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The World Bank

“Joint report by IEA, OPEC, OECD and World Bank on fossil-fuel and other energy subsidies: An update of the G20 Pittsburgh and Toronto Commitments”

Prepared for the G20 Meeting of Finance Ministers and Central Bank Governors (Paris, 14-15 October 2011) and the G20 Summit (Cannes, 3-4 November 2011)

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When G20 Leaders met on 24-25 September 2009 in Pittsburgh, USA, they committed to “rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption”, while recognising “the importance of providing those in need with essential energy services, including through the use of targeted cash transfers and other appropriate mechanisms”. They called on all countries to “adopt policies that will phase out such subsidies worldwide”. They also asked the IEA, OPEC, OECD, and World Bank to provide an analysis of the scope of energy subsidies, and suggestions for the implementation of this initiative. A first joint report by these Organisations was presented to the G20 Leader Summit in Toronto in June 2010 (IEA et al., 2010).

Referring to the Pittsburgh and Toronto commitments, the G20 Leaders reaffirmed at their Summit in Seoul in November 2010 their “commitment to rationalize and phase-out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption, with timing based on national circumstances, while providing targeted support for the poorest.” Furthermore, they asked the IEA, World Bank and OECD together with OPEC to “further assess and review the progress made in implementing the Pittsburgh and Toronto commitments and report back to the 2011 Summit in France.”

This joint report responds to this request. Its first section reports the latest data from the OECD, the IEA and OPEC on fossil-fuel and other energy support measures. The data that is provided and the countries that have been reviewed in the report are not necessarily representative of the G20 countries, and it is likely that some of the support measures discussed are beyond the scope of the commitment of G20 countries to address inefficient fossil-fuel subsidies that encourage wasteful consumption. Accordingly, the analyses presented here do not aim to specify which measures are “inefficient fossil fuel subsidies that encourage wasteful consumption”, for which no common definition has been established by the G20 countries. Instead, they provide important background information to assist in the process of identifying such measures and designing appropriate reforms.¹ Furthermore, the support estimates established by the IEA and OECD are complementary, in that they use two different approaches, which provide distinct but complementary information, and they generally cover different countries or different types of support. They were established using different estimation methods; the specific estimation methods are indicated in the text below, with further details provided in the background documents listed in the References. The second section of this report highlights lessons learned from country experiences on how to implement fossil fuel subsidy reform while protecting the poor and most vulnerable, drawing on case studies and analysis from the World Bank, OPEC and the OECD.

A number of background reports were developed that support the analysis in this joint report. The World Bank developed a report which highlights case studies from a representative sample of 20 developing countries describing the trends over time in energy subsidies, fossil fuel prices and electricity tariffs and household survey evidence on the distributional impact of subsidies and their removal (World Bank, 2011 forthcoming). The OECD has developed an Inventory of estimated budgetary support and tax expenditures for fossil fuels (OECD, 2011a).

This report has been developed jointly by the IEA, OPEC, OECD and World Bank.

¹ The first Joint Report outlined a decision tree, developed by the World Bank, based on a Social Cost Benefit Analysis that could provide a sound starting point to identify those energy subsidies that are inefficient and encourage wasteful consumption (IEA et al., 2010).

1. Trends in support to fossil-fuel and other energy sources

Since our first joint report to the G20, new work has been undertaken to identify and quantify policy measures that support production and consumption of fossil fuels and other energy sources for a broad range of countries. This section presents time series data of support to fossil fuel production and consumption in OECD countries, collated by the OECD from the published budgets and other government documents of these countries. It also presents the latest 2010 data on fossil-fuel consumer support, mainly in emerging and developing economies, estimated by the IEA using the price-gap approach, as well as assessing the economic, social and environmental impacts of fossil fuel subsidy reform. Updated data on subsidies to non-fossil fuel energy are also presented, as calculated using estimates for financial support and support for research and development (R&D) on a per energy unit base from a broad range of published analysis and data as compiled by the Global Subsidies Initiative (GSI). Estimating support to energy is not always straight-forward, and any approach to providing such estimates will have limitations. Some of these are briefly highlighted in the text below, and a more detailed discussion can be found in the 2010 joint report by the IEA, OPEC, the OECD and the World Bank.

1.1 Fossil-fuel producer and consumer support in OECD countries

For the first time ever, the OECD has developed an inventory of the various mechanisms that support fossil-fuel production or consumption in 24 OECD countries (of which 10 are G20 countries).² Given the wide range of policies deployed in OECD countries, the inventory uses a broad concept of support that encompasses policies that provide a benefit or preference for fossil-fuel production or consumption, either in absolute terms or relative to other activities or products. The fossil-fuel support policies that governments use include direct subsidies, intervention in markets in ways that affect costs or prices, assumption of a part of companies' financial risks, tax reductions or exemptions, and under-charging for the use of government-supplied goods, services or assets. Many of the mechanisms that support fossil-fuel production or use in developed countries are particularly difficult to identify and estimate. The data in the OECD inventory were sourced from official government documents and web sites, complemented by information provided directly by government agencies themselves, and were estimated using benchmarks and valuations from the respective governments. It includes a small sampling of support provided by states, provinces or *Länder* in federal systems. Where governments do not provide such information, the allocation of support across particular fuels has been estimated by the OECD based on relative production or consumption levels. The inventory has been organized using the OECD's Producer and Consumer Support Estimate (PSE and CSE) organising framework, which is used for reporting government support in a number of other sectors, including agriculture.

Over 250 individual mechanisms that effectively support fossil-fuel production or consumption in the 24 OECD countries were identified in the inventory. These are estimated to have an aggregate value in the order of USD 45-75 billion per year over the 2005-2010 period (OECD, 2011a). Caution is required in interpreting the support amounts and in aggregating them.³ This is particularly true as the majority of

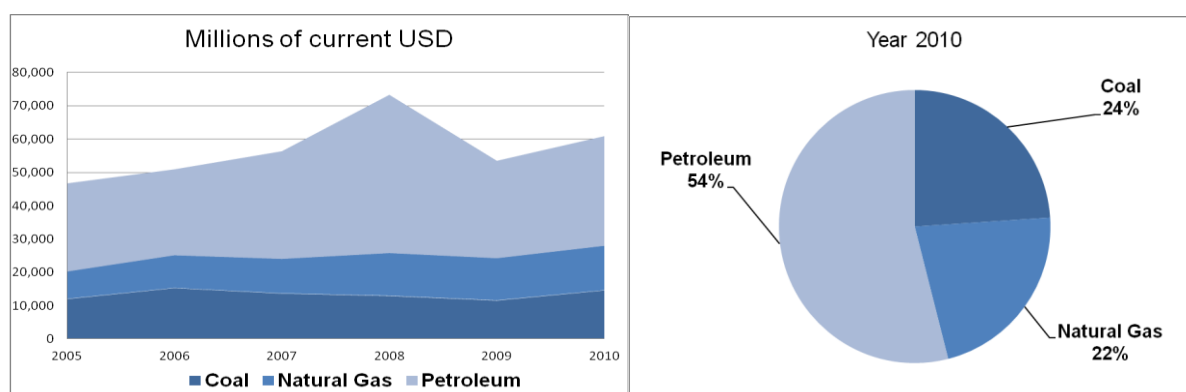
² Australia, Belgium, Canada, Chile, France, Germany, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Turkey, the UK, and the United States. Inventories for the other 10 OECD countries will be developed in the near future. While the G20 Leaders' commitment focuses on "inefficient fossil fuel subsidies that encourage wasteful consumption", this OECD inventory takes stock of the broader range of mechanisms that may support fossil fuel production or use. This Inventory marks an important step for the OECD, but further analysis would be needed to determine the impacts of the different mechanisms in G20 countries in order to determine which may be inefficient subsidies that encourage wasteful consumption.

³ The aggregates are arithmetic totals which do not take into account potential interactions that could affect the financial impact if multiple measures in a country were to be eliminated concurrently. See OECD (2011), *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels* for more information.

support mechanisms identified in the current inventory are tax expenditures. Since the value of tax relief is measured with reference to a benchmark tax treatment that is generally specific to a given country, and countries use different methods to measure the extent of tax relief, the amounts measure support within the context of a particular tax system and are not generally comparable across countries. In addition, due to time and resource constraints, no quantification was attempted of the transfers associated with government-mediated credit programmes (e.g., loans and loan guarantees).

As indicated in Figure 1, in absolute terms, petroleum products (*i.e.* crude oil and its derivative products) have generally been the prime beneficiaries of the fossil-fuel support measures listed in the inventory. This may reflect the larger share of oil than other fossil fuels in total primary energy supply. The peak indicated in 2008 of USD 73 billion was driven partly by transfers via Mexico’s Petroleum Revenue Stabilisation Fund (FEIP) which is linked directly to world crude-oil prices, which averaged about USD 100 per barrel in 2008 (WTI, spot prices). This can be seen in the decomposition of the total OECD estimate, which attributes the peak to consumer measures and to petroleum products (see Figures 1 and 2).

Figure 1. Support to fossil fuels in OECD countries by type of fuel



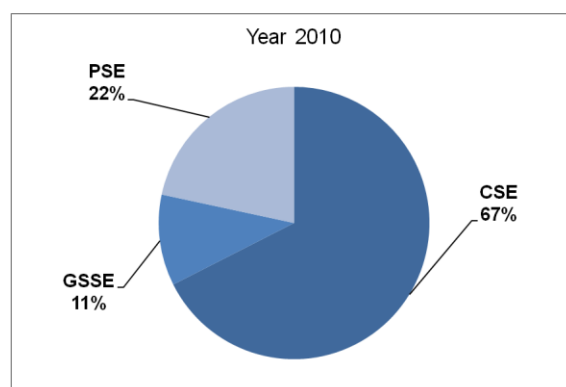
Note: This graph is based on an arithmetic sum of the individual support measures identified for a sample of 21 OECD countries, i.e. the 24 OECD countries included in the inventory net of those countries for which estimates have not been collected yet (Chile, Iceland and Luxembourg). It includes the value of tax relief measured under each jurisdiction’s benchmark tax treatment. The estimates do not take into account interactions that may occur if multiple measures were to be removed at the same time.

Data source: OECD (2011a).

In terms of recipients of the fossil-fuel support in OECD countries, Figure 2 indicates that consumers have attracted a larger share of support than producers. However, these estimates do not take into account ultimate incidence nor the behavioural responses of economic agents to the measures considered.⁴

⁴ As discussed above, the set of measures that underlie the trends comprise a wide array of budgetary support and tax provisions, the effects of which are uncertain and hard to gauge.

Figure 2. Support to fossil fuels in OECD countries by type of support



Notes:

- PSE = Producer Support Estimate; CSE = Consumer Support Estimate; GSSE = General Services Support Estimate. See OECD Secretariat (May 2010) for more information.

- This graph is based on an arithmetic sum of the individual support measures identified for sample of 21 OECD countries, *i.e.* the 24 OECD countries included in the inventory net of those countries for which estimates have not been collected yet (Chile, Iceland and Luxembourg). It includes the value of tax relief measured under each jurisdiction's benchmark tax treatment. The estimates do not take into account interactions that may occur if multiple measures were to be removed at the same time.

Data source: OECD (2011a)

1.2 Fossil-fuel consumer support in emerging and developing economies

Using the price-gap approach, which compares average end-use prices with reference prices that correspond to the cost of supply (based on international benchmarks), the IEA has identified 37 economies that subsidise fossil-fuel consumption; collectively, this group accounted for more than half of global fossil-fuel consumption in 2010 and includes all of the biggest subsidisers in the world.⁵ Fossil-fuel consumption subsidies in these economies are estimated to have totalled USD 409 billion in 2010 – almost USD 110 billion higher than in 2009 (Figure 3). Volatile international energy prices largely explain the differences in subsidy estimates from year to year; higher international prices in 2010 negated or reversed the reductions in subsidies in some economies that would have occurred from pricing reform had international market prices not risen. While measuring consumption subsidies through the identification of price-gaps is a common method that has been established in subsidy accounting for many years, and applied to many sectors, like any accounting method it has certain limitations.⁶ The estimates do not include subsidies specifically provided to extend access to basic energy services.

According to the IEA estimates, oil products attracted the largest subsidies, totalling USD 193 billion (or 47% of the total), followed by natural gas at USD 91 billion. Fossil-fuel subsidies resulting from the underpricing of electricity were also significant, reaching USD 122 billion. Subsidies to coal end-use consumption were comparatively small, at USD 3 billion. For the economies surveyed, in 2010 fossil fuels were subsidised at a weighted-average rate of 23%, meaning that consumers paid roughly 77% of

⁵ An alternate approach to quantifying subsidies could rely on budgetary estimates provided by the governments of the economies that subsidise fossil fuels. While this could give more precise estimates of actual expenditures on subsidies in individual economies, it was not adopted in this analysis for several reasons, including (i) only a small proportion of economies included in the IEA's survey provide detailed data for fuels covered by this analysis; (ii) measurements based on such data may not take into account the opportunity costs often associated with subsidies; and (iii) the need to maintain a consistent methodology across economies.

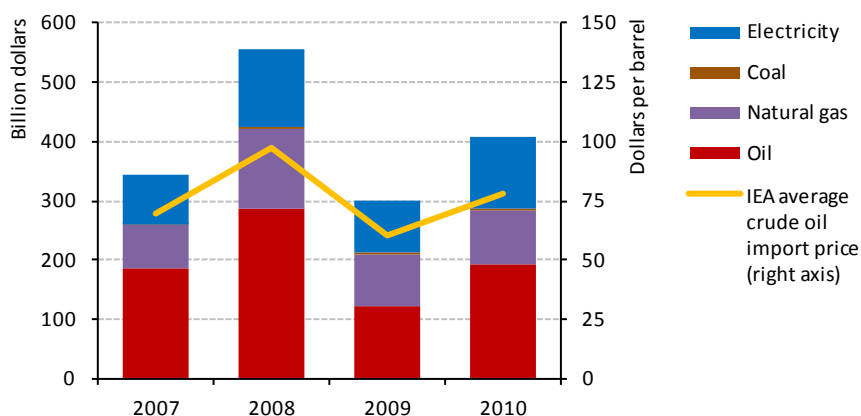
⁶ See IEA, OPEC, OECD and World Bank (2010), page 4 and Box 2.2 for more information.

competitive market reference prices for products. The rate of subsidisation was highest among oil and gas exporters in the Middle East, North Africa and Central Asia, many of which have a domestic price of fuels below those that would prevail in the international market. For countries well-endowed with fossil-fuel resources, this may reflect the lower production, transportation and other costs associated with local consumption. Furthermore, the local prices adjusted for purchasing power parity in some of these countries may be higher (relative to global benchmark prices). A number of countries that are well endowed with energy resources are of the opinion that the reference price in their markets should be based on their cost of production, rather than prices on international markets as applied within this analysis. The basis for this view typically is that these countries are using their natural resources in a way that effectively promotes their general economic development, and that this approach more than offsets the notional loss of value by selling the resource internally at a price below the international price. The counter-argument is that such an approach results in an economically inefficient allocation of resources and reduces economic growth in the longer term.

Modern energy services are crucial to a country’s economic development, yet the IEA estimates that over 1.3 billion people are still without access to electricity and 2.7 billion people are without clean cooking facilities. One common justification for consumption subsidies is that they help the poor gain or maintain access to basic energy services that improve living standards. But, in practice, the poor only capture a small share of all the subsidies to fossil fuels. Based on IEA analysis, out of the USD 409 billion spent on fossil-fuel consumption subsidies in 2010, only USD 35 billion, or 8% of the total, reached the poorest income quintile (the bottom 20%). Nonetheless, subsidy reform programmes need to be carefully designed as low-income households are likely to be disproportionately affected by their removal.

In recent years, a growing number of countries have realised or are pushing forward with reforms, in particular reforms to inefficient fossil-fuel subsidies that encourage wasteful consumption. Two drivers underpin this trend: first, ongoing efforts to implement the commitments made by G20 and APEC leaders to phase-out and rationalise inefficient fossil-fuel subsidies and, second, high international energy prices that make subsidies a growing economic liability in some countries. Of the economies identified by the IEA as having fossil-fuel consumption subsidies under the price-gap approach, almost half had either implemented fossil-fuel subsidy reforms or announced related plans since the beginning of 2010. A number of OECD countries have also taken steps or are examining options to reform support provided to fossil fuels, including to coal production, oil and gas production, and the taxation of fossil-fuel consumption.

Figure 3. Economic value of fossil-fuel consumption subsidies by fuel



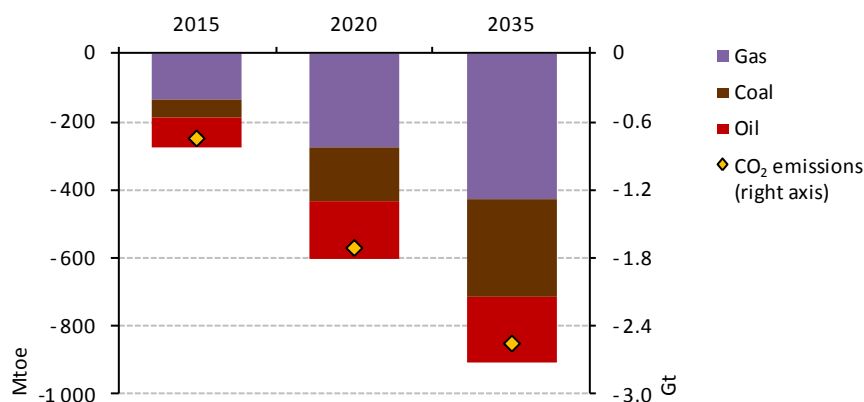
Note: Electricity subsidies include only those resulting from under-pricing of fossil fuels consumed in power generation.
Source: IEA (2011, forthcoming)

1.3 The potential economic, social and environmental consequences of further fossil-fuel subsidy reform

Inefficient fossil fuel subsidies that encourage wasteful consumption are economically costly to taxpayers, can damage the environment through increased emissions of greenhouse gases and other air pollutants, and by distorting the energy mix. Several studies have also found that subsidies to fossil-fuel use tend to benefit high-income households more than the poor, due to the former’s higher per capita consumption levels (World Bank IEG, 2008). According to the IEG study, the bottom 40% of the population in terms of income distribution received only 15-20% of the fuel subsidies in developing countries. However, a reform of inefficient fossil-fuel subsidies that encourage wasteful consumption may require some safety net to protect low-income households and other vulnerable populations that would otherwise benefit from such measures.

Based on IEA modelling using subsidy estimates based on the price-gap approach, relative to a baseline in which subsidy levels remain unchanged, if fossil-fuel consumption subsidies in the economies captured by the IEA survey were completely phased-out by 2020, the energy and emissions savings realised in 2020 would be significant: global primary energy demand would be cut by 4.1% and CO₂ emissions by 4.7% (Figure 4). Similarly, using the OECD ENV-Linkages global general equilibrium model and IEA data on consumer subsidies, OECD analysis finds that phasing-out fossil-fuel consumption subsidies in the economies captured by the IEA survey (based on the IEA subsidy estimates) could lead to about a 6% reduction in global greenhouse gas emissions in 2050 compared with a business-as-usual scenario. However, different results may emerge when other models or subsidy estimates are used. Recent efforts to reform and phase-out fossil-fuel subsidies, including the efforts undertaken by a number of G20 countries, have already had an impact. New modelling-based analysis by the OECD suggests that, compared with the projections from just a few years ago, GHG emissions from 2020 to 2050 could be about 3-4% less as a result of the reductions in fossil-fuel subsidies that have taken place in recent years. While phasing-out inefficient fossil-fuel subsidies that encourage wasteful consumption could be a contribution to reducing greenhouse gas emissions, the provisions of the United Nations Framework Convention on Climate Change (UNFCCC), in particular the principles of equity, and common but differentiated responsibilities and respective capabilities in terms of climate change action, should be borne in mind when considering climate change mitigation approaches. When undertaking reforms, it is important to ensure that the full economic value and costs of all energy sources are fully reflected in their prices, including their social and economic effects, in order to ensure a level playing field.

Figure 4. Impact of fossil-fuel consumption subsidy phase-out on global energy demand and CO₂ emissions, 2012-2035



Note: Savings from the progressive phase-out of all subsidies by 2020 compared with a baseline in which subsidy rates remain unchanged.
Source: IEA (2011, forthcoming)

According to the OECD analysis, in most cases, countries reforming fossil fuel consumer subsidies would realise a net economic benefit, measured both in terms of GDP impacts and real-income effects, from removing their consumer subsidies. For some oil-exporting countries, these economic benefits would be offset by trade impacts if other countries also removed their subsidies and thus reduced their demand for fossil-fuel imports, which may result in potentially significant income losses for energy-exporting countries.

On the other hand, without further subsidy reform, the IEA estimates that fossil-fuel consumer subsidies in the economies captured by the IEA survey would reach USD 660 billion in 2020, or 0.7% percent of global GDP, when comparing local prices to international benchmarks. Price controls that prevent the full cost of energy supply from being passed through to end users can result in a heavy burden on public finances at the expense of other priorities competing for government spending, such as education, healthcare and physical infrastructure. This observation also applies for subsidies to other forms of energy, including nuclear power, biofuels and renewables. This effect can be acute for economies that import energy at world prices and fund energy subsidies directly from their budget.

Curbing the growth in energy demand via subsidy reform would have several important energy-security implications. In net importing countries, lower energy demand would reduce import dependence and consequently also spending on imports. For net exporting countries well-endowed in fossil fuel resources, removing subsidies would boost export capacity and earnings for energy related products, but potentially significant negative impacts on non-energy sectors would need to be considered.

Research from OPEC has shown that, when phasing-out energy subsidies, the GDP effect on OPEC Member Countries would be an annual average of minus 3.4 percentage points for the first five years. The quantification of the economic impact of removing fuel price subsidies was conducted through the Oxford Global Macro Model. The actual level of expenditure on fossil fuels was estimated using IEA data for 2009 on average subsidy rates as a proportion of the full cost of supply. For these simulations, it was assumed that the subsidy would be removed gradually over a five-year horizon. It was further assumed that, on average, 60% of the value of the fuel subsidy would be recycled back into the economy through government transfers, while the rest would be used to reduce budget imbalances.

The negative GDP effect for OPEC countries in this scenario is primarily triggered by a significant increase in inflation, which negatively affects the competitiveness of the manufacturing sector as it lifts input prices for the non-oil sector and puts pressure on real income and consumption levels. The average consumer price index for OPEC Member Countries would rise by 4.4 percentage points compared with the baseline assumptions. A major impact of this would be a significant loss of jobs. Employment would decline by 2.3 percentage points compared with the baseline assumptions.

These findings illustrate some of the challenges and sensitivities involved in phasing-out energy subsidies. Phasing-out consumer subsidies usually means raising prices. Those countries that decide to phase-out subsidies may face challenges in implementing reform, and the reforms may lead to some restructuring of the economy that will need to be carefully managed. Therefore, any reform has to be carefully designed and will need considerable time – Section 2 below provides some guidance, based on country experiences, on how to implement fossil fuel subsidy reform. No one-size-fits-all model exists.

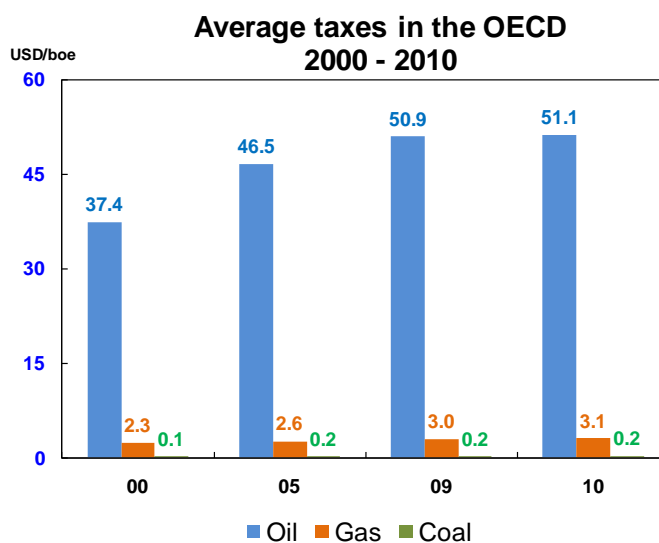
1.4 Fossil-fuel taxation in OECD countries

OECD countries raised USD 482 billion in revenue from taxes levied on energy products in 2009.⁷ These revenues were stable in nominal terms between 2007 and 2009 – reflecting a modest decrease in real terms – thanks in large part to reduced sales of motor-vehicle fuels. The motivations behind the taxes on fossil fuels vary across countries, and can vary over time within a given country. In some cases, the taxes are partially intended to internalise environmental externalities related to fossil-fuel use. Sometimes, the revenues from the taxes are earmarked for road building or maintenance. In other cases, the only publicly stated motivation is to raise revenues.

Based on energy demand, price and tax data published by the IEA, OPEC estimates that, between 2005 and 2010, around USD 850 billion were raised annually by OECD countries through taxes on petroleum products, including goods and services taxes and value added taxes (VAT).⁸ This compares with an estimate of USD 800 billion in the years between 2004 and 2009, as reported in the June 2010 Joint Report (IEA et al., 2010). This increase is mainly due to yearly rise in demand in the years 2005 and 2010 and demand revisions for the affected years, both lifting VAT assumptions.⁹

Based on IEA and OECD data, tax revenues are relatively highest for oil-related products, followed by natural gas and coal. In 2010, the average amount of taxes in OECD countries for oil stood at USD 51.1/barrel of oil equivalent (boe); for gas it was USD 3.1/boe and for coal it was USD 0.2/boe (Figure 5).

Figure 5. Average taxes levied on fossil fuels in OECD countries, including goods and services taxes and VAT, 2000 – 2010



Source: OPEC Database

⁷ This number is based on revenues from energy taxes reported by all OECD countries. It includes revenues from taxes on electricity, some of which is generated using nuclear and renewable energy, and not exclusively fossil fuels. The number does not include general sales taxes and VAT. Those taxes generally have only a modest impact on energy use.

⁸ This number is based on revenues from excise taxes reported by the OECD, combined with a VAT estimate based on total consumption in the OECD that is not considering tax deductions, credits or exemptions.

⁹ Applying the revised demand data to the 2004 and 2009 yearly average, the number that has been reported in the June 2010 Joint Report would move to around USD 820 billion.

1.5 Recent trends in support to non-fossil fuel energy

Subsidies to renewable-energy has expanded considerably in recent years with the accelerating pace of renewable-energy installations, as governments have sought to expand and diversify energy supply, reduce local pollution and avoid emissions of climate-change-inducing greenhouse gases. Subsidy schemes have also been widely promoted as part of economic recovery packages aimed at stimulating green industries and creating jobs. By enabling deployment and faster learning, subsidy schemes for renewables are intended to lower the cost of renewable-energy technologies, thereby improving their competitiveness relative to conventional alternatives in the future.

The Global Subsidies Initiative (GSI) has estimated subsidies to non-fossil fuel energy based on a broad range of publicly available estimates. These are compiled from publicly available estimates of subsidies to fossil and non-fossil energy. The estimates presented are not directly comparable due to a range of factors, including differences in subsidy definitions used, the estimation methods used, the geographical scope, and the time period under consideration. The data provided should be considered as giving an indicative estimate of broad trends with no claim being made for completeness. Based on these estimates, the GSI found that in 2009 rates of subsidisation for non-fossil fuel energies remained at relatively high levels compared with fossil fuels and continued to be provided mainly by OECD countries. The OECD countries are currently responsible for 83% of the world's nuclear and renewable-energy-based electricity generation, according to the U.S. Energy Information Administration, and two-thirds of biofuel production (Table 1). Based on GSI estimates, non-fossil fuel energy sources and biofuels are subsidised at an average rate that is higher than for fossil fuels. The per unit subsidies to nuclear and renewable energy are up to 11.6 US cents per kilowatt hour (kWh) and 15.4 US cents per kWh respectively, compared with up to 0.7 US cents per kWh for fossil fuels. For transportation, biofuels receive a subsidy of 3.3 US cents per kWh compared with 0.5 US cents per kWh for oil-related products.

Table 1. Estimates of subsidies to different energy types

Energy type	Energy produced (2009)	OECD Share of production (2009)	Subsidies per energy unit US cents/KWh (2009)
Nuclear energy	2,600 TWh electricity	83%	0.5-11.6
Renewable energy (excluding hydropower)	500 TWh electricity	83%	1.7-15.4
Fossil Fuels to electricity	12,900 TWh electricity		0.1-0.7
Biofuels to transport	51 Mtoe	66%	3.3
Oil products to transport	2,205,570 Ktoe		0.5

Source: Global Subsidies Initiative (2011): Subsidies and External Costs in Electric Power Generation; Global Subsidies Initiative (2011): Subsidies to liquid transport fuels.

2. Managing subsidy reform in the context of sustainable development

Energy subsidies are often used to alleviate energy poverty and promote economic development by enabling access to affordable modern energy services. In this regard, efforts to rationalise or phase-out inefficient energy subsidies that encourage wasteful consumption need to be based on a thorough cost-benefit analysis, and adverse impacts on the poor should be avoided or mitigated. At the same time, a number of energy subsidies are poorly targeted, with the result that they are costly to governments and taxpayers and may not be efficient in achieving their intended social goals. Sustainable development – and its three mutually-supportive pillars of economic growth, social progress and environmental protection – should be a guiding concept in undertaking subsidy reform.

2.1 Experience in developing countries

The World Bank has examined experiences with phasing-out energy subsidies using a representative sample of case studies in 20 developing countries, of which 5 are G20 countries. A number of criteria were used to identify four groups of countries, including the country's level of development (and consumption), developing country region, energy security and the fuel it subsidises (petroleum fuels, electricity, natural gas). The four groups of countries are referred to as Groups A to D. Group A and B consist of net importer countries with low and lower middle income and upper middle and high income respectively. Group C and D represent instead energy net exporters with low and lower middle income and upper middle and high income respectively.¹⁰

Phasing-out subsidies in these developing countries has led to some success in the reduction of direct budgetary subsidies (see Figure 6). For the sample of countries, the average energy subsidy recorded in the budget was reduced from 1.8% in 2004 to 1.3% of GDP in 2010. The reduction of subsidies is particularly remarkable for net energy importers (Group A and Group B).

Figure 6. Energy direct budgetary subsidies over time

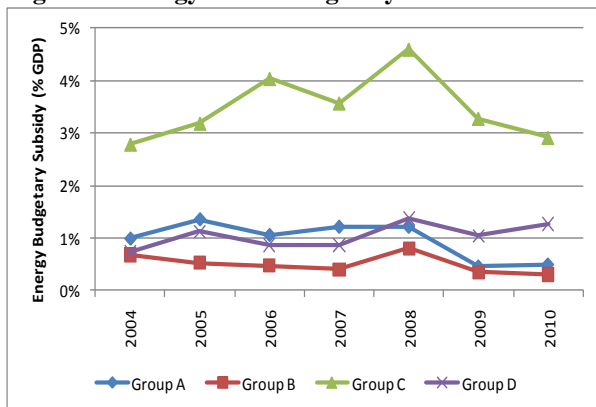
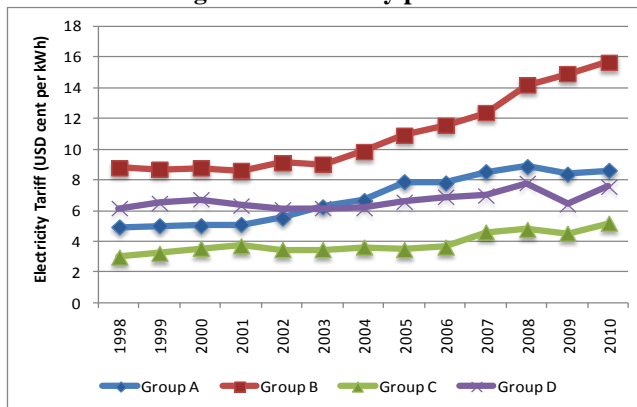


Figure 7. Electricity prices over time

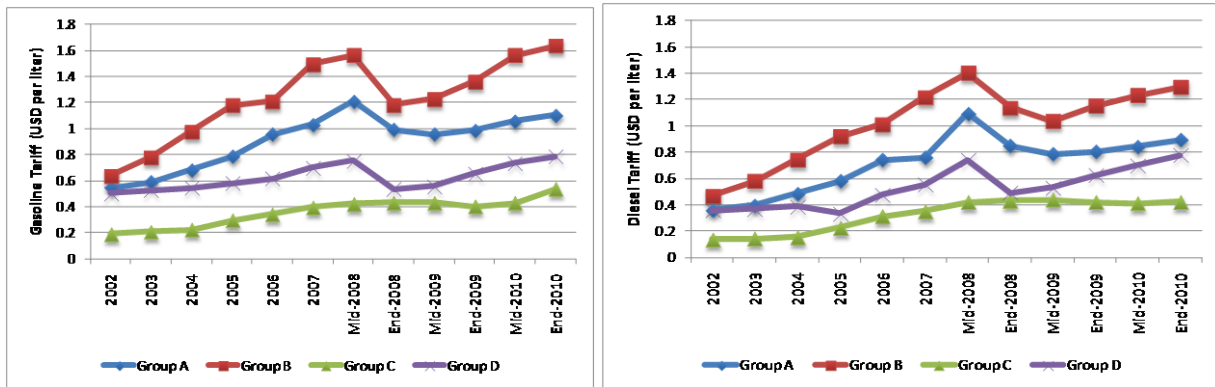


Source: World Bank (2011)

In their effort to phase-out energy subsidies, substantial increases in the end-user prices of gasoline and diesel have been recorded. In the 20 countries examined, gasoline prices more than doubled in nominal terms, from USD 0.5 per liter in 2002 to USD 1 in 2010. Diesel prices almost tripled, from USD 0.3 per liter to USD 0.8 per liter over the same period (Figure 8). Gasoline and diesel prices have consistently been higher for net energy importers (Group A and Group B). Such tariff increases compare rather favourably with the trends in developed countries, such as the US where gasoline prices increased from USD 0.4 per liter and in EU where for the countries charging the lowest prices (Romania for gasoline and Luxembourg for diesel prices) increased from around USD 0.6 per liter in 2002 to USD 1.4 per liter in 2010. Pass-through of international fuel prices was also notable in the case of electricity generated by fossil fuels. For the sample of countries, the average end-user electricity tariff increased by 50%, from USD 6 cents in 2002 to USD 9 cents per kWh in 2010 (see Figure 7).

¹⁰ The case studies included in Group A Armenia, Ghana, India, Jordan, Moldova, Morocco, Pakistan; in Group B Chile, Dominican Republic, Peru, Turkey; in Group C Azerbaijan, Egypt, Indonesia, Iran, Nigeria, Yemen; and in Group D Argentina, Malaysia, and Mexico. The case studies were supported by data collection related to direct budgetary subsidies, fuel and electricity tariffs, and household survey data, from official documents, complemented by information publicly available through the websites of the ministries and energy service providers.

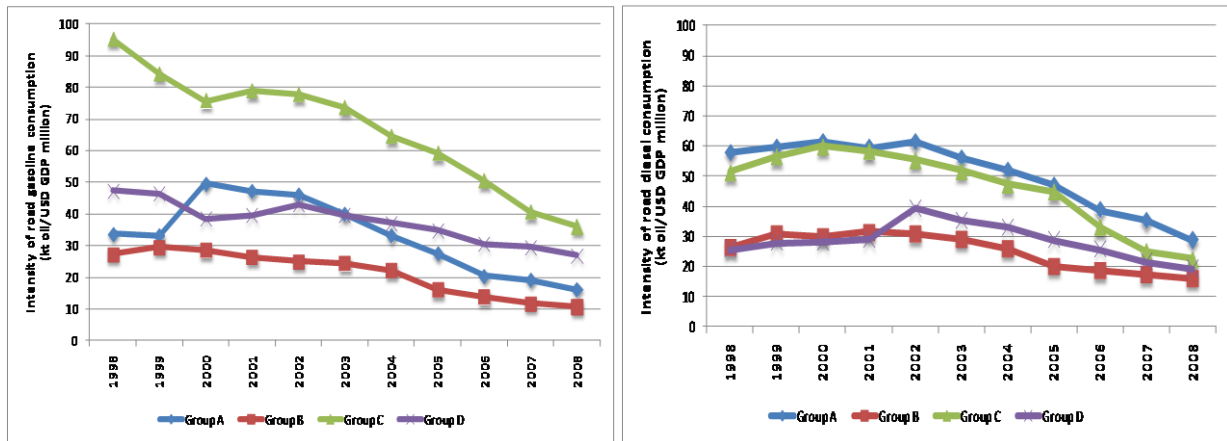
Figure 8. Fossil fuel prices over time



Source: World Bank (2011)

In spite of the relatively price inelastic demand for gasoline and diesel, fossil fuel consumption in the road sector (per unit of GDP) declined in the 20 countries examined from 53 (44) in 2002 to about 23 kt oil equivalent per million of GDP in 2008 in the case of gasoline (diesel). As shown in Fig. 9, however, the most notable decline in consumption was recorded in the low and lower middle income countries (Group A and C). This reflects the much higher rate of growth in GDP in this group of countries and underlines the opportunities to influence future consumption behaviour rather than modifying the existing consumption patterns, overcoming inertia and vested interests. Similar trends are recorded for power consumption.

Figure 9. Fossil fuel road consumption over time



Source: World Bank (2011)

2.2 Lessons learned

While there is no one-size-fits-all model for subsidy reform, there are some general lessons that can be learned from past experience, as is shown by a review of case studies by the World Bank, OPEC and the OECD. Three of the specific challenges facing developing countries are: (i) strengthening social safety nets and improving targeting mechanisms for subsidies; (ii) informing the public and implementing social policy or compensatory measures; and (iii) implementing the reform in the context of broader energy sector reform. Some of the lessons learned from the 20 case studies developed by the World Bank on these aspects are highlighted below.

- ***Strengthening social safety nets and improving the targeting mechanisms for subsidies***

Targeting mechanisms and methods for identifying those eligible for the subsidy program can vary, depending on the degree of coverage as well as the extent to which different subsidy programmes are progressive. In choosing between alternative policy tools, policy makers often face trade-offs between different objectives. In the case of lifeline tariffs, while they offer the advantage of much higher coverage than other existing targeted programs, they entail a relatively high cost of implementation. Moving from commonly-used Inverted Block Tariff (IBT) to Volume Differentiated Tariff (VDT) structures, where the lowest price for the lowest block is only available to the poor, can help to improve the targeting of electricity subsidies. Connection subsidies that are designed to reach a majority of the unserved population living in areas connected to the grid are superior to consumption subsidies, and in most cases are also progressive. Cash transfers and near-cash transfers (food stamps, etc.) have been found to be progressive in the great majority of cases studied. In contrast, consumption subsidies for electricity are generally regressive. However, the implementation of targeted transfers can be challenging. Their effectiveness and efficiency depend on the targeting method and administrative capacity (Komives et al., 2007).

- ***Informing the public and announcing one-off compensatory measures***

Governments need to ensure public trust in the reform agenda through effective communication, appropriate timing of subsidy removal, and implementation of compensatory social policies. Explaining the need for change and the policy measures that will be undertaken, before the changes are introduced, reduces uncertainty and can make the case for reform stronger. Planning careful communication strategies including media and public campaigns in order to reach out to the poor and those who will be most affected by the subsidy reform can help minimise public opposition to energy subsidy reforms.

While developing social safety nets is important to ensure that consumers can cope with higher prices in the long run, tariff and fuel-price increases may need to be accompanied by immediate short-term measures to address any acute impacts of subsidy reform.

- ***Reforming the energy sector***

Where the quality of electricity services is low, engaging in broader reforms to improve service ahead of reforming energy subsidies lends credibility and improves consumer willingness to pay the unsubsidised prices. Steps such as improving metering, billing and payment collection, and quality of service can make tariff increases more acceptable as subsidies are removed. Improving energy efficiency will also help to reduce the potential social costs of removing subsidies to consumers.

More generally, rationalising the fuel mix for electricity and transport, keeping an even playing field in the fuel mix, and facilitating the greater use of public transport can help support reforms, as will the prioritisation of structural expenses that benefit the poor (including sectoral road and rural electrification schemes, but also social expenditure, including health and education).

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