THE NEW CLIMATE ECONOMY
The Global Commission on the Economy and Climate

Working Paper

Fossil Fuel Subsidy Reform: From Rhetoric to Reality

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CONTENTS

Executive Summary

Worldwide, a significant proportion of the private sector receives some level of support, interventions and subsidies from the public sector. In the specific case of energy subsidies (of which fossil fuels are a subset) their use has been historically linked to supporting energy security, domestic energy production and access to energy.

In recent years, however, accounting for the full economic, social and environmental costs and benefits of subsidies for fossil fuels, along with the development of other government interventions to achieve the same objectives, has led to demands to start removing them. This report outlines the economic, social and environmental costs of fossil fuel subsidies, emerging evidence of the benefits to be derived from their reform and opportunities and processes to support such reform.

Fossil fuel subsidies can inhibit sustainable economic development by creating a burden on government budgets, reducing resources that could be put to more efficient use within the economy; increasing inequality and undermining access to affordable energy by benefiting the rich rather than the poorest members of society; decreasing the competitiveness of key industries, including low-carbon businesses, by discouraging investment in renewable energy and energy efficiency; increasing the risk of stranded assets (in the event of climate regulation) by encouraging exploration for and production of unburnable carbon; compromising energy security (compared to subsidising alternatives such as renewables and energy efficiency); damaging public health by increasing air pollution; and negating carbon price signals.

Despite this mounting evidence of the costs of fossil fuel subsidies, and the potential virtuous cycles that could result from their removal, governments are often reticent to undertake reform. Researchers have identified several specific reasons for the persistence of subsidies. Some of these are

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About this working paper

The research underpinning this New Climate Economy Working Paper was a major input into the 2015 New Climate Economy report and articulates the practical steps that policymakers can take to phase out fossil fuel subsidies. The paper reinforces the recommendations of the Global Commission on the Economy and Climate to introduce or strengthen carbon pricing by 2020, and phase out fossil fuel subsidies.

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explicit, such as a lack of information, while others are implicit, driven by special interests. In addition, governments sometimes subsidise fossil fuels because they lack other effective means and institutional capacity to adopt more suitable policies. Taken together, these implicit and explicit barriers to reform create a dangerous inertia regarding subsidies even in the context of new technological, economic and social developments.

Despite the challenges associated with reform, a number of countries have recently made significant progress in reforming subsidies for fossil fuels across a wide range of sectors. The International Energy Agency (IEA) and the International Monetary Fund (IMF) have documented reforms undertaken in almost 30 countries in 2013 and 2014, some of which were spurred by falling oil prices. A number of these country case studies are included in this report (see Annex 3), and, in conjunction with wider research on the processes of reforming subsidies, have provided lessons for the key 'ingredients' for successful reform. These steps are very similar to those needed for any effective processes of policy change, and include:

- Mobilising resources in order to support many of the elements necessary for a robust reform process.
- Providing clear, open and honest information on the scale of subsidies, their costs and impacts, who pays and who benefits, plans for reform, and complementary measures to be adopted.
- Creating new institutions or strengthening existing ones to support reform.
- Using the fiscal space created for wider public goods.
- Reallocating the resources saved to those groups most affected by reform by adopting complementary measures. These may include support to sectors, industries and firms, and to households and individuals.
- Setting credible and predetermined timeframes for phasing out subsidies, staggering the elimination of different subsidies, and ideally undertaking reform as part of broader sector- or economy-wide reforms.

In relation to international support for the reform of fossil fuel subsidies, agencies such as the World Bank and bilateral donors are already providing resources and finance for 'complementary measures' in developing countries, such as support for health services, education, social protection, energy-sector development and economic diversification, but seldom in a way that is linked to subsidy reform processes, either in terms of institutional arrangements or timing. It will be important to not only increase these resources, but to also foster linkages between existing support mechanisms and the processes of (and linked to the benefits from) reforming fossil fuel subsidies.

Although this report highlights the fact that opportunities and processes for reforming fossil fuel subsidies take place at the national level, international cooperation is already supporting national reform efforts in a number of ways. These include identifying and estimating the cost of subsidies, country-level support for reform processes, coordination and drawing out lessons and advocacy. The high-level commitments to reform made by the G20, Asia-Pacific Economic Cooperation (APEC) and European Union (EU) countries,[1] as well as key international agreements, present a critical opportunity for existing activities to be scaled up, and for new efforts to be developed in order to: 1) improve the availability of comparable information on fossil fuel subsidies; 2) increase technical and financial support for national reform efforts (with a focus on complementary measures); and 3) widen and strengthen countries' commitments to reform.

The primary channels for greater international ambition and action are: bodies for reporting, tracking and accountability; financial and technical support, which must be diverted from providing subsidies and towards reform; multilateral and bilateral agreements (including on trade); and a greater understanding of the processes being undertaken by regions and countries that are already leading by example in reforming subsidies to fossil fuels.

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1. Introduction

This report examines a subset of energy subsidies, related to the production and consumption of fossil fuels (oil, gas and coal), and outlines opportunities and processes to support their reform.

The analysis focuses on fossil fuel subsidies because their economic, social and environmental costs have recently received significant attention – including through high-level calls to reform and phase them out from organisations including the World Bank, the International Monetary Fund (IMF) and the International Energy Agency (IEA). Far less attention, however, has been paid to providing guidance for those seeking to undertake or to support such reforms.

In a recent report, the Global Commission on the Economy and Climate suggests that the G20 countries have an opportunity to build upon their 2009 commitment to phase out fossil fuel subsidies by setting criteria and clear timelines for reporting, and through eliminating fossil fuel subsidies by no later than 2025.[2] In order to support governments and other stakeholders that are seeking to understand the potential for fossil fuel subsidy reform, or are planning to undertake or provide financial assistance for wider programmes of energy subsidy reform, this report outlines:

1. The current scope and scale of subsidies for fossil fuels.
2. The economic, social and environmental costs of fossil fuel subsidies.
3. Emerging evidence of the global benefits of reforming fossil fuel subsidies.
4. Potential barriers to subsidy reform.
5. Drivers and opportunities for reform.
6. Key principles for national-level reform.
7. Current opportunities to accelerate reforms on fossil fuel subsidies through international support.

This report is complemented by a regional report on sub-Saharan Africa (SSA) that provides more specific guidance on reform of fossil fuel subsidies that could apply to countries in that region. It is anticipated that similar reports on other regions may be produced.

2. Current scope and scale of fossil fuel subsidies

Main points:

- ***Governments generally use subsidies as part of wider economic policies to support specific businesses, markets, sectors or regions; and subsidies are among the more common public policy instruments in current use, with political interests often determining who receives subsidies and at what scale.***
- ***In the specific case of energy subsidies (a subset of which are directed towards fossil fuels), their use has been historically linked to supporting energy security, domestic energy production and affordable access to energy, which are expected to have wider positive effects for economic development and for public goods such as health and education.***
- ***Subsidies for fossil fuels, such as oil, gas and coal, take several forms and are provided along the full value chain from exploration, to production, and consumption. According to the World Trade Organization (WTO) definition, subsidies include: 1) all government financial contributions or direct support; 2) transfer of risk through provision of debt, equity and guarantees; 3) forgone revenue through tax breaks; 4) provision of infrastructure, goods and services below market value; and 5) royalty breaks and investment in infrastructure.***
- ***Although there have been recent improvements in the measurement of fossil fuel subsidies, with estimates for different groups of countries compiled by the IEA, IMF and Organisation for Economic Co-operation and Development (OECD), substantial gaps remain due to limited transparency at the national level, and a full accounting of global energy subsidies (to fossil fuels and renewables) has never been completed. As a result, it is likely that global estimates are well below current levels of support.***
- ***Taking into account these gaps, Koplow (2014) added the available data on subsidies for fossil fuels, renewable energy and nuclear power and calculated that a total of $840 billion was spent on energy subsidies annually (roughly 1% of global GDP), of which fossil fuel subsidies make up roughly 70%.***

2.1 WHAT ARE FOSSIL FUEL SUBSIDIES?

Worldwide, a significant proportion of the private sector receives some level of support, interventions and subsidies from the public sector. In general, governments use subsidies as part of wider processes of economic policy to support specific businesses, markets, sectors or regions and these are among the more common public policy instruments in current use, with political interests often determining who receives subsidies and at what scale.

In the specific case of energy subsidies (a subset of which are for fossil fuels) their use has been historically linked to supporting energy security, domestic energy production and affordable access to energy, which are expected to have wider positive effects for economic development and for public goods such as health and education.[3] In recent years, however, accounting for the full economic, social and environmental costs and benefits of fossil fuel subsidies, alongside those of alternative government interventions to achieve the same objectives, has increasingly favoured a move away from subsidies to fossil fuels (see Sections 3 and 7).

The WTO defines a subsidy as 'any financial contribution by a government, or agent of a government, that confers a benefit on its recipients in comparison to other market participants'.[4] This definition of subsidies and its detailed components[5] has been accepted by the 153 member states of the WTO, and can be used as a basis for identifying fossil fuel subsidies, which include subsidies for the production and consumption of coal, oil and gas.

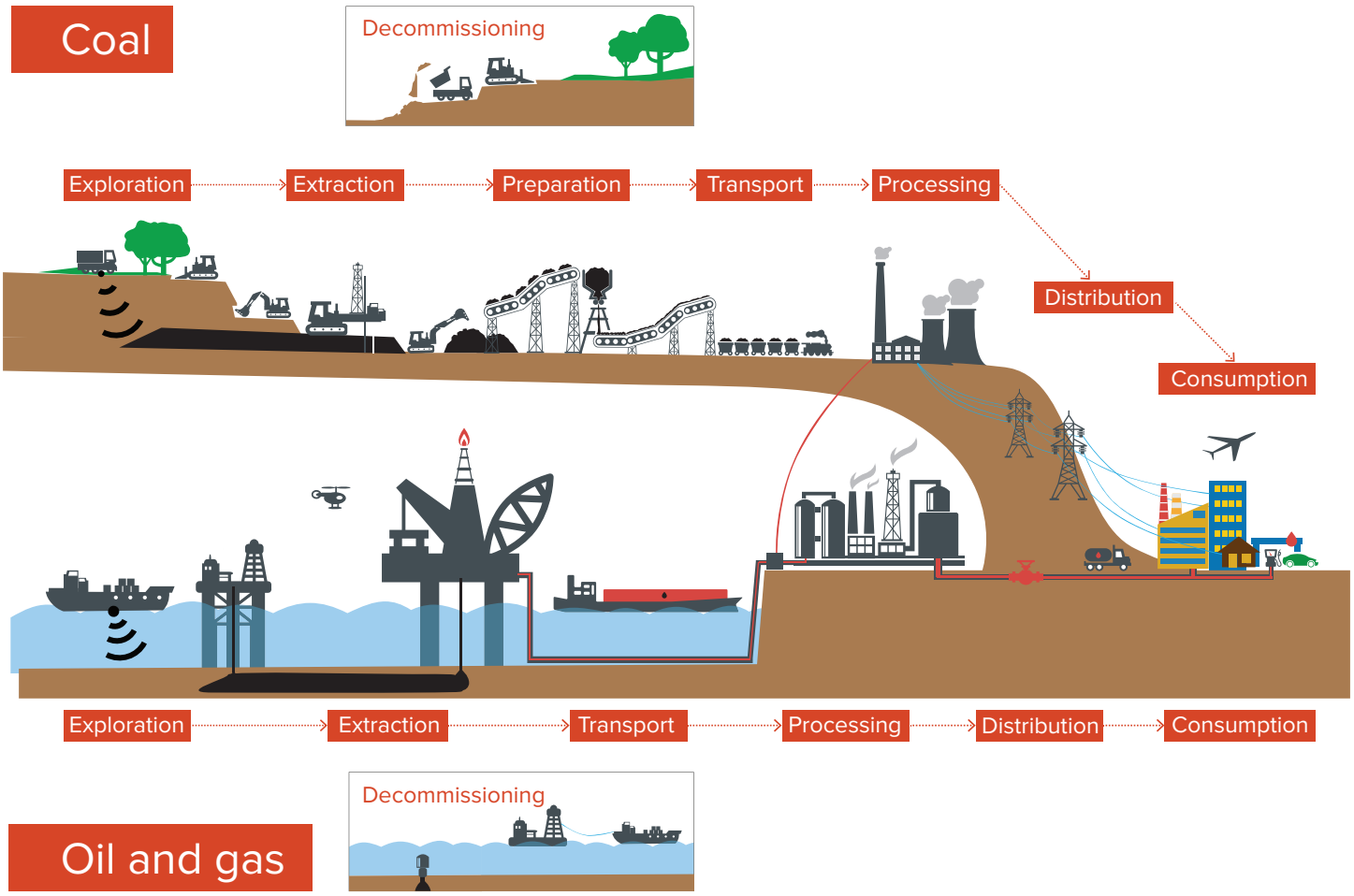
Despite this widely agreed definition, terminology can be one of the first obstacles to understanding what is meant by 'subsidies'. This is often because of the negative connotations of the term 'subsidy', and the potential for the legal challenge of subsidies at the WTO, both of which can drive policymakers to use euphemisms or alternative terms.[6] The Global Subsidies Initiative (GSI) says that 'incentive' is commonly used instead of 'subsidy'. Other frequently used substitutes (ranging from general to technical) include support, aid, assistance, fiscal policy and fiscal instruments.

Subsidies for fossil fuels (oil, gas and coal) take several forms and are provided along the full value chain from exploration to production and consumption including fossil fuel power generation (see Figure 1):[7]

- Direct financial transfers, e.g. fuel vouchers or grants to producers or consumers.
- Trade instruments, e.g. tariffs on imports of crude oil and petroleum products, which make domestic fuel production more lucrative; quotas and technical restrictions.
- Regulations, e.g. petrol prices regulated at below international market levels; regulations that prioritise the use of domestic coal for power generation; restrictions on market access.
- Tax breaks, e.g. tax deductions for the depletion of or investment in oil and gas fields and coal deposits; excise exemptions for fuels used in international air, rail or water transport.
- Credit, e.g. loan guarantees to finance energy infrastructure or preferential rates on loans to producers.
- Risk transfers, e.g. insurance or indemnification provided to fossil-fuel producers at below market levels; limitation of financial liability.
- Access to government goods and services below full cost, e.g. provision of seismic data for oil and gas exploration.

(Annex 1 includes more detailed subsidy categories.)

Figure 1
Value chain of production and consumption of fossil fuels (oil, gas and coal)



Source: Authors own

2.2 SCALE OF FOSSIL FUEL SUBSIDIES

There have been recent improvements in the measurement of fossil fuel subsidies:

- Detailed country-level inventories have been completed by the OECD of the subsidies provided for the production and consumption of fossil fuels in its member countries since 2010. These have most recently been updated in September 2015 and expanded to include major emerging economies (Brazil, China, India, Indonesia, Russia and South Africa). The inventory includes almost 800 spending programmes and tax breaks used by governments, and it estimates total support at US$ 160-200 billion annually.[8]
- The IEA has made high-level estimates of subsidies for the consumption of fossil fuels in 40 developing countries and emerging economies since 2008, and for 2013 these were estimated at US$548 billion.
- Recent IMF analysis of fossil fuel subsidies[9] in 2013, and forecast for 2015, estimates that these have dropped from US$900 billion in 2013 to a predicted level of US$650 billion for 2015,[10] due mostly to the falling price of oil (see Section 6.2).[11]
- According to the IMF, when the costs of climate change, local air pollution, congestion, accidents and road damage are included in the calculated subsidies for fossil fuels (which are not included in the OECD and IMF estimates), the cost to governments will be US$5.3 trillion in 2015.[12]

In addition, non-governmental organisations (NGOs), such as the Global Subsidies Initiative (GSI), Oil Change International (OCI), and the Overseas Development Institute (ODI), have produced analyses that highlight specific subsidies provided at the national and sub-national level. Their studies generally focus on a specific fuel or set of countries.

(For additional details of subsidy estimates compiled by the above organisations see Annex 2 and Figure 32.)[13]

Although this progress in the estimation of subsidies is extremely valuable, substantial gaps remain because of limited transparency at the national level, and a full accounting of global energy subsidies (for fossil fuels and renewables) has never been completed. As a result, it is likely that existing global estimates are well below current levels of support.[14] Taking into account the gaps in overall data on energy subsidies, Koplow (2014) added the available data on subsidies for fossil fuels, renewable energy and nuclear power and found that a total of US$840 billion was spent on energy subsidies annually (roughly 1% of global GDP), of which fossil fuel subsidies make up roughly 70%[15] (see Figure 3).[16]

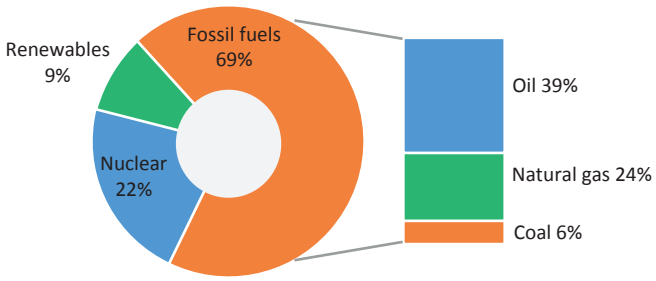
Figure 2
Total quantified energy subsidies

	Billions of US$					
	2011	2010	2009	2008	2007	2007-11
Fossil fuels[a]	589	475	361	622	404	2451
Renewables[b]	88	66	60	48	44	306
Nuclear[c]	162	159	157	156	152	787
All	**839**	**700**	**579**	**825**	**600**	**3544**

a OECD consumer subsidies to South Korea and Mexico deducted to avoid double counting. IEA price gap subsidies to fossil-fuel electric allocated back to source fuels based on country-level data on the fuel mix of power generation. IEA (2011a, 2012, 2013); OECD (2012); and Sauvage (2013). b IEA (2011a and 2012). c Kitson, Wooders, and Moerenhout (2011) midpoint value. Single year annual value for 2009, adjusted for inflation, was applied to other years in the series. No adjustments made to incorporate the taxpayer costs of the Fukushima nuclear accident.

Source: Koplow, 2014.[17]

Figure 3
Fossil fuels receive the highest proportion of energy subsidies[18]



Note: see Annex 2 for international estimates of main subsidies for fossil fuels.

Source: Koplow, 2014.[19]

3. Economic, social and environmental costs of subsidies for fossil fuels

Main points:

- ***Although complete data is missing, available information shows that the economic, social and environmental costs of fossil fuel subsidies, when fully accounted for, often outweigh the benefits of this support, particularly as subsidies are often ineffective at achieving the specific policy objectives that they seek to address, and as increasingly there are less costly alternatives that can achieve the same objectives.***
- ***Full cost accounting has helped spur a greater understanding that subsidising fossil fuels is not sound policy and, indeed, can actually inhibit sustainable economic development by:***

    1. ***Creating a significant burden on government budgets, and reducing resources that could be used more efficiently.***
    2. ***Perpetuating inequality and limiting access to affordable energy, benefiting the rich and failing to meet the needs of the poorest in society.***
    3. ***Decreasing the competitiveness of key industries, including low-carbon businesses, skewing the playing field for investment in renewables and energy efficiency.***
    4. ***Increasing the risk of stranded assets (in the event of climate regulation), by encouraging the exploration for and production of unburnable carbon.***
    5. ***Compromising energy security (compared to alternatives such as subsidizing renewables and energy efficiency).***
    6. ***Damaging public health by increasing air pollution.***
    7. ***Negating carbon price signals.***

When the full economic, social and environmental costs and benefits of fossil fuel subsidies are taken into account, their net costs far outweigh the benefits of sustaining them, and there are increasingly less costly alternatives that can achieve the same policy objectives.[20]

Fossil fuel subsidies are often introduced for understandable and legitimate public policy objectives such as improved energy security, domestic energy services and access to energy. For example, production subsidies may temporarily sustain jobs in the oil and gas sectors, and consumption subsidies may help to improve access to (affordable) energy. In addition, the benefits of fossil fuel subsidy reform – particularly in the short term – will be unevenly distributed across countries and strongly dependent on the approach and complementary measures adopted (see Section 7.6).[21]

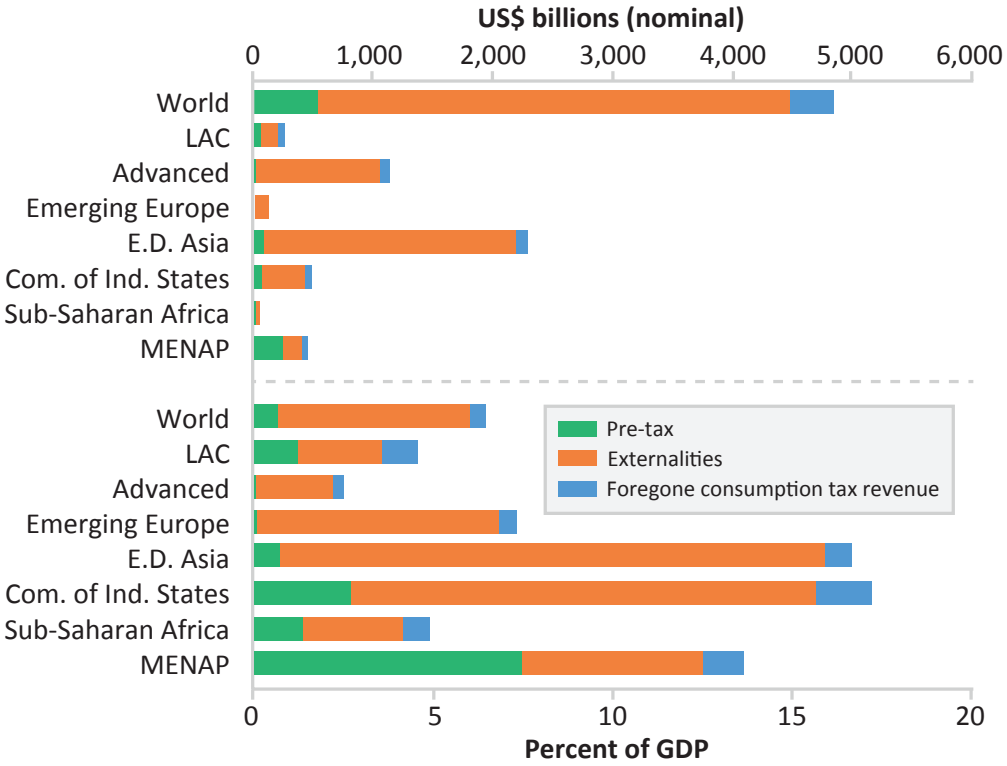
Nonetheless, emerging evidence demonstrates that in most cases the costs of subsidies far outweigh the benefits. The interconnected economic, social and environmental costs of fossil fuel subsidies are discussed in the next sections.

3.1 CREATING A SIGNIFICANT BURDEN ON GOVERNMENT BUDGETS

In relation to consumption subsidies in 40 developing countries, support for fossil fuels accounts for up to 5% of GDP and between 25% and 30% of government revenues.[22] The IMF has produced a global analysis of the comparative burden of subsidies on GDP and government revenue by region, showing the impact of pre-tax subsidies and forgone consumption tax revenue (see Figure 4 and Sections 2.5 and 2.6).[23] Fossil fuel subsidies are particularly high in the Middle East and North Africa (MENA) region where they are estimated at 13% of GDP and 35% of government revenues.[24]

In a number of countries that produce fossil fuels, revenues from natural resources have been seen as a national patrimony to be shared across the population in the form of subsidies.[25] In the 1990s, major oil exporters spent twice as much on subsidising domestic petroleum consumption (as a share of GDP) as countries that did not produce oil.[26] For major energy producers, the opportunity costs of these subsidies are less evident than their budgetary costs because revenues rise and fall with the costs of the subsidy, so there is little incentive to phase them out.[27]

Figure 4
Fossil fuel subsidies as a percentage of GDP by region



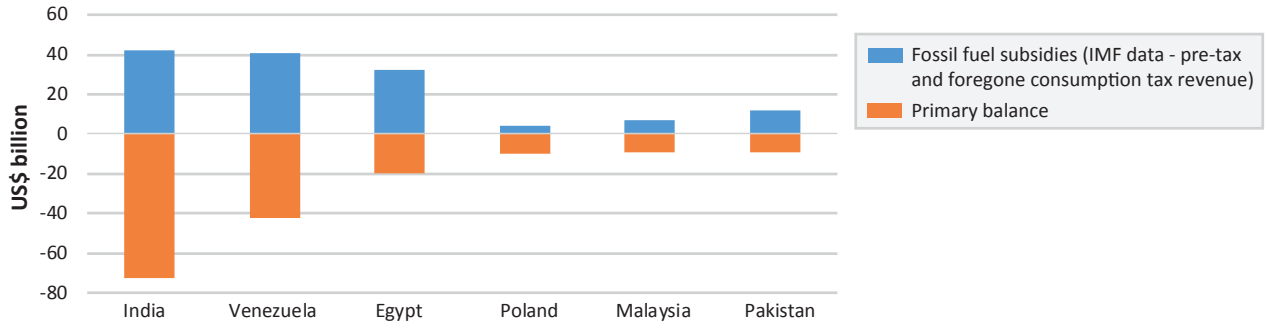
Source: Coady et al, 2015.[28]

A comparison of fossil fuel subsidies to consumers with the primary balance[29] (or the level of debt) in a number of developing countries shows the intensity of the budget pressure created by the aim to maintain low energy prices (see Figure 5). Although well documented, it is likely that the fiscal burden of fossil subsidies is also underestimated. This is particularly relevant in countries that have state-owned enterprises (SOEs) for the production and distribution of fossil fuels, electricity and heat. SOEs play very different roles in each country – some are commercially oriented and differ very little from their private-sector counterparts, while others receive significant government support.[30] In such cases governments may offset the costs of supporting SOEs against the company's profits, or the costs of finance for these companies may be reduced thanks to access to credit or guarantees from government. Frequently, the total level of government support to SOEs is not transparent and may be significantly larger than the documented drain on government budgets.[31]

Energy subsidies also can create a burden on government budgets (and more widely on trade flows and exchange rates), as when domestic fuel prices do not adjust automatically to changes in world prices, the government must step in to offset a portion of the shift. More directly, energy-consumption subsidies lead to greater domestic demand for energy products that must be imported, or that could potentially be exported, thus forgoing revenue and worsening the trade balance.[32]

These impacts can be particularly acute in countries that produce fossil fuels and which generate a significant portion of their revenues from oil, gas or coal, where subsidies have a significant impact both domestically and internationally. For example, Venezuela has historically generated over half of its revenues from oil and gas.[33] In addition to providing domestic subsidies, it has supplied Caribbean countries with subsidised oil through 'Petrocaribe'. This programme, which includes both grants and oil shipments, is estimated to have cost 3% of Venezuela's GDP, or an estimated US$44 billion in forgone revenue. In addition, Venezuela sends another 500,000 barrels per day (bpd) of oil to China in order to service US$50 billion of previous oil-backed loans, leaving only around 1.3 million bpd to sell on world markets, worth only US$20 billion a year in March 2015. This limited potential revenue stands in stark contrast to Venezuela's import bill, which is almost four times as high.[34]

Figure 5
Primary balance and fossil fuel subsidies



Source: IEA (2012) and IMF (2013).

Compounding the lack of information on subsidies and incentives, there is also a lack of information about the revenue from taxes or fees obtained from the fossil fuel industries, and how it is used. On the basis of information from a fee-based data provider, (i.e. not publicly available) ODI and Oil Change International research found that government income from the companies active in oil and gas exploration and production in the G20 countries (including royalties, government profit oil, income tax and bonuses), excluding Saudi Arabia, was U$554 billion in 2012. This accounts for, on average, 8% of these countries' total tax income. With more information on production subsidies and tax revenue there would be greater potential to understand how countries might sustainably move away from fossil fuel-based tax revenues (see Figure 6).[35]

Figure 6
Government income from oil and gas in G20 countries in 2012 (across all upstream)

Country	Royalty effects and government profit oil (million US$)	Income tax and bonuses (million US$)	Total government income from oil and gas (2012) (million US$)	Percentage of total government income from oil and gas
Saudi Arabia	84 921	253 750	338 671	90
Russia	150 793	29 171	179 963	30
United States	64 929	18 725	83 654	3
China	7 138	75 440	82 577	10
Mexico	1 717	79 610	81 327	36
Indonesia	29 183	5 300	34 483	41
Canada	16 558	7 725	24 283	8
India	14 428	4 768	19 196	8
Brazil	44	18 018	18 063	3
Australia	82	9 489	9 570	3
United Kingdom	-	9 333	9 333	1
Argentina	2 961	2 410	5 371	2
Italy	588	2 039	2 626	0.34
Germany	1 928	537	2 465	0.25
Japan	115	557	671	0.10
Turkey	211	153	364	0.13
France	72	174	246	0.02
South Africa	19	158	177	0.16
South Korea	37	(165)	(128)	(0.001)
Total	**375 722**	**517 191**	**892 914**	**12 (average)**
Total (excluding Saudi Arabia)	**290 802**	**263 441**	**554 243**	**8 (average)**

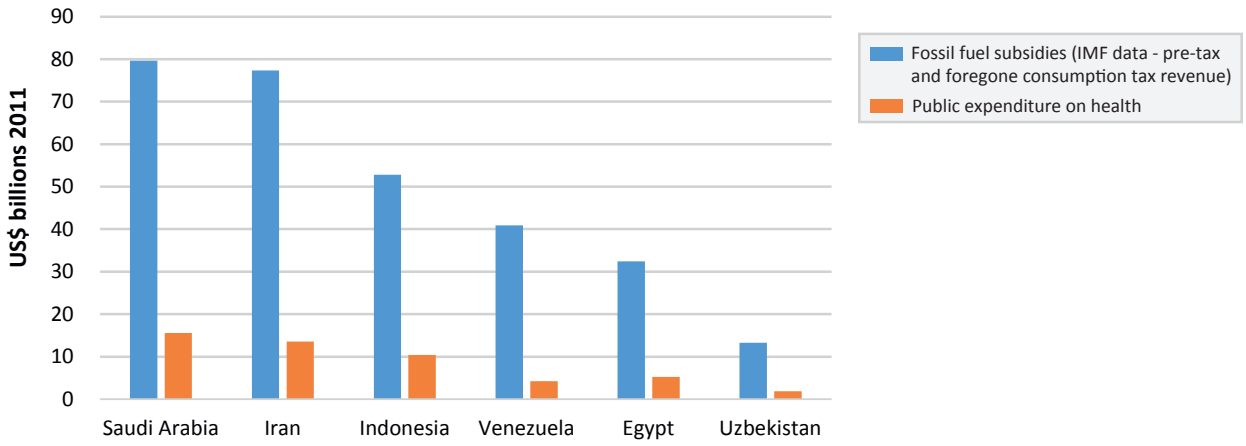
Source: Bast et al, 2014[36]

Keeping prices artificially low may also encourage smuggling and fuel adulteration, thus further reducing government revenue. This is particularly the case for oil products, which are easy to transport and store. For example, due to a history of high subsidies in Angola, (see Annex 3) about 10% of the country's oil is smuggled into the neighbouring Republic of Congo and Democratic Republic of Congo, which have higher domestic prices.[37] Fuel shortages and flourishing parallel markets with high prices are common also in countries where low official prices have the impact of reducing overall fuel supply (see Section 3.4).[38]

Finally, the significant proportion of many country's budgets spent on maintaining subsidies to fossil fuels is a drain on public finances and reduces the resources available to address social and development objectives. In a number of countries that provide high levels of fossil fuel subsidies to consumers, such subsidies may be equivalent to, or significantly exceed, expenditure on health (see Figure 7). Many aid-recipient countries are also subsidising fossil fuels at levels that far exceed the official development assistance (ODA) and climate finance they receive (see Figure 8 and Figure 9).

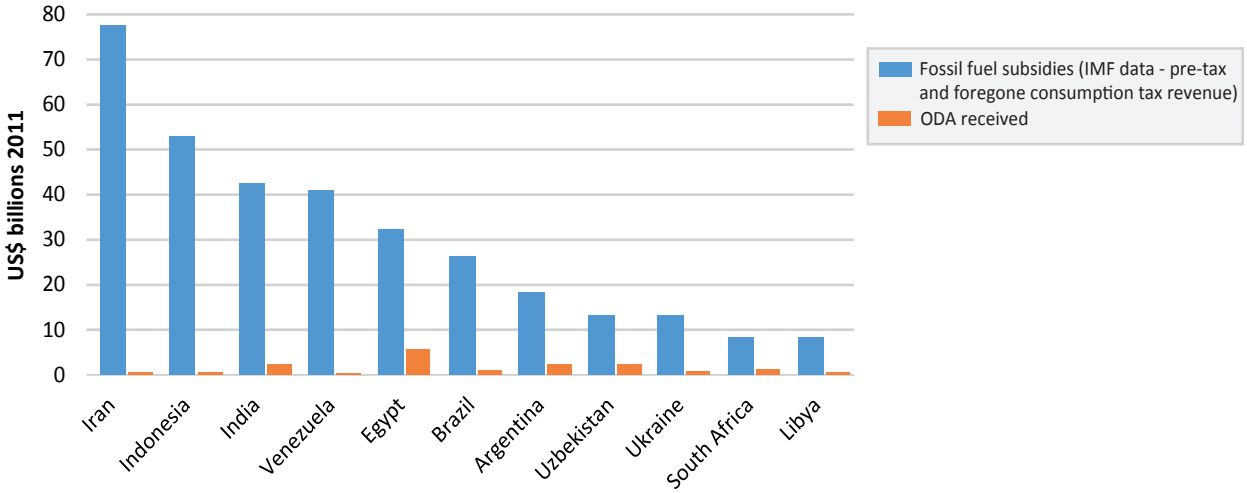
Such resources or support could potentially be dedicated more directly to economic or social development goals, such as improving health services and education, and financing the development of low-carbon infrastructure.[39] Section 7.7 emphasises that complementary measures, which help to finance wider public goods, should be developed as part of a subsidy reform process.

Figure 7
Public health expenditure compared to fossil fuel subsidies



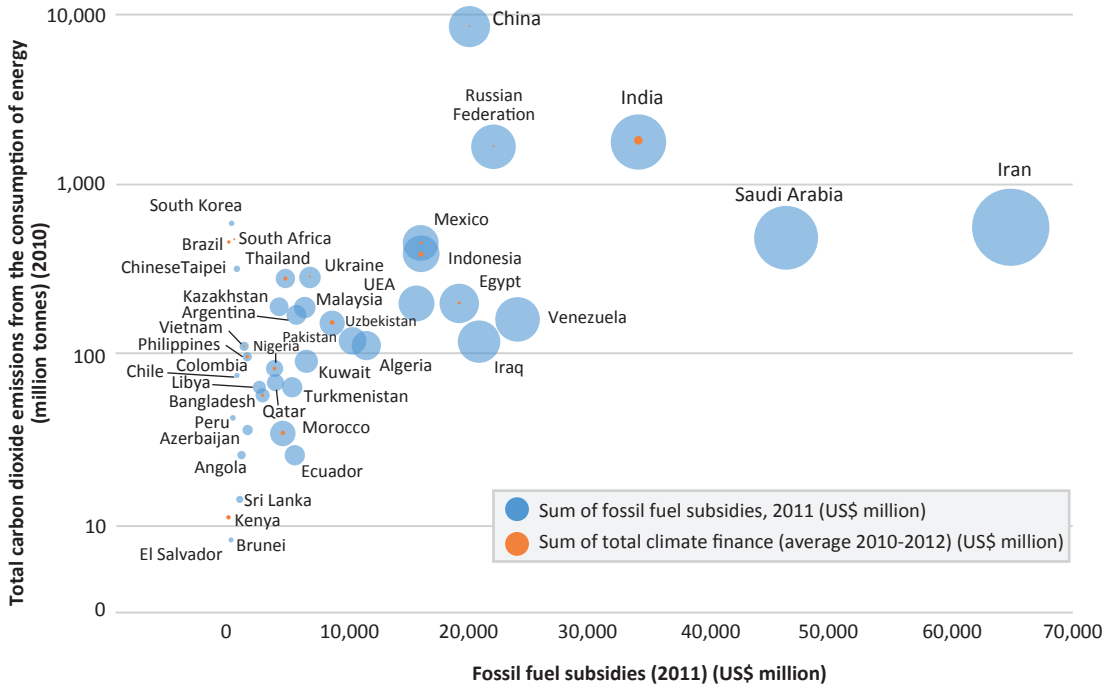
Source: Coady, et al, 2015 and WHO, 2015.

Figure 8
Aid received compared to fossil fuel subsidies



Source: Coady, et al, 2015 and OECD, 2015 (2013 data).

Figure 9
Fossil fuel subsidies, climate finance and greenhouse gas emissions in developing countries



Source: Whitley, 2013.

3.2 DECREASING COMPETITIVENESS OF THE ECONOMY AND SELECTED INDUSTRIES, INCLUDING LOW-CARBON BUSINESSES

3.2.1 Impact on key industries (energy production and energy-intensive businesses)

Governments often use the under-pricing of energy inputs to support production across particular sectors or firms. The purpose of these subsidies is often to promote national or regional economic development by conferring an advantage to domestic energy-intensive industries or energy producers, and to increase the competitiveness of export-oriented firms.[40]

However these subsidies may, in fact, encourage an inefficient allocation of resources across the economy by undermining efficiency, and encouraging over-consumption. Countries where energy prices are much lower than the cost of producing it are characterised by very high consumption per capita and low energy efficiency. In Venezuela, which has some of the world's highest levels of fossil fuel subsidies, petrol consumption per capita is 40% higher than in any other country in Latin America, and more than three times the regional average for Latin America and the Caribbean (LAC).[41] This impact of subsidies on inefficient over-consumption of resources by key industries and energy production has an impact not only on domestic consumption, as in Venezuela, but also means its highly subsidised oil is distributed internationally.[42] Furthermore, every barrel sold domestically at a subsidised price cannot be exported at the international market price for hard currency.

Similarly, subsidies for the production of fossil fuels can promote the consumption of one particular type of fuel by reducing the cost of the inputs for energy service providers. This type of policy was often applied to the coal used to produce electricity in eastern and central Europe, and still is in many developing countries, including China and India.[43] Subsidies thus lead to efficiency losses and can impede energy sector development.[44]

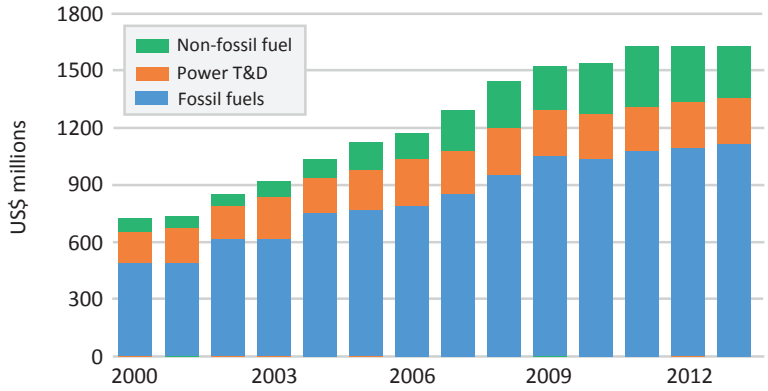
Subsidies to inputs for electricity production, for example, can create a vicious cycle by artificially lowering costs and thus discouraging investment in efficiency, maintenance and increasing supply.[45] This under-investment in turn seriously reduces the ability of such companies to invest in order to meet the increasing demand, especially by potential consumers who do not yet have access to energy (see Section 3.4). These subsidies can also discourage private and foreign investment in the energy sector.[46]

3.2.2 Skewing the playing field for renewables

From the perspective of the transition to low-carbon economies, one of the most damaging effects of subsidising fossil fuels is that low-carbon technologies, and in particular emerging renewable energy technologies, are less able to compete. This hinders investment in renewables and leads to continued dependence on fossil fuels. In addition, the slower adoption of renewables reduces the pace of learning and cost reduction as the technologies mature. In other words, the more a government subsidises fossil fuels, the more it has to subsidise renewables if it wants these to compete fairly (see Figure 3).

According to the IEA, in 2013 about two-thirds of the US$1.6 trillion invested in the energy sector worldwide was for fossil fuels, while global investment in renewables and energy-efficiency amounted to US$380 billion a year (see Figure 10).[47]

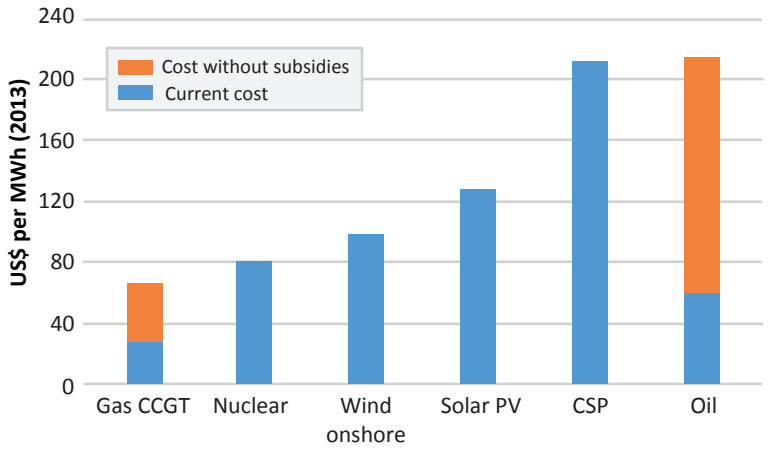
Figure 10
Investment in global energy supply, 2000-2013



Source: UNEP, 2015.[48]

The impact of fossil fuel subsidies on investment in renewables is particularly striking in the Middle East, where more than 33% of the region's electricity is generated by oil.[49] Both oil and natural gas are heavily subsidised in this region, to the degree that oil subsidies reduce electricity-generation costs to around 30% of the level they would be if full reference prices were paid, while gas subsidies reduce costs to around 45% of the unsubsidised level. As a result, low-carbon power technologies face greater challenges in competing against existing or new capacity. Were oil not subsidised in the Middle East, new oil-fired plants would be unable to compete with any of the main renewable energy technologies or with nuclear power (see Figure 11). In the absence of subsidies to natural gas, nuclear and onshore wind power would still be more expensive options than gas-fired power plants, but the gap would be significantly reduced.[50]

Figure 11
Impact of fossil fuel subsidies on the costs of generating electricity in the Middle East



Source: IEA, 2014.[51]

Some businesses are starting to highlight the unfair competition that is created by subsidising fossil fuels. In response to a parliamentary enquiry on energy subsidies in the United Kingdom (UK), Vestas Wind Systems highlighted that "subsidies for fossil fuelled power stations in the UK are significant… [and] distort the electricity market, making it unnecessarily difficult for technologies not in receipt of such subsidies … to compete". The Chief Executive of ReNew Power, one of India's largest renewable energy companies, stated that "to the extent the government keeps giving cheap coal to power producers, you have to give something [to the renewable energy sector]…when they say that renewable energy needs subsidies to survive [that] is because our entire power market is totally distorted…there is no actual fair market pricing happening today".[52]

3.2.3 Discouraging innovation in energy services and demand-side management

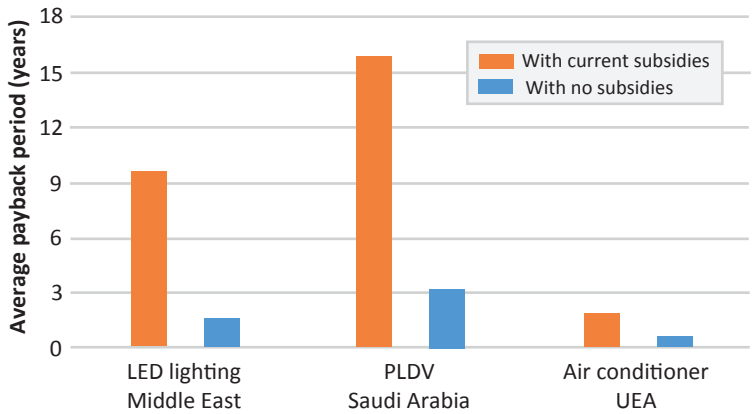
In addition to undermining the wider competitiveness of energy producers and energy-intensive industries, fossil fuel subsidies for consumers can also undermine the development and commercialisation of new technologies that might ultimately become more economically (as well as environmentally) attractive. As a result, fossil-fuel subsidies can lock-in technologies and create barriers to the adoption of cleaner energy.[53]

To give an illustration, private research and development (R&D) spending on new low-carbon energy technologies is discouraged by fossil fuel subsidies because their impact on prices makes it more difficult to commercialise new technologies. In OECD countries, where the bulk of energy-related R&D investment takes place, fossil-fuel subsidies have historically far exceeded total government spending on R&D for all types of energy.[54]

Subsidies for fossil fuels also make it less attractive for households to invest more in energy-efficient equipment and appliances: when a fuel is cheaper because it is subsidised, this reduces the potential savings of buying a more energy-efficient device. Energy subsidies lengthen the effective payback periods for investments in energy efficiency by reducing the savings on energy bills. The higher the rate of fuel or electricity subsidy, the longer the payback period and the less likely consumers will be to make an outlay on improved efficiency.[55]

Again, the Middle East serves as an important example of the impact of subsidies on investment in energy efficiency. With the exception of a few countries in the region, the prevalence of fossil-fuel subsidies has acted as a brake on the uptake of modern, energy-efficient technologies in most sectors. In the transport sector, for instance, the average passenger car uses 60% more fuel per kilometre than does the average car in the OECD.[56] In Saudi Arabia, the removal of subsidies to petrol would reduce the payback period of upgrading from a vehicle with average efficiency to one that is twice as efficient from 16 to three years (see Figure 12).[57] A similar case applies to lighting, including for light-emitting diodes (LED), which consume much less electricity than incandescent or fluorescent bulbs. Given the large subsidies to fossil-fuel-based electricity in the Middle East, the payback period for installing LEDs is almost ten years on average across the region, compared with about 18 months if electricity tariffs were to cover the full cost of supply (see Figure 12).[58] A parallel review of the impact of subsidies on investment in new energy technologies in Southeast Asia found that payback periods in all sectors considered are almost twice as long as they would be without energy subsidies (see Figure 13).[59]

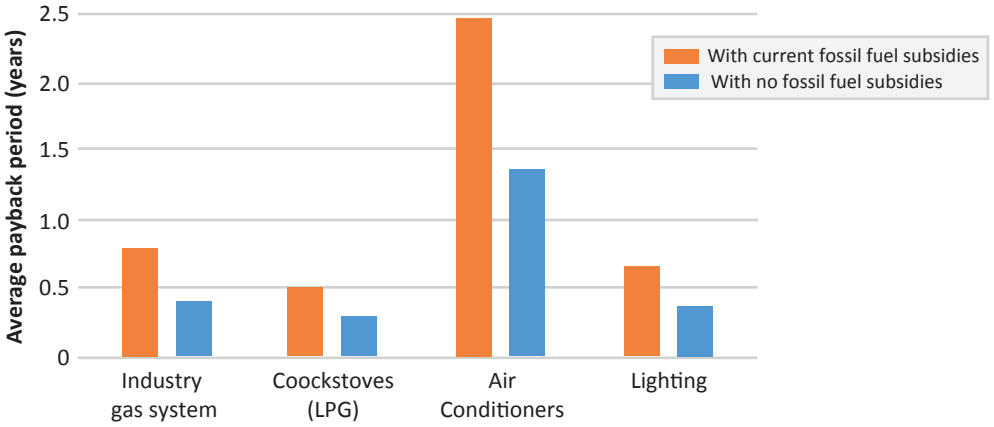
Figure 12
Impact of fossil fuel subsidies on the payback periods of efficient equipment in the Middle East



Source: IEA, 2014.[60]

Figure 13

Effect of removing fossil fuel subsidies on average payback periods by sector in selected ASEAN economies



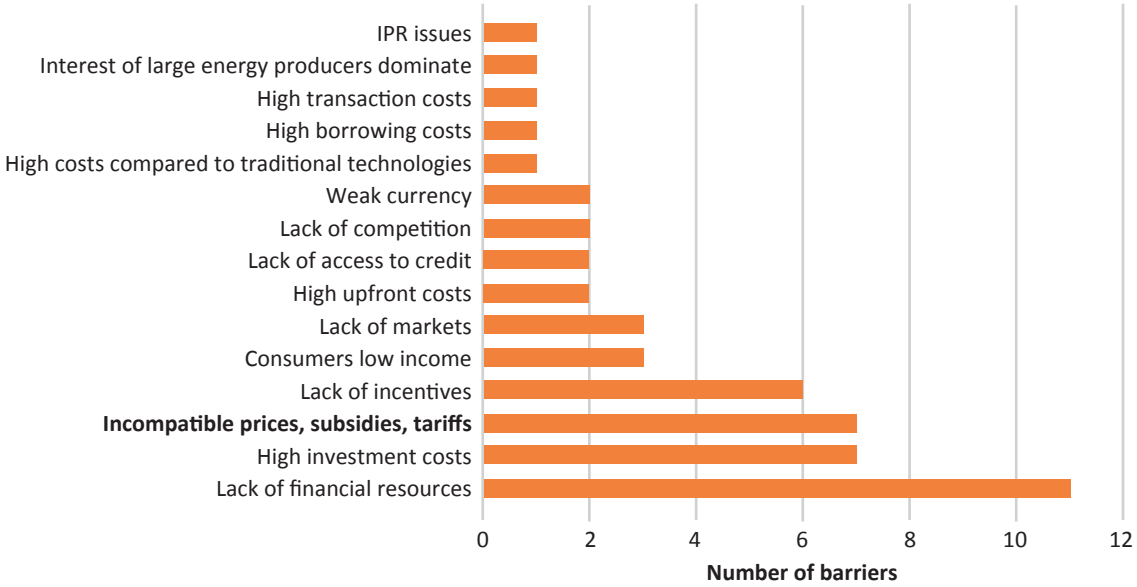
Source: IEA, 2013.[61]

The UK is also at risk of establishing fossil fuel subsidies that undermine demand-side management as part of the establishment of capacity markets. The capacity market was set up to offer subsidies (GBP 2.5 billion per year) to reliable forms of power capacity to switch on when needed to balance demand and capacity; however, the current structure favours the supply of new sources of on-demand power, which are provided on 15-year contracts (with old refurbished coal plants on three-year contracts), whereas demand side management is eligible only for one-year contracts. The capacity market has been accused of violating the EU's State Aid rules by prioritising the generation of fossil-fuel electricity over "cheaper and more reliable" demand-side options.[62]

In addition to creating domestic barriers to technology development, fossil fuel subsidies also have a significant impact on technology transfer to developing countries, and has been identified as the second most important barrier after a lack of financial resources (see Figure 14).[63]

Figure 14

Barriers to the transfer of clean-energy technologies to developing countries



Source: UNFCCC, 2007.[64]

3.3 COMPROMISING ENERGY SECURITY

Governments often seek to increase diversity in energy supply by providing subsidies to specific energy sources. A frequently stated objective in subsidising fossil fuels is to promote 'energy security', a concept that often bundles security of supply through domestic production with protection from volatile fuel prices. It is possible, however, that the domestic production of fossil fuels can be disrupted by changes in international market prices (as has recently occurred in the production of shale gas in the USA).

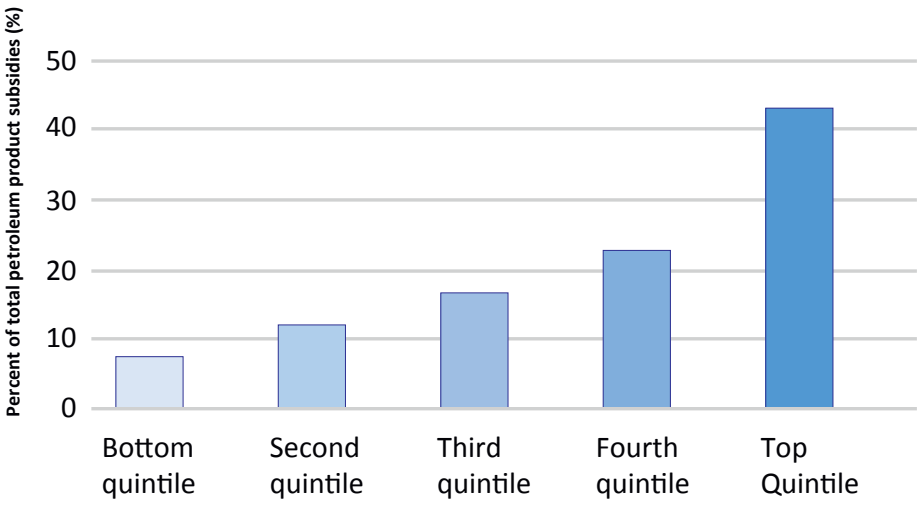
This price volatility hurts the economy. The value of oil is 5% of world GDP, and its price can move by 50% within a matter of months. Many countries have few short-term options to change patterns of production and consumption, and fuel price changes can affect other key inputs to economic activity. In addition to compromising energy security, energy price volatility can also delay business investment, reduce consumer spending and slow job growth. Thus, even when consumers enjoy the benefits of low oil prices, governments should work to reduce their exposure to energy price volatility, by adopting policies and measures such as reforming the subsidies to fossil fuels in order to discourage wasteful consumption, increase energy efficiency and expand the economically viable supply of non-fossil energy.[65]

Energy subsidies often start out as temporary income buffers. According to many governments these subsidies are intended to protect the population from the impact of international price hikes.[66] In fact, governments may be less concerned about fluctuations in energy prices than about the resulting fluctuations in income (potential consumption) and its distribution.[67] Since fossil fuel subsidies have been found to aggravate inequality and undermine the capacity of the poorest to obtain access to energy, they may in fact do more harm than good in protecting populations from volatile energy prices.

3.4 PERPETUATING INEQUALITY AND LIMITING ACCESS TO AFFORDABLE ENERGY: BENEFITING THE RICH AND FAILING TO ADDRESS THE NEEDS OF THE POOREST

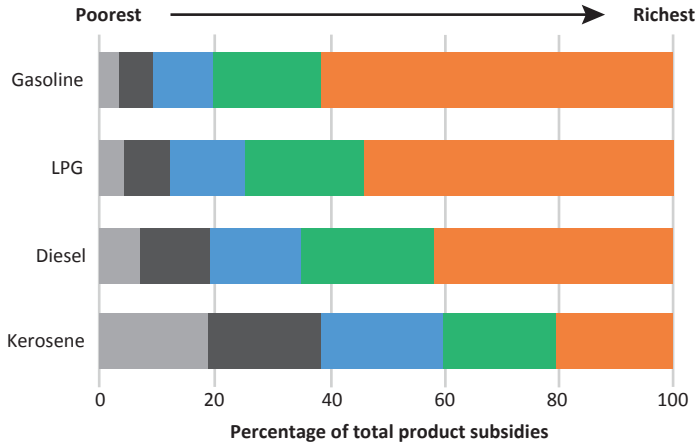
Consumer subsidies are often justified as a way to help the poorest households to obtain access to energy. There is mounting evidence, however, that fossil fuel subsidies are actually regressive, since their benefits accrue mainly to middle- and higher-income groups, while their costs are borne by the whole population.[68] An IMF review of subsidies in developing countries found that only 7% of the benefits accruing from fossil fuel subsidies reached the poorest 20% and that subsidies for petrol, LPG and diesel are particularly regressive (Figure 15 and Figure 16).[69]

Figure 15
The wealthy benefit most from fossil fuel subsidies in developing countries



Source: Arze del Granado, Coady and Gillingham, 2010.

Figure 16
Distribution of petroleum product subsidies by income group



Source: Arze del Granado, Coady and Gillingham, 2010

Fossil fuel subsidies frequently exacerbate unwelcome distributional effects. This is particularly true in those countries where most people lack access to electricity or commercial fuels and often rely on biomass, which is collected in rural areas, or purchased at an unsubsidised cost in urban areas. These populations do not share the benefits of lower prices for commercial energy, as subsidies tend to go to large, capital-intensive projects or wealthier users, which may be at the expense of support to smaller-scale biomass-based energy.[70]

As outlined in Section 3.4, subsidies often constitute a barrier for the poorest to obtain access to energy. In countries and regions where electricity production is based on fossil fuels, subsidies create a disincentive to invest in the power sector and can result in an industry being unable to recover the full costs of production. On average, electricity tariffs in sub-Saharan Africa (SSA) cover only 70% of the cost of power production.[71] This adds to challenges in the SSA energy sector, where under-investment contributes to poor access, high transmission and distribution losses, and persistent shortages.[72]

Although the benefits of subsidies accrue mostly to middle-class and wealthier sectors, the adverse impact of their removal can still fall disproportionately on the poor. Income groups differ greatly in their energy-consumption patterns, and the distributional impact of subsidies is not the same for all types of fuel and electricity. On average, lower-income households (particularly in urban areas) spend a higher proportion of their energy budget on fuel, particularly in cases where these are used for cooking, and less on electricity and private transport.[73] As a result, the poor will be directly affected not only by the rising prices resulting from reforming subsidies, but also indirectly through the increased cost of transport and food (World Bank, 2006). Any reforms to phase out subsidies for fossil fuels should therefore include measures to mitigate the likely negative impacts on the poorest households (see Section 7.7.2).[74]

3.5 DAMAGING PUBLIC HEALTH BY INCREASING AIR POLLUTION

In many towns and cities, the pollution associated with the combustion of fossil fuels either for uses such as transport, or in transformation activities (to generate electricity and heat), is a major public health problem.[75] It is estimated that, globally, air pollution resulting from the combustion of fossil fuels and biomass was responsible for 3.7 million premature deaths in 2012.[76] These health hazards are borne disproportionally by people who cannot avoid heavily congested and polluted urban areas.[77] An analysis of OECD countries alone found that the cost of mortality due to air pollution was US$1.6 trillion in 2010, of which almost US$1 trillion was attributable to road transport.[78] Although the level of air pollution caused by road transport is linked to the specific type of fuel and vehicle used, and the extent and type of use, most of these costs result from the combustion of fossil fuels.[79]

The IMF has found that phasing out subsidies to fossil fuels would lead to reduced emissions of air pollutants such as sulphur dioxides (SOx), nitrogen oxides (NOx) and particulate matter, which are not only harmful for public health but also cause environmental problems such as acid rain, and material damage to infrastructure. A combination of subsidy reform and corrective taxes on fossil fuels could result in a 23% reduction in these emissions as well as a 63% decrease in deaths worldwide from outdoor fossil fuel air pollution.[80]

3.6 NEGATION OF CARBON PRICE SIGNALS

Unfortunately, rather than placing a price on emissions or raising their cost, governments are currently subsidising firms to over-produce and consumers to over-use carbon-intensive fossil fuels. Research undertaken by the IEA estimated that 13% of energy-related emissions received an incentive of US$115 per tonne through a wide range of subsidies, and that only 11% of energy-related emissions were subject to a carbon price (on average US$7 per tonne).[81] In addition, carbon prices have fallen sharply. In 2008, carbon credits from developing countries – Certified Emission Reductions (CERs) – were valued at €20 per tonne. But as a result of the 2008 financial crisis, low caps in the emission-trading scheme (leading to a surplus of allowances), and the failure to reach a new international climate agreement in 2009, the price of carbon from projects in developing countries has fallen to below €1 per tonne.[82] Investors have been sent the wrong signals in a number of countries where carbon prices have fallen and fossil fuel subsidies have risen.[83]

Investors and businesses tend to look for long-term, unambiguous and legal signals from governments in order to decide where to invest. Rather than using carbon price signals as a means to avert dangerous climate change, governments' subsidies for fossil fuels indicates to investors that they should continue to invest in fossil fuel-based energy (see Figure 19).[84]

Until recently there was no link made between discussion on reforming subsidies to fossil fuels and the issue of carbon pricing, but the 2015 IMF and World Bank spring meetings, and a recent World Bank report, emphasise that getting energy prices right and introducing carbon pricing must start with the removal of subsidies for fossil fuels, which are "bad for the environment, bad for fiscal policy and neither help the poor nor competitiveness".[85]

3.7 INCREASING THE RISK OF STRANDED ASSETS: DRIVING EXPLORATION FOR AND PRODUCTION OF 'UNBURNABLE' CARBON

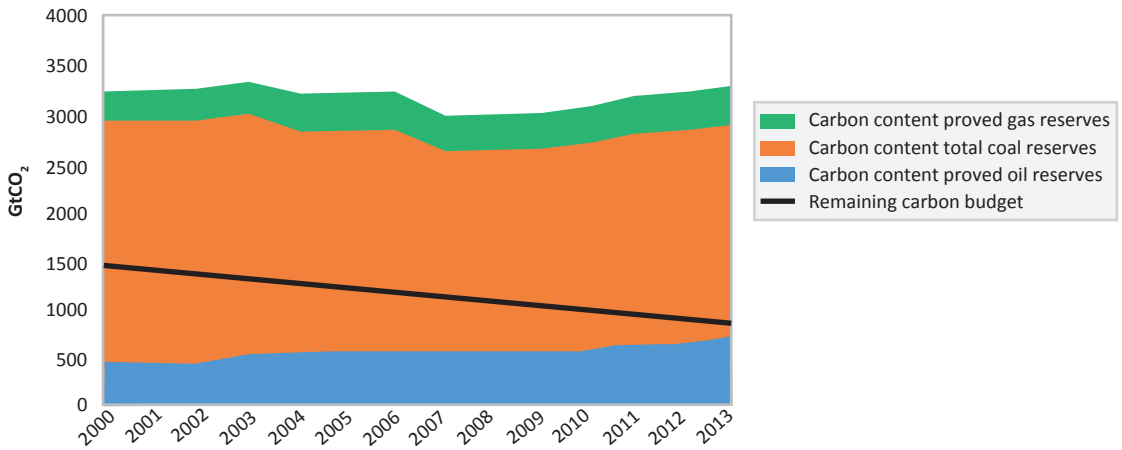
At the 2010 United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Cancún, governments from around the world agreed to limit global average temperature increase to a maximum of 2°C above pre-industrial levels in order to avert dangerous climate change.[86]

Following their lead, the world's major scientific institutions that were working on climate and energy issues determined the volume of fossil fuels that could be burned to stay safely within this limit – and, at the same time, the amount of carbon reserves that are 'unburnable.' According to both the IEA and the Intergovernmental Panel on Climate Change (IPCC), by 2013, at least 75% of proven reserves of oil, gas and coal needed to stay in the ground if climate change was not to reach dangerous levels.[87]

The percentage of total reserves of fossil fuels that are unburnable has grown rapidly over the past decade: there are more proven global oil, gas and coal reserves while the carbon budget (the amount left to burn) has shrunk as the result of rising greenhouse gas (GHG) emissions (see Figure 17). In addition, as fossil fuels become more difficult and expensive to obtain, their extraction and production are also becoming more energy- and emissions-intensive. The Carbon Disclosure Project has found that major oil and gas companies are producing more GHG emissions, despite producing less oil and natural gas.[88]

Figure 17

The carbon content of fossil fuel reserves in comparison to the carbon budget (2000– 2013)

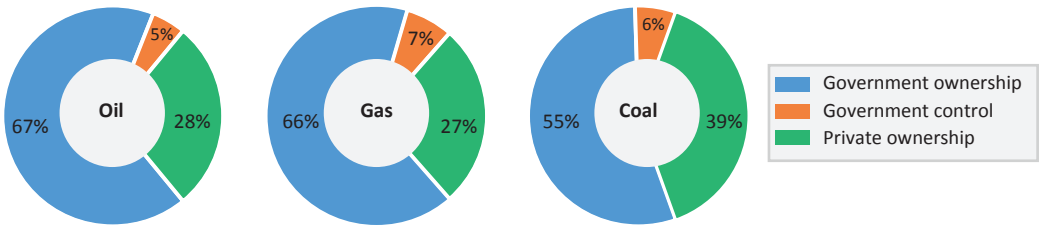


Source: Bast et al 2014.[89]

Unburnable carbon is a climate issue and could also be a financial one: according to the Carbon Tracker Initiative (CTI), as much as 80% of the coal, oil and gas reserves of private companies are now 'unburnable,' which represents potentially 'stranded' assets. The CTI defines stranded assets as fuel, energy and generation resources that, at some time before the end of their economic life, can no longer create an economic return because of regulatory changes linked to the transition to a low-carbon economy.[90] It is estimated that under a global climate deal consistent with the 2°C commitment, the fossil fuel industry could lose US$28 trillion in gross revenues by 2035 compared to the existing scenario. The oil industry alone would face stranded assets of US$19 trillion, including current investments in offshore deep-water fields, tar sands and shale oil.[91] Despite these risks, public and private fossil fuel companies continue to invest heavily in exploration – US$674 billion was spent in 2012 to find and develop new sources of oil, gas and coal.[92]

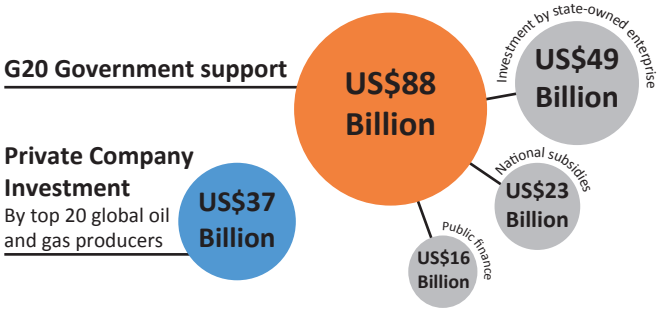
Governments own over 50% of the world's production of fossil fuels and control as much as 70% of oil and gas production through companies that are wholly or majority state-owned (see Figure 18).[93] If governments were to remove current subsidies for exploration, including those provided through public finance and support to SOEs, the economics of a wide range of fossil fuel exploration and production projects would shift. Research undertaken by ODI and OCI found that governments make much of this investment, since they have continued to support exploration despite the spectre of unburnable carbon and stranded assets. For instance, G20 countries are providing US$88 billion a year in support for exploration alone, despite their commitment to phase out inefficient subsidies for fossil fuels (see Figure 19, Annex 2 and Section 8).

Figure 18
Government ownership and control of oil, gas and coal production (globally)



Source: Bast et al 2014.[94]

Figure 19
Estimated G20 government annual support to fossil fuel exploration



Source: Bast et al 2014.[95]

4. Emerging evidence on the benefits of fossil fuel subsidy reform – global level

Main points:

- ***A review of studies on the economic impact of the reform of subsidies to the consumption of fossil fuels suggests that phasing them out leads to an increase in global real income or GDP by up to 0.7% per year to 2050. This benefit would not be spread equally, however, as in general, fossil fuel importers would see increases in GDP whilst fossil fuel producers would face income losses. Given uncertainties about the exact impact of removing subsidies, these can only be rough estimates, but nevertheless provide an order of magnitude that indicates the issues at stake.***
- ***There are also likely to be health and environmental benefits accruing from reforming fossil fuel subsidies. An analysis conducted by the IEA, using its data on fossil fuel consumption subsidies in developing countries, estimated that a phase-out of these subsidies between 2011 and 2020 would lead to lower emissions of air pollutants such as SO_2, NOx and particulate matter, which are harmful to public health and the environment.***
- ***Recent research by the Global Subsidies Initiative (GSI) based on modeling in 20 countries found that the removal of fossil fuel subsidies between now and 2020 could lead to average national emission reductions of approximately 11%.***
- ***There are significant gaps in studies of the impact of reforming subsidies. Carbon-emissions savings from the removal of subsidies to producers have not yet been estimated in the same way as the emission reduction potential of reforming subsidies to consumers, but are likely to be significant. Furthermore, the impacts of national-level subsidy reform on the economy and climate are rarely analysed together.***

There is increasing evidence and acceptance of the fact that subsidies for fossil fuels are economically, socially and environmentally unsustainable, and that they need to be reformed to open fiscal space for public investments that will enhance low-carbon growth.[96] The following section outlines the findings from global-level studies on the benefits of subsidy reform.[97]

4.1 BENEFITS FOR GDP, ENERGY DEMAND AND PRICES

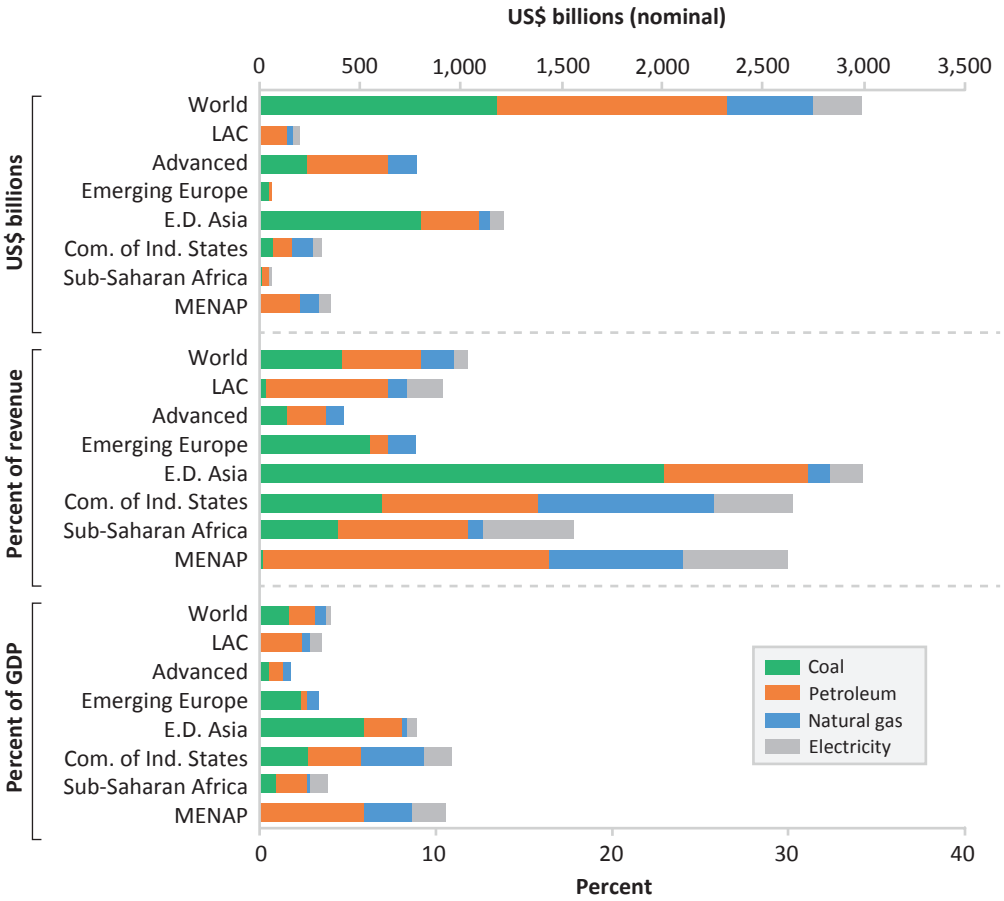
A review of studies on the economic impact of reforming subsidies to the consumption of fossil fuels suggests that phasing these out leads to increases in global real income or GDP. These gains are the result of more efficient allocation of resources saved from subsidy reform, with global increases in GDP ranging up to 0.7% per year to 2050.[98]

The GDP impact of subsidies to fossil fuel consumption arises from their role in distorting energy prices. When energy is sold below its true costs, its use imposes a burden on the economy. This burden can be expressed as the increase in growth that would occur if subsidies were removed and resources redeployed more efficiently.[99] Given uncertainties about the exact impact of removing subsidies, the numbers can be only rough estimates, but they nevertheless suggest an order of magnitude that indicates the issues at stake.

Specific studies find that while the multilateral removal of subsidies to the consumption of fossil fuels would bring real income gains at the global level, these gains would be unevenly distributed across countries. For a number of countries, particularly those which import fossil fuels, phasing out subsidies would lead to a real increase in GDP relative to the baseline, both from efficiency gains associated with their removal and from an improvement in the terms of trade. At the same time, most countries that produce fossil fuels are projected to incur real income losses, in some cases substantial, such as for Russia and non-EU Eastern European countries.[100] In relation to wider removal of subsidies, combined with reforms in the price of energy (to tax and fully reflect the cost of fossil fuels) the IMF finds that all countries benefit, with the highest GDP gains in Asia, the former Soviet Union, and the MENA region (including Pakistan) (see Figure 20).[101]

Figure 20

Projected fiscal benefit of removing subsidies for fossil fuels and reforming the price of energy

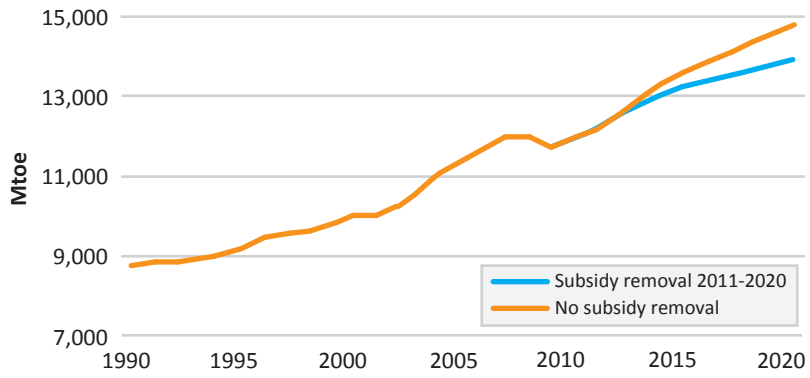


Source: Coady et al, 2015[102]

In addition, a 2010 IEA analysis, using its figures for subsidies to the consumption of fossil fuels (see Annex 2), found that a phase-out between 2011 and 2020 would cut primary global energy demand by 5.8% by 2020 alone, equivalent to the combined energy consumption of Australia, Korea and Japan (See Figure 21).[103]

Figure 21

Impact of removing fossil fuel subsidies on global energy demand



Source: IEA 2010[104]

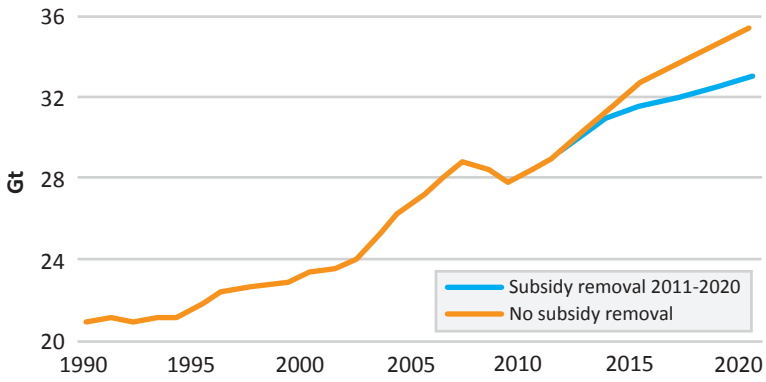
4.2 BENEFITS FOR HEALTH, ENVIRONMENT AND CLIMATE

According to data presented by the IEA in 2010, phasing out subsidies to the consumption of fossil fuels in developing countries between 2011 and 2020 would lead to lower emissions of air pollutants such as SO_2, NOx and particulate matter, all of which are harmful to public health and the environment (see also Section 3.5 on the health costs of air pollution).[105]

Subsidies for fossil fuels have significant climate impacts. According to the 2014 IPCC report, emissions from the energy sector accounted for 78% of the increase in GHG emissions in the past decade.[106] Recent modeling by the Global Subsidies Initiative finds that the removal of fossil fuel subsidies across 20 countries between now and 2020 could lead to average national reductions of about 11% against a business as usual scenario. This research also found that if 30% of the savings from subsidy removal are redirected to renewable energy and energy efficiency, the national average emission reduction estimates increase to 18%.[107,108] Research completed at Laval University and the University of Oxford in 2014 found that subsidies for fossil fuels could have been responsible for up to 36% of global carbon emissions between 1980 and 2010.[109]

Emissions savings from the removal of subsidies for the production of fossil fuels have not yet been estimated in the same way as consumption subsidies, but are likely to be significant. Subsidies to fossil fuel production influence the economic viability of both exploration and extraction with a potential 'all or nothing' outcome in releasing emissions from new reserves. In addition, once fossil fuel reserves come on line, there is a risk that they will continue to be put to productive use until they are depleted, because the fixed costs of exploration and extraction are sunk, and the variable costs of production may be far smaller. There is also a significant link between existing subsidies for the production of coal and gas and locking-in high-emission sources of electricity generation. Further work is needed – and is currently underway – to model and estimate emissions savings from the removal of production subsidies.

Figure 22
Impact of fossil fuel subsidy removal on energy-related CO_2 emissions



Source: IEA 2010[110]

Like energy consumption per unit of GDP, GHG emissions per unit of GDP and per capita also display large differences between countries. The impact of subsidy reform on a country's GHG emissions will depend largely on the energy and carbon intensity of its economy.[111]

The impacts of national-level subsidy reform on the economy and climate are rarely quantitatively analysed together (see Figure 23).[112] A 1999 IEA study estimated that the removal of fossil fuel subsidies in the eight countries reviewed would:[113]

- Reduce primary energy consumption by 13%;
- Increase GDP through higher economic efficiency by almost 1%;
- Reduce CO_2 emissions by 16%; and
- Produce domestic environmental benefits, including reduced air pollution.

Replicating this analysis alongside efforts to produce a detailed global inventory of fossil fuel subsidies would make a significant contribution to the data needed to support the phasing out of these subsidies (see Section 8.1.1).

Figure 23

The economic and climate impacts of subsidy removal in eight countries

Country	Average rate of subsidy (percent of market price)	Annual economic efficiency gain (percent of GDP)	Reduction in energy consumption (in percent)	Reduction in CO_2 emissions (in percent)
China	10.9	0.4	9.4	13.4
Russia	32.5	1.5	18.0	17.1
India	14.2	0.3	7.2	14.1
Indonesia	27.5	0.2	7.1	11.0
Iran	80.4	2.2	47.5	49.4
South Africa	6.4	0.1	6.3	8.1
Venezuela	57.6	1.2	24.9	26.1
Kasakhstan	18.2	1.0	19.2	22.8
Total sample	**21.1**	**0.7**	**12.8**	**16.0**
Total world	**NA**	**NA**	**3.5**	**4.6**

Source: IEA 1999

The global economic and climate benefits of subsidy reform are particularly high where: 1) reforms are undertaken simultaneously worldwide to minimise competitiveness and trade effects; 2) budgetary allocations are used to mitigate the distributional impacts of subsidy removal across income groups and sectors at the national level; and 3) reinvestment at the sector level is focused on low-carbon alternatives (see Section 7.5.1). Although limited, existing evidence suggests that the economic, social and environmental benefits of fossil fuel subsidy reform would largely exceed the transitional costs.[114] A review by the Copenhagen Consensus Centre finds that there is US$15 dollars of benefit for every US$1 spent on reforming subsidies to fossil fuels.[115]

5. Why subsidies persist: barriers to reform

Main points:

- ***Despite the potential benefits that could result from the removal of fossil fuel (and other) subsidies, governments are often reluctant to undertake reform.***
- ***Researchers have identified several reasons for the persistence of subsidies – some explicit, such as a lack of information, while others are implicit, driven by special interests.***
- ***In addition, certain governments subsidise fossil fuels because they lack other effective means and institutional capacity to implement more targeted policies.***
- ***Taken together, implicit and explicit barriers to reform create a dangerous inertia around subsidies even in the light of new technological, economic and social developments.***

Phasing out subsidies for fossil fuels as part of wider reform of the energy sector can reduce pressure on budgets, and create the necessary fiscal space to support sustainable economic development and ensure access to energy for the poor; establish price signals for investment in efficient, low-carbon energy systems and efficient urban planning and transport systems; and eliminate the perverse incentives that drive up carbon emissions. Despite the potential virtuous cycles for national priorities that could result from the removal of fossil fuel subsidies, governments are often reluctant to undertake reform. Researchers have identified several specific reasons for the persistence of subsidies – some are explicit, such as misperceptions of their role in social protection and economic development; others are implicit, driven by special interests.[116]

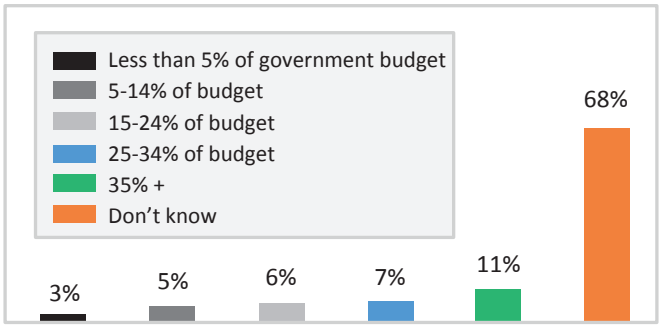
5.1 EXPLICIT REASONS WHY SUBSIDIES PERSIST

5.1.1 Lack of information: consumer subsidies

Although citizens are aware of fuel prices, they rarely have complete or accurate information about what they or others receive in terms of subsidies. This lack of transparency can pose a significant barrier to revising or eliminating subsidies.[117]

Survey and focus-group evidence collected in Morocco in 2010, for example, found that few households were aware of a subsidy for butane gas that absorbed 5.5% of GDP, or 17% of the government budget, and households that did know about it underestimated its scale by a wide margin.[118] The Egyptian government sponsored a survey in 2014 that found that nearly 70% of households did not know the scale of the country's fossil fuel subsidies, and that poor households in particular had no idea of the size of government support. Although richer households were more likely to claim knowledge, they usually underestimated the scale of government spending, which at the time of the survey absorbed 8% of GDP and 39% of the government's budget (see Figure 24 and Annex 3).[119]

Figure 24
Egyptian household beliefs about the scale of fossil fuel subsidies



Source: Vis-Dunbar, 2014.[120]

The public may also have a flawed understanding of the effectiveness of fossil fuel subsidies. A survey in Mexico found that a large proportion of the population believed that subsidies for fossil fuels subsidies were universally beneficial and that the government had an obligation to maintain them.[121] In Bolivia, the public was not aware that a new cash-transfer scheme was funded by, and meant to compensate for, the removal of subsidies for fossil fuels. The cash transfer was supported, but the public opposed the decision to remove subsidies, which was eventually reversed.[122]

Robust processes of reform must therefore be accompanied with detailed information about the impacts of fossil fuel subsidies, and the potential benefits of their reform (see Section 7.3).

5.1.2 Lack of information: producer subsidies

It may be even more complicated in political terms to reform producer subsidies than consumer subsidy reform, and also face stiff opposition given the role of fossil fuel revenues in government budgets in some countries, and the fact that the fossil fuel industries often have access to many levels and branches of government.[123] In addition, there is a basic lack of knowledge about the extent of support for producers and of taxes and revenues governments receive from the energy industry, and where this information is held.

A GSI research project found that fossil fuel production is supported by a wide range of subsidies that include direct payments; preferential access rights to energy deposits; credit and insurance support; caps on liabilities related to fossil-fuel enterprises; tariffs or export restrictions; government ownership of power generation; transmission or distribution assets and fuel stockpiles; support for bulk fuels transport; and health and safety oversight (see Annex 2).[124] The 2015 OECD inventory of fossil fuel subsidies uncovered about 800 types of subsidy, mainly in national budgets, but said they did not cover all factors causing artificially lower prices.[125] Reform is further impeded because, most of these subsidies, despite being widely recognised as incentives, are not clearly identified in standard government budget documents.[126,127]

Compounding the lack of information on subsidies and incentives, there is also a lack of information about the revenue from taxes or fees obtained from the fossil fuel industries, and how it is used. On the basis of information from a fee-based data provider (i.e. not publicly available) a review of exploration subsidies by OCI and ODI across the G20 countries (which have committed to phasing out inefficient subsidies) found wide variations in the availability of data, and highlighted that in order for governments to be fully accountable for their commitments, there is an urgent need for more transparent and comparable information.[128]

5.2 IMPLICIT REASONS WHY SUBSIDIES PERSIST

5.2.1 Special interests

Even when experts agree that the cost of a given subsidy significantly outweighs its benefits, it can be very difficult to reform or phase it out. This is because the benefits of subsidies are often concentrated among specific sectors or groups, while the costs are spread across the general population (i.e. consumers and taxpayers).[129] This creates asymmetric incentives for political leaders, as lobby groups often support the interest of small, special interest groups, rather than those of comparatively vague "general interest" and disbursed benefits.[130] Depending on the political influence exerted by these special interest groups, this can impose significant constraints on decisionmakers.[131]

The influence of special interest groups can be significant. In India, cheap or free electricity provided to farmers creates a significant fiscal burden, but the politically influential farming lobby has ensured that no government can remain in power without maintaining these subsidies.[132] Although not only linked to subsidies, in the USA, individuals and political-action committees affiliated with oil and gas companies have donated US$424 million to political candidates and parties since the 1990 election.[133] Recent research has also found that Exxon Mobil and Shell are the third and sixth most significant lobbyists of EU institutions, spending almost €10 million a year.[134]

5.2.2 Weak institutions

Governments sometimes subsidise fossil fuels because they lack other effective means and institutional capacity to implement more targeted policies. In most countries, the price of energy is a simple indicator that is fairly easy for the public to monitor, which means that consumption subsidies are a visible way to provide benefits in exchange for political support.[135] As a result, subsidies are difficult to reform because governments often see them as a convenient fiscal tool for achieving economic or social objectives, requiring little administrative capacity.[136]

Governments may not reform subsidies due to their limited capacity to respond, lack of mechanisms for targeting and transferring payments at the national level, lack of strategy to integrate transfer programmes and subsidy policy, and little or no coordination between entities that administer subsidies and social programmes (and other complementary measures) (see Section 7.7).[137]

This dynamic is often reinforced in countries where the public has little confidence in the government's ability to make responsible use of the savings generated from reform to support more focused and efficient policies and support.[138] Weak governance and institutions can also lead to distrust, and makes potential supporters of change averse to risk, severely limiting policymakers' capacity to reform subsidies.[139]

Well-targeted subsidies require adequate institutional and administrative capacities, and strong links among different ministries and departments. Governments willing to reform subsidies but lacking these capacities need to be supported in their efforts to build or reinforce institutions, and incentives may be needed to adopt these alternative instruments or complementary measures (see Sections 7.5 and 7.6).[140]

5.3 INERTIA

Taken together, the implicit and explicit barriers to reform create a dangerous inertia around subsidies even in the light of new technological, economic and social developments. Subsidies tend to lock in the patterns of activity that they support, and thus prevent dynamic responses to changing circumstances. They tend to encourage rigidity, because they maintain the production and consumption decisions encouraged by the subsidy.[141]

In many cases subsidies persist even when their original rationale or justification has ceased to exist, and the original policy objectives have been achieved. This poses a significant challenge, as subsidies often persist even in a changed policy environment with new preferences and objectives.[142] Subsidies that are originally intended as short-term measures can eventually become permanent, because they become embedded in planning and expectations, prices (including of capital), resource allocation, and community assets, creating new vested interests.[143]

As will be outlined in Section 7.7, subsidy reform often requires the adoption of complementary measures to ease the process. These interventions must also be carefully designed to allow for flexibility and phase-out so that they do not become immutable as public priorities evolve.

6. Drivers of reform: windows of opportunity

Main points:

- ***A review of case studies of reform shows that the most common motivation was a combination of crises, particularly where the fiscal costs are so high that the government has no choice but to act.***
- ***In addition, although the factors driving subsidy reform may include sector or economic reforms and wider political changes, they are rarely driven by broader social and environmental (or climate-related) issues.***
- ***Fast-rising demand for energy will require some US$45 trillion in new infrastructure investment by 2030. Governments therefore have an important near-term opportunity to avert fiscal crises by reforming energy prices (including phasing out fossil fuel subsidies) as part of wider energy system reform and development. In addition, volatile prices reinforce the case for reforming these subsidies.***
- ***Despite the challenges associated with reform, a number of countries have made significant progress in recent years, which is documented in a detailed set of 15 country case studies (see Annex 3).***

6.1 CROSS-CUTTING DRIVERS (ACROSS ALL SUBSIDIES AND TIMEFRAMES)

An OECD review of case studies of subsidy reform across a number of sectors, including energy, found that the most common motivation for reform was a combination of crises (fiscal and economic, climate or resource). Subsidy reform appears to be possible in situations where the fiscal costs are so high that the government has no choice but to act. This gives the political will to implement and maintain reform. In many cases, a major driver of reforms on energy-related subsidies has been the escalating costs of oil that made the fiscal cost of subsidies unsustainable.[144]

In the absence of a fiscal or economic crisis, the OECD study found that subsidy reform was also driven by broader processes of sector or economic reforms, sometimes aided by a change in political orientation (see Section 7.8).[145] Often reforms of consumption subsidies are undertaken in the context of an enabling environment, which creates the foundation for wider reforms, including times of economic growth, low energy prices, and currency stability. These reforms are often supported by a sound social security system, labour market programmes and a well-funded education system.

Only in rare cases have broader environmental (or climate-related) issues appeared to be a direct motive for reform. While leverage from multilateral processes and rules were cited as a potential motivation, they did not play a large role in the cases assessed in the OECD analysis.[146] This suggests that while climate benefits may motivate a small number of countries to reform subsidies to fossil fuels (such as Germany) (see Annex 3), in most cases the economic rationale for reform prevails as a primary driver being the creation of fiscal space. Particularly in the least developed countries, focusing on the climate-change benefits of reform may be relevant only in cases where it can allow the government to attract climate finance (see Section 8.2.2).

6.2 CURRENT DRIVERS OF REFORM: 2015

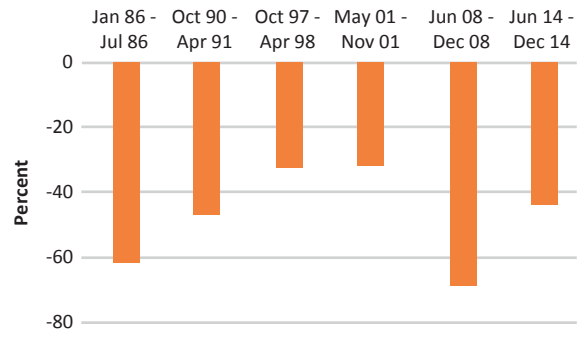
The New Climate Economy (NCE) estimates that fast-rising demand for energy will require some US$45 trillion in new infrastructure investment by 2030.[147] This means that notwithstanding slow progress on subsidy reform, governments have a significant opportunity over the next 15 years to realign energy prices as part of wider energy system reform and development. More efficient energy pricing offers significant promise as countries look for better future economic growth – this underpins two of the NCE's recommendations: the elimination of fossil fuel subsidies and the introduction of a carbon price as part of overall fiscal reform.

In addition to the opportunity to link subsidy reform to wider energy pricing reform, current market conditions also reinforce the case for reforming of fossil fuel subsidies. While many have suggested that the recent drop in oil prices (including the International Energy Agency, the International Monetary Fund, and the Economist) is a once-in-a-generation opportunity to slash subsidies and introduce a carbon price, it is important to recognise that falling commodity prices lead to a parallel rise in demands for production subsidies, as has been demonstrated in calls from UK North Sea oil producers for tax breaks in light of recent falling oil prices.[148,149]

The continued volatility in oil prices (see Figure 25 and Figure 26), the rising cost of finding and extracting oil, gas and coal,[150] and the falling cost of renewables, all highlight the risky nature of the current energy mix focused on investments in and subsidies for fossil fuels (see Section 3.3). Without government support for fossil fuels, large swathes of today's production and use would be uneconomic.[151] The budgets of countries that produce fossil fuels such as Angola, Canada, Iran and Nigeria (see Annex 3) are particularly at risk due to rapid changes in international prices for oil, gas and coal, although these impacts could be mitigated by reducing fossil fuel subsidies to production and increasing taxation (see Section 3.1).[152]

Figure 25

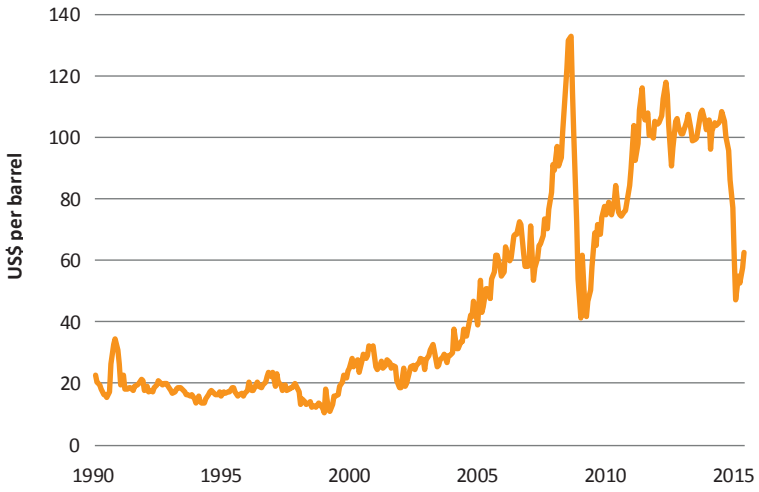
Non-consecutive episodes of six-months for which the average oil price dropped by more than 30%



Source: World Bank, 2015.[153]

Figure 26

Average crude oil prices (Brent, Dubai, WTI) in US$ per barrel, nominal, 1990-2015



Source: World Bank, 2015.[154]

6.3 RECENT EXAMPLES OF SUBSIDY REFORM

Despite the challenges associated with reform, and the fact that fossil fuel subsidies remain unreasonably high, a number of countries have made significant progress in recent years. The IEA has recently documented 27 country-level reform efforts, and in 2013, the IMF assessed 28 processes worldwide of fossil fuel subsidy reform.[155] It classified 12 as a success (leading to a permanent and sustained reduction of subsidies); 11 as a partial success (reduction for at least a year, but subsidies have been reintroduced or remain a policy issue); and five as unsuccessful (price increases or efforts to improve efficiency in the energy sector reversed soon after reform began).

Encouragingly, there has been accelerating progress in recent years, particularly in terms of reforming subsidies to the consumption of fossil fuels. In 2013 and 2014, several countries undertook such reform. Egypt raised fuel prices by 78% in 2014 and is doubling electricity prices over the next five years; Indonesia raised petrol and diesel prices by an average of 33%

in 2013 and by another 34% in 2014; India eliminated diesel subsidies in October 2014 after incremental increases over the preceding two years; Iran raised petrol prices by 75% in April 2015; and Malaysia raised fuel prices by 10–20% in 2013 and again in 2014.[156] This trend is likely to accelerate if oil prices remain relatively low, which makes it easier to reform consumption subsidies, particularly in oil-importing countries.[157]

Based on the work of the IMF, World Bank and other organisations, we have compiled case studies of reforms of fossil fuel subsidies across a range of regions, country income groups and sectors, including transport, energy (electricity, heating and cooking), extractives and manufacturing, which highlight particular drivers relevant to different national contexts. The case studies include lessons learned in Angola, Argentina, Canada, Germany, Egypt, Ghana, India, Indonesia, Iran, Mexico, Nigeria, Peru, Tunisia, Turkey and the United Arab Emirates (UAE) (see Figure 27 and Annex 3).

Figure 27

Summary of case studies of fossil fuel subsidy reform (see Annex 3)

	Region	Country income grouping[158]	Country is a net importer of...	Country is a net exporter of ...	Sectors affected by reform	Type of subsidies reformed	Target(s) of complementary measures to support reform (see Section 7.7)
Angola	Sub-Saharan Africa	Upper-middle income		Oil	-Transport, heating and cooking -Electricity generation and use	Consumption	- Households
Argentina	Latin America	Upper-middle income	Coal, Oil, Gas		-Transport, heating and cooking -Electricity generation and use	Consumption	- Households - Sectors
Canada	North America	High-income	Gas	Coal, Oil	- Extractives	Production	None identified (in literature reviewed)
Germany	Europe	High-income	Coal, Oil, Gas		- Extractives	Production	- Sectors
Egypt	Middle East and North Africa	Lower-middle income	Coal, Oil	Gas	-Transport, heating and cooking -Electricity generation and use	Consumption	- Households - Sectors
Ghana	Sub-Saharan Africa	Lower-middle income		Oil	-Transport, heating and cooking	Consumption	- Households
India	Asia	Lower-middle income	Coal, Oil, Gas		-Transport, heating and cooking	Consumption	- Households
Indonesia	Asia	Lower-middle income	Oil	Coal, Gas	-Transport, heating and cooking	Consumption	- Households
Iran	Middle East and North Africa	Upper-middle income	Coal	Oil, Gas	-Transport, heating and cooking -Electricity generation and use	Consumption	- Households - Sectors
Mexico	Latin America	Upper-middle income	Coal, Gas	Oil	-Transport, heating and cooking -Electricity generation and use	Consumption	- Sectors
Nigeria	Sub-Saharan Africa	Lower-middle income		Oil, Gas	-Transport, heating and cooking -Electricity generation and use	Consumption	- Households - Sectors
Peru	Latin America	Upper-middle income	Coal, Oil	Gas	-Transport, heating and cooking -Electricity generation and use	Consumption	None identified (in literature reviewed)
Tunisia	Middle East and North Africa	Upper-middle income	Oil, Gas		-Transport, heating and cooking -Electricity generation and use	Consumption	- Households
Turkey	Europe	Upper-middle income	Coal, Oil, Gas		-Transport, heating and cooking -Electricity generation and use	Consumption	- Households - Sectors
United Arab Emirates	Middle East and North Africa	High income	Coal, Gas	Oil	-Transport, heating and cooking -Electricity generation and use	Consumption	None identified (in literature reviewed)

7. Principles for reform

Main points:

- ***The 'ingredients' for successful subsidy reform are the same as those needed for any effective process of policy change.***
- ***The role of energy in the economy justifies a 'whole of government' approach to reform processes. Individual ministries seldom have access to all the tools required to mitigate the impacts of reform, support economic diversification, or the convening power to plan reform processes.***
- ***Research should be undertaken before, during and after reform to support understanding of the scope and nature of fossil fuel subsidies, the policy objectives of existing subsidies, up-to-date information on the costs of energy services, key attributes of relevant institutions and decisionmaking processes, the potential domestic impacts of removing consumption subsidies, and the groups that would be favoured or penalised as a result of reform.***
- ***Any subsidy reform process should be supported by transparent and extensive communication and consultation with stakeholders, including the general public. There is strong evidence for the need for clear, open and honest information on the scale of subsidies, their costs and impacts, plans for reform, and complementary measures. There are several examples of how a failure to engage and communicate with stakeholders has significantly undermined reform efforts.***
- ***While subsidy reform can yield significant fiscal space and additional government revenue, which are often far greater than the up-front costs of reform, these positive impacts are felt only after the reforms have been enacted. As a result most governments will need to mobilise resources to support many of the elements necessary for robust subsidy reform.***
- ***There may be a need to create new institutions or strengthen existing ones to support energy sector reform, the mobilisation of resources, and the deployment of the fiscal space created for wider public goods.***
- ***A key element of successful reform is the efficient and visible reallocation of resources to those groups most affected through complementary measures. These complementary measures can be developed through resources mobilised prior to reforms, and through the resources saved or generated by removing fuel subsidies. Although there are specific considerations for support to sectors, industries and firms, and to households and individuals, complementary measures should be designed and implemented in a manner that follows a set of basic principles that build on lessons from general good practice in policy reform.***
- ***Although the temptation may be to undertake wholesale elimination of fossil fuel subsidies, where possible the best approach is to set ambitious goals, with slow, credible and specified timeframes for phasing out subsidies. This can include staggering the elimination of subsidies, and ideally should take place as part of broader sector- or economy-wide reforms as part of a comprehensive approach.***

Guidance for robust subsidy reform (across all sectors) is very similar to the principles that would be used in a well-designed process of policy reform.[159] While there is no single 'recipe' for success in managing the process of subsidy reform, the prospects for sustained reforms can be enhanced by adherence to some basic principles, and by taking into account both national circumstances and changing regional and international market conditions.[160]

Since subsidies are provided at the national and sub-national level (either through domestic or international support), any guidance for reform must be relevant to the country or local level. As highlighted in the experiences of subsidy reforms of a number of countries (see Annex 3), and outlined in a growing body of research on the topic, several specific elements of a subsidy reform process contribute to its being effective and sustained over time, including a 'whole of government' approach; research and analysis; consultation and communication (before, during and after reform); mobilising resources (before and during reform); complementary measures (for sectors and households); and phasing-in and linking to wider reform processes.

7.1 WHOLE OF GOVERNMENT APPROACH

Although at first glance efforts to reform fossil fuel subsidies might seem to link only to one sub-sector, and only a limited portion of an energy department or ministry's portfolio, the role of energy in the economy and the significant impact of subsidies on wider economic, environmental and social objectives justify a whole of government approach to reform. In addition, individual government ministries seldom have access to all the tools required to mitigate the impacts of reform, support economic diversification, or the convening power to plan reform processes.[161] This places the burden of the 'reform agenda' on high-level political and bureaucratic leadership at the national or sub-national level. For examples if subsidies are provided at the national level this would include parts of central government such as the Office of the Prime Minister or President and Treasury or Ministry of Finance, to ensure that any process is broad in scope and planning, and involves all relevant parties (see Figure 28).[162] Such processes are also needed to bring together the many relevant agencies (see Figure 29), and to avoid sending (too many) conflicting signals to the public and businesses.[163] This has been highlighted recently in the cases of the Dominican Republic and Honduras, where the joint action of various public actors across the entire government, as opposed to in one or two ministries, was seen as essential for creating broad political ownership of reform.[164]

Figure 28
Policymakers and ministries that typically have a stake in fossil fuel subsidy reform

Issue	Political	Bureaucratic	Other
Whole of government coordination	President or prime minister, cabinet, state council	President or PM's department, central planning agencies	
Energy policy	Minister for energy	Department for energy and resources	SOEs in the energy sector
Economic policy	Finance minister or treasurer	Department of finance or treasury	
Social policy	Minister for social protection	Department of social services	Domestic non-government organisations involved in providing social services
Business policy	Minister of commerce or business	Department of commerce	Financial or regional institutions involved in providing financial assistance (loans, cash payments)
Environmental policy	Minister of environment	Department of environment and natural resources	

Source: Beaton et al, 2013[165]

Figure 29
Non-executive branches of government with a stake in fossil fuel subsidy reform

Stakeholder group	Sub-categories	Represented by
Federal parliament (non-government members)	Upper and lower houses	Parliamentary and Senate committees
State, provincial and territory government	First minister, key portfolio ministers and their departments	Federal-state consultative bodies and leaders' meetings
Local government	Leaders and their office	Local government associations

Source: Beaton et al, 2013[166]

7.2 RESEARCH AND ANALYSIS

Governments and wider stakeholders seeking to undertake or encourage subsidy reform should conduct research and analysis before, during and after reform. This research and analysis should not be undertaken in a vacuum, but in a manner that can directly contribute to the elements necessary for a successful process. As such, information and findings should feed directly into communication and consultation processes, and provide the necessary evidence to support cross-government collaboration and the mobilisation of resources. In many cases, the decision of who should complete this research and analysis, and how they go about it, may be just as important as the analytical content of the report produced. For example, a supportive review of subsidy reform, written by a member of the industry benefiting from the subsidy, and which consulted all relevant stakeholders, may be more influential than the same report prepared by a technocratic institution.[167]

There must also be clear recognition through the process of collecting data that there are limits to the scale of analysis that can be undertaken and acted upon; that rational arguments and economic findings alone are not sufficient to enable and sustain reform (see Section 5); and that some of the information collected can be equally useful in supporting the reforms necessary to implement carbon pricing.[168]

Specific areas of focus for research and analysis should include:

- **Data on the scope and nature of fossil fuel subsidies** can be useful in dispelling myths and misinformation about the magnitude and incidence of these incentives (see Annexes 1 and 2). If transparently provided, this information can encourage informed discussion and debate among those with an interest in maintaining the subsidies and those interested in their reform, and can support peer review and encourage compliance with any future subsidy reform processes.[169] In addition to global estimates there are also country-level subsidy inventories by the IEA, OECD, IMF and other groups, which can be an important point of departure for governments seeking to develop their own transparent list of subsidies (see Figure 32).
- **The policy objectives of existing subsidies** should be reviewed along with their effectiveness in achieving stated goals.[170] This requires rigorous analysis as it often requires disentangling various subsidies' objectives and impacts, and as those resisting reform may have a strong incentive to obscure the objectives of policy.[171] One suggestion has been to place the onus for identifying subsidy objectives and justifications for their retention on the providers and recipients of subsidies as opposed to those seeking their reform.[172] In addition, identifying the original objectives can support a comparison between the cost effectiveness of fossil fuel subsidies and alternative policies, and the design of a well-targeted package of instruments (including complementary measures – see Section 7.7).[173]
- **Updated information on the costs of energy services.** Fossil fuel production and consumption, and associated subsidies, are often ingrained in government approaches to energy development. Subsidy reform may depend on a government's ability to understand the swiftly changing nature of energy systems, such as the rapid growth and increasing competitiveness of the cost of renewable energy and energy access alternatives. There is also a need for a willingness to try new approaches to energy development, which requires on-going learning and openness on the part of policymakers and those responsible for implementing policies. For example, energy strategies have often historically been approached in terms of the amount of fuel produced or as the number of megawatts generated. More recently, particularly in the context of providing increased access to energy, and increasing efficiency, energy production has been discussed as the provision of 'energy services' such as hot water, thermal comfort, lighting, cooking, food cool-storage and mobility. Further, using methods such as 'full cost accounting' can help to consider the unwanted by-products and additional costs of energy choices from the project level to a systems level. A new approach to energy strategies and systems can help pave the way for reforming the policies and subsidies that promote fossil fuels, while ensuring that energy policy and investment provides maximum value for money.
- **Key attributes of relevant institutions and decision making processes** should be outlined to support a whole of government approach, and to determine which institutions and processes will need increased capacity or to be newly established. Although self-evident within a given sector or government department, this analysis will support understanding across the wide range of affected institutions that are likely to form part of the reform process.[174] This should also support coordination and implementation of complementary measures and timing of reforms including understanding election cycles at the sub-national and national level (see Sections 7.7 and 7.8).
- **The potential domestic impacts of consumption subsidy removal (economic, social and environmental)** can be estimated using a number of modelling tools including Computable General Equilibrium (CGE) models, which provide information on household welfare, GDP, government budgets, and forecasts for major macroeconomic

indicators.[175] In addition, the World Bank has developed a Subsidies Simulation Stata Toolkit, which should help in studying the impact of price reforms on household wellbeing and on government revenues (where information is available on prices paid by consumers), and GSI has developed an Integrated Fiscal Model (GSI-IF) for estimating GHG emissions reductions from removal of fossil fuel subsidies or an increase in fossil fuel taxation (VAT, goods and services tax or carbon tax).[176]

- **The groups that would gain or suffer an economic loss as a result of subsidy reform** must be identified in order to understand the distribution of costs and benefits.[177] This information can be gleaned from resources such as household-expenditure surveys and sector and industry performance reviews, and can directly support the development of comprehensive consultation processes (see Section 7.3) and the development of complementary measures (see Section 7.7).[178] This means determining not only who is concerned and what they stand to gain and lose but also what they know about the issue, along with their preferences, beliefs, and values (Cabañero-Verzosa and García, 2009).[179] This specific analysis is particularly important in supporting consultation and communication undertaken as part of reform processes (see Section 7.3) and can include literature and media reviews, interviews and focus groups, discussion groups and workshops, polls and surveys, web-based forums and public enquiries.[180]

7.3 CONSULTATION AND COMMUNICATION (BEFORE, DURING AND AFTER REFORM)

Any subsidy reform process must be supported by transparent and extensive communication and consultation with stakeholders, including the general public. There is strong evidence for the need for clear, open and honest messages on the scale of subsidies, their costs and impacts, plans for reform, and complementary measures to be provided.[181] Both consultation and communication are seen as critical to dispelling myths about subsidies, correcting information asymmetries, building coalitions of support for reform, improving participation in collective efforts and getting the support of those more resistant to change.[182]

Broad stakeholder consultation and engagement is particularly important for durable reform and to ensure that reform processes are broadly perceived as fair and legitimate and reflect citizens' preferences.[183] Consultation and engagement can also include efforts to build alliances for change. This may include engaging unlikely allies such as well-performing segments of sectors or regions that could be used to offset other lobbying against reforms.[184]

The stakeholder groups are diverse and beyond government officials include industry associations, companies, trade unions, consumers, social and labour political activists and civil society organisations (CSOs) – all of which need to be involved if subsidies are to be eliminated (see Figure 30). Reform efforts may even originate from or be supported by some of these non-governmental groups such as international organisations and CSOs (see Section 8). These actors can increase interest and participation in reform processes. In addition, third-party mandatory approaches can also help provide cover for the imperative for change (i.e. requirements to notify subsidies through the WTO) (see Section 8).[185]

Figure 30
External stakeholder groups

Stakeholder group	Subcategories	Represented by
Public consumers	Lower-, middle- and upper-income groups	Civil society, consumer organisations
Non-consuming public	Low-income groups that do not use subsidised fuel but would be eligible for cash assistance	Civil society
Fuel industry	Exploration companies, producers, importers, exporters, refiners, distributors, retailers	Industry associations, chambers of commerce, lobbyists, peak bodies
Industry	Primary production and processing, transport, manufacturing, services, construction, ICT	Industry associations, chambers of commerce, lobbyists, peak bodies
Workers	Production and consuming industries	Unions and labour groups
Policy community	Academia, policy institutes and commentators	Coalitions, councils, peak bodies
Media	Print, online, television, radio	N/A

Source: Beaton et al, 2013

As outlined in the country case studies (see Annex 3) there are several examples of how robust consultation and communication can help to build support for reform.

- In **Ghana**, the government undertook an independent poverty and social impact analysis of its subsidies and made the findings easily accessible and publicly available.[186] In addition, a strong communication campaign aimed at the poor and communicated via radio broadcast highlighted the complementary measures to be implemented as part of reforms (support to health, education and energy access).[187]
- **Iran's** energy subsidy reforms were supported by a public relations campaign emphasising that the reform did not aim to eliminate subsidies but to switch subsidies from products to households.[188] Iran used a range of messages throughout its campaigns including promoting the standard of living, distributing national wealth fairly and equally, minimising income disparities, increasing efficiency and preventing wasteful consumption, reducing fuel smuggling, allocating more energy resources to boost production, encouraging demand for domestically produced commodities and enhancing the country's oil and gas export capacity.[189]
- **Jordan** initiated a fossil fuel subsidy reform process in 2008, including a public campaign before price changes in 2012, and including wide consultations that the government undertook with parliament, local CSOs, the business community and labour representatives.[190]

There are also several examples of how a failure to engage and communicate with stakeholders can significantly undermine reform efforts. In Bolivia and Nigeria the failure to provide advance notice of a significant increase in fuel prices (either at all or early enough) led to large-scale demonstrations and strikes, and the complete or partial reinstatement of subsidies.[191]

Communication about subsidies and processes of reform need to be tailored to different audiences and should employ a range of channels, such as television, radio, digital media, direct engagement and print. For example, Malaysia's reform processes involved a public forum on fossil fuel subsidies inviting members of parliament, leading academics, business leaders and representatives of consumer groups; a simple public survey on whether subsidies should be reduced, and if so, how quickly; YouTube videos giving basic information about the country's fuel subsidies; a Twitter account for announcements and answering questions from the public on the topic; and engaging public figures to write about subsidy-related issues in the media.[192] Reform processes in Indonesia included text messages explaining the new subsidy policy, and in the Philippines included a nationwide roadshow. CSOs can also play an important role in communications. For example GSI has supported a number of subsidy reform efforts in Bangladesh, India, Indonesia and Nigeria by publishing 'Citizens' guides to fossil fuel subsidies' written in non-expert language to increase public understanding of subsidies.[193]

Based on objectives of media and communications strategy, establishing metrics for assessing impact, media monitoring and content analysis are important for measuring the success of the media outreach, and should be in place. Surveys and polls provide insights into existing habits, and follow-up surveys will reveal whether these have changed.[194] These can be paired with wider government efforts to develop mechanisms to monitor the impacts of reform, with the aim of supporting its sustainability, so that policies will not be reversed and the subsidies reintroduced. This would include demonstrating the progress that has been made towards achieving announced goals of subsidy reform, and monitoring and disseminating information on the use of fiscal space created by the reform. They should also offer transparent and up-to-date information on the costs of any remaining subsidies.

7.4 MOBILISING RESOURCES (BEFORE AND DURING REFORM)

While subsidy reform can provide significant fiscal space and additional government revenue that often far exceeds the up-front costs, these positive impacts on government budgets are felt only after the reforms have been implemented.[195] As a result, most governments will need to mobilise resources prior to reform in order to support many of the elements necessary for a robust reform process. These resources could be mobilised both domestically and internationally (see Section 8). This is particularly important for covering the costs of analysis, communication, consultation, complementary measures and institutional reforms that are required in advance of wider subsidy reform processes. Recent reforms in Indonesia clearly illustrate the need for upfront finance for reforms, as its reform process was funded by the 2014 State Budget rather than by a reallocation of the fiscal space created through reform, intended to be directed towards complementary measures that would be introduced following the initial reform.[196]

7.5 CREATION OF OR STRENGTHENING INSTITUTIONS

The establishment of independent regulatory bodies can be part of wider power sector reform, including improving (state) enterprise efficiency and encouraging investment in cheaper sources of energy production in order to ensure energy service quality, access and affordability (IMF, 2013). In the energy sector in Tanzania a specialised regulatory entity was set up to monitor reform efforts and to keep the public constantly informed about energy prices. In a number of countries similar independent institutions were set up with the aim to 'de-politicise' the price-setting framework (separate it from election cycles).

In addition, subsidy reform provides opportunities to free up government budgets for more efficient public spending. For example, the money can be reinvested in public health, education and transport. Doing so, however, requires a strengthening of, or sometimes the establishment of, institutions that are charged with providing these services, and ensuring the services reach the poorest and most vulnerable.

7.6 COMPLEMENTARY MEASURES

Although subsidies for fossil fuel production and consumption are often poorly targeted, the impact of their removal can be significant for particular sectors and segments of the population, as every subsidy benefits somebody, somewhere.[197] In a number of countries, the affected groups and sectors may represent a large proportion of the population, and therefore a key element of successful reform is the efficient and visible reallocation of resources to those most affected.[198]

Complementary measures can be developed through resources mobilised prior to reforms and resources saved or generated by removing fossil fuel subsidies. The efficient use of these resources as part of well-designed and clearly communicated complementary measures (for sectors, households and even within government) increases the likelihood that reform processes will both be successful and sustained. Interventions need to be designed in recognition that economies are constantly changing and that it is impossible to indemnify all members of society from the negative consequences of economic change.[199]

Although there are specific considerations for support to sectors, industries and firms, and to households and individuals, all of these complementary measures should be designed and implemented in a manner that follows a set of basic principles that build on lessons from general good practice in policy reform:[200]

- Transparency – governments must be explicit about the transitional costs of reform and communicate clearly about the complementary measures to be implemented;
- Public accountability – complementary measures should be designed so that the objectives are for the public good rather than the specific groups being supported;
- Use of independent measures – each instrument should be matched to each objective to facilitate continual adjustment of policies as objectives change (to minimise policy inertia);
- Decentralisation – developing complementary measures based on local information may allow for more targeted actions and policies (and may be facilitated by transfers from central to regional and local governments);
- Grouping measures together – packaging several complementary measures may reduce political opposition;
- Balance flexibility with predictability – so that measures can be adjusted when new information is available, with enough continuity to support longer-term investment decisions;
- Exit strategy – clear and transparent criteria and timeframes that determine when complementary measures should be terminated.

The following sections provide more specific guidance for complementary measures to be directed toward affected sectors and households, and within government, noting that although any given measure may be directed to one affected group, the benefits will spill over to other groups, e.g. job creation supports sectors as much as households.

7.6.1 Sectors, industries and firms

Fossil fuel subsidies often become embedded in the operations of sectors, industries and firms. As a result, any reform process can gain political support only if it is carefully designed so that these groups are able to adapt to new economic circumstances. Just as much as support is required for the growth of new sectors, the rapid economic transition needed to achieve de-carbonisation requires active government policies to smooth the decline of old sectors.[201] Complementary measures should aim to improve the competitiveness or viability of those who stay in the sector, support those who want to leave the industry or

to diversify into other activities, and take into consideration the potential of the private sector to create new opportunities in response to changing conditions.[202]

These measures for sectors, industries and firms can include incentives to diversify the regional economic base, infrastructure development, assistance with business restructuring and adoption of alternative technologies, initiatives for counselling workers, retraining and relocation, unemployment insurance and support for early retirement programmes.[203] If complementary measures can be developed through the existing social security system this can reduce costs and simplify administration. Where the existing social security system is not sufficiently targeted or easily tailored to the sector affected by subsidy reform, the development of new institutions and systems may be required and could be linked to support at the household level (see Section 7.7.2).[204]

Reforms to coal subsidies in a number of European countries provide examples of how governments have provided complementary measures for a specific industry. Reforms of coal subsidies in Germany and Poland were accompanied by support for regional economic development, social assistance related to the closure of mines, and in the case of Poland, generous severance packages for affected workers (see Annex 3 – Germany country study).[205]

Reforms to the United Kingdom's coal mining industry were initially imposed with little adjustment assistance, leading to problems such as high unemployment and poor health in the affected regions, and to significant protests. In 2000, the UK government began to provide some financial support to assist the remaining parts of the coal industry to adjust their operations to be able to enter into viable investment projects, provide employment opportunities in disadvantaged areas, and create an enabling environment for the development of alternative economic opportunities in (former) coal-mining areas.[206]

A broader example from trade liberalisation includes the United States' Trade Adjustment Assistance (TAA) programme, which provided re-employment services to affected workers and financial assistance to manufacturers and service firms hurt by import competition. Such programmes have shown that wage subsidies to encourage employment in expanding sectors and unemployment insurance for those who lose their job can effectively mitigate most of the losses, and have generally modest costs.[207]

Where the quality of energy services, infrastructure or public transport is low, engaging in broader reforms to improve service before reforming energy subsidies can make tariff increases more acceptable.[208] In the case of Indonesia's fossil fuel subsidy reform programme, although these improvements were not made in advance, the fiscal space created through reform is meant to allow for funding of infrastructure improvements, largely by increasing contributions to SOEs in the construction and transport sectors.[209] Where complementary measures involve supporting emerging industries, firms and infrastructure this should ideally favour those that contribute to a more energy-efficient, less carbon-intensive economy.[210] This was exemplified in the case of fossil fuel subsidy reform in Iran, where funds were made available to industry for investment in energy efficiency (see Annex 3 – Indonesia and Iran country studies).

7.6.2 Households and individuals

In addition to support at the sector, industry and firm level to limit the negative impacts of reform on national competitiveness, subsidy reform should also be accompanied by support at the household level in order to improve equity and protect the poorest.[211] Such programmes are known collectively as social safety nets, or social-assistance transfers, and include direct transfers such as cash benefits or near-cash transfers such as vouchers or smart cards, and indirect transfers such as fee waivers to help households maintain access to essential services such as health, education and public transport.[212]

As outlined above, some reforms have been used to create entirely new social programmes and thus serve as an impetus for wider social reforms, while others, as in India, have modernised existing social programmes to facilitate subsidy reforms (see Annex 3 – India country study).[213] Strong social protection systems can protect households and individuals against economic hardship, regardless of its origin.[214]

These new or improved social safety nets can be developed in advance of reform through resources that have already been mobilised (either domestically or internationally – see Section 7.4), or through revenues and savings from subsidy reform. The fiscal space created by reform can be used to reduce wider costs to individuals by cutting payroll taxes, increasing personal income tax thresholds, and providing tax credits for low-paid jobs. Governments can also use the revenues saved from subsidy reform to increase spending on other priorities such as health and education.[215] Together these are found to be far more efficient instruments for achieving distributional objectives than holding down energy prices below levels warranted by their market costs and social and environmental impacts.[216]

Studies show that by alleviating the impact on the poor and middle classes, policymakers make it far more likely that subsidy reform will be successful. In the Middle East and North Africa, "of the cases where cash and in-kind transfers were introduced,

100 percent were associated with a successful outcome, while only 17 percent of the cases where these transfers were not introduced resulted in a successful reform".[217]

Many of the reform experiences highlighted in Annex 3 show the importance of direct and indirect support measures for households and individuals. For instance, India piloted a cash transfer to replace LPG subsidies in 2014, linked in part to biometric identifier cards; Indonesia introduced programmes to mitigate the effect of higher energy prices by providing free health care, cash assistance to poor students and a one-year conditional cash-transfer scheme for poor households in which there were pregnant women or school-age children; Iran implemented a quasi-universal cash transfer (approximately US$45 per month per capita) when it reformed its energy subsidies; and Ghana's reforms included an expansion of primary health care, large-scale distribution of efficient light-bulbs, public transport improvements, and immediate elimination of school fees at state primary and secondary schools (see Annex 3 – country studies).[218]

7.7 CAREFUL TIMING, PHASING-IN AND LINKING TO WIDER REFORM

Although the temptation may be to undertake wholesale elimination of fossil fuel subsidies, where possible (except at times of crisis) the best approach is to set ambitious goals, but to have slow, credible and pre-specified timeframes for phasing out subsidies.[219] This is because sharp changes are generally disruptive and can lead to social unrest; they do not allow time for planning and implementation of consultation, communication and complementary measures; and because phasing-in increases the chances that previous incremental reforms can be maintained if the policy environment becomes less favourable in the future.[220] By phasing out subsidies slowly there is also extended time to take advantage of timing reform during economically advantageous phases in business or sectoral cycles.[221]

Phasing out subsidies is a process that often, but not always, takes place over a long period of time. The rate at which OECD countries succeeded in phasing out coal subsidies varied considerably, for example. In the case of Belgium, the Netherlands and the UK, the closure of mines was carried out quickly, accompanied in some cases by social assistance and job training for unemployed coal miners. In other countries, such as Germany and Spain, the phasing out of subsidies has been relatively slow, with Germany phasing out its subsidies for hard coal production over 11 years (ending in 2018) (see Annex 3 – Germany country study). Developing countries also present mixed evidence, with Jordan succeeding in phasing out its fuel subsidies over a four-year period.[222]

Another important consideration for subsidy reform is sequencing. Taking into account competitiveness it may be easier to start by introducing performance standards or fiscal incentives for low-carbon investments. These measures redirect new investments towards more efficient technologies and production capacity, progressively making the economic system more efficient and competitive with less distorted energy prices.[223] In addition, to mitigate the impact of reform on the poorest it may be beneficial initially to reduce subsidies on goods mainly consumed by wealthier segments of the population (such as petrol), before those consumed by lower-income groups (such as diesel and kerosene).[224] Examples of countries that have phased in reforms by fuel include Angola, India and Peru (see Annex 3).

Finally, fossil fuel subsidy reforms are more likely to be accepted if they are undertaken as part of broader sector- or economy-wide reforms.[225] The reduction of subsidies can be packaged with other fundamental policy changes or combined with other changes to the regulatory environment governing an industry in order to ease the adjustment process.[226] A review of case studies of reform shows that generally the larger the reform effort the easier it was to achieve narrower and more focused reform efforts, and that subsidy reform is often undertaken alongside wider changes in policies, pricing and programmes.[227] For example, the process of reforming the coal sub-sector in the Germany has been part of a much broader process of energy sector reform.[228] In addition, it is recommended that fossil fuel subsidy reform be undertaken as an integral part, and ideally first step, of the introduction of or increases in carbon pricing.[229]

8. Opportunities for international collaboration and support

Main points:

- ***While reform is ultimately undertaken at the national or sub-national level, international cooperation is already supporting national reform efforts in many ways, by identifying and estimating subsidies, providing support for country-level reform processes, coordinating reform efforts and drawing out lessons and advocacy.***
- ***There are, however, important opportunities for these existing activities to be scaled up, and for new efforts to be developed in order to: 1) improve the availability of comparable information on fossil fuel subsidies; 2) increase technical and financial support for national reform efforts (with a focus on complementary measures); and 3) widen and strengthen countries' commitment to reform.***
- ***The primary channels for this scaled-up ambition and action at the international level are: 1) bodies for reporting, tracking and accountability; 2) financial and technical support which must be diverted away from providing subsidies and toward reform; 3) multilateral and bilateral agreements (including on trade); and 4) through regions and countries leading by example in reforming subsidies.***

Following the OECD's recognition of the importance of subsidy reform in its 2009 Declaration on Green Growth, G20 leaders agreed to phase out "inefficient" fossil fuel subsidies that promote "wasteful consumption." APEC countries, and the EU soon made similar commitments. Since that time, the need to phase out fossil fuel subsidies has increasingly become an agreed priority for fiscal reform and for climate-related action, but substantive progress – particularly in reform of subsidies to exploration and production – has been limited.[230]

Nonetheless, the fossil fuel subsidy reform efforts highlighted in Annex 3 demonstrate the role that international institutions such as the IEA, IMF, OECD, World Bank and a number of CSOs are playing in subsidy identification and estimation, country-level support to reform processes, coordination and lesson learning and advocacy (see Figures 28 and 29).[231]

This section starts by outlining existing initiatives, and then discusses ways in which scaling these up and developing new international efforts[232] can help to improve the availability of comparable information on fossil fuel subsidies; increase technical and financial support to national reform efforts (with a focus on complementary measures); and widen and strengthen countries' commitments to reform.

8.1 CURRENT INTERNATIONAL SUPPORT TO SUBSIDY REFORM

8.1.1 Subsidy identification and estimation

As outlined in Section 7.2 identifying the scope and nature of fossil fuel subsidies is a critical early step in any reform process. As a result, most of the organisations involved in reform of fossil fuel subsidies are working on identifying them and estimating their value to some extent. This work is often completed as part of country-level support to reform (building on the findings of international estimates). Figure 31 outlines the major initiatives in subsidy identification and estimation.

Figure 31

A comparison of international initiatives to identify and estimate subsidies (see also Annex 3)[233]

Initiative	Primary purpose	Subsidies covered	Types of analysis	Countries	Status	Next steps
APEC	Rationalise and phase out inefficient fossil fuel subsidies that encourage wasteful consumption.	Fossil fuels; Consumption and production	Identification, estimation and peer review	Peru and New Zealand peer review in 2014	Peru[234]	Complete 10 peer reviews between 2014 and 2018
European Commission	Identify public interventions in energy markets across the EU.	Fossil fuels, Nuclear, Renewables; Consumption and production	Identification and estimation	EU member states	All energy subsidies[235] Budgetary support and tax expenditures[236]	
G20	Rationalise and phase out inefficient fossil fuel subsidies that encourage wasteful consumption.	Fossil fuels; Consumption and production	Identification, estimation and peer review	USA and China peer review in 2014	Forthcoming	Finalise USA and China peer reviews. Germany will undergo peer review in 2015.
GIZ	Fuel price and tax policies	Fuels (petrol and diesel); Consumption	Retail price analysis	170 countries	Completed[237]	
GSI	Support the phase out of subsidies that undermine sustainable development.	Fossil fuels, Electricity; Consumption and Production	Identification and estimation	Brazil, Canada, Indonesia, Mexico, Norway, Russia, UK, USA (production subsidies); Bangladesh, India, Indonesia, SE Asia, MENA (consumption subsidies)	Completed (producer subsidies[238] and consumer subsidies[239])	
IDB	Quantify fiscal resources from domestic budgets to energy and fossil fuels.	Energy	TBD	26 borrowing member countries	Forthcoming	
IEA	Creating long-term energy demand and supply projections, understanding energy prices.	Energy; Consumption	Price-gap analysis	40 developing countries	Completed[240]	Expansion to additional African countries
IMF	Efficient taxation of energy, reducing fiscal costs of subsidy.	Energy; Consumption and production	Price-gap analysis combined with modelling of tax expenditure (and externalities)	153 countries	Completed[241]	
OECD	Quantitative estimates of support for the production or consumption of fossil fuels in OECD member states.	Fossil fuels; Consumption and production	Identification and estimation	All 34 OECD members 6 emerging G20 economies (Brazil, China, India, Indonesia, Russia and South Africa)	Completed[242]	
OCI	Energy subsidies from international, regional and bilateral public financial institutions	Energy; Production	Identification and estimation	International financial institutions	Completed[243]	Work underway on production subsidies
ODI and OCI	G20 subsidies to oil, gas and coal exploration.	Energy; Production	Identification and estimation	G20 countries	Completed[244]	Work underway on production subsidies

8.1.2 Country-level support (financial and technical)

In addition to undertaking subsidy identification and estimation, a number of international organisations work at the country level on identifying feasible reform options and processes for achieving reform, and support countries' reform efforts. As outlined in Figure 32, most of this support is dedicated to consumption subsidy reform in developing countries, and in this context one of the leading actors is the World Bank's Energy Subsidy Reform and Delivery Technical Assistance Facility within its Energy Sector Management Assistance Program (ESMAP), which aims to support 15 countries in the next three to five years.

Although ESMAP does not disclose the list of countries that it is currently supporting, this initiative is based on national demand, and the facility offers comprehensive technical assistance in many of the areas of subsidy reform highlighted in Section 7.2, including:

- Analysis of the poverty, social, fiscal, macroeconomic, political economy and environmental impacts of subsidies;
- Assessment of distributional impacts of subsidies at the household and macroeconomic levels;
- Support for policy dialogue, consultations, communications strategies and consensus building;
- Support for improving the targeting and provision of subsidies, including through technology-enhanced approaches; and
- Design and implementation of subsidy reform approaches, energy pricing frameworks, transition plans, energy efficiency and renewable energy options, and suitable social protection and other mitigation mechanisms.

Figure 32
International actors providing country-level support for fossil fuel subsidy reform

Actor	Countries supported	Timeframe	Next steps
ADB	India, Indonesia, Thailand	A GSI/ADB report on fossil fuel subsidies in SEA is forthcoming	Additional countries in South and SE Asia where most electricity is generated with fossil fuels.
Chatham House	Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates)	Project completed in 2013	On-going work on resource valuation across developed and developing countries
ESMAP and World Bank	Country engagement has begun in East Asia, Latin America, Eastern Europe, and the Middle East and North Africa (individual countries cannot be disclosed)	Energy subsidy reform facility Established in 2014	Develop knowledge-sharing platform. In its initial 3-5 year period ESMAP will support about 15 countries
GSI	Bangladesh, Egypt, India, Indonesia, Nigeria, Viet Nam, Jordan, Libya, Morocco, Thailand, Tunisia	2015-2017	Countries in MENA and additional countries in SE Asia
IEA	Two emerging economies (individual countries cannot be disclosed)	2014-2016	In process of finalising two country studies
IMF	Global	On-going	

8.1.3 Coordination, outreach and lesson learning

Several initiatives aim to support global learning about processes of fossil fuel subsidy reform and to coordinate and facilitate relevant action and advocacy, in addition to or in parallel with direct support. Several non-G20 countries[245] have formed the Friends of Fossil Fuel Subsidy Reform to support the G20 and APEC commitments, including the organisation of roundtables on subsidy reform and side events at UNFCCC and G20 meetings. In April 2015 the group released a communiqué calling on countries to phase out fossil fuel subsidies in advance of the Paris negotiations on climate change.[246]

The Global Subsidies Initiative (GSI) has a dedicated website for tracking the progress of the G20 and APEC countries in phasing out inefficient fossil fuel subsidies over the medium term, and has established a worldwide network of CSOs that are working on subsidy reform.[247] In addition, a group of the organisations listed above, along with the United Nations Environment Programme (UNEP), has established the Green Growth Knowledge Platform and the Green Fiscal Policy Network, which facilitate online-based knowledge sharing, bilateral study visits and international meetings.[248] The World Bank ESMAP is also developing a website to facilitate knowledge sharing through public and confidential channels among governments.[249] The sharing of positive experiences of reform through these means could prove a powerful way to communicate the benefits of reform, and raise the ambition of reform processes.[250]

In addition, several high-level coalitions (including the Global Commission on the Economy and Climate) are urging governments to reform fossil fuel subsidies. Other examples include 'We Mean Business', a group of influential businesses and investors that have asked policymakers to "implement domestic policies through to 2030 that support bold business action to cut emissions, including: eliminating subsidies that incentivise high-carbon energy" and the Corporate Leaders Group on Climate Change (CLG), which represents EU business leaders, and is supporting the Friends of Fossil Fuel Subsidy Reform Communique.[251] At the end of 2014, a number of high-profile economists wrote a letter calling for the phase out of G20 fossil fuel exploration subsidies,[252] and in a statement released on Earth Day 2015, a group of scientists urged world leaders to eliminate fossil fuel subsidies.[253]

From a technical perspective, the International Centre for Trade and Sustainable Development (ICTSD) and the World Economic Forum (WEF) have convened a group of subsidy experts as the 'E15 Task Force on Subsidies'. This group is reviewing the WTO Subsidies and Countervailing Measures Agreement (SCM) in the light of changes in the global economy and emerging social and environmental concerns, and will make recommendations by the end of 2015, in time for the tenth WTO ministerial conference.[254]

8.2 SCALING UP INTERNATIONAL COOPERATION

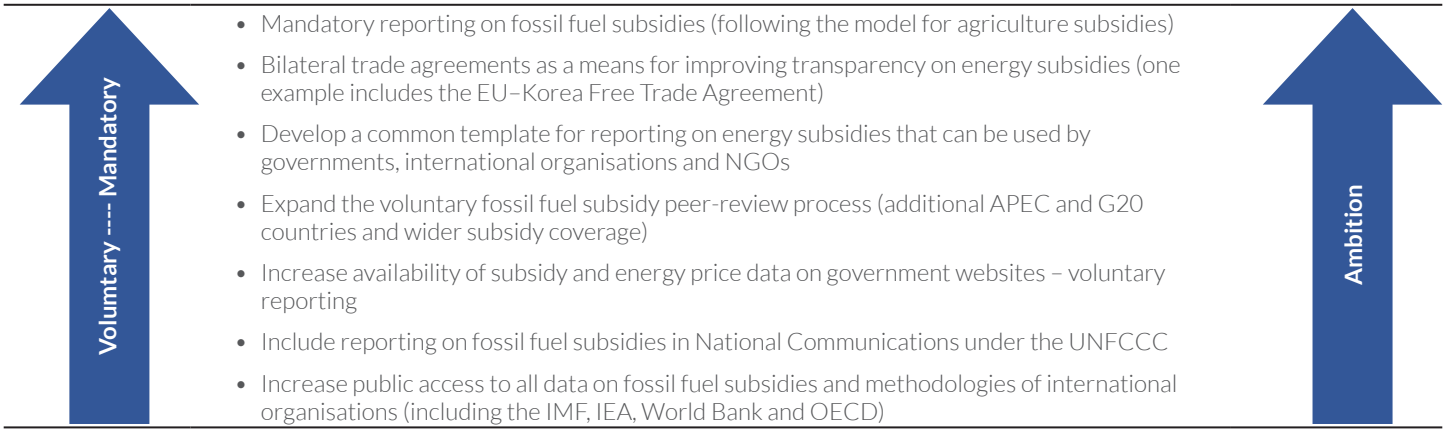
The existing international support for national-level reforms of fossil fuel subsidies has created greater transparency and dialogue on the issue, but is not enough to achieve the scale of change required to support better growth and a better climate.

New international efforts can build on this early support for reform through improving the availability of comparable information on fossil fuel subsidies; increasing technical and financial support to national reform efforts (with a focus on complementary measures); and widening and strengthening country commitments to reform. Any international initiatives should include close coordination and collaboration of organisations that are active, well connected and already working on fossil fuel subsidy reform.

The following section outlines a range of options for international support in each of these areas, ranked in terms of increasing ambition and degree to which they would be linked to binding commitments.

8.2.1 Improve the availability of comparable information on energy subsidies

Figure 33
Options for international support: improving availability of comparable information on energy subsidies



The identification of the scope and nature of fossil fuel subsidies is a critical early step in any reform process (see Section 7.2), and the current lack of transparency regarding both consumer and producer subsidies and their wider impacts continues to form a barrier to reform (see Section 5.1). As a means of supporting energy transition, ideally any work on improving subsidy transparency would not focus solely on fossil fuels, but be extended to cover all energy subsidies.

GSI research shows that few governments know the full extent of the subsidies they have granted because many forms of support have never been quantified. The primary sources for expenditure data are government financial statements, government departments' summary tables on expenditure, national accounts and public domestic and international finance.

Where information does exist, it is scattered across ministries and among regional and local governments, and is rarely available to the public, standardised, validated or accurate. Many forms of subsidies, including tax breaks and tax credits, are not included in official accounts.[255] These problems are exacerbated in developing countries by poor budget transparency and limited resources for gathering data and estimating subsidies.[256] The resulting gaps and discrepancies in the data collected on fossil fuel subsidies, even by international organisations, make it difficult, if not impossible, to assess or rationalise them (see Annex 2).

An integral component of support from international actors should therefore be directed towards improving the transparency and detail of information on specific fossil-fuel subsidies at the national and sub-national level, based on consistent (or clearly comparable) methodologies, and including details of the levels of support, sources, intermediaries and recipients. While domestic reforms can proceed without internationally comparable data on fossil fuel subsidies, this information can be valuable in facilitating lesson learning and the evaluation of progress, creating peer pressure and enabling cross-country comparisons of the effectiveness of different interventions.[257]

Increase public access to all data on fossil fuel subsidies and methodologies of international organisations (including the IMF, IEA, World Bank and OECD)

The country-level subsidy estimates compiled by the IEA, IMF, OECD and other international organisations are contributing to enhancing transparency on fossil fuel subsidies by enabling cross-country comparisons and by drawing attention to the scale of support (see Figure 31). Although the OECD makes all its production and consumption subsidy data available in spreadsheet format, along with publishing its methodology and sources of information, other international organisations do not publish all of this information, and should follow suit by making their data and approaches more transparent.[258] Researchers can and have supported these efforts by providing their own overviews and comparison of various methodologies, assumptions and data sources.[259] In addition, international agencies could support more widespread sharing of subsidy impact modelling tools, such as the World Bank Subsidies Simulation Stata Toolkit and GSI Integrated Fiscal Model (see Section 7.2).

Include reporting on fossil fuel subsidies in National Communications under the UNFCCC

Parties to the UNFCCC must submit national reports on implementation of the Convention, and although they are offered great flexibility in their reporting, the guidelines invite them to provide information on energy subsidies (see para. 8(f)).[260] To date, no Party has included a subsidy inventory in its national reports, although in 2014 both Sweden and the USA used these reports to reiterate their commitment to reform.[261]

Increase availability of energy subsidy and price data at the national level: voluntary reporting

Beyond international data on fossil fuel subsidies, many national governments have started to produce their own accounts. Canada, for example, has prepared a Study of Federal Support to the Fossil Fuel Sector,[262] France has completed a review of the environmental impacts of energy-related tax concessions,[263] and an enquiry into energy subsidies in the UK included an inventory.[264] The EU Directorate Generals for Energy and Environment have also commissioned fossil fuel subsidy inventories for all EU member states, along with a parallel assessment of renewable energy subsidies.[265] There has also been a call for governments to integrate tax expenditures with subsidies in their annual budgets, although Germany is the only country doing this effectively.[266]

Tracking of energy prices for consumers is an essential element in estimating the value of consumption subsidies. There are useful examples for liquid fuels in developing countries. For example, Chile has mandated public disclosure of retail prices on the energy regulator's website (www.cne.cl), which also provides time-series data on price structures and flows to the price stabilisation fund that can also be used to identify subsidies.[267]

Bilateral exchanges could be supported to enable voluntary disclosure in a greater number of countries, and these could be linked to existing international initiatives on open government, open data and data transparency. One possibility may be to look at countries that have already accepted and adopted open data protocols, including Ghana, Kenya (opendata.go.ke), the UK (data.gov.uk and openei.org) and the USA (data.gov).

Expand the voluntary fossil fuel subsidy peer-review process (additional APEC and G20 countries and wider subsidy coverage)

Both the G20 and APEC countries included the option of peer review as part of their commitment to 'phase out inefficient fossil fuel subsidies that encourage wasteful consumption'.

The objective of peer review is the: *'systematic examination and assessment of the performance of a State by other States, with the ultimate goal of helping the reviewed State improve its policy making, adopt best practices, and comply with established standards and principles. The examination is conducted on a non-adversarial basis, and it relies heavily on mutual trust among the States involved in the review, as well as their shared confidence in the process.'*[268]

GSI has produced a set of guidelines for peer review of fossil fuel subsidies, which can be completed bilaterally or through a review panel (as has been conducted in the APEC countries).[269] The first peer review of fossil fuel subsidies has been completed for Peru, and parallel processes are underway or planned for New Zealand and the Philippines (APEC), and for China, Germany and the USA (G20).[270] In the case of the Peru peer review, the Peruvian government selected specific subsidies for evaluation, prepared the pre-briefing material and approved the final report and the review panel's recommendations.[271] More countries and a wider set of subsidies could be included in peer review, particularly if this was facilitated by more international technical and financial support, such as the OECD is currently providing as part of the G20 peer-review process.

International organisations could develop and endorse a template for standardised reporting on energy subsidies

There are no universally agreed methodologies to track subsidies, but those used by the IEA, IMF and OECD could serve as a basis for a common approach to measuring fossil fuel subsidies. A common template would help national governments to provide more consistent, comprehensive and comparable information on fossil fuel subsidies, and make more efficient use of international resources.[272]

To support the development of a common approach, the GSI and others have catalogued the definitions and methodologies used by different governments and international organisations to estimate subsidies including and beyond those to fossil fuels.[273] This cataloguing includes subsidies to agriculture, fisheries and traded goods and services. Common approaches for subsidy accounting and reporting should build on these experiences. Lessons could also be drawn from corporate financial reporting, for which international accounting and auditing standards are used extensively. [274]

There are also sample templates, including one to assist countries in consistent reporting of energy subsidies to the WTO;[275] the voluntary reporting mechanism proposed by APEC;[276] and the template developed to assist G20 countries in their self-reporting efforts.[277] A common template developed and endorsed in a joint effort by the international organisations involved in subsidy tracking would enhance the comparability of subsidy data and could be used to monitor progress towards the existing G20, APEC and EU commitments and to report subsidies to the UNFCCC through national communications.[278]

Bilateral trade agreements as a means for improving transparency on energy subsidies

Bilateral trade agreements can also be a means to enhance transparency in and accountability for subsidy reporting. One example is the 2011 EU–Korea Free Trade Agreement, which obliged the parties to report on all subsidies on an annual basis (including energy subsidies), and to provide further information on any subsidy on request.[279] It has also been recommended that the Transatlantic Trade and Investment Partnership (TTIP) currently under negotiation between the USA and the EU be used to enhance transparency on fossil fuel subsidies.[280]

Mandatory reporting on fossil fuel subsidies, and tracking by the OECD, following the model for agriculture subsidies

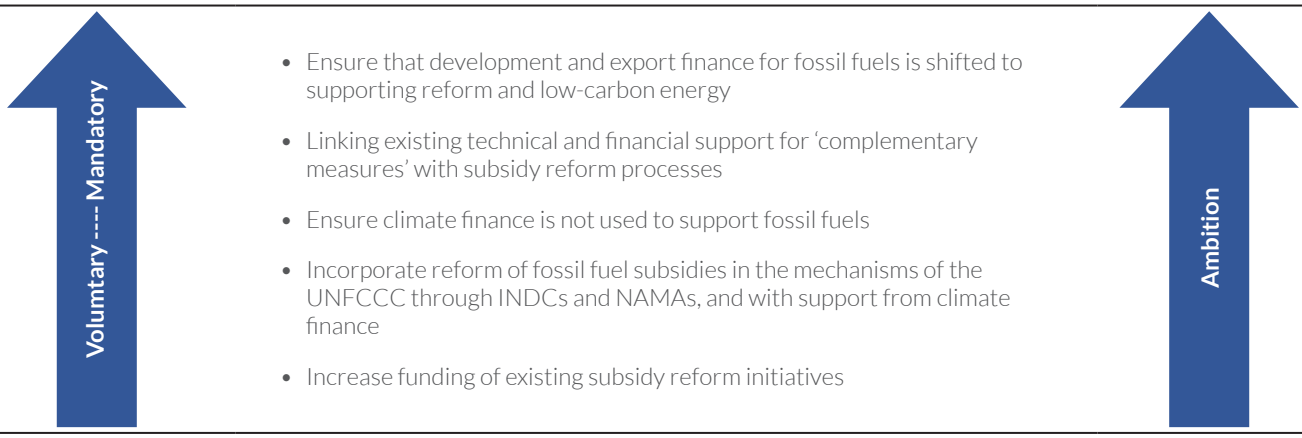
The OECD Secretariat has been compiling data and completing analysis on agriculture subsidies since the mid-1980s, when it was given a specific mandate to do so by Finance and Trade Ministers at a Ministerial Level Council Meeting.[281] The data led to the adoption of a set of principles by OECD ministers to reform agricultural policies and greatly influenced the negotiations on agriculture in the WTO, when the Agreement on Agriculture was adopted.[282] Under this Agreement parties committed to a gradual percentage reduction of certain trade-distorting agricultural subsidies, and this commitment helped to improve subsidy notifications to the WTO.[283,284] This has also resulted in common practices for subsidy accounting in agriculture, and to extensive reporting on agricultural subsidies both to and by the OECD.[285]

With the parallel intention to support the G20 in its commitment to reform fossil fuel subsidies, and as part of its work on environmentally harmful subsidies, the OECD has been collecting data on support to fossil fuel production and consumption in member countries since 2010, using a similar framework to the one it uses for agricultural support.[286] In contrast to its reporting efforts on agriculture, in which it provides estimates for support levels when countries do not provide information, the OECD for the most part limits itself to published government sources for information on fossil fuel subsidies, which means that estimates may be higher for countries that are more transparent rather than for those that provide the highest subsidies.[287] In addition, because of a lack of published government data, the coverage of fossil fuel subsidies has been more limited than in agriculture.

This coverage could be improved if the OECD Secretariat had the same mandate as it has for agriculture, so that it would have the responsibility to estimate support levels when countries do not provide information, which would also be an incentive for countries to present more accurate data. This could also support more ambitious requirements such as mandatory reporting on fossil fuel subsidies in National Communications under the UNFCCC, and the incorporation of subsidy reform commitments in trade agreements.[288]

8.2.2 Increase technical and financial support for subsidy reform (with a focus on complementary measures)

Figure 34
Options for international support: technical and financial support for subsidy reform



- Ensure that development and export finance for fossil fuels is shifted to supporting reform and low-carbon energy
- Linking existing technical and financial support for 'complementary measures' with subsidy reform processes
- Ensure climate finance is not used to support fossil fuels
- Incorporate reform of fossil fuel subsidies in the mechanisms of the UNFCCC through INDCs and NAMAs, and with support from climate finance
- Increase funding of existing subsidy reform initiatives

Although subsidy reform offers significant economic and climate benefits, the process of reform, and in particular the development of complementary measures for sectors and households (see Section 7.7) may require up-front resources and could benefit from lesson learning and technical support.[289] Fortunately, in addition to activities on subsidy identification and estimation, a small group of international organisations is already providing technical and financial assistance to governments to support their efforts to reform subsidies for fossil fuels. As outlined in Section 8.1.2, however, most of this support is narrowly focused on the reform of consumption subsidies, and on developing countries.

The following section highlights how these existing activities could be expanded and suggests additional opportunities to increase technical and financial assistance to the full scope of subsidies, including those provided to fossil fuel exploration, production, and through channels such as public finance and SOEs (see Annex 2).

Increase resources available to existing subsidy reform initiatives

International governmental and non-governmental organisations are already supporting domestic reform efforts by providing technical and financial assistance to governments, and in-country engagement and awareness-raising on fossil fuel subsidies (see Figure 31). One relatively simple way to scale up existing activities is to direct more resources to governmental and non-governmental groups. In doing so, the emphasis should be on collaboration to ensure that efforts are coordinated and resources are used efficiently, such as that encouraged through the network of CSOs working on fossil fuel subsidy reforms, and of international institutions through the Green Growth Knowledge Platform and the Green Fiscal Policy Network (see Section 8.1.2). As most of these groups are focused on consumption subsidies in developing countries, emphasis should also be placed on increasing technical and financial resources for the emerging group of actors working on reform to the full scope of subsidies and energy pricing, including those provided to fossil fuel exploration, production, and through channels such as public finance and SOEs.

Incorporate fossil fuel subsidy reform in the mechanisms of the UNFCCC through INDCs and NAMAs, and with support from climate finance

Given the multiple climate benefits of phasing out fossil fuel subsidies, the process of tracking, reporting and reforming fossil fuel subsidies could also be included in Intended Nationally Determined Contributions (INDCs), recognised as Nationally Appropriate Mitigation Actions (NAMA), included in Low Emission Development Strategies (LEDS) and supported with climate finance.

The INDCs that are to be submitted to the UNFCCC prior to the Paris negotiations on climate change, are meant to submit information on national emission-reduction plans, which are important building blocks for a new international agreement, but since the process for reviewing INDCs has not been agreed, it remains unclear how binding they will be.[290] Parties are free to determine the content of their INDCs and fossil fuel subsidy reform plans could be included as planned emission-reduction efforts from 2020, but would need to be accompanied by a corresponding estimation of emission reductions expected from reform.[291] To date the INDC of Vietnam includes a roadmap to phase out subsidies for fossil fuels, and those of Ethiopia, Singapore, and India mention efforts already undertaken to reform fossil fuel subsidies. In addition, Morocco's INDC signals an intention to substantially reduce fossil fuel subsidies through energy sector reforms that are ongoing, and China and Mexico's INDCs include intentions to improve the pricing and taxation regime for energy products.[292]

Within the UNFCCC framework developing countries could also propose fossil fuel subsidy reform as a NAMA to the Secretariat. The concept of NAMAs, described as policies and actions taken by developing countries to reduce GHG emissions in the context of sustainable development, is sufficiently broad to include subsidy reform.[293] To ensure that such subsidy reform NAMAs would both lead to reduced emissions and foster sustainable development, the reform policies would need to guarantee that the savings made from reform are directed to low-carbon development goals.[294] Although none has yet been established, if the Secretariat approves these NAMAs, developing countries could benefit from additional external technical and financial support.[295]

Climate finance can make a direct contribution to subsidy reform efforts as part of increased support to developing countries, INDCs and NAMAs between now and 2020.[296] International donor support will be particularly important in assisting these countries to define complementary measures for affected sectors and households, in particular those that need to be established in advance of subsidy reform. The High-level Advisory Group on Climate Change Financing has also emphasised that the elimination of fossil fuel subsidies in developed countries would be a valuable source of climate finance, and since it is a domestic instrument it could allow finance to be disbursed more rapidly than sources that require significant international coordination (High-level Advisory Group on Climate Change Financing, 2010).

Ensure climate finance is not used to support fossil fuels

The governments and international financial institutions that are providing climate finance under the UNFCCC are currently continuing to provide public finance for fossil fuel exploration, production and consumption, a portion of which would be considered a subsidy according to the WTO definition (see Endnote 4). In the absence of a definition for climate finance under the UNFCCC, there is the potential for the provision of fossil fuel subsidies to be presented as climate finance. A group of the leading development finance institutions (including the World Bank) has established its own 'common principles' for climate finance, which includes support to efficient coal power and carbon capture and storage (including for enhance oil recovery), and Japan has included loans to the construction of super-critical coal-fired power plants in Indonesia in its climate finance tracking under the UNFCCC.[297]

As a first step towards ensuring the phase-out of fossil fuel subsidies through international finance, a large number of CSOs have called on the Green Climate Fund (GCF) to rule out the use of its funds for fossil fuel projects.[298] In addition, the providers of development finance and international public finance should shift their subsidies away from fossil fuels and toward supporting complementary measures as part of subsidy reform, and invest in renewable energy and efficiency.

Linking existing technical and financial support for 'complementary measures' with subsidy reform processes

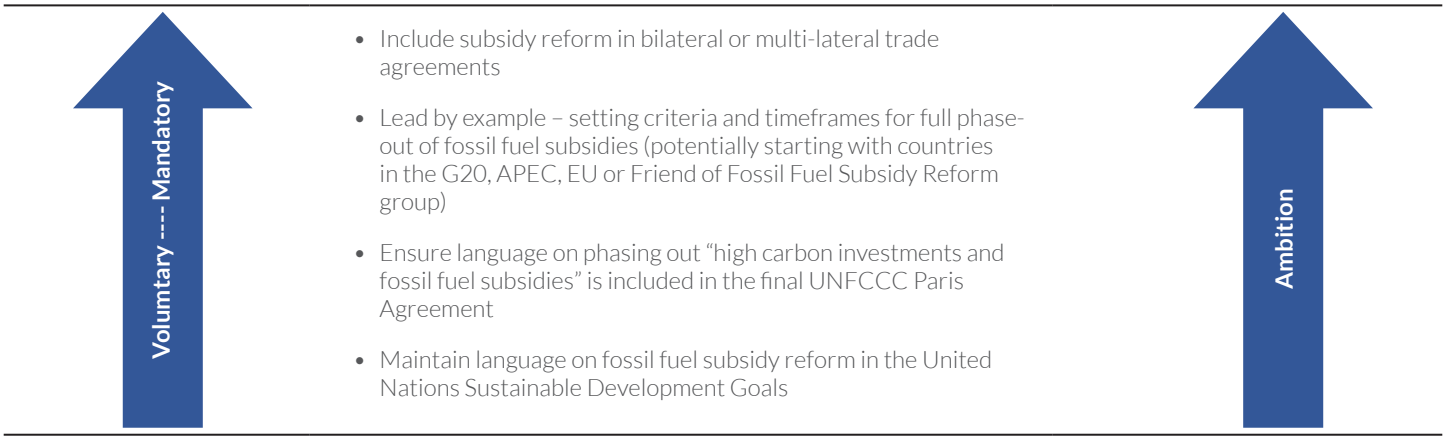
In addition to shifting development finance, climate finance and international public finance away from fossil fuels, it may be possible to combine international and domestic resources (public and private) to support the up-front finance required to initiate and implement subsidy reform processes and in particular to support complementary measures for affected households and sectors (see Section 7.7). Often international agencies such as the World Bank and bilateral donors are already providing resources and finance for 'complementary measures' such as support to health services, education, social protection, energy sector development and economic diversification but in a manner that is separated from subsidy reform processes, in terms of both institutional arrangements and timing. It will be important not only to increase these resources, but to also improve the linkages between existing support and the processes of (and linked to benefits from) fossil fuel subsidy reform.

Ensure that development and export finance for fossil fuels is shifted to supporting reform and low-carbon energy

There has been some progress in shifting development finance away from fossil fuels in the form of commitments to end public finance for coal plants abroad (bar exceptional circumstances) by the governments of Denmark, Finland, France, Iceland, Norway, Sweden and the USA, and by the World Bank, the European Bank for Reconstruction and Development (EBRD), the US Export-Import Bank and the European Investment Bank (EIB).[299] In a recent joint presidential statement with the USA, China has also committed to 'strictly controlling public investment flowing into projects with high pollution and carbon emissions both domestically and internationally'.[300] The US and Japan have also recently reached agreement on curbing coal financing, increasing the prospects for a successful outcome at the discussions the OECD is convening on support to coal through export credits and guarantees. These efforts should be scaled up to also address public finance for oil and gas.

8.2.3 Widen and strengthen country commitments

Figure 35
Options for international support to widen and strengthen country commitments



While addressing fossil fuel subsidies has increasingly become an agreed priority for fiscal reform and climate-related action, and although numerous countries have made recent commitments to reform, progress has been slight. The following section offers several recommendations for international agencies to be more ambitious regarding reform, and to strengthen and broaden existing commitments.

Build on commitments to fossil fuel subsidy reform in the United Nations Sustainable Development Goals

The Sustainable Development Goals (SDGs) were adopted by the United Nations General Assembly (UNGA) in September 2015. The final draft document includes fossil fuel subsidy reform as a means of implementing Goal 12 to "ensure sustainable production and consumption patterns".[301] As such, the document identifies reform as a measure to generate savings with which the SDGs could be financed.[302] The UN Secretary-General's synthesis report on the post-2015 development agenda, which also provided input to the negotiations, more firmly notes that "harmful fossil fuel subsidies, both direct and indirect, should be phased out".[303] All countries that have committed to fossil fuel subsidy reform should work together to ensure that reform efforts are directly supported in plans to implement the SDG framework.[304]

Ensure language on phasing down "high-carbon investments and fossil fuel subsidies" is included in the final UNFCCC Paris Agreement

Although in the Kyoto Protocol encouraged parties to progressively reduce or phase out "market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter the objective of the convention", fossil fuel subsidy reform has only recently received substantial attention in the Convention.[305] The Secretariat's 2013 Technical Paper identified fossil fuel subsidy reform as one of eight options to increase pre-2020 ambitions, and a previous draft of the Paris Agreement included "the phasing down of high-carbon investment and fossil fuel subsidies" as a source of private and alternative finance.[306] All countries that have committed to fossil fuel subsidy reform should work together to ensure that strong language on phasing out fossil fuel subsidies is included in the final document, so that reform efforts are directly supported by the UNFCCC.

Lead by example – setting criteria and timeframes for full phase-out of fossil fuel subsidies (starting with countries in the G20, APEC, EU or Friend of Fossil Fuel Subsidy Reform group)

Although the motivation to reform subsidies is generally driven by domestic considerations, examples of how other countries have reformed subsidies could be very powerful and, as shown in Section 7, can serve to identify best reform practices. Countries that are part of the G20, APEC and the Friends group should accordingly act on their commitments in a timely manner in order to lead by example. This should include clear criteria for identifying fossil fuel subsidies (using the internationally agreed WTO definition) and specific timelines for phase-out so that governments can be held accountable for their existing commitments. In September 2015, the USA and China announced that in the context of China's 2016 presidency of the G20, "the two sides are committed to working closely with other G20 members [...] to phasing out inefficient fossil fuel subsidies by a date certain."[307] In a recent report, the Global Commission on the Economy and Climate suggests that the G20 has an opportunity to build up on its 2009 commitment to phase out fossil fuel subsidies by setting criteria and clear timelines for reporting, and through eliminating fossil fuel subsidies by no later than 2025.[308]

For example, Finland, which is part of the Friends of Fossil Fuel Subsidy Reform group, completed an analysis revealing that it provides significant subsidies to the production of fossil fuels and estimated its environmentally harmful subsidies at €4.5 billion a year.[309] In response the government is making efforts to reform subsidies in the energy and transport sectors.[310]

Include subsidy reform in bilateral or multilateral trade agreements

Governments that have already committed to reform can use trade agreements as a means to encourage others to make similar commitments, and to collaborate on reform efforts through the adoption of criteria and timelines. Such joint commitments can serve to address competitiveness concerns, and to enhance transparency and accountability in the reform process. By way of example, within the EU trade bloc, it has been agreed that all countries will phase out subsidies for the production of coal from uncompetitive coal mines by 2018.[311] Several researchers have also made the case for using the Transatlantic Trade and Investment Partnership (TTIP) to develop concrete plans to meet the commitments that both the USA and EU member states have made to phase out fossil fuel subsidies.[312]

In addition, the E15 Task Force on Subsidies (see Section 8.1.3) examined the extent to which the WTO Subsidies and Countervailing Measures (SCM) agreement could address fossil fuel and renewable energy subsidies. It pointed out that the current SCM agreement does not adequately address dual energy pricing practices and production subsidies, and stated that the adoption of a new multilateral agreement on subsidies or trade remedies within the WTO framework would be the best means to address these limitations.[313] As such, this group could support the design and adoption of a new multilateral subsidies agreement within the WTO framework, which would create a formal and binding structure for fossil fuel subsidy reform, along the lines of that which currently exists for agricultural subsidies and has been discussed for fisheries.

Annex 1: Fossil fuel subsidy categories

These categories are placed in copy directly from Fossil Fuel Subsidies: Approaches and Valuation, Koplow and Kojima, 2014.[314]

1 . Direct transfer of government funds

- Budget and off-budget transfers:
  - Direct transfers of funds to producers (for example, to compensate producers for price controls or fund applied research and development, demonstration projects in commercial development of an energy technology involving fossil fuels, and other types of support for a fossil fuel or firms engaged in fossil fuel trade and transformation). Cash transfers to consumers, where transfers are directly linked to consumption of fuel, electricity, or heat.

2. Government induced transfers between producers and consumers

- Government control of energy prices
  - Prices or price ceilings set by government. Direct regulation of prices at any level along the supply chain to reduce costs to producers or consumers, or to increase prices paid to producers.
  - The domestic price effects of import or export measures. Import tariffs or quantitative restrictions that raise the domestic price received by producers and paid by consumers; export tariffs or quantitative restrictions that reduce the domestic price received by producers and paid by consumers.
  - Special case of cross-subsidy. Policies that reduce costs to particular types of customers or regions by increasing charges to other customers or regions, or by requiring firms to use profits in one segment of the supply chain (usually upstream oil and gas) to reduce prices charged to consumers in another segment of the supply chain.
- Purchase or supply mandate
  - Purchase requirements. Required purchase of particular energy commodities, such as domestic refined products or priority access to the grid, typically when other choices are more financially attractive
  - Domestic supply obligation. Required sale of energy—typically oil or gas—on the domestic market, usually when domestic prices are kept artificially low.

3. Fiscal revenue forgone

- Tax expenditure
  - Corporate tax, petroleum profit tax, value added tax, excise tax, and other taxes reduced or waived. Acceleration of allowable deductions. Special tax favoured corporate structures primarily accessible by fossil fuel industries.
- Other fiscal revenues
  - Bonuses for oil blocks, royalties, production share, and other non-tax payments reduced or waived in upstream oil and gas

4. Underpricing of other goods and services including risk

- Subsidised inputs
  - Subsidies to large-volume inputs to energy suppliers, including water and rail or water freight.
- Lending and Credit
  - Below-market provision of loans, loan guarantees, or grants for energy-related activities

- Goods and services provided by government
  - Underpricing of access to land and other goods and services
- Permits
  - Underpricing of permits and licenses
- Shifting of risk burdens
  - Government assumption of price, safety, and other risks; consumer or resident assumption of risks through limits on commercial liability
- Special treatment of SOEs
  - Undue risk-taking, soft budget constraints leading to contingent liabilities, debt cancellations, tax-exempt operating status

Annex 2: Gaps and discrepancies in global estimates of fossil fuel subsidies

(see also Figure 31)

Fossil fuel subsidy estimates (USD)	Countries covered	Source	Year for subsidy data
US$908 billion pre-tax subsidies and foregone consumption tax revenue[315] (see also below re. IMF post-tax subsidy calculations)	153 countries	IMF	2013 (2015 projection is US$646 billion)
US$548 billion in consumption subsidies[316]	40 non-OECD countries	IEA	2013
US$160 billion to US$200 billion a year[317]	34 OECD member countries and 6 emerging economies (Brazil, China, India, Indonesia, Russia and South Africa)	OECD	2007–2014
US$100 billion in production subsidies[318]	Global estimate	GSI	Multiple (average annual)
US$88 billion exploration subsidies[319]	G20 countries	ODI and OCI	Multiple (average annual)

Core gaps in most of the estimates cited above include:

- **Geographic coverage**: Although coverage of consumer subsidies is improving, subsidies to producers in developing countries are systematically missing from global estimates. In addition, beyond a handful of OECD countries, subsidies at the state or provincial levels are rarely included, although they can be substantial.
- **Production subsidies**: There are substantial coverage gaps on support for producers via subsidised credit or insurance, regulatory oversight and site remediation, energy security (shipping lanes, stockpiling) and bulk transport costs (ports, railways, pipelines, transmission lines, inland and coastal shipping), tax-exempt corporate forms, and government-owned energy infrastructure or service organisations. The work by GSI, ODI and OCI has sought to address some of these gaps.
- **Non-payment**: Measurements of price gaps used by the IMF and IEA do not capture power theft and non-payment. These hidden costs, which are often included in the pricing of fossil fuel-based power, are sometimes larger than underpricing.
- **User fees**: Many countries levy a variety of fees or taxes on fuels that are earmarked for specific uses closely linked to particular fuels – for example, building and maintaining transit infrastructure or cleaning up oil spills or decommissioning sites. These fees are sometimes improperly deducted from subsidy estimates.

In addition to these significant gaps in current estimates, there is discussion on whether the failure to price externalities should be considered a subsidy. These figures are included in the IMF 'post-tax' subsidy estimates of US$5.3 trillion for 2015, but they would not come under the WTO definition of a subsidy (see Section 2). Nonetheless, it is important to consider that governments may indirectly 'subsidise' fossil fuels when, for instance, they cover the healthcare costs resulting from air pollution.

Annex 3: Case studies of fossil fuel subsidy reform

Figure 36
Case study countries

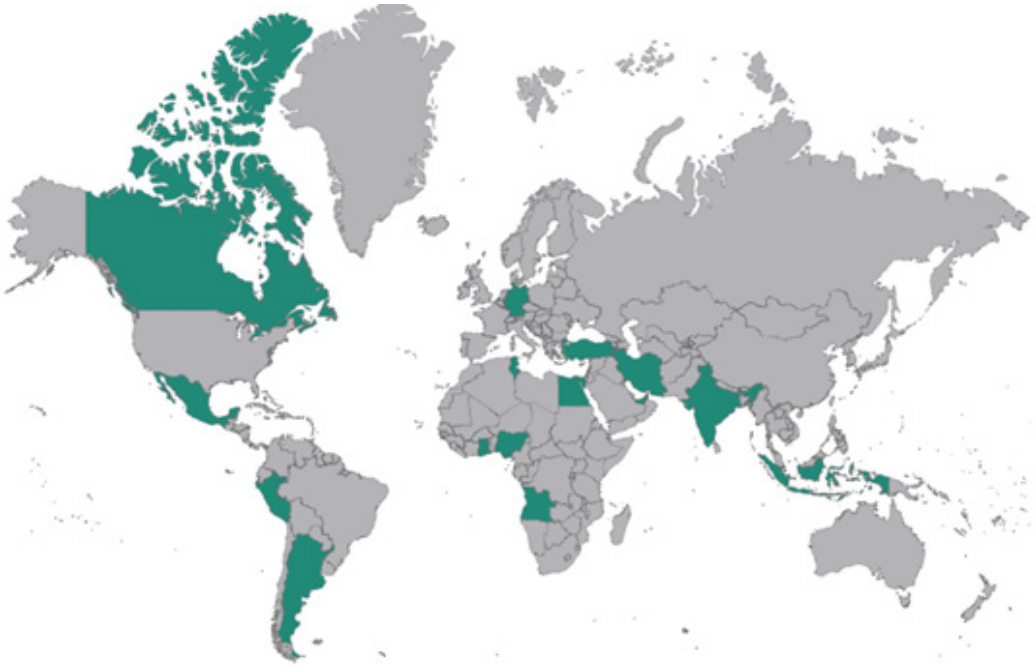
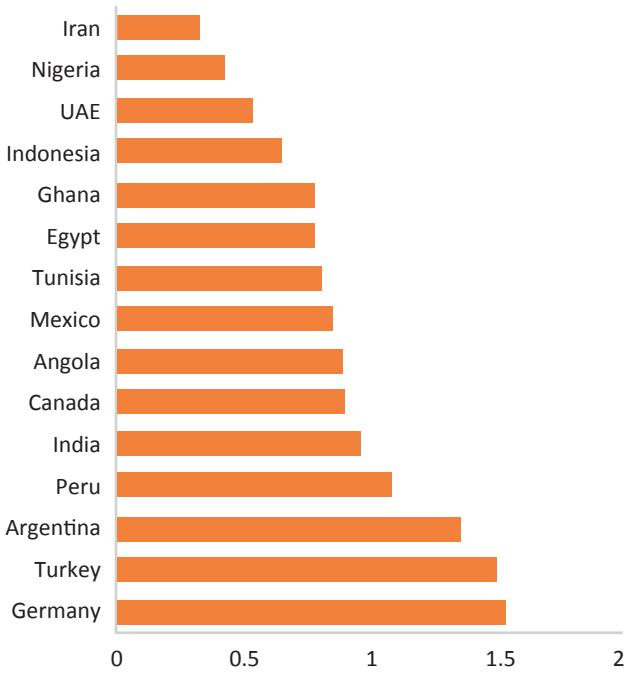


Figure 37
Petrol prices in case-study countries, US$/litre (14 September 2015)



Source: Globalpetrolprices.com.

METHODOLOGY

The following country studies are based on a literature review on the process of reforming subsidies to fossil fuels, including those published by the International Monetary Fund (IMF), the World Bank and the Global Subsidies Initiative (GSI). The IMF and World Bank country studies typically include detailed information (including modelling) on the potential economic impacts of reforms, while the GSI tends to offer wider information on the local context and the challenges involved in implementing reforms. Although interviews were not undertaken, where an expert in subsidy reform in the country reviewed the case study (see Acknowledgements).

Currency conversions have been completed using: http://www.irs.gov/Individuals/International-Taxpayers/Yearly-Average-Currency-Exchange-Rates

Angola

Angola is the second-largest oil producer in sub-Saharan Africa (SSA). The country experienced an oil boom between 2002 and 2008 as several deep-water fields came online, and in 2007, became a member of the Organization of the Petroleum Exporting Countries (OPEC). Angola hopes soon to commercialise more of its natural gas for export and domestic consumption.[320]

Despite being an oil exporter, in 2011 55% of Angola's primary energy consumption was from traditional solid biomass and waste.[321] In 2010, only 40% of Angolans had access to electricity, and hydropower contributed 60% of the country's electricity.

As do many oil-producing countries, Angola's government provides significant subsidies for the consumption of fossil fuels. Fuel products are exempt from taxes and custom duties, and Angola's fuel prices are among the world's lowest and were 67% below the average SSA price in 2011. In 2014 Angola spent more on subsidies for fossil fuels than for health and education combined, accounting for 3.7% of its GDP.[322] In order to address this situation, in 2015 the Angolan government approved a 60% cut in support for fossil fuels.[323,324]

The reform process included analysis from the IMF which showed that:

- Subsidies to diesel, gasoline and LPG accounted for 94% of all consumption subsidies.
- Industry absorbed about 47% of all subsidies, the government 21% and households 32% (based on fuel consumption).
- Subsidies created incentives for over-consumption and smuggling (about 10% of consumption was being smuggled to the Republic of Congo and the Democratic Republic of Congo).
- 77% of fuel price subsidies benefited the richest 40% of households, while only 10% of benefits accrued to the poorest 40%.
- Although poorer households benefited less from the subsidies, they spent about 4.8% of their income on energy while richer households dedicated only 3.6%.
- The fuel-intensive sectors that would experience the greatest impacts of subsidy reform include fisheries, electricity, transport and mining.
- Inflation resulting from subsidy reform would be limited as many consumer goods in Angola are imported, so their cost of production would not be affected by higher fuel prices.

Based on this analysis the IMF proposed the following reform strategy:

- Phasing of reforms with an immediate reduction of subsidies for fuels consumed by richer households (petrol), and later for those consumed by poorer households (kerosene).
- Increasing household fuel prices by 133% between 2015 and 2020.
- Strengthening existing social welfare programmes including assistance for vulnerable children, the elderly, poor households, people with disabilities and war veterans; professional training; and school meals.
- Support to the Ministry of Social Assistance in setting up a cash-transfer scheme. The estimated costs of the cash transfer, equivalent to 50% of the poverty line (i.e. US$40.50 per month for a family of five) would represent 0.5% of GDP.[325]

In a recent presentation, Angola's Finance Minister underlined the significance of timing and of linking reform of fossil fuel subsidies to larger macroeconomic or social initiatives. He stated that such measures worked better when treated not as a stand-alone issue, but as part of more comprehensive and society-wide reform.[326]

Although not the focus of the country's subsidy reforms, there may also be potential for Angola to review and phase out support for the production of fossil fuels. Sonangol, Angola's state-owned national oil company, has a stake in all of the country's oil and gas exploration and production blocks, and although Angola has significant hydroelectric capacity, it has no near term plans to develop it and is currently focusing on the development of natural gas-fired power plants.[327] In 2011, over 80% of government revenue came from oil and gas, making the country vulnerable to volatile international prices.

Argentina

In 2012, Argentina was the largest producer of natural gas and the fourth largest of petroleum in Latin America and the Caribbean (LAC) and in 2011 was second in the region only to Brazil in its electricity consumption. Argentina relies on gas for 52% of its total primary energy consumption and on oil for 34%.[328]

The Argentinian government provides a number of subsidies for the consumption and production of fossil fuels, including fixed residential and industrial natural gas tariffs, export taxes and subsidised rates for imported crude offered to refineries. In recent years, subsidies through budget expenditure and losses experienced by the national oil company were equivalent to 2% of GDP.[329] Although there has been a reduction in subsidies for fossil fuel-based electricity generation (as part of wider energy-sector reform), direct transfers are still provided to generators, resulting in electricity subsidies forecasted to be US$4.7 billion in 2015.[330] Direct fossil fuel subsidies combined with indirect subsidies to fossil fuels through support to electricity generation were 3.9% of GDP and 14% of tax revenues between 2011 and 2013, equivalent to the country's fiscal deficit.[331] The IMF estimates that fossil fuel subsidies (pre-tax and foregone consumption tax revenue) are forecasted to be US$12.4 billion in 2015, or 2.3% of GDP. [332]

Although the stated objectives of many of Argentina's subsidies is to protect consumers from rising energy prices, they have led to greater energy demand, under-investment in the energy sector resulting in supply shortages and to the country shifting from being a net exporter of energy to a net importer.[333] In addition, subsidies for LPG are captured mainly by the main distribution company rather than passed on to consumers.[334]

Argentina embarked on reforming the energy sector in the late 1980s with the aim of making electricity generation more competitive and efficient. The reforms included the unbundling and privatisation of SOEs and the establishment of an independent regulator. While these reforms were considered successful at the time, they were rolled back in response to the 2002 economic crisis when the government froze electricity, oil and gas prices and renationalised electricity distribution companies.[335] This led to a decline in investments in the sector, and a heavy burden for the government as it had to pay generators the difference between the frozen rates and the costs of energy production. Although the government once again sought to increase electricity tariffs by 10–30% in 2008, these were again suspended in the winter months of 2009 in response to the global financial crisis and public protests.[336] Further reforms of subsidies for electricity and natural gas were announced in 2011, with a focus on price increases for commercial users and wealthy Argentinians in specific regions (with a further 15,000 consumers in unaffected regions also accepting price rises).[337]

Argentina has adopted complementary measures to compensate for the impacts of subsidy reforms. Up to 1997, the government subsidised energy for low-income pensioners, and then replaced the subsidies with direct cash transfers. It also retained subsidies for electricity in rural areas as these were found to be progressive. In 2013, because of the high burden on its budget and continued under-recovery of generation and transmission costs, the government made a commitment to phase out electricity and gas subsidies.[338] It cut subsidies to commercial and residential users by 20%, a saving of US$1.6 billion, which will be used to cover utility costs and boost social spending.[339]

Canada

Canada has the world's third-largest proven oil reserves, of which oil sands, one of the fastest growing sources of global GHGs, account for the biggest share.[340,341] It is also the world's fifth-largest energy producer, behind China, the USA, Russia and Saudi Arabia, and a net exporter of oil, natural gas, coal and uranium.[342] In recent years, the discovery of unconventional gas resources has increased Canada's gas reserves, and the production of unconventional oil has also grown.[343] The recent drop in oil prices has, however, slowed the planned expansion of the oil sands.[344] Canada's energy consumption needs are primarily met by petroleum, followed by natural gas and hydropower, with the latter providing most of the country's electricity needs.[345]

The production of oil and gas is concentrated in Alberta, British Columbia, Saskatchewan, and Newfoundland and Labrador, and production is regulated largely by provincial governments.[346] While the oil and gas industry is highly competitive, a number of electricity utilities are owned by provincial governments, which regulate natural gas and electricity prices. Historically, subsidies for the consumption and production of fossil fuels have been provided at both the federal and provincial level.[347]

The OECD 2013 inventory[348] identified consumer subsidies provided at the provincial level, which included discounts on diesel and heating fuel and fuel-tax exemptions for farmers; sale and fuel tax exemptions for electricity, natural gas, heating fuel, kerosene, propane, firewood, diesel and petrol; excise tax refunds to users of petroleum products including the forestry, farming, fishing, manufacturing, electricity-generation and residential sectors; and support to reduce pensioners' heating costs.[349] In the recently published OECD inventory it is estimated that fossil fuel subsidies in Canada had a combined value of US$3.1 billion in 2014, and it is estimated that subsidies for oil alone accounted for an estimated US$1.4 billion in the same year.[350, 351]

Production subsidies are also provided both at the federal and the provincial level and take, among others, the form of income tax deductions, exploration and capital costs deductions, the possibility to transfer exploration and development deductions to investors, drilling royalty credits for new oil and gas wells and tax credits on mining exploration.[352] These measures are typically intended to stimulate the production of (unconventional) oil and natural gas. According to more recent estimates by ODI and OCI, federal government subsidies for fossil fuel exploration alone amount to at least US$955 million annually.[353]

In addition to supporting domestic production of fossil fuels, ODI and OCI found that from 2010 to 2014 Canada provided at least US$5.4 billion in export credit for fossil fuel projects through its public finance institutions.[354] Between 2010 and 2013 Canada also contributed an annual average of US$22 million to fossil fuel exploration projects through its shares in the World Bank, the European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB).[355] In 2010 the IISD published an extensive study on government support for upstream oil activities in Alberta, Saskatchewan and Newfoundland and Labrador.[356] This study found that the Canadian federal government and relevant provincial governments provided support for oil production worth about US$2.8 billion in 2008, mostly benefiting oil-sands production. It also found that while these subsidies contributed to oil exports and increased production, their employment benefit was questionable since most of the production growth was in the capital-intensive oil sector.

Canada has reformed various subsidies for the oil, gas and mining sectors since 1990. Rather than being motivated by climate or budgetary considerations, the reforms were principally undertaken because the subsidies were no longer regarded as necessary because their goal had been reached: the oil, gas and mining sectors had become "robust and growing".[357]

A 2014 study by the Canadian Pembina Institute provides the most recent overview of reforms of subsidies provided to the oil industry.[358] Between 1990 and 2007, Canada announced its intention to reform four tax exemptions: the earned depletion reduction for oil, gas and mining corporations, the resource allowance, the Syncrude remission that allowed investors in oil sands to deduct royalties and resource allowances from their income-tax base, and the Accelerated Capital Cost Allowance (ACCA) that allowed the deduction of the capital costs of oil-sands projects. These measures had a combined value of US$904 million annually. Progress since the 2009 G20 commitment to subsidy reform has been slower. Since 2011, further phase-out efforts have been announced and will save the government a further US$150 million annually, including:[359]

- Reduced deduction rate for oil-sands property expenses from 30% to 10% (reformed in 2011)
- Reduced deduction rate for oil-sands pre-production development from 100% to 30% (reformed in 2011)
- Phasing out the Atlantic Investment Tax Credit (a 10% tax credit on investments in manufacturing and energy production) (to be eliminated by 2017)

Rather than fully phasing out the subsidies, most recent reforms serve to bring the tax system for oil sands more into line with the tax system for conventional oil and gas.[360] Moreover, two primary subsidy measures are to be retained – the Canadian Development Expense (CDE) and the Canadian Exploration Expense (CEE), which provided accelerated deduction rates for pre-production development and exploration expenses at a combined value of US$732 million in 2008, and thereby incentivised increased production.[361] Exploration spending rose rapidly between 2008 and 2013, with Shell's exploration expenditure increasing by more than 7.5 times in this period.[362] Other, not exclusively oil-related, support that has been maintained according to the 2013 OECD budgetary inventory, include the accelerated depreciation of physical assets in (coal) mines and oil and gas and mineral exploration expenses, flow-through shares that allow corporations to transfer unused exploration and development expenses to their shareholders and royalty-reduction programmes for specific oil and gas projects.[363]

Although, according to the 2014 Pembina study, the federal tax revenue forgone by providing exemptions to the oil and gas industry may well exceed the revenue the government is collecting from these industries,[364] the 2013 and 2014 budgets include

no further plans to reform subsidies. On the contrary, in response to rising production costs and plummeting oil prices, in 2014 the government eliminated tariffs on mobile offshore drilling units used in oil and gas exploration and development, and additional tax breaks for natural gas projects (in the form of ACCA treatment for assets used in facilities that liquefy national gas) were announced in the 2015 budget.[365] Tim McMillan, president of the Canadian Association of Petroleum Producers, welcomed these new incentives, and said, "we need to keep Canada an attractive place to invest in oil and gas. The fiscal regime in the federal budget supports capital investment and enables future growth."[366]

Although concerns that low oil prices are dampening efforts to reform subsidies are legitimate, given that reform is framed as "kicking industry while it is down",[367] the recent drop in oil price has also served to expose the risks of strong economic reliance on a volatile resource. This has led Canadians who were already pushing for greater emission-reduction efforts to call for economic diversification and also to protests against pipeline developments.[368] In Alberta, resource revenues fell by US$518 million below budget,[369] while Shell, Statoil and Total more recently dropped plans to develop tar sands.[370, 371] As a result, the Albertan energy industry is expected to cut 31,800 jobs in 2015.[372] These recent setbacks for the industry set the conditions for the unexpected; in May 2015 the New Democratic Party (NDP) won the majority of seats in the Alberta Legislative Assembly for the first time in its history, defeating the Conservative Party, which had ruled the province since 1971.[373] The Conservatives are thought to have lost popularity because of their failure to adopt an economic diversification strategy in the face of volatile oil prices. In the 2015 budget, the outgoing Premier, despite earlier statements that the province would need to reduce its reliance on oil,[374] left industry support measures intact and at the same time infuriated citizens by increasing their tax burden.[375] In contrast, the NDP election campaign said it was committed to increasing corporate taxes and would form a committee to review royalties, impose more stringent environmental standards, ban gas drilling in urban areas, scale back advocacy for pipelines and phase out coal power more quickly than federal regulations prescribe. Although it remains to be seen what the NDP will achieve in Alberta, it may be a sign for things to come for the whole country as the recently elected Liberal Party is committed to phasing out subsidies on fossil fuels.[376, 377, 378]

Egypt

Egypt is the largest non-OPEC oil producer in Africa, and the continent's largest consumer of oil and natural gas, which account for 94% of Egypt's primary energy consumption.[379] Energy demand is increasing rapidly as the result of economic growth, population growth and energy subsidies.[380] This increased demand is posing a challenge for Egypt's government as production of oil and gas is falling, and oil consumption has outpaced production since 2010. Combined with aging infrastructure this is causing frequent electricity blackouts.

In 2013 subsidies to fossil fuel consumption accounted for 12% of Egypt's GDP or US$32 billion and absorbed around 20% of public spending (exceeding expenditure on health, education and infrastructure combined), making Egypt the world's eighth largest spender on fossil fuel subsidies.[381] Motor fuels and LPG are subsidised for general consumption, and natural gas and fuel subsidies are provided to energy-intensive industries in order to promote their competitiveness. A World Bank study in 2005 estimated that a 50% reduction in energy subsidies and a uniform distribution of the savings to the population could reduce poverty in the country by 33%.[382]

Egypt's subsidies have significant negative social, economic and environmental impacts. In 2013, the Egyptian Ministry of Petroleum found that 92% of petrol subsidies and 66% of natural gas subsidies went to the richest 20% of consumers. The subsidies have significantly contributed to the country's budget deficit and have caused a high level of debt for the state-owned Egyptian General Petroleum Corporation. In addition, they have led to the creation of a parallel market for fuel products, encouraged the over-consumption of energy products, and exacerbated air pollution, which contributes to over 15,000 deaths in Egypt annually.[383]

Recognising the negative impacts of energy subsidies, and their inefficiency in achieving the intended aims to alleviate poverty and boost competitiveness, the Egyptian government has made several attempts to reform subsidies, for which it has received technical assistance from the World Bank and IMF. Some early reforms faced strong public opposition, however, and although the price of electricity and diesel rose between 2005 and 2009, further reforms were put on hold in response to public resistance and the 2008 financial crisis. In addition, the reform of subsidies for high-octane petrol in 2012 led motorists to use lower-octane petrol, which continued to be subsidised.

In July 2014 the government announced significant subsidy cuts for petrol, diesel, natural gas and electricity as part of wider economic reforms aimed at reducing the budget deficit.[384] To compensate for the declining purchasing power of poorer households, a minimum wage for public servants, an increase in pensions and subsidies on certain foods were introduced. The government also stated in 2014 that its ambition was for refined products to be sufficiently priced to achieve cost-recovery in

five to seven years, and to double the cost of electricity over five years, using cross-subsidisation to compensate the smallest consumers.[385] These reforms are expected to save US$7 billion, of which the government has said that US$3 billion would be invested in health and education.[386]

In addition to the use of a range of complementary measures and in contrast to earlier reforms, the latest efforts were accompanied by extensive efforts to communicate the benefits of reform to the public, with the President speaking almost daily on the reform plans. A recent presentation by the Minister of Finance underscored the need for information and communication in order to build popular support for reform, and noted that this was not simply a technical issue to be resolved by the government alone behind closed doors.[387] This approach may have been successful since there has been less public resistance than to the previous attempted reforms, although this may also be linked to the ban on public protests following the election of President Abdel Fattah el-Sisi. The transport sector did stage limited protests, and small transport operators argued that they had to pass on the 64% diesel price increase to passengers, resulting in the doubling of minibus fares in Cairo.

Germany

Germany is the second-largest producer of primary energy in Europe after France, and despite its focus on the development of its renewable capacity as part of the country's Energiewende (energy transition), it is still Europe's second-largest producer of coal and third-largest producer of natural gas, although its reserves have been dwindling in recent years.[388]

The OECD's 2013 inventory identified production and consumption subsidies to fossil fuels in Germany. Consumer subsidies included support in the form of energy-tax breaks for agriculture and manufacturing, and tax exemptions for certain energy-intensive processes (particularly the steel and chemical sectors), for fuels used in commercial aviation and in internal waterway transportation. In the 2013 inventory the largest share of production subsidies, which are mainly provided at the state level, was attributed to the hard coal industry, in the form of support for the closure of hard coalmines and compensation for revenue losses as a result of the sale of high-cost or low-quality coal.[389] Other forms of subsidy for producers include income-tax deductions for miners, royalty exemptions for lignite, and energy tax exemptions for coal, natural gas and oil products used by energy companies as production inputs.[390] In the recently published OECD inventory it is estimated that fossil fuel subsidies in Germany had a combined value of US$6.3 billion in 2014.[391]

In 2003, Germany reformed one of its consumption subsidy schemes: the exemption on the eco-tax.[392] The eco-tax, effectively an energy tax levied on fuel products and electricity, was introduced in 1999 to encourage the efficient use of natural resources. Because of competitiveness concerns, however, partial exemptions were extended to the manufacturing, agriculture and forestry industries and accordingly these sectors paid only 20% of the standard rate, and could receive a 95% refund of the remaining eco-tax payments that exceeded the relief on pension contributions.[393] In response to pressure from environmental advocacy groups, the German Green Party, and the European Commission, which promoted reform because the eco-tax exemption could potentially distort competition, Germany raised the reduced tax rates from 20% to 60% of the full rate in 2003.[394] After these partially successful reforms, however, new tax exemptions were introduced in 2006, again aiming to improve the competitiveness of German businesses.[395] This experience shows that while competitiveness concerns at the EU level might drive subsidy reforms, similar concerns at the national level continue to provide a popular argument for subsidisation.

Despite a decline in overall subsidies in recent years, Germany's subsidies for the production of coal, which it provides because its coal is no longer competitive on international markets, continue to be the largest in Europe.[396] Historically, hard coal has been supported through debt-relief measures, mining royalty exemptions and reduced pension contributions for miners, but driven by environmental and budgetary considerations, European competition legislation, a change of governments in North-Rhine Westphalia and Saarland, and the election of a new coalition federal government, the Hard Coal Financing Act (Steinkohlfinanzierungsgesetz) was adopted in 2007. This Act stipulates that subsidies for hard coal production have to be phased out by the end of 2018 in a "socially acceptable manner".[397] Accordingly, most of the remaining subsidies to the coal industry are for early-retirement schemes, which are meant to compensate for unemployment due to the closure of hard coal mines and power plants when subsidies are phased out.[398] It was further agreed that the costs of financial support for sales, closures and inherited liabilities would be divided among the state of North Rhine-Westphalia (US$2.9 billion), the federal government (US$11.6 billion) and RAG AG (US$722 million) between 2009 and 2019.[399] Thus, although industry and the government share the costs of socially acceptable phase-out, the latter is assuming most of the costs of doing so.

Although in 2007 Germany officially committed to phasing out subsidies by 2018, the initial steps towards transparency regarding these subsidies were taken in 1994. In that year the German Constitutional Court ruled that the subsidies for hard coal mining, which at the time were met by a surcharge on the price of electricity, were unconstitutional and had to be

moved to the budget. This made the subsidies clearer to the public and provided further stimulus for reform.[400] The German experience with phasing out subsidies to hard coal illustrates that such reform can be a long-term effort that, in order to be successful, requires a combination of transparency on subsidies, the right political circumstances, pressure by advocacy groups, complementary measures and possibly new legislation.

Despite these efforts to phase out subsidies for the domestic production of fossil fuels, Germany continues to provide significant support to fossil fuel projects abroad through KfW IPEX, Germany's export finance bank, KfW Entwicklungsbank, Germany's development finance agency, and Euler Hermes, its trade credit insurance company. Bilateral agencies supported coal projects with US$4.8 billion, and oil and gas exploration and production with US$400 million between 2007 and 2014.[401] The Ptolemais V lignite power plant in Greece is an example of the types of project these agencies fund; in 2013 it received US$997 million from Euler Hermes.[402]

There has been some recent progress in limiting this funding of fossil fuel projects abroad. In December 2014, the federal government agreed to limit development finance for new coal power stations overseas.[403] It decided that KfW Entwicklungsbank financing would no longer be provided for the construction of coal-fired power plants or the upgrading of decommissioned coal plants, and that the modernisation of existing plants would be subject to stricter lending terms. In addition, the government confirmed that it would also restrict the guarantees currently provided to the coal industry by EulerHermes, as long as all OECD countries agreed to follow suit. Despite these efforts, KfW IPEX, the private-sector arm of KfW, can continue to provide export finance to the coal sector including for the construction of new plants.[404] As Germany holds the G7 presidency in 2015, it has an opportunity to take the lead in turning commitments to reform subsidies for fossil fuels (reiterated in the Brussels G7 Summit Declaration)[405] into firm action.[406]

Ghana

Since 2000, the Ghanaian government has made numerous attempts to reform fuel subsidies. By 2004, the total cost of fuel subsidies represented 2.2% of GDP, which exceeded the total budget of the Ministry of Health, and about 1% of GDP was needed to support the operations of Tema Oil Refinery (TOR) alone. In addition, LPG subsidies caused such fuel shortages (by encouraging over-consumption), that drivers of commercial LPG vehicles lobbied for the government to remove the subsidy.[407]

Following initial failures to sustain efforts to reform fuel subsidies in 2001 and 2003, in 2005 the government was able to make more permanent reforms by establishing the National Petroleum Authority (NPA). One of the government's objectives in setting up the NPA was to depoliticise the price-setting process, mandating it to establish a formula for adjusting fuel prices and to review oil prices twice a month. The 2005 reforms have been considered successful in that they did not lead to widespread protests (as had happened following the 2003 reforms, which hit the poor hardest) and were maintained over a longer period. The successes of the 2006 reform can primarily be attributed to a joint scientific survey undertaken by the government and the IMF on the impact of changes in fuel prices on different social sectors, the constant dialogue with stakeholders and civil society before and during the reforms, as well as to the complementary measures that were introduced to cushion the effects of price increases, including social-protection programmes.

In addition to establishing the NPA, the 2005 reforms were supported by preliminary research, including a Poverty and Social Impact Assessment (PSIA), a communications campaign, and the complementary measures to ensure broad support for reform.[408]

The PSIA found that subsidies were poorly targeted, with the rich receiving the biggest share of the benefits, and less than 2.3% benefiting the poor. The results of the PSIA were made public through a widespread communications campaign, and were discussed with various stakeholders. The finance minister announced that the savings from subsidy reform would be directed to complementary measures including the elimination of fees for state primary and secondary schools; a ceiling on public transport fares; additional funding for health care in poor areas; and a rise in the minimum wage.[409] The government also continued to cross-subsidise kerosene and LPG (by charging a fee for petrol, which is used to subsidise kerosene and LPG, fuels that are typically used by the poor), and distributed compact fluorescent light bulbs to reduce household electricity costs.[410]

The 2005 reforms did not remove all subsidies on fossil fuels, as there continued to be (cross-) subsidisation for petrol, diesel, kerosene and LPG, and the NPA continued to make ad hoc price adjustments. In addition, in 2007 and 2008 the automatic price adjustment was suspended in response to rising commodity prices. By 2013, the cost of fuel subsidies had risen to US$1.2 billion, or about 3.2% of GDP.[411]

To address the increasing budgetary burden, in 2013 the government raised the price of petroleum products by 15% (for kerosene) and 50% (for LPG), while the price for pre-mix (petrol with a lubricant blended in) was not adjusted and remains heavily subsidised.[412] Similarly, there were reductions in the large subsidies for electricity, through increases in tariffs.[413]

This recent round of reforms was complemented by a 17% rise in the minimum wage and an expansion of the cash-transfer programme (LEAP) from 100,000 to 150,000 households.[414] Research has found that the LEAP programme is well-targeted, has had positive impacts in reducing inequality, and costs far less than fossil fuel subsidies.[415] These recent reforms have contributed to a fiscal surplus, are expected to help reduce fossil fuel consumption and carbon emissions, and reduce road use, which in turn may reduce air pollution.[416] There is some indication, however, that the removal of subsidies to LPG may be causing the poorest sectors to use more wood fuel and charcoal, which could increase both air pollution and deforestation.[417] According to IMF forecasts, fossil fuel subsidies in Ghana (including pre-tax subsidies and foregone consumption tax revenue) will drop to US$240 million in 2015, down from US$1.2 billion in 2013, which is likely linked to both subsidy reforms and the fall in oil prices.[418]

In response to recently falling oil prices, in 2015 the government made further statements about reforms to the pricing of fossil fuels, which may reverse previous reform efforts:[419]

- The NPA announced that it would use the windfall from the low price of crude oil to settle the debts of the country's Bulk Oil Distribution Companies (BDCs), which resulted from earlier subsidies, and respond to consumers' demand for a further 10% drop in prices.
- The NPA is considering alternatives to the full-pass-through of changing international prices to domestic prices, including a hedge policy to secure low energy prices in the future.
- The government also proposed a levy on petroleum products to establish a renewable energy fund that would enable residents and "micro enterprises" to install rooftop solar panels.

Ghana's state of the nation address also hinted at the potential need for new consumption and production subsidies, with an indication that because of low rainfall the country's base-load generation would have to shift from hydropower to thermal power, and that Ghana stands to lose about $700 million from oil exports if the price remains at current levels.[420]

India

In 2011, India was the world's fourth-largest energy consumer, with rising demand linked to the country's rapid economic growth (expected to reach 7.6% by 2017).[421] Coal is India's primary source of energy. In 2012, the country was the world's third-largest coal consumer and producer, and the government retains a near-monopoly over the sector. Despite growing energy production and large coal reserves, India is facing increasing shortages of energy supply and is becoming more dependent on imports of crude oil, natural gas and coal.[422]

India subsidises the consumption of fossil fuels by controlling the price of petroleum and electricity, at a cost of US$47 billion in 2013.[423] Although these subsidies have the stated objective of protecting consumers from volatile energy prices, and ensuring access for the poor, they often fail to reach their target groups.[424] One example is the LPG cooking gas subsidy, of which more than half goes to the richest 30% of the population while the poorest receive only 15%.[425,426] The rising cost of the country's consumption subsidies are a strain on government resources, increasing India's fiscal deficit, and as the costs of the low energy prices are borne partly by SOEs, they are discouraging investment in the energy sector.[427]

Recognising the negative impacts of the subsidies for the consumption of fossil fuels, in 2010 the Indian government sought to liberalise the price of petrol,[428] and in 2013 it began a phased deregulation of diesel prices. This has already resulted in a significant decrease in India's budget deficit, as well as in the share of diesel vehicles in India's passenger car fleet.[429] The petroleum subsidy was halved to US$5 billion in 2014/15.[430] By October 2014, the government had fully deregulated the price of diesel and, due to low international oil prices, retail prices have remained relatively stable.

Notwithstanding this recent success, subsidies for LPG, kerosene, electricity and gas remain high. In response, in January 2015 India's Finance Minister announced a new phase of subsidy reform for LPG and kerosene, combined with an increase in excise duties on petroleum and diesel.[431] Taken together, the reforms are expected to help to bring the fiscal deficit down from 5.5% of GDP in 2014/15 to 4.2% in 2015/16.[432] In the recently published OECD inventory it is estimated that fossil fuel subsidies in India had a combined value of US$9.6 billion in 2014.[433]

The government has sought to addresses the impacts of the subsidy reforms on agricultural competitiveness by continuing to subsidise farmers' access to groundwater and providing lower priced electricity for irrigation and water pumping.[434] In addition, India adopted a number of complementary measures for households. These included direct benefit transfers (DBT) that, in contrast to subsidised pricing, transfer subsidies for cooking gas or LPG to the beneficiaries' bank accounts. Those eligible can obtain unique biometric identity cards (Aadhaar) linked to their bank account through which they can receive a refund for purchased LPG cylinders.[435] Following an initial pilot, in January 2015, 10 million citizens joined the LPG cash-transfer

scheme, which the Prime Minister regarded as a success. The DBT for LPG has, however, been criticised for linking the receipt of the subsidy to fuel consumption and for failing to target specific beneficiaries,[436] but the government contends that this compensation is preferable to direct cash transfers, which would be less accessible to women (who are responsible for most LPG purchases). More recently, the government has encouraged wealthy consumers to give up the LPG subsidy. It is estimated that more than 650,000 people nationwide have surrendered their subsidy after the government launched its "Give it Up" campaign, which enables it to transfer the subsidised gas cylinders to rural households in order to replace other cooking fuels, such as coal and wood.[437]

Electricity subsidies in India are more difficult to monitor or reform than those for specific fuels, since electricity pricing policies vary between states and consumer categories.[438] State governments keep down the price of (primarily fossil fuel-based) electricity by regulating tariffs and compensating utilities with lump-sum subsidies. The level of government support is, however, often inadequate to fully cover utility losses, leading both to under-investment in the sector and to power shortages. The government is considering introducing a gas-pooling price for power plants, which would enable them to buy gas at uniform prices.[439] This could lead to higher electricity subsidies, however, since the pooled gas price is likely to be higher than domestic prices.[440]

As is the case in many countries, India's subsidies for the production of fossil fuels have received less attention than those for consumption. A recent study by OCI and ODI found that the Indian government finances domestic fossil fuel projects, including loans worth US$305 million for coal projects, and US$602 million disbursed to public oil-sector companies in 2012. State-owned banks provided an annual average of US$121 million for fossil fuel production projects (Exim Bank, 2013; IJ Global, 2014). As well as substantial activities in the domestic coal sector, the 90% state-owned Coal India Limited (CIL) has set aside about US$9.8 billion to develop coal projects overseas between 2012 and 2017, with up to US$1.5 billion allocated to developing a project in Mozambique in 2013/14 alone. Indian oil and gas SOEs invested US$2.7 billion in exploration activities in 2013/14 through projects in India and 16 other countries. Although only part of this could be considered government support, the total annual investment by Indian SOEs in activities related to the production of fossil fuels is estimated at $4.3 billion.

Indonesia

Indonesia is the largest coal exporter worldwide, and the largest exporter of gas regionally. Although Indonesia used to be a net oil exporter, it is now increasingly dependent on oil imports. With a rapid increase in demand as middle-income families replace their motorbikes with cars, it has become the second-largest oil importer in the region.[441]

The country's rising oil imports have been accompanied by an increase in fossil fuel subsidies for consumers, which correlate with international price changes and are a significant burden on the government budget. Between 2009 and 2014, subsidies increased almost fourfold. Indonesia's fuel prices were among the lowest in the world, with petrol costs at US$0.65 per litre on 15 September 2015 (Figure 38).[442] In 2013, Indonesia allocated US$27 billion to subsidies for fuel and electricity consumption, equal to around 2.5% of GDP.[443] Although one of the stated objectives is to guarantee affordable energy, in reality richer households benefit most from these subsidies. The Indonesian national statistics office has estimated that only 2.7% of subsidies go to the poorest 20% of households, while 59% of the benefits accrue to the richest 20%.[444] The World Bank found that a full phase-out of subsidies by 2018 would free up 3.3% of GDP, which would allow Indonesia to double its spending on infrastructure and social protection.[445]

Recognising the potential benefits of subsidy reform, Indonesia has made a number of efforts to reform consumer subsidies since 1997.[446] Early fuel (petrol and diesel) subsidy reforms in 2005 and 2008, years in which global oil prices peaked, helped to reduce the fiscal burden of energy subsidies, but efforts stalled in 2009 and energy subsidies rose to more than 20% of the government's spending in 2011.[447] In 2013, the government increased petrol and diesel prices in an effort not to not exceed its statutory budget deficit limit of 3% of GDP.[448] These reforms enabled it to spend another US$2.6 billion on various social programmes for low-income households.[449] In October 2014, President Joko Widodo further raised fuel prices only one month after he took office,[450] and in December 2014 took advantage of low international oil prices and announced a cap on diesel subsidies and a cut in subsidies for premium petrol.[451] In the longer term these reforms are expected to lead to savings of US$15.5 billion.[452]

Despite the progress made in reforming petrol and diesel subsidies, 'Solar' diesel and kerosene continue to be subsidised. 'Solar' diesel receives a fixed subsidy and kerosene has a fixed price.[453] Moreover, while premium petrol subsidies have now been cut, there are exemptions for fisherman and for public transport vehicles, and the distribution of this fuel to remote areas is subsidised.[454] Distributors of 3kg of LPG receive a subsidy to compensate them for selling at below costs, although in June 2015 the government embarked on plans to restrict the subsidised LPG distribution and reduction scheme.[455] In addition, although

electricity prices have risen since 2013 as a result of periodical adjustments, electricity for low power connections – and for a number of residences, businesses and industries – is still subsidised and represents more than 99% of the customers of Indonesia's state owned electricity company.[456]

To complement the 2005, 2008 and 2013 reforms, the government assisted a wide range of the country's poorest people through cash transfers, an expansion of the Poor Student Education Support programme, free health care and a subsidised rice programme.[457, 458] In 2005 and 2008 these compensation packages were not as well designed and funds did not always reach the poorest households.[459] With the 2013 reforms, Indonesia extended temporary unconditional cash transfers to 15.5 million poor and near-poor families in the form of Social Protection Cards. It also expanded the country's conditional cash-transfer programme, scholarships and subsidised rice (Raskin) for the poor.[460] These social protection measures were funded through the State Budget, ahead of reforms, and it is anticipated that subsidy savings will be redirected to programmes to improve the country's infrastructure, largely by increasing contributions to SOEs in the construction and transport sectors.[461]

To ensure public support for the reforms, the Indonesian government undertook a widespread campaign to communicate the reform plans and ensuing benefits, taking advantage of youth media, television, mobile phones, community elders and student and labour organisations.[462] Although reforms which led to price increases in November 2014 resulted in panic buying, strikes by public transport workers and occasionally violent protests, the public welcomed subsequent reforms linked to the fall in fuel prices in January 2015.[463] This is probably due to the communication campaigns, the absence of political opposition, and the prospect of lower rather than higher diesel and petrol prices because of low international oil prices. The Indonesian Consumers' Association supported the subsidy reform policy, but emphasised that the savings should be used to support improvements to and the affordability of the public transport system. While the public responded far more positively to the fall in fuel prices as a result of reforms in January 2015, the government remains concerned that companies may not pass on the lower energy prices to consumers and has called for businesses and public transport companies to adjust their prices.[464] It also remains unclear how the government will respond (with compensatory measures or by reintroducing subsidies) if international oil prices rise again.[465]

As is the case in many countries, Indonesia's subsidies for the production of fossil fuels have received less attention than those for consumption. A recent study OCI and ODI study identified tax breaks that benefit exploration activities in the oil and gas industry that were worth US$245 million in 2008, and that the state-owned oil and gas company Pertamina spent US$210 million on fossil fuel exploration in 2013. In addition, while state-owned banks and financing institutions are thought to provide significant finance to extractive industries both in Indonesia and abroad, there are no available data because of a lack of transparent reporting.

Iran

It is estimated that Iran holds the world's fourth-largest proven crude oil reserves and the second-largest natural gas reserves. Although in 2012 Iran ranked among the world's top-ten producers of oil and top-five producers of natural gas, its production of crude oil has slowed down substantially in recent years, in part due to international sanctions.[466] In contrast, Iran's primary energy consumption has increased by more than 50% over the past ten years, partly driven by high subsidies on fossil fuels. Fossil fuels account for about 98% of Iran's total primary energy consumption, and the IMF forecasts that fossil fuel subsidies in the country (including pre-tax subsidies and foregone consumption tax revenue) will fall slightly to US$63 billion in 2015, from US$77 billion in 2013, which is likely linked to both subsidy reforms and the fall in oil prices.[467, 468] Iran's petrol prices, – US$0.33 per litre in September 2015 – are among the lowest in the world (see Figure 37).[469]

In 2010, Iran made significant efforts to reform subsidies, as part of its broader structural reform agenda.[470] The reforms were designed with the goals of stimulating economic growth and job creation, increasing energy efficiency and the country's oil and gas export capacity, and reducing air pollution, inequality (the wealthiest quintile captured 41% of energy subsidy benefits, while the poorest quintile captured 8%), fuel smuggling, and wasteful consumption.[471, 472]

It was decided to increase petrol, diesel, fuel oil, kerosene and LPG prices gradually over a five-year period to 90% of FOB Bandar Abbas Port prices, natural gas retail prices to a minimum of 75% of average export prices (minus transmission and export costs), and electricity prices to the level of full cost recovery.[473] To contain the immediate impact of rising fuel prices on the economy, the price increases were scheduled for months of low energy use.

The savings as a result of the reform were estimated at between US$50 billion and US$60 billion.[474] In contrast with many other efforts to reform energy subsidies, the reforms in Iran were not driven solely in order to achieve fiscal savings.[475] Indeed, the government distributed almost all of the savings across all parts of the population in the form of a bimonthly cash transfer, using specially created bank accounts.[476] The government had initially planned to target the cash transfers to the poor over time, but the administrative difficulties associated with targeting eventually proved too great, and were aggravated by fears of social

unrest following the 2009 presidential election. To mitigate the impacts of price increases on the lowest consumers of energy, the government introduced tiered tariffs for different types of consumer of natural gas and electricity, distinguishing between commercial and household use, region, volume consumed and season.[477]

To ensure public support for the reforms, the government conducted an extensive communication campaign. A spokesperson was appointed to coordinate the campaign, and politicians, businesses and leaders from civil society and academia were mobilised to lend public support for the reforms. News media, public seminars, meetings, educational programmes and Friday prayers were used to inform Iranians of the increasing cost of the country's subsidies and the benefits of reform.[478] To raise further awareness, the true costs of electricity were shown on electricity bills. Although government officials at first warned of protests, there were no reports of disturbances, which could either be linked to acceptance of the reforms or to fears of speaking out against them.[479] The reforms succeeded in reducing energy consumption in between 2009 and 2011.

While the first phase of reform was successfully implemented, a second phase in 2012 was postponed, leading energy consumption to rebound. This decision was due to the combined impact of international sanctions, the government's expansion policy in the natural gas and electricity sectors and the subsidy reforms in productive sectors, which did not receive the government support anticipated and could not remain profitable in the face of increasing energy prices.[480, 481, 482] This led to inflation and contraction of the economy, both of which were aggravated when the savings from subsidy reforms fell short of the cash transfers promised to households and businesses. In response, the government resorted to printing money and reducing the value of the monthly cash transfers by 66%.[483, 484, 485]

As subsidy reform re-emerged on the agenda, the second phase of the programme was finally implemented in April 2014. Petrol prices were increased by 75%, and went up again in June 2015.[486, 487] Importantly, the public largely backed the reforms, despite the fact that these were implemented during a period of slow economic growth and high inflation. In this reform episode the government planned to better target the cash transfers by cutting the universal transfer and asking richer Iranians not to re-apply. Almost 73 million people have applied for the transfer, however, which raises doubts about whether it will be any better targeted than before.[488] To address these concerns, the government is seeking to set criteria to identify wealthy groups and Iranians who are living abroad in order to eliminate them from monthly transfers, but has faced opposition from members of parliament on the detail of the criteria.[489, 490]

Mexico

Mexico was one of the world's ten largest oil producers in 2013, although production has steadily declined since 2005 and has led to a drop in net crude oil exports, most of which go to the USA. In 2012, oil accounted for 53% of Mexico's total energy consumption, natural gas 36%, coal 5% and hydropower for 4%. The country is a net importer of refined petroleum products and of natural gas, for which demand is increasing.[491] Although the state-owned petroleum company Pemex (the world's eighth-largest oil and gas company) accounted for 32% of total government revenues in 2013, export earnings and government revenues have fallen over the past decade and are likely to continue to decline if the oil price stays low.

The government sets almost all energy prices in Mexico.[492] The consumption of transport fuels (petrol and diesel) has been subsidised by setting domestic fuel prices on a monthly basis. In 2000 a Petroleum Fund (FEIP) was created in order to smooth the impact of international price fluctuations on government revenues, similar to funds established in Chile and Peru.[493] This fund was designed, through the continuous adjustment of the excise tax, either to tax or subsidise fuels. But as international prices continued to rise steadily up to 2014, the Fund continued to provide subsidies and failed to generate tax revenues. The OECD estimated that in 2011 the negative excise tax on products and services on petrol and diesel at MXN169 billion (US$13 billion), and further identified a fuel-tax credit for agriculture and fisheries worth MXN135 million (US$10 million) and a subsidy on LPG through price controls worth MXN40 billion (US$3 billion).The low price of transport fuel encouraged excessive consumption, and Mexico's per capita fuel consumption is higher than in other developed countries and lower only than in countries such as the USA, Canada and Saudi Arabia. Energy subsidies in the country furthermore largely benefit the rich: more than 55% of the subsidies accrue to the richest 20% of the population, while the poorest 10% only received 0.9%.[494] In the recently published OECD inventory it is estimated that fossil fuel subsidies in Mexico had a combined value of US$4.9 billion in 2014.

With the aim of increasing fossil fuel exploration activities, in 2013 the government introduced reforms to the oil sector. Until then Pemex held exclusive rights to the entire oil and gas sector.[495] The reforms allowed foreign companies to participate in exploration and production activities through profit-sharing agreements with Pemex.[496] To further boost exploration a law adopted in 2014 allows companies to deduct the entire costs of exploration from their income tax payments, while the government provides at least US$400 annually in public finance for oil and gas exploration.[497] These support measures have helped to increase Pemex's oil and gas exploration expenditures.[498]

Electricity in Mexico is similarly subsidised through below-cost pricing, by increasing block tariffs with tariff categories varying between regions. To compensate power companies for providing below-cost electricity, the companies are exempt from tax. Since 2002 the subsidies have begun to erode the state-owned Federal Electricity Commission's (CFE) capital base as compensation falls short of the losses incurred by below-cost pricing.[499] According to IMF data, electricity subsidies cost of 0.5% of GDP in 2011.[500]

Following earlier failed attempts to reform subsidies in 1999 and 2001,[501] the government has very gradually increased petrol and diesel prices, and is working to target energy subsidies in order to bring prices more into line with the true costs. Although in 2009 the Mexican government froze petrol prices in the face of the global financial crisis, in 2013 the gap between domestic and US prices was closed. In the same year, the Mexican congress approved the introduction of a carbon tax starting at US$3.12 per tonne, varying between fuel types, and approved increases in the retail price of petrol and diesel through to 2017, in line with overall inflation.[502, 503] Based on oil prices in January 2015, this is expected to eliminate subsidies on fossil fuels and result in petrol and diesel products effectively being taxed. It is projected that from 2018, petrol prices will be liberalised and determined by the market.[504]

To reduce the electricity subsidies provided under the increasing block tariff mechanism, in 2002 higher rates were introduced for major consumers, but 75% of total consumption continued to be subsidised and the benefits accrue more to the rich than to the poor.[505] The failure of efforts to reform electricity subsidies has been attributed to public opposition to privatisation, a long history of tariff subsidies and the dominance of the state-owned electricity company, which posed major obstacles to reform.[506]

So far, the partial success of the reform of subsidies on fuel consumption has been attributed to wider energy-sector reforms, a coordinated national communication strategy to raise awareness of the regressive nature of the energy subsidies and the introduction of social safety nets.[507] Although not explicitly linked to the subsidy reform efforts, in 2007, the government introduced an energy component to the existing anti-poverty programme, Oportunidades, and in the face of the 2008 financial crisis, introduced additional cash transfers. Mexico has also started a pilot direct cash-transfer programme to replace electricity subsidies for the pumping of irrigation water. In addition to discouraging the over-consumption of fossil fuels, this is also expected to reduce the over-consumption of groundwater.[508]

Nigeria

Nigeria is the largest oil producer in Africa, and has the world's ninth-largest natural gas reserves.[509] The oil and gas sectors account for around 25% of Nigeria's GDP, 75% of general government revenue, and over 95% of total exports, making the country's fiscal balance particularly vulnerable to international oil price volatility, as highlighted by recent low oil prices.[510]

Despite Nigeria's natural resource wealth, the country's domestic petroleum consumption is met largely by imports. This is in part due to Nigeria's limited refining and domestic pipeline capacity.[511] In addition, only half of Nigeria's population has access to electricity and even they continue to depend on petroleum products during frequent electricity supply shortages.[512] Biomass and waste account for 80% of Nigeria's primary energy consumption, oil for 13% and natural gas for 6%.[513]

Poverty rates in Nigeria are high, and in the absence of a well-designed social welfare system, subsidies are a means for the government to distribute the country's oil wealth.[514] While diesel prices are deregulated, the Petroleum Products Pricing Regulatory Agency (PPPRA) sets maximum prices for premium motor spirit (petrol) and kerosene on a monthly basis, meaning that those who are officially licensed to sell this fuel must do so below the market rate. The government then partially compensates the petroleum vendors and licensed importers both with lump-sum payments.[515] Subsidies to electricity come in the form of subsidised gas used as an input in electricity production as well as the setting of too low tariffs to recover the costs of electricity production. To help state utilities recover their costs the government provides payments as compensation.[516] The IMF estimates that fossil fuel subsidies in Nigeria (pre-tax and foregone consumption tax revenue) were US$4.5 billion in 2013.[517]

While fossil fuel subsidies are justified primarily as supporting social welfare, their benefits accrue largely to richer households that consume more energy than do low-income households. Kerosene subsidies are also often captured by intermediaries in the parallel market, who sell it at far above the price set by the PPPRA.[518] Also, although electricity subsidies include lifeline tariffs that are supposed to be progressive, the poorest households often lack access to electricity and hence do not benefit from these subsidies.[519] Finally, Nigeria's fossil fuel subsidies, as in other countries, create a disincentive for investments in efficiency such as for upgrading and maintaining energy infrastructure, which can in turn be linked to frequent blackouts and oil spills in the country, and to over-consumption and inefficient use of fossil fuels, all of which exacerbate fuel shortages.[520]

The strain that fossil fuel subsidies placed on the government's budget, and the wider negative effects of subsidies, prompted the Nigerian government to make efforts to reform electricity subsidies from 2008 (in a 15-year plan to achieve cost-reflective

tariffs), followed by petrol in late 2011. Before the latter, the president made public statements highlighting the cost of the subsidies, and plans to use the savings to spend more on safety nets for the poor, wider infrastructure for energy, transport and water and improving the country's oil-refining capacity.[521] The government stated that the potential impact of the subsidy removal on the poor would be mitigated "through properly targeted safety-net programmes". These complementary measures formed the Subsidy Reinvestment and Empowerment (SURE) Programme.

In January 2012, only six weeks after the SURE Programme was presented to the public, the government raised the price of petrol to full cost-recovery level, leading to a 117% price increase.[522] For most Nigerians, this short notice meant that the implementation of the reforms came as a surprise and many did not trust that the government would use the proceeds in a manner that would benefit them.[523] Consequently the reforms resulted in nationwide protests and strikes. In response, the government had scaled back the price increase from 117% to 49% by mid-January 2012, meaning that the country's petrol subsidies were reduced significantly but not eliminated.[524]

Nigeria has not since resumed reform efforts. The IMF forecasts that fossil fuel subsidies in Nigeria (pre-tax and foregone consumption tax revenue) will be US$1.7 billion in 2015, a significant fall from 2013 due to subsidy reforms and falling oil prices.[525] As is the case in many other countries, there is only limited information on production subsidies in Nigeria. According to Nigeria-based Spaces for Change, fuel subsidies are likely to exceed the national revenue if they remain intact.[526]

The country is currently facing persistent fuel scarcity, which has led to a significant increase in the domestic price of petrol and long queues at fuel stations. Although these difficulties, and the heightened fiscal burden from low oil prices, have drawn increasing attention to existing fossil fuel subsidies, the current president has said that subsidies will be maintained, and that the challenges in the energy sector are best addressed by targeting "sabotage, corruption and mismanagement".[527, 528]

Peru

Peru has crude oil reserves mainly in the Amazon region, and the third-largest proven natural gas reserves in Latin America. The country is, however, a net importer of oil and relies increasingly on refined petroleum imports from the USA. Hydropower accounts for the largest share of Peru's electricity generation.[529] The government is using incentives to reduce its dependence on hydroelectricity by increasing its natural gas production and plant capacity.[530]

Up to 2004 the government set the prices for fuels sold by the SOE, PetroPerú. When global commodity prices began to rise, however, it introduced a price smoothing mechanism whereby excise taxes were adjusted in order to stabilise consumer prices.[531] This led to significant loss of revenue and to the establishment of the Fuel Price Stabilisation Fund (FEPC) with the aim of recovering money from oil refineries when international prices were low in order to compensate them in periods of high international prices. As oil prices continued to rise after 2004, this mechanism proved to be a drain on fiscal resources, costing 2% of GDP in 2008.[532]

In 2010, the government took the opportunity of reduced international prices to reform the FEPC. In order to limit the adverse effects of removing subsidies, it removed them first from high-octane fuel, which is mainly consumed by richer households, after which it reformed subsidies to standard petrol and LPG for industrial consumption.[533] Later, standard petrol was also excluded from the FEPC, so that only diesel and LPG for household consumption remained subsidised. Although the reforms did not provoke significant protests and in that sense could be regarded as successful, diesel and LPG, the most politically sensitive fuels, continue to receive support. As these fuels had accounted for 80% of total subsidy spending under the FEPC, the reforms did not significantly reduce the cost of maintaining the fund.[534] In 2011, the government stopped making budgetary transfers to the FEPC.[535] The IMF estimates that fossil fuel subsidies in Peru (foregone consumption tax revenue) were US$620 million in 2013, and are forecast to fall to US$550 million in 2015.[536]

In 2014, Peru was the first APEC country to voluntarily undergo a peer review of some of its fossil fuel subsidies as part of the APEC countries' wider commitment to rationalise and remove these.[537] Reviewers from Cambodia, Indonesia, New Zealand and the USA were involved in the process. Peru selected three subsidies for review: the FEPC; the FISE (the Social Inclusion Fund, a cross-subsidy programme designed to ensure the affordability of LPG for the poor, based on charges to industrial consumers of electricity); and a VAT exemption for fossil fuels sold in the Amazon region. Although not chosen for review, Peru also continues to regulate the price of natural gas for power generation, which is among the lowest in the world. This low price persists despite the establishment of an independent sector regulator and the full privatisation of the electricity sector in 1997.[538] Peru also maintains significant subsidies for electricity, although these benefit mainly hydropower production and use.

The APEC review panel found that the FEPC had probably encouraged the over-consumption of fossil fuels in Peru, and had led to high fiscal costs, undermined the competitiveness of the country's refineries, and only marginally decreased inflation. The

panel also found that the benefits were primarily regressive and poorly targeted. This echoed a parallel study commissioned by the government, which found that the wealthiest 20% of the population captured eight times the value of the benefits received by the poorest from the FEPC. The APEC review also found that the reforms undertaken in 2010 had had positive effects, and recommended that the country move LPG and diesel for public transport and the distribution of goods out of the FEPC and into FISE (the targeted subsidy programme) and to reduce frequency of price adjustments.

The APEC panel reviewed the FISE, which had been introduced in 2012 to ensure the affordability of LPG for low-income households by giving them a monthly discount voucher. The panel found that FISE ensured poor households' access to fuel and did not significantly stimulate increased consumption of fossil fuels; and recommended that the programme should be extended to other regions in view of the successful pilot. Should Peru do this, it would in effect increase its subsidisation of fossil fuels, which might prove financially unsustainable. In addition, it might affect competitiveness since it is based on charging high consumers of electricity.[539]

The review panel found that VAT exemption cost the Peruvian government approximately US$1 billion in 2014, despite which the subsidy failed to promote economic development in the Amazon and benefited the wealthy rather than the poor. The APEC review panel recommended that the Peruvian government eliminate VAT exemption and replace it with targeted social and regional development programmes focusing on education, health, infrastructure and transport. To undertake these reforms the panel recommended that the government design plans for direct public investments, and a communication campaign to garner support for the reforms. Peru's peer-review experience can be built upon to accelerate a similar process in other APEC countries.

Tunisia

In 2011, natural gas accounted for 45% of total primary energy consumption in Tunisia, oil for 40%, and biomass for 15%. In 2013, 98% of Tunisia's electricity was generated from fossil fuels, primarily natural gas. Since the mid-1980s, Tunisia's petroleum production has steadily declined, and the country is currently a net importer of oil and gas. As energy demand is expected to grow by 4% annually between 2010 and 2030, large investments in the energy sector are needed, part of which the government plans to meet with renewable energy sources, including the aim to produce 11% of electricity from renewables by 2016 and 25% by 2030.[540, 541]

Tunisia subsidises fossil fuels in a number of ways, with the stated parallel objectives of ensuring the competitiveness of energy-intensive industries and supporting social welfare.[542] Historically, the largest subsidies have been for LPG and diesel by applying fuel and electricity price controls for SOEs and consumers. The government compensates the energy companies for the difference between the set natural gas and petroleum prices and the corresponding international prices. Energy subsidy costs tripled from an average of 0.9% of GDP in 2010 to 2.6% of GDP in 2012,[543] as domestic retail prices were kept artificially low while international oil prices were rising. In addition to placing an unsustainable burden on the government's budget, the energy subsidies are an inefficient means to ensure social protection since the richest households capture 40 times more benefit from them than do low-income households.[544]

The Tunisian government has attempted to reform these subsidies several times between 2005 and 2009, but has often reversed reforms in response to protests linked to unemployment and rising living costs.[545] In 2013, another subsidy reform plan was announced, including a system of targeted benefits and a communication campaign to gain public support for the reform plans.[546] Complementary measures included a new lifeline electricity tariff for households that consume less than 100kWh per month, a social housing programme and tax cuts for the poorest households, which were introduced before the rise in the price of fuel. The government also made efforts to improve the effectiveness and expand the reach of the existing cash-transfer system for the poor (PNAFN), by setting up a single registry and a better targeting system.[547]

Following these preparatory steps, in March 2013, the government increased the prices of petrol, diesel and electricity by an average of 7.5%. In January 2014, subsidies to cement companies for electricity and natural gas were halved, while the price of electricity and natural gas for industrial and low-voltage consumers was increased more gradually (10% price increases at two set times). In July 2014, petrol and diesel prices went up by another 6%, leading to government savings of about 0.9% of GDP.[548] The IMF estimates that fossil fuel subsidies in Tunisia (pre-tax and foregone consumption tax revenue) were US$1.8 billion in 2013, and are forecast to fall to US$1.4 billion in 2015, linked to reform and falling oil prices.[549]

Turkey

While Turkey's energy use is still relatively low, demand is growing rapidly and is expected to continue to grow by 4.5% annually from 2015 to 2030.[550] As Turkey has limited domestic oil and gas reserves, it imports most of its oil and gas supplies. It relies on both domestically produced and imported coal for most of its electricity generation.[551]

Consumer subsidies to coal are provided through a programme that distributes a minimum of 500 kg of coal per low-income household, at a total value of more than US$280 million in 2013.[552] In addition, the OECD has identified tax exemptions for the transport and distribution of oil and gas; tax exemptions for LPG consumption; fuel-tax exemptions for domestic commercial aviation; and fuel-tax exemptions for vehicles used for national security. The total value of this support is unknown because of the lack of publicly available data. According to IISD estimates, Turkey provided producer and consumer subsidies worth at least US$730 million to the coal industry in 2013, of which the largest share was to hard coal enterprises via direct transfers from the Under-Secretariat of the Treasury.[553] In the recently published OECD inventory it is estimated that fossil fuel subsidies in Turkey had a combined value of US$911 million in 2014.[554]

Additional subsidies that are difficult to quantify include investment guarantees provided to coal power plants, guaranteed prices and purchases of electricity, exemptions from environmental regulations, and the New Investment Incentive Scheme, which is a broad investment subsidisation programme to boost regional development, and covers various industrial sectors including coal. An ODI study estimated that subsidies for fossil fuel exploration cost between US$516 million and US$524 million a year, of which the largest share is direct support to the state-owned oil and gas company, Turkish Petroleum Organisation (TPAO).[555]

While the stated aims of Turkey's subsidies for fossil fuels have included supporting low-income households and promoting economic development and energy security, the government initiated reforms of petroleum consumption subsidies as early as 1989 in order to improve the country's fiscal position, reduce inefficiencies in the oil and gas sector, and meet the preconditions for EU membership.[556] In 2003, in accordance with EU legislation, the Petroleum Market Law established an independent agency to regulate the oil and gas sector and launched the privatisation of SOEs in the sector. Full liberalisation of petrol and diesel prices was achieved in 2005, and because of the high excise taxes their prices are now among the highest in the OECD (see Figure 2). In 2008 Turkey moved to a cost-based pricing mechanism for electricity, leading to price increases of around 50%.

The successful price liberalisation has been attributed to improving economic conditions in Turkey, strong pre-existing social safety programmes, wide support and commitment to reform because of EU accession ambitions and the establishment of the independent regulatory authority, which ensured that reforms could not easily be reversed.[557] In addition, a number of complementary measures included the distribution of efficient light bulbs to regions with high electricity theft rates, tax exemptions for LPG consumption and for public transport and a rebate for diesel used in agriculture.[558] The tax exemptions and rebates are also subsidies, which are used to mitigate the impact of price liberalisation on certain groups.

The consumption and production subsidies that have been maintained in Turkey largely benefit coal mining and coal-fired power generation as well as pushing up imports of hard coal. Moreover, while Turkey's past efforts to reform consumer subsidies have largely been considered a success, the current government has made a commitment to expand fossil fuel exploration and production activities. It declared 2012 the 'year of coal' and set the goal of using all coal resources by 2023 and expanded its coal exploration programme, which has increased estimated coal resources by more than 50% since 2005. As domestic resources are almost exclusively lignite while most of the country's power stations use hard coal, a shift towards domestic production will also require the construction of power stations designed to use lignite. In 2013, the Turkish Petroleum Law was also amended to "enable expedient, continuous and effective exploration, development and production of petroleum resources".[559] These expansion programmes could lead to the parallel expansion of fossil fuel subsidies in Turkey, particularly for coal.

At the time of publication it remained to be seen if Turkey would take the opportunity to make progress on wider subsidy reform since it holds G20 presidency in 2015, and one priority is the G20 commitment to phase out inefficient subsidies for fossil fuels. Should the Turkish government decide to take on coal subsidies it should anticipate the consequences for employees in the coal sector and if necessary design compensation packages since the coal industry remains an important employer in many parts of the country.[560]

United Arab Emirates (UAE)

Since 1971, the UAE has been a federation of seven emirates, governed by absolute monarchs who form a General Supreme Council, and include Abu Dhabi, Ajman, AL Fujayrah, Dubai, Ras al Khaymah, Sharjah and Umm al Qaywayn. The UAE is one of the tenth-largest oil and gas producers and it holds the seventh-largest proven oil reserves worldwide. It is a major oil exporter.[561] Oil and gas revenues account for about 80% of government revenues, but the UAE is also diversifying its economy through trade and tourism.[562] The UAE has one of the world's highest rates of petroleum consumption per capita. It has succeeded in shifting almost all power consumption to gas but is increasing gas imports because domestic production of natural gas has not kept pace with demand.[563]

Fossil fuel subsidies are particularly large in the Middle East and North Africa (MENA) region, accounting for half of global subsidies to consumption. In 2013 oil exporters in the region were provided subsidies worth US$204 billion, compared to US$33 billion worth of subsidies that were provided by oil importers.[564] The subsidies are regarded as a way to redistribute the region's sovereign wealth, support industrial development and make the region more attractive for investments.

The IMF estimates that fossil fuel subsidies in the UAE (pre-tax and foregone consumption tax revenue) were US$22 billion in 2013, and are forecast to fall to US$16 billion in 2015.[565] Despite the UAE's large subsidies to fuels (petrol, diesel, kerosene and LPG), it has the highest petrol prices in the Gulf. This has led to the smuggling of petroleum products from neighbouring Oman and Saudi Arabia, where petrol prices are much cheaper.

The UAE is one of the few countries in the Gulf region that has attempted gradually to increase electricity and fuel prices with the aim of curbing the strong growth in the consumption of electricity and petrol and diesel for transport and reducing dependence on subsidies.[566] In 2010, the price of petrol across the UAE was raised by 26% to a still low of US$0.47 per litre, and this price has increased to US$0.53 per litre as of September 2015 (Figure 38),[567] and in 2011 the emirate of Dubai increased electricity tariffs to address fiscal deficits, as part of a wider energy strategy to improve efficiency. More recently, as the low oil price is projected to push the UAE's budget into a deficit of 2.3% in 2015, the emirate of Abu Dhabi raised electricity prices to curb growing consumption, and representatives from Dubai recommended that the energy ministry cut the country's petrol subsidies by 20%.[568, 569] On 22 July 2015 the UAE announced additional reforms on fuel subsidies, with the aim of ending major subsidies for petroleum.[570] Rather than referring to fiscal considerations, the reforms were justified on environmental and economic development grounds as the cuts are expected to reduce consumption and encourage the use of public transport and fuel-efficient vehicles. From 1 August 2015, petrol and diesel prices are set by the newly established government Gasoline and Diesel Prices Committee, based on international benchmark prices and operating costs, although the details of the pricing formula are not yet available. As a result of the first price adjustments, the price of petrol rose by 24%, and the price of diesel fell by 29%.[571] Meanwhile, the neighbouring Gulf States that are also grappling with financial pressures as a result of the low price of oil, are closely monitoring the implementation and public perception of the subsidy reforms in the UAE. This suggests that if successful, the UAE's experience may serve as a model for further subsidy cuts in other countries in the region.[572] Oman and Bahrain reduced natural gas subsidies for industrial users early in 2015. In Kuwait, the price of diesel and kerosene went up in January 2015, but these price increases were partially reversed after criticism by some members of parliament.[573]

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ABOUT THE NEW CLIMATE ECONOMY

The Global Commission on the Economy and Climate, and its flagship project The New Climate Economy, were set up to help governments, businesses and society make better-informed decisions on how to achieve economic prosperity and development while also addressing climate change.

In September 2014, the Commission published *Better Growth, Better Climate: The New Climate Economy Report*. Since then, the project has released a series of country reports on the United States, China, India and Ethiopia, and sector reports on cities, land use, energy and finance. In July 2015, the Commission published *Seizing the Global Opportunity: Partnerships for Better Growth and a Better Climate*. It has disseminated its messages by engaging with heads of governments, finance ministers, business leaders and other key economic decision-makers in over 30 countries around the world.

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