industrial and agricultural consumers brought the question of misalignment between climate and economic policy objectives to the fore, leading the panel to recommend that Germany review these support measures to “ascertain their role in energy transition”. The team reviewing the Netherlands noted failure to include assessment of fossil-fuel subsidies in the country’s then most recent review of energy policies (2014) as a missed opportunity to assess the cumulative effect of government policies relevant to energy pricing on carbon price signals facing energy-intensive industries. It recommended that the government expand the envisaged scope of a then forthcoming energy taxation review to include “all those support measures that confer a benefit to the use and production of fossil fuels”, to enable a more complete overview of alignment of fiscal policy with energy transition and climate ambitions.

The Chinese and United States reviews address the question of alignment with the broader fiscal environment. The United States review panel flagged the potential for reform of fossil-fuel policy “in a broader sense” to go beyond the ambition of subsidy phase-out, to encompass enhanced environmental taxation. It noted the gradual tightening of emissions controls via regulation in the United States across several decades, but considered the efficiency of the measures challenging to assess, particularly as likely resulting in heterogeneous prices on emissions across sectors and even programmes. Complementing regulation with environmental taxes on fossil fuels would strengthen pricing signals for all economic players, increasing cost-effectiveness and efficiency. The China review panel noted complementarity between subsidy reform and China’s plans to strengthen both its shift towards market-based energy prices and environmental taxation, as “contributing to pollution reduction while removing one major source of price distortions in the economy”. It urged the government to take price reform beyond the subsidies identified in the review, to capture environmental consequences of production and consumption of fossil fuels.

Finally, the team reviewing Chinese Taipei urged the government to consider accompanying phase-out of its sea freight subsidy for oil products shipped to offshore islands with demand-side management policies and investment on the islands. It recommended investment in renewable energy, energy efficiency, electric vehicles, energy storage and public transport to support reduced fossil demand.

Examples of good practice in reform

In addition to setting out several “scalable” lessons emerging from country experience, the peer review reports highlight examples of good practice that could inform efforts to phase out fossil-fuel support in other countries. Reflecting diversity in country-specific circumstances, the examples set out noteworthy responses across multiple challenges in reform. These include transitioning industry, “pro-poor” reform, fuel price liberalisation, ongoing monitoring and adjustment of support measures, assessing potential impacts of phase-out and communicating change.

Accompanying industrial transition

Accompanying the phase-out process with stakeholder meetings, a scheduled wind-down and retraining and compensation plans serves to enhance acceptability. The team reviewing Germany, for example, identified the country's experience in phasing out subsidies to the hard-coal mining industry over several decades as a notable successful reform. The team pointed to several elements of the German process, designed to enhance the social and regional acceptability of the phase-out process that could be of interest to other countries seeking to pursue similar reform. Consolidation of industry under a single umbrella company (the RAG Foundation) to manage the phase-out process, the closing of the sector, legacy debts and liabilities, and restoration efforts, was an important first step. A series of industry stakeholder meetings conducted over several years to plan the scale-back of industry also played an important role, particularly in engendering industry acceptance of capacity adjustment. The meetings determined the schedule and sequencing for mine closures, along with worker benefits, ultimately overseeing formal adoption of the phase-out process into law as a way to promote certainty and foresight on proposed outlays.

The review considered the successful workforce retraining and relocation efforts that accompanied production wind-down to be of particular interest. A strong emphasis on retraining younger workers for relocation meant that no lay-offs resulted from mine closures, despite the greater risk of unemployment stemming from the very specific nature of the skill set of underground manual labourers. The absence of lay-offs resulting from mine closures greatly assisted the social acceptability of reform. The review panel noted that further analysis on the impact of the retraining efforts on employment prospects could help illuminate their role in enhancing the social acceptability of the transition, to the benefit of other countries pursuing similar industrial reform efforts.

“Pro-poor” reform to help reduce social inequalities

The panel reviewing Indonesia unanimously praised the country's efforts to better target electricity subsidies and reform petroleum fuel pricing as a good example of “pro-poor” subsidy reform, and standing out as the main successful reforms in the Indonesian context. The government had been subsidising electricity prices for a majority of consumers as a means to help alleviate poverty, address inequality and enhance energy access, with support reaching a high of USD 9 billion in 2013-14. The rising costs of the electricity subsidy scheme and an acknowledgement of poor targeting led the government to begin reform in 2013, to try to focus support on low-income households. As a first step, the government phased out support for 12 consumer classes across industry, business, government and residential groups between 2013 and 2016, focusing on consumers with the largest power connections. Then, the government sought to better target support for the two most vulnerable residential classes at the end of 2016, to isolate “poor” 450 volt-ampere (VA) and 900 VA households (the bottom 40% of households) from “non-poor”, by using a new united poverty database of socioeconomic information on vulnerable households. The number of supported 900 VA consumers dropped dramatically, from 23 million to 4 million, yielding significant savings for government. The cost of electricity subsidies fell to USD 3.4 billion in 2017, from USD 8.6 billion in 2014. The government also increased the price of gasoline and diesel by 30 and 36% in 2014, ceased subsidising premium gasoline, and introduced a new fuel-pricing mechanism to tie fuel prices more closely to international oil price movements.

The review panel praised Indonesia's accomplishment in reducing electricity and fuel subsidy expenditure and developing the tools needed to better target subsidies, in the form of the united poverty database and a planned smart card system for both electricity and LPG subsidies. The electricity and fuel pricing reform measures had enabled the government to increase funding for social assistance programmes as well as infrastructure projects, and resulted in an increased proportion of health and education spending in overall government expenditure. It nevertheless pointed out that Indonesia could further improve the targeting of support and remedy distributional problems raised by universal subsidies by decoupling subsidies from

consumption, for example by favouring means-tested cash transfers. Such transfers would more efficiently and effectively serve Indonesia's poverty alleviation and energy access goals, and avoid subsidy-related distortions.

Moving to market-based pricing to help limit challenges associated with price controls

The team reviewing Mexico, for its part, championed the country's achievement in fuel pricing and taxation reform as "remarkable" and holding "valuable lessons for other emerging economies wishing to carry out a broad-based reform of the energy sector", as among the most ambitious recent, global reform efforts (Steenblik, 2017^[79]). The review panel noted the fundamental shift in fuel pricing policies starting in 2013, from heavy support for gasoline, diesel and LPG to net positive taxes through reform of the IEPS, a floating excise tax (*Impuesto Especial sobre Producción y Servicios por Enajenación de Gasolina y Diesel*). 2016 gasoline and diesel prices were held at within 3% (+/-) of 2015 prices, while a 2017 shift enabled a maximum price shift of up to 20% for gasoline. The market for LPG became fully liberalised at the beginning of 2017. Regions with "sufficiently competitive" gasoline and diesel markets were also allowed to fully liberalise end-user prices for these fuels and were anticipated to have market prices by 2018. The panel urged Mexico to build on the success of transport fuels more fully reflecting their costs by continuing on its path towards full liberalisation of diesel and gasoline prices.

The panel reviewing fossil-fuel subsidy reforms in the Philippines under APEC similarly emphasised that country's lengthy experience with energy price liberalisation, noting parallel efforts to help buffer the economy and protect Filipino consumers from international oil price hikes. The country's Oil Price Stabilization Fund (OPSF), which either provided subsidies or collected levies from oil companies based on fluctuation of international oil prices above or below fixed domestic crude oil and petroleum fuel prices, was phased out in 1998. The *Downstream Oil Industry Deregulation Act* came into effect that year to liberalise the downstream oil industry, promote market competition and abolish the OPSF. International price hikes had caused the fund to run a large deficit over time. Despite being inactive, the OPSF was included as a measure for review by the panel, as continuing to be "an option weighed by policy makers in the Philippines to smooth out petroleum product price volatility on the domestic market".

The panel recommended that the government not re-instate the OPSF, irrespective of oil prices, as promoting wasteful consumption and resulting in fiscal imbalances. In so doing, it noted that assessments of the *Downstream Oil Industry Deregulation Act* had emphasised its positive role in levelling the market playing field, lowering prices and helping stabilise electricity supply. The liberalised petroleum market was firmly established, with little support for reinstatement of the OPSF. It also highlighted the development of the National Energy Efficiency and Conservation Program, targeting domestic, industry and transport end-use, as part of government efforts to protect the economy from international oil price volatility. The panel encouraged the government to build on these policies by considering additional energy policy measures that might help guard against shifts in international oil prices, including measures to encourage fuel switching, modal shift and energy efficiency (e.g. standards or labelling programmes), and creating a strategic petroleum reserve. It highlighted several example of international good practice in doing so.

Likewise, in urging Peru to "depoliticise fuel pricing completely" and eventually close down its fuel stabilisation fund, the review panel noted the success of prior, incremental reform efforts to the fund. Earlier removal of a number of fuels (gasoline, bulk LPG, kerosene, aviation fuel, and fuel oil) had "significantly reduced the fiscal exposure of Peru". Introduction of automatic price band adjustments every second month had served to buffer fuel price changes from political pressure: previously, increases had failed to keep up with international oil price shifts for significant periods, aggravating the fiscal cost to Peru.

Spending reviews to improve expenditure prioritisation

The review of the Netherlands’ effort to phase out and rationalise its fossil-fuel subsidies highlights the role of periodic policy evaluations of tax expenditure and subsidy programmes – undertaken as part of the government’s general budgetary planning process – in casting light on the state of fossil-fuel subsidies and their interaction with the broader energy, climate and fiscal landscape (OECD/IEA, 2020^[69]). Many OECD member countries use spending reviews as a budgeting tool to enhance spending efficiency and ensure expenditures effectively align with government policy and fiscal objectives. Their role in the Netherlands as an “essential practice of transparency and good policy design” and important tool to drive fossil-fuel subsidy reform is good practice. Government spending schemes are to be evaluated every four to seven years, either through review of specific policy areas – through impact assessment or cost-benefit analysis of individual measures – or forward-looking interdepartmental policy reviews (*interdepartementale beleidsonderzoeken* or IBOs), which suggest options for policy adjustment and can look across policy areas as defined in the budget law. Given that IBOs are not constrained to specific policy areas, they can address broader social problems than the targeted policy reviews. The evaluation process identifies factors for success, reasons for insufficient effectiveness and efficiency and the unintended consequences, negative or positive, of government policy, to inform policy reform.

Policy reviews have led to the elimination of multiple tax expenditures providing support for fossil fuels, in particular targeted to specific users, as deemed ineffective in reaching their policy objectives. For example, a 2018 evaluation of a partial refund scheme for LNG excise duty intended to promote the use of LNG over diesel found that the scheme was only partially effective. LNG truck and infrastructure supply challenges were dampening the uptake of LNG trucks. In addition, the cost-benefit analysis determined that the social cost of the trucks – including the cost of the reduced excise duty, approximately EUR 5 million from 2014-18 – outweighed their environmental benefit. A 2008 evaluation of all excise tax related measures assessed fuel tax exemptions in favour of the refinery sector, aircraft, shipping, LPG used in public transport and garbage trucks, and “red diesel” used by tractors and stationary equipment. The evaluation determined that the LPG tax refund scheme for public transport and garbage trucks was ineffective to reach the goal of reduced emissions in view of alternative energy sources with better outcomes (e.g. natural gas, biogas and biodiesel). The government subsequently phased it out. The tax differential in favour of diesel used by tractors and stationary equipment (“red diesel”) relative to “white diesel” used by road vehicles was proving increasingly ineffective, due to monitoring challenges and abuse. The government proposed a tax plan to gradually close the gap, for environmental in addition to ineffectiveness reasons.

Despite lauding the role of the Netherlands’ periodic evaluation practice in driving fossil-fuel subsidy reform, the review suggested ways that the government might strengthen this role. Broadening the tax and non-tax measures addressed in policy reviews would help the country achieve its climate targets, by facilitating a more coherent assessment of support measures and how they may hinder overarching climate goals. The scope of a planned 2020 evaluation of energy taxation, for example, excluded several measures related to the upstream oil and gas sector including measures falling under the purview of the EU Energy Taxation Directive, tax expenditures related to fuel excise duties, and compensation to certain companies for the indirect costs arising from the EU Emissions Trading System. While some measures were to be subject to review in separate evaluation rounds, the review recommended the government expand the proposed scope of the evaluation to cover all relevant support measures.

Strengthening the evidence base for reform with macroeconomic modelling exercises

The panel in the Italian review praised Italy’s efforts to promote transparency through the use of model-based macroeconomic assessment to analyse the possible impact of phase-out of support measures on economic activity, in addition to publication of its catalogue of environmentally related subsidies (the *Catalogo dei Sussidi Ambientalmente Favorevoli e dei Sussidi Ambientalmente Dannosi* or

ICES) (OECD, 2019^[76]), (Italy Ministry of Environment, Land and Sea, 2019^[80]). Inclusion of a macro-economic assessment of reform of listed subsidies, the panel noted – a first among country self-reviews – can support phase-out efforts by anticipating their potential impact. Based on a dynamic computable general equilibrium (CGE) model of the Italian economy, the assessment modelled sectoral, GDP and GHG emission impacts of reform using different revenue-recycling scenarios. It indicated decline in GHG emissions following reform, with any decline in GDP offset or reversed by recycling the revenue gain from eliminating subsidies. The panel highlighted the great value of the assessment in helping gauge net benefits and broad patterns of incidence of reform, and demonstrate how revenue recycling might contribute to stronger economic performance. It also pointed to the potential for macro-economic assessment to help build support for reform options across government and inform public debate on fossil-fuel subsidy phase out. The panel recommended that the government publish and disseminate widely the results of the modelling exercise to this end.

Communicating changes to all stakeholders

The reviewing panel in the APEC peer review of New Zealand similarly commended the country on its commitment to transparency (APEC Secretariat, 2015^[71]). New Zealand explicitly stated promoting ambition for reform through free and frank dialogue, building political awareness on challenges and promoting transparency on a broad set of support measures as goals for the peer review process. The country's approach of ongoing monitoring and adjustment of support measures, active participation in international efforts to promote fossil-fuel subsidy reform, tracking of international best practice and transparent policy environment resulted in “an efficient and effective” peer review process. The panel cautioned however on the need for a holistic approach in tackling ongoing reform, pointing to linkages between the review panel's recommendations across the identified policy measures and with the broader policy and legal environment. It recommended New Zealand use its well-established tools for inter-ministerial coordination to consider and address the review's recommendations, to “remain at the forefront of good energy policy formulation”.

The team reviewing Peru commended the outreach and communication methods used to implement the country's Energy Fund for Social Inclusion (FISE), as integral to its successful rollout and ability to identify and capture vulnerable segments of the population. The FISE programme comprised multiple elements, including a website, and the use of text messaging and other “fast communication” methods to facilitate contact with eligible groups. Use of digital vouchers and cellular banking enabled real-time transactions, eliminating delays and reducing administrative costs. Citing international literature on the importance of a proactive, holistic communications strategy and strong public support for successful reform, the panel recommended that the country adopt the FISE methods to support implementation targeted social and development programmes to accompany the panel's proposed phase-out of tax exemptions for fossil fuels in the Amazon region. The experience could help tailor social programmes to the specific context of the Amazon, identify and connect with targeted beneficiaries, and erode any resistance to reform.

Building on progress to date

The *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2021* included a number of suggestions for how G20 countries might build on progress to date beyond concerted analysis of lessons and good practice in reform as highlighted by peer reviews (OECD, 2021^[2]). These and other suggestions set out below may be of interest to G20 countries seeking to advance reform.

With the assistance of the OECD Secretariat, there is scope for G20 countries to track and share more systematically the lessons and experience of reform generated by the peer review process through a more regular, structured platform to disseminate outcomes and monitor follow-up. More systematic follow-up of

peer review processes would support reform efforts not only within the G20 but also beyond. G20 countries could consider coupling such a mechanism with tailored, country-specific advice in view of the difficulty of reform, and specific challenges facing individual countries. A more systematic approach to self-reporting could also help spur progress. G20 economies may also wish to engage in further dialogue on what might be considered an inefficient subsidy encouraging wasteful consumption for the G20 reform mandate, including the ongoing relevance of certain elements of the traditional formulation given mounting climate ambition and the aim – manifested by many countries – to “build back better” and relieve fiscal pressure in response to the COVID-19 crisis.

As part of its APEC host year and with support from the Italian G20 Presidency as a means to spur co-ordinated momentum on fossil-fuel subsidy reform across the two international fora, the New Zealand Government has requested the OECD undertake complementary analysis on lessons emerging from APEC-economy peer reviews (Section 5). The project, which was endorsed by the APEC Energy Working Group in April 2021, will take the form of a report and virtual workshop. It will complement the analysis in this report by focusing on the role of the peer review mechanism in promoting reform and potential ways, if any, to enrich the peer review process. The analysis in this section suggests that the peer review mechanism has a role to play in promoting reform in pointing to common challenges faced by countries and options to tackle them more effectively, including as implemented in other countries – provided a forum to highlight them.

One possible way to enhance the peer review process that arises from the analysis includes the potential for greater clarity on the types of subsidies targeted by the G20 reform mandate, given the definitional challenges that confront both countries and peer review panels. The peer reviews demonstrate the benefit of ongoing guidance to countries on how to design fossil-fuel subsidy reform; this topic could potentially feature more prominently in future reviews. Focused work on the politics of reform and transitional policy in countries, building on the analysis in Section 4, could also facilitate fulfilment of the G20 reform commitment. The OECD will work with the Italian Presidency to communicate to G20 economies relevant outcomes of the APEC project and any implications for the G20 peer review mechanism in the course of 2021.

4 Addressing political dimensions of reform

The peer reviews of fossil-fuel support (Section 3) sheds light on the spectrum of political challenges that confront governments in seeking to implement and maintain fossil-fuel subsidy reform. Potential macroeconomic, firm-level or household impacts can all deter reform. The central role of energy in G20 economies means that support for fossil fuel producers and consumers has implications beyond the energy sector. Assessing possible economic and social effects of fossil-fuel subsidy reform is therefore a challenging and complex task – one that requires a whole-economy approach, with careful attention to assessing and designing complementary measures to address any anticipated adverse effects.

The explicit reference in the G20 reform commitment to the need to ensure targeted support for the poorest can be seen as a further spur to reform. Fossil-fuel subsidies are widely recognised as a blunt instrument to address social objectives. They often benefit wealthier rather than low-income households and divert scarce government resources from other priorities that may more directly support the needs of vulnerable segments of the population. More efficient allocation of resources post-reform can enhance general welfare, as can astute redirection of government funding previously dedicated to supporting fossil fuels. Relevant to the G20's joint commitment for fossil-fuel subsidy phase-out, international literature on the economic and environmental implications of a multilateral approach to phasing out fossil-fuel subsidies shows that co-ordinated removal of subsidies would lead to aggregate welfare gains across countries (Nachtigall et al., 2021^[81]). These range from 0.2% by 2150 to 0.4% in 2050 compared to a business-as-usual scenario, depending on the study – although the aggregate figures mask variations in welfare gains across and within countries.

This section provides guidance to G20 governments on how they might go about anticipating and addressing possible impacts of reform of fossil-fuel subsidies, drawing on recent OECD framework guidance across the reform trajectory (Elgouacem, 2020^[82]). Careful design of reform can help shore up specific reform initiatives against political backlash and backsliding, supporting enhanced ambition and durability of fossil-fuel subsidy phase-out. The section sets out recent evidence, primarily from OECD analysis, on possible winners and losers of fossil-fuel subsidy and broader environmental fiscal policy reform processes.⁴ It considers alternative or complementary policies that can enhance economic, fiscal or social outcomes of government intervention, to help governments more effectively address political challenges of reform. All too often, perceived impacts on economic growth, employment and income from energy price increases across end-users can deter reform in developed and emerging economies alike, without full pursuit of evidence of likely adverse effects of reform, and alternative means of government intervention or possible mitigating measures. Finally, the section highlights examples of future work priorities proposed in the literature, to give a flavour of the evidentiary gaps relevant to the political dimensions of fossil-fuel subsidy reform for possible future analysis.

Tools to identify winners and losers of fossil-fuel subsidy reform, and find and facilitate alternatives to subsidised activities

Recent OECD analysis (OECD, 2021^[2]), (Elgouacem, 2020^[82]) **highlights identifying and quantifying adverse effects that might hinder reform, and finding alternatives to subsidised activities, as two of four major analytical steps** integral to building the necessary evidence base for successful reform.⁵ The work proposes a set of analytical tools to support governments undertake both steps, drawing on latest international literature (Table 4.1).

Table 4.1. Analytical tools to help identify and address potential adverse impacts of reform

Step in sequential approach	Objective	Analytical tools	Availability of the tool
Identify the winners and losers of fossil-fuel support reform processes.	Analyse the distributional impact and other potential adverse effects of reform of support for fossil fuels.	Micro-simulation models (based on household and firm surveys) CGE models	OECD micro-simulation model for energy taxes Commitment to Equity (CEQ) Institute assessment tool OECD ENV-Linkages, OECD METRO, UCL Energy Institute models
Evaluate alternative policies with better economic, environmental, fiscal or distributional outcomes.	Identify policies that increase the efficiency and improve the distributional impact of government intervention.	Micro-simulation models (based on household and firm surveys) CGE models	OECD ENV-Linkages, OECD METRO, UCL Energy Institute models

Note: The list of analytical tools is not exhaustive. It sets out the mostly frequently used tools in this policy area and those utilised by the OECD. Source: (OECD, 2021^[2]), (Elgouacem, 2020^[82]).

Both empirical and modelling-based approaches can shed light on potential household, firm or industry-level effects, helping to identify individuals and entities that may be adversely affected either directly, or due to price shifts for inputs and outputs across the fossil-fuel value chain. Anticipating the nature and extent of any undesired economic and social impacts of phasing out fossil-fuel support as an integral part of policy design is at the heart of political acceptance of reform, and thus its successful passage.

Economic studies using micro-data rely on highly detailed firm or household data on expenditures and incomes to assess the impact of reform on firm competitiveness or household income, and thereby consumption demand or welfare more broadly. The granularity of household- or firm-level surveys enables detailed assessment of groups impacted by reform, the extent of the impact and effects on poverty or inequality. The OECD has used micro-simulation models based on household and firm surveys to assess distributional and other impacts of fossil-fuel subsidy and broader environmental fiscal reform (i.e. changes in energy taxes and carbon pricing) (see Table 4.1 and Table 4.2). Other organisations have developed modules to support governments to the same end (Fabrizio, Goumilevski and Kpodar, 2016^[83]), (Enami and Lustig, 2018^[84]), (Table 4.1). However, the country, sector or region specific nature of survey-based studies can make it harder to translate their results into more general conclusions. In addition, they do not account for knock-on effects, often give only near-term information on impacts of reform and do not account for behavioural responses, which means that such studies may not capture dynamic responses to changes in policy.

Structural and computable general equilibrium (CGE) models – at the global, country, or sectoral level – can serve as an important complement to empirical studies, as they enable dynamic and

long-term predictions of responses to reform. They can be calibrated to account for indirect or feedback effects. The OECD has extended its ENV-Linkages CGE model, developed to assess climate change mitigation policy, to study potential macroeconomic and distributional impacts of fossil-fuel subsidy reform (see Table 4.1 and below). The OECD's Trade model METRO (Modelling TRade at the OECD), developed to explore the economic impact of changes on policy, technology and other factors, is also undergoing extension to enable assessment of distributional effects (OECD, 2021^[85]). Energy-specific models are available through universities and research institutions such as the University College London Energy Institute, which has a number of models. These range from a bottom-up model capturing project-level oil and gas extraction information (BUEGO) to an integrated assessment model aiming to capture the complexity of the climate system (TIAM-UCLIAM) (UCL, 2021^[86]).

Modelling tools can provide much information on likely effects of fossil-fuel subsidy reform (Table 4.2), but – like studies using micro-data – have shortcomings that mean that they should not be taken as precisely predictive. These include, for example, that structural and CGE models often rely on fixed parameters that may change over time, such as the proportion of income saved by households. It can also be challenging to isolate particular industries or regions due to computing limitations, and granularity may be low, impacting the ability to capture distributional effects. These constraints can limit the range of questions that models can address. Survey-based analysis can help complement insights from structural and CGE models.

Table 4.2. Modelling tools for assessing potential impacts of fossil-fuel subsidy reform

Scope	Indicators	Tools
Macroeconomy	Gross domestic product Inflation Public debt Employment	Computable general equilibrium model
Firms	Competitiveness Redistribution between firms or sectors	Micro-simulations based on firm surveys Empirical model Sectoral model Computable general equilibrium model (with specific add-on)
Households	Inequality Poverty Redistribution across income groups	Micro-simulations based on household surveys Computable general equilibrium model (with social add-on)
Environment	Greenhouse gas emissions	Computable general equilibrium model Micro-simulation models based on household and firm surveys

Source: (OECD, 2021^[2]), (Elgouacem, 2020^[82]).

Similarly, both micro-simulation and CGE models can support governments to craft alternative or complementary measures to both address any negative impacts of reform on households and firms, and channel fiscal savings to more productive uses, consistent with the wide-reaching impact of fossil-fuel subsidies in the economy (Table 4.1).

The following discussion sets out principal findings from OECD and some broader analysis deploying the tools flagged above to advance international understanding of possible winners and losers of reform and how best to go about finding and facilitating alternatives to subsidised activities.

What impact of reform on employment and firm-level outcomes?

The literature on overall employment and firm-level effects of energy price increases resulting from environmental fiscal reform, including fossil-fuel subsidy reform, is nascent but growing. Despite

its policy relevance, evidence of possible employment and firm-level responses to energy price increases is scarce, albeit to a lesser extent than was previously the case (Brucal and Dechezleprêtre, 2021^[87]), (Dechezleprêtre, Nachtigall and Stadler, 2020^[88]), (Dussaux, 2020^[89]), (Hille and Möbius, 2019^[90]), (Dechezleprêtre, Nachtigall and Venmans, 2018^[91]), (Flues and Lutz, 2015^[92]).

Considering that the energy mix is still largely based on fossil fuels in many countries, the employment and other firm-level impacts of environmental fiscal reform mainly depend on how firms respond to energy price shocks. There are multiple ways that affected firms might respond, including simply absorbing the cost increase into profits without any shift in pricing schemes, energy demand, output or employment if they have the capacity to do so, or passing the cost through to firms that purchase their products through increased output prices. They may also pursue high-return energy and material efficiency improvements, or change technological processes through fuel switching or by reducing energy-intensity of production. Alternatively, they may reduce energy consumption, output and employment, potentially leading to more significant economic loss (Brucal and Dechezleprêtre, 2021^[87]), (Dussaux, 2020^[89]), (Rentschler and Kornejew, 2017^[93]).

The existing empirical evidence shows that environmental fiscal reform can have little to no effect on industry-level employment and other indicators of competitiveness, including in emerging economies. The literature review in (Ellis, Nachtigall and Venmans, 2019^[94]) on the ex-post empirical assessments on the impact of carbon pricing in OECD and G20 countries find no statistically significant effect on several dimensions of competitiveness. Their findings also point towards the influence of relatively low carbon prices, and the exemption of many industries from carbon pricing schemes. Recent OECD work uses a dataset comprising all Indonesian manufacturing plants of 20 employees or more in the period between 1980 and 2015 to look empirically at the impact of higher energy prices resulting from fossil-fuel subsidy reform on the economic and environmental performance of firms (Brucal and Dechezleprêtre, 2021^[87]). The work documents aggregate, industry-level energy intensity and employment trends over time and causes of change, providing insights into how industry as a whole may adapt to policy-induced energy price shocks. Despite a very small increase in plant exit and employment reductions in large and energy intensive plants (-0.2%), a 10% increase in energy prices resulted in no impact on job creation or destruction at the industry-level, with jobs being reallocated to more energy-efficient firms rather than forfeited from the sector. The price increases also had no strong negative impact on real output. Previous evidence of the impact of energy price increases on firms in developing countries is limited, with the exception of (Rentschler and Kornejew, 2017^[93]), which looks at the effect of energy price shifts on firm-level competitiveness in Indonesia. However, the latter study assesses small enterprises only, representing less than 20% of Indonesia's industrial output.

Using data on 8 000 French manufacturing firms between 2001 and 2016, another recent OECD study assesses the impact of energy prices and carbon taxation on firms' economic performance (Dussaux, 2020^[89]). This study shows that a 10% rise in energy prices resulted in a shift of production and workers to energy-efficient firms, but had no impact on net employment at industry level in France. That is, the overall impact of the price increase on job levels in manufacturing industries was null, as small firms including new entrants compensated for reductions in employment in large, energy intensive firms (with over 50 employees).

Both studies are consistent with the results of simulations in (Chateau, Bibas and Lanzi, 2018^[95]), which uses the OECD's ENV-Linkages CGE modelling tool to assess the labour-income distribution consequences of structural changes brought about by decarbonisation policies more broadly. A central scenario assuming global adoption of a USD 50t/CO₂ carbon tax finds a generally small and positive impact of the tax on aggregate employment, when combined with revenue recycling to reduce taxes on wages (0.3% for OECD countries and 0.8% for non-OECD countries). The results reflect that sectors heavily impacted by the carbon tax – mostly energy sectors – represent a small share of total employment. Climate policies “do not fundamentally reshape labour markets”.

The principle holds even in the case of ambitious reform, resulting in large environmental benefits.

The Indonesian example involved a 10% energy price increase, driving significant reduction in energy use and CO₂ emissions of 5.2% and 5.8% across industry on average, with greater reductions in energy-intensive sectors. In addition to improving energy intensity of output, the pricing reforms prompted plants to enhance the energy-efficiency of capital stock, with firms increasing turnover of machinery and vehicles with energy price increases (Brucal and Dechezleprêtre, 2021^[87]). Similarly, in the French case, a 10% energy price increase resulted in a reduction of energy use and CO₂ emissions of 6% and 9%, again with no net effect on industry-wide employment. Simulations reinforced the finding of significant impact of energy taxes and market-based pricing mechanisms on emissions: when compared to a “no-tax” scenario, the carbon tax rate of EUR 45 per tonne acted to reduce 2018 CO₂ emissions from the manufacturing sector by 3.6 Mt (5%). A tax rate of EUR 86 would reduce the sector’s emissions by 6.2 Mt (9%), even as “likely leaving total employment unaffected” (Dussaux, 2020^[89]).

Across sectors, the empirical evidence to date on variations of employment and output response is mixed.

In (Brucal and Dechezleprêtre, 2021^[87]), large and energy-intensive sectors tended to reduce energy consumption significantly when faced with higher energy prices while sectors less reliant on energy demonstrating a weaker response. This did not translate into equivalent cross-sector heterogeneity in terms of employment and output response, however. With the exception of the food and basic metal sectors only, (Brucal and Dechezleprêtre, 2021^[87]) demonstrates no statistically significant employment response to higher prices across sectors; only the latter registered a reduction in employment (10%). In terms of output, the study showed that smaller plants tend to expand production with price increases, while larger plants are not affected; this pattern applied both within and across sectors. In (Dussaux, 2020^[89]), changes in energy price were shown to drive a 0.25% reallocation of employment on average across the manufacturing sector, but with significant variation across industries. Worker reallocation was substantial in the food products (0.73%), basic metals (0.61%), and wearing apparel (0.53%), while pharmaceuticals, paper and textiles showed little reallocation (0.07%, 0.05% and 0.04%). Output data was unavailable at plant level for the French manufacturing industry.

The simulation exercise of the sectoral employment impacts of global adoption of a USD 50t/CO₂ carbon tax in (Chateau, Bibas and Lanzi, 2018^[95]) finds substantial impacts on employment in very few sectors only, as “employment largely follows output”: mining and fossil fuel supply (-8% in OECD countries), fossil-fuel electricity (-8%) and other electricity sectors (+7). Labour changes are smaller than output changes for both OECD and non-OECD economies, reflecting the high cost of sectoral reallocation of labour.

In terms of firm-level impacts, the empirical literature fails to identify significant adverse competitiveness effects of environmental fiscal reform across common competitiveness indicators such as employment, output, profits and exports when comparing regulated and unregulated firms.

A recent OECD study investigates the joint economic and environmental impacts of the EU Emissions Trading System (ETS) on regulated firms using firm-level data and installation-level information for all countries covered by the EU ETS (Dechezleprêtre, Nachtigall and Venmans, 2018^[91]). The study is significant as the first European-wide analysis of the economic impacts of the EU ETS on regulated companies between 2005 and 2012 (i.e. during the first two phases of the ETS’ existence). While inducing emissions reductions of around 10% in this period, the EU ETS had no negative impact on firms’ profit and employment outcomes when compared to installations with similar characteristics operating in the same country and sector, but falling below the production capacity threshold at which the EU ETS kicks in. Moreover, the system led to an increase in revenues and fixed assets for the firms in question, likely resulting from enhanced productivity from increased investment in carbon-saving technologies. The findings lead the authors to conclude that competitiveness concerns associated with the EU ETS have been “vastly overplayed”, although they recognise that different impacts could result in the future, as the emissions cap becomes more stringent.

Similarly, a 2015 study assesses competitiveness impacts of Germany’s electricity tax, introduced in 1999 and levied on electricity-use, on firms in Germany’s manufacturing sector (Flues and Lutz, 2015^[92]). With

the intent to cushion any negative competitiveness impacts of the tax, reduced rates were applied to firms using electricity amounts above certain thresholds (80% of the full tax rate). The econometric analysis demonstrates that the reduced rate had no robust effects, either positive or negative, on firms' competitiveness. Firms similar to those benefiting from the reduced rates that were not eligible for the same relief suffered no detriment on several indicators for competitiveness including turnover, exports, value added, investment and employment. Given the lack of effects on competitiveness, the study queried the rationale for the tax deduction, pointing to the fact that the revenue could be used to reduce other distortionary taxes, such as those on labour income. It proposed that the reduction be removed over time, by increasing the energy use threshold triggering the reduced rate, while monitoring any competitiveness impacts.

The review finds that the empirical literature fails to identify economically meaningful competitiveness impacts of carbon pricing policies across employment, output or export indicators. The EU ETS and German studies are consistent with the findings of a comprehensive review of the *ex post* evaluations of competitiveness impacts of carbon prices across a number of competitiveness indicators (Arlinghaus, 2015^[96]). While the majority of studies pertain to systems subject to exemptions or free emissions permit allocation, the more limited number of papers that compare firms subject to beneficial treatment to those paying full rates also fail to find any difference in competitive position between the two groups. The preferential treatment was therefore likely unnecessary to consolidate the competitive position of the relevant firms.

The findings are consistent with an expanding body of empirical literature analysing the joint environmental and economic impacts of environmental policies more broadly. That literature demonstrates that more stringent environmental regulation improves environmental performance without having a detrimental effect on economic performance (Dechezleprêtre and Kruse, 2018^[97]). The literature focused on competitiveness impacts of environmental regulations demonstrates that environmental policy implementation can lead to statistically significant but small short-run adverse effects on trade, employment, plant location and productivity, in particular in a small group of pollution- and energy-intensive sectors (Dechezleprêtre and Sato, 2018^[98]). However, other factors determining trade and investment location choice such as transport costs and proximity to demand have a far greater impact, including because the share of energy costs in production costs is relatively minor (for example, 5% at most for EU manufacturing sectors) (Rentschler and Kornejew, 2017^[93]).

Modelling work indicates that redistribution schemes also play a role in determining the macroeconomic impact of a rise in energy prices. 2015 work extends the OECD's ENV-Linkages CGE model to assess the macroeconomic, but also distributional impacts of a phase out of all Indonesian fossil-fuel subsidies between 2012-2020, under three stylised redistribution schemes (Durand-Lasserve et al., 2015^[99]). These include cash transfers, support according to labour income and subsidies on food products. The results indicate that Indonesia stood to experience GDP gains of between 0.4 and 0.7% of GDP in 2020 by removing fossil fuel subsidies, depending on the redistribution scheme, with direct payment on a per household basis resulting in most significant gains. Welfare gains for consumers ranged from 0.8-1.6% in 2020, with both sets of gains stemming from more efficient resource allocation across sectors following reform – although the food subsidy redistribution scheme was shown to introduce other inefficiencies and result in less savings and investment.

What impact of reform on households?

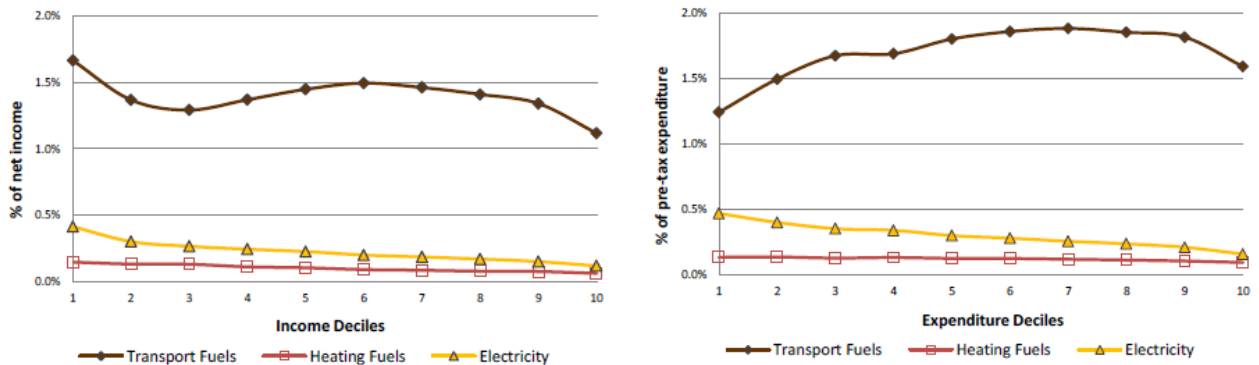
Reform can impact households through shifts in consumer prices and income, and as a result of accompanying redistribution mechanisms. Energy prices are directly affected; impacts of reform on the prices of other goods are indirect, resulting from the increase in energy costs of firms. Disposable

household income can be impacted by changing wage and non-wage incomes due to changes in firm behaviour, as well as possible changes to transfers and taxation on income as part of any compensatory measures that seek to redistribute government budget previously spent on subsidising fossil fuels. Reform will have distributional consequences if changes in price and income differ across households. Household expenditure structures, income sources and capacity to reduce demand in response to changes in income and prices are also relevant. If for example energy products represent a significant share of household budget and ability to adjust to price increases is low, a household may be negatively impacted by reform absent compensatory measures (Durand-Lasserve et al., 2015^[99]), with potential implications for overall poverty levels. In addition, reform may prompt fuel switching in vulnerable households in favour of cheaper sources of energy, with potential health and environmental consequences (Rentschler and Bazilian, 2016^[100]).

Evidence of actual distributional impacts of energy taxes across 21 OECD countries shows that the picture is not clear-cut. A 2015 OECD study uses household expenditure micro-data to model the burden of energy taxes across income and expenditure deciles (Flues and Thomas, 2015^[101]). It assesses whether overall energy taxes and taxes on electricity, transport fuels and heating fuels have a progressive, regressive or proportional impact – that is, whether the share of income or expenditure spent on energy taxes is greater in higher deciles, lower deciles or independent of income or expenditure.

Distributional effects of energy taxes differ across electricity, transport fuels and heating fuels. The study shows that – for the 21 countries analysed – taxes on transport fuels are more or less proportional as a percentage of net income, and generally progressive as a percentage of pre-tax expenditure, with a lower proportion of expenditure in households in lower deciles spent on taxes on transport fuels (Figure 4.1). The principal driver of this outcome is that poorer households are less likely to use transport fuels. The weighted country average masks heterogeneity across countries, however, with some countries showing progressive effects on both measures, more proportional effects, or greater burden on middle deciles. This finding is consistent with broader studies of distributional impacts of energy taxes (Flues and Thomas, 2015^[101]). Conversely, taxes on heating fuels are slightly regressive on both measures, with households in lower income and expenditure deciles spending more proportionally than those in middle and upper deciles, as are taxes on electricity, to a greater extent. The slightly regressive nature of taxes on heating fuels may result from lower expenditure households being more likely to live in buildings with poor insulation – although they may also be more likely to live in smaller surface areas. The clearly regressive nature of taxes on electricity may result from difficulties in poorer households to reduce electricity consumption due to unavoidable fixed consumption, and constraints on replacing older, less efficient appliances. Overall, the results suggest that an increase in electricity prices resulting from environmental fiscal reform would tend to have regressive effects, while the opposite could be expected of reform resulting in an increase in the cost of transport fuels.

Figure 4.1. Average taxes on transport fuels, heating fuels and electricity as a % of net income and pre-tax expenditure (21 countries)



Source: (Flues and Thomas, 2015_[101]).

Redistribution schemes are also determinative of the welfare and distributional performance or reform, as well as its political acceptance. Phasing out fossil-fuel subsidies can be pro-poor and progressive; it is the redistributive scheme that matters in determining the impacts of reform on inequality and poverty, and whether poorer households in fact benefit from reform (Durand-Lasserve et al., 2015_[99]), (Rentschler, 2016_[102]), (Chateau, Bibas and Lanzi, 2018_[95]), (Mackie and Hašičič, 2019_[103]). Examples include cash transfers to households, a reduction of taxes on non-energy expenditures and enhanced services for the public.

A study assessing the impact of energy taxes on the affordability of domestic energy – the ability of households to pay for “necessary levels of energy use within normal spending patterns” – illustrates the important role of redistributive schemes in shaping the impact of reform on households (Flues and van Dender, 2017_[104]). It simulates an energy tax reform applying a EUR 45/t CO₂ on heating fuels and electricity in 20 OECD countries, generally increasing applicable tax rates, to monitor how energy affordability indicators change. The study finds that reform tends to enhance energy affordability when combined with an income-tested cash transfer funded by one-third of the revenue increase arising from the reform. Such a scheme also increases real income for the final two income deciles and can render reform progressive. By contrast, a lump-sum transfer funded in the same way only increases energy affordability according to the most stringent of three indicators of affordability used in the simulation, and may merely mitigate regressive impacts (i.e. rather than rendering reform progressive).

Disaggregated analysis of potential impacts of reform can support effective tailoring of compensation mechanisms and public acceptance of phase-out of fossil-fuel subsidies. For example, regional variation in the effects of reform on vulnerable households demands care in designing compensation schemes to ensure they reduce, or at least do not exacerbate distributional outcomes across regions (Rentschler, 2016_[102]). A 2016 study of welfare effects of fossil fuel subsidy reform in Nigeria based on a statistical simulation model assesses the regional variability of reform. It demonstrates that compensation that appears to mitigate energy price shocks at national level can fail to do so in certain regions due to differences in energy consumption, “putting livelihoods (and public support for reforms) at risk”. This was found to be the case for 16 of 37 Nigerian states in (Rentschler, 2016_[102]), demonstrating the need for a disaggregated approach to compensation across regions to understand and meet differences in vulnerability.

In terms of effects of reform on workers, employment reallocation between energy-intensive and energy-efficient firms driven by energy price increases implies redistributive implications and costs for those workers who are laid-off (Dussaux, 2020_[89]), **as well as regions in which energy-**

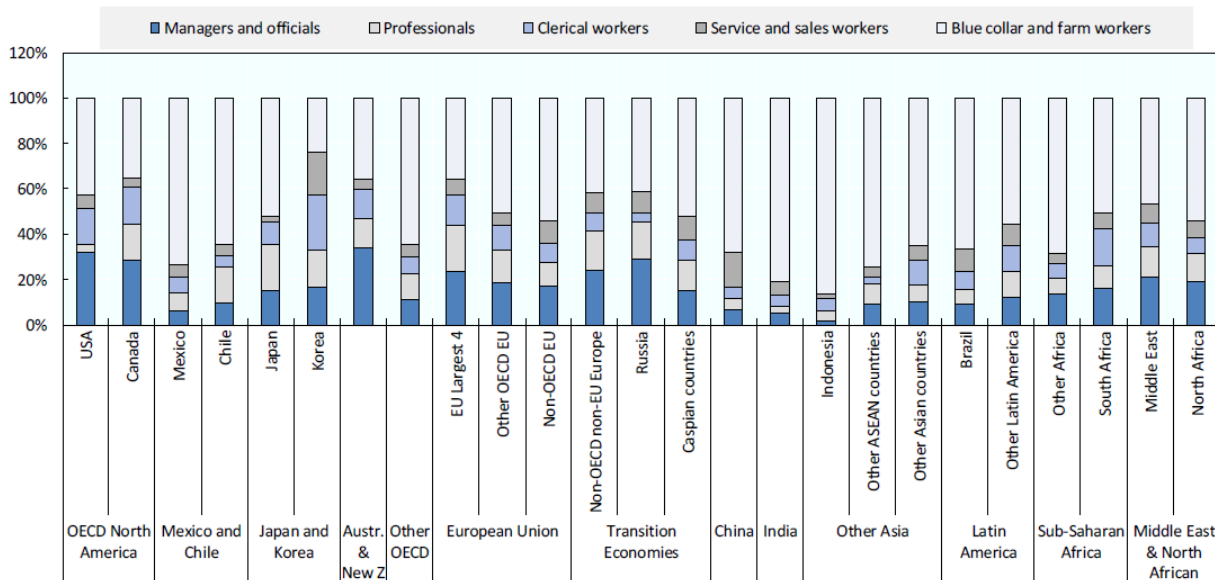
intensive industry accounts for a large share of employment (Botta, 2019^[105]). Worker relocation can destabilise community and family lives; post-displacement jobs also tend to be “worse” than previous employment in terms of average earnings and across other dimensions (Botta, 2019^[105]), (OECD, 2013^[106]). This has prompted the international community to recognise the need for a just transition of workers in the context of the policy changes required for the low-carbon transition more broadly, including in the Paris Agreement preamble and the adoption of International Labour Organization Guidelines for a just transition towards environmentally sustainable economies and societies for all (ILO, 2015^[107]). However, significant labour reallocation goes hand in hand with modern economies. Involuntary job loss induced by structural change or other economic factors impacts between 2 and 7% of employees every year (OECD, 2013^[106]).

The limited studies available suggest that new jobs resulting from the low-carbon transition more broadly may not be located in the same geographical areas in which jobs are likely to be phased-out (Botta, 2019^[105]), with implications for adjustment costs. Evidence suggests that employment in fossil-fuel mining and a number of carbon-intensive sectors is geographically concentrated. Concentration of job losses and mismatch with location of new jobs may be a particular challenge for small or undiversified regional economies.

Modelling analysis suggests that low-skilled workers will be more affected by environmental fiscal reform with respect to both job reallocation and wage income than other workers (Chateau, Bibas and Lanzi, 2018^[95]). The general equilibrium modelling analysis in (Chateau, Bibas and Lanzi, 2018^[95]) differentiates between job categories to reflect labour market imperfections resulting from the high costs associated with worker mobility across sectors. Rigidities in labour markets, combined with the different impact of decarbonisation policies on sectors and job categories, imply consequences for labour-income distribution. The analysis finds that job reduction resulting from adoption of a USD 50t/CO₂ carbon tax globally would affect blue collar and farm workers most in most countries, as a job category concentrated in energy and energy-intensive industries. They account for two-thirds of total job reallocations on average (Figure 4.2). Workers tend to benefit from the carbon tax when revenues are used to lower income taxation, however – although low-skilled workers are most vulnerable to experiencing a decline in net wage income as carbon tax levels increase.

Figure 4.2. Job reallocation shares by job category and by region, (Chateau, Bibas and Lanzi, 2018_[95]) central scenario

% of total employment reallocations, w.r.t. reference equilibrium, 2011



Note: The job reallocation shares are calculated as the employment reallocations (sum of job destructions and job creations) for each job category in percentage of the total employment reallocations.

Source: (Chateau, Bibas and Lanzi, 2018_[95]), OECD ENV-Linkages model.

Finding and facilitating alternatives to subsidised activities

OECD and broader international literature demonstrates that economic, distributional and environmental improvements result from means-tested cash transfers or more-targeted fuel subsidies as opposed to blanket consumer price support (i.e. government measures that lower domestic prices relative to market prices) (Rentschler, 2016_[102]), (Yusuf and Resosudarmo, 2008_[108]).

Policy objectives that look across and harness synergies between policy areas can help ensure that reform increases welfare and effectively manages any trade-offs between economically efficient policies, “equitable” income distribution and better environmental outcomes, building on the considerable scope for reducing distortions from fossil-fuel subsidies (Elgouacem, 2020_[82]). Taking a whole-economy approach and ensuring fossil-fuel subsidy reform is anchored in broader climate and energy transition agendas, including transition programmes for concerned sectors, will help protect vulnerable segments of the population from harm.

The OECD’s *Going for Growth* work stream adopts an integrated approach to advising countries on structural reform priorities to boost income, inclusiveness and sustainability, to advise on reform packages that account for synergies and trade-offs between policies, and mitigate adverse effects (OECD, 2019_[109]). With respect to fossil-fuel subsidy reform, increasing energy taxes on firms and lowering labour costs has been identified as an alternative measure to reduce the “deadweight loss” (i.e. costs to society) from support, while mitigating the impact of higher energy-input costs (Welsch, 1996_[110]), (Metcalf, 2014_[111]).

Pursuit of economic development opportunities outside the sector should be a focus of reform for fossil-fuel resource revenue dependent countries and regions (Morris, Kaufman and Doshi, 2019_[112]).

What kind of redistribution schemes can make fossil-fuel subsidy phase-out pro-poor and progressive? Simulations in the 2015 OECD study using the OECD's ENV-Linkages CGE model to assess impacts of fossil-fuel subsidy reform in Indonesia show that, of the three redistribution schemes modelled, cash transfers that increase incomes in the lowest income segments can render reform more appealing for poorer households and help reduce poverty (Durand-Lasserve et al., 2015^[99]). This finding is supported by the international literature (Rentschler and Bazilian, 2016^[100]). Food subsidies are likely to have the same effect, but to a lesser extent. On the other hand, payments proportional to labour income may benefit higher income households disproportionately and increase poverty. Households with labour earnings that are informal – and therefore ineligible for support on that proportion of income – are more prevalent among the poor.

Reliable and affordable access to alternative renewable energies or to more energy-efficient technologies can be critical to facilitate and direct fuel substitution at the firm-level, following energy price increases, for example, through public investments in electrification and renewable energy infrastructure (Rentschler, Kornejew and Bazilian, 2017^[113]). This will avoid price increases being passed on to households, and mitigate short-term losses for firms. Investments can also be made into energy efficiency-enhancing measures, addressing the information, technological and financial barriers faced by firms when reacting to cost increases of fiscal energy policy reforms. Governments can accompany pricing reforms with policy and regulatory efforts to increase the efficiency of various fossil fuel consuming capital, such as motor vehicles, residential and commercial buildings, or of various appliances and equipment available on the market.

Identifying most vulnerable job categories with respect to job and income losses can support implementation of environmental fiscal reform. The modelling simulations in (Chateau, Bibas and Lanzi, 2018^[95]) demonstrate the potential for modelling analysis to support tailored policy design to identify – and correct through revenue reallocation or recycling – any undesirable distributional effects across different categories of workers, “when workers are not interchangeable because they are trained for different jobs”.

Complementary labour market policies can help facilitate between-firm adjustments in employment and provide training or unemployment benefits for workers. The analysis of the French manufacturing industry in (Dussaux, 2020^[89]) suggests the need for complementary labour market policies to facilitate transition of workers between firms and minimise costs on concerned workers. This recognises that employment reallocation between firms driven by energy price increases has redistributive implications and costs. In the French example, the basic metals, food products, beverages, wearing apparels, plastics, and machinery industries had relatively important levels of reallocation.

Ensuring a stable business environment through long-term policy strategies can counterbalance potential competitiveness losses faced by firms. Strengthening institutional and administrative capacity, investing in renewable and electricity infrastructure and labour productivity, and enhancing information flows can be more influential in harnessing firms' competitiveness than eventual energy cost increases (World Bank Group, 2016^[114]).

Lessons from broader country experience with structural adjustment can support development of labour and transition strategies (Botta, 2019^[105]), **including as part of fossil-fuel subsidy reform.** Case studies show that multiple policy instruments are relevant to ease worker relocation, including structural reforms, and active labour market and skills policies. Examples of structural policies include reforms to housing policies to facilitate worker mobility across regions, or spurring firms to meet energy price increases by encouraging innovation through reforms to enhance competition. Active labour market policies include job-search or entrepreneurial training. Skills policies can support displaced workers update or learn new competencies. Involving principal stakeholders to ensure a common vision for long-term transition of regions is also integral to most successful examples of transition management.

Communication and consultation with the public on the benefits of reform are an integral component of successful reform processes (Rentschler and Bazilian, 2016^[100]). Explanation in communication of strategies of accompanying compensation schemes and plans to protect livelihoods and affordability is also important.

Forward work priorities

The international literature proposes a number of forward work priorities to build the evidence base to support government reform efforts. Select forward work priorities are highlighted below.

Employment/ firm-level outcomes

Further econometric studies using firm-level micro-data to broaden the evidence base on how firms respond to energy price shocks and the extent to which energy cost increases translate into competitiveness impacts (Rentschler and Kornejew, 2017^[93]). Further firm survey analysis can support policy design to support firm “coping and adjustment capacities” as required.

Further work to explore the drivers of increase of revenue and fixed assets of regulated firms when compared to unregulated firms in response to environmental fiscal reform (Dechezleprêtre, Nachtigall and Venmans, 2018^[91]). To what extent do regulated firms pass-on increased costs and benefit from environmentally-friendly innovation induced by reform?

Work on complementary labour policies to ease between-firm adjustments in employment caused by changes in energy costs (Dussaux, 2020^[89]). Even if overall firm-level employment effects of environmental fiscal reform may be small, between-firm reallocation of production and workers can have redistributive consequences and costs. These can be met by complementary labour policies.

Households

Future work on distributional effects of environmental fiscal reform across income groups taking into account the impact of behavioural responses to price shifts (Flues and Thomas, 2015^[101]). There is potential to model possible distributional impacts, including as resulting from behavioural responses, of future changes in energy prices resulting from environmental fiscal reform. Examples cited in (Flues and Thomas, 2015^[101]) include reforms involving levelling taxation levels on diesel and petrol on an energy content basis, or through more consistent taxation of electricity and heating fuel use.

Further analysis on the potential impact of increases in energy prices on the distribution of wages (Brucal and Dechezleprêtre, 2021^[87]). The adoption of newer and energy-saving technologies by firms may affect demand for skilled and unskilled labour, and wages for these groups in turn. Further work could assess possible indirect negative income effects on poorer people resulting from shifts in demand for unskilled workers resulting from energy price changes.

Further understanding of the ability of existing social protection schemes to help mitigate any adverse impacts of reform may be important in some countries (Rentschler and Bazilian, 2016^[100]).

Improvements to modelling approaches used to assess distributional impacts of energy price reform (Durand-Lasserre et al., 2015^[99]), (Chateau, Bibas and Lanzi, 2018^[95]). Refinements to enable representation of institutional bottlenecks and challenges associated with the role of social security systems in facilitating cash-transfer based redistribution schemes is one example. Reducing the data intensity of analysis by using synthetic indicators of differences across households to mimic distributional consequences is another. In addition, to build on the work in (Chateau, Bibas and Lanzi, 2018^[95]) to identify wage-income distribution impacts of environmental fiscal policy, future work could increase the number of job categories modelled, to identify potential bottlenecks on specific jobs. It could incorporate a dynamic

setting to seek to capture short- in addition to long-run labour market adjustment costs and rigidities,⁶ including to support elaboration of more complex recycling policies and adaptation of training and education policies to address anticipated impacts of reform across skills and sectors. As the effect of education policies take time to manifest and assess, modelling insights on the dynamics of reform can help address any undesired distributive impacts.

Work to enhance understanding of geographical distribution of expanding and retracting industries (Botta, 2019_[105]). Further focus on the spatial dimension of reform, including the costs associated with seeking new employment for transitioning workers, could aid understanding of employment implications of reform.

Further evidence on how to garner broad acceptance and support for environmentally motivated industrial restructuring processes (Botta, 2019_[105]). Case studies of industrial restructuring highlight the importance of integrating relevant stakeholders into transition planning, but evidence on promoting acceptance of such transition processes remains limited.

5 Developments in support of fossil-fuel subsidy reform

This section reports firstly on developments and work in support of fossil-fuel subsidy reform in international fora beyond the G20, as relevant to continued progress and momentum globally.⁷ It incorporates contributions provided by the Organisation of the Petroleum Exporting Countries (OPEC). It then reports on IEA and OECD recent activities.

APEC project on lessons learnt and good practice from APEC-economy fossil-fuel subsidy peer reviews

As part of its 2021 APEC host year, the New Zealand Government has proposed work under the APEC Energy Working Group (EWG) to provide an update on lessons learnt and good practice from the eight APEC-economy fossil-fuel subsidy peer reviews conducted to date under the auspices of APEC and the G20. Co-sponsored by Hong Kong, China and Chinese Taipei, the project will take stock of progress in phasing out fossil-fuel subsidies in APEC economies, the role of the peer review process in promoting reform, and potential ways, if any, to enhance the APEC peer review process. It will comprise both a report and virtual workshop in July 2021, to facilitate sharing of information and best practices emerging from reviews.

To date, Peru (2014), New Zealand (2015), the Philippines (2015) and Chinese Taipei (2017) have undergone peer reviews under the APEC umbrella (Section 3). China (2016), Indonesia (2019), Mexico (2017) and the United States (2016) are additional APEC economies to have completed peer reviews in the context of the G20.⁸ Canada – currently undertaking a G20 peer review in a pair with Argentina – is also an APEC economy. The Italian G20 Presidency is supporting the APEC project, endorsed by the APEC EWG in April 2021 and to be undertaken with the analytical support of the OECD, to drive concerted, parallel momentum on reform across APEC and the G20. The project complement the analysis in Section 3 of this report.

The project builds on APEC economies' commitment to “rationalize and phase out over the medium-term fossil fuel subsidies while providing those in need with essential energy services”, first stated in the APEC Leaders Declaration in 2009 (APEC, 2009_[115]), and reaffirmed in 2010 (APEC, 2010_[116]), 2013 (APEC, 2013_[117]), and 2015 (APEC, 2015_[118]). The project also aligns with the sustainability aspect of the APEC Putrajaya Vision 2040 to “promote economic policies, cooperation and growth, which supports global efforts to comprehensively address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet” (APEC, 2020_[119]). It will build on a 2017 APEC Fossil Fuel Subsidy Reform Capacity Building Workshop (Energy Working Group, 2017_[120]) and seek to reinvigorate APEC economy progress on fossil-fuel subsidy reform in support of existing APEC commitments.

Friends of Fossil Fuel Subsidy Reform

Since its establishment in 2010, the informal grouping of non-G20 countries, which brings together Costa Rica, Denmark, Ethiopia, Finland, New Zealand, Norway, Sweden, Switzerland and Uruguay, has worked to build consensus on ambitious and transparent fossil-fuel subsidy reform. Since release of the last update report, the Friends have organised seminars at a number of international events and processes, including the December 2019 UNFCCC COP 25 in Madrid (FFFSR, 2019^[121]), the October 2019 World Trade Organization Public Forum (FFFSR, 2019^[122]), the July 2019 United Nations' High Level Political Forum on Sustainable Development (FFFSR, 2019^[123]) and the June 2019 UNFCCC Bonn Climate Change Conference (FFFSR, 2019^[124]). They held a seminar in Stockholm in collaboration with the Stockholm Environment Institute and the New Zealand government in March 2020, focused on the links between climate change, trade and sustainable development (FFFSR, 2020^[125]).

During the pandemic, the Friends have continued their efforts through webinars on opportunities for reform as part of government responses to COVID-19. In December 2020, they issued a joint statement with the United Kingdom – as the incoming co-host of the UNFCCC COP26 and ahead of the 5th anniversary of the Paris Agreement on climate – urging governments, businesses and other organisations to accelerate action to eliminate fossil-fuel subsidies through a focus on green recovery (FFFSR, 2020^[126]).

Organization of the Petroleum Exporting Countries (OPEC)

The G20's country-led approach on this issue recognizes that phasing out or rationalizing inefficient fossil-fuel subsidies is a sovereign issue dependent on the unique situation and priorities of individual countries, including enhancing energy access and the eradication of energy poverty. It further recognizes that efforts on this initiative at the international level should be pursued fully taking into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development.

For their part, OPEC Member Countries have been actively evaluating, assessing and modifying their energy subsidy policies, especially where these are considered inefficient and lead to wasteful consumption. The challenge for energy-exporting countries is to strike a balance between ensuring the optimal use of their finite energy resources, providing energy access to all, and in discouraging wasteful consumption. 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 eradicate energy poverty. Such an approach has been used in many countries as a means of utilizing societal gains to offset the theoretical value loss of selling their energy resources domestically at prices below those on international markets.

Such considerations are not adequately captured in the estimates for subsidies that are based on the 'Price Gap Approach' methodology, as this methodology 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 objective could more than offset the notional value loss of selling the resource internally at below international prices. For this reason, a more accurate benchmark price for countries that are well-endowed with energy resources should be the cost of production. Adding further externalities, such as forgone taxes, would only further inflate any estimates derived from such an approach.

Although the process of tackling inefficient energy subsidies is complicated, certain OPEC Member Countries have developed sophisticated energy governance structures to adapt to market changes and phase out inefficient subsidies that encourage wasteful consumption. Hence, a broad range of recent energy pricing reforms have been pursued in OPEC Member Countries.

As developing countries, OPEC Members take into account that the stability and advancement of their economies is of the utmost importance when examining and planning energy subsidy reforms. Therefore, the country-led initiative being carried out by G20 Members to share knowledge and experiences, as well as good practices, provides an invaluable contribution to these efforts.

IEA in-depth country reviews

The IEA conducts regular in-depth reviews of member and association country energy policies, to support policy development and encourage the exchange of international best practices. Several recent reviews discuss the question of fossil-fuel subsidy reform (Table 5.1).

Table 5.1. IEA in-depth reviews of energy policies that discuss support to fossil fuels

Country and year of review	Analysis relating to fossil-fuel subsidies
Belgium (2021)	Belgium aims to support emissions reductions and energy transitions by phasing out fossil-fuel subsidies. In the first quarter of 2021, Belgium submitted an inventory of (fossil) energy subsidies to the European Commission. Subsidies with the largest forgone tax revenues are the reduced excises for heating oil (EUR 2.1 billion in 2019), preferential fiscal treatment of company cars (approximately EUR 2 billion in 2019) and voluntary agreements with industry (approximately EUR 1 billion in 2019). Belgium's National Energy and Climate Plan (NECP) and Recovery and Investment Plan note that recommendations for fossil-fuel subsidy reform will be examined in 2021 as part of the above-mentioned inventory. The federal government has committed to developing an action plan to gradually phase out fossil-fuel subsidies, including tax reductions for fossil-fuel powered company cars.
Canada (2021)	Canada committed to phase out inefficient fossil-fuel subsidies by 2025. To date, eight tax measures have been or are being phased out. According to Canada, the flow-through share regime is the only remaining tax expenditure at the federal level that provides a preference to, among others, the fossil fuel sector without an end date in view. This programme permits mining companies to renounce certain exploration expenses, passing them on to shareholders who can deduct these expenses from their tax declaration. Canada, alongside Argentina, committed to undergo a peer review of inefficient fossil fuel subsidies under the G20 process, a peer review process that is still ongoing. In 2020, the government introduced COVID-19 relief measures that support oil and gas companies while incentivising them to reduce their emissions. The measures include CAD 1.72 billion to clean up orphan and inactive oil and gas wells; a CAD 750 million Emissions Reduction Fund, with a focus on methane; and CAD 320 million for Newfoundland and Labrador's offshore energy sector to fund safety improvements and upgrades.
Czech Republic (2021)	The Czech Republic supports fossil fuels under the housing allowance, a social benefit to households on the basis of income relative to housing costs, which include fossil-fuel heating. Despite the Minister of Labour and Social Affairs and the Minister of the Environment receiving orders from the Government resulting from the Clean Air Dialogue in 2019 to assess changing the allowance to prefer cleaner heating methods, it will be maintained for the foreseeable future, according to its National Energy and Climate Plan. Investment and operational support are also provided for fossil fuels when used in co-generation.
France (2021)	France applies several exemptions or reduced rates of excise on energy products to specific sectors, notably reduced rates for diesel use in agriculture, buildings and off-road transportation, and a partial refund of the tax on diesel, natural gas, and heavy fuel oil used in agriculture. These amounted to around EUR 2.3 billion in 2019. In transport, freight vehicles of goods benefit from a partial refund of France's fuel tax rate, a measure which had an overall cost of EUR 1.4 billion in 2019. France plans to end oil export support by 2025 and by 2035 for natural gas.
Japan (2021)	Japan provides subsidies for overseas oil, gas and coal exploration and the construction of coal-based power generation. In July 2020, Japan announced a tightening of its export credit policy for support to newly planned overseas coal-fired power generation projects. However, Japan still supports the installation of coal-fired power generation at or above ultra-supercritical levels in certain countries. Japan also enacted a temporary subsidy to support electricity and natural gas bills for consumers in the context of the COVID-19 crisis.
Korea (2020)	Residential electricity tariffs are kept artificially low and are cross-subsidised through industrial sector tariffs. While Korea provides subsidies for domestic coal mining, it is committed to phasing out fossil-fuel subsidies. No final date has been set due to social considerations. In 2018, coal subsidies amounted to USD 24 million. This includes USD 8 million paid to power plants for the use of uneconomical coal. The remaining USD 16 million was provided as a subsidy for the use of coal in domestic heating in coal mining and other remote areas. The government has increased prices of domestically produced coal and coal products every year since 2016. In April 2021, the Korean President announced that Korea will phase-out all new financing for overseas coal projects.
Lithuania (2021)	Lithuania has a range of exemptions or reduced rates of excise on energy products and has one of the lowest excise duties on petrol and diesel in the OECD. Excise duty rates in Lithuania and their structure across energy products remained largely stable over time with many exemptions, notably in the form of reduced excise tax rates for heavy heating oil, and the commercial use of coal, coke and lignite, and of natural gas as heating fuel. Under its National Energy and Climate Plan, Lithuania has outlined plans to phase out these exemptions over time. Positively, a reform saw tax on diesel used in

	agriculture almost tripling from 1 July 2015 to 1 January 2020.
The Netherlands (2020)	The OECD/IEA review of fossil-fuel subsidies in the Netherlands, <i>The Netherlands' Effort to Phase Out and Rationalise its Fossil-Fuel Subsidies</i> was conducted as part of the 2020 IEA Energy Policy Review of the Netherlands. The outcomes of the report and related recommendations are summarised in the in-depth review. See the extended discussion of the fossil-fuel subsidy review in Section 3 of this report.
Spain (2021)	Spain ended all subsidies for coal mining by the end of 2018. With the closure of coal mining operations, the government has redirected coal mining subsidies to restructuring coal mining regions. Spain sets lower prices for specific formats of LPG; tax exemptions for gas oil used in electricity production and other uses such as navigation and rail transport, kerosene for air transport, and fuel oil for electricity production; tax reductions for gas oil for some engine types (including farm tractors); and partial tax refunds for road transport activities including freight, taxis and some regular passenger transport as well as for agriculture and farmers.
Turkey (2021)	Turkey provides incentives to encourage coal mining and the use of domestic coal in power generation. State-owned coal producers (TKI and TTK) set low domestic sales prices for hard coal and lignite. The non-producing areas of these producers were divided and re-licensed, on the condition that a thermal power plant be built near the mine site, for which the government provides a purchasing guarantee (through state-owned electricity company EÜAŞ) for 15 years of electricity at a fixed price. The government offers production subsidies for private underground mining (though not for exploration), based on labour and production methods. The hard coal mining sector receives financial support from the government to pay for miners' wages. Coal and gas power plant operators can also receive capacity payments to prevent plant closures. Coal plants can also enter into fixed-price power purchase agreements with EÜAŞ until the end of 2024. Turkey's upstream oil and gas sector benefits from certain tax exemptions, which were increased amid the COVID-19 crisis.

Source: (IEA, 2021^[127])

OECD country reviews

Economic Surveys

The OECD publishes *Economic Surveys* every two years for each of its member countries and for select partner countries, including Argentina, Brazil, China, India, Indonesia, the Russian Federation, and South Africa. The *Economic Surveys* routinely discuss issues relating to fossil-fuel subsidies and environmental fiscal reform more broadly, often with recommendations related to the liberalisation of energy markets, and the pricing and taxation of fossil fuels, and coal or gas-fired electricity. A summary of relevant discussion in selected *Economic Surveys* published since the last update report is set out in Table 5.2.

Table 5.2. OECD *Economic Surveys* that discuss support to fossil fuels

Reviews published April 2019 to April 2021

Country and date of survey	Recommendations relating to fossil-fuel subsidies or broader environmental fiscal reform
Japan (2019)	In Japan, effective carbon prices are particularly low for coal. Although transport fuel is taxed more than other fuels, they are taxed less than in most OECD countries, and diesel less than petrol, although it contributes more to air pollution. Carbon pricing policies are recommended to take into account the specific circumstances of Japan. For example, a gradual rise in the effective carbon price is recommended due to the high share of fossil fuels in electricity generation, thus limiting disruptions on competitiveness in specific sectors and locations. International experience indicates that raising the level of carbon pricing would generate tax revenues, contributing to an improvement in the fiscal position.
Lithuania (2020)	Lithuania, where carbon is not taxed, except in sectors subject to the European Union emission trading system, has one of the lowest excise duties on motor fuel, and has of the largest 'diesel differentials', the gap in the price of diesel versus gasoline, owing to the differential tax treatment. It also provides among the highest subsidies to fossil fuels in the OECD. Against this background, there is scope for increasing fossil fuel taxes and removing subsidies, which would achieve both reductions in emissions and pollution and generate additional revenues that could help fund green jobs and innovation.
Malaysia (2019)	Malaysia is recommended to phase out distortive energy subsidies (in particular for transport fuels), disproportionately benefiting wealthier segments of society, who consume more of the subsidised products. Although fuel subsidies were eliminated in December 2014, they were reintroduced in June 2018 for all consumers. The survey recommends to introduce a subsidy mechanism targeted to households in the bottom 40% income group by the second half of 2019, which should help reduce energy subsidies and provide support for low-income households. Malaysia should also

	strengthen the taxation of fossil fuel combustion, for example with a carbon tax. This would help reduce carbon emissions and air pollution, while providing a steady flow of substantial tax revenues, which can in turn be used to protect low-income households from affordability risks.
New Zealand (2019)	As part of its need to form a comprehensive GHG emissions reduction plan, New Zealand is recommended to reform its fossil fuel subsidies. Carbon pricing is weak, transport fuel taxes are low and non-transport fossil fuel uses are almost all untaxed, including coal use in industry. The Survey shows progress towards this goal to be limited. For example, the 2018 ban on new offshore oil and gas exploration has been found to likely have a net negative impact on global emissions, due to a shift to higher-emissions production internationally.
Thailand (2020)	A key recommendation is to raise excise taxes on fossil fuels following the pandemic shock, which would also increase Thailand's tax revenue. In addition to strengthening the excise taxes on fossil fuels, a broader usage of carbon tax like in Singapore would also be a useful tool in the long run.

Source: (OECD, 2021^[128])

Environmental Performance Reviews

The OECD publishes *Environmental Performance Reviews* on a cyclical basis for member countries and key partner economies such as Argentina, Brazil, China, Indonesia, and South Africa. Table 5.3. provides a summary of the reviews published since April 2019 that have discussed fossil-fuel subsidies or environmental fiscal reform more broadly.

Table 5.3. OECD Environmental Performance Reviews that discuss support to fossil fuels

Reviews published April 2019 to April 2021

Country and date of review	Recommendations relating to fossil-fuel subsidies or broader environmental fiscal reform
Belgium (2021)	<p>Following the recommendations of the 2007 EPR, the National Debate on Carbon Pricing identified options to implement a carbon price in non-ETS sectors. However, this remains to be implemented, and the plan to phase out fossil fuel subsidies was postponed. A multi-stakeholders' mechanism to track and support the reform of environmentally related taxes and subsidies, for example by following-up on the National Debate on Carbon Pricing would be helpful.</p> <p>Increased revenue from fossil-fuel subsidy reform could help fund low-carbon infrastructure and support vulnerable households. Support to fossil fuel consumption was equal to 40% of energy tax revenue in 2018, among the highest rates in the OECD. It is mostly composed of tax preferences for the use of oil products, in particular lower taxation of heating oil and partial refund of excise duty on diesel for commercial use. These tax preferences narrow the tax base and undermine carbon prices. Support to fossil fuel consumption rose significantly in the past decade as forgone revenue from tax concessions increased with taxes on diesel. Belgium has not reported progress towards phasing out fossil-fuel subsidies in its NECP as required by EU regulation. Belgium has introduced measures to support vulnerable households: reduced tax rates on heating oil, as well as social tariffs for electricity and natural gas. These measures often fail to target the most in need, distort prices, fail to encourage people to save energy, and reduce investment capacity in infrastructure. Providing direct support to vulnerable households, decoupled from energy consumption, would better address environmental and equity issues.</p> <p>Belgium should adopt a sequential approach to minimise the political backlash and risk of backtracking that often accompanies reforms of fossil fuel subsidies. First, it should identify and estimate support measures for fossil fuels and document their objectives. Second, it should measure the relative distortion of support measures and prioritise them for reform. Third, it should evaluate the distributional effects of reform. Finally, it should identify alternative policies that increase the efficiency and improve the distributional impact of government intervention. While Belgium regularly monitors progress in this area through the list of tax expenditures attached to the annual federal budget bill, it lacks details and only partially covers regional tax expenditure. Belgium has not implemented the 2007 recommendation to establish a Green Tax Commission. The High Council of Finance envisages the reform of some environmentally related taxes and subsidies as part of its advice on the foreseen labour tax reduction (HCF, 2020^[129]).</p>
Denmark (2019)	<p>Denmark has a long history of energy taxation and carbon pricing, being one of the first countries to introduce a carbon tax (1992) and pioneering CO₂ emission trading for the power sector (2000). Taxes on energy products accounted for 2.2% of GDP in 2016, one of the highest levels in the OECD. In line with the recommendation in Denmark's 2007 EPR, energy duty rates, which apply to fossil fuel use (oil products, natural gas, coal, coke and fossil waste) are now indexed for inflation.</p> <p>Industry and agriculture face a considerably lower tax burden due to reductions and exemptions. The electricity tax for industry, for example, was set at DKK 4 (EUR 0.54) per MWh in 2019, just above the EU minimum and about 200 times below the ordinary electricity tax applicable to households (DKK 884 or EUR 119/MWh). The large disparity in energy tax rates creates unequal incentives for energy savings, and is not justified from an environmental perspective. The energy tax burden on industry (i.e. energy tax revenue as a share of industry's gross value added) declined from 1.5% in 2004 to</p>

	<p>0.8% in 2016, where there is scope for reform. Electricity taxes for households are the highest in the EU. While historically high taxes have encouraged power savings, their justification diminishes as power generation becomes cleaner. They also interfere with the cap in the EU ETS and discourage switching towards efficient solutions for electric heating (e.g. heat pumps and electric boilers) or electric vehicles, and create incentives for self-generation of power (e.g. with individual rooftop photovoltaic systems), even where socio-economically inefficient. The government has taken steps to address this issue. It has reduced the electricity tax for heating (both for households and businesses) to DKK 259 (EUR 35) per MWh and plans to differentiate the tax on electricity used for electric vehicles. This will help increase the attractiveness of electric heating and mobility vis-à-vis fossil fuel- and biomass-based solutions. Unfortunately, the Energy Agreement also lowers the rate for some businesses to the minimum set for industrial processes, contributing to disparity among users.</p> <p>While energy taxes are an important source of budget revenue, accounting for 5% of total tax revenue in 2016, energy-related tax revenue has fallen by 11% since 2005 in real terms. The decline was driven by reductions in revenue from the CO₂ tax and the energy duty on petrol and natural gas, which in turn reflected declining consumption of fossil fuels and associated CO₂ emissions. Revenue will likely continue to fall with the projected decline in fossil fuel consumption, the phase-out of the Public Service Obligation tax and reductions in the electricity tax. The government is considering temporarily increasing energy taxes or establishing a new temporary energy tax to finance the shortfall. Reducing the gap between industrial processes, heating purposes and other uses and/or taxing biomass could help in this respect.</p>
Greece (2020)	<p>Effective tax rates on CO₂ emissions from energy use are high compared with other OECD countries. However, tax variation across fuels and uses, as well as tax concessions, provides inconsistent carbon price signals. Although decreasing, fossil-fuel consumption subsidies account for more than one-quarter of energy tax revenue, among the highest rates in the OECD. This includes tax expenditures compliant with the EU Energy Taxation Directive (e.g. excise tax exemption on specific industrial use of coal and coke, and on diesel for aircrafts and vessels, plus reduced excise on oil for heating) and budget transfers (subsidies for oil-based power generators in non-interconnected islands, oil heating allowances to households, capacity payments to gas- and coal-based electricity producers). There is room to improve the monitoring of these direct and indirect subsidies and evaluate their social costs and benefits. It is noted that Greece view, the phasing out of fossil-fuel subsidies in the NECP as an effect of the energy transition rather than as an incentive to speed it up.</p>
Indonesia (2019)	<p>Much progress has been made in reducing subsidies to fossil-fuel consumption. Indonesia has a long history of subsidising end-user prices for petrol, diesel, electricity and other energy products to keep energy affordable for the poor, increase energy access and raise household purchasing power. Until 2014, consumption subsidies amounted to about 30% of government expenditure, equal to nearly 4% of GDP. Pressured by an increasingly large fiscal burden, the government embarked on major reforms, linking domestic transport fuel prices to international prices and better targeting electricity subsidies to needy households. This helped cut subsidy expenditure by roughly half between 2014 and 2015 alone, freeing resources for infrastructure and social development.</p> <p>However, not all price reforms have been implemented as announced, putting into question the stability and durability of reform. Subsidies to petrol were abolished in 2015, yet domestic prices have not been adjusted to rising global oil prices since mid-2016. In March 2018, the president announced that petrol and electricity prices would be kept stable until at least the end of 2019, and diesel subsidies were increased in mid-2018. In 2017, the government launched the “single fuel price” policy, which aims to harmonise fuel prices and address inequality across the archipelago. It is questionable whether the state-owned petroleum company, Pertamina, will be able to deliver set fuel prices without government subsidies. Fossil fuel-producing industries benefit from fiscal incentives that aim to encourage reserve discovery and boost output. Frequent policy changes around supportive measures and lack of strong political commitment have depressed investor confidence. While fossil-fuel subsidies have been markedly reduced (to 1.2% of GDP in 2017), they continue to disadvantage renewables vis-à-vis fossil fuels, coal in particular.</p> <p>Current efforts to better target electricity and liquefied petroleum gas subsidies should continue. In the medium term, subsidies should be replaced with targeted support to the vulnerable via conditional cash and non-cash transfer programmes. Indonesia’s work to systematically track fossil-fuel subsidies through their engagement in international forums, including through participation in a peer review on fossil-fuel subsidy reform under the auspices of the G20, is welcomed.</p>
Latvia (2019)	<p>A wide range of environmentally related taxes and charges generates among the highest levels of revenue in the OECD. Since 2015, the government has raised the rates of several such taxes and reformed vehicle taxation to take account of fuel economy. However, rates remain too low to encourage low-carbon investment and a more efficient use of energy, materials and natural resources. Three-quarters of carbon dioxide emissions from fuel combustion face a low price signal or are not priced at all. Support to fossil fuel use remains high, which runs counter to energy saving objectives. Latvia should continue reducing tax exemptions and raising the energy and carbon tax rates; close the petrol/diesel tax gap; and improve vehicle taxation and road charging. This approach would also help raise revenue to finance Latvia’s high spending needs while reducing the tax burden on low-income households. Targeted social benefits can help address any adverse impact of higher taxes and prices on vulnerable groups, in particular given that energy affordability is still an issue in Latvia, as in other Central and Eastern European countries.</p> <p>Despite progress in removing tax exemptions, fuel use in many sectors is still exempt or benefits from reduced rates. The fuels involved include biodiesel from rapeseed oil and some fuels used for heating and in agriculture, fishing, electricity generation and industry. This undermines the carbon price signal and the government’s efforts to improve energy efficiency and reduce CO₂ emissions across the economy. When measured as a share of energy tax revenue, Latvia’s level of fossil fuel consumption support is among the ten highest in the OECD, hovering around 25% of energy tax revenue in 2006-16. Latvia should consider reducing tax exemptions and further raising the energy and carbon tax rates to reflect environmental</p>

and climate damage from energy use. Increasing transport fuel taxes could also help make the tax system more progressive. The government has made some progress in reducing total exemptions from energy taxes. For example, diesel partially blended with biodiesel has been taxed at the standard diesel rate since 2015; the exemptions on natural gas used in industry and fuels used in agriculture and fishing were replaced by reduced rates. The reduced value added tax on natural gas used by households was discontinued in 2011.

While tax rates are above the minimum rates required by the 2003 EU Energy Tax Directive, rates on electricity and fossil fuels used at stationary facilities are among the lowest in the EU. Tax rates on energy products do not fully reflect the estimated environmental cost of energy use. Tax rates for heavy fuel oil and marked mineral oils for heating have remained unchanged since at least 2010, and the excise duty on diesel is still well below that on petrol, despite diesel's higher carbon content and local air pollution cost. Effective tax rates on CO₂ emissions from energy use in road transport are the lowest in OECD Europe, and those on emissions from other energy uses are among the ten lowest in OECD Europe. These effective rates, however, do not take into account the effect of the EU ETS on carbon pricing.

Source: (OECD, 2021^[130])

OECD Green Action Task Force Reviews

The OECD Green Action Task Force conducts reviews of fossil-fuel subsidies in the countries of Eastern Europe, Caucasus and Central Asia. In 2018, the Green Action Task Force published an *Inventory of Energy Subsidies in the EU's Eastern Partnership Countries*, which provides analysis of energy subsidies, including support to fossil-fuel production and consumption, in Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine (EaP countries) (OECD, 2018^[131]). An update of the Inventory and accompanying report is forthcoming (July 2021).

The 2021 Inventory reveals that government support to fossil fuels is relatively small in the EaP countries, with the exception of Azerbaijan and Ukraine. It shows a distinct declining trend in fossil-fuel subsidies in the form of budget transfers and revenue forgone in Armenia, Georgia and Ukraine. Subsidy values in Moldova have fluctuated over the review period while data gaps in the bottom-up assessment of fossil-fuel subsidies in Azerbaijan and Belarus preclude clearer conclusions on the general trends in these countries. Altogether, 2018 government support to fossil-fuel production and consumption amounted to 0.04% of GDP in Armenia, 0.14% in Belarus, 0.09% in Georgia and 0.63% in Moldova. In Azerbaijan and Ukraine, support stood at about 2% of GDP (1.9% in Azerbaijan and 2.3% in Ukraine). In both countries, fossil-fuel subsidies exceeded the government deficit as a share of GDP in 2018. In Ukraine, the cumulative value of budget transfers and tax expenditure surpassed USD 5 billion in 2012 but had declined by more than 50% by 2019. However, at USD 2.2 billion in 2019 the size of subsidy remains significant and is the largest among the EaP countries, including as a share of GDP. This suggests that Ukraine still has a long way to go in its energy sector reforms.

OECD work on energy taxation and effective carbon rates

The OECD tracks developments in energy taxation and environmental fiscal reform in OECD countries and most G20 economies, and has recently expanded coverage to 15 developing and emerging economies (OECD, 2021^[132]). By putting a price on polluting emissions from fuel combustion, carbon taxes, fuel excise 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, climate and fiscal policy.

Taxing Energy Use

Taxing Energy Use 2019 (TEU) analyses the coverage and magnitude of energy and carbon taxes across 44 OECD and G20 economies, which together represent approximately 80% of global energy use and CO₂-emissions associated with energy use (OECD, 2019^[133]). Taxing polluting sources of energy is an effective way to curb emissions that harm the planet and human health, and the income generated can be

used to ease the low-carbon transition for vulnerable households in addition to other uses. Yet as of 2018, some 70% of energy-related CO₂ emissions from advanced and emerging economies are entirely untaxed, offering little incentive to move to cleaner energy.

In January 2021, the OECD released *Taxing Energy Use for Sustainable Development: Opportunities for energy tax and subsidy reform in selected developing and emerging economies* (TEU-SD) (OECD, 2021^[132]). The report finds that developing countries could raise much-needed public revenues, while cutting emissions and air pollution, by making better use of energy taxes and reducing energy subsidies. TEU-SD presents data and indicators to support carbon pricing reforms across the 15 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.

TEU presents effective energy or carbon tax rates, for which it is standard methodology to take into account reduced and zero rates, as well as full or partial tax refunds in favour of certain energy users. Such preferential tax treatment is also included in the Inventory of Fossil Fuel Support. The TEU-SD publication goes a step further, to integrate principal subsidies on domestic energy use beyond tax expenditures (e.g. direct transfers linked to regulated prices or mandated tariffs). The result is an extended carbon pricing indicator that integrates negative carbon prices resulting from fossil fuel support measures. Work on *Taxing Energy Use 2022* is ongoing, which intends to make this “composite FFS-ECR” indicator available for OECD and G20 countries as well.

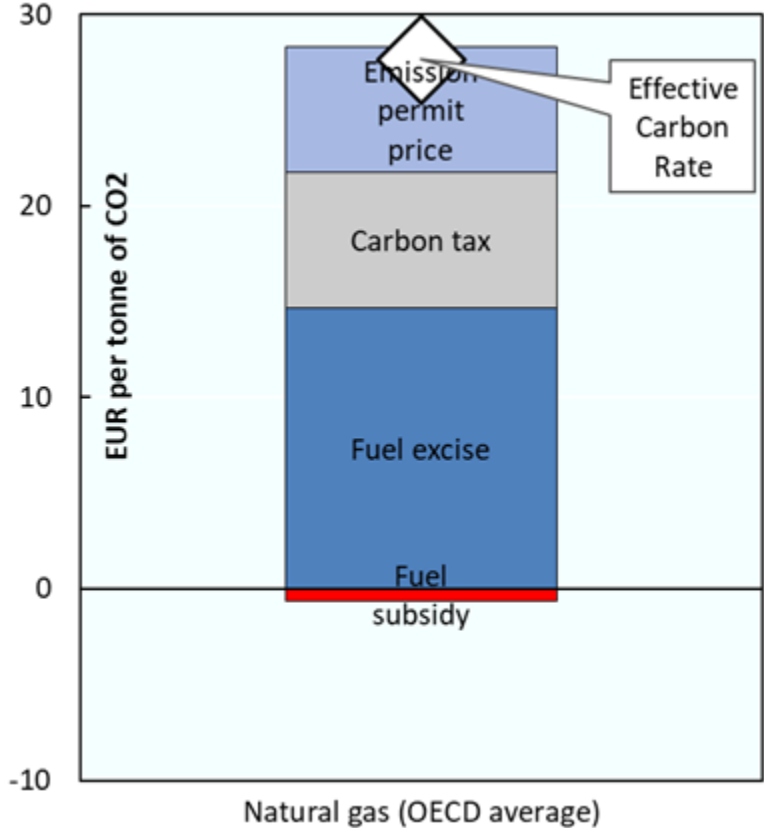
Effective Carbon Rates

In its Effective Carbon Rates (ECR) publication (OECD, 2021^[134]), which considers emissions trading systems as well as taxes (Figure 5.1), the OECD estimates the Carbon Pricing Score (CPS). The CPS indicates how close 44 OECD and G20 countries are, together as well as individually, to pricing all energy-related carbon emissions at benchmark values for carbon costs. EUR 60 per tonne of CO₂ is a mid-range benchmark of carbon costs in 2020, and low-end benchmark for carbon costs in 2030. The ECR follows the TEU methodology in relation to the treatment of tax expenditures. It accounts for free allocation of emissions permits through the calculation of effective average carbon rates, in addition to effective marginal carbon rates (see further Box 4.1) (OECD, 2021^[134]).

In 2018, the 44 countries together had a CPS of 19% at the EUR 60 benchmark (CPS₆₀), i.e. they were not even pricing a fifth of emissions at the mid- to low-end estimate of carbon costs. Across the 44 countries, the CPS₆₀ ranged from 1% to 69% in 2018. Less than a quarter of the countries studied were more than halfway to the EUR 60 benchmark, and just three countries achieved more than two-thirds of the benchmark. Around 60% of emissions were not subject to any price at all.

Countries with a high CPS tend to emit fewer emissions than countries that hardly price any emissions. High CPS countries also emit less CO₂ per unit of GDP and are better prepared for the low carbon economy.

Figure 5.1. Effective carbon rates following the TEU-SD approach



Note: Simple average for OECD countries in 2018 as calculated in TEU-SD.
Source: (OECD, 2021^[134]).

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Notes

- ¹ A review process for Viet Nam took place in 2016-17, but no final report has been released.
- ² The Netherlands is an Invited Guest Country under G20 presidencies and sat on the peer review panel for the Italian review (2019). The peer review builds on an IEA In-Depth Review (IDR) of the country, which included a special focus on fossil-fuel subsidies.
- ³ The medium time horizon for the commitment, relevant to ambition on the pace of reform, similarly remains undefined.
- ⁴ I.e. improved alignment of taxes and tax-like instruments with environmental damages coupled with socially productive ways of using revenues (OECD, 2017_[137]).
- ⁵ The first steps are identifying support measures, documenting their objectives and estimating their budgetary cost, and measuring the distortiveness of support measures, including their economic, social and environmental effects.
- ⁶ This is currently challenging given lack of labour projections by job category at global level.
- ⁷ This section of the report has traditionally incorporated contributions from the World Bank. No contributions were forthcoming from this organisation for the current report.
- ⁸ See Table 3.1 for citation details.

