



**Asia-Pacific  
Economic Cooperation**

**Reforming Fossil-Fuel Subsidies to  
Reduce Waste and Limit CO<sub>2</sub> Emissions  
while Protecting the Poor**

**APEC Energy Working Group**

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Prepared by the Global Subsidies Initiative, IISD



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## Acronyms and Abbreviations

APEC	Asia-Pacific Economic Cooperation
ASCM	Agreement on Subsidies and Countervailing Measures
BCM	billion cubic meters
BLT	Bantuan Langsung Tunai
CCT	conditional cash transfer
CIF	cost, insurance and freight
CNE	National Energy Commission (Chile)
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide equivalent
CPI	Consumer Price Index
CSE	Consumer Support Estimate
ENAP	Empresa Nacional de Petróleo (Chile)
EPPO	Energy Policy and Planning Office (Thailand)
ETP	Electronic trading platform
EWG	Energy Working Group
FEPC	Fondo de Estabilización de Precios de Combustibles (Chile)
FEPP	Fondo de Estabilización de los Precios de Petróleo (Chile)
FOB	free on board
FTS	Federal Tariff Service (Russia)
GDP	Gross Domestic Product
GHG	greenhouse gas
GSI	Global Subsidies Initiative
Gt	gigatonnes
IEA	International Energy Agency
IEC	Specific Excise Tax
IEPS	Special Tax on Production and Services (Mexico)
IMF	International Monetary Fund
IPP	import parity price
IRP	intermediate reference guide
KL	kilolitre
Ktoe	kilotonnes of crude oil equivalent
LPG	liquefied petroleum gas
Mb/d	million barrels per day
MER	market exchange rate
MTCE	mega tonnes of coal equivalent
MTOE	million tons of oil equivalent
NDRC	National Development and Reform Commission (China)
NGO	non-governmental organization
NGV	national gas for vehicles
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
PLN	Perusahaan Listrik Negara
PSE	Producer Support Estimate
R&D	research and development
SIPCO	Sistema de Protección ante Variaciones de los Precios de Combustibles (Chile)
SME	small and medium enterprises
UGSS	Unified Gas Supply System
USGC	U.S. Gulf Coast
VAT	value-added tax
WTO	World Trade Organization



## Executive Summary

Asia-Pacific Economic Cooperation (APEC) economies are estimated to have spent at least US\$105 billion subsidizing fossil-fuel consumption in 2010 (International Energy Agency [IEA], 2011b). This estimate excludes consumption subsidies in developed members of APEC and subsidies for fossil-fuel production in all economies, which the Global Subsidies Initiative (GSI) estimates could be worth more than US\$100 billion per year worldwide (GSI, 2009a). Government expenditure on inefficient subsidies incentivizes fossil-fuel production and consumption, increasing energy demand and exacerbating harmful emissions, undermining APEC's sustainable green growth agenda. Some APEC economies are spending up to 2.8 per cent of national gross domestic product (GDP) or as much as US\$840 per capita, despite evidence that fossil-fuel subsidies tend to be regressive, with only around 8 per cent of the benefits reaching the poorest 20 per cent of the population (IEA, 2011a).

While the benefits of fossil-fuel subsidy reform for both national economies and the regional green growth agenda are increasingly being recognized, reform remains difficult to implement. Governments can face strong opposition from political parties trying to undermine government policies, stakeholders with vested interests in maintaining the subsidies and the general population, if they are not fully informed of the impacts of subsidies and the policy alternatives. Many practical and administrative challenges also abound, particularly those ensuring that poor and vulnerable groups within society are adequately protected from rising energy prices resulting from subsidy reform.

In November 2009 APEC Leaders (2009) agreed to "rationalise and phase out over the medium term fossil-fuel subsidies that encourage wasteful consumption, while recognising the importance of providing those in need with essential energy services." The APEC Secretariat commissioned the GSI to prepare this report as part of the Energy Working Group's (EWG) program to implement the APEC Leaders' commitment over the medium term.

This report can be read in three parts:

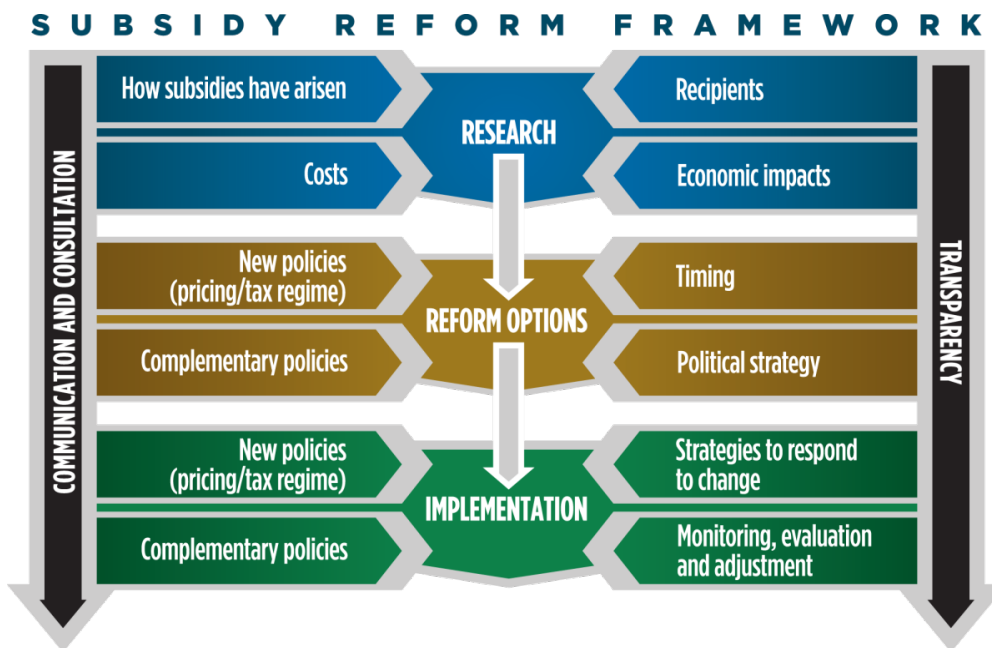
1. It draws on existing literature to provide an overview of the types and magnitude of fossil-fuel subsidies in APEC economies; their economic, environmental and social impacts; and issues raised by the private sector and political economy challenges (Sections 1-7).
2. It provides new case examples of reform efforts in seven APEC economies that illustrate key elements of a subsidy reform strategy and draw lessons that can be shared with other policy-makers (Section 9).
3. It outlines a framework for planning and implementing subsidy reform, along with policy options and suggestions for capacity building (Sections 8 and 10).

*It is not the objective of this report to evaluate whether the support measures identified within the literature (outlined in Section 1) are "inefficient" or "encourage wasteful consumption." This report does not distinguish between "good" and "bad" measures or those that are within the scope of the APEC commitment and those that are beyond, but instead provides an overview of all support measures the GSI assesses as being fossil-fuel subsidies. The purpose of this report is to provide an analytical framework to assist governments identify, measure and evaluate their support measures, with a view to implementing their commitment to phase-out inefficient fossil-fuel subsidies that encourage wasteful consumption. For this reason, the report does not make specific recommendations for reforming fossil-fuel subsidies in APEC economies.*



## Policy Options

The report bases its key policy options on the GSI's Subsidy Reform Framework (as illustrated in Figure ES1). The framework includes three phases: i) background research, ii) developing reform options and iii) implementation, with extensive communications and consultations throughout the process. The success of these reforms will depend on how fully each of these elements is included and developed within the strategy.



**FIGURE ES1: THE GSI'S SUBSIDY REFORM FRAMEWORK**

### Research

The first stage of research is *to identify which subsidies are being granted in the economy using a common reporting format*. A format for voluntary reporting has been agreed within the APEC EWG group for general adoption.

*Governments should use a step-by-step, "define, measure and evaluate" process<sup>1</sup> to identify the range of support provided for products or recipients, the total costs and what impacts the subsidies have in order to determine what reforms are necessary.*

Subsidy policies are often put in place with good intentions, aiming to correct a market failure or to redistribute wealth to those considered to be in need. Over time, subsidy schemes tend to expand, increasing coverage to non-intended recipients and "captured" by groups with vested interests. *Researching how subsidies being considered for reform have developed* is a necessary step in understanding the political economy. It also helps develop alternatives that could meet policy aims more efficiently. In practice, energy subsidies often turn out to be a blunt (i.e., inefficient)

<sup>1</sup> The "define, measure and evaluate" process is one description of a commonly accepted system of best practice in policy analysis. It is described, along with an extended World Trade Organization (WTO) definition of subsidies suitable for application to the energy sector, in the GSI policy brief *Defining Fossil-Fuel Subsidies for the G-20: Which Approach is Best?* (GSI, 2010a).



instrument for meeting policy aims. *Investigating whether other policy options could meet policy aims more efficiently prepares the ground for an open debate.*

*Understanding who needs support in society and who is benefitting from subsidy reform are prerequisites of a successful reform strategy.* The minimum requirement is to categorize society to the extent that complementary policies can be delivered. As an example, if we recognize that poor families need to be compensated, then there must be a common understanding of how to identify “poor” families and how to deliver alternative benefits to them.

*It is also essential to understand those who oppose subsidy reform and their concerns and demands.* This group is likely to include poor segments of society, but may also include a range of vested interests, with concerns and demands that may or may not be considered fully legitimate. *Generating a list of the potential opponents of reform and their positions, then engaging and consulting with them,* will minimize opposition.

**Capacity-building needs could include:**

- *Identifying methods to quantify subsidies and transparency, including in budget reporting.*
- *Strengthening the capacity of credible, independent research institutes to provide a range of data and analysis, for example, from household survey data on energy consumption patterns to computable general equilibrium modelling of the macroeconomic impacts of energy price adjustments.*
- *Developing new or improved systems for sharing information among government departments and with the public.*

## **Reform Options**

*Clearly defining the objectives of reform, the criteria against which success will be measured and a time frame for reform* are essential preliminary steps.

It is not necessary to reform all energy subsidies together. In general, gasoline subsidies are the most regressive (the highest percentage of their benefits accrues to the wealthier parts of society). They also tend to be where political resistance to reform is lowest. Diesel subsidies are less regressive, followed by liquefied petroleum gas (LPG) and finally by kerosene. *Reforming subsidies individually, starting with gasoline and moving down to those that are most important to the poor,* is a strategy worth considering.

*Instituting reforms when prices are falling and/or when inflation is falling is likely to represent a good opportunity,* but waiting until such circumstances arise may mean waiting for a considerable period of time. In the meantime, the losses from subsidies will increase and reform may become politically ever more difficult and economic dislocations ever higher.

*Identifying which complementary policies would compensate those affected, satisfy vested interests and be politically implementable* can considerably increase the chances of successful reform. Stating what complementary policies are needed is not sufficient; *detailed designs of these policies are needed,* so that they can be implemented once the political case for reform has been demonstrated. Among commonly considered complementary policies are: cash transfers (conditional and unconditional), pro-poor expenditure and increased budgets for essential services and infrastructure. *But subsidies may be dampening inflation or supporting industries considered strategic—complementary policies may be needed outside the social sphere.*





Although there are important local considerations for reform, **actively searching out and learning from the experiences of other countries yields many useful lessons**. Subsidy reform considerations and strategies exhibit many common elements among economies.

**Capacity-building needs could include:**

- *Establishing a central role within government for coordinating the reform strategy across all relevant ministries—including finance, energy, social welfare, and industry—and with subnational governments.*
- *Case studies of reform experience in other countries, and best-practice examples of reform plans, pricing regulations and compensation measures.*

### **Implementation**

**It is essential to plan for changed circumstances, particularly increases in international fuel prices.** Often subsidy policies are successfully implemented, but the country reverts to subsidization when fuel prices increase because there is no automatic correction mechanism. Ad hoc pricing **mechanisms require the investment of political capital each time a price increase is required; mechanisms that are linked to international price changes** should be a final aim.

Subsidy reform is not a precise process that can be predicted fully in advance. **Monitoring impacts, and adjusting the scheme in response to those impacts**, improves the chances of sustainable reforms.

**Capacity-building needs could include:**

- *Establishing independent institutes responsible for implementing new fuel pricing regulations and overseeing competition.*
- *Creating the administrative tools for implementing cash transfers or other compensation measures.*
- *Establishing monitoring systems, including, for example, complaint procedures for compensation schemes.*

### **Communications, Consultation and Transparency**

Transparency is beneficial to the public debate necessary for deciding how finances in general, and subsidies in particular, should be utilized. **Reform strategies should be fully transparent at all stages**, stating aims, circulating research findings, setting out the options, and discussing implementation proposals and progress.

**Wide consultation throughout the process** will also be beneficial in generating support. The private sector has a range of interests in subsidy reform. Some of these may be mixed; for example, oil companies and utilities may be simultaneously benefitting from and harmed by subsidies. Consulting with them will help clarify their concerns and needs, and what policy packages they support or oppose.

There are many examples where one ministry or department has presented a plan for reform when it has not been apparent that other ministries and departments are wholly behind the plan. The ministries of energy, finance, regional development, industry, environment, social welfare and foreign affairs are likely to be key government stakeholders.



*Government needs to develop and present a joint position on reform, across all key ministries and departments. Reform plans should not be communicated until government has developed an agreed internal position.*

*A communications strategy is needed to educate the general population about the impacts of energy subsidies and the government's plans to reform them.* High-profile spokespeople can help raise awareness through the media (print, television, radio and online); civil society organizations and networks; public seminars; and community meetings. Publications such as the GSI's series of Citizens' Guides<sup>2</sup> can raise awareness of the true costs and impacts of energy subsidies among civil society groups and provide them with the information needed to inform their own campaigns.

**Capacity-building needs could include:**

- *Developing and coordinating a joint communications campaign across ministries.*
- *Identifying high-profile spokespeople within politics, business, academia and society.*
- *Preparing a range of easy-to-read materials targeted for different audiences.*
- *Developing forums and platforms for consulting with a range of stakeholders, including industry and business groups, rural communities and civil society.*

<sup>2</sup> The GSI has developed a series called *Citizens' Guide to Energy Subsidies*, an easy-to-read overview of energy subsidies, their costs, recipients and impacts in several selected countries. The GSI has published guides for Indonesia, India, Nigeria and Bangladesh: [www.iisd.org/gsi/introductions-non-experts](http://www.iisd.org/gsi/introductions-non-experts)



## 1.0 *Types and Magnitudes of Subsidies for Fossil-Fuel Production and Consumption*

There are many different ways in which governments can subsidize the production and consumption of fossil fuels. Research and development (R&D) grants, tax relief, assumption of liabilities, low-interest loans, price regulations and compensation for oil companies' under-recoveries are just a few examples.

A basic distinction can be made between the subsidies provided for consumers and those provided for producers. Consumer subsidies usually stimulate energy consumption by individuals or industry. A common measure in this area is price controls that keep prices artificially low. There are also many types of tax-related measures targeted at specific fuels or user groups, including tax reductions, refunds, exemptions and credits. Governments also pay for equipment or technologies, such as cylinders for storing liquefied petroleum gas (LPG) or cleaner cooking stoves. Consumer subsidies, such as grants for home heating, or tax reductions on fuel purchases by farmers and fishermen, can be found in both developed and developing countries. Subsidies for the production of fossil-fuel resources, on the other hand, promote domestic exploration, extraction or refining (Laan, 2010).

There is more than one definition of subsidy: the International Energy Agency (IEA), the Organisation for Economic Co-operation and Development (OECD) and the World Trade Organization (WTO) have all adopted different definitions (see Box 1.1). G-20 members failed to agree on a common definition for the purposes of implementing their commitment and decided to let each national government adopt their own approach; likewise APEC economies have not attempted to agree on a common definition of subsidy. For the purposes of this report, the GSI uses the definition provided by WTO's Agreement on Subsidies and Countervailing Measures (ASCM). The GSI has applied the WTO's definition to the energy sector by developing an illustrative (albeit non-exhaustive) list of energy subsidies (see Table 1.1).<sup>3</sup>

### **BOX 1.1: DEFINITION OF SUBSIDY**

Two main definitions of energy subsidies are commonly used by the international community. The IEA uses an "effects test" to determine whether a subsidy exists: "any government action directed primarily at the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers" (IEA, 2010, p. 570).

The WTO's ASCM adopts a definition based on the policy instruments used to pass a subsidy to the recipient, which can be applied to any sector. Article 1 of the ASCM determines that a subsidy exists where:

1. Government provides direct transfer of funds or potential direct transfer of funds or liabilities
2. Revenue is foregone or not collected
3. Government provides goods or services or purchases goods
4. Government provides income or price support

The limitation of an effects-based definition, such as that used by the IEA, is that the effect can be the result of more than one government intervention. Adopting a definition that identifies individual subsidy policies gives a more accurate picture of what subsidies are in place and provides a foundation for analyzing how much they cost and what impacts they have.

Source: GSI (2010a)

<sup>3</sup> A more detailed discussion of the strengths and weaknesses of these definitions, and the GSI's approach, is included in the policy brief *Defining Fossil-Fuel Subsidies for the G-20: Which Approach is Best?* (GSI, 2010a).



**TABLE 1.1: NON-EXHAUSTIVE LIST OF ENERGY SUBSIDIES**

Direct and indirect transfer of funds and liabilities	Direct spending	<b>Earmarks:</b> special disbursements targeted at the sector
		<b>Agency appropriations and contracts:</b> targeted spending on the sector through government budgets
		<b>Research and development support:</b> funding for research and development programs
	Government ownership of energy-related enterprises	<b>Security-related enterprises:</b> <b>strategic petroleum reserve;</b> some Homeland Security Administration; securing foreign energy shipments or key assets.
		<b>Municipal utilities and public power:</b> significant public ownership of coal- and natural-gas-fired electricity stations; some transmission and distribution systems for both natural gas and electric power
	Credit support	<b>Government loans and loan guarantees:</b> market or below-market lending to energy-related enterprises, or to energy-intensive enterprises, such as primary metals industries
		<b>Subsidized credit to domestic infrastructure and power plants</b>
		<b>Subsidized credit to oil- and gas-related exports</b>
	Insurance and indemnification	<b>Government insurance/indemnification:</b> market or below-market risk management/risk-shifting services
		<b>Statutory caps on commercial liability:</b> can confer substantial subsidies if set well below plausible damage scenarios
	Occupational health and accidents	<b>Assumption of occupational health and accident liabilities</b>
	Environmental costs	<b>Responsibility for closure and post-closure risks:</b> facility decommissioning and cleanup; long-term monitoring; remediation of contaminated sites; natural resource restoration; litigation
<b>Waste management:</b> avoidance of fees payable to deal with waste		
Environmental damages: avoidance of liability and remediation to make the environment whole		
Government revenue foregone	Tax breaks and special taxes	<b>Tax expenditures:</b> Tax expenditures are foregone tax revenues, due to special exemptions, deductions, rate reductions, rebates, credits and deferrals that reduce the amount of tax that would otherwise be payable.
		<b>Overall tax burden by industry:</b> marginal tax rates are lower than other industry.
		<b>Exemptions from excise taxes/special taxes:</b> excise taxes on fuels; special targeted taxes on energy industry (e.g., based on environmental concerns or “windfall” profits)
Provision of goods or services below market value	Government-owned energy minerals	<b>Process for mineral leasing:</b> auctions for larger sites; sole-source for many smaller sites
		<b>Royalty relief or reductions in other taxes due on extraction:</b> reduced, delayed or eliminated royalties are common at both national and subnational levels. Royalties are targeted based on type of energy, type of formation, geography or location of reserve (e.g., deep water)
		<b>Process of paying royalties due:</b> allowable methods to estimate and pay public owners for energy minerals extracted from public lands
	Government-owned natural resources or land	<b>Access to government-owned natural resources land:</b> at no charge or for below fair market rate
	Government-owned infrastructure	<b>Use of government-provided infrastructure:</b> at no charge or below fair market rate
	Government procurement	<b>Government purchase of goods or services for above-market rates</b>
Income or price support	Market price support and regulation	<b>Government-provided goods or services at below-market rates</b>
		<b>Consumption mandates:</b> fixed consumption shares for total energy use
		<b>Border protection or restrictions:</b> controls on imports or exports leading to unfair advantages
		<b>Regulatory loopholes:</b> any legal loopholes, either in the wording of the statute or in its enforcement, that transfers significant market advantage and financial return to particular energy market participants
		<b>Regulated prices set at below-market rates:</b> for consumers (including where there is no financial contribution by government)
<b>Regulated prices set at above-market rates:</b> including government regulations or import barriers		

Source: Sawyer & Stiebert (2010)



Fossil fuels are generally understood in this study as including peat; lignite; bituminous and sub-bituminous coal; petroleum derived from conventional geological formations; oil sands or oil shale; and natural gas derived from conventional geological formations, coal seams, natural-gas shales or methane clathrate (cf. with definition in OECD, 2011a).

This report discusses all types of support measures that the GSI determines are subsidies, and does not distinguish between those that are considered “good” or “bad.” Determining which measures are subsidies or whether they are “inefficient” or “encourage wasteful consumption” or other undesirable criteria requires substantive analysis of the policy in question; analysis that should be informed by national circumstances and is often subject to political sensitivity. However, the GSI considers that to improve government accountability, all subsidy expenditure should be transparent and regularly reported to enable an informed public debate over whether this spending is a good use of public funds (GSI, 2011c). To this end, the following sections discuss all types of support measures, including some measures considered by some APEC economies to be effective policies. Not all support measures identified in the sections below will require reforming; this is for APEC economies to evaluate and determine based on their national circumstances.

## Estimates of Consumer Subsidies

The most widespread approach to measuring consumer subsidies uses a price-gap analysis, which compares actual, end-user prices for a certain fuel with a reference price and then multiplies the differential—the “gap”—by the volume of consumption. The price-gap approach is popular as it is simple and does not require an examination of the many complex policies that affect energy prices in order to reach an aggregate estimate (Koplow, 2009).

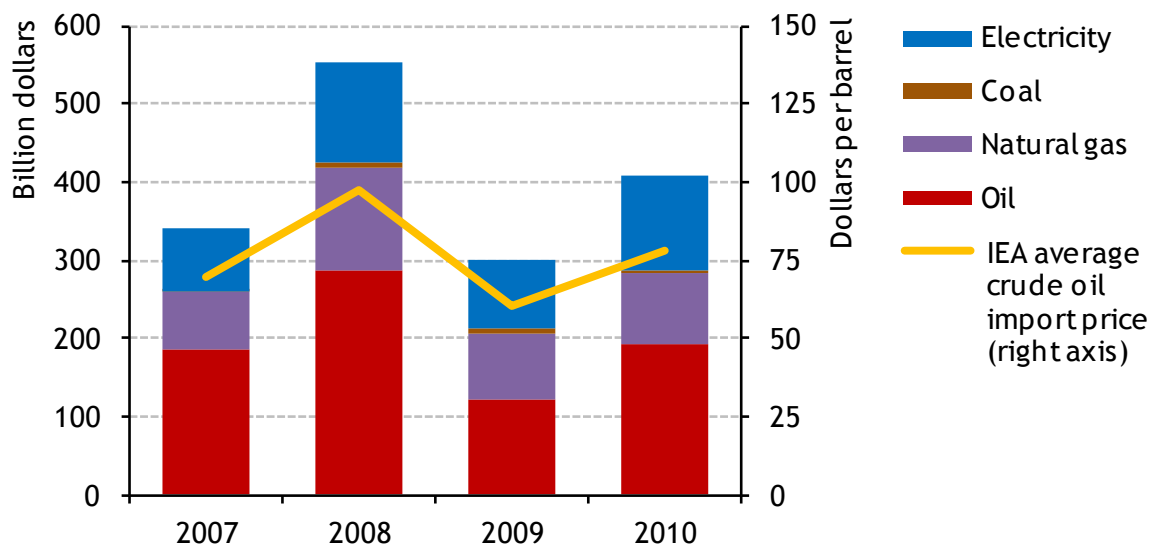
Using the price-gap approach, the IEA estimates that global subsidies for fossil-fuel consumption amounted to US\$409 billion in 2010 (IEA, 2011a). This is an increase of more than 30 per cent compared to the previous year but still considerably below the 2008 figure as can be seen in Table 1.2 and Figure 1.1. These estimates include both subsidies to fossil fuels for final consumption and those to fossil-fuel inputs for electric power generation. The considerable variations of figures between years are mainly due to fluctuations in world prices, as seen in Figure 1.1, but also the result of changes in domestic pricing policies, variations in exchange rates with the U.S. dollar and shifts in demand (IEA, 2010).

**TABLE 1.2: ESTIMATED GLOBAL ENERGY SUBSIDIES, 2007-2010 (US\$ BILLION)**

	2007	2008	2009	2010
<i>Fossil fuels (consumption)</i>	342	554	300	409
<i>Oil</i>	186	285	122	193
<i>Gas</i>	74	135	85	91
<i>Coal</i>	0	4	5	3
<i>Electricity*</i>	81	130	88	122

*\*Fossil-fuel consumption subsidies designated as “electricity” represent subsidies that result from the under-pricing of electricity generated only by fossil fuels, that is to say, factoring out the component of electricity price subsidies attributable to nuclear and renewable energy*

Source: IEA (2011a)

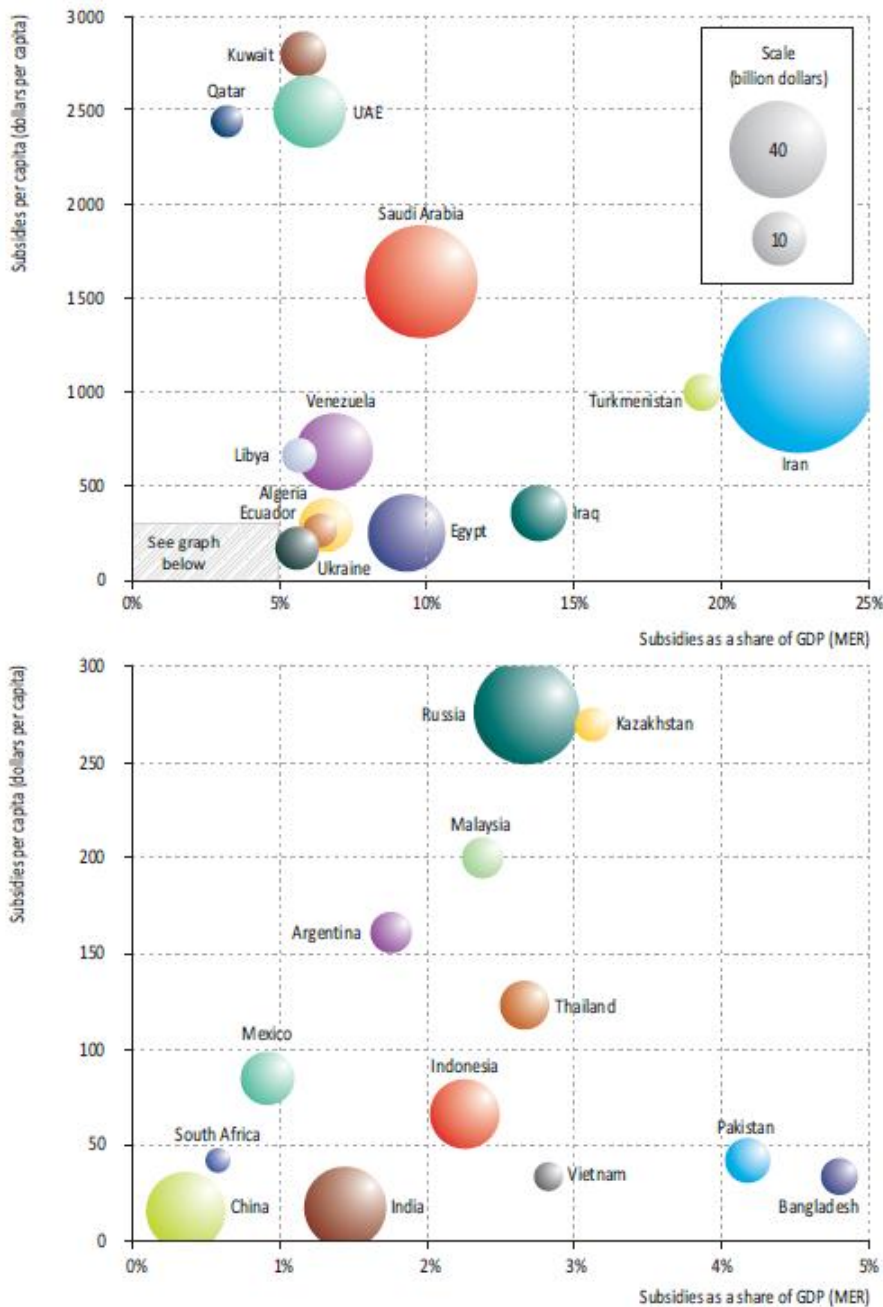


**FIGURE 1.1: ECONOMIC VALUE OF FOSSIL-FUEL CONSUMPTION SUBSIDIES BY TYPE (US\$)**

Source: IEA (2011a)

The IEA has published consumer subsidy estimates for 12 APEC economies, totaling US\$105.24 billion, or around a quarter of the IEA’s global estimate for 2010 (see Annex I for a breakdown of subsidy data by APEC economy). Those with the highest total consumer subsidies—above US\$10 billion—are also among the largest in terms of population and GDP: Russia (US\$39.21 billion), China (US\$21.32 billion) and Indonesia (US\$15.94 billion). Most of the 12 APEC economies covered by the IEA are developing economies. This should not lead to the conclusion that consumer subsidies are largely a developing economy issue. As discussed and shown through estimates below, developed economies also subsidize fossil-fuel consumption.

On a per capita basis, Brunei Darussalam has the highest subsidies, at US\$840 per person. Russia and Malaysia also have high subsidy rates at US\$274.30 per person and US\$199.60 per person, respectively. As a share of GDP, six economies spent more than 2 per cent of their GDP subsidizing fossil fuels in 2010: Brunei Darussalam (2.6 per cent), Indonesia (2.3 per cent), Malaysia (2.4 per cent), Russia (2.7 per cent), Thailand (2.7 per cent) and Vietnam (2.8 per cent).



**FIGURE 1.2: FOSSIL-FUEL CONSUMPTION SUBSIDIES PER CAPITA AND AS A PERCENTAGE OF GDP IN SELECTED ECONOMIES IN 2010**

Note: MER = market exchange rate. Circle sizes are proportional to the total cost of the subsidy.  
Source: IEA (2011a)





Although the IEA estimates are useful for providing comparisons across economies and across years, there are limitations to the data. The price-gap approach relies on assumptions when identifying costs and prices between which the price gap is calculated (IEA, OECD, OPEC & World Bank, 2010). For costs, there are a variety of concepts besides the end-user price, including average, marginal, opportunity and production costs. For prices, usually the international market price is used as a benchmark, which is only relevant to the extent that the fuel in question is traded internationally. Actual prices are frequently distorted and highly volatile. Also, taking free-on-board (FOB) prices of fuels excludes shipping costs and thereby does not determine the exact subsidy on the end-user price. Moreover, the international price is not certain, as the actual price paid by refineries may have been negotiated in long-term contracts. Because these transactions are often not transparent, it is difficult to use the price-gap approach. Representing the position of many fossil-fuel producing economies, the Organization of the Petroleum Exporting Countries (OPEC) has argued that, for countries that are well endowed with energy resources, the cost of production should be used as the benchmark instead of the international market price (OPEC Secretariat, 2010).

The price-gap approach also excludes some subsidies that do not lower market prices, notably producer subsidies, which are not captured at all (Koplow, 2009). A subsidy type that benefits consumers that is also not covered by the price-gap approach is export restrictions. Preventing exports aims to reduce domestic prices. Russia, for example, imposes high export tariffs on gasoline (reaching US\$0.55 per litre in June 2011), while China has banned diesel exports. Another subsidy type can be linked to national fuel price stabilization funds, which are used in Chile, Peru and Thailand to prevent price spikes. While in principle the objective is for the funds to be self-financing over time, in practice they almost never are, leading to large budgetary transfers (see Bacon & Kojima, 2008).

Price-gap estimates of consumer subsidies also do not usually account for low or suboptimal taxation rates. While recognizing that the concept of an optimal tax rate is difficult to apply in practice— governments apply differing tax rates for a range of legitimate reasons—it is important to understand the magnitude and impacts of differing tax rates, as they can severely distort markets (Coady, Gillingham, Ossowski, Piotrowski, Tareq & Tyson, 2010). According to economic principles, petroleum products should be taxed at a higher rate than other consumer goods for both revenue and environmental purposes (Crawford et al., 2008, in Coady et al., 2010). The International Monetary Fund (IMF) found that global consumer subsidies, including suboptimal “tax subsidies,” were estimated to be in the order of US\$740 billion in 2010 (Coady et al., 2010).

Alternative figures are also available from a range of sources, such as national budgets. Indonesia’s State Budget for 2011, for instance, allocated IDR137 trillion (US\$15.1 billion<sup>4</sup>) to energy subsidies (Ministry of Finance, Indonesia, 2010a). Using the price-gap approach, the Ministry of Finance in Mexico (2010) calculated a combined revenue cost for gasoline and diesel subsidies of US\$2.07 billion for 2010.

Substantial consumer subsidies can also be found in developed countries, as reported by the OECD in its *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels* for its member countries. For instance, fuel tax exemptions granted to U.S. farmers are estimated to have exceeded US\$900 million in 2010 (OECD, 2011a).

Consumer subsidies are commonly justified as support for parts of populations that could not afford the full market price of energy. Therefore, policy-makers may decide to subsidize particular fuels that are of more utility to these groups. However, such subsidies are often poorly targeted, mostly benefitting the already better-off, and relatively ineffective in meeting stated social objectives. Section 5 discusses the social impacts of fossil-fuel subsidies and their reform in detail. Table 1.3, prepared by the IEA for six APEC economies with low rates of access to modern

<sup>4</sup> With an IDR/USD exchange rate of 8,538 (<http://www.xe.com>).





energy services, gives an overview of subsidies for electricity (which is mostly generated from fossil fuels in these countries), LPG and kerosene. Additionally, the share of total consumer subsidies that each of these three energy carriers receives is given. Notably, the shares range from almost a third to more than 90 per cent, showing the varying proportion of subsidies to other fuels—such as gasoline, diesel and natural gas.

**TABLE 1.3: ENERGY SUBSIDIES FOR SPECIFIC FUELS/ELECTRICITY IN SELECT APEC ECONOMIES**

APEC ECONOMY	PRESENCE OF SUBSIDIES			ELECTRICITY, LPG AND KEROSENE SUBSIDIES AS A SHARE OF TOTAL CONSUMER SUBSIDIES
	Electricity	LPG	Kerosene	
				%
People's Republic of China	X	X		38
Indonesia	X	X	X	58
Peru		X	X	30
The Philippines		X		94
Thailand	X	X		47
Vietnam	X			39

Data source: IEA, OECD, OPEC & World Bank (2010)

Because a relatively simple “price-gap” methodology can be used to collect data on and estimate consumer subsidies, most comparative studies focus on countries’ subsidies for fossil-fuel consumption. As the price-gap approach mostly identifies subsidies in developing countries, attention has so far tended to focus on these countries. In practice, however, consumer subsidies are widespread in developed countries as well.

The OECD has published an inventory of support measures<sup>5</sup> for the production and consumption of fossil fuels in OECD member countries, applying its Consumer Support Estimate (CSE) and Producer Support Estimate (PSE) methods,<sup>6</sup> previously used for calculating support to the agriculture sector (OECD, 2011a). The inventory covers eight APEC economies: Australia, Canada, Chile, Japan, Korea, Mexico, New Zealand and the United States. The consumer support measures identified by the OECD for these economies are shown in Table 1.4, and categorized by type of fuel.

<sup>5</sup> Note that the OECD definition of support is broader than some definitions of subsidy: “The scope of what is considered ‘support’ is here deliberately broad, and is broader than some conceptions of ‘subsidy.’ Essentially, it includes both direct budgetary expenditures and tax expenditures that in some way provide a benefit or preference for fossil-fuel production or consumption relative to alternatives” (OECD, 2011a, p. 17). The OECD inventory also highlights several difficulties associated with the measurement of support, including the setting of benchmarks, international comparability, interactions between measures and the allocation of the cost of a measure to a specific fossil fuel.

<sup>6</sup> For more information about the OECD’s PSE and CSE method for calculating subsidies, see: [http://www.oecd.org/document/59/0,3746,en\\_2649\\_37401\\_39551355\\_1\\_1\\_1\\_37401,00.html](http://www.oecd.org/document/59/0,3746,en_2649_37401_39551355_1_1_1_37401,00.html)



**TABLE 1.4: CONSUMER SUPPORT ESTIMATES FOR OECD ECONOMIES THAT ARE APEC MEMBERS**

ECONOMY/CATEGORY	JURISDICTION	2009	2010P
<b>Australia</b>		AU\$ million, nominal	
<b>Support to coal</b>		n.a.	n.a.
<b>Support to petroleum</b>			
Diesel and Alternative Fuels Grants Scheme	Federal	n.a.	n.a.
Fuel Sales Grants Scheme	Federal	n.a.	n.a.
Queensland Fuel Subsidy Scheme	QLD	28	n.a.
Western Australian Diesel Subsidy	WA	9.44	9.72
Petroleum Products Freight Subsidy Scheme	Federal	n.a.	n.a.
Fuel Tax Credits	Federal	4,996.23	4,996.23
Reduced Excise Rate on Aviation Fuel	Federal	980	1,000.00
Exemption from Excise for 'Alternative Fuels'	Federal	517.02	536.53
Reduced Excise Rate on Heating Oil et al.	Federal	n.a.	n.a.
<b>Support to natural gas</b>			
Reticulated Natural Gas Rebate	QLD	2.96	2.96
Home Energy Emergency Assistance Scheme	QLD	1.05	1.05
Exemption from Excise for 'Alternative Fuels'	Federal	12.98	13.47
Infrastructure Bonds Scheme Power Generation	Federal	n.a.	n.a.
Infrastructure Borrowings Tax Offset Scheme – Power Generation	Federal	n.a.	n.a.
<b>Canada</b>		CA\$ million, nominal	
<b>Support to coal</b>			
Your Energy Rebate	NS	3.03	4.27
<b>Support to petroleum</b>			
Alberta Farm Fuel Distribution Allowance	AB	33.17	32.5
Home Heating Assistance for Alternative Fuels	SK	n.a.	n.a.
Alberta Tax Exempt Fuel Use Program <sup>2</sup>	AB	160	160
Fuel Tax Exemption for Farm Activity Heating and Mining	SK	132.1	125.2
Your Energy Rebate	NS	25.95	36.59
<b>Support to natural gas</b>			
Sales Tax Exemption for Natural Gas	SK	35.1	25.2
<b>Chile</b>		[No data available]	
<b>Japan</b>		JPY million, nominal	
<b>Support to coal</b>		n.a.	
<b>Support to petroleum</b>		n.a.	
<b>Support to natural gas</b>			
Promotion of Natural Gas Use Subsidy	-	699.97	124.26
<b>Republic of Korea</b>		KRW million, nominal	
<b>Support to coal</b>			
VAT Exemption for Briquettes	-	21,108.00	21,108.00



VAT Exemption for Anthracite Coal	-	..	..
<b>Support to petroleum</b>			
Fuel Subsidy for Certain Users - Buses	-	..	..
Fuel Subsidy for Certain Users - Taxis	-	..	..
Fuel Subsidy for Certain Users - Freight Transport	-	..	..
Fuel Subsidy for Certain Users - Passenger Ships	-	..	..
Fuel Subsidy for Certain Users - Disabled Persons	-	..	..
Fuel Subsidy for Certain Users - Meritorious Persons	-	..	..
Fuel Tax Exemption for Agriculture	-	1,120,779	1,120,779
Fuel Tax Exemption for Fisheries	-	751,500	751,500
<b>Support to natural gas</b>		n.a.	
<b>Mexico</b>		<b>MXN million, nominal</b>	
<b>Support to coal</b>		n.a.	
<b>Support to petroleum</b>			
General Diesel Tax Credit	Federal		n.a.
Diesel Tax Credit for Commuters	Federal		3,048.10
Tax Credit for Marine Diesel	Federal		85.5
Tax Credit for Purchased Diesel	Federal		0
Fuel Tax Credit for Agriculture and Fisheries	Federal		51.5
Petroleum Revenue Stabilisation Fund	Federal		5,649.40
<b>Support to natural gas</b>		n.a.	
<b>New Zealand</b>		<b>NZD million, nominal</b>	
<b>Support to coal</b>		n.a.	
<b>Support to petroleum</b>			
Motor Spirits Excise Duty Refund	-	36.4	38.31
Management of IEA Oil Stocks	-	2.06	3
<b>Support to natural gas</b>			
<b>United States</b>		<b>US\$ million, nominal</b>	
<b>Support to coal</b>			
Credit for Investment in Clean Coal	Federal	180	240
Amortisation of Certain Pollution Control Facilities	Federal	100	100
Industrial Expansion and Revitalization Credit	WV	44.8	44.8
Credit for Reducing Utility Charges	WV	1.72	1.72
<b>Support to petroleum</b>			
Low-Income Home Energy Assistance Program	Federal	570.23	570.23
Small Municipality Energy Assistance Program	AK	n.a.	n.a.
Power Cost Equalization	AK	37.03	37.03
Alaska Heating Assistance Program	AK	4.5	2.25
Gasoline Tax Exemptions	TX	77.6	78.9
Fuel Tax Exemptions for Farmers	both	923.03	923.03



Fuel Tax Exemption for Aviation	WV	2.3	2.3
Fuel Tax Exemption for Dyed Diesel	WV	68.6	68.6
Fuel Tax Exemption for Propane	WV	13.4	13.4
Fuel Tax Exemption for County Boards of Education	WV	13.6	13.6
Fuel Tax Exemption for Certain Public Administrations	WV	1.8	1.8
Fuel Tax Exemption for Certain Off-Highway Uses	WV	84.8	84.8
Strategic Petroleum Reserve	Federal	1,093.85	1,077.35
Northeast Home Heating Oil Reserve	Federal	12.84	3.22
<b>Support to natural gas</b>			
Low-Income Home Energy Assistance Program	Federal	2,879.10	2,879.10
Alaska Heating Assistance Program	AK	5.5	2.75
Sales Tax Exemption for Natural Gas	TX	245.4	255.63
Non-Utility Sales of Natural Gas	WV	17	17
Credit for Reducing Utility Charges	WV	2.58	2.58

*Note 1: Tax expenditures for any given country are measured with reference to a benchmark tax treatment that is generally specific to that country. Consequently, the estimates contained in the table above are not necessarily comparable with estimates for other countries. In addition, because of the potential interaction between them, the summation of individual measures for a specific country may be problematic. The allocation of particular measures across fuel types was done by the OECD Secretariat based on the IEA's Energy Balances.*

*Note 2: Categories that are not applicable are indicated by "n/a." Where data is unavailable, this is indicated with "..."*

Source: OECD (2011a)

## Estimates of Producer Subsidies

Global estimates of subsidies for fossil-fuel production are not as readily available as those for consumption. The GSI estimates that global producer subsidies are at least US\$100 billion per year (GSI, 2010c). However, no systematic studies on production subsidies covering a broad set of economies have been undertaken in the last 10 years (IEA, OECD, OPEC & World Bank, 2010).

The OECD inventory (described above) identified and estimated producer support measures for its members, including eight APEC economies. These estimates are shown in Table 1.5, categorized by fuel type for each country.



**TABLE 1.5: PRODUCER SUPPORT ESTIMATES FOR OECD ECONOMIES THAT ARE APEC MEMBERS**

ECONOMY/CATEGORY	JURISDICTION	2009	2010P
<b>Australia</b>		AU\$ million, nominal	
<b>Support to coal</b>			
Accelerated Depreciation for Mining Buildings	Federal	n.a.	n.a.
Capital Expenditure Deduction for Mining et al.	Federal	2.34	1.64
Exploration and Prospecting Deduction	Federal	30.39	35.06
Collingwood Park Assistance Package	Federal	n.a.	n.a.
Coal Industry Development	Federal	4.06	0.02
<b>Support to petroleum</b>			
Cleaner Fuels Grants Scheme	Federal	0	n.a.
Exemption from Crude Oil Excise for Condensate	Federal	600	580
Accelerated Depreciation for Mining Buildings	Federal	n.a.	n.a.
Capital Expenditure Deduction for Mining et al.	Federal	1.33	0.93
Exploration and Prospecting Deduction	Federal	17.23	19.89
<b>Support to natural gas</b>			
Dampier to Bunbury Gas Pipeline Sale Assistance	WA	n.a.	n.a.
North West Shelf Gas Financial Assistance	WA	n.a.	n.a.
Accelerated Depreciation for Mining Buildings	Federal	n.a.	n.a.
Capital Expenditure Deduction for Mining et al.	Federal	2.19	1.53
Infrastructure Bonds Scheme Transport	Federal	n.a.	n.a.
Infrastructure Borrowings Tax Offset Scheme Transport	Federal	n.a.	n.a.
Exploration and Prospecting Deduction	Federal	28.44	32.82
<b>Canada</b>		CA\$ million, nominal	
<b>Support to coal</b>			
Excess of Resource Allowance over Non-Deductibility of Royalties	Federal	n.a.	n.a.
Earned Depletion Allowance	Federal	0.11	0.11
Flow-Through Share Deductions	Federal	4.2	5.34
<b>Support to petroleum</b>			
Excess of Resource Allowance over Non-Deductibility of Royalties	Federal	n.a.	n.a.
Syncrude Remission Order	Federal	n.a.	n.a.
Energy Industry Drilling Stimulus	AB	590.17	386.04
Alberta Royalty Tax Credit	AB	n.a.	n.a.
Alberta Crown Royalty Reductions	AB	182.52	182.52
Saskatchewan Petroleum Research Incentive	SK	..	..
Earned Depletion Allowance	Federal	2.67	2.67
Flow-Through Share Deductions	Federal	97.93	124.64
Reclassification of Expenses Under FTS	Federal	-7.91	-5.27
Accelerated Capital Cost Allowance <sup>1</sup>	Federal	300	300
Orphan Well Fund	AB	7.91	7.91



Petroleum Technology Research Centre	SK	3.2	3.2
<b>Support to natural gas</b>			
Excess of Resource Allowance over Non-Deductibility of Royalties	Federal	n.a.	n.a.
Energy Industry Drilling Stimulus	AB	528.89	345.96
Alberta Royalty Tax Credit	AB	n.a.	n.a.
Alberta Crown Royalty Reductions	AB	163.57	163.57
Saskatchewan Petroleum Research Incentive	SK	..	..
Support to SaskEnergy for the La Ronge Project	SK	n.a.	n.a.
Earned Depletion Allowance	Federal	2.39	2.39
Flow-Through Share Deductions	Federal	87.76	111.69
Reclassification of Expenses Under FTS	Federal	-7.09	-4.73
Orphan Well Fund	AB	7.09	7.09
Petroleum Technology Research Centre	SK	2.87	2.87
<b>Chile</b>		[No data available]	
<b>Japan</b>		JPY million, nominal	
<b>Support to coal</b>		n.a.	
<b>Support to petroleum</b>			
Large-Scale Oil Disaster Prevention Subsidy	-	777.08	710
Oil Prospecting Subsidy	-	1,100.91	300.79
Oil Refining Rationalisation Subsidy	-	10,942.02	9,596.78
Oil Product Quality Assurance Subsidy	-	1,700.05	1,650
Subsidy for Structural Reform Measures	-	15,206.88	9,194.09
Subsidy for Oil Refining Technology Programmes	-	10,760.95	11,857.34
<b>Support to natural gas</b>			
Natural Gas Exploration Subsidy	-	800.11	400.02
<b>Republic of Korea</b>		KRW million, nominal	
<b>Support to coal</b>			
Support to Coal Production - Direct Support	-	24,233	24,233
Support to Coal Production - Government Injection	-	n.a.	n.a.
Support to Briquette Production - Costs of Intermediates	-	151,221	151,221
Support to Coal Production - Capital and Facilities	-	11,390	11,390
Coal Mining - Inherited Environmental Liabilities	-	0	0
Coal Mining - Inherited Social Liabilities	-	132,885	132,885
Funding for CCS and Clean-Fuel R&D	-	14,008.29	14,008.29
Funding for Renewable Energy R&D	-	500	500
<b>Support to petroleum</b>			
Funding for CCS and Clean-Fuel R&D	-	960.25	960.25
Funding for Resources Technologies R&D	-	1,234.30	1,234.30
<b>Support to natural gas</b>			
Funding for CCS and Clean-Fuel R&D	-	5,031.47	5,031.47
Funding for Resources Technologies R&D	-	15,365.70	15,365.70



Mexico		MXN million, nominal	
Support to coal		n.a.	
Support to petroleum		n.a.	
Support to natural gas		n.a.	
New Zealand		NZD million, nominal	
Support to coal		n.a.	
Support to petroleum			
Research and Development	-	2.41	2.41
Acquisition of Petroleum Exploration Data	-	6.44	2.75
Support to natural gas			
Research and Development	-	2.84	2.84
Acquisition of Petroleum Exploration Data	-	7.58	3.24
United States		US\$ million, nominal	
Support to coal			
Alternative Fuels Production Credit	Federal	60	170
Reduced Tax for Thin-Seamed Coal	WV	37	37
Capital Gains Treatment of Royalties on Coal	Federal	70	50
Partial Expensing for Advanced Mine Safety Equipment	Federal	0	0
Excess of Percentage over Cost Depletion	Federal	144.38	416.16
Fossil Energy R&D	Federal	1,008.75	3,905.60
Support to petroleum			
Severance Tax Exemptions for Crude Oil	TX	67.51	83.64
Development Credit for Certain Producers	AK	13.53	13.53
Exclusion of Low-Volume Oil & Gas Wells	WV	3.18	3.18
Exception from Passive Loss Limitation	Federal	7.96	11.94
Expensing of Exploration and Development Costs	Federal	652.47	159.14
Excess of Percentage over Cost Depletion	Federal	77.83	224.32
Temporary Expensing of Equipment for Refining	Federal	770	760
Aid to Small Refiners for EPA Capital Costs	Federal	10	0
Enhanced Oil Recovery Credit	Federal	0	0
Sales Tax Exemption for Oil & Gas Equipment	TX	49.77	48.54
Qualified Capital Expenditure Credit	AK	232.74	232.74
Alternative Credit for Exploration	AK	16.31	16.31
Amortisation of Geological Expenditure	Federal	15.91	59.68
Fossil Energy R&D	Federal	6.43	17.32
Support to natural gas			
Severance Tax Exemptions for Natural Gas	TX	1,133.79	1,314.89
Development Credit for Certain Producers	AK	20.47	20.47
Exclusion of Low-Volume Oil and Gas Wells	WV	4.82	4.82
Coalbed Methane Exemption	WV	4	4



Exception from Passive Loss Limitation	Federal	12.04	18.06
Alaska Gasline Inducement Act	AK	4.36	32.38
Expensing of Exploration and Development Costs	Federal	987.53	240.86
Excess of Percentage over Cost Depletion	Federal	117.79	339.52
Accelerated Depreciation of Distribution Pipelines	Federal	80	120
Enhanced Oil Recovery Credit	Federal	0	0
Sales Tax Exemption for Oil and Gas Equipment	TX	75.33	73.46
Qualified Capital Expenditure Credit	AK	352.26	352.26
Alternative Credit for Exploration	AK	24.69	24.69
Amortisation of Geological Expenditure	Federal	24.09	90.32
Fossil Energy R&D	Federal	29.24	126.08

*Note 1: Tax expenditures for any given country are measured with reference to a benchmark tax treatment that is generally specific to that country. Consequently, the estimates contained in the table above are not necessarily comparable with estimates for other countries. In addition, because of the potential interaction between them, the summation of individual measures for a specific country may be problematic. The allocation of particular measures across fuel types was done by the OECD Secretariat based on the IEA's Energy Balances.*

*Note 2: Categories that are not applicable are indicated by "n/a." Where data is unavailable, this is indicated with ".."*

Source: OECD (2011a)

APEC economies that are also G-20 members have submitted implementation strategies to the G-20 for fulfilling their commitment to "rationalize and phase-out over the medium term inefficient fossil-fuel subsidies that encourage wasteful consumption" (G-20, 2009). Table 1.6 reproduces the progress updates provided by G-20 governments at both the Toronto summit (G-20, 2010, p. 1) and the Los Cabos summit (G-20, 2012, p. 2).





**TABLE 1.6: SUMMARIES OF IMPLEMENTATION STRATEGIES AND TIMETABLES SUBMITTED UNDER THE G-20 SUBSIDY REFORM PROCESS**

APEC ECONOMY	SUBSIDIES IDENTIFIED BY THE ECONOMY AS TO BE PHASED OUT	
	2010 PROGRESS REPORT	2012 PROGRESS REPORT
Australia	No inefficient fossil-fuel subsidies.	As in 2011, Australia reported no measures that fall within scope of commitment.
Canada	Proposes to implement recently released draft legislation to phase-out the accelerated capital cost allowance for oil sands assets over the 2011–2015 period. Previously phased out other tax preferences applying to fossil-fuel producers.	Phasing out over 2011–2015 the accelerated capital cost allowance for investment in oil sands projects. As announced in Budget 2011, also reducing deduction rates for intangible capital expenses in oil sands projects to better align these with rates applicable in conventional oil and gas sector. Announced in Budget 2012 the phase-out of Atlantic Investment Tax Credit for investments in oil and gas and mining sectors.
China	Proposes to gradually reduce the urban land-use tax relief for fossil-fuel producers.	As in 2011, China reports it does not have any inefficient fossil-fuel subsidies that encourage wasteful consumption. However, China is pursuing a policy of adjusting the urban land-use tax relief to fossil-fuel producers as appropriate, gradually reducing the preferential tax treatment and phasing out the policy over the medium and long terms.
Indonesia	Proposes to phase-out inefficient fossil-fuel subsidies in a gradual manner in parallel through managing the demand side by adopting measures that will reduce fossil-fuel energy consumption and by gradually narrowing the gap between domestic and international prices.	Government has committed to continue rationalizing the domestic prices of both fuel and electricity. Has significantly reduced kerosene subsidies with its kerosene-to-LPG conversion program; will gradually continue the utilization of alternative energy and conversion program from fossil fuel to gas. Has committed to a framework to alleviate gradually all fuel subsidies through promoting greater use of Pertamina (market-price-based fuel), improving distribution to the targeted subsidy recipient. As of June 2012, government vehicles are prohibited from using subsidized fuel; moreover, policy also applies to operational vehicles of mining and plantation companies.
Japan	No inefficient fossil-fuel subsidies.	As in 2011, Japan reports that it has no inefficient fossil-fuel subsidies.
Korea	Proposes to phase-out subsidies to anthracite coal [US\$6.3 million/year in 2009] and briquette producers [US\$136 million/year].	Completely phased out stable coal production subsidy in 2011. Twelve development projects are aimed at revitalizing economic activity in affected areas. Briquette production subsidy in place (helps low-income families afford traditional cooking fuel); hope to raise fixed price on briquettes in 2012 to reduce subsidy expenditure.
Mexico	By continuing current policies and based on current market conditions, subsidies to gasoline, diesel and LPG are expected to disappear in the medium term.	State-controlled price-setting mechanism was modified such that gasoline, diesel and LPG prices increase incrementally on a monthly basis at a constant rate, with the goal of gradually eliminating subsidies.
Russia	Proposes to implement the commitment to rationalize and phase-out inefficient fossil-fuel subsidies through national economic and energy policy, within the framework of its Energy Strategy 2030 and the Concept of Long-Term Social and Economic Development, as well as in the context of its joining the WTO.	As in 2011, Russia has not identified any inefficient fossil-fuel subsidies. A resolution was adopted that provides for the preparation of proposals on the transition from the state regulation of wholesale gas prices to the state regulation of tariffs for gas transportation services by 2015. Another program aims to decrease the energy intensity of Russia's GDP by not less than 13.5 per cent of 2007 levels (total decrease of energy intensity for the stated period should equal 40 per cent).
United States	Proposes to pass legislation to eliminate 12 preferential tax provisions related to the production of coal, oil, and natural gas [US\$3.89 billion in 2010].	As reported in 2011, U.S. Congress must pass legislation to eliminate twelve preferential tax provisions related to the production of coal, oil, and natural gas.

Note: Text in brackets inserted by author; source of inserted estimates: G-20 (2010). Specific estimates were inserted from the submissions by Korea and the United States in the same G-20 document.

Source: G-20 (2010) and G-20 (2012)



In addition to the OECD’s multi-country study, a series of country-specific studies exists that shed light on the form and magnitude of subsidies for fossil-fuel production (see Table 1.7). However, it should be noted from the outset that, due to differences in scope and methodologies, the findings of these studies are not comparable, nor should they be equated with the APEC and G-20 commitments to rationalize and phase-out inefficient fossil-fuel subsidies. The following paragraphs present findings from studies on APEC economies. The estimates provided are those of the authors and have not been endorsed by the APEC economy in question.

**TABLE 1.7: AVAILABLE ESTIMATES OF FOSSIL-FUEL SUBSIDIES IN SELECTED APEC ECONOMIES**

APEC ECONOMY	MAIN SUBSIDY TYPES INCLUDED	YEAR(S)	SOURCE	SUBSIDY ESTIMATE
Australia	Consumer and producer subsidies to energy—coal, oil, gas and non-fossil—and transport	Fiscal 2005–2006	Riedy (2007)	AU\$10 billion
	Mostly tax benefits for exploration, aviation and other fuels, and company cars	Annual	Tingle (2011), citing government reports	AU\$8 billion
Canada—Alberta, Saskatchewan, and Newfoundland and Labrador	Subsidies for the exploration and production of oil	2008	Sawyer & Stiebert (2010)	CA\$2.84 billion
Indonesia	Subsidies for the exploration and production of oil and gas	2008	Braithwaite et al. (2010)	US\$1.8 billion
Malaysia	Subsidized gas for non-power sectors	Fiscal 2009	Petronas (2010)	US\$5.36 billion
Mexico	Tax and royalty subsidies for the Chicontepec oil field	Annual	GSI (2010d)	US\$122–183 million
United States	Federal tax provisions for the exploration and production of oil, gas and coal	Annual	G-20 (2010)	US\$3.88 billion
	Federal subsidies for fossil fuels	2006	Koplow (2007)	US\$49 billion

Note: These estimates cannot be totalled due to inconsistent methodologies, scope and time periods.

A 2007 study on subsidies to the energy and transport sectors in Australia covered both producer and consumer subsidies to fossil fuel (coal, oil and gas) and non-fossil-fuel energy (Riedy, 2007). The report adopts a very broad definition of “subsidy,” including funding for government energy agencies and road infrastructure that other definitions would exclude. It analyzed a broad range of government expenditure for the fiscal year 2005–2006, ranging from AU\$9.3 billion to AU\$10.1 billion in total (Riedy, 2007, pp. 8, 55). More than 96 per cent of this total was directed at fossil fuels. Table 1.8 gives an overview of the subsidy estimates for each fuel type. It should be noted that since this study was published, a number of policy changes have been introduced, including amendments to fringe benefits for vehicles in the 2011–2012 Budget and condensate production is now subject to crude oil excise.<sup>7</sup>

**TABLE 1.8: OVERVIEW OF MAGNITUDES OF IDENTIFIED FOSSIL-FUEL SUBSIDIES BY SECTOR IN AUSTRALIA**

SECTOR	SUPPORT FOR FOSSIL FUELS 2005–2006 (AUD\$ MILLION)			
	COAL	OIL	GAS	TOTAL
Electricity	1,091 to 1,866	3	120	1,214 to 19,89
Other stationary energy	177 to 188	280–289	229–235	686 to 712
Transport	1	7,089	24	7,114
Total	1,269 to 2,055	7,371–7,381	374–379	9,014 to 9,815

Source: Riedy (2007)

<sup>7</sup> Update provided by the Australian government



In February 2010 an interdepartmental committee listed the following federal and state support measures:

1. Excise treatment on fuels, comprising a fuel tax credit scheme (AU\$5.1 billion)
2. Aviation fuel concessions (AU\$750 million)
3. Tax deductions for fuel exploration (up to AU\$1 billion)
4. Fringe benefits concessions for employee cars (AU\$1.1 billion)

Documents obtained from the Australian government through a Freedom of Information Act request showed that the government had undertaken a policy review as part of its response to the G-20 commitment and determined that it had no measures related to the consumption of fossil fuels that fell within the scope of the G-20 commitment (Tingle, 2011).

The GSI conducted an analysis of **Canadian** subsidies for upstream oil production<sup>8</sup> (Sawyer & Stiebert, 2010). The report covered both the federal and provincial expenditure<sup>9</sup> for Alberta, Saskatchewan, and Newfoundland and Labrador. The three provinces account for around 97 per cent of all national oil production. More than 60 subsidy programs were identified that are solely or primarily targeted at the oil sector. The majority of these subsidies aim to increase exploration and development activity by reducing costs through a combination of tax breaks and royalty reductions. The programs for which quantification was viable (and which were deemed to represent the largest share of subsidies) amount to CA\$2.84 billion in 2008. Table 1.9 gives an overview of the fossil-fuel subsidies identified in the GSI report with the corresponding estimates of their magnitudes. Not all subsidies identified in the GSI report fall within the G-20 and APEC commitments, for example R&D expenditure related to clean energy technologies that reduce greenhouse gas emissions are not included in the G-20 commitment.

<sup>8</sup> Upstream activities are defined as exploration, development, production and upgrading, thereby excluding refining, storage, transportation, distribution and retail.

<sup>9</sup> It should be noted that subnational governments may not be bound by international commitments taken within the APEC forum or the G-20. As this report includes discussion of all fossil-fuel subsidies within APEC economies, some of those identified may not be considered within the scope of the APEC commitment.



**TABLE 1.9: SUMMARY OVERVIEW OF SUBSIDIES TO OIL PRODUCTION IN CANADA IN 2008**

MAJOR CATEGORY	TYPOLOGY OF SUBSIDIES		ESTIMATE OF ANNUAL VALUE OF SUBSIDIES (CA\$ MILLIONS)				
	SECONDARY CATEGORY	TYPE	FEDERAL	AB*	SK*	NFL*	TOTAL
Direct and indirect transfer of funds and liabilities	Direct spending	Agency appropriations and contracts	7	133	2	6	148
		Research and development support	205	68	1	-	273
		Earmarks	-	-	-	11	11
	Credit support	Government loans and loan guarantees	28	-	-	-	28
	Environmental costs	Environmental damages	-	-	2	-	2
		Responsibility for closure and post-closure risks	-	3	-	-	3
Government revenue foregone	Tax breaks and special taxes	Tax expenditures	1,142	8	64	53	1,266
		Provincial tax reductions due to federal programs	-	254	-	-	254
		Exemptions from excise taxes/special taxes	-	-	3	13	16
Provide goods or services below market value	Government-owned energy minerals	Royalty relief or reductions in other taxes	-	485	255	-	740
		Process of paying royalties due	-	100	-	-	100
<b>TOTAL (CA\$ million)</b>			<b>1,382</b>	<b>1,049</b>	<b>327</b>	<b>83</b>	<b>2,841</b>

\*Note: Subsidies provided by provincial governments may be outside the scope of the APEC commitment.

Source: Sawyer & Stiebert (2010)

The GSI undertook a similar analysis of Indonesia's subsidies to the upstream oil and gas sector (Braithwaite et al., 2010). The scope of the study covered subsidies by the national government for exploration, development and production activities. Any subsidies from regional or local governments were not expected to be significant and were not included in the study. The report identified 11 potential subsidies, but due to the lack of information available, the researchers were only able to quantify the value of three subsidies, totaling US\$ 1.8 billion in 2008 (see Table 1.10).

**TABLE 1.10: ESTIMATE OF INDONESIA'S SUBSIDIES FOR UPSTREAM OIL AND GAS ACTIVITIES IN 2008**

SUBSIDY	ESTIMATED VALUE IN 2008
Investment Credit Allowance	US\$115 million
Tax incentives for imported goods and services	US\$130 million
Oil Domestic Market Obligation (subsidy from industry to Pertamina's refineries)	US\$1,554 million
<b>Total</b>	<b>US\$1,799 million</b>

Source: Braithwaite et al. (2010)



**Malaysia** also has support measures in place for fossil-fuel production. The country’s main oil and gas corporation receives subsidies to supply cheaper gas to non-power sectors, despite it not being state owned. For the fiscal year 2009, these amounted to US\$5.36 billion<sup>10</sup> (Petronas, 2010).

A GSI study examined **Mexico’s** subsidies to the Chicontepec on-shore oil field. Subsidies were identified in the form of a newly introduced fiscal scheme on the national oil company’s exploration and production activities (GSI, 2010d). The scheme includes a royalty reduction and prolongation of payback period, as well as special fossil-fuel extraction and sales taxes. At a reasonably assumed yearly production volume and depending on the assumed oil price, the GSI’s initial estimate of this subsidy amounts to US\$122-183 million per year.

Producer subsidy estimates for the **United States** are available from a number of sources. As part of the G-20 initiative to rationalize and phase-out inefficient fossil-fuel subsidies, the United States has submitted a list of its producer subsidies (G-20, 2010). The estimated support programs amounted to US\$3.89 billion in 2010. Twelve permanent preferential tax provisions related to coal, oil and natural gas production were identified (see Table 1.11).

**TABLE 1.11: ANNUAL ESTIMATES OF U.S. FEDERAL SUBSIDIES FOR THE EXPLORATION AND PRODUCTION OF FOSSIL FUELS (US\$)**

FEDERAL TAX PROVISION	ANNUAL REVENUE COST
Percentage depletion for oil and gas	\$1 billion
Expensing of intangible drilling costs	\$789 million
Geological and geophysical expenditures	\$111 million
Percentage depletion for hard mineral fossil fuels	\$106 million
Royalty taxation of coal	\$75 million
Expensing of exploration and development costs for hard mineral fuels	\$41 million
Passive loss exception for working interests in oil and gas properties	\$18 million
Deduction for tertiary injectants	\$7 million
Enhanced oil recovery credit	\$0 [rounded]
Marginal wells credit	\$0 [rounded]
Domestic manufacturing deduction for oil and gas	\$1.73 billion
Domestic manufacturing deduction for coal and other hard mineral fossil fuels	\$6 million
<b>Total</b>	<b>\$3.88 billion</b>

Source: G-20 (2010)

The U.S. Energy Information Administration (2011) has quantified federal government energy subsidies that represent a financial benefit and are identifiable in the fiscal 2010 federal budget. The report does not categorize subsidies explicitly by consumer or producer types; however, most of the following subsidies are directed at producers. Natural gas- and petroleum-related tax expenditures totalled US\$2,690 million, while coal-related tax expenditures amounted to US\$561 million. Applied federal energy R&D expenditures amounted to US\$70 million for natural gas and petroleum liquids, and US\$663 million for coal.

<sup>10</sup> Converted from MYR18.9 billion with the average MYR/US\$ exchange rate of 3.5236 for 2009; retrieved from: [www.bnm.gov.my/index.php?ch=12&pg=629&lang=en&StartMth=1&StartYr=2009&EndMth=12&EndYr=2009&session=1200&pricetype=Mid&unit=rm](http://www.bnm.gov.my/index.php?ch=12&pg=629&lang=en&StartMth=1&StartYr=2009&EndMth=12&EndYr=2009&session=1200&pricetype=Mid&unit=rm)



U.S. subsidies to large corporations in the fossil-fuel sector were identified in a Congressional Report (Casey, 2011). The document listed different types of support “to the major integrated oil and natural gas companies” in the form of “domestic manufacturing deduction[s] against income derived from the production of oil and gas; ... expensing of intangible drilling costs [and] of costs of tertiary injectants used as part of a tertiary recovery method; and ... modifying the foreign tax credit rules for dual-capacity earners” (Casey, 2011, p. 1). Congress’s Joint Committee on Taxation (2011) estimated that these measures would amount to US\$1.2 billion in fiscal year 2012 and US\$21 billion in fiscal year 2021.

In addition, a study by Koplow (2007) found that U.S. federal energy subsidies totalled US\$79 billion in 2006, of which US\$49 billion were to fossil fuels.



## 2.0 *Availability and Transparency of Data*

While some estimates and analysis of fossil-fuel subsidies are available, particularly at the global level, data availability is inconsistent across countries and many gaps exist. A necessary prerequisite for subsidy reform is an accurate picture of the nature and level of subsidization (GSI, 2010b). Reliable information facilitates assessment of the subsidy costs, distribution and impacts, and the development of effective reform strategies. At the international level, transparency provides the foundation for dialogue on reform and for monitoring the progress of phase-outs. The current gaps in data about fossil-fuel subsidies and differences among countries in availability and quality hinder reforms. This section reviews the causes of lack of data on the national and international levels, discusses the implications of the limited availability and transparency, and examines data availability on consumer and producer subsidies for fossil fuels with a focus on APEC economies.

### Reasons for the Current Lack of Transparency

One reason why information on fossil-fuel subsidies is still opaque is that governments themselves do not have full records on the range of support measures in place in their jurisdictions (Laan, 2010). Energy subsidies are frequently administered by different ministries and in many countries, as well as by central and subnational governments, without comprehensive coordination and oversight. Besides on-budget subsidies that are visible in national accounts, many other forms of support have never been calculated—for example, the value of special tax exemptions or the opportunity cost of allowing access to fossil-fuel resources at below-market prices. Records of cross-subsidies provided by state-owned energy companies are another example of data that are usually hard to come by, making estimates of net subsidies difficult (Laan, 2010).

As is evident through the multitude of different subsidies in place around the world, a massive effort is needed to produce reliable figures on them. However, currently most governments do not dedicate enough resources, if they dedicate any, to subsidy transparency. Developing countries are particularly challenged, as they tend to have lower budget transparency and accounting standards and information may not be as readily available electronically. Further, pricing decisions of state-owned energy companies are often non-transparent in developing countries (Laan, 2010). The particular experience of such countries suggests that international support to strengthen their technical capabilities can provide great benefits, at least in the initial stages of creating subsidy transparency (Ellis, 2010).

Another issue is that governments often do not see it in their best interests to disclose subsidies. Transparency can help governments to reduce the political influence of subsidy recipients. However, if governments themselves depend on support from those that receive subsidies, there is a disincentive to improve transparency, which might lead to the questioning of these subsidies (Victor, 2009).

On the international level, the lack of transparency is also due to the absence of an international system or protocol to comprehensively assess and monitor fossil-fuel subsidies (GSI, 2010b). There is currently no mechanism to gather and manage data on subsidies. Such international measures could facilitate the collection of data across multiple jurisdictions through agreed standards on scopes and methodologies for documenting subsidies. Internationally consistent estimation methods and subsidy-accounting standards could result in improved national reporting. This would allow compiling and comparing data from different countries. Even where international obligations to report subsidies do exist, these are not being met. WTO members, obliged to notify subsidies under the WTO ASCM, have, in practice, fallen short of their commitments.<sup>11</sup>

<sup>11</sup> For a summary of the current situation of international cooperation to phase-out fossil fuels in the WTO and other venues and solutions for improvement, see Lang, Wooders & Kulovesi (2010).



## Problems Created by Limited Data Availability

The disparities in data availability and quality of information among countries and categories of subsidies are stark. In estimating magnitudes and identifying types of energy subsidies, challenges are posed both by the lack of data and the absence of consistency in data collection (Laan, 2010). The gaps in knowledge about the level and nature of countries' fossil-fuel subsidies make it difficult for APEC governments to assess the impacts these subsidies have. A further effect is that it is harder to develop effective implementation strategies to achieve their stated objectives: reducing the burden on government expenditure, improving energy efficiency and security, boosting investment in clean energy sources and addressing climate change.

Comparisons across countries are also more challenging when they are based on inconsistent data (Laan, 2010). To a large extent, currently available information on subsidies focuses on consumer subsidies in developing countries, estimated through price-gap analysis. This is at least partly due to the fact that such subsidies are relatively easier to detect and quantify. This resulting bias diverts attention from subsidies in developed countries, particularly from the often considerable support to fossil-fuel production. Comprehensive subsidy reform should take place both in developing and developed countries and consider both consumer and producer subsidies.

## Producer and Consumer Subsidies Data

Annex II provides an overview of the different types of producer subsidies, how easy their valuation is and what sources can be drawn depending on the level of transparency in a given country. The table underlines the challenges confronting the collection of very diverse types of data from different sources. The reason for non-transparency is often not due to data not being released but rather to their non-existence in the first place.

Data on fossil-fuel subsidies in APEC economies are only partly available and inconsistent. If subsidy reform is to gain traction, national and international efforts are required to provide a comprehensive picture of fossil-fuel subsidies. This would form the required basis for assessing subsidy impacts, developing reform strategies and monitoring progress (GSI, 2010b).





### 3.0 *Fiscal and Economic Impacts of Fossil-Fuel Subsidies*

Due to their magnitude and broad effects, fossil-fuel subsidies have considerable economic repercussions. Fiscal expenditures on subsidies are often substantial, burdening national budgets. By encouraging overconsumption and inefficient energy usage, subsidies can lead to higher imports, negatively affecting balances of payments. Market inefficiencies can also result in fuel shortages. Inflation can be exacerbated by both the subsidy and subsidy reform—higher inflation can result from increasing the fiscal deficit to pay for subsidies or from increasing fuel prices to reduce a subsidy. Further, energy investment decisions are distorted by fossil-fuel subsidies. Fuel diversion for unintended uses and cross-border smuggling are frequent consequences of artificially low fuel prices. After discussing these key economic costs of subsidies, this section reviews estimates of the economic impacts of subsidy removals. It concludes by examining evidence of economic costs and benefits in several APEC economies. It should be noted from the outset that, due to data availability, the section focuses mainly on the effects of consumer subsidies.

#### Fiscal and Economic Impacts of Fossil-Fuel Subsidies

##### *Fiscal Liability*

Consumer subsidies that set the price of energy below market prices expose government budgets to the volatility of these prices (Bromhead, 2011). Particularly, net fuel importing countries that must purchase their fuel at international market prices, such as China, Indonesia or Thailand, can see their fiscal balance deteriorate with an increase in world prices. A stark increase in international prices, as in 2008, confronts governments with two unattractive policy options: letting consumer prices surge—potentially triggering inflation and unpopularity—or increasing expenditure. The latter option can force governments to increase debt or reduce expenditure in other areas, which can in turn lead to slower development and diminished economic competitiveness. The wider the gap between domestic and international fuel prices, the more vulnerable an economy's fiscal position is to unpredictable changes in global energy prices. Malaysia for example, saw its budget deficit increase from 2.7 per cent of GDP in 2007 to 7 per cent of GDP in 2009 as a result of increasing global oil prices and the ensuing increase in public expenditures on subsidies (Sivalingam, 2011). Mexico foresaw fuel subsidy expenditures amounting to around US\$25 billion for 2008—a fourfold increase since 2007 (Kojima, 2009).

##### *Economic Inefficiencies*

The market distortions caused by fuel subsidies lead to different economic inefficiencies. By lowering prices, subsidies encourage overconsumption and can thereby increase fuel imports and lower exports. This deteriorates the national balance of payments and increases foreign dependence, widening the vulnerability to international price changes (Bromhead, 2011). Oil price volatility can lead to uncertainty over future revenues that can hold back investment and difficulties in macroeconomic management.

##### *Inflation*

Rising energy prices as a result of rising international market prices or as a result of subsidy reduction can contribute to general inflation as the prices of energy inputs into all products rise. This has been shown for several (non-APEC) economies through economic modelling (IEA, OECD, OPEC & World Bank, 2010). Recent examples from the APEC region include the Bank of Thailand calculating that inflation in the country would increase by between 0.5 and 1 percentage points if oil subsidies to stabilize retail petroleum fuel prices are removed (Limsamarnphun, 2011).



Meanwhile, also for Thailand, the bank Credit Suisse has estimated that a permanent 10 per cent increase in the retail price of diesel would increase headline inflation by seven tenths of a percentage point within a year (Sriring, 2011). In China, since early 2009, fuel taxes have risen considerably for petrol and diesel. By simultaneously removing various fees, authorities have reduced any inflationary impact as a result of the fuel price increase (Dansie, Lanteigne & Overland, 2010). In the medium to long term, it is expected that the economic gains of a more balanced fiscal position, reducing the deficit or increasing spending in other areas, will outweigh the short-term rise in inflation.

### *Fuel Shortages*

Fuel shortages are common when domestic energy prices are kept low (Kojima, 2009). Fixed fuel prices dampen consumers' demand response to price signals. At the same time, low domestic energy prices cause financial difficulties for oil companies and can result in refiners and importers reducing procurement, exacerbating the gap between supply and demand. Price increases of non-subsidized fuels can also lead to an additional demand of subsidized energy. When consumers expect that prices will rise, panic buying and hoarding of subsidized fuels can take place with ensuing shortages. In China, fuel shortages arose in 2008 because refiners were taking heavy losses due to rising world crude prices and fixed domestic prices. They reduced or stopped refining, which caused widespread shortages, potentially impacting economic growth (Kojima, 2009).

### *Investment*

Artificially low energy prices generally reduce national energy companies' revenues, in turn constraining their capacity to invest in energy infrastructure. This commonly affects developing countries' electricity, oil, gas and coal sectors (IEA, 2010). To address this issue arising from consumer subsidization, producer subsidies are sometimes used to provide energy companies with capital. However, this leads to an aggravation of the fiscal burden. The incentive to actually finance new capital is lower if price controls are in place, as they decrease the expected returns of investments. The Indonesian case illustrates the consequences of energy companies' lack of capital to maintain and expand the energy system (Mourougane, 2010). Even with government compensation, in 2009 the state-owned power company had a large deficit due to the gap between supply cost and revenue from sales under the mandated low prices. This led to the inability to fund new investments, connect rural areas to the electricity grid and, in certain cases, even prevented standard maintenance. The result has been a lack of development of generating capacity and frequent blackouts.

Non-fossil energy investments are also discouraged by fossil-fuel subsidies and thereby prevent an economically beneficial diversification of the energy supply. Subsidies undermine investment in alternative energy sources and alternative energy technologies by increasing consumer demand for fossil fuels, or decreasing production costs for producers, thereby making investments in renewable energy less lucrative. Subsidies that encourage investments in new fossil-fuel energy infrastructure essentially "lock in" technologies for decades. Coal power plants, for example, have lifetimes of at least 45 years and gas turbines of 25 (Stern, 2006). Investments in such technologies, reasonably assuming that they will not be written off ahead of time, considerably reduce the potential for renewable energy to green the energy supply for the foreseeable future.



### *Fuel Adulteration and Corruption*

Subsidies in the form of price controls commonly result in black market trading of fuels in short supply, smuggling of fuels from jurisdictions where they are subsidized to those where they are not, and adulteration of non-subsidized fuels with subsidized ones, as well as related corruption (Kojima, 2009). By creating price disparities between subsidized and non-subsidized products, subsidies encourage fuel smuggling and sale to unintended recipients. In Indonesia, for example, a government agency estimated that 10 to 15 per cent of subsidized fuel distributed by the government was illegally sold to industries (Fadillah & Samboh, 2011). Illegal sales and smuggling led to an increase in the demand for subsidized fuels, increasing subsidy costs. Also in Indonesia, explosions resulting from improper handling of fuels to transfer LPG from the subsidized 3-kilogram cylinders to the non-subsidized 12-kilogram cylinders, and trying to illegally profit from price differences, has led to injuries and deaths (KOMPAS, 2010; KOMPAS, 2011). In India, subsidized kerosene is sold at much lower prices than diesel and as it is a near perfect substitute for diesel, the price difference incentivizes such activities. This results in up to 40 per cent of subsidized kerosene being diverted to the black market or for use as a transport fuel (Shenoy, 2010).

### **Economic Benefits of Reforming Fossil-Fuel Subsidies**

There are significant economic benefits to be gained from reducing or phasing out fossil-fuel subsidies. Indonesia, Malaysia, Russia and Thailand, for example, spend between 2 and 3 per cent of GDP subsidizing fossil fuels, while Mexico spends 0.9 per cent of GDP, the Philippines 0.6 per cent and China 0.4 per cent of GDP (IEA, n.d.). This is lower than the double-digit percentages of some Middle Eastern and Central Asian countries, but still substantial. The IEA and OECD have found that eliminating subsidies would increase per-capita GDP in most countries examined (IEA, 2009b). Besides reducing government expenditure, the IEA sees a key benefit of reducing subsidies in quicker and stronger responses by demand to energy price changes in the future (IEA, 2010). A number of studies have attempted to quantify the macroeconomic impacts of fuel subsidy reforms. Macroeconomic research that addresses the global or regional level is initially discussed, before turning to studies that are available for individual APEC economies.

A recent OECD study concluded that if energy subsidies were to be eliminated in non-OECD countries, this would result in GDP gains in these countries, as well as OECD countries (despite them undertaking no reforms in the model) (Burniaux, Chateau, Dellink, Duval & Jamet, 2009a). The model included seven APEC economies, for which the predicted changes in GDP and real income from a multilateral removal of energy subsidies in non-OECD countries are shown in Table 3.1. GDP and real income changes are relatively small in most cases as, the study argues, demand for energy is not very sensitive to price limiting the distortionary impact of a subsidy removal. Also, lower world fossil-fuel prices would lead producers to reduce supply, leaving more reserves untapped and, all things being equal, reducing GDP.



**TABLE 3.1: PREDICTED CHANGES IN GDP AND REAL INCOME RELATIVE TO A BUSINESS-AS-USUAL BASELINE IN SEVEN APEC ECONOMIES FROM A MULTILATERAL REMOVAL OF ENERGY SUBSIDIES IN NON-OECD COUNTRIES**

REGION	GDP		HOUSEHOLD EQUIVALENT REAL INCOME*	
	2020	2050	2020	2050
Australia & New Zealand	0.1	0.1	0.0	-0.6
Canada	0.0	-0.3	-0.4	-1.5
China	0.2	0.6	0.1	0.7
Japan	0.1	0.6	0.4	0.9
Russia	0.7	-2.5	0.1	-3.7
United States	0.0	0.2	0.1	0.1

\*Hicksian "equivalent real income variation" is defined as the change in real income (in percentage) necessary to ensure the same level of utility to consumers as in the baseline projection.

Source: Burniaux et al. (2009a)

A review of Burniaux et al. (2009a) and five other studies by Ellis (2010) showed that fuel subsidy reform would likely lead to overall increases in GDP, with few countries (i.e., large fuel exporters) seeing slight decreases in GDP. The studies predicted welfare gains for both OECD and non-OECD countries. Differentiating between the two groups, the studies usually found non-OECD countries to have higher GDP increases. The predictions in GDP changes varied significantly, from an increase in 0.1 per cent overall by 2010 to an increase in 0.7 per cent per year to 2050 (Ellis, 2010).

For APEC economies Mexico and Indonesia, empirical studies have built general equilibrium models to simulate the macroeconomic effects of subsidy removal. The Energy Sector Management Assistance Program (2004, cited in World Bank, 2010a) modelled the effects of electricity subsidy removal in Mexico for the period 2000–2015, assuming that freed government revenue would be used for goods and transfers. Generally, small macroeconomic effects were found, with small declines in GDP, exports, imports and employment. The lower overall consumption led to more investments into capital stock.

For **Indonesia**, Clements, Jung and Gupta (2007) modelled the effects of removing subsidies for petroleum products. In one scenario, real output fell and consequently, so did household incomes. In a second scenario, aggregate output remained unaffected. Both cases saw the prices of all goods rise because of the lower subsidies.

Besides modelling future subsidy phase-outs, the economic effects of actual experiences in APEC economies have been documented. Between 2005 and 2008 the **Indonesian** government considerably increased petroleum, natural gas, diesel, gasoline and LPG prices. The Indonesian Ministry of Energy and Mineral Resources estimated that this led to savings in government expenditure of US\$270 million per year (IEA, 2009b).

In **Russia**, consumer subsidies in the form of underpricing made the country the least efficient worldwide in energy consumption per unit of GDP, and its gas and electricity firms incur high revenue losses with ensuing low investments (IEA, 2010). In 2003 the country began a process of gradually liberalizing prices for industry with the aim of alignment with export prices by 2014 (Laan, 2011). Pricing in the wholesale electricity market for industry was also steadily liberalized by 2011. In the residential sector, which accounts for up to 15 per cent of total electricity consumption,



prices will be cross-subsidized by industry at least until 2014 (Solanko, 2010). Through the reform measures so far, average electricity prices for industry have risen by more than 50 per cent between 2006 and 2009 and the national gas corporation has been able to reach a net profit from domestic sales for the first time in 2009.

Hope and Singh (1995) examined the economic effects of Malaysia’s subsidy reforms in 1984–1985. They found that GDP rose by 7.8 per cent in 1984, dropped by 1 per cent in 1985, and rose again by 1.2 per cent in 1986 and by 4.7 per cent in 1987. The authors note that many factors could have influenced the GDP growth rates, especially as many fiscal policy changes were being undertaken at the time. They conclude that the public deficit was reduced and that the increase in treasury revenues by 2 per cent was at least in part the result of subsidy reform.

A GSI study modelled the economic effects of removing subsidies to oil producers in Canada’s three biggest producing regions (Sawyer & Stiebert, 2010), as shown in Table 3.2. The study concluded that GDP would fall by 0.16 per cent or less in the oil sector but remain unchanged economy-wide. The budget balances would improve significantly for federal and provincial governments, even taking into account reduced revenue from lower production rates. The trade surplus declines in all cases with the lower oil exports. The effect of removing subsidies would be negligible or slightly positive for employment rates, due to the oil sector being more capital-intensive. The study concluded that oil production is forecast to more than double between 2010 and 2020, with or without the subsidies in place; and scaling up the current subsidies to future production levels would more than double the subsidies as a share of government expenditure.

**TABLE 3.2: ECONOMIC IMPACTS OF REMOVING SUBSIDIES FOR OIL PRODUCERS IN THREE CANADIAN PROVINCES (PERCENTAGE CHANGE WITH NO SUBSIDIES FROM 2020 BASELINE WITH SUBSIDIES)**

	FEDERAL/NATIONAL	ALBERTA	SASKATCHEWAN	NEWFOUNDLAND AND LABRADOR
GDP	0.0%	-0.16%	-0.14%	-0.10%
GDP Oil Producers	-4.8%	-6.0%	-1.2%	-0.3%
Government Budget	0.9%	4.8%	3.8%	-0.2%
Net Oil Exports (trade surplus)	-13.6%	-9.9%	-1.6%	1.0%
Employment	0.0%	0.4%	0.3%	0.0%

Source: Sawyer & Stiebert (2010)

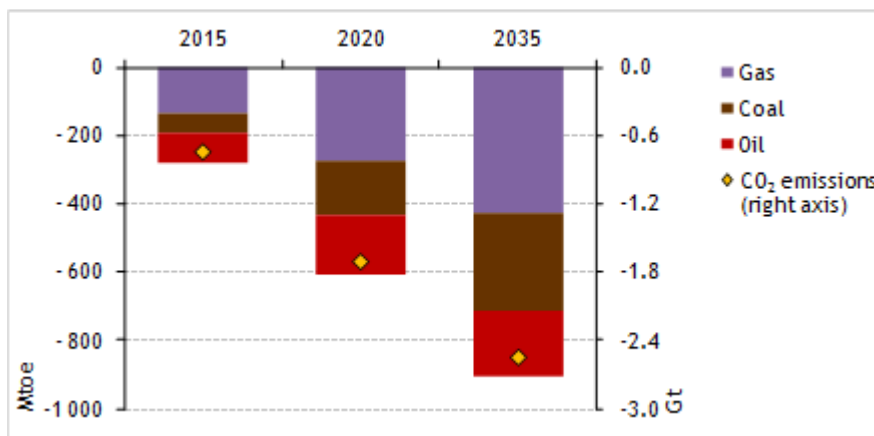


## 4.0 Environmental Impacts of Fossil-Fuel Subsidies, Including Implications for Energy Consumption

Subsidies encourage greater consumption of fossil fuels by making them cheaper to use, and increase production by reducing costs or increasing revenues, thereby having significant environmental impacts. Fossil-fuel subsidies can result in a host of negative environmental impacts, including: greater greenhouse gas (GHG) emissions, increased pollution of local air and water resources; land degradation and depletion of non-renewable resources. In some cases, subsidies can also have positive environmental impacts, such as reducing pressure on forests by reducing biomass fuel use, or shifting energy consumption from more to less polluting energy types (Ellis, 2010).

### Global Impacts on Energy Consumption and GHG Emissions

The IEA (2011a) has estimated that a gradual and full phase-out of worldwide subsidies for fossil-fuel consumption over the period 2012–2020 would reduce global energy demand by 4.1 per cent (620 million tonnes of oil equivalent [Mtoe]) by 2020, compared to if the subsidies remained in place, as shown in Figure 4.1. Additional benefits would accrue after the phase-out is accomplished, leading to a 5 per cent (930 Mtoe) energy demand reduction by 2035. In more detail, the phase-out would decrease oil demand—mainly for transportation—by around 3.7 million barrels per day (mb/d) by 2020, equaling the current consumption of Japan. By 2035 oil demand would decrease by 4.4 mb/d (4 per cent). Coal demand would decrease by 230 megatonnes of coal equivalent (Mtce) in 2020 and 410 (5.3 per cent) in 2035, while natural gas demand would decrease by 330 billion cubic metres (bcm) by 2020 and by 510 bcm (9.9 per cent) in 2035.



**FIGURE 4.1: IMPACT OF A FOSSIL-FUEL CONSUMPTION SUBSIDY PHASE-OUT ON GLOBAL ENERGY DEMAND AND CARBON DIOXIDE (CO<sub>2</sub>) EMISSIONS, 2012–2035**

Note: This figure represents savings from the progressive phase-out of all subsidies by 2020 when compared to a baseline in which subsidy rates remain unchanged.

Source: IEA (2011a)



The lower demand for fossil fuels would in turn reduce CO<sub>2</sub> emissions by 4.7 per cent, or 1.7 gigatonnes (Gt), by 2020 and 5.8 per cent or 2.6 Gt by 2035, as estimated by the IEA and illustrated in Figure 4.1 above (IEA, 2011a). Cumulatively until 2035, the phase-out of fossil-fuel subsidies would lower emissions by 41 Gt. The OECD estimates that a multilateral phase-out of subsidies for fossil-fuel consumption would reduce GHG emissions by 10 per cent by 2050 (when compared to the baseline) if OECD countries abide by emissions caps announced in the Copenhagen Accord (IEA, OECD, OPEC & World Bank, 2010). The OECD also found that the biggest impacts would be felt in Russia and other Eastern European countries, which could see a reduction in GHG emissions by more than 20 per cent by 2050.

Both the IEA's and the OECD's findings are based on the same subsidy estimates calculated through the price-gap method and thus can be considered conservative, as they exclude a number of subsidies, notably subsidies for the production of fossil fuels.

Ellis (2010) reviewed six studies on the interplay between subsidies and emissions. The studies all employed the price-gap approach to estimate the magnitude of current subsidies and varied in the time horizons they examined. The findings of the studies ranged from a GHG-emissions reduction of 1.1 per cent by 2010 to an estimated reduction of 18 per cent by 2050. The various studies reviewed by Ellis (2010) differ in scope, assumptions and time horizons and are therefore difficult to compare directly. Nonetheless they all project that fossil-fuel subsidy reform would have a considerable impact on GHG emissions.

A recent study showed that those OECD economies that had historically higher fuel prices due to taxes developed much more energy-efficient infrastructure and transport use habits than countries with lower taxes (Stern, 2007, cited in World Bank Independent Evaluation Group, 2009).

## Regional Impacts on Energy Consumption and GHG Emissions

The OECD has calculated that a gradual multilateral phase-out of energy subsidies in 20 non-OECD countries—that are responsible for around 40 per cent of world energy consumption and for which the IEA has estimated subsidies—would lead to a 16 per cent reduction (8.8 Gt CO<sub>2</sub> equivalent) of GHG emissions from fossil fuels by 2050 in these countries (Burniaux, Chateau, Dellink, Duval & Jamet, 2009b). Integrating offsetting effects from emissions increases in OECD countries (which could be avoided through appropriate emission caps for OECD countries), such a phase-out would lead to worldwide GHG emission reductions of 10 per cent by 2050, relative to business as usual. Table 4.1 shows how the national GHG emissions of the APEC economies included in the study would change with a multilateral phase-out of energy consumption subsidies in the non-OECD countries.



**TABLE 4.1: CHANGES IN GHG EMISSIONS FOR SELECTED APEC ECONOMIES WITH A MULTILATERAL ENERGY SUBSIDY PHASE-OUT IN 20 NON-OECD ECONOMIES (PER CENT DEVIATION RELATIVE TO BUSINESS AS USUAL)**

REGION	CO <sub>2</sub> EMISSIONS FROM FUEL COMBUSTION		ALL GHG EMISSIONS	
	2020	2050	2020	2050
Australia & New Zealand	2.1	8.3	1.2	3.4
Canada	1.7	5.5	1.3	3.7
China	-4.0	-15.7	-3.1	-11.8
Japan	1.6	10.8	1.4	8.7
Russia	-19.9	-41.3	-16.6	-34.6
United States	1.2	7.5	1.0	6.1

Source: Burniaux, et al. (2009a)

The OECD study found that the reduction of subsidies in the 20 non-OECD countries examined would lead to lower fuel demand in these countries, which, in turn, would likely cause world oil prices to fall. The lower world price would lead to higher demand in other countries, with ensuing emissions increases. To avoid such an effect, OECD countries in particular would have to impose caps on their emissions.

For Indonesia, Yusuf, Komarulzaman, Hermawan, Hartono and Sjahrir (2010) have found that the phase-out of fuel subsidies would reduce CO<sub>2</sub> emissions by almost 6 per cent by 2020. The removal of electricity subsidies would lower emissions by close to another percentage point by the same year.

The GSI's study on subsidies for oil exploration and production in Canada also modelled the impacts of subsidy removal on GHG emissions. The study concluded that subsidy removal could reduce national emissions by more than 2 per cent below expected levels in 2020, if federal and provincial subsidies were reformed (Sawyer & Stiebert, 2010).

The various estimates of changes in emissions resulting from lower consumption of fossil fuels due to reductions in subsidies hinge on assumptions of the price elasticity of energy consumption—or in other words, how consumption reacts to price changes. Generally, studies assume that demand is price elastic, or that it increases with price decreases and vice versa (World Bank Independent Evaluation Group, 2009). There is much evidence showing that higher energy prices lead to lower demand, thereby reducing CO<sub>2</sub> emissions. It is on this basis that the above estimates project decreases in CO<sub>2</sub> emissions from subsidy removals. A 2004 review of almost 200 energy demand studies since 1991 showed that an increase in energy prices by 10 per cent led to an average 7 per cent expected reduction in energy demand in the long run (Dahl & Roman, 2004, cited in World Bank Independent Evaluation Group, 2009). In the short run, however, individuals might not be able to change their consumption behaviour much in the face of price changes; this is especially the case when energy is rationed.

In Indonesia, strong price elasticity has been observed for petroleum fuels (IMF, 2008a, cited in Kojima, 2009). From 2004–2008, consumption rose whenever the gap between domestic and international prices increased. This was attributed to an increase in smuggling out of the country and shifts to subsidized fuels.





## Environmental Impacts in APEC Economies

Fossil-fuel combustion emits sulfur dioxide, nitrogen oxides and particulates that contribute to local air pollution. These pollutants can cause significant health impacts and damage structures, agriculture and natural environments. Production and consumption of fossil fuels can pollute water, including through oil spills from tanker accidents, runoff and leaching from tailings and coal washing, and flooding of closed mines that contaminate groundwater. Both air and water pollution can have the effect of increasing the demand for land and water, adding to environmental pressures. Further, fossil-fuel production contributes to the exhaustion of this non-renewable natural resource.

Despite general knowledge on this multitude of environmental impacts that are exacerbated by fossil-fuel subsidies, there are few specific data available on them (Ellis, 2010). Studies to date have mostly focused on impacts of fossil-fuel subsidies and their phase-out on GHG emissions.

The implications of subsidy reductions described so far make such studies desirable from an environmental perspective. Some subsidies, however, can be used for environment objectives such as the decommissioning, clean-up, monitoring and restoration of production sites. The United States, for example, is estimated to have paid “many tens of billions of dollars” to stabilize abandoned coal mines (Koplow, Lin, Jung, Thöne & Lontoh, 2010, p. 142). The decommissioning and clean-up costs of production sites should be paid for by producers. Ideally, a fund, like an Escrow account, should be set up before production starts, in which the producer sets aside a portion of profit during production from which to draw upon during decommissioning. The United States government has also paid for litigation procedures to make past owners comply with their environmental protection obligations concerning oil, gas and coal production (Koplow, et al., 2010, p. 142).

In some cases, subsidizing energy consumption can also serve environmental objectives, for instance lowering deforestation by discouraging the use of biomass for fuel or shifting energy consumption to cleaner fuels. Indonesia, for example, has implemented a national kerosene-to-LPG program to reduce its kerosene subsidies and to shift energy consumption to LPG, which is less polluting (Ministry of Finance, Indonesia, 2010b). Government support can also promote the use or development of environmentally friendly technologies, such as carbon capture and storage.



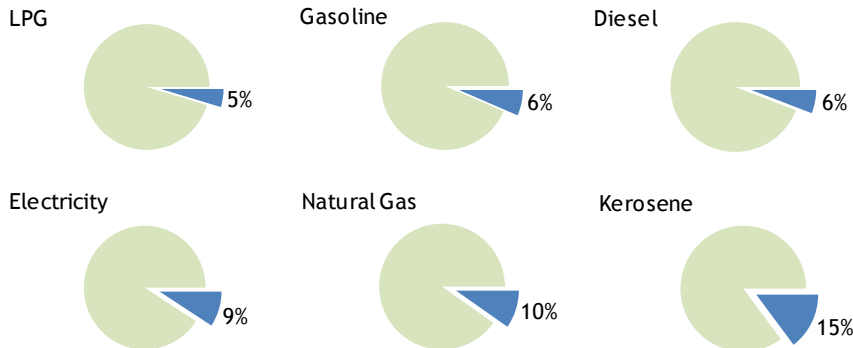
## 5.0 Social Impacts of Fossil-Fuel Subsidies

Subsidies to fossil fuels, especially consumer subsidies that lower energy prices in developing countries, are frequently justified as providing benefits to lower-income populations in the form of cheaper energy and, thereby, more affordable living costs (Ellis, 2010). For example, electricity subsidies or programs that shift low-income household energy consumption to cleaner fuels can help alleviate poverty and counter health impacts from indoor air pollution. However, energy subsidies are not always well targeted for the poor and there are often more effective and efficient ways of providing support. In practice, energy subsidies often end up benefitting energy firms, suppliers of equipment and higher-income households, especially in urban areas (United Nations Environment Programme, 2008). Rural areas, which are predominantly poor, benefit little if at all, from support measures, as they have less access to energy infrastructure or cannot afford it even when subsidized. Urban poor also benefit proportionally less from subsidies as they consume less energy. This section discusses the social implications of fossil-fuel subsidies and the studies that have quantified the social impacts of reform with a focus on individual APEC economies.

### Impacts of Fossil-Fuel Subsidies on Social Welfare

A central criticism of consumer subsidies in the form of lower prices is that they tend to be regressive in their distribution. As energy consumption correlates with the level of income, the higher the income, the higher the subsidies received, in both absolute and per capita terms. Because most energy subsidies are paid according to necessity, higher energy consumption equates to harnessing higher subsidization. The World Bank (World Bank Independent Evaluation Group, 2009) concluded for a series of cases that, on average, the lowest 40 per cent of income earners only receive 15 to 20 per cent of fossil-fuel subsidies. An IMF study (Baig, Coady, Mati & Ntamungiro, 2007) calculated that, on average, the top quintile of high-income households received more than 40 per cent of all subsidies, while the lowest quintile received less than 10 per cent. Similarly, the IEA (2011a) found that only 8 per cent of the US\$409 billion spent subsidizing fossil-fuel consumption in 2010 went to the poorest 20 per cent of the population.

Distinguishing between different fuels types, variations in how different income groups benefit from subsidies for the different fuels are visible. One study shows that gasoline subsidies have been distributed most regressively, with over 80 per cent of total benefits being accrued by those in the top 40 per cent income bracket (Coady et al., 2010). LPG followed closely with 70 per cent, and diesel was third with more than 65 per cent of benefits accruing to this top income group. An analysis by the IEA points in the same direction, with subsidies to LPG, gasoline and diesel providing the smallest benefit to the lowest quintile, as shown in Figure 5.1. Contributing to undermining the effectiveness of fuel subsidies that are relatively more beneficial for the poor—such as kerosene—is their diversion to adulterate transport fuels, or to neighbouring countries where fuel prices are higher. For example, in India, it is estimated that more than one third of the subsidized kerosene ends up on the black market for use as a transport fuel, with secondary effects being corruption of officials and the emergence of interest groups that hinder reform (Shenoy, 2010).



**FIGURE 5.1: SHARE OF FOSSIL-FUEL SUBSIDIES RECEIVED BY THE LOWEST INCOME QUINTILE BY FUEL IN SURVEYED COUNTRIES, 2010**

Note: Countries surveyed were Angola, Bangladesh, China, India, Indonesia, Pakistan, Philippines, South Africa, Sri Lanka, Thailand and Vietnam.

Source: IEA (2011a)

In **Indonesia**, subsidies for fuel consumption also benefit the higher-income households: in 2008, it was estimated that the wealthiest 40 per cent of households received 70 per cent of all subsidies, while the lowest 40 per cent received only 15 per cent (IEA, 2009a). For gasoline, the numbers were even more skewed towards higher incomes, with the top 50 per cent of households receiving 84 per cent of subsidies, and the top 10 per cent alone getting close to 40 per cent. Meanwhile, the poorest 10 per cent received less than 1 per cent of gasoline subsidies (World Bank, 2011).

Beyond the distribution effects, fossil-fuel subsidies can have a series of other significant social impacts. Consumer subsidies lower the revenue of energy companies, as discussed in Section 3. This can deprive them of capital to expand electricity supply to poor rural areas, negatively affecting populations (United Nations Environment Programme, 2008).

Both consumption and production subsidies require government funds, reducing those available for healthcare, education, food programs or targeted cash transfers, from which lower income populations benefit (Ellis, 2010). By increasing consumption, subsidies also lead to higher pollutant emissions from fossil fuels, disproportionately affecting the lower-income populations locally through health impacts (Moltke, Morgan & McKee, 2004), as well as globally, as the poor have been found to suffer most from climate change. Being more vulnerable in the first place, the affected lower-income populations cannot afford to move geographically.

Some subsidy programs have had some success in achieving social objectives, such as shifting energy consumption to cleaner fuels and reducing energy poverty. For example, **Indonesia** has been successfully implementing its kerosene-to-LPG subsidy program since 2007. The government has reduced kerosene consumption from 9.9 million kilolitres (KL) in 2007 to 2 million KL in 2010 by providing over 23 million LPG conversion packages, including a cookstove and 3kg LPG cylinder (Ministry of Finance, Indonesia, 2010b). LPG, a much cleaner-burning fuel, does not cause indoor air pollution, whereas kerosene, in many developing countries, leads to poisoning in children that ingest it and loss of life and property from fires linked to its use (McDade, 2004).

However, not all subsidies intended to shift energy consumption of poor households to cleaner fuels have been as successful. In India, for example, the government of Andhra Pradesh implemented an LPG subsidy “Deepam Scheme”



in 1998 intended to help poor families afford the upfront cost of getting an LPG connection (Bandyopadhyay, 2010). The objectives of the scheme were to reduce urban and rural poor households' reliance on biomass for cooking; alleviate energy poverty by switching consumption to a cleaner fuel with less negative health impacts; and relieve the burden of having to collect firewood or biomass for women and children, freeing up more time for studies or other productive activities. The scheme provided rural women with a subsidy of INR1000, around US\$22, for the connection. However, the cost of the fuel itself was not subsidized. An evaluation in 2001 showed that most rural households continued to rely on traditional fuels for cooking. In a renewed effort to increase rural LPG consumption, thereby also reducing losses incurred by oil companies due to lack of LPG demand, the state government introduced smaller, more affordable LPG cylinders. The efficacy of the revised scheme has yet to be evaluated.

In **Senegal**, starting in the 1970s, several different types of LPG subsidies have had the effect of substantially reducing deforestation from firewood and charcoal use (Laan, Beaton & Presta, 2010). However, a recent IMF study found that, although the consumption subsidies were targeted at the poor by lowering the price of smaller LPG cylinders, the poorest 40 per cent of the population benefitted only from 19 per cent of the total welfare increase, while the richest 40 per cent received a share of 61 per cent (IMF, 2008, cited in Laan, Beaton & Presta, 2010). Poorer households could not afford even the subsidized LPG and, especially in rural areas, continued to use charcoal and firewood for cooking and kerosene for lighting.

## Impacts of Fossil-Fuel Subsidy Reform on Social Welfare

The benefits of fossil-fuel subsidies accrue mainly to higher income groups, but their costs have to be raised from societies overall. As a result, reducing and phasing out subsidies will have long-term economic benefits. Nevertheless, in the short term, subsidy elimination can have negative impacts on certain population groups. The following section will discuss quantitative studies that have been undertaken to estimate the social effects of phase-outs with a particular focus on the few quantitative assessments of APEC economies that have so far been undertaken.

For **Canada**, Sawyer and Stiebert (2010) have calculated the effects on employment levels of removing subsidies to upstream oil activities in the three Canadian provinces that represent 97 per cent of national oil production. The results concluded that the net effect would be slightly positive (0.4 per cent in Alberta and 0.3 per cent in Saskatchewan), as the oil sector is less labour intensive than other sectors. This was also mirrored by the higher income tax revenue estimates shown in Section 1 above.

For **Indonesia**, Clements, Jung and Gupta (2007) used a computable general equilibrium model to assess the effects of removing subsidies for fossil-fuel consumption. The study found that, in the short term, poor and non-poor groups alike would see their real consumption levels of goods and services fall, while the overall price level increased. Output would decrease or remain stable depending on the scenario. These effects would lead to falling employment and an increase in poverty of less than 1 per cent. It was found that poor urban populations would suffer more than rural poor, as the former rely more on fossil fuels for employment and electricity. In the longer term, however, the study predicted that poor populations would benefit from the phase-out due to improved fiscal sustainability, higher social spending, more efficient allocation of resources, increased investment and better overall macroeconomic stability.

A simulation of subsidy reform effects in five developing countries—Bolivia, Ghana, Jordan, Mali and Sri Lanka—by Coady, et al. (2006, cited in Baig, et al., 2007 and in Ellis, 2010) showed that, on average, a 50 per cent increase in domestic fuel prices would lead to a decrease in household real incomes of close to 5 per cent. The model included both direct and indirect effects. Some countries showed direct effects that were distributionally regressive, while



for others they were neutral. Indirect effects from price increases of goods and services were higher than the direct effects and generally neutral in distribution. In combination, direct and indirect effects led real incomes to decline by 1.7 to 8.5 per cent (as shown in Table 5.1), being moderately regressive in all countries simulated.

**TABLE 5.1: IMPACTS OF SUBSIDY REMOVAL ON HOUSEHOLD INCOME IN FIVE DEVELOPING COUNTRIES**

COUNTRY	AGGREGATE (DIRECT & INDIRECT EFFECT) REAL INCOME IMPACT FROM A FUEL SUBSIDY REMOVAL (RANGE FROM BOTTOM TO TOP INCOME QUINTILES)
Bolivia	5.0 per cent (5.8 to 4.7)
Ghana	8.5 per cent (9.1 to 8.2)
Jordan	4.4 per cent (5.4 to 4.1)
Mali	1.7 per cent (regressive, U) (1.9 if electricity incl.)
Sri Lanka	2.4 per cent (2.9 to 2.2)

Source: Coady, El-Said, Gillingham, Kpodar, Medas & Newhouse (2006)

Using empirical data on spending patterns in the 1980s and some economic modelling, Hope and Singh (1995) studied the impacts of reforming fuel consumption subsidies on spending in six developing countries, including **Malaysia**. In all countries, the increase in fuel prices resulted in incomes being lowered between 1 and 3 per cent. Urban low-income groups were affected most negatively. In Malaysia, between 1983 and 1985, kerosene consumption fell by almost a third when prices increased by a third. The estimated welfare losses for the country were at 1.5 per cent of GDP.

For **Mexico**, the Energy Sector Management Assistance Program (2004, cited in World Bank, 2010a) built a general equilibrium model to simulate the macroeconomic effects of an electricity subsidy removal. The phase-out was modelled for the period 2000–2015, assuming that freed government revenue would be used for goods and transfers. The macroeconomic effects found were generally minor, with small declines in GDP, exports, imports and employment. Welfare decreased for all income groups, though poorer groups were most affected due to their higher dependency on electricity subsidies in proportionate terms.

The drawback of the single-country studies of distributional impacts discussed so far is that they do not include interactions that can take place between countries with unilateral or multilateral phase-outs. An OECD study simulated fuel phase-outs by several non-OECD countries, took into account these and also OECD countries, and confirmed that some of the non-OECD countries would see substantial real income declines in such an event (Burniaux, et al., 2009a). The study found that household equivalent real income would fall by 3.7 per cent by 2050 in Russia but increase by 0.7 per cent in **China**. See Table 3.1 for further figures for APEC economies covered by the study.

The examination of social effects in this section showed that although most of the benefits of fuel subsidies are captured by high-income groups, low-income groups can be disproportionately affected by subsidy reform because they spend proportionately more of their household income on basic commodities like fuel and food. Any government measures to reform subsidies should assess the impacts of the proposed reforms on poor and vulnerable groups and complement the policy reforms with measures to mitigate the negative impacts of rising energy prices for the most vulnerable groups in society. Section 8 outlines the necessary elements of a successful reform package and examples of compensation measures that governments can use to protect lower-income households.



## 6.0 *Issues Raised by the Private Sector Regarding Fossil-Fuel Subsidy Reform*

Energy consumption underpins economic activity and implementation of fossil-fuel subsidy reform affects the private sector in multiple ways. Subsidies for exploration and production of oil and gas are often considered by the industry to be necessary incentives rather than subsidies. Consumption subsidies, on the other hand, can result in under-recoveries for national oil companies and can “freeze out” the private sector from the domestic retail market. The issues are different again for power generators and major consumer groups, such as energy-intensive industries, the transport sector, and agriculture and fisheries.

### Private Sector Issues: Producer Subsidies

Subsidies for upstream exploration and production activities can be difficult to identify and estimate, often involving complex tax and royalty regimes, with interplays between federal and provincial governments, and a lack of clear benchmarks against which to assess the individual provisions. Therefore, studies that aim to estimate and evaluate subsidies for production, such as the GSI's *Fossil Fuels – At What Cost?*,<sup>12</sup> tend to invoke a debate on whether tax breaks and other such provisions are “subsidies” or “incentives,” with the industry holding the view that most provisions are actually necessary incentives to encourage exploration and production activities.

A common justification put forth by the industry (see for example, Mintz, 2010) is that the oil and gas industry is taxed at higher rates than other industries and so any special tax breaks must be considered within the wider tax regime. Industry representatives also often claim that these “incentives” are justified because the industry is capital intensive, requires high up-front expenditure, is high risk, creates jobs and is subject to volatile markets.

On the other hand, while such considerations should play a role in policy-making processes, they do not set the industry apart from other sectors. There are many other capital-intensive industries that do not get comparable levels of support. Risk has fallen in the sector over time and it is generally matched by high returns on markets. Other sectors also create jobs and many are more labour intensive. Price volatility is the same or higher for commodities. Oil and gas companies, moreover, have the advantage that demand for their products can be predicted to remain substantial for the foreseeable future. Table 6.1 outlines some of the common justifications put forth by industry representatives as to why the industry deserves special treatment, and some of the corresponding counter-arguments or considerations (GSI, 2010c).

<sup>12</sup>The GSI's series *Fossil Fuels – At What Cost?* is available at <http://www.iisd.org/gsi/fossil-fuel-subsidies/fossil-fuels-what-cost>



**TABLE 6.1: JUSTIFICATIONS AND COUNTER-ARGUMENTS FOR PROVIDING SPECIAL TAX TREATMENT TO THE OIL AND GAS INDUSTRY**

JUSTIFICATION	COUNTER-ARGUMENTS AND CONSIDERATIONS FOR SUBSIDY EVALUATION
Subsidies increase production, increasing government revenue and energy security of supply	Does increased revenue exceed the cost of the subsidies? How does the cost of oil subsidies compare to other options to increase security of supply, for example, investing in other fossil fuels and renewables, investing in storage and distribution systems, geopolitical options?
The oil industry pays more in taxes and royalties than other industries	Oil in the ground has a rent value (the difference between its market value and the costs of production, including reasonable profit). This should lead to higher government take in a rational system.
Subsidies to oil are less than to other energy sources, such as renewables	If external costs are not included within the fiscal and regulatory system, there may be an argument for subsidies to renewables. Infant industry treatment may also apply to some technologies over periods of some duration. There is no overriding reason why subsidy to one part of the energy sector should result in subsidy to other parts, and all subsidies should be assessed for their efficacy.*
Investment in oil extraction is risky	Risk needs to be apportioned to those best able to manage it, in government or industry. Many other industries are risky and face less certain futures. There is almost certainly a very strong market for oil for at least the next two decades, which may not be the case for other industrial products.
Investment is capital-intensive—industry needs long-term certainty	All sectors of the economy want long-term certainty. Many tend to be capital intensive (e.g., all the energy-intensive sectors) or involve high upfront costs with uncertain benefits (e.g., the pharmaceutical industry). It is not clear that the oil industry is sufficiently different to justify special treatment.
There is a risk of expropriation or appropriation of oil industry investments	Does this characteristic justify subsidy or is it just a part of doing business? How much are other sectors similarly affected?
Marginal (depleting) fields will be lost forever if production is not maintained	Technologies (such as horizontal drilling) have improved over time, as have oil prices, and thus some fields that had been abandoned have been re-opened.
Subsidies will encourage the development and deployment of new technologies and processes	What are the costs and benefits? Would an alternative such as international R&D cooperation be more cost effective?
The industry needs more competition	There are a range of alternative methods to increase competition. It must be proven that more players would lead to net benefit over the longer term.
Subsidies will create and/or retain jobs	How does the cost per job compare to alternatives?
Subsidies are needed because the potential liability from accidents is so high	The case for governments taking liability for private activities is contentious. The nuclear power industry typically receives government assistance of this type, regarded by many to represent a significant subsidy.**
Government discount rates are lower than private oil sector ones, so governments can benefit by incentivizing production	This argument can be applied to all private sector investment, not just the oil sector. Government discount rates also tend to be lower because they are lower risk.

Source: GSI (2010d)

\* The GSI had a three-year program assessing subsidies to biofuels (<http://www.globalsubsidies.org/biofuel-subsidies>) and has published a paper on the cost effectiveness of subsidies to renewable energies ([http://www.nccr-trade.org/fileadmin/user\\_upload/nccr-trade.ch/wp5/5.9b/Cost-effectiveness%20of%20wind%20deployment%20subsidies%20-%20working%20paper%20-%20FINAL%202023-01-2011.pdf](http://www.nccr-trade.org/fileadmin/user_upload/nccr-trade.ch/wp5/5.9b/Cost-effectiveness%20of%20wind%20deployment%20subsidies%20-%20working%20paper%20-%20FINAL%202023-01-2011.pdf)).

\*\* See, for example Schneider, M., Thomas, S., Froggatt, A. & Koplou, D. (2009). *The world nuclear industry status report 2009: With particular emphasis on economic issues*. Table 7, p. 72. Paris, France: Commissioned by German Federal Ministry of Environment, Nature Conservation and Reactor Safety (Contract n° UM0901290).





In the **United States**, there has recently been a debate on reforming tax breaks for fossil-fuel producers. Those in favour of these subsidies state that they increase production and decrease energy prices (Karl, 2011). Others argue that the support measures have virtually no impact on short- or even longer-term production, and thereby have no effect on prices. Furthermore, it is argued that subsidies have not proven able to avert fuel price spikes in the past and have likely reduced investments in renewable energy or energy efficiency “by distorting the effective tax rate on investments in oil and natural gas” (Joint Economic Committee, 2007).

Many countries also treat national oil companies more favourably than private sector companies. For example, in **Indonesia**, Pertamina has different conditions in its Work Agreements than the private sector’s production-sharing contracts. Pertamina also has first right of access to expired production-sharing contracts operated by other companies, and is entitled to a share of all production at discounted rates (Braithwaite et al., 2010). However, preferential treatment can lead to inefficiencies and a lack of competitiveness. **Mexico’s** national oil company, PEMEX, for instance is both heavily taxed and subsidized at the same time, creating many fiscal distortions and leaving PEMEX without the necessary capital to invest in new fields (GSI, 2010d).

## Private Sector Issues: Consumer Subsidies

There are a number of different mechanisms in which governments implement fuel price controls. In some countries, the national oil company is tasked with distributing the subsidized fuel products and is compensated for its losses by the government. In **Indonesia**, for example, Pertamina is the sole distributor of subsidized gasoline and diesel. As a result, other oil companies like Shell and Petronas have found it difficult to compete with Pertamina’s subsidized prices in Indonesia’s retail market (Gelling, 2006).

In **India**, subsidized fuel products were placing a huge burden on the oil marketing companies responsible for distribution. The government provided compensation in two forms: direct financial compensation, worth approximately 3 per cent of the total cost; and by issuing oil bonds worth 70 per cent of the total under-recoveries in 2008–2009 (Soni, 2010). The oil bonds proved to be a very inefficient means of compensating the oil companies. Issued for the medium to long term and only partly tradable, the oil bonds made it difficult for companies to raise funds. The companies faced shortfalls in available capital, necessitating increased borrowing. As a result, oil companies such as Reliance, Essar Oil and Shell India pulled out of India’s retail market (Soni, 2010). Losses suffered by downstream companies due to under-recoveries meant that upstream, exploration and production companies had to share the losses by providing discounts to downstream firms. The costs to exploration and production companies amounted to INR140 billion in 2005–2006 and rose to INR320 billion in 2008–2009—capital which was then not available for investment (Soni, 2010). As a result, India deregulated its petroleum prices in 2010, easing the burden on the private sector and encouraging international companies to re-enter India’s retail market, increasing competition.

It is not unusual for the private sector to support the reform of consumption subsidies. For example in **Thailand**, the private sector has called on the government to phase-out fuel price subsidies. The American Chamber of Commerce in the country supported this position, stating that its members have been negatively impacted by a price structure that is “artificial” (Wiriyapong, 2011). The Chamber of Commerce argues that subsidies that result in below-market prices for fossil fuels are not sustainable and that, almost always, the economic costs outweigh the benefits (Lucarelli, 2005, pp. 21–22). Instead of increasing national economic competitiveness, it is lowered by keeping energy-intensive industries alive that will perish when subsidies eventually have to be eliminated. Additionally, the Chamber criticizes resulting “unreliable energy supply conditions” due to consumer and producer responses to “distorted price signals” (Lucarelli, 2005, p. 22).





## Private Sector Issues: Consumer Groups

Rising energy prices that result from subsidy reform are a major concern for groups that are large consumers of fossil fuels, such as the transport and freight industry, fisherman and farmers. The transport and freight industry, in particular, often claim that subsidy reform will push high increases in inflation, and these groups are liable to strike in the face of subsidy reforms. The transportation industry is strongly opposing the Indian government's current plans to increase diesel prices. In June 2011 the freight industry warned that an increase in diesel prices of INR3 per litre could push freight rates up by 8 to 10 per cent and threatened to strike, prompting the Finance Minister to call for a tax reduction to ease the price increases (Mukherjee, 2011).

Fuel is also an important input for fishermen, and for farmers who need diesel for machinery such as water pumps and farm vehicles. In developing countries, where these groups are vulnerable to energy price increases, support measures targeted to assist farmers and fishermen should be considered in the package of policies to be implemented as part of the subsidy reform plans (discussed in more detail in Section 8).



## 7.0 *Political Economy of Fossil-Fuel Subsidy Reform*

The economic and environmental benefits of reducing and phasing out fossil-fuel subsidies are well known and understood by many governments. But the difficulty lies in overcoming the political barriers to reform. Policy-makers and politicians fear that increasing energy prices will impoverish vulnerable groups in society, that they will face strong opposition from interest groups that benefit from subsidies or that such an unpopular policy will result in a loss of votes in the next election. Even where governments such as the G-20 members have taken an international commitment to reform their fossil-fuel subsidies, implementing national reform policies proves difficult and slow.

In analyzing the political economy of fossil-fuel subsidy reform, Victor (2009) found that, although subsidies are often introduced for legitimate policy objectives, such as redistributing income or supporting infant industries, the reality is that subsidies are often maintained for political reasons as well. Once created, interest groups and investments solidify around the subsidy policy, making it difficult to remove, even when the original policy objective has been achieved.

Often, once a subsidy is in place, companies will base investment decisions around that subsidy and increasingly invest resources to ensure the policy is maintained (Victor, 2009). Concentrated interest groups, such as fossil-fuel producers, are well organized and have access to subsidy mechanisms that are less visible, such as tax breaks and royalty reductions; complex policies that are difficult to calculate and assess. In such cases where the benefits are concentrated in powerful groups and where the costs are diffuse and poorly understood by those bearing the costs (i.e., tax-payers), it can be very difficult for the government to build support for reform despite the financial or economic benefits to be gained.

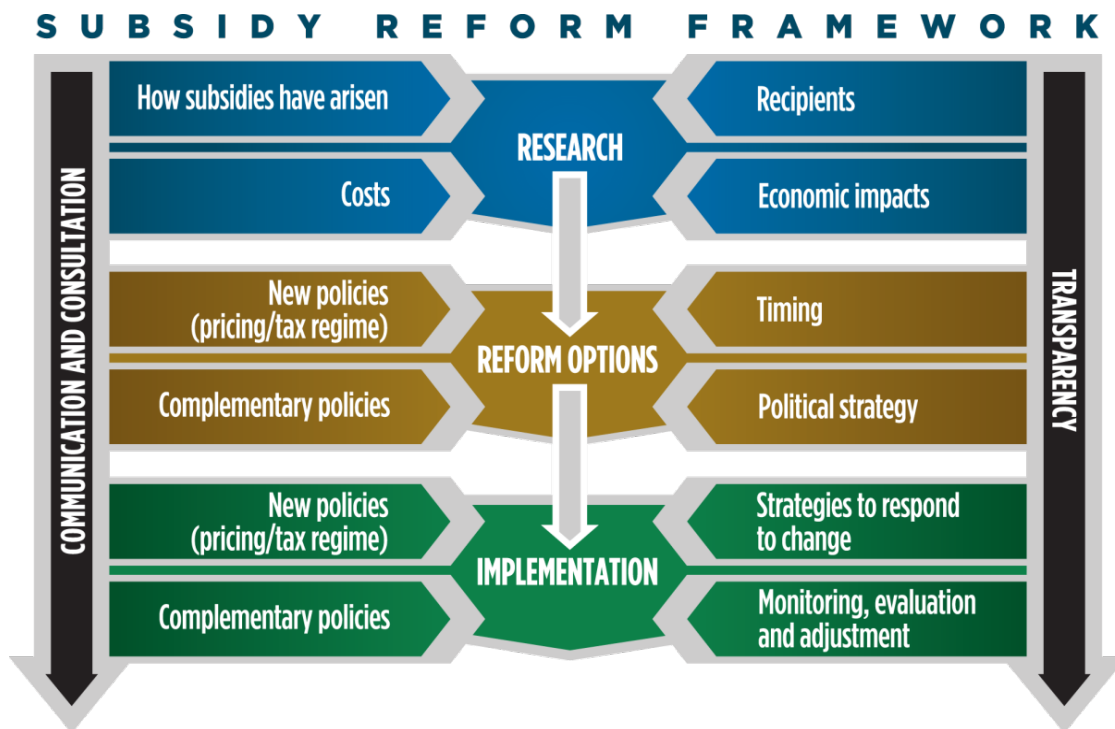
The challenges are different for broad-based policies that are used to subsidize the consumption of fossil fuels. These subsidy policies benefit a larger number of more dispersed interests and tend, over time, to become “locked-in,” as the population believes the subsidy serves their interest. Subsidy reform is often presented as an “unpopular” policy when civil society is concerned that the reforms will negatively affect vulnerable parts of the population or when there is a low level of public trust in the government’s reform agenda or ability to compensate the poor (IEA, OPEC, OECD & World Bank, 2010).

In his analysis, Victor (2009) recognizes that subsidies are granted not only because there is demand for them, but also for a number of supply-side reasons. Subsidies are easy to administer; for example, regulating low fuel prices is relatively easy when compared with establishing a pension scheme for a large population working in the informal economy, and subsidy policies satisfy constituents, either by providing essential services at low cost or offering a favourable investment climate to industries. Subsidies are also granted by many different arms of government—finance, energy, inland revenue, and environment ministries, as well as subnational governments—often with a lack of coordination and very little reporting.



## 8.0 A Framework for Subsidy Reform and Complementary Measures

Governments should adopt a comprehensive strategy when reforming fossil-fuel subsidies in order to overcome political opposition, protect vulnerable groups from the direct and indirect impacts of energy price increases, and ensure that the reforms are sustainable, particularly in the face of rising international oil prices. The GSI has developed a subsidy reform framework for guiding policy-makers in developing their reform strategies that includes three phases, with extensive communications and consultations throughout the process: i) background research, ii) developing reform options and iii) implementation. Figure 8.1 illustrates the framework and the section below discusses each component in detail.



**FIGURE 8.1: THE GSI'S SUBSIDY REFORM FRAMEWORK**

### Research

Initial research will provide useful information regarding how the subsidy has arisen or been exacerbated, how its costs and benefits are distributed, and it will identify the likely short- and long-term economic, political, environmental and social impacts of reform. This is also an opportunity to identify stakeholders and take into account their concerns about reform. A strong understanding of the subsidy will help design an appropriate reform strategy, including measures to assist those most likely to be affected by higher energy prices.

For consumer subsidies, understanding the effects of reform on household income is critical in designing an appropriate compensation package.<sup>13</sup> The World Bank recommends using household expenditure surveys to provide

<sup>13</sup> Household incomes can be affected by higher energy prices, either directly or indirectly (Baig, Mati, Coady & Ntamatungiro, 2007). Direct effects arise from paying a larger proportion of income to secure the same amount of energy, such as cooking fuel. Indirect effects arise through the inflationary effect of higher energy prices flowing onto the prices of goods and services that use energy as an input, such as increased prices for public transport.



information on those benefiting from the subsidy and the potential effects of its removal on various groups (World Bank, 2010a). The IMF has carried out a Poverty and Social Impact Analysis in several countries to model the impacts of higher energy prices. Amongst other things, the Poverty and Social Impact Analysis revealed that the inflationary impact of higher fuel prices on other goods, such as food and public transport, are likely to have a larger impact on poor households than the direct effect of paying more for fuel (Coady et al., 2010).

In the case of producer subsidies, research can assess the size of the industry (number of jobs, value of infrastructure, capital and revenue) and the level of subsidization. The greater the level of support, the greater the shock to the sector upon its removal. Research can identify likely impacts of reform on domestic exploration and production (therefore energy security), job losses and flow through effects to related industries and communities. These will be important in determining the speed of reform and the development of mitigating measures.

Energy reform in APEC economies has been informed by research from various sources, including government bodies, academia, think-tanks and international institutions. In the United States, for example, the U.S. Congress has periodically requested that the Department of Energy's Energy Information Administration prepare reports on domestic fossil-fuel subsidies. In China, the Energy Research Institute of the National Development and Reform Commission has undertaken research that informed the development of China's energy policies, including the current fuel pricing mechanism. Many governments have a strategic policy unit to conduct research and provide advice.

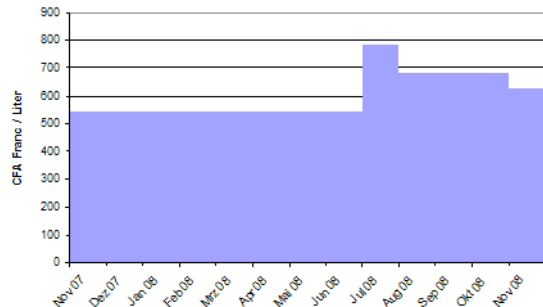
Governments, the public and industry all need to have confidence in the initial research as a legitimate foundation for reform. As such, research is best conducted by an independent institution using transparent processes and providing the opportunity for meaningful stakeholder input at several stages throughout the process.

## Reform Options

### *Establishment of Market-Based Price Mechanisms, Deregulation and Liberalization*

The ultimate aim of the reform of consumer subsidies is deregulation of domestic prices, allowing market forces to set energy prices without government interference. Where deregulation is not feasible in the short term, measures to reduce rather than eliminate government involvement can provide an interim option.

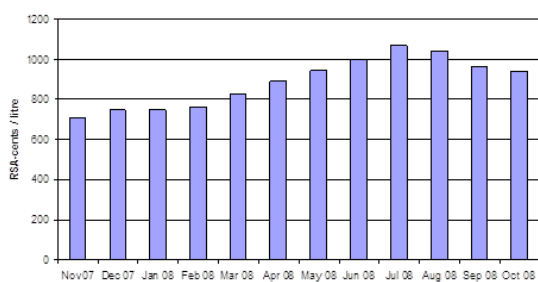
The German International Cooperation agency illustrates three different types of price regulations in Figure 8.2.



**Ad hoc pricing (includes constant prices)**

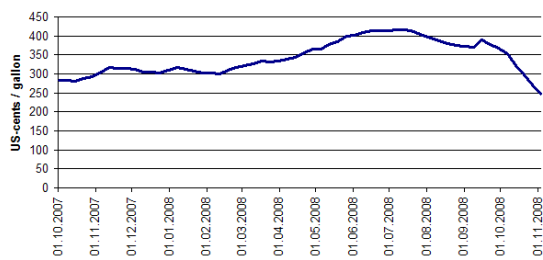
Unsystematic price changes over long intervals or constant price changes over several years

Ad hoc pricing is usually associated with delayed and partial pass through of costs.



**Automatic adjustments/regular adjustments based on formulae**

Prices are regulated and reviewed based on pre-determined criteria or formulae, in regular intervals (weekly, monthly). Automatic formulae are usually associated with delayed but, in the long term, full pass through of costs.



**Liberalized markets**

Regulation is limited to setting taxes and the framework conditions (e.g. fuel quality)

Liberalized markets provide full pass through of costs with minor delays.

**FIGURE 8.2: THREE TYPES OF FUEL PRICING MECHANISMS**

Source: Wagner (2010)

**Market-Based Price Mechanisms**

An administrative mechanism that establishes a degree of automatic linkage between domestic and international prices can limit outlays on subsidies and expose consumers to some degree of price volatility while still providing some smoothing of fluctuations and cushioning of extreme prices. Several APEC economies use price adjustment or smoothing mechanisms (Table 8.1).



**TABLE 8.1: APEC ECONOMIES USING PRICE ADJUSTMENT OR SMOOTHING MECHANISMS**

ECONOMY	PRICE STABILIZATION MECHANISMS	SOURCE
Chile	Oil fund	See case examples in section 9
People's Republic of China	Managed float price mechanism	See case examples in section 9
Peru	Oil fund	IMF (2010).
Chinese Taipei	Managed float pricing mechanism	China Post (2011)
Thailand	Oil fund providing cross subsidies for diesel for certain sectors, LPG, compressed natural gas and biofuels	See case examples in section 9
Vietnam	Petrol price stabilization fund	Chau & Kusuma (2011)

IMF researchers comment that a price adjustment mechanism will be more robust if it uses an appropriate benchmark and degree of smoothing (Baig et al., 2007). Domestic prices should generally be based on import or export parity. For importers, this would be the import market price (including insurance and freight costs) plus local taxes, fees and margins. For exporters, this would be the market price at which the energy product could be sold competitively to neighbouring markets. The report goes on to note that the most effective smoothing rules—and those that strike an appropriate balance between retail price smoothing and fiscal risk—are short moving average rules or a maximum-minimum rule with automatic updating of the maximum-minimum price band. Box 8.1 provides examples of the most effective mechanisms.

For domestic prices to reflect market prices, the pricing mechanism needs to operate automatically and be overseen by an independent institution, otherwise the government will be tempted to intervene in fuel pricing for political, economic or social reasons. Price stabilization funds have been used in Chile, Peru, Thailand and Vietnam to fund short-term fluctuations in prices. The stabilization fund is intended to provide a reserve pool of funds that will be replenished—through a levy on fuel sales—during times of low international oil prices and drawn upon to subsidize fuels during time of high oil prices. Such funds are effective in smoothing short-term price volatility. However, long-term upward trends in prices cause continuous outlays and no replenishment. Depletion of the fund requires fiscal transfers or a sudden increase in fuel prices. In addition, consumers expect to benefit from falling world oil prices and therefore governments can be pressured to lower fuel prices before stabilization funds are fully replenished.

### *Deregulation and Liberalization*

The target endpoint of fossil-fuel subsidy reform is deregulated prices. Successful deregulation results in transparent price signals that reflect the real costs of generating, transporting and consuming energy (IEA, 2005). Deregulation can occur in the presence of state-owned energy companies and limited competition, as long as anti-competitive behaviour such as price collusion is prevented through government regulations and oversight.

Transparency in pricing mechanisms is an important element of reform: it helps the public to understand how the price changes are determined and where the money is going. The German International Cooperation agency recommends that governments make the following information publicly available in an easy-to-access, comprehensible and accountable manner: price data for all fuel products, timelines of prices, price components (e.g., production/import prices, taxation levels and other charges), structure and modus operandi of the pricing mechanism (if applied) and underlying legislation (Wagner, 2010).



### BOX 8.1: COUNTRY EXPERIENCE IN SETTING REGULATED PRICES

*Price adjustments* under automatic adjustment formulae have generally taken the following forms:

*Moving average:* In **Dominica**, the retail price is reviewed every month on the basis of a four-week moving average of import market prices.

*Caps:* In **Sri Lanka**, the pricing adjustment formula was adopted in 2003. This mechanism was suspended in early 2004, capping price increases and decreases at LKR2 (about US\$0.02) per month.

*Triggers:* Under **Gabon's** (suspended) price adjustment mechanism, the ex-refinery price (and therefore the retail price) was to be changed whenever the administered import price deviated from the import market price by more than 4 per cent. Bolivia used to maintain an asymmetric trigger of 5 per cent for upward adjustments and 20 per cent for downward adjustments.

*Price bands:* Under a maximum-minimum rule, a ceiling and floor are placed on the level of the import price or ex-refinery price. **Chile** and **Peru** have a price stabilization scheme under which ex-refinery prices are updated on a regular basis. If the ex-refinery price is above the ceiling, the government pays the difference to refineries by withdrawing from a stabilization fund. If the price falls below the floor, refineries pay to the fund. During 1998–2004, **Turkey** had an automatic mechanism involving a small band, frequent price adjustments, and a smoothing mechanism, by which the ex-refinery price was adjusted if the average market price (using a mix of five-day and seven-day averaging) was beyond a 3 per cent band (1.5 per cent above or below the existing price).

Source: Baig et al., 2007

## Complementary Policies

### Protecting the Poor

While the elimination of fossil-fuel subsidies might deliver broad economic benefits, it can also disadvantage the poor who rely on subsidies to make energy affordable and cannot accommodate the inflationary impacts of higher energy prices (see Section 5 of this paper for more detailed discussion). Budget savings from subsidy reduction can be used to finance targeted assistance to vulnerable groups, whether by funding services or through cash payments. Compensation needs to be visible and sufficiently material to offset the adverse effect in the early years of the change. The credibility of the government's plan to compensate vulnerable groups is important for public acceptance (World Bank, 2010a).

Governments have frequently used budgetary savings from subsidy reform to finance targeted public expenditures, particularly education, health, roads, transport and electricity. Such expenditures can directly target services for women and children, such as maternal health services, immunization, schools, and infrastructure more frequently used by women, such as water supplies. For electricity, district heating, or natural gas, lifeline rates or volume differentiated tariffs can assist those connected to the utility. Subsidies for new connection charges can also be targeted to the poor but might be cost prohibitive in some countries.

Providing cash directly to the poor is generally agreed by economists and aid-providers to be a preferable way of assisting the poor rather than providing subsidized products. According to De Moor (2001), a well-designed transfer program can avoid distorting economic decisions, while both ensuring extensive coverage of poor households and minimizing leakage to higher income groups.



Several APEC economies have used unconditional cash transfers to mitigate higher fuel prices, including Chile, China and Indonesia. Conditional cash transfers (CCT) link payments to certain behavioural requirements, generally related to children's health care and education. Several APEC economies have used CCT programs, including Chile, Mexico, Indonesia, Peru and the Philippines (World Bank, 2010b). Some CCT programs make payments to the mother rather than a male head of the household. Women are usually responsible for the health and education needs of children and therefore are more able to ensure that any such conditional obligations are met. Providing cash to the women also helps to empower them in financial decision-making (Veras Soares, 2010).

**Indonesia** implemented an unconditional cash transfer scheme, Bantuan Langsung Tunai (BLT), starting in 2005 to complement increases in fuel prices. The BLT was implemented in two direct payments of IDR300,000 (US\$30) each to poor families, one in that year and the other in 2006 (Beaton & Lontoh, 2010). The scheme is estimated to have saved the government around US\$10 billion in expenditures by targeting its support (IEA, OECD & World Bank, 2010). In 2008–2009 the scheme was repeated, with families receiving IDR700,000 overall, again through several payments. The total annual cost of the scheme was estimated at nearly 0.7 per cent of GDP (Baig et al., 2007). By replacing broader subsidies, the program freed spending to finance the transfer scheme itself as well as public education, rural development and healthcare. The program covered around 20 million households, or around one third of the Indonesian population, and proceeded in five steps: i) verification of poor households and issuing of identity cards for eligible subjects, ii) assessment of public complaints, iii) awareness-raising, iv) securing of distribution of the BLT, and v) enforcement and monitoring (Beaton & Lontoh, 2010). Measures accompanying the BLT consisted of a health insurance program for the poor, a school assistance program and a rural infrastructure support project. Alongside the reduction of subsidies to kerosene and the fuel's replacement with LPG, the government distributed over 23 million LPG stoves and small LPG cylinders to the population (Ministry of Finance, Indonesia, 2010b).

In 2008 **Malaysia** introduced broad energy-subsidy reforms to reduce the increasing fiscal burden (IEA, 2009b). This included subsidy reductions, taxes on windfall in sectors, cash rebates and an expansion of the social safety net. Retail gasoline prices were increased by more than 40 per cent in July 2008 and the price of gas for electricity production by 124 per cent in Peninsular Malaysia in August 2008. This led to an average increase in the national electricity rate of 24 per cent. Although Malaysia increased prices markedly in July and August 2008, the government subsequently dropped them steadily in the following months and thereby maintained the subsidies.

**Mexico** subsidized electricity, gasoline, diesel and LPG equating to more than 1.5 per cent of GDP per year from 2005 to 2009. The gradual elimination of gasoline, diesel and LPG support prompted the country to introduce a cash transfer scheme to assist the poorest parts of the population in affording their electricity costs (IEA, OECD & World Bank, 2010). The payments to households were coupled with children's school attendance and health clinic visits. A related scheme drives rural electrification by supporting private sector participation (IEA, OECD & World Bank, 2010).

Other countries have used direct cash transfers on an ad hoc basis to compensate for rising fuel prices (Bacon & Kojima, 2006b). In 2005, for instance, **Chile** made a lump sum payment of around US\$30 to low-income households and handed out further compensation to 1.4 million households that are low energy consumers. In 2006 the Chilean government again paid out US\$35 to 1.25 million low-income families. In 2008 Chile raised the minimum wage by about 10 per cent and established a US\$2.80/month subsidy for electricity for the poorest 40 per cent of the population (Kojima, 2009).





In 2006 some Chinese provincial governments paid US\$1.24–\$2.48 per month to low-income populations after an increase in LPG prices (Bacon & Kojima, 2006b). In view of rising LPG prices, in 2008 the Chinese finance ministry allocated RMB3.78 billion (US\$548 million) to assistance for low-income families (Kojima, 2009). Urban and rural low-income families received RMB15 (US\$2.20) and RMB10 (US\$1.50), respectively, per person.

In 2008 **Thailand** implemented a THB46 billion (US\$1.3 billion) package of measures to assist low-income individuals cope with higher energy prices (Kojima, 2009). The program included free electricity for low consumers, free public transport on certain means, free water up to a certain quantity, excise exemptions on ethanol-gasoline blends and diesel, and a price ceiling on LPG. Although there is some uncertainty on whether the policies were directly prompted by the increase in fuel prices in 2008, the effect of the measures has been to help low-income populations in that period.

Malaysia and Vietnam did not target the poor directly in their responses to the 2008 oil price increase. Instead, they supported the fishing sector, which could have represented a benefit to low-income individuals indirectly through their employment in the sector or through lower food prices than they would otherwise have been. Vietnam gave fishing vessel owners a cash compensation of VND15–VND24 million each (US\$833–\$1,413), subject to vessel engine capacity (Kojima, 2009). In **Malaysia**, cash was given to fishermen and vessel owners to compensate for a part of the fuel price increase, amounting to MYR200 (US\$61) plus MYR0.1 (US\$0.03) per kilogram of fish landed (Kojima, 2009). Beyond the fishing sector, the country also gave cash rebates to private vehicle owners, structured so as to favour smaller vehicles.

While any scheme to target support for low-income populations will likely suffer from administrative inefficiencies and incomplete information, it should be underlined that schemes do not have to be perfect to raise the welfare of the poor more effectively than the fossil-fuel subsidies they are to replace. Jensen and Tarr (2002) simulated the effects of redistributing subsidy money equally among all households and found that the welfare of low-income households would still grow by 200 per cent. Including the middle-class in a compensation scheme can also help win their support for the reforms.

Improving the coverage of cash transfer schemes may require a trial and error process, with improvements made over time. **Armenia**, for example, removed its subsidy regime in 1999 through a change in policy that significantly raised electricity prices (Yemtsov, 2010). In order to counter the negative impact on lower-income populations, the government adjusted the existing safety net and introduced a new benefit scheme for those below the poverty line, accounting for 28 per cent of all families. In order to target the program, the government used a household poverty and vulnerability scoring formula that had already been employed to target humanitarian assistance. It took a number of years to improve implementation of the scheme. In the first transfer, only 55 per cent of poor families received the cash transfer, excluding 45 per cent of the target beneficiaries. However, by 2006, coverage had expanded to 61 per cent of the bottom consumption decile.



#### **BOX 8.2: EXPERIENCE FROM OTHER COUNTRIES**

The experience of countries outside the APEC membership is informative. Gabon, Ghana and Jordan all implemented an extensive range of compensation measures to protect low-income households when reforming their fuel (and food) subsidies:

Gabon's reform package included:

1. Cash hand-outs to poorer populations, while conducting an improved census of lower income households
2. Increased support to single mothers through an existing program
3. Expansion of a microcredit program for disadvantaged women in rural areas
4. Free electricity and water up to a specified limit for low-consuming families
5. Abolition of school enrollment fees and provision of free text books for students in public schools
6. Increased investments into rural health services, electrification and freshwater supply
7. Improved public transport in the capital Libreville

Ghana's package of reform policies included:

1. Abolition of primary and junior-secondary school fees
2. Increased funding for primary health care in the poorest regions
3. Increased and expedited investment in urban public transport
4. Expansion of rural electrification scheme

Jordan's policies to protect poor populations from increased fuel prices included:

1. Increased minimum wage, with higher wage increases for low-paid government employees
2. Lump sum bonus to low-paid government employees and pensioners
3. Keeping the "lifeline electricity tariff" low
4. Cash transfers for other lower-income households
5. Announcement of a plan to dedicate more funds to the national safety net scheme

Source: IMF (2008a)

### **Assisting Workers and Communities**

Subsidy reform can affect workers in a number of ways. Mines can be shut down when they are no longer economically viable without subsidies. This has occurred with coal mining in developed economies and lessons on how to support workers can be drawn from the experience of, for example, Poland (see Box 8.3) and France.<sup>14</sup>

#### **BOX 8.3: SUBSIDY REFORM AND COAL MINING IN POLAND**

Removal of subsidies to fossil-fuel producers can cause job losses and localized recession in mining communities. In Poland, for example, repeated attempts to restructure the coal-mining industry in the early 1990s failed, largely due to lack of adequate social programs to assist affected workers. In 1998 government reforms were accompanied by extensive social programs that funded:

- Redeployment of younger coal workers elsewhere in the economy
- Welfare benefits to dismissed workers while they looked for a new job
- Retirement benefits for older employees
- Soft loans for the establishment of businesses outside of mining

Under the social program from 1998 to 2002, more than 53,000 workers left coal mining, of which 33,000 received some form of help.

Source: Wojciech (2010)

<sup>14</sup> For a case study of lessons learned from France's reform of its coal mining sector, see Laan, Beaton and Presta (2010).



Energy-intensive sectors, such as petrochemicals, steel, cement and transport will also be affected. A classic example is public transport (taxis, buses and rail). Taxi drivers and bus operators would be less concerned if they could simply pass higher costs on to passengers. In China, for example, the government did not allow transport prices to increase when government-set fuel prices rose, in order to stem inflationary effects. If prices are allowed to be passed on, demand may drop but the situation would be better than running the business at a loss if fares are kept constant in the face of higher fuel costs.

Governments will need to consider a wide range of policies to support vulnerable sectors and help industries cope with the rise in energy prices. These complementary policies could include measures to improve energy efficiency, improve investment infrastructure, extend credit facilities and other banking services, or implement policies to strengthen market forces and encourage competition (see the experience of Iran in Box 8.4).

#### **BOX 8.4: SUPPORT FOR THE CORPORATE SECTOR IN IRAN**

When the Iranian government reformed energy subsidies in 2010, it allocated 30 per cent of the additional revenue from energy price increases for support packages for the corporate sector. This included:

- Interest subsidies on loans for the adoption of new, energy-saving technologies
- Credit lines to mitigate the impact of higher energy costs on cash flow
- Credit lines to spread the costs of higher energy costs over a three-year period
- Revised fees, taxes, import tariffs and export awards for specific industries
- Initiatives to improve enterprises' efficiency, such as credit for the hiring of consultants to improve management

Some sectors received additional benefits to support the transition to the higher energy prices. Selected sectors of the economy, such as agriculture, fisheries and transport, were offered quotas of subsidized diesel.

Source: Guillaume, Zytek & Farzin (2011)

### ***Overcoming the Political Barriers***

Successful subsidy reform requires a political strategy that compensates powerful interests or finds ways to inoculate policy reform against opposition (Victor, 2009). To gain the necessary political support for reforms, a package of policies should be proposed. Different policies will attract the support of different stakeholders; for example, a local non-governmental organization (NGO) might support better health and safety measures, a trade union might want improved working conditions or an environmental NGO might advocate for increased electricity generation from renewables. Any or all of these solutions could form part of a final package acceptable to the various constituencies (GSI, 2011b). Developing comprehensive reform packages may also require establishing new administrative tools, such as the Unique Identification Scheme currently being developed in India, which aims to provide every resident with a unique identification number, bank account and ID card for receiving benefits such as cash transfers or pensions (Unique Identification Authority of India, 2011).

Increasing the availability and transparency of information about fossil-fuel subsidies is essential for overcoming some of the political barriers to reform. Clear information identifying the full range of subsidies, their costs, impacts and who the beneficiaries and losers of subsidy reform would be is an important first step in explaining the government's



rationale for reform. It also helps to dispel myths and misinformation and encourages an open public debate on whether subsidy reform is in the public interest. An extensive communications strategy will help build public trust and accountability in the government's reform plans (IEA, OPEC, OECD & World Bank, 2010).

### ***Prioritizing Reform***

The World Bank has developed a framework to guide countries' prioritization of fossil-fuel subsidy reform (IEA, OECD, OPEC & World Bank, 2010). A series of tests is suggested to assist in assessing whether a given energy subsidy should be kept, modified or phased out. It is summarized in the form of a decision tree, as shown in Figure 8.3 below. Phases 1 and 2 consider the impact of a subsidy to help in identifying inefficient ones that lead to wasteful consumption, covering efficiency as well as equity issues. Efficiency in this context means how appropriate the subsidy is to reach its intended objective(s). Wastefulness is the case if the subsidy leads to excessive energy consumption compared to a scenario without the subsidy. Phases 3 and 4 evaluate the cost-effectiveness of a subsidy policy relative to other policies and, more generally, in the context of other policy objectives. Modification of a subsidy may be required to ensure cost-effectiveness. The evaluation in the final phase is intended to consider all other possible uses of public funds.

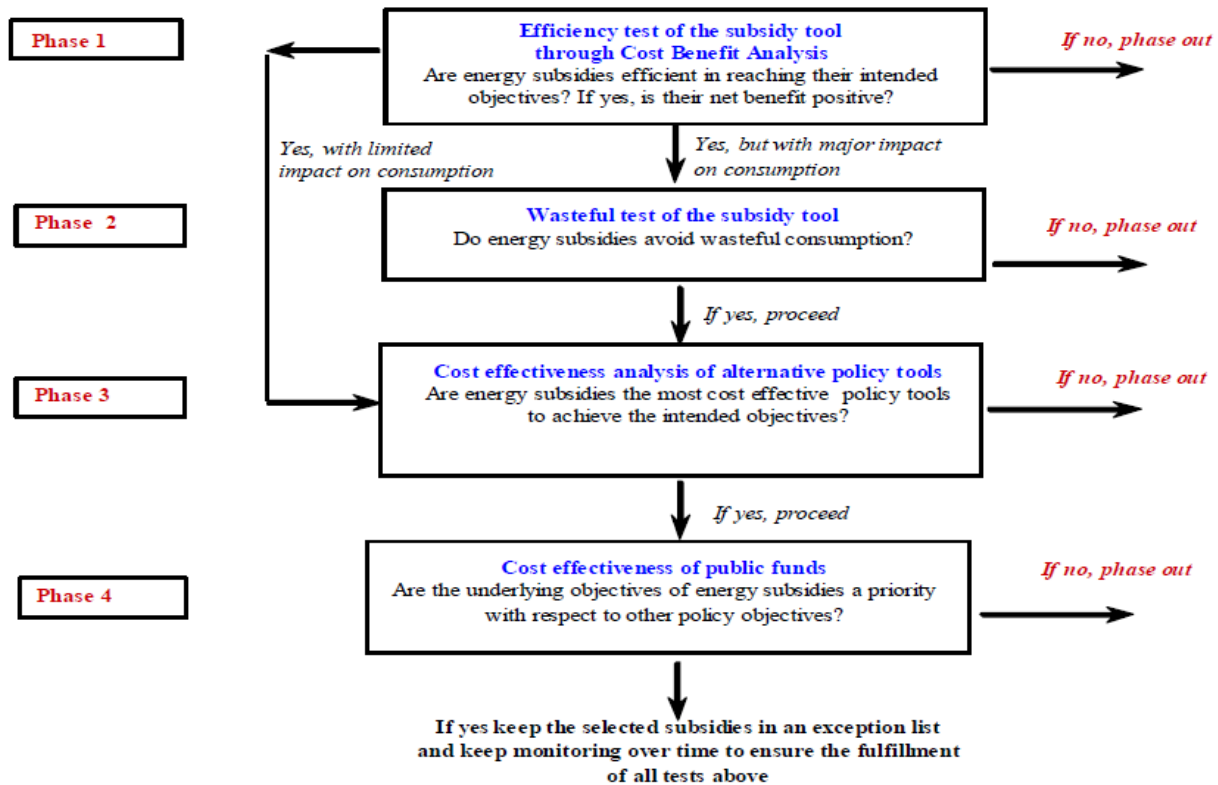
The IMF (2008a) recommends a gradual reform strategy to protect low-income households, which includes:

- Maintaining subsidies on commodities that are more important for the budgets of poor households (such as kerosene and cereals)
- Identifying a package of short-term measures that will alleviate the pressures of rising prices for poor households (e.g., providing school meals, reducing education and health fees, subsidizing public transportation, cash transfers) or for farmers and small businesses (such as credit facilities and improved infrastructure)
- Identifying high-priority public expenditures that benefit poor households that can be financed from the savings in subsidy reduction (such as education, healthcare, infrastructure and electrification schemes)
- Improving the targeting and design of safety net programs over time. Targeting methods can use: socioeconomic and demographic criteria (e.g., targeting the elderly, children or the unemployed, or identifying families living below the poverty line); geographical criteria (e.g., those living in certain locations); or self-targeting conditions (e.g., cash transfers based on school attendance).

The IMF's approach is consistent with the GSI's experience in consulting with the wider civil society community in Indonesia, where many groups, particularly those that are pro-poor, would support the reform of gasoline subsidies before they could support the reform of kerosene subsidies. This is because gasoline subsidies are the most regressive in terms of welfare distribution (IEA, 2011a) and will have fewer direct and indirect impacts on the poor.



**Figure 4.1: Decision tree**



**FIGURE 8.3: WORLD BANK DECISION TREE TO ASSIST IN RATIONALIZATION AND PHASING-OUT OF ENERGY SUBSIDIES**

Source: IEA, OECD & World Bank (2010)



In practice, most APEC economies appear to take an ad hoc approach to reforming price subsidies. Market-based mechanisms are introduced to take advantage of falling world energy prices (China, Thailand) or prices are raised during times of unsustainably high prices (Indonesia) or reforms are postponed due to high energy prices (Mexico, Russia). The result is often a temporary reduction in subsidies.

At the same time, the energy pricing policies that are now in place in these economies are a product of the governments' (past and present) prioritization of the competing opportunities offered by market liberalization or consumer protection. The method in China, for example, has been to use a managed float to allow the pass through of prices in a controlled way, depending on macroeconomic conditions. In Thailand, the oil fund provides for price fixing of certain products at certain times, against a general policy of liberalized prices.

### *Timing*

Public acceptance of reform can be assisted by careful timing. An election may provide an opportunity to make changes because a new government may initially enjoy a period of greater credibility and legitimacy than the old government that failed to tackle the problem (World Bank, 2010a). This suggests that incoming governments need to start preparation beforehand to be able to move early in their term in office.

Times of falling world oil prices can be opportune times to liberalize fuel prices (Wagner, 2008). Consumers are unlikely to object to lower prices and there is less need for flanking measures such as compensation or alternatives for reducing inflation. Times of falling inflation are also opportune for reform if inflationary impacts are a concern.

Often subsidy reform is planned as part of a government's annual budget process. Preparation of the research and reform options should ideally be timed to influence the budget process, identifying the entry points and roles of relevant decision-makers at national and subnational levels.

### **Implementation**

Implementation of subsidy reform may require governments to establish new institutions responsible for energy pricing or restructure the roles and reporting of existing agencies. An independent organization can improve the transparency of how energy prices are set and remove the process from political interference (Victor, 2009).

Governments may also need new administrative tools to implement compensation measures. For example, the Indian government is creating Unique Identifications for all Indian residents, which aims to create a unique ID and bank account for every resident and can be used to transfer a number of government benefits, including cash transfers as compensation for energy price increases, pension schemes and unemployment benefits. The government has set up and tasked an independent authority with developing and rolling out the technology for the ID, also requiring the cooperation of the banking sector to extend their services to new clients and open branches in rural areas.

In the face of opposition to reform and/or rising international oil prices, implementation of subsidy reform can be postponed or reversed and several attempts may be required. Governments should review progress of reform against its policy objectives on a regular basis and assess whether there have been any unintended consequences, adapting policies as necessary over time (Laan, Beaton & Presta, 2010).

Where reform results in a subsidy being restructured or reduced, rather than eliminated, it may require monitoring and adjustment of the following best practice features:



- Sunset clauses that ensure the subsidy is removed once it is no longer needed to meet its original policy objective. Criteria and time frames should be written into legislation and monitored.
- Adjustments to the subsidy based on pre-announced conditions that respond to changes in market conditions or other circumstances. Announcing the conditions before granting the subsidy enables businesses to plan their investments accordingly.
- Transparency mechanisms to ensure up-to-date information about the subsidy policy is easily accessible, enabling investors to predict market conditions and informing a public debate on the utility of the subsidy (Victor, 2009).

Regularly monitoring, evaluating and adjusting measures in light of new information or as circumstances change is important for ensuring that policies achieve their desired outcomes.

## Consultation, Communication and Transparency

A clear communication campaign is an essential component of a successful subsidy reform strategy. The public and industry participants are more likely to support a phase-out of subsidies if the government has, before the changes are introduced, widely disseminated information regarding negative impacts of subsidies, the expected implications of reform and the compensation that will be made available. Citizens can also be informed of how their money will be redirected to other services or returned to them in the form of cash transfers or lower taxes (Laan, Beaton & Presta, 2010).

Concerns raised by subsidy recipients and other stakeholders in response to information campaigns can be taken into account early and accommodated in the reform package. In addition, some promotion of the benefits of reform can be necessary to counteract campaigns by lobbyists or rival political parties that publicize the negative impact of reform on jobs, affected communities or financial services to the poor.

Generating and publicizing accurate and timely information about subsidies can itself be a catalyst for change. Transparency increases accountability in public expenditure and allows an assessment of the economic distortions and inefficiencies created by these policies, as well as the links to environmental impacts. This encourages an informed debate about the merits of the policy and its opportunity costs. Where the explicit or implicit fiscal costs to the government are very large, the government might be compelled to act (World Bank, 2010a). At the international level, substantial information about the size and nature of subsidies has been a prerequisite for international negotiations on reform to gain traction and see results, particularly subsidies to agricultural producers (Laan, 2010). Transparency also allows better monitoring of the subsidy over time.

Disclosing as much information as possible about how fuel prices are formed can increase acceptance of fuel price fluctuations, including any differences between domestic and international prices (Kojima, 2009). Information can include the components of fuel prices (such as refining margins, taxes and distribution cost), the process and time frame for adjusting fuel prices, rates of stock turnover (particularly for small markets where slow turnover could lead to a delay in the transmission of international to domestic prices), historical price data and comparisons with other countries.



## 9.0 Case Studies of Reform

Many countries, including most APEC economies, have some experience in reforming fossil-fuel subsidies. Rarely have these attempts resulted in the complete and permanent elimination of all fossil-fuel subsidies. In the case of subsidies to consumers, public opposition to reform has often caused governments to moderate reform plans or to reintroduce subsidies when facing the polls or high international energy prices. The temptation to introduce politically popular policies is often difficult to resist (Victor, 2009). Producers of fossil fuels are often politically powerful and well connected (many APEC developing economies still have state-controlled oil companies) and will argue to maintain subsidies on the basis of energy security and jobs.

Volatile energy prices can also undermine reductions to price subsidies if governments do not allow high prices to be fully passed on to domestic consumers. A World Bank survey of 49 developing countries found that at the peak of high oil prices in 2008, nearly all of the countries intervened with price-based policies to mitigate higher prices for at least one fuel (Kojima, 2009). A similar effect has occurred in 2011 with high international prices leading many governments to reverse or postpone the reform of energy subsidies (e.g., see Hook, Johnston & Bland, 2011; Chau & Kusuma, 2011).

Despite the sporadic nature of many reform efforts, observing country experiences with phasing out subsidies provides useful information about policy approaches that have tended to help in the past. Reviews of experience with the reform of fossil-fuel subsidies undertaken by the IMF, the GSI and the World Bank show that the best chance of success requires a comprehensive strategy that includes the following elements:<sup>15</sup>

- i. Initial research on the subsidy
- ii. Building of political support
- iii. Policies and measures to protect the poor or employees in energy and other sectors and their communities
- iv. Price control based on automatically adjusted pricing formulas, and deregulation of prices<sup>16</sup>

This paper presents case examples chosen to illustrate how these elements of a reform strategy have been implemented in specific APEC economies (Table 9.1). The case examples primarily address subsidy reform experiences in developing APEC economies. As a result, the majority of studies focus on subsidies to consumers, particularly for petroleum products.<sup>17</sup> Subsidies to producers are also almost certainly extensive in the APEC region, and are prevalent in both developed and developing economies.

<sup>15</sup> These papers are, respectively, Baig et al. (2007); Laan et al. (2010); Beaton & Lontoh (2010); de Oliveira & Laan (2010); Shenoy (2010); Suwala (2010); and World Bank (2010a).

<sup>16</sup> When referring to fuel pricing, deregulation and liberalization of prices have the same meaning: the removal of government controls that constrain market forces from determining fuel prices and investment decisions. Liberalization of prices should not be confused with liberalization of the energy sector more broadly, which includes privatization and opening the sector to foreign competition.

<sup>17</sup> Petroleum products and natural gas refer to gasoline, diesel, fuel oil, kerosene, jet fuel and natural gas (such as LPG and compressed natural gas).





**TABLE 9.1: SUMMARY OF APEC CASE EXAMPLES**

REFORM STRATEGY	APEC ECONOMY	FUEL TYPE	SUBSIDY TYPE
Research	Australia	All	Producer and consumer
Communications and measures to assist the poor	Indonesia	Gasoline, diesel, kerosene, LPG	Consumer
Transparency	Chile	Gasoline, diesel, natural gas	Consumer
Measures to assist the poor	Mexico	Petroleum products	Consumer
Gradual deregulation and measures to assist the poor	Thailand	Gasoline, diesel, natural gas	Consumer
Price adjustment mechanisms	China	Gasoline and diesel	Consumer
Gradual liberalization	Russia	Natural gas	Consumer

## Research: Australia’s Productivity Commission

Many APEC economies have institutions that provide research on economic reform issues, but Australia appears to be unique in having created an independent institution within government to pursue this on an ongoing basis (Banks & Carmichael, 2007). The purpose of this case study is not to analyze a specific reform initiative in Australia but to describe Australia’s best-practice approach to reform-related research that could be useful to economies wishing to design a reform program to phase-out fossil-fuel subsidies. Research studies and public inquiries by the federal Productivity Commission have been a foundation for many successful economic reforms over three decades, including in the fossil-fuels sector.

The Productivity Commission was created in its present form by an Act of Parliament in 1998. However, it previously existed in similar forms dating back to the early 1970s.<sup>18</sup> The Productivity Commission’s stated role is to help governments make better policies in the long-term interest of the Australian community (Productivity Commission, 2011a). The commission is often asked to focus on areas of public policy where reform is difficult but the potential payoffs are large (Banks & Carmichael, 2007).

Of fundamental importance to the operation of the commission’s research are three core principles: independence, transparency and a community-wide focus.

- *Independence:* The commission operates under the protection and guidelines of its own legislation. It has its own budgetary allocation and permanent staff, operating at arm’s length from other government agencies. The government largely determines what the commission should research, but it cannot influence its findings and recommendations. The final research findings must be tabled in parliament, but the government retains autonomy over policy and is under no obligation to accept the recommendations of the commission.
- *Transparency:* The work of the commission is open to public scrutiny throughout the research and inquiry process.
- *Community-wide focus:* In providing advice, the commission seeks to advance the interests of the community at large, not the government of the day or the interests of the particular sector it is considering.

<sup>18</sup> The Productivity Commission was created as an independent authority by an Act of Parliament in 1998, to replace the Industry Commission, Bureau of Industry Economics and the Economic Planning Advisory Commission. The Industry Commission had been created in 1989 from the previous Industries Assistance Commission which was established in 1974 (which itself replaced the Australian Tariff Board, established in 1922 but with a generally protectionist rather than liberalizing mandate).



The WTO Trade Policy Review of Australia makes the following observation:

*The high degree of transparency in the formulation and evaluation of Australia's economic policies in relation to their rationale, nature, and economic effects, enhances government accountability and public debate over the merits of these policies. Hence, transparency has contributed greatly to the continued process of reform, which began in the 1980s. (WTO, 2007, p. vii)*

The subject matter handled by the commission has varied depending on the economic reform issues of the day and the government's priorities. In the 1970s and 1980s, approximately 80 per cent of its research concerned assistance for manufacturing industries. Successive federal governments have broadened the remit of the commission and it is now the government's principal advisory body on all aspects of microeconomic reform. Approximately 80 per cent of recent Productivity Commission inquiries relate to cross-sectoral, infrastructure, social and environmental policy issues (Banks & Carmichael, 2007). The commission's work has at times encompassed reform of the fossil-fuel industry. Inquiries and studies include electricity sector privatization and corporatization (Industry Commission, 1991b), taxation of petroleum products (Industry Commission, 1994), the Australian black coal industry (Productivity Commission, 1999), costs and benefits of reducing GHG emissions (Industry Commission, 1991a), upstream petroleum (oil and gas) regulation (Productivity Commission, 2009) and carbon emission policies of key economies (Productivity Commission, 2011b).

Box 9.1 below describes the commission's analysis on carbon pricing in key economies, developed at the request of the Australian government to inform consideration of Australia's carbon pricing policies. A second box describes Australia's fuel tax policies.



**BOX 9.1: EXAMPLE OF THE PRODUCTIVITY COMMISSION'S WORK ON FUEL PRICING: CARBON EMISSION POLICIES IN KEY ECONOMIES, MAY 2011**

A recent study by the Productivity Commission examined the role of fuel pricing on carbon emissions. Average tax rates for transport fuels (such as excise tax, but excluding broadly based consumption taxes) were calculated for eight economies, six of whom are APEC members (see Table 9.2). Based on assumptions regarding demand elasticity, the commission estimated likely carbon abatement resulting from these fuel taxes compared with a counterfactual scenario of no fuel taxes. In other words, fuel taxes increase prices, which reduces consumption leading to reductions in emissions (expressed as CO<sub>2</sub> equivalent [CO<sub>2</sub>e]).

The results indicate that even if demand were only mildly responsive to price, it is likely that fuel taxes have led to substantial abatement relative to the counterfactual of no fuel taxes (see Table 9.2). For example, the “high” estimates for Germany indicate that abatement relative to the counterfactual of no fuel taxes could have been of the order of 40 per cent.

**TABLE 9.2 ABATEMENT AND CONSUMPTION COST OF FUEL TAXES**

ECONOMY	AVERAGE FUEL TAX	CONSUMPTION COST	ABATEMENT	ABATEMENT AS A PERCENTAGE OF COUNTERFACTUAL ROAD TRANSPORT EMISSIONS	AVERAGE CONSUMPTION COST
	AU\$/L	AU\$ million (2010)	Mt CO <sub>2</sub> e	%	A\$/t CO <sub>2</sub> e
Australia	0.36	373-1,189	6-21	8-23	57-59
China	0.14	449-1 383	20-68	6-17	20-23
Germany	0.78	3,437-11,492	29-102	17-41	113-119
Japan	0.64	2,238-7,301	21-73	9-26	100-105
New Zealand	0.43	54-174	1-3	7-19	71-73
South Korea	0.5	1,046-3 432	12-41	13-34	83-87
United Kingdom	0.96	3,323-11,125	24-85	17-42	130-139
United States	0.11	1,749-5,421	92-291	6-16	19

The commission notes that it is arguable whether fuel taxes can legitimately be considered as emissions reductions measures. Most economies instituted such taxes for the purposes of raising general revenue or as “road user charges.” Any resultant abatement could be considered incidental.

Nonetheless, the results are highly relevant to the consideration of subsidy reform. The study demonstrates that price subsidies and tax exemptions have a clear impact on fuel consumption and GHG emissions.

Source: Productivity Commission (2011b)

**The Government’s Rationale for Reform**

When establishing the Industry Assistance Commission in 1973 (a predecessor of the Productivity Commission), the prime minister at the time stated:

*The first and most important reason for establishing the Commission is to allow public scrutiny of the process whereby governments decide how much assistance to give to different industries. ... Such a process must be independent and impartial. (Whitlam, 1973)*



Successive Australian governments have reinforced and expanded the role of the commission over several decades. When introducing the Productivity Commission legislation in 1996, the Australian government stated that:

*The Productivity Commission will be the Government's principal advisory body on all aspects of microeconomic reform. ... Sound policy development must be based on a full appreciation of the facts. A primary role of the Productivity Commission will be to identify impediments to improving productivity in particular sectors. It will also have due regard to the important relationships between improved use of resources in one sector and the rest of the economy. It is only with this sort of information and economy-wide focus that governments can make sensible and considered choices as to future policy—choices that will ensure better and more sustained growth prospects for all Australians. (Miles, 1996)*

### **Policy Description**

Several features of the institutional arrangements for the Productivity Commission appear to have been instrumental in achieving the government's vision for an independent and transparent advisory body on economic reform. These are:

- Enshrining its charter and functions in legislation
- Establishing transparent consultation processes
- The capacity to conduct and initiate research in addition to conducting government-commissioned inquiries and studies
- Placement in a neutral portfolio
- Adequate resources and the capacity to direct its own resources
- The statutory appointment of the Commission's Chairman and Commissioners

### **Legislation**

The legislation creating the Productivity Commission sets out its core functions, objectives and procedures. It ensures that that commission's advice to government is based on broad consultative processes, open to public scrutiny and formulated in the best interests of the Australian public, not individual sectors or industries (Banks & Carmichael, 2007). Establishment in legislation makes the commission's work less likely to be influenced by the government of the day and any attempt by the government to reduce the transparency or independence of the Commission would require legislative change, which in itself is open to public scrutiny. Box 9.2 contains the legislative policy guidelines for the Productivity Commission.



#### **BOX 9.2: GENERAL POLICY INSTRUCTIONS FOR THE PRODUCTIVITY COMMISSION**

In the performance of its functions, the Productivity Commission must have regard to the need to:

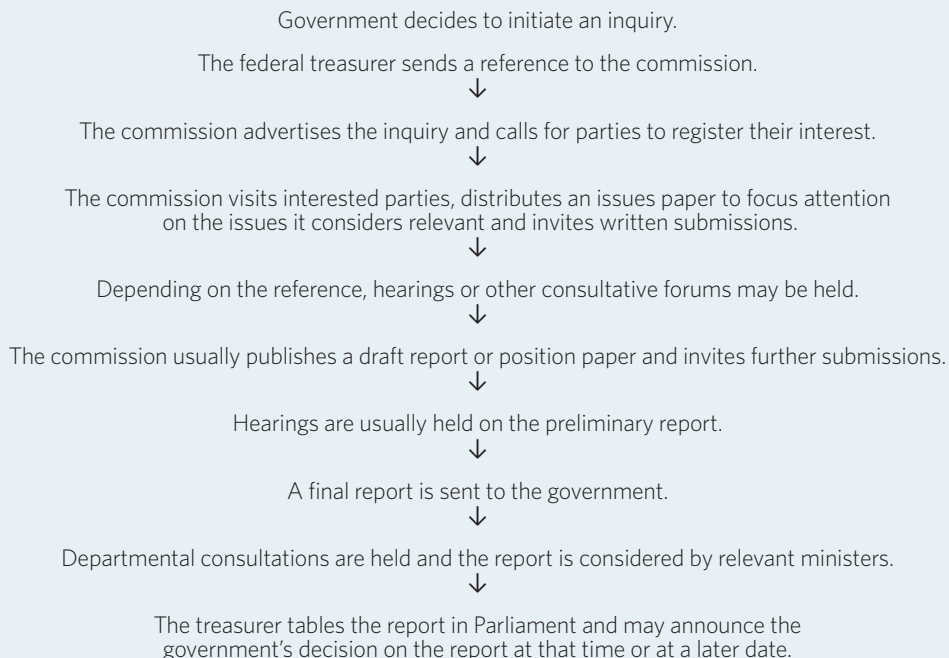
- Improve the overall economic performance of the economy
- Reduce regulation of industry
- Encourage the development and growth of efficient Australian industries
- Facilitate adjustment to structural change
- Recognize those likely to be affected by measures proposed by the commission
- Promote employment and regional development
- Have regard to Australia's international commitments and the trade policies of other countries
- Ensure that Australian industry develops in a way that is ecologically sustainable

Source: Adapted from the Productivity Commission Act 1998 (Government of Australia, 1998)

### **Transparent Processes**

The majority of the commission's research work is initiated by the federal government. The treasurer writes to request an inquiry into a specific issue, such as the "generation, transmission and distribution of electricity and the transmission and distribution of gas" (Industry Commission, 1991b).<sup>19</sup> Detailed terms of reference are included that contain main points of focus as well as a time frame in which the commission must report (usually 9 to 12 months). An established public consultation process is then initiated (Box 9.3).

#### **BOX 9.3: STAGES IN THE INQUIRY PROCESS**



<sup>19</sup> The treasurer is the minister responsible for economic policy in Australia, a position equivalent to the finance minister in other countries. For example, the treasurer represents Australia at the G-20 and APEC meetings of finance ministers.



The consultation process not only ensures that all interests are taken into account in developing the commission's recommendations, but also engages the community in public debate about the costs and benefits of reform. The arguments of specific interest groups are open to scrutiny as is the work of the commission (Banks & Carmichael, 2007). All commission publications are readily available, including on the Internet.

### **Research Capacity**

The public consultation process is based on draft inquiry reports developed by the commission staff (primarily economists). A draft inquiry report will generally outline the background facts and trends, set out key issues, describe the analytical framework used to investigate the issue, discuss the range of possible policy options for addressing the matter, assess their relative efficacy and their likely impacts, and make recommendations about a preferred option and implementation strategy (Banks, 2007). These will generally be released midway through the inquiry to outline the commission's current thinking and seek further public input.

The whole-of-community focus of the commission's work has necessitated increasingly comprehensive analytical tools to assess the costs and benefits of different policy options. It has proved crucial to be able to quantify the extent to which assistance to one sector disadvantages other sectors of the community, industries, consumers or taxpayers (Banks & Carmichael, 2007). The commission has developed and employed economic modelling and other tools to quantify industry assistance and the effects of change in a range of factors on other industries and on the economy as a whole. The commission, for example, developed the general equilibrium model of the world economy that evolved to become the Global Trade Analysis Project model and pioneered subsidy estimation tools such as the "effective rate of assistance" measure (Banks & Carmichael, 2007).

The commission must include senior expertise on environmental sustainability and social welfare as well as working with industry. The work of the commission has included the design of appropriate transitional assistance arrangements and assessment of whether existing general social safety nets were adequate or needed to be supplemented with specially targeted support measures.

In addition to referred inquiry and study work, the commission has an explicit statutory duty to generate its own research, which allows it to comment on reform issues that the government may not find politically appealing. In addition, it must report annually on the impact of assistance and regulation on the productivity and performance of the Australian economy as a whole.

### **Resourcing**

The commission is provided with an annual appropriation from government. The total appropriation in 2009-2010 was AU\$41.7 million with an average staffing level of 188 (Productivity Commission, 2010). The appropriation can vary and at times has been constrained to a point that the commission's functions have been impaired (Productivity Commission, 2003). Several commission research projects are performed concurrently in addition to internally initiated research.



### *Portfolio Placement*

While the commission operates as an independent agency, it can be placed under different ministerial jurisdictions by the government of the day. This has influenced the type and scope of issues that have been referred for investigation by the responsible minister. The commission has been most effective when placed in a whole-of-government portfolio, such as the prime minister's portfolio or the Treasury. When briefly housed in the Australian industry portfolio, some insiders commented that the minister and department protected industries from investigation by the commission (Productivity Commission, 2003). Fewer matters were referred, the scope of inquiries was tightly constrained and the commission's resources were reduced. The prime minister or treasurer, on the other hand, is more likely to consider economy- and community-wide benefits of reform if it outweighs the pain caused to individual industries. The commission is currently in the Treasury portfolio.

### *Outcomes and Effectiveness*

The commission has been in place in Australia for almost 40 years, which speaks to its effectiveness as an advisory body on economic reform. Successive governments of differing political perspectives have committed to the commission and expanded its role (Productivity Commission, 2003). A simple indicator of its effectiveness is government acceptance of its findings and recommendations. The majority of the commission's recommendations regarding industry protection or assistance have been implemented (Banks & Carmichael, 2007).

### *Lessons Learned*

Creation of an independent government agency dedicated to reform has been useful in Australia to help formulate policies that take economy-wide effects into account. However, the significant level of resources and expertise involved might be an unreasonable level of commitment for some economies, especially if fossil-fuel subsidies are the only reform priority. The public inquiry and research process is time-consuming, which can be a concern when subsidy policies are fiscally unsustainable and require urgent action.

Without adopting the full model of the commission, the essential elements of its approach could be drawn upon to initiate independent, transparent and community-wide advice on reform. Expert task forces and public inquiries hosted in a central government agency can help achieve a non-sectoral approach to research (Banks, 2007). India, for example, has historically appointed commissions of inquiry into fossil-fuel subsidies by leading experts. These have produced comprehensive research reports although rarely have the recommendations been implemented (Shenoy, 2009). The secretariat needs to be well resourced and preferably staffed by a range of experts, not only departmental officials from the relevant portfolio (i.e., the Energy ministry in the case of fossil-fuel subsidies). Economic modelling and other research can be outsourced to independent consultants and academic experts, so long as there is sufficient in-house expertise in government to oversee the research and evaluate results. Public consultation will ensure an emphasis on community-wide rather than sectoral benefits. The consideration of distributional effects and the development of adjustment policies can be part of the research terms of reference.

While independent, transparent and community-wide research can be time consuming and expensive, the cost should be weighed against the potential longer-term benefits. The financial investment should be considered compared to the cost of poor economic and industry policies that may be hampering growth, competitiveness and productivity throughout the economy. The AU\$40 million (US\$42 million) per year that the Australian government currently spends on the commission (which runs approximately 10 research projects concurrently), for example, is dwarfed by the amount governments spend annually on fossil-fuel subsidies: between US\$4 billion and US\$81 billion in each of the top 25 subsidizing economies in 2010 (IEA, 2011a).



The benefits of repeated public inquiries into reform over a long period of time in Australia have been to gradually build a pro-reform constituency in government and the wider community. Reforms once made in Australia have tended to stick, having stronger foundations of support or acceptance within the community precisely because the basis for reform was transparent (Banks & Carmichael, 2007). If viewed in this context, the investment in thorough research is likely to be worthwhile in the long term. Without adequate time and public consultation, reforms may be poorly formulated, have little buy-in by the community and consequently tend to be unstable.

## Building Political Support for Reform and Measures to Protect the Poor: Communication Campaigns and Social Programs in Indonesia

### Introduction

The building of political support is imperative for the successful implementation of any initiatives to reform fossil-fuel subsidies. The Indonesian government has made several attempts at reforming its fossil-fuel subsidies. One of the initial attempts was undertaken in 2003, when then President Megawati Sukarnoputri planned to increase the prices of fuels, electricity and telephone charges. The inability of the government to promote reform to the public led to widespread protests and the eventual the cancellation of this reform initiative.<sup>20</sup>

Learning from the mistakes of the previous government, the new administration of President Susilo Bambang Yudhoyono was more careful in carrying out reforms in 2005 and 2008. On both occasions, the government conveyed simple messages to the public through the media regarding the rationale for reform and the intention to protect the poor from the impacts of higher energy prices. The government also carried out a series of consultations within the parliament to ensure the smooth implementation of the reform initiatives. The reasons for reform were used to garner support, including easing the fiscal burden, reducing the economy's dependence on the fossil fuels and reducing carbon emissions.

**TABLE 9.3: INDONESIA'S ENERGY SUBSIDIES TO CONSUMERS, 2005-2011 (IN BILLION US\$)**

DESCRIPTION	2005	2006	2007	2008	2009	2010	2011
	Audited	Audited	Audited	Audited	Audited	Revised	Proposed
Energy consumers	10.76	10.32	12.79	23.01	9.09	15.65	15.83
Fuel	9.85	7.01	9.17	14.35	4.33	9.66	10.97
Electricity	0.91	3.32	3.62	8.66	4.76	5.99	4.85

Source: Ministry of Finance, Indonesia (2010c, Ch. IV, pp. 44, 124, 126)

Support to the oil and gas sectors (to both producers and consumers) has dominated the Indonesian state budget for more than three decades. Between 2001 and 2008, 10 to 28 per cent of the national budget was spent on subsidies, at the expense of other important public spending, such as service infrastructure, health and education (GSI, 2011a) (see Table 9.3). In the 2011 fiscal year, subsidies given to the oil and gas sectors alone are expected to absorb about IDR92.8 trillion (US\$10.9 billion), roughly 12 per cent of the state's total expenditures (or equal to 1.9 per cent of the GDP), and 50 per cent for the overall subsidy budget (Ministry of Finance, Indonesia, 2010c, Ch. IV). Combined with

<sup>20</sup> In 2003 the government launched simultaneous adjustments on the prices of fuels and electricity. The lack of clarity on the compensation packages associated with these reform generated much public anxiety (KOMPAS, 2003a; Sardini, 2003) and led to widespread demonstrations in several cities, many of which also called for the impeachment of President Megawati should the fuel subsidy reform plan go ahead (KOMPAS, 2003b; KOMPAS, 2003c; Suara Merdeka 2003).





the IDR41 trillion (US\$4.8 billion) electricity subsidy, they form one the largest state expenditures, larger than non-energy subsidies (e.g., food, fertilizer, public services), which amounts to US\$12.06 billion.

**TABLE 9.4: FOSSIL-FUEL CONSUMPTION OF PERUSAHAAN LISTRIK NEGARA'S (PLN) POWER PLANTS, 2009**

	TYPE OF FUEL*				
	COAL (TONNES)	HIGH-SPEED DIESEL (KL)	INDUSTRIAL DIESEL OIL (IDO) (KL)	FUEL OIL (KL)	NATURAL GAS (MMSCF)
Volume by original unit	21,604,464	6,365,116	11,132	3,032,657	266,539
Share of fuel consumption of PLN power plants (%)	47.09%	17.91%	0.04%	10.70%	24.26%
Total PLN power plant production from fossil fuels	106,817 GWh				

Note: \*Not all PLN power plants use fossil fuels: some are using geothermal, hydro, and a very small amount of solar and wind energy. PLN also purchases power from independent power producers, though this is small in comparison those generated by the PLN power plants.

Source: Ministry of Energy and Mineral Resources, Indonesia (2010, pp. 62-63)

The size and pricing mechanism for subsidized fuel is extremely vulnerable to international oil price volatility. As a result of the significant increase of oil price in 2008, for instance, the government was forced to increase the size of the fuel subsidy from IDR83.8 trillion (US\$ 9.9 billion) to IDR139 trillion (US\$ 16.4 billion).<sup>21</sup>

The Indonesian government is continuing to target the reduction of subsidies for petroleum products and electricity, both of which are normally maintained at a fixed price set by the government. In terms of subsidies for oil products, the government sets the price of Premium, the widely-used low octane gasoline (RON 88) and automotive diesel fuel, both at IDR4,500 per litre (US\$0.53). Electricity prices are also subsidized, although not all power generators in the economy are powered by fossil fuel.<sup>22</sup> Coal is the main fossil fuel consumed by the State Electricity Company (PLN). In 2009, coal was 47 per cent of the total fuel consumption of the PLN.

<sup>21</sup> In general, this paper uses the exchange rate as of August 2, 2011 where US\$ 1 equals IDR8,455. However, where significant events in 2005 and 2008 are discussed, average exchange rates for those years are used, drawn from the state budget issued by the Government of Indonesia. For 2005 and before, the exchange rate was set at IDR9,705 per US\$1. The exchange rate for 2008 was IDR9,691 per US\$ 1.

<sup>22</sup> The electricity subsidy is normally applicable for the two lowest electricity rates, 450 volt-ampere (VA) and 900 VA, both of which are commonly used for social services, households, businesses, industries, government offices and public street lighting.



**TABLE 9.5: FUEL FIXED PRICE, 2005–2011 (IDR)**

YEAR / FUEL TYPES	2005			2006	2007	2008				2009*	
	3 JAN- 28 FEB	1 MAR- 30 SEPT	1 OCT- 1 DEC	1 JAN- 31 DEC	1 JAN- 31 DEC	1 JAN- 23 MAY	24 MAY - 30 NOV	1 DEC- 14 DEC	15 DEC- 31 DEC	1 JAN- 14 JAN	15 JAN 2011
RON 88	1,810	2,400	4,500	4,500	4,500	4,500	6,000	5,500	5,000	5,000	4,500
Market Price	2,100	2,870	5,160	4,780	4,838 - 5,088	7,342 - 8,147	7,870 - 8,346	6,500 - 6,735	NA	4,565 - 4,744	4,349 - 4,520
Diesel (automotive)	1,650	2,100	4,300	4,300	4,300	4,300	5,500	5,500	4,800	4,800	4,500
Market Price	2,100	2,700	5,350	4,493 - 5,612	4,950 - 5,180	7,944 - 8,305	9,374 - 10,108	6,627 - 7,535	NA	4,760 - 5,195	4,601 - 5,034
Kerosene	1,800	2,200	2,000	2,000	2,000	2,000	2,500	2,500	2,500	2,500	2,500
Market Price	2,200	2,790	5,600	5,320	5,541 - 5,827	7,625 - 8,092	9,572 - 9,989	6,500 - 6,735	NA	4,565 - 4,744	4,999 - 5,288

\* Fixed fuel prices have not been changed since January 15, 2009.

Source: Ministry of Finance, Indonesia (2010c, p. 39)

### Indonesian Government's Rationale for Reform

As a result of the decline in domestic crude oil production and increase in domestic consumption, Indonesia has imported an increasing proportion of its oil needs. This has meant that Indonesia must pay international prices for the much of its oil while providing refined products to consumers at below-market prices, leading to escalating fuel subsidies.

The government had carried out a number of fossil-fuel subsidy reforms in the post-1997–1998 economic crisis era, but two successful initiatives are noteworthy. In 2005 fossil-fuel subsidy reform was carried out for the purpose of achieving what the government referred to in its 2005 annual state budget as “financial sustainability,” which included: (1) the gradual reduction of the state budget to create a balanced or surplus (financial) condition; and (2) to attain optimal, efficient and effective budget financing management (Ministry of National Development and Planning [BAPPENAS], Indonesia, 2004, p. 1). The 2005 state budget also mentioned that the achievement of the financial sustainability is justified as a result of the continuous expansion of the share of subsidy, particularly fuel subsidy, as a component of the state’s expenditure.<sup>23</sup>

As was the case in 2005, the government’s effort to reform fossil-fuel subsidies in 2008 was also driven by several external and internal factors (Coordinating Ministry for Economic Affairs, 2008). Externally, the international price of oil rose to over US\$130 per barrel, which provided very little space for the government to provide subsidies.<sup>24</sup>

<sup>23</sup> Indeed, as pointed out in the 2005 State Budget, the government’s spending on subsidy in the 2002–2004 period increased significantly. While in 2002 and 2003 subsidy took a 2.5 per cent share of the national GDP, the share of subsidy in the national GDP in 2004 rose to 3.5 per cent. In nominal terms, while in 2002 the government spent about IDR40 trillion (US\$4.12 billion) for subsidy, that figure grew higher in 2003 and 2004 to IDR43.9 trillion (US\$4.52 billion) and IDR69.9 trillion (US\$7.2 billion) respectively. Out of these figures, the government spent IDR31.2 trillion (US\$3.21 billion), IDR30 trillion (US\$3.09 billion) and IDR59.2 trillion (US\$6.09 billion) for fuel subsidy alone. Source: Ministry of National Development and Planning (BAPPENAS), Indonesia, 2004.

<sup>24</sup> The 2008 State Budget that was approved by the parliament in the previous year stipulated that the maximum budget allocated for fuel subsidy should not exceed IDR139.1 trillion (US\$14.3 billion). However, with the assumption that the price of crude oil would reach US\$120/barrel in 2008, the government revised the estimate of fuel subsidy upward to IDR200 trillion (US\$20.6 billion) (Ministry of National Development and Planning [BAPPENAS], Indonesia, 2004).



Internally, with the likelihood of the increased spending on fuel subsidy, the government speculated that its ability to fund programs that were oriented towards the improvement of the lives of the poor—such as in health, education and infrastructure development—would be drastically reduced. Then Vice President Jusuf Kalla, for instance, argued that with the reduction of subsidies, Indonesia could invest more on other social programs (Hajramurni, 2008). Moreover, aware of the persistent problem that 40 per cent of the high-income families benefit from 70 per cent of the subsidy value, the government finally decided to take action.

### ***Building Political Support for Reform through Clear Compensation Programs***

In order to secure support for its reform policies, the Indonesian government has adopted complementary policies that help the population adjust to any negative social and economic impacts from the reform initiatives. In 2005 the government launched a series of social welfare programs under the umbrella of Fuel Subsidy Reduction Compensation Program (*Program Kompensasi Pengurangan Subsidi BBM*) (refer to Box 9.4). The government's reform effort in 2008 was also accompanied by compensation programs (refer to Box 9.5).

#### **BOX 9.4: SOCIAL PROGRAMS ASSOCIATED WITH INDONESIA'S FOSSIL-FUEL SUBSIDY REFORM IN 2005**

In 2005, along with its effort to promote fossil-fuel subsidy reform, the government launched four social compensation programs, including:

- (1) **School Operational Assistance (*Bantuan Operasional Sekolah*)** and the **Special Student Assistance (*Bantuan Khusus Murid*)**, which were targeted for 40.3 million students and involved IDR6.2 trillion (US\$638.8 million) in state funding.
- (2) **Basic Health Care Package (*Jaminan Pelayanan Kesehatan*)**, which provided health service for up to 36.1 million poor people and absorbed about IDR3.8 trillion (US\$391 million) of state funding.
- (3) **The development of poor and disadvantaged areas or regions** in the economy that reached 12,834 villages and cost about IDR3.3 trillion (US\$340 million).
- (4) **Unconditional cash transfers (*Subsidi Langsung Tunai*)** for 15.5 million poor households, which involved IDR4.6 trillion (US\$474million) of state funding.

In total, the government spent about IDR18.1 trillion (US\$1.8 billion) for these compensation packages.

Source: Board of Finance and Development Control (2005)



#### **BOX 9.5: SOCIAL PROGRAMS ASSOCIATED WITH INDONESIA'S FOSSIL-FUEL SUBSIDY REFORM IN 2008**

Along with the adjustment of the fuel price as a result of the government's attempt to promote fossil-fuel subsidy reform, a number of compensation packages were introduced.

##### **(1) Rice support for the poor (*Beras untuk Rumah Tangga Miskin [Raskin]*)**

Raskin was mainly a food (rice) aid program that was intended to reach up to 19.1 million households where the price of the rice was maintained at the rate of IDR1,600/kg (US\$0.16) against the actual market price of IDR4,600/kg (US\$0.47). Initially, each household was given 10 kilograms per month for the duration of six months between June to December 2008, but the amount of the rice aid was later adjusted to 15 kilograms per month for each household. In nominal terms, the government spent up to IDR4.2 trillion (US\$433.3 million) for the Raskin program (KOMPAS, 2008).

##### **(2) Unconditional cash transfer (*Bantuan Langsung Tunai [BLT]*)**

The BLT was aimed at providing financial support for poor households. Each eligible household was given IDR100,000 per month (US\$11.35), which was distributed in two lump sum payments over a period of six months (from June to December 2008).

##### **(3) Financial support for the children of the lowest ranks of civil servants plus military and police officers.**

The compensation program was given a budget of IDR450 billion (US\$46.4 million) and was intended to reach up to 3 million children of low ranking civil servants, military and police. The amount of the support was IDR15,000 (US\$15.4) per child and was added to the officials' salaries (KOMPAS, 2008).

##### **(4) Loan interest subsidy for small and medium enterprises (SMEs)**

Currently, there is no comprehensive assessment analyzing the loan interest subsidy for SMEs during the 2008 fuel subsidy reform. However, data from several governments' official documents, academic studies and news reports indicate that the government provided up to 50 per cent loan interest subsidy for SMEs for any loans made during the second half of 2008. This was the case in the Bangka Belitung province (Media Indonesia 2009; Sedjati, 2009, p. 60). The implementation of this program was mainly coordinated by regional governments and local commercial banks. Data provided by the Coordinating Ministry for Economic Affairs (2008) stated that the government provided IDR1 trillion (US\$103 million) for this program.

Another notable program in the Indonesian government's effort to reform fossil-fuel subsidies was the Conversion from Kerosene to Liquefied Petroleum Gas Program (*Program Konversi dari Minyak Tanah ke LPG*). This program was launched a year earlier than the government's fuel subsidies reform effort in 2008, and was designed to tackle the expansion of the kerosene subsidy in the state budget.

### ***Building Political Support for Reform through Effective Communication Campaigns***

Effective consultations with stakeholders and widespread information campaigns were critical to the success of fossil-fuel subsidy reform processes in both 2005 and 2008. As mentioned earlier, the absence of political support was one of the key failures of the 2003 reform attempt. In the Indonesian context, a distinction is made between the support provided by the political elites (e.g., members of parliament) and intellectual groups (e.g., academia, experts, business associations and NGOs). These groups can be involved in policy-making and help shape public opinion. The political and intellectual elites are often targeted for direct consultations with the government based either on their level of representativeness of the public interests or their expertise or professional experience on the subject discussed. The public more generally is often the target for information campaigns.



## Stakeholder Consultation

A number of key stakeholders have been targeted by the government to provide input on fuel subsidy-related policies. Among the political elites, support from key political factions and relevant commissions (e.g., energy and budget commissions) from the parliament are essential. For most members of parliament, supporting fuel subsidy reform is politically difficult. In an economy that is used to fuel subsidies, phasing out support is unpopular with voters.

In the 2005 reform process, the government presented two options to the parliament: (1) keeping fuel prices constant at the expense of ballooning subsidy costs amounting to IDR113.7 trillion (US\$11.7 billion), a 92 per cent increase from in the previous year; and (2) increasing the prices of fuel price with the consequence of lowering the total subsidy cost to IDR89.2 trillion (US\$9.19 billion) (Detik News, 2005). The government also attached comprehensive compensation packages with the second option. Knowing that the compensation packages could reduce political risks and deflect public anxiety, the parliament unanimously chose the second option.

Amid concerns over the significant increase of food price in 2008, the public initially reacted negatively to the government's plan to raise fuel prices that year. As a response to the public outcry, the parliament summoned the government in a plenary session to discuss the government's intentions. In the face of mounting opposition,<sup>25</sup> the government argued that: (1) the success of 2005 reforms could be built upon; (2) the fuel subsidy had become a major burden for the state budget; (3) fuel subsidies are not targeted to the poor; and (4) compensation programs, including the BLT, would be included in the reform plan. The government finally managed to obtain parliamentary buy-in, particularly because of the need to reduce the fiscal burden created by fuel subsidies.

In both 2005 and 2008 the government also carried out extensive consultations with influential business associations and intellectual groups. Information regarding these formal consultations is not available publicly. However, there was extensive debate between stakeholder groups and the government in the media. In these exchanges, the government repeatedly highlighted the compensation packages. The government developed specific compensation packages for industry, labour and farmer groups. While the industrial sector was awarded with fiscal and non-fiscal incentives,<sup>26</sup> labour groups were promised an increase in the non-taxable income level, which, prior to the fuel subsidy reform, was set at IDR1 million (US\$103). For farmers, the government's purchasing price for rice was increased above the previously set amount of IDR1,330/kg (US\$0.1) (Indonesian Chambers of Commerce and Industry, 2005).

In 2008 members of the business community gave the government their much-needed support to increase fuel prices. The Indonesian Chambers of Commerce and Industry (*Kamar Dagang dan Industri Indonesia*) stated that the business community could tolerate an increase of fuel price of up to 10 per cent. The Indonesian Entrepreneurs Association (*Asosiasi Pengusaha Indonesia*) shared the government's concern over the need to ease the fiscal burden of the 2008 state budget (Directorate General of Budget, Ministry of Finance, Indonesia, 2008).

<sup>25</sup> Several major opposition parties rejected the government's proposed plan on the grounds that the fuel price increase at the time was far from suitable amid the people's weak purchasing power. The government was also accused by some opposition groups for failing to manage the economy's natural resources properly (Liputan 6, 2008).

<sup>26</sup> Fiscal and non-fiscal incentives the government agreed to launch, as proposed by the business sector, were: exemption on value-added tax on agricultural commodity, extension of the credit period, removal of terminal handling charges, control of interest rate credit and removal of high economic costs on the road (Tempo Interaktif, 2005).





### Information Campaigns



Public campaign on fossil-fuel subsidy in Indonesia

Campaign banners from the Ministry of Energy and Natural Resources were posted in all Pertamina’s gas stations. The banner reads: “Regular gasoline (Premium–RON 88) is subsidized fuel only for the disadvantaged customers in society.” The photograph was taken on August 5, 2011 in Jakarta. The campaign has had little success in making non-disadvantaged motorists voluntarily switch to unsubsidized blends of gasoline. Further, the poorest 10 per cent of the population does not use gasoline at all.

Information campaigns are another important aspect in fostering political support for government subsidy reform in Indonesia. In both 2005 and 2008 information campaign activities were carried out for the purpose of: (1) increasing public knowledge about the subsidy-reform programs, (2) shifting the public’s behaviour towards energy efficiency and (3) obtaining popular support for the government’s energy subsidy reforms. To achieve these objectives, the government carried out general information campaigns as well as issue-specific campaigns on issues such as safety in the “Kerosene-Gas Conversion” program. In most of its general campaigns, the government attempted to avoid any mention of the removal or phasing-out of subsidies, but instead called on the public to join its “fuel efficiency movement” (*gerakan hemat BBM*) (Box 9.6).

#### BOX 9.6: THE 2008 INFORMATION CAMPAIGN

Launched at the end of 2007, the “movement” policy was initiated by the Ministry of Energy and Natural Resources and had the following objectives: (1) reducing the consumption of fossil fuels in the transportation sector, households, industry and power plants, (2) reducing carbon emissions from fossil fuels and (3) reducing fossil-fuel subsidies (Ministry of Energy and Mineral Resources, Indonesia, 2007). The implementation of this policy was also accompanied with a campaign action plan, including: the distribution of pins, stickers and leaflets/brochures; appearances on television talk shows; print and electronic media advertisement; and empowering the participation of NGOs and students. Other actions that followed from of this policy were promoting the use of bicycles (e.g., “Car-Free Day” campaign that involves the closure of several main streets in central areas of Jakarta) and public transportation, the efficient use of electricity, the age limit for certain types of vehicles and energy audits for industries.



Equally important in public campaign activities is disseminating information regarding the compensation programs to the public. For example, the federal government communicated its plan for cash transfers to all local governments in the economy, including 33 provincial governments, as well as officials in 44 districts and 6,300 sub-districts. Internally within the government, the Coordinating Team for Direct Cash Transfer—Household Target (*Tim Kordinasi Program BLT—Rumah Tangga Sasaran*) was responsible for coordinating the release of information on the program. Externally, the information campaign was the responsibility of the Minister of Communication and Information and the Minister of Internal Affairs (Ministry of Social Affairs, Indonesia, 2008, p. 11). An interdepartmental team was established to coordinate and provide information on the government's 2005 reform program: the Compensation Program Team for the Reduction of Fuel Subsidy (*Kompensasi Pengurangan Subsidi Bahan Bakar Minyak*)<sup>27</sup> Compensation programs were advertised in print and electronic media.

### **Timing of the Reform Process**

Timing of reforms in Indonesia was critical. According to the Central Bank of Indonesia, every IDR500 (US\$0.06) increase in the subsidized fuel price is likely to create 1.6 per cent inflation pressure (Harian Ekonomi Neraca, 2011). In general, timing refers to the period in which the government finds it strategic to implement reforms during the political cycle. For example, while it is rarely possible for the government to raise prices in the lead up to an election year, the same policy manoeuvre is generally possible to pursue after a strong election win when the government's political capital is high. The Indonesian government managed to increase prices in mid-2008, one year before the government won the general election in July 2009.

The Indonesian government avoids raising fuel prices on major holidays, such as Ramadhan, the holy Muslim month, and the end of the year, as the prices of foods and other consumer items tend to increase around these holiday periods.<sup>28</sup> Fuel price adjustments normally take place in the first three months of the year (refer to Table 9.5) or in October following the evaluation and revision of the Annual State Budget.

### **Outcomes and Effectiveness of the Reform Measures**

Although imperfect, the efforts of the Indonesian government to reduce fossil-fuel subsidies have been applauded by many in the international community (VOA News, 2011). The BLT program to help poor households overcome the adverse impacts of higher fuel prices in 2005 and 2008 was one of the largest in the world (International Initiative for Impact Evaluation, n.d.). One recent study found that some of the unconditional cash transfers in Indonesia were misappropriated, poorly targeted and led to social unrest (Cameron & Shah, 2011). While some of compensation failed to reach the intended beneficiaries, to a large extent, the fossil-fuel subsidy reform conducted on both occasions were relatively successful.

### **Impacts on Domestic Prices**

In both 2005 and 2008 the reforms resulted in an increase in domestic fuel price. In the 2005–2008 period, the price of regular gasoline (RON 95) increased 150 per cent from IDR1,800 (US\$0.18) per litre at the beginning of 2005 to IDR4,500 (US\$0.46) per litre by the end of May 2008. The price of regular gasoline rose by 33 per cent in

<sup>27</sup> The ministries were the Coordinating Minister for People's Welfare, the Minister of the National Development Planning (BAPPENAS), the Minister of National Education, the Minister for Religious Affairs, the Minister of Finance and the Minister for Internal Affairs.

<sup>28</sup> Amid the rising consumption during the month of Ramadhan in August 2011, for instance, instead of adjusting the price, the government chose to increase the volume of subsidized fuel to maintain economic stability (Republika, 2011). However, at the same time, the price of unsubsidized fuel increased IDR200 (US\$0.02) per litre.



the second half of 2008 to IDR6,000 (US\$0.61) per litre. At the beginning of 2009, the price of gasoline went down again to IDR4,500 (US\$0.46) per litre as a result of the declining international oil price. Other fuel products, including diesel and kerosene, also had price reductions in early 2009.

Although the average global price of oil in the first seven months of 2011 were similar to that of 2008, the government did not carry out another round of fossil-fuel subsidy reform due to the relative weakening of the ruling Democratic Party (as a result of numerous corruption scandals targeted around the Party) and the fact that the most important national holidays, or Idul Fitri, fell in August in 2011. High world oil prices have not been passed on to consumers, once again leading to a large subsidy burden. The primary concern of the Indonesian government now is to link the domestic fuel price with the international price, as well as to mitigate the possible adverse impacts of such a price adjustment processes.

### ***Access to Energy***

Numerous media reports indicate that higher fuel prices affect access to energy by the poor. For example, several newspaper articles recently suggested that poor households in regions outside Java and Bali have suffered fuel scarcity (diesel, in this case). One news report indicates that fishermen in the province of Lampung have been unable to work as a result of fuel shortages (Saroso, 2011). In Kalimantan, youth leaders have been quoted as saying that much of the subsidized fuels have been illegally sold to local industries, including palm oil plantations and mining (Tempo, 2011).

### ***Political Backlash***

As one of the largest democracies in the world, political backlash is common every time the government announces policy changes. The initial reform effort undertaken by the Megawati administration in 2003, for example, met with strong opposition, with large demonstrations in major cities such as Jakarta, Surabaya, Bandung and Manado (U.S. Embassy in Jakarta, 2002; Bacon & Kojima, 2006a). The subsequent reform efforts in 2005 and 2008 met with less opposition due to the presence of welfare programs, the highest profile of which was the BLT (Beaton & Lontoh, 2010, p. 9).

### ***Impacts on Exports and Investments***

There is no evidence to suggest that fuel subsidy reform generated direct negative impacts to exports or international investment. Despite the removal of fuel subsidy to industry in 2005, the value of Indonesian exports rose 17.6 per cent from US\$85.6 billion in 2005 to US\$100.7 billion in 2006. In the 2008–2009 period, there was a decrease of 15 per cent in the value of Indonesian exports from US\$137 billion in 2008 to US\$116.5 billion, largely due to the 2008–2009 global financial crisis.

The level of foreign direct investment in Indonesia has shown an upward trend. While in the 1995–2003 period, Indonesia managed to secure an average of US\$1,857 million per annum of foreign investment, there figure was much improved in 2007 and 2008, each with a total net inflow of US\$6,928 million and US\$9,318 million. In 2009 the total net inflows dropped to US\$4,877 million, primarily because the global financial crisis (Chandra, 2011). In fact, the most commonly cited factors that hamper investment in Indonesia are the lack of regulatory consistency and corruption.





### *Fossil-Fuel Subsidy Reform and Its Impacts on Women*

The role of women in managing households makes this a vulnerable group to any changes to the availability or prices of essential goods and services such as cooking fuels and food.<sup>29</sup> Policies that influence food prices may lead to an additional burden on women to find alternative staple foods and to restrict household spending. Frequent accidents occurred during the early stage of the Kerosene-to-LPG Conversion Program due to unfamiliarity with the new gas cylinders and cooking equipment. The media reported 12 deaths, 131 hospitalization and 55 damaged buildings (Afrida, 2010). As a result, the Indonesian Consumer Foundation (*Yayasan Lembaga Konsumen Indonesia*) called for the suspension of the program. Although data on the victims of the accidents are not disaggregated by gender, women were more at risk because they generally do more cooking than men.

Cameron and Shah (2011, p. 21) note that, in comparison to their male counterparts, women appear to be more concerned than men with the leakage of funds from the BLT program to non-deserving recipients.

### *Lessons Learned*

The Indonesian government had experienced some failures and successes in its implementation of fossil-fuel subsidy reform. The following are a number of key points that can serve as lessons learned for future reform efforts in Indonesia, as well as in other APEC economies, particularly in relation to building political support.

1. Indonesia has succeeded in raising fuel prices but continues to have a large subsidy burden because the policy of price-fixing continues. The next reform effort needs to include changes to the pricing mechanism in order to link domestic and international prices, either through an automatically applied price adjustment mechanism or deregulation of the fuel price.
2. Successive reform measures can provide valuable learning experiences and gradually build a suite of successful policies to support reform. In both 2005 and 2008 reform efforts, the government and the public were able to draw the lessons from the mistakes that occurred from the 2003 reform initiative.
3. The reform policy undertaken by the government should be comprehensive in nature in that it should be able to address the target set by the government (e.g., easing fiscal pressures and improving the efficiency of social welfare initiatives, energy security and environmental considerations), while, at the same time, anticipate the likely impacts such a policy adjustment may have on the most vulnerable in society and communicate how these will be mitigated.
4. The quality of the compensation programs given to the poor and other vulnerable sectors of society matters greatly in the success of the reform initiatives. Apart from helping those in need cope with the economic hardships caused by increases in the fuel price, the quality of the reform programs also determine the public's trust vis-à-vis the government, which is critical if the reform process is to be repeated in the future.

<sup>29</sup> For further information see the public statement made by a local NGO, the Indonesian Women's Coalition (Koalisi Perempuan Indonesia) (2011).



5. The government should also be able to draw upon the inventory of the existing programs and make use of some of them as part of its reform policy. For example, the compensation packages attached to the fossil-fuel subsidy reform initiatives in Indonesia were actually programs that had been either running for years or experimented with in the past. In both 2005 and 2008 the government successfully integrated the existing programs, such as Raskin (rice support), which had initially been launched in 1998.<sup>30</sup> The BLT program launched in 2008 was also dubbed “an improved version” of the 2005 cash transfer program (Chamsyah, 2008).
6. Timing is important. Among other things, the electoral cycle and calendar of events such as major holidays should be taken into account. A study on the inflation pattern is likely to be needed if similar reform efforts are to be conducted elsewhere in the APEC economies.
7. Effective consultation and information campaigns assisted the Yudhoyono administration in convincing the Indonesian public that increases in the fuel price were necessary and to promote compensation programs.
8. Although the government can be applauded for its public campaign success, transparency remains an issue for the government. The limited availability of accurate data, for example, often hampers effective participation by stakeholders. Limited data also diminishes the possibility of independent evaluation of the effectiveness of the government’s reform initiatives.
9. More attention should be given to the impact of fuel price reform on women. Initial research indicates that women from poor households could be particularly vulnerable to rising fuel prices and changes in energy technologies. As it stands, available data concerning the impacts of the fuel price adjustment policies of the government have not been disaggregated by gender. While this approach does not discriminate between the economic status of men and women, such a method also prevents assessment of the impacts of policy changes towards women.

## Building Support for Reform: Chile’s Probity and Transparency Agenda

Chile was one of the pioneering economies in Latin America to implement economic and industrial liberalization. In the 1970s Chile introduced an ambitious reform agenda aimed at limiting the role of the State in the economy and increasing international trade. As an important element of these reforms, the fuel sector was deregulated, subsidies were largely eliminated and prices were left to market forces. This situation underwent some changes as a consequence of the Gulf War in 1991 and the resulting oil shock when the government decided to intervene by creating stabilization mechanisms to shield final consumers from volatility in international prices. Albeit with some transformations, cushioning mechanisms remain in place to this day.

This case study examines Chile’s recent Probity and Transparency Agenda to highlight the availability of information regarding the stabilization mechanisms and the importance of transparent pricing with the objective of improving accountability. The document focuses on the benefits of having a transparency framework in place.

In recent years, calls for improving public sector performance, particularly energy policy, have increased. Citizens demand more accountability in return for the powers they have granted governments to raise and spend revenue. However, effective accountability requires transparent and timely information, a situation that has been challenging to attain. In the case of Chile, important steps have been taken towards achieving this goal by placing the Probity and Transparency Agenda high on the list of public policy priorities.

<sup>30</sup> See Bulog (2010) for further information regarding the Raskin program.



### Early Deregulation of the Energy Sector

In the 1970s Chile introduced an ambitious reform agenda in line with the neoliberal ideology. In the absence of democracy, whatever opposition existed with regards to the adoption of these measures was minimized and reform was undertaken without much regard for transparency or accountability. The objectives of the transformation were twofold: first, limit the role of the State in the economy (deregulation and privatization) and second, integrate into the world economy (Schatan, 2001).

Prior to the launch of the reforms, the energy industry was under State control and prices of most oil products, including kerosene and diesel, were kept artificially low. As a consequence, the reform effort had serious implications for the energy sector (Von Moltke, McKee & Morgan, 2003). As an important element of these reforms, the deregulation of the fuel sector was initiated in 1973. By 1982 the production, distribution and commercialization of oil-related products were determined by market forces (Altomonte & Rogat, 2004). Hence, prices of fossil fuels ceased to be subsidized.<sup>31</sup>

#### BOX 9.7: GASOLINE & DIESEL IN TOTAL FINAL CONSUMPTION OF ENERGY

In Chile, the transport sector represents about 33 per cent of total final consumption of energy, approximately 8.1 Mtoe that come almost exclusively from petroleum products (IEA, 2009c). Moreover, this figure is likely to increase significantly in the next few years as the number of cars on the road is growing at a rate close to 8 per cent per year, from 3.3 million in 2010.

##### Cars on the road in 2010

Gasoline	2,623,941
Diesel	670,749
Gas	4,715
Electric	41
Total	3,299,446

### The Gulf War and the Implementation of Stabilization Mechanisms

This situation underwent some changes as a consequence of the Gulf War in 1991 and the resulting oil shock.<sup>32</sup> The government decided to intervene with the objective of shielding domestic petroleum prices from international price volatility and created the Oil Price Stabilization Fund (*Fondo de Estabilización de los Precios de Petróleo [FEPP]*). In 2005 the cushioning mechanism was adjusted and a second fund was created. The FEPP kept the coverage of fuel oil and LPG while the newly created Fuel Price Stabilization Fund (*Fondo de Estabilización de Precios de Combustibles [FEPC]*) covered gasoline, diesel naphtha, kerosene.<sup>33</sup> The FEPC was active from 2005 until March 2010. In 2011 another reform was made, and the System for Protecting Taxpayers Against Variations in the International Price of Fuels (*Sistema de Protección ante Variaciones de los Precios de Combustibles [SIPCO]*) was introduced to cover gasoline, diesel, automotive LPG and compressed natural gas.<sup>34</sup> The scope of the FEPP was restricted and it is now limited to domestic kerosene (OECD, 2011a).

<sup>31</sup> Further reforms included the creation of the National Energy Commission (CNE) in 1978 to be responsible for developing and implementing energy policy.

<sup>32</sup> By 1990 the military rule in Chile had ended and the economy emerged as a leading example of market-oriented economic restructuring (Silva, 1996).

<sup>33</sup> Later on, the government extended the coverage to include LNG regasified within the country.

<sup>34</sup> The use of these fuels for purposes other than transport are not covered by SIPCO.



## BOX 9.8: FEPP & FEPC

### FEPP

The FEPP was designed to smooth final prices for a wide range of petroleum products, such as gasoline, diesel, naphta, kerosene, fuel oil and LPG. After the introduction of FEPC in 2005, it was decided to limit its coverage to fuel oil and LPG. Nevertheless, when the FEPC was terminated in 2010, all those products were put back under the aegis of FEPP. When SIPCO was introduced in 2011, FEPP coverage was limited to domestic kerosene.

Price intervention occurred at the point of first sale (or import) of the relevant product. It relied on the use of an import parity price (IPP) and an intermediate reference price (IRP), both of which were set on a weekly basis. IPP was obtained by adding a mark-up to the CIF\* price of crude oil to account for various elements such as customs duties, exchange-rate fluctuations, logistics and the importer margin. On the other hand, the IRP was the expected price of oil over the medium term. The CNE calculated its value on the basis of the following formula:

$$IRP = 0.4 HP + 0.25 STF + 0.35 LTF$$

where "HP" was a historical weighted average of the IPP, and "STF" and "LTF" are short-term and long-term forecasts of IPP prices respectively (making calculation both backward- and forward-looking). The CNE then added a fixed margin on each side of the IRP to define a price band inside which the domestic price is to fluctuate. A tax was levied or a credit granted whenever the IPP fell outside that band.

From 1991 to 2000, the FEPP had a built-in asymmetry in the direction of lower prices. This stemmed from a bigger weight ascribed to overshooting of the target price, meaning that credits would always be higher than taxes for a given equal variation on each side of the target. The asymmetry resulted in the government having to provide more than US\$463 million in nominal terms to keep the program in place over the years.

The exhaustion of the fund's resources prompted the government to reform the scheme in 2000. Among the many changes brought about by the reform, the formula for setting the IRP was made public and some degree of flexibility was introduced in the determination of the band's margins. The government also disaggregated the fund at the product level, thereby establishing separate balances for each type of fuel. Last, the formulae were modified to make FEPP transfers contingent on the fund's available resources and the CNE was asked to update the scheme on a weekly basis, thereby allowing a better transmission of world prices to final consumers. Since February 2011 the FEPP has been restricted to domestic kerosene only. This reform (Law 20.493) also provided for a US\$5.4 million recapitalization of the fund.

### FEPC

The FEPC program (no longer in force) was initially endowed with US\$10 million and was supposed to operate until June 2006. It was meant to counterbalance a sharp increase in fuel prices that the FEPP alone could not address. Although being quite similar to the FEPP in terms of its basic design, the FEPC possessed a much smaller margin of fluctuation (5 per cent). Additionally, calculation of the IPP was not based on the cost, insurance and freight (CIF) price of crude oil, but instead on the standard West Texas Intermediate.

The FEPC did not prove self-financing. From January 2007 to July 2009 credits outweighed taxes in the FEPC by US\$288 million. To maintain a positive balance in the fund, the government injected more than US\$760 million. By the time of its termination in September 2010, only US\$362 million remained in the fund.

#### Government transfers to FEPC

Date	US\$ Million
Sep-05	10 (initial)
Jun-07	60
Jan-08	200
Jul-08	500
<b>TOTAL</b>	<b>770</b>

\* The INCOTERM CIF denotes that cargo insurance and freight to the port of destination are at the seller's expense.  
Sources: OECD (2011a); Campodónico (2009)



Although the official discourse maintains that there is no price capping or explicit subsidies for fuels, and many would argue that prices are set freely by the refiner and throughout the distribution chain including retail operations, others disagree and see cushioning mechanisms as a subsidy. Some analysts have described Chile's pricing regime as being only semi-liberalized (Altomonte & Rogat, 2004).

#### **BOX 9.9: SIPCO**

SIPCO was established in February 2011 to smooth fluctuations in the prices of transport fuels that are subject to a specific excise tax (IEC tax). In practice, for each SIPCO-covered fuel, a price band is established around the fuel's average of past and projected future prices over a five-month window. The CNE estimates an import parity price based on prices in the two previous weeks. If the estimated price goes above the price band ceiling, a reduction in the rate of the IEC tax is applied to benefit final fuel consumers. Conversely, if the import parity price falls below the price band floor, an increase of the IEC tax is applied and paid for by final consumers.

For SIPCO-covered fuels, taxation occurs at the point of first sale (or import) of the relevant product. It relies on the use of an IPP and an IRP, both of which are set on a weekly basis. The IPP is obtained by averaging, over the last two weeks, the CIF price of the relevant fuel plus a mark-up to account for various elements, such as customs duties, exchange-rate fluctuations, logistics and the importer margin. This price tries to replicate the import price in a competitive market since Chile is a small producer of fossil fuels and relies extensively on imports to meet its energy needs. The IRP is the average price of the relevant fuel over the recent past and in the near future. The CNE calculates its value on the basis of the following formula:

$$IRP = (1-a).HP(n) + a.FP(m) + CS(s)$$

where "HP(n)" is a historical average of oil prices over the past "n" weeks, "FP(m)" is an average of anticipated oil prices over the future "m" months, and "CS(s)" is the average crack spread over the past "s" weeks. The parameter "-a" varies between 0 and 0.50, "n" and "s" between 8 and 30 weeks, and "m" between 3 and 6 months. A 12.5 per cent price band is then established around each side of the IRP. If the IPP exceeds the band's ceiling (or drops below the band's floor) a reduction (or increase) in the rate of IEC tax is applied.

It follows that the domestic price of each transport fuel in Chile is determined by:

$$P^{Dom} = (P^{Int} + DM) \cdot (1 + VAT) + IEC^{Tot}$$

where "P<sup>Dom</sup>" stands for the domestic price, "P<sup>Int</sup>" is the international reference price, "DM" is the distribution margin, "VAT" is Chile's rate of value-added tax, and "IEC<sup>Tot</sup>" is the total rate of IEC tax on transport fuels. The latter is in turn equal to:

$$IEC^{Tot} = IEC + IEC^{Var}$$

where "IEC" is the basic component of the IEC tax and "IEC<sup>Var</sup>" is its variable component, which is in turn calculated based on the difference between IRP and IPP.

Source: OECD (2011a)

### **Implementation of the Probity and Transparency Agenda in Chile**

The Chilean Transparency Act was issued in August 2008 (Law 20.285) and put into effect in April 2009. Civil society groups had long been pushing for institutional mechanisms that guaranteed citizens' rights to access public information.<sup>35</sup> The principles of probity and openness with regards to the dealings of the government were already included in Article 8 of the Constitution when it was reformed in 2005 (Law 20.050). Presidential Instruction No. 008 from 2006, established new obligations for government entities, such as the need to publish key information on their websites.

<sup>35</sup> Access to information has been recognized as a human right by international law.



The Transparency Act mandates all government agencies from the executive branch (federal, regional and local) to use their websites to facilitate dissemination of public information (active transparency) as well as to respond to specific requests for information (passive transparency). Legislative and Judicial Branch agencies as well as autonomous entities (e.g., the Central Bank) are bound to comply with active transparency obligations and to develop their own procedures to address requests for information. State-owned enterprises like the National Oil Company (Empresa Nacional de Petróleo [ENAP]) or the National Copper Company CODELCO (the largest state-owned enterprises in the economy) are required to make available on their website specific information (organizational chart, directory, employees' remuneration package, corporate financial statements, etc.) and are also bound by regulations dictated by the Securities and Exchange Superintendence.

#### **BOX 9.10: COUNCIL FOR TRANSPARENCY**

Law 20.050 introduced the Council for Transparency as an autonomous entity with budgetary independence and legal identity. Its objective is to act as a steward of the Transparency Act and to enforce compliance. The steering of the council is the responsibility of four council members appointed by the president and ratified by the Senate (two-thirds majority voting). Council members serve terms of six years that can be renewed once. They can also be removed prior to serving a full term by the Supreme Court at the request of either the president or the Chamber of Deputies.

Objectives:

- Promote the principle of transparency and disseminate the right to access public information
- Guarantee access to public information
- Improve the rules and norms that govern transparency and access to information so as to improve the government's performance and citizen empowerment
- Lead the council to better results by increasing citizen participation and through best practice and comparative analysis

Source: *Consejo para la Transparencia* (n.d. a; n.d. b; n.d. c)

### ***Outcomes and Effectiveness: The Probity and Transparency Agenda and the Stabilization Mechanisms***

As part of the broader strategy to increase probity, transparency, and ultimately accountability announced by President Bachelet in 2006,<sup>36</sup> the Chilean government has made available to the public all public documents regarding the workings of the government, including those related to the price stabilization mechanisms.<sup>37</sup> Among them, two weekly reports by the CNE stand out as a means to improve understanding of fuel price calculations and the operation of SIPCO and FEPP.

Each SIPCO and FEPP report clearly states which fuels are to be covered and present general background information on these mechanisms. They provide detailed information concerning the methodology used to determine parity prices. The data in the documents includes the time period, reporting service,<sup>38</sup> specific quotes to be used, projections and historical data. These documents not only present the statistics, but also put forward brief explanations as to why the elements of formulae have been deemed relevant—for example, the significance of the U.S. Gulf or Atlantic Coasts in the international trade of gasoline in the Americas or Mount Belvieu prices for LPG in SIPCO reports.

<sup>36</sup> This policy is regularly referred to as the Probity and Transparency Agenda.

<sup>37</sup> The mandate includes decrees, acts, and more importantly working documents that lead to the promulgation of laws. Government entities can request a waiver to the Transparency Council when they can prove that information is sensitive or confidential in nature.

<sup>38</sup> For example, Platts Global Alert or Shipping Intelligence Weekly.



In the case of reference prices, the documents are comprehensive. Hence, they include not only the breakdown of applicable formulae, but also comments on the multiple variables and the rationales for their inclusion. The final part of the reports is devoted to information about the operating rules and projections. In summary, the SIPCO and FEPP weekly reports contain valuable information for a wide-ranging variety of users that has been well disseminated through electronic means (CNE website) and traditional means (federal official gazette) and its general content is monitored by the relevant audience (Galdames, 2009).

More generally, Chile performs well internationally in terms of fiscal transparency. In 2010, the Open Budget Index ranked Chile 8th out of 94 countries, just below the United States and above countries such as Germany and South Korea, in providing access to key budget documents.<sup>39</sup>

The controversy over whether Chile provides fuel subsidies would indicate, however, that there is room for improvement in transparency about subsidies. Regular budget reporting of net subsidies provided by the price stabilization funds would be useful, as well as any fuel subsidies provided by Chile's National Oil Company (see Box 9.10).

#### **BOX 9.11: NATURAL GAS SUBSIDIES IN MAGALLANES**

At the end of 2010 the Chilean government announced through ENAP that natural gas subsidies for residential, commercial and industrial customers in the region of Magallanes (in the extreme south of the country) would end as of February 1, 2011. According to ENAP, it was subsidizing 30 per cent of natural gas bills, equivalent to US\$20 million. ENAP sells natural gas to 52,000 users in Magallanes and each of them was subsidized on average US\$382 annually, a figure higher than the average low-income household's subsidy for water, estimated at US\$114.

The financial burden of these subsidies is born by ENAP and not the government through the federal budget. The subsidies have further eroded the already fragile finances of the company. ENAP is highly indebted and in dire need for financial resources to undertake exploratory activities.

The Board of Directors of ENAP decided to partially remove the subsidies and announced an increase of 16.8 per cent for the price of natural gas. The Ministry of Energy assured the citizens of Magallanes that they would retain certain preferential treatment, particularly low-income households. This announcement triggered a number of protests and mass mobilizations in the following weeks that ended in the government's decision to raise tariffs by only 3 per cent with the intention of adding gradual increments in the coming years.

The gas subsidy in Magallanes seeks to ensure that the citizens of the zone pay a gas bill similar to those in the rest of the country, despite the higher energy consumption necessary for heating in the south. Cross-subsidies by ENAP are a non-transparent way to grant the subsidy and therefore a new law to specifically address the Magallanes region is under discussion in Congress. It is expected that this piece of legislation will result in the Executive Branch of government providing the subsidy directly.\*

\* The presidential initiative is available at [www.dialogosur.cl/wp-content/uploads/2011/09/Proyecto\\_Ley\\_de\\_Gas.pdf](http://www.dialogosur.cl/wp-content/uploads/2011/09/Proyecto_Ley_de_Gas.pdf)

Source: Bedoya, Viale & Monge (2011); Plataforma Urbana (2011).

### **Lessons Learned**

First, accountability and transparency have not only political rationale but also significant operational value. When accountability fails a lot can go wrong: ineffective and inequitable policies might be implemented, unsound prices for energy could be in place, public funds may be stolen or public services poorly delivered (Schacter, 2000).

<sup>39</sup> The International Budget Partnership's Open Budget Survey is an independent, comparative, regular measure of budget transparency and accountability. See <http://internationalbudget.org>





With regard to the pricing methodology and operation of the stabilization mechanisms, transparency is particularly important when the government intervenes in fuel prices in order to make clear to consumers the extent that market forces are dictating prices and to what extent the government is intervening (and at what cost). Improved transparency opens the door to informed debate about the benefits and pitfalls of this policy as well as its alternatives. Additionally, by making information public and available, more stakeholders are in a position to provide input to policy discussions. An important element in the process of policy transformation is the attitude of important political actors, business leaders, academics and opinion-makers. In that light, policy changes are more likely to take place when the policy community agrees both that it is necessary and what direction the transformation must take (Richardson, 2000)

Second, passing laws is not enough. More than the simple issuance of the Transparency Act, an important transformation to the institutional arrangement was achieved through the creation of the Council for Transparency as an independent body. While the council appears to have been effective in fulfilling its mandate, it is quite recent and still has to withstand the passage of time. As an entity in charge of supervising other government bodies, or horizontal accountability (O'Donnell, 1998),<sup>40</sup> it should be constantly challenged to guarantee that it is well fitted to perform its duty by having a clear mandate, adequate empowerment and no conflict of interest (Khademian, 1998).<sup>41</sup>

Third, an active civil society was key to advancing the probity and transparency agenda. Civil society plays a crucial role both as a demander of quality services and as supplier of the ultimate conduit of accountability (Khademian, 1998). In functional democracies, the legislature is the vehicle par excellence through which citizens can advance their interest, and history has taught us that successful representation may be more easily achieved when demands are presented by a collective effort. Without an active civil society pushing forward for transparency, the government would have most likely postponed the adoption of the Probity and Transparency Agenda. Moreover, the degree to which civil society can express and advance its demand for better accountability has a positive impact on the position of the supervisory bodies with respect to the monitored agencies (Tendler, 2007). Hence, the existence of participative elements within the civil society serves the purpose of achieving better results.

## Measures to Protect the Poor: The Energy Component of Mexico's Cash Transfer Program

Mexico is an oil-producing economy with a state-owned energy industry.<sup>42</sup> Significant resources are allocated to fossil-fuel subsidies as a means to deliver assistance to the population. Mexico also has extensive experience with CCT schemes that offer a more targeted approach to deliver assistance without the shortcomings of indiscriminately subsidizing energy consumption. CCT schemes better target specific parts of the population and in Mexico they have been widely and effectively used to provide social assistance to low-income households. Cash transfers provide an increase in family income that does not affect relative prices of energy vis-à-vis other commodities and thus reduce market distortions. Built upon the Mexican CCT poverty alleviation program, *Oportunidades*, Mexico has taken steps to include an additional cash transfer to help reduce energy poverty.

<sup>40</sup> O'Donnell (1998) sees accountability as operating along two dimensions. The vertical dimension refers to the relationship between citizens and the state exercised through elections, lobbying and public advocacy. The horizontal is the process whereby one public authority scrutinizes the activities of another whether by checks and balances, or the introduction of specialized supervisory bodies to oversee the public function.

<sup>41</sup> More often than not, institutional arrangements are plagued with overlaps, ambiguities and dispersed responsibility among the relevant actors and while on paper the arrangement is often unambiguous, there are frequently discrepancies over what is established de jure and the de facto situation.

<sup>42</sup> PEMEX, Mexico's national oil company, has monopoly of the oil sector. CFE, the public utility, has the monopoly of transmission and distribution of electricity and is by far the most important player in electricity generation.





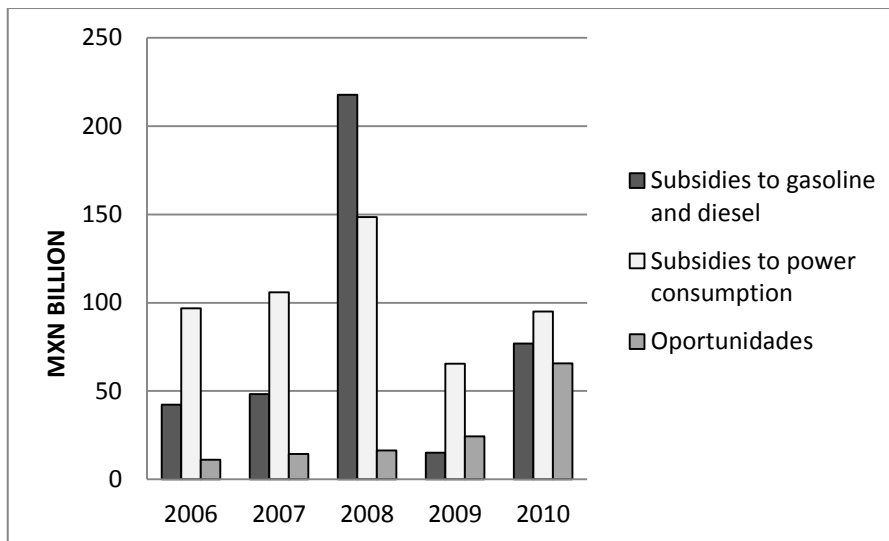
The aim of this case study is to explore how energy poverty can be alleviated through a CCT scheme specifically aimed at poor households. In that context, the study will start by presenting some of the key arguments in favour of undertaking reform to fossil-fuel subsidies in the Mexican context. The next section describes the *Oportunidades* program and how it has been implemented. The case study focuses on the energy component, assesses its impact and draws lessons that can be learned.

### Is There a Rationale for Fossil-Fuel Subsidy Reform in Mexico?

Subsidies to gasoline alone are projected to go as high as MXN130 billion (US\$5.3 billion) in 2011 (Cancino & Contreras, 2011). Altogether, subsidies to gasoline, diesel, LPG and electricity tariffs<sup>43</sup> have been around 1.5 per cent of GDP in the recent years (OECD, 2011b), a figure higher than the total expenditure in poverty reduction (United Nations Development Programme, 2011).

PEMEX, the Mexican national oil company, is the only wholesale distributor of gasoline and diesel. Retail prices are set by the federal government on a monthly basis. In recent years, the monthly price changes did not fully reflect the changes in international oil prices, resulting in a differential between domestic and international prices of gasoline and diesel.

In Mexico, fossil-fuel subsidies have been found to increase demand artificially (and with it, carbon emissions) and to affected transport choices and cities' land use (Quadri, 2011). Researchers have also found evidence that the subsidies are regressive, with the wealthiest 20 per cent of the population received 53 per cent of the total subsidies for regular gasoline in 2010 (Palacios, 2010).



**FIGURE 9.1: FOSSIL-FUEL SUBSIDIES VERSUS OPORTUNIDADES**

Source: Centro de Estudios de las Finanzas Públicas de la Cámara de Diputados (2005, 2007, 2008, 2009); Cámara de Diputados (2010)

<sup>43</sup> Electricity generation is the second most important source of CO<sub>2</sub> emissions in Mexico and an important contributor of local airborne pollution.



In recognition of the limitations of the current pricing mechanism, the Government of Mexico is considering reforms to reduce fuel subsidies. The stated objectives of the reforms (Vela, 2010) are that:

- Retail prices should reflect changes in the international price references
- Rules of retail price changes should be easy to understand by markets and must allow a component of automatic adjustment to reflect international prices
- Pricing policies must continue to provide protection for consumers against episodes of high volatility
- The price should be used to correct for the negative externalities of excessive consumption

While the removal of fossil-fuel subsidies could deliver fiscal and emission reduction benefits, it could also negatively affect low-income households that rely on these subsidies to access energy supplies and are ill-equipped to withstand escalation and volatility of energy prices.<sup>44</sup> The Mexican government recognizes that other public-policy instruments can use the increased revenue obtained through the elimination of subsidies to mitigate and compensate for fuel price increases. Such instruments include direct monetary transfers that are means-tested and increased financing to energy-efficient projects such as infrastructure for non-motorized transportation and public transportation projects such as tramcars, light rail, underground trains and trolleybuses.

The next section explores an alternative to subsidizing fossil-fuel consumption that could reduce distortions in the economy as a whole while shielding those in dire need of social protection.

### ***Adding an Energy Component to the CCT Poverty Alleviation Program Oportunidades***

From the mid-1970s and until the 1990s, Mexico had recurrent economic and financial crises that were largely the result of the implementation of populist policies (Fuentes & Lozano, 2006). This period was characterized by an increase in public expenditure (that was not matched with a boost in government's income), an expansion of monetary supply through money printing, greater intervention of the State in the economy, an increase in the government's payroll, growing inflation, large foreign debt and an overvalued exchange rate.

Fuel subsidies were vital to gain political support from both the working classes and the entrepreneurial groups (Cárdenas, 1996). *Progres*a, the predecessor to *Oportunidades*<sup>45</sup> was introduced in 1997 as a novel way to deliver poverty alleviation outside the traditional (non-transparent and often corrupt) structures in order to depart from political pressure and clientelism.<sup>46</sup> The program itself was implemented at a time where pressure groups had less power, right after an economic crisis, partly explaining its departure from the traditional design.

<sup>44</sup> Approximately 40 million people live below the poverty line in Mexico. Of that number, 11 million live in extreme poverty (monthly income of less than US\$84 for people living in urban areas and US\$58 for people living in rural communities) (Consuejo Nacional de Evaluación de la Política de Desarrollo Social, 2011).

<sup>45</sup> *Progres*a and *Oportunidades* are basically the same program with a different name. The new name was introduced in 2002.

<sup>46</sup> Clientelism has been characterized as an action set built upon the principle of "take there, give here," enabling clients and patrons to benefit from each other's support (Graham, 1997). Clientelism involves asymmetric but mutually beneficial relationships of power and exchange and implies mediated and selective access to resources and markets from which others are normally excluded (Roniger, 2004).



#### **BOX 9.12. KEY FEATURES OF OPORTUNIDADES**

Overall Objective: stop the intergenerational cycle of poverty by increasing human capital of beneficiaries through investments in education, health and nutrition.

Specific Objectives:

- Provide grants to children and the youth in order to promote enrolment, regular attendance, and completion of primary and secondary education. Cash transfers are incremental as children advance their education.
- Guarantee access to basic health programs in order to foster the use of preventive health and self-healthcare, as well as better nutrition.
- Provide grants to improve nutrition (give access to better quality and wider variety of foods), particularly in children, and pregnant and nursing women. These cash transfers are complemented by dietary supplements.
- Encourage commitment and participation with the program's objectives by means of effective compliance with co-responsibilities
- Realize the program's impact through the delivery of additional cash transfers as may be determined by the government.

Target beneficiaries: Low income households with family members under the age of 22 and women of childbearing age. Recipients are selected through a two-stage process. First, families are identified by a geographical selection of highly marginalized villages. Second, eligible households are selected by assessing family size and composition, number of income earners, type of occupation, education levels, presence of a person with disabilities, availability of basic services, household dwelling characteristics, ownership of durable goods and animals, and land tenure. The census of beneficiaries goes under a process of frequent updating based on compliance with co-responsibilities.

Co-responsibilities (conditionality): In order to be eligible to take part in this program, children must attend school regularly and families must be present at community meetings (these assemblies are used to provide further information regarding education, health and nutrition) and health centres as required.

Delivery: For each family, one representative is selected (normally the mother of the household) to receive the cash transfers. Women are chosen with the objective of promoting gender equity in the family and in the community.

Monitoring and evaluation: The program establishes that internal as well as external evaluations must be pursued. In addition, periodical assessments regarding operational aspects are undertaken regularly.

Sources: *Oportunidades* (2010); García (2003)

### **Implementation of the Energy Component**

In 2007, built upon the well-established *Oportunidades* program, an additional transfer (the energy component) was added to this program. The transfer was set at MXN50 (US\$4.12).<sup>47</sup> The rationale behind this action was to increase household welfare and reduce energy poverty. Beneficiaries of *Oportunidades* spend on average MXN300 (approximately US\$25) on energy per month, which is equivalent to approximately 13 per cent of average household total monthly expenditure. This is the second most important spending category after the purchase of food. A transfer of an additional MXN50 represents around 17 per cent of the average monthly spending in energy (Gertler, Fuchs & Sturdy, 2007).

The energy component of the *Oportunidades* is not linked to fossil-fuel subsidy reform. It is provided in addition to the subsidies. In fact, the energy component of *Oportunidades* and the subsidies to gasoline and other fossil fuels are

<sup>47</sup> For 2011, the transfer was set at MXN60.



independent policies and are not pursued in a coordinated fashion. *Oportunidades* is administered by the Ministry of Social Development, while fossil-fuel prices and subsidies are determined by the Ministry of Finance.

**TABLE 9.6: KEY FIGURES OF OPORTUNIDADES (2010)**

COVERAGE	5.8 MILLION FAMILIES
Budget	MXN63 billion (US\$5.2 billion)
Budget/ total families	MXN10,800 (US\$895)
Minimum amount per beneficiary family	MXN220 every two months (US\$18)
Maximum amount per beneficiary family	MXN2,440 every two months (US\$201)

Sources: *Oportunidades (2010)*; *Secretaría de Desarrollo Social (Sedesol) (2010)*; *Alix-García, Mcintosh, Welch & Sims (2010)*

### Outcome and Effectiveness of Adding the Energy Component

Gertler, Fuchs and Sturdy (2007) performed an econometric evaluation of the energy component of *Oportunidades*. They found that the income elasticity of energy demand is very low. In other words, *Oportunidades*' cash transfers do not distort beneficiaries' consumption decisions. The latter is important in terms of CO<sub>2</sub> emissions reductions since the external income shock would not result in an increase in energy demand or consumption. They also found a low price elasticity of demand, so that in terms of energy intensity, a cash transfer should not increase the amount of energy used in their activities (electricity and gas have few direct substitutes). Therefore, in case of an increase in the price of any of these forms of energy, low-income households need to divert resources for other ends to meet these needs. According to that study, the energy component of *Oportunidades* achieves its objective to relieve poor families' energy burden. Nevertheless, we should bear in mind that the conclusions drawn from were preliminary and based on estimations from data mostly gathered prior to 2007, the year in which the energy component was introduced.

#### BOX 9.13: TYPE OF ENERGY AVAILABLE TO OPORTUNIDADES BENEFICIARIES

- 95 per cent of households have electricity supply
- 67 per cent of households have access to gas supply
- 73 per cent of households use biomass (wood) for cooking, lighting and/or heating
- 80 per cent of households use both gas and electricity

Source: *Gertler, Fuchs & Sturdy (2007)*

Further assessments of the energy component impact as well as up-to-date data with which to contrast those results are scarce. Additionally, under the current rules of the program this additional transfer is not earmarked or linked to additional or specific conditions. Hence, it could be seen as extra cash that families can use as they see fit. In that light, although a possible double dividend (reducing emissions of harmful pollutants and improving health) could be achieved by using the additional cash to switch from cheaper, more polluting fuels to more expensive cleaner ones (Gertler, Fuchs & Sturdy, 2007), it may be difficult to attest to whether this is actually happening. On the other hand, the small scale of this transfer vis-à-vis electricity subsidies, for example, suggest that although this is a step in the right direction, a more comprehensive action towards fossil-fuel subsidies needs to be undertaken.

In terms of public finances, a cash transfer like *Oportunidades* can have a positive impact. This type of policy can have a greater benefit in terms of energy consumption in households in extreme poverty than, for example, the subsidy



applied to electricity tariffs, which in Mexico is based on the consumption of electricity. In other words, subsidies decrease as consumption increases (Irastorza, 2006).<sup>48</sup> However, a subsidy based on electricity consumption per household benefits those households that consume less electricity, and not necessarily those of the lowest income levels. In fact, given that many low-income households share electric meters, consumption levels appear to be higher and as a result, they do not pay subsidized tariffs (Gertler, Fuchs & Sturdy, 2007).

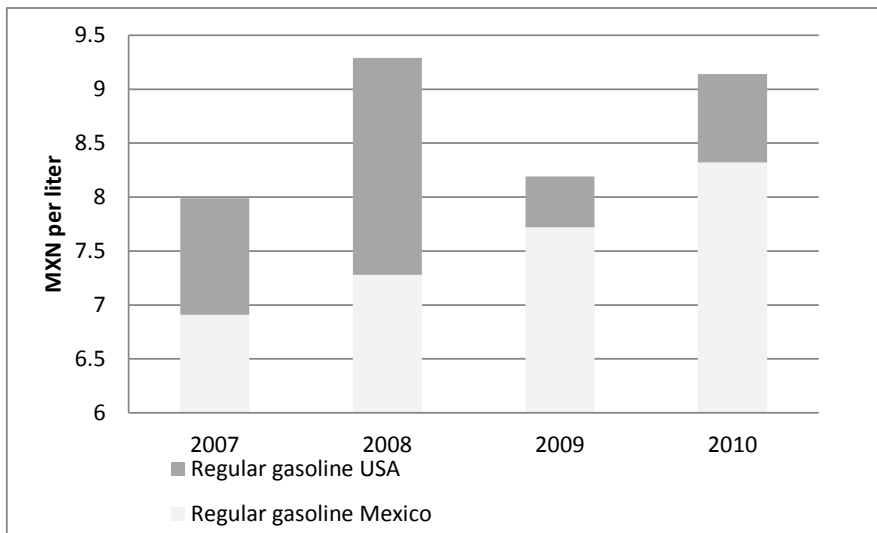
**BOX 9.14: AVERAGE MONTHLY SPENDING ON ENERGY BY OPORTUNIDADES BENEFICIARIES**

- Biomass (including wood) for energy purposes: MXN202 (US\$16)
- Gas: MXN151 (US\$12.5)
- Electricity: MXN104 (US\$8.30)

Source: Gertler, Fuchs and Sturdy (2007)

**Lessons Learned**

Environmental sustainability is among the priorities put forward by Mexico’s National Energy Strategy. Better targeted energy subsidies together with final consumer prices that reflect costs are two of its chief goals (Secretaría de Energía, Mexico, 2011). However, the strategy makes no mention as to how to overcome the challenges of removing fossil-fuel subsidies, nor how to implement policy change. In recent years, government’s attempts to eliminate gasoline subsidies have had limited success. Political pressures against the elimination of these subventions in tandem with economic policy concerns for spiralling inflation have prevented the government from taking decisive action. In fact, from January to December 2009 the government was forced to temporarily reverse the policy of gradual increments to the price of gasoline and diesel it had started in 2008, and froze the prices. Since December 2009 prices have been increasing steadily, but they are still below market levels.



**FIGURE 9.2: AVERAGE GASOLINE PRICES IN THE U.S. AND MEXICO, 2007-2010**

Source: Secretaría de Hacienda y Crédito Público, Mexico (2011)

<sup>48</sup> Electricity tariffs are calculated by combinations that factor in variables such as type of consumer (industrial, domestic, service sector), region, time of the day, etc. In total there are around 98 types of tariffs, each with different levels of subsidies.



Mexico has the opportunity to build on the success of its CCT program to deliver social assistance while scaling back fossil-fuel subsidies. Mexico already has the administrative arrangements in place for this type of program, with 14 years of experience to refine the program and build public trust. The CCT program is an ideal complimentary policy to help reform fossil-fuel subsidies.

The government could presumably increase the amount of the energy component as well as expand the target population in order to compensate for higher fossil-fuel prices resulting from removal of subsidies. Any CCT program that is offered as a substitute for generalized subsidies would need to also protect: 1) households that do not currently receive any benefits from *Oportunidades* because of problems of undercoverage and 2) households that may fall below the poverty line after the subsidies are eliminated and that will not be incorporated to the program in the short or even the medium run.

Over the long run, it is clear that there are efficiency gains that could be realized if the subsidies were to be eliminated. It is unclear, however, how long it would take for such gains to materialize and, most probably, such a policy could have a negative impact on economic activity in the short run. In light of the very fragile recovery that the Mexican economy has experienced after the latest crisis, the timing of reforms would need to be carefully considered to ensure that short-term negative effects are offset.

Increasing the scope of this program to reach a larger population would require a thorough evaluation of elasticities, preferences and general patterns of consumption of the expanded target population. In addition, a wider program could represent significant additional operational costs. It would also require a major increase in coordination between different ministries in Mexico, which are currently not working harmoniously or even with the same objective in mind.<sup>49</sup>

Second, the fact that transfers are conditional, matters. Creating an obligation in order to be entitled to the grant is a significant departure from cash handouts or welfare payments. Co-responsibility increases the credibility of these schemes for taxpayers who ultimately finance them. By creating a contractual relationship through conditionality, monitoring whether goals are being accomplished is more straightforward.<sup>50</sup> Conditionality can be gender sensitive and help to overcome the sociocultural bias against women's education by linking grants to regular attendance by girls in school. Moreover, it has been proven a successful tool to limit child labour by financially rewarding secondary school completion (Adato & Hoddinott, 2007). Conditionality could serve the purpose of increasing awareness about fuel prices and energy saving practices. A critical component of *Oportunidades* has been mandatory attendance to informational health and nutrition talks, and these could include information and training on energy use issues.

Third, an understanding of political economy challenges is fundamental. The elimination of subsidies tends to have macroeconomic, political and electoral consequences (Victor, 2009). On the verge of a presidential election in Mexico in 2012, some political parties have already pronounced in favour of the continuation of fossil-fuel subsidies (Gómez, 2011). Moreover, since Mexico has an abundance of fossil-fuel resources, some even argue that it is the citizen's right to have access to cheap energy (Segal, 2011) despite sustainability concerns. In that light, policy-makers pushing for reform must be clear in that eliminating fossil-fuel subsidies is neither an endeavour that can be taken lightly nor one that can be easily implemented.

<sup>49</sup> Energy pricing is set by the Ministry of Finance taking into account multiple considerations, with fiscal rationality generally predominating in decision-making. *Oportunidades* is a social program run by the Ministry of Social Development with the primary objective of poverty alleviation. Impacts on climate change or fuel switching are secondary considerations.

<sup>50</sup> *Oportunidades* is recognized as a very successful poverty alleviation program.



APEC economies willing to reform their fossil-fuel subsidies should bear in mind that a CCT scheme could be an effective way to deliver social protection to low-income households, one of the main concerns of a fossil-fuel reform. However, it should be acknowledged too that this would not free them completely from political pressure or novel administrative costs and coordination challenges. More importantly, when considering lessons from international success stories, policies should reflect the reality of individual country situations.

**BOX 9.15: REFINERY AND FINAL CONSUMER PRICE COMPONENTS FOR GASOLINE AND DIESEL**

PEMEX’s refinery price is calculated in reference to those on the U.S. Gulf Coast (USGC). The final consumer price is set by the Ministry of Finance through the Special Tax on Production and Services (IEPS).

The IEPS is applicable to gasoline and diesel and is regulated under the Federal Income Law. The IEPS rate is calculated as the difference between the retail or “final price,” and the “producer price.” IEPS for gasoline and diesel has two components. The first is set on a monthly basis by Secretaría de Hacienda y Crédito Público using the reference price. Collection of this component is inversely related to the international price of crude oil. Hence, when international prices are above domestic prices, this component is negative, and when international prices are below domestic prices, it is positive. In sum, it is considered an adjustment tax given that the final prices of gasoline and diesel are administered. The second component is fixed currently at MXN0.36 per litre of regular gasoline, MXN0.43 per litre of premium gasoline and MXN0.29 per litre of diesel.

**TABLE 9.7 PRICE COMPONENTS FOR GASOLINE AND DIESEL**

	REGULAR GASOLINE	PREMIUM GASOLINE	DIESEL
<b>REFINERY PRICE</b>			
Reference price	USGC Unleaded 87	USGC Unleaded 87/93	USGC Fuel Oil No. 2 LS*
Adjustment for quality	Octane / RVP**	Octane / RVP	Sulphur
Transport	√	√	√
Handling	√	√	√
<b>FINAL CONSUMER PRICE</b>			
Refinery Price	√	√	√
Freight / Transport	√	√	√
Commercial Margin	√	√	√
IEPS	√	√	√
Value-Added Tax (VAT)	√	√	√

\*LS: Low Sulphur

\*\*RVP: Reid Vapor Pressure (volatility)

Source: Secretaria de Energia, Mexico (2010); PEMEX (n.d.)



## Price Stabilization and Measures to Protect the Poor: Thailand's Gradual Approach to Reform

The Kingdom of Thailand provides an interesting case example where reforms to reduce fossil-fuel subsidies have been pursued gradually over a long period of time. The Thai government deregulated the fuels market in 1991. After the 1997 Asian financial crisis, a Master Plan for State Enterprise Sector Reform was developed to provide guidelines, principles and time frames for privatization, including in the energy sector (Sirasootorn & Quiggin, 2007). Following the ascendance of former Prime Minister Thaksin Shinawatra in 2001, the economy saw the privatization of the Petroleum Authority of Thailand and Electricity Generating Authority of Thailand, though the decision to privatize the latter was eventually annulled by the Supreme Court.

The purpose of this case study is to examine Thailand's attempts to control its consumer subsidies for petroleum products, particularly gasoline and diesel. Despite deregulation of the fuels market in 1991, the Thai government has frequently intervened in the fuel market, primarily through an oil fund (see Box 9.16). The fund has been used to: (1) cross-subsidize fuels to economically or politically important groups (e.g., LPG for cooking and high-speed diesel for the transportation sector), (2) encourage greater use of domestically produced energy resources, such as natural gas and biofuels, (3) reduce price spikes and (4) fund energy-efficiency programs. In 2010 Thailand's subsidies for oil products were approximately US\$2 billion (IEA, 2011a).

### **BOX 9.16: THAILAND'S OIL FUND**

The Oil Fund was one of the main responses that the Thai government pursued to address the global oil crisis in 1973. The fund, established in 1979, is a monetary reserve whose revenues are collected from taxes levied on petroleum producers and importers during the times of low or average international prices. It was established "to maintain domestic retail price at a set ceiling in times when global petroleum prices soar by subsidizing domestic oil producers and importers" (United National Economic and Social Commission for Asia and the Pacific, n.d.). The fund is also used to cross-subsidize certain energy-related products, with taxes imposed on gasoline and subsidies provided to biofuels and natural gas. Although the fund is large enough to filter out brief price spikes and promote fuel switching, the practice of using the fund to subsidize fuels may also generate dependency on subsidy (Glassman, 2010a, p. 24)

In the past decade, prices have frequently been fixed for gasoline, diesel, LPG and biofuels with government transfers to the oil fund when it became depleted. During rising international oil prices in 2004–2005, government transfers of US\$2.2 billion to stabilize the domestic fuel price resulted in a decision to stop providing subsidies on some fuel products (Changplayngam, 2008). When the economy faced another spike in international oil price in 2008, the government resisted the temptation to subsidize all fuels. Oil prices reached record highs of US\$145/barrel on July 3, 2008, but the government continued to impose taxes and an oil fund levy on gasoline, gasohol 95 E10, fuel oil, kerosene and LPG.<sup>51</sup> Diesel was temporarily cross-subsidized as well other biofuel blends.<sup>52</sup> Instead, the administration of Prime Minister Samak Sundaravej put in place an anti-poverty package to deliver targeted assistance to the poor to reduce the impacts of the 2008 global financial crisis and high oil prices.

These measures reduced the need for the government to fix prices for all fuels (and therefore provide subsidies) during a period of high oil prices, as had been previously been done in 2003 and 2004–2005. The measures were also more targeted to fuels and services used by the poor, rather than blanket subsidies for gasoline that would be accessed by all income levels.

<sup>51</sup> Gasohol 95 E10 refers to Research Octane Number 95 gasoline blended with 10 per cent ethanol.

<sup>52</sup> See, for example, the price structure of petroleum in Thailand as provided by the Energy Policy and Planning Office (EPPO) (n.d. d).





Despite efforts to improve energy efficiency and reduce subsidies, Thailand’s reliance on fossil fuel for its energy consumption—particularly imported oil—remains high and numerous fossil-fuel subsidies remain in place for specific fuels and consumers (see Table 9.8).

**TABLE 9.8: EXAMPLES OF FOSSIL-FUEL SUBSIDY POLICIES IN THAILAND, 2010**

POLICIES	RATIONALE
<b>Electricity</b>	
Fixed electricity rate at 92.55 satang	Maintain low cost of living
Electricity below marginal cost of production for certain consumers (e.g., small residential, agricultural, government and the Provincial Electricity Authority)	Various
Free electricity for the use below 90 kWh/month	Allowing the poor to adjust to rising cost of living
<b>Natural Gas</b>	
LPG wholesale price fixed at US\$330/tonne	Maintain low cost of living
LPG retail prices fixed for cooking	Maintain low cost of living
LPG retail prices fixed for industrial users	
Conversion of taxis to natural gas with an estimated cost of THB40,000/taxi	Reducing the import of LPG
Other fossil-fuel subsidy-related policies	
Oil Fund to promote fuel switching and price smoothing	Fuel switching and price smoothing
THB2/litre subsidy for “purple oil” diesel fuel for fishermen	Assisting fishermen with higher cost of living
Half price for domestically produced natural gas, as opposed those coming from other neighbouring economies, such as Myanmar	Unclear whether the lower cost for domestically produced natural gas is due to subsidy or lower transportation cost

Source: Glassman (2010b, pp. 23-26)

### *The Thai Government’s Rationale for Reform*

In 1991 the government took advantage of the opportunity created by the fall in world oil price after the end of Iraq-Kuwait war to deregulate the fuels market. At the time, the rationale was to improve the efficiency and reliability in the supply of fuels by (EPPO, 1995):

- Increasing competition in domestic oil market
- Abolishing import controls
- Increasing refining capacity by allowing existing refineries to expand and giving permits for new refineries to enter the market
- Improving determination of ex-refinery and import prices to more accurately reflect world prices
- Improving tax and retail price structure of petroleum products
- Reducing regulatory barriers for the establishment of new petrol stations



More generally, there were at least three underlying reasons behind Thailand's energy policies in relation to fossil fuels, which contributed to subsidy reforms in 1991, 2001 and 2008, as well as to energy conservation and efficiency initiatives. First, energy is recognized as an important factor in Thailand's economic and social development, and, as such, the government has given priority to energy security. Second, given Thailand's high dependency on imported oil, the high volatility of global oil prices and unpredictable political tensions in major oil exporting economies, such as Iran and Nigeria, make Thailand's energy security vulnerable to external factors (Pichalai, 2007, p. 125). Third, along with rapid industrial expansion and population growth, environmental concerns have also played their part in encouraging Thailand to make efficient use of energy.

Energy conservation policies and programs have been in place since the early 1990s, such as the Energy Conservation Promotion Act (ENCON Act) in 1992 and the Demand Side Management program in 1993. Under the administration of Prime Minister Thaksin Shinawatra (2001–2006), addressing environmental externalities was considered critical for Thailand to achieve its long-term sustainable economic development and competitiveness objectives (EPPO, 2003b).

#### **BOX 9.17 THAILAND'S DEPENDENCE ON IMPORTED FOSSIL-FUEL ENERGY**

Despite efforts to conserve energy, Thailand remains highly dependent on fossil-fuel energy. Data provided by the EPPO (n.d. a), for example, highlights that the commercial primary energy consumption, composed mainly of fossil fuels, in 2010 reached 87,163 kilotonnes of crude oil equivalent (ktoe), an 8 per cent increase from the previous year's consumption of 80,590 ktoe. Although the consumption of oil in the same period increased only marginally by 1.5 per cent, or from 32,075 ktoe in 2009 to 32,563 ktoe in 2010, an increase in natural gas consumption rose by about 15 per cent, from 34,022 ktoe in 2009 to 39,136 ktoe in 2010. The same situation also applies to the consumption of coal, which rose by 9.8 per cent from 9,607 ktoe in 2009 to 10,551 ktoe in the subsequent year. Out of the total fossil fuels consumed in the economy in 2010, 56.2 per cent came from abroad. Overall, energy import accounted for about 15.6 per cent of the economy's total GDP, and of the total imported energy, crude oil took up the largest share, or 82.5 per cent (EPPO, n.d. b).

### *The Thai Government's Evolving Approach to Fuel Subsidies*

Following the establishment of the oil fund in 1979, prices for petroleum products remained fixed by the government until deregulation in 1991. After deregulation, the government continued to intervene in fuel prices. Table 9.9 provides a summary of the history of major reforms that affect consumer prices for petroleum fuels in Thailand.



**TABLE 9.9: BRIEF TIMELINE OF THAILAND'S PRICING POLICIES FOR PETROLEUM PRODUCTS**

YEAR	MILESTONES
<b>Prior to 1991</b>	
1979	Thailand seeks a US\$600 million loan from the IMF to establish the Oil Fund.
1979-1990	Price fixing by the government for all petroleum products, both imported and domestically produced.
1982	The World Bank's structural adjustment loan disbursed with a condition for Thailand to increase its energy prices and undertake privatization in the economy's energy sector.
<b>1991-2000</b>	
1991	Fuel prices deregulated.
1996	Conversion from leaded to unleaded gasoline (achieved by subsidizing unleaded gasoline).
1999	A cabinet resolution was passed for the EPPO to undertake the deregulation process of LPG price. The ex-refinery price of LPG, however, has remained fixed.
<b>2001-2007</b>	
2001	Privatization of the Petroleum Authority of Thailand, creating the PTT Public Company Ltd.
2003	New diesel brand, blue diesel, and the natural gas for vehicles (NGV) program were launched.
2003	Subsidies on gasoline and diesel were put in place as a result of the war in Iraq. The subsidies cost the government up to THB389 million (US\$9.36 million).
2005	Gasoline and diesel were subsidized again, with the former lifted on October 21, 2004. The subsidies cost the government up to THB92 billion (US\$2.29 billion).
2005	Diesel subsidy was lifted, although the price of national gas for vehicles remained fixed.
<b>2007-present</b>	
2007	The Oil Fund's debt cleared, and the government decided to stop subsidizing LPG.
2008	The government subsidized non-automotive diesel for three months, from May until July. By the end of this initiative, or in July, the Oil Fund was near zero. Subsequently, from July until December, the government decided to reduce the excise tax on gasoline and diesel; as part of the measures to address the global financial crisis, the government also implemented a plan to assist the poor cope with high oil prices.
2009	The Abhisit Vejjajiva administration launched the diesel subsidy to ease domestic political tension.
2009	Establishment of the Energy Regulatory Commission.
2011	The administration of Prime Minister Yingluck Shinawatra came to power and decided to suspend Oil Fund levies.

Source: EPPO (1995, 2003a); Greacen & Greacen (2004, pp. 520, 534); Wong-Anan (2008); Bacon & Kojima (2006); ASEAN Affairs (2008); Ministry of Energy, Thailand (2009); United National Economic and Social Commission for Asia and the Pacific (n.d.); Petroleum Authority of Thailand (n.d.); Praiwan & Chantanusornsiri (2009); Bangrapa (2011).

Fuel prices comprise the ex-refinery price, excise tax, municipal tax, oil fund levy, energy conservation fund levy, VAT and marketing margin. In the period following deregulation, the government alternated between imposing an oil fund levy on fuels and subsidizing fuels from the Oil Fund. Table 9.10 shows a fall in average prices between 1990 and 1991 (high oil prices during the first Gulf War in 1990 followed by deregulation during a period of falling international oil prices). From 1991 to 1996, fuel prices generally show an upward trend.



**TABLE 9.10: RETAIL PRICES OF FUEL PRODUCTS, 1990-1996**

FUEL PRODUCTS	1990	1991	1992	1993	1994	1995	1996
Benzine 95	11.05	10.06	9.29	9.09	8.57	9.05	9.32
Benzine 91	10.35	9.49	8.61	8.40	7.98	8.20	8.73
Diesel	8.40	8.03	7.83	7.84	7.39	7.57	8.60
Kerosene	8.72	8.82	8.93	8.97	8.57	8.54	9.80
Fuel oil	n.a.	3.44	3.55	3.30	3.56	4.03	4.51
Cooking gas, 11.5 kg (ceiling price)	n.a.	124.0	124.0	124.0	124.0	124.0	124.58

Source: Bank of Thailand (n.d.), EPPO (n.d.c) and Sayeg (1998).

Table 9.11 illustrates that from 1996 to 2009 the Oil Fund was used, at various times, to subsidize LPG, diesel, gasoline and biofuels. For example, the government applied a price ceiling to gasoline, diesel and LPG during high international oil prices in 2004. The subsidy was removed in October 2004 for gasoline and for diesel in July 2005 (Bacon and Kojima, 2006b, p. 1). Table 9.11 shows only the average annual Oil Fund levy for each year and therefore hides that during each year, the Oil Fund may have cross-subsidized products and when those subsidies have been applied and removed.

**TABLE 9.11: ANNUAL AVERAGE OIL FUND LEVIES ON PETROLEUM PRODUCTS IN THAILAND (TBH PER LITRE UNLESS OTHERWISE SPECIFIED)\***

YEAR	(EX-REFINERY)													
	ULG 95	UGR 91	GASOHOL 95			GASOHOL	KEROSENE	HSD	HSD	HSD	LSD	FO 1500	LPG	LPG (CAR)
			(E10)	(E20)	(E85)	91		0.05%S	0.035%S	B5			(B/KG)	(B/KG)
1996	0.11	0.11					0.03	0.16			0.12	0.03	-0.64	-0.64
1997	0.08	0.08					0.06	0.07			0.04	0.03	-1.89	-1.89
1998	0.16	0.16					0.10	0.15			0.13	0.06	0.40	0.40
1999	0.09	0.09					0.10	0.10			0.08	0.06	-2.94	-2.94
2000	0.34	0.22					0.10	0.11			0.11	0.06	-7.31	-7.31
2001	0.50	0.30					0.10				0.50	0.06	-5.55	-5.55
2002	0.50	0.30	0.27			0.27	0.10				0.50	0.06	-2.45	-2.45
2003	0.49	0.30	0.27			0.27	0.10				0.50	0.06	-3.05	-3.05
2004	-0.34	-0.59	0.24			0.27	0.10		-2.24		-2.27	0.06	-2.55	-2.55
2005	1.28	1.03	0.13			0.16	0.10		-0.92		-1.02	0.06	-2.54	-2.54
2006	2.70	2.50	0.84			0.84	0.10		1.47	0.41	1.47	0.06	-1.93	-1.93
2007	3.67	3.37	0.85			0.62	0.10		1.39	0.60	1.39	0.06	-1.02	-1.02
2008	3.78	3.31	0.77	-0.21		0.28	0.10		0.40	-0.68	0.31	0.06	0.30	0.30
2009	6.94	5.31	1.78	-0.80	-7.88	1.17	0.10		0.78	-0.95	1.20	0.06	0.22	0.22

List of acronyms: Gasoline ULG 95: unleaded premium gasoline, with research octane number 95; Gasoline UGR 91: unleaded regular gasoline, with research octane number 91; Gasohol 95 (E10): gasoline with ethanol 10 percent by volume, octane number 95; Gasohol 95 (E20): gasoline with ethanol 20 percent by volume, octane number 95; Gasohol 95 (E85): gasoline with ethanol 85 percent by volume, octane number 95; Gasohol 91 (E10): gasoline with ethanol 10 percent by volume, octane number 91; KL: kerosene; HSD 0.035%S: high speed diesel with 0.035 percent sulphur content; HSD B5: HSD with bio-oil 5 percent by volume; LSD: low speed diesel; FO 1500: fuel oil grade C, calorific value 41.28 MJ/litre; LPG (USD/Kg): liquified petroleum gas, unit: USD/kg; NGV: natural liquified gas vehicle

Source: EPPO (n.d. e)



The cost for maintaining the fuel subsidy in 2004 exceeded the expectation of the Thai government. While the government had initially predicted that total government transfers would cost no more than US\$128 million, by the time the price of diesel was floated on July 2005, the subsidy bill had reached US\$2.2 billion. Moreover, as a result of the increased use of LPG by the economy’s transportation sector and households (e.g., for cooking), the government would need to collect more from consumers of other types of petroleum products to cover LPG subsidies (Bank of Thailand, 2006, p. 70).

In 2008, however, the government faced a new set of challenges from the global financial crisis, record-high international oil prices and high food prices. Rather than providing blanket subsidies for all oil products, the government of Prime Minister Samak Sundaravej put in place a package of social assistance measures aimed at helping the poor cope with the financial crisis and high energy prices. From late July and early August 2008, the government put in place the compensation programs outlined in Table 9.12.

**TABLE 9.12: 2008 COMPENSATION PROGRAMS TO ASSIST THE POOR**

COMPENSATION PROGRAM	COST TO GOVERNMENT
Free travel on all non-air conditioned train services	THB250 million (US\$7.58 million)
Free travel on half of the non-air conditioned buses	THB1.24 billion (US\$37.61 million)
Free tap water for households that use less than 50 cubic metres per month	THB3.93 billion (US\$119.22 million),
Free electricity to consumers who use less than 80 kWh/month and halving of the the tariff for consumers who consume between 81-150 kilowatt hour/month <sup>1</sup>	THB12 billion (US\$364.05 million)
Fuel excise tax cuts	THB30 billion (US\$910.13 million),

*Note: In 2011 electricity subsidies for the poor are funded by cross-subsidies from industrial consumers.*

Source: ASEAN Affairs (2008)

The measures were estimated to cost approximately THB46 billion (US\$1.4 billion) over a period of six months (Fernquest, 2008). However, many of the measures have been repeatedly extended, leading to higher costs than originally anticipated (Wattanaporn, 2011).

Prior to the general election in July 2011, the administration of Prime Minister Abhisit Vejjajiva capped the price of diesel, LPG and the NGV primarily to ease the domestic political tension and court votes from voters in the rural sector (Leeahtam & Treesraptanagul, 2011). Following the 2011 election, a new government was installed in Thailand. While it is too early to give an assessment of the new government’s energy policy, an indication of the policy direction of the new administration of Prime Minister Yingluck Shinawatra was given when she delivered an inaugural policy statement before parliament on August 24, 2011. One of the key economic priorities that the prime minister stated in her speech was the short-term suspension (no more than one year) of fuel levies by the Oil Fund on some petroleum products, such as premium (RON 95) and regular (RON 91) gasoline, in order to help lower the retail prices of oil. The plan is likely to cost the state of up to THB3 billion/month. At the same time, the government would need to fund subsidies to biofuels and NGV from other sources (Ruangdit & Bangprapa, 2011).



### *The Outcome and Effectiveness of Thailand's Reform Measures*

Thailand has generally managed to maintain, for the most part, liberalized prices for gasoline since the economy undertook deregulation in 1991. Some fuel products, such as the LPG and diesel, have been subsidized more often due to these products' importance to vulnerable groups (e.g., the poor using LPG and transport and fishing industries using diesel). Although assistance to the poor has been maintained through some fossil-fuel subsidies, the government is also increasingly looking at various alternative policies that can better target the poor than universal price subsidies for fuel. A case in point is the 2008 assistance measures that were undertaken to address the impacts of the global financial crisis and record-high oil prices.

### *Lessons Learned*

Thailand provides a case example of how economies can pursue fossil-fuel subsidy reforms gradually. To start with, Thailand deregulated its fuel prices in 1991 at a time of falling global fuel prices. Domestically, the relative weakening of the anti-liberalization camp in Thai politics and the continued booming of the Thai economy at the time also helped the government to carry out the necessary move to pursue fossil-fuel subsidy reform.

Moreover, ever since the establishment of the Oil Fund in the late 1970s, Thailand has also used the fund, largely funded by levies on gasoline and other petroleum products, to cross-subsidize certain fuel products and reduce price spikes. Over the years, however, such interventions appear to have become more limited and more targeted.

The use of alternatives to fuel-price subsidization, such as free public transportation and free electricity for small consumers, can alleviate energy poverty without providing universal subsidies that can be captured by wealthier income groups. However, like other forms of subsidies, these can become entrenched and difficult to remove once the time of crisis has passed. The measures have been repeatedly extended and free public transport for certain journeys could become permanent (Theparat, Intathep & Wiriyapong, 2010).

Free electricity appears to have been a particularly effective measure to provide targeted assistance for the poor and ensure energy access. Many slum dwellers in the northeastern city of Khon Kaen are connected to electricity and benefit from cheap rates (Global Network for Energy Sustainable Development, 2008). Interestingly, the policy might help reduce consumption because people try to keep their usage within the capped amount in order to avoid bills. However, individual economy and regional circumstances would determine whether reduced electricity tariffs would be effective in reaching the poor.

In Thailand, the use of fossil-fuel subsidies has been determined by the international price of oil as well as other domestic economic and political considerations. The key challenge for Thailand in this regard is to enhance its existing energy sector reforms, while preventing the return of fossil-fuel subsidies despite domestic political turmoil or regime change.

### *Price Adjustment Mechanisms: China's Prices for Gasoline and Diesel*

In December 2008 the Chinese government announced a new regime for setting domestic prices for gasoline and diesel. Under the new arrangements, the administrator of the price controls—the National Development and Reform Commission (NDRC)—considers adjusting domestic prices when average international crude oil prices move beyond a threshold level. Using a formula based on international oil prices, the government sets the maximum prices for wholesale and retail gasoline and diesel. The aim of the reform was to peg domestic prices against international prices in a controlled way.



The policy change was prompted by record-high international oil prices earlier in 2008 that had caused large financial losses for China's state-owned refineries as well as fuel shortages for consumers. China became a net oil importer in 1993, and by 2010 was importing approximately 55 per cent of its oil, a figure that is expected to grow steadily each year (Hongyan, 2011). While China imports oil at prices dictated by the global market, refiners are required to sell fuel at fixed prices that are often below cost. Escalating international prices in 2008 were not passed on to domestic prices and independent refineries responded by reducing or even ceasing production of subsidized fuels, leading to widespread fuel shortages. The Government of China paid partial compensation to the China Petroleum and Chemical Corporation (Sinopec) and to the China National Petroleum Corporation (PetroChina).<sup>53</sup> Sinopec, the largest refiner, was paid US\$7.5 billion in compensation in 2008, but the two refiners still suffered a combined loss of more than US\$20 billion in 2008 (Kojima, 2009).

Reform of the pricing mechanism in December 2008 took advantage of falling international oil prices. In that month, China reduced fuel prices for the first time in nearly two years (Kojima, 2009). Other reforms were also undertaken, notably an increase in the consumption tax for oil products and the abolition of several fees and charges relating to roads (Government of China, 2008).<sup>54</sup>

In May 2009 the government announced that it would continue to subsidize domestic petrol, diesel and other fuel when crude oil prices exceed US\$80 per barrel (NDRC, 2009). The plan was for domestic prices to still be responsive when international oil prices were between US\$80 per barrel and US\$130 per barrel, but refiners would no longer be allowed to take a profit margin. Above US\$130 per barrel, the government would use fiscal policies to ensure the production and supply of refined products to maintain the smooth operation of the national economy (NDRC, 2009). Commentators have taken this to mean that price rises above US\$130 per barrel would not be passed on to consumers (Business Monitor International, 2009; Hook, 2011).

However, for any given international oil price, the government maintains the option of not adjusting domestic prices at all, taking into consideration social, political and economic matters such as inflation (Platts, 2009). The NDRC adjusted Chinese oil product prices nine times in 2009 and three times in 2010 (Weerts, 2010a; Xing, 2011). Retail prices were increased twice in the first half of the year but domestic prices significantly lagged behind world prices. Prices were reduced for the first time in 2011 in early October, despite major losses from China's refineries (Aizhu, 2011b). Since the new pricing mechanism was first applied in January 2009, the NDRC has raised retail fuel prices by about 50 per cent, lagging the over 70 per cent rally in international crude prices (Aizhu, 2011b).

### *The Chinese Government's Rationale for Reform*

The government's objective for the December 2008 reforms was to take advantage of falling world oil prices to better integrate domestic fuel prices with the international market (Government of China, 2008). However, prices continued to be controlled to also take into account the impact of fuel prices on all sectors of society. The "managed float" is an attempt to balance macroeconomic objectives such as controlling inflation with the need to curb demand on imported oil, ensure profitability of refineries and avoid large compensation payments, and guarantee energy supply.

<sup>53</sup> PetroChina and Sinopec dominate the Chinese domestic refined product market. Sinopec accounted for 84 per cent of total refined product sales in 2009. Sinopec imported 138 million MT crude in 2009, or 70 per cent of the total crude imported into China (Weerts, 2010a).

<sup>54</sup> The new consumption tax is reported to have generated CNY228 billion (US\$36 billion) in revenue during the first 10 months of 2009 (Weerts, 2010a).



The reform is consistent with the Chinese government's longer-term energy policies. China's Energy Strategy 2007–2012 states that “the Chinese government has advanced energy price reform in a vigorous yet steady way, gradually established a pricing mechanism that is able to reflect resource scarcities, changes in market supply and demand, and environmental costs” (Information Council of the State Council of the People's Republic of China, 2006). The 12th Five Year Plan, released in March 2011, highlights energy conservation, efficiency and reducing GHG emissions as important objectives in China's energy policy (Wen, 2011b).

### *The Subsidy Reform Policy: What the Government Intended and How it was Implemented*

The price adjustment mechanism introduced in 2008 replaced an earlier formula that used a basket of gasoline and diesel prices from Rotterdam, New York and Singapore to set the prices of oil products sold in the domestic market (Platts, 2009). The previous formula was applied on an ad hoc basis to adjust prices.

The NDRC now considers price adjustments when international prices move more than a threshold of 4 per cent within a 22 working day period (roughly one month). Domestic prices for refined products comprise (Platts, 2009):

- The FOB prices of three benchmark crude oils: the Middle East's Dubai, North Sea's Brent and Indonesia's Cinta (given equal weighting)
- Shipping costs and port handling fees
- Average processing costs at CNY200 (US\$31) per tonne
- Refining margins at 5 per cent of the sum between referenced crude benchmarks and crude processing cost
- Pipeline and ground transportation charges of CNY110 (US\$17) per tonne for moving crude inland to refineries
- A consumption tax of CNY940 (US\$146) per tonne for diesel and CNY1350 (US\$ 210) per tonne for gasoline
- A 17 per cent VAT

Since initiating the new regime, the government has sent mixed signals about its willingness to integrate domestic with international fuel prices. On the one hand, it announced that that it would continue to intervene to shelter domestic consumers from high international oil prices and clearly has done so in 2011. On the other hand, the NDRC is considering plans to adopt a more responsive pricing system (see Table 9.13).





**TABLE 9.13: RECENT DEVELOPMENTS IN CHINA'S DOMESTIC PRICING POLICIES FOR FUELS**

DATE	EVENT	SOURCE
July 2008	China increased domestic gasoline and diesel prices by approximately 18 per cent, the largest fuel price increase in 10 years.	Business Monitor International (2009); Kojima (2009)
December 2008	Adoption of new price adjustment formula and new fuel tax.	Kojima (2009); Weerts (2010a); NDRC (2009)
December 2008	China reduces fuel prices for the first time in two years.	Kojima (2009)
May 2009	The government announces that it will continue to set prices to protect consumers when world oil prices exceed US\$80 a barrel.	NDRC (2009)
December 2009	NRDC acknowledges that it is in the process of reviewing the pricing mechanism.	Weerts, (2010a)
May 13, 2011	China bans diesel exports in a bid to keep domestic prices low.	Anderlini (2011)
July 1, 2011	China lowered import duties for diesel and jet kerosene to zero, and cut those on fuel oil (grades No. 5-7) to 1 per cent, from 3 per cent. The previous rate for jet kerosene was 6 per cent. (The article did not specify the previous rate for diesel.)	Aizhu (2011a)
July 5, 2011	Former Director of the NDRC's Energy Research Institute reports that the NDRC is considering reforms to its pricing mechanism. Energy Consultant Zhou Dadi said: "The current oil pricing mechanism goes some way to ward off global price fluctuations, but it still remains too rigid. It doesn't properly reflect changes in the market."	Xinhuanet (2011)
July 12, 2011	NDRC issues a new policy that aviation kerosene prices will be adjusted once a month to promote a market price of aviation kerosene.	Chinahrly (2011)
July 15, 2011	According to media reports, an NDRC official says China will introduce a more market-driven oil pricing mechanism by the end of the year. The new mechanism will shorten the periods between price adjustments to 10 working days and the 4 per cent threshold will also be lowered.	Fei (2011)
October 8, 2011	NDRC reduces retail prices by CNY300 (US\$47) per tonne, corresponding to a 3.5 per cent cut to gasoline prices and a 3.9 per cent cut for diesel.	Aizhu (2011a).
October 12, 2011	The Chinese government enacts a nationwide 5 to 10 per cent tax on domestic sales on oil and gas, to be applied from November 1. The new sales-based tax will replace the existing regime that levies taxes based on volume rather than value.	Business Monitor International (2011)
October 12, 2011	The NDRC is reported to have submitted a new fuel pricing scheme to State Council, China's cabinet, for approval.	Lin, Shen, Hua, Bai & Aizhu (2011)

### *Measures to Protect Vulnerable Sectors*

The new price mechanism was introduced at a time of falling oil prices and therefore measures were not explicitly used to ameliorate impacts on industry or the poor. However, when domestic prices were raised in December 2010, the NDRC also promised subsidies to low-income families, farmers, taxi drivers and other sectors that could be hurt by the price adjustment (China Daily, 2010). Public transport systems including buses, railways and airlines were not permitted to raise fuel surcharges after the price increase.



### *Outcomes and Effectiveness of the Reform Measure*

The price adjustment mechanism as implemented by China since December 2008 has had limited effectiveness as a means to reduce losses for state-owned refineries because the government frequently chose not to pass on higher international prices. Between the NDRC's fuel price increase on February 20, 2011 and its next increase on April 7, for example, the 22-day moving average prices of Brent, Dubai and Cinto crude oils gained more than 14 per cent (Bai & Aihzu, 2011). However, the NDRC raised prices only by 5.8 per cent (Bloomberg, 2011b).

PetroChina posted a refining loss of CNY6.13 billion (US\$944 million) in the first quarter of 2011, while Sinopec sustained a refining loss of CNY576 million (US\$90 million) (Hua & Miles, 2011).<sup>55</sup> PetroChina and Sinopec have criticized the current pricing mechanism for being too simplistic and open to manipulation (Weerts, 2010a). The infrequent adjustment of prices encourages hoarding, stockpiling and dumping of fuels ahead of expected price changes (Weerts, 2010a). And under the current pricing system, refineries in general take no profit margin when crude prices go above US\$80 per barrel. A more frequent price adjustment would leave less room for the speculators to take advantage of the price movement.

Ongoing price fixing has also led to diesel shortages in 2011, as independent refineries halted production due to low profitability, leaving the burden of supply falling only on the state-owned refineries (Bloomberg, 2011b).

The Chinese government made it clear, however, that reducing subsidies and ensuring refinery profits were not its only objective in establishing the new pricing mechanism. It also sought to manage other economic, social and political matters. Inflation has been a major concern for the Chinese government. China's consumer price index (CPI) rose 6.2 per cent year-on-year in August 2011, decelerating from July's 6.5 per cent, which was the fastest in more than three years (Back, 2011).

Stabilizing prices remains one of the government's key economic priorities and more important than maintaining economic growth rates, as outlined by a speech by Premier Wen at the summer World Economic Forum meeting in Dalian, China (Wen, 2011b). Food price increases are the main factor driving the high CPI and the focus of government efforts, but the NDRC is also working to keep energy price increases and their impact on the CPI to a minimum. At the same time, they are balancing how to encourage energy producers to maintain supply to avoid a worsening of recent power shortages.

In this regard, regulation of domestic fuel prices and control of the chain reaction arising from price hikes (e.g., not allowing public transport operators to increase their fuel levy) may have helped contain inflationary pressures, thus contributing to a major government objective (Invest in China, 2010).

### *Lessons Learned*

#### *Take advantage of falling world prices to introduce a market-based formula*

The introduction of the new pricing mechanism took advantage of a time of falling international oil prices. Such reforms are likely to encounter less opposition when they lead to price reductions (Wagner, 2008). The NDRC appears to be once again timing reforms to the pricing mechanism to coincide with falling world crude oil prices, with reports of changes to make domestic prices more responsive to international prices being submitted to the State Council in October 2011.

<sup>55</sup> Sinopec reduced its losses by refining stockpiled crude that had been bought at lower prices.



***The formula must be applied automatically and independently to avoid political interference***

The NDRC's implementation of the pricing mechanism has been ad hoc and international prices have not been passed through to Chinese consumers, leading to a continuation of the problems that arose from earlier ad hoc mechanisms. This is largely because the administrator of the mechanism, the NDRC, is not an independent regulatory authority. A paper by IMF researchers noted:

*The governance structure of the institutions in charge of implementing the price formula is also an important element of the pricing policy. The pricing formula should be insulated from political influence, perhaps by delegating its implementation to an independent body, transparently organized, that includes representatives from the different industry stakeholders (importers, distributors, transporters, etc.) and with appropriate disclosure to the public. This should help to reinforce the public's understanding that price changes are determined by changes in international prices. (David, El Harrak, Mills & Ocampos, 2011)*

A restructuring of China's energy bureaucracy was completed in March 2008, leading to the creation of a new National Energy Administration (Downs, 2008). However, the NDRC and ultimately the State Council, whose approval is needed for any major energy price changes, retained control over energy prices. According to commentary by Downs (2008), this is not surprising given that the power to set prices is one of NDRC's main instruments of macroeconomic control, and it is reluctant to relinquish this power to another government body that might be tempted to adjust energy prices in ways that run counter to broader economic objectives, such as combating inflation.

Few developing economy governments consistently use automatic price adjustment mechanisms implemented by independent authorities. An IMF study of West African countries found that many countries that had automatic pricing schemes in principle suspended the full operation of their schemes to insulate domestic prices (David et al., 2011). A survey of 49 developing countries found that nearly all intervened with price-based policies to mitigate the impacts of high world oil prices in 2008 (Kojima, 2009).

South Africa did, however, continue to implement an automatic price adjustment mechanism during high oil prices in 2007 and 2008. The mechanism is based on import parity and cost recovery profit margins and is regulated by the Department of Energy (see Box 9.18). The regime is transparent, with the price structure of petroleum products published regularly on government websites.<sup>56</sup> This mechanism is widely considered to have functioned well over the years (Baig et al., 2007) and could constitute an example of a successful framework upon which to base reform (David et al., 2011).

**BOX 9.18 SOUTH AFRICA'S FUEL PRICE ADJUSTMENT MECHANISM**

The underlying principle for the determination of South Africa's Basic Fuels Price is to reflect realistic, market-related costs of importing a substantial portion of South Africa's liquid fuels requirements.

The gasoline and diesel price in South Africa is directly linked to the prices quoted in U.S. dollars at refined petroleum export-orientated refining centres in the Mediterranean area, the Arab Gulf and Singapore. This means that the domestic prices of fuels are influenced by: (a) international crude oil prices, (b) international supply and demand balances for petroleum products and (c) the Rand/U.S. Dollar exchange rate. The import parity principle is an arms-length method of basic fuel price determination to ensure that local refineries compete with their international counterparts.

Prices of all grades of petrol, diesel and illuminating paraffin are adjusted on the first Wednesday of each month. The amount of price change is determined and implemented in such a manner that over- or under-recoveries incurred during the previous period caused by Basic Fuel Price movements will be cleared during the following period.

Source: Adapted from Department of Energy, South Africa (n.d.)

<sup>56</sup> See Department of Energy, South Africa (n.d.)



### *Controlling fuel prices may help fight inflation but it comes at a high cost*

China is rare in being able to afford large fuel subsidies if they meet other government objectives. Most developing countries cannot afford the fiscal vulnerability that comes with a managed float (Federico, Daniel & Bingham, 2001). Failing to pass through high oil prices is risky in a volatile market. Soaring prices will lead to large subsidy costs and, when these become unsustainable, sudden and dramatic increases in domestic prices. Both of these outcomes can be politically and economically disastrous.

China's single-party political system does not make it immune from the political economy pressures that face democratic governments attempting to reform fossil-fuel subsidies. Victor (2009) notes that "populist" or interest-based fuel subsidies are common even in economies that have contested elections (such as Iran, until recently, and Venezuela). Countries that do not hold national elections, such as Saudi Arabia, also provide significant fuel subsidies.

According to media reports, in response to higher fuel prices, thousands of taxi drivers in the eastern city of Hangzhou went on strike to demand higher fares in August 2011 (MercoPress, 2011). In April, truck drivers in Shanghai stopped work over rising fuel costs, disrupting operations at the city's ports (Anderlini, 2011)

Like other countries, China must balance the competing pressures of controlling inflation and appeasing community opposition to higher fuel prices with the need to minimize fiscal outlays on subsidies and ensuring profitability for domestic refineries. Fuel shortages caused by artificially low prices have the potential to also cause significant public unrest.

### *Adjusting taxes offers a degree of smoothing*

China's decision to lower import duties on certain fuels from July 1, 2011 illustrates an alternative approach to freezing prices. Temporarily reducing taxes is a method used by several APEC economies, including Chinese Taipei, to reduce domestic fuel prices.

## The Path to Deregulation: Reform of Russia's Subsidies for Domestic Consumers of Natural Gas

Russia's regulated prices for domestic consumers of natural gas provide the single largest fossil-fuel subsidy in the APEC region (IEA, 2010). Both gas and electricity (around 40 per cent of which is generated from gas) are sold within Russia at average prices that are well below international market prices.<sup>57</sup> This price gap between domestic and international prices was estimated to be approximately US\$19 billion for gas and US\$15 billion for electricity in 2009 (IEA, 2010). Together, these subsidies were equivalent to US\$238 per person and 2.7 per cent of GDP. Russia is one of the world's largest producers of natural gas, the largest exporter and the biggest reserve holder (Simmons & Murray, 2007).

Low gas prices have deep roots in Russia's history. From the 1960s to the 1980s, Soviet infrastructure for power and district heating expanded rapidly on the assumption that cheap energy would be available in the long term. By the end of the Soviet era, the heat and power sector had reached an historical peak in output, relying heavily on gas (Pirani, 2011). Lower gas prices were used in the 1990s to manage post-Soviet industrial and social problems of transition (Pirani, 2010). This led to a significant increase in the share of gas in Russia's total primary energy supply and an expectation by consumers, particularly households, that cheap energy is a legitimate government service.

<sup>57</sup> Electricity generation capacity in 2008 was thermal (comprising 47 per cent natural gas and 19 per cent coal), 16 per cent nuclear and 16 per cent hydroelectricity (Pirani, 2011)



Russia's domestic gas market consists of regulated and unregulated sectors. The regulated market is supplied by Gazprom, a state-controlled producer and distributor of gas, and accounts for around 75 per cent of sales by volume (Gazprom, n.d. a). The government sets wholesale prices for Gazprom and its affiliates, the tariffs for distribution through pipelines, and charges for supply and marketing services. Regulated prices vary between regions (depending on the proximity to gas production sites amongst other things) and consumer type: residential consumers generally pay around 25 per cent less than industrial consumers. In 2010 the wholesale price for Russia's industrial consumers was around one quarter of the price paid by neighbouring European countries for Russian gas (Pirani, 2011). The unregulated sector consists largely of independent producers that sell gas to electricity generators and district heating providers.

In 2006 the Government of Russia initiated plans to liberalize the domestic market for industrial consumers of gas. Prices would be gradually increased towards the European netback price: the prices charged to European importers minus export taxes and transport costs (IEA, 2011c). A directive issued in May 2007 said that prices for non-residential sectors would be increased gradually, with prices reaching export parity by 2011.<sup>58</sup> Prices for households would also rise, but more slowly.

Volatile oil markets in 2008 and the 2009 global financial crisis caused a change in Russia's reform plans. Record high oil prices in 2008 led to a steep increase in export gas prices (in the European Union, natural gas prices are indexed against oil prices). Raising domestic gas prices towards this level would have meant dramatic increases in energy costs for Russian industry.

In the following year, international oil prices fell, but the financial crisis dampened growth sufficiently in Russia for the government to postpone significant energy price increases on industry. Russia's year-on-year GDP fell 7.9 per cent in 2009 and gas consumption dropped 6.6 per cent, with the majority of the decrease in consumption attributed to reduced activity in Russia's energy-intensive industries (Pirani, 2011). Gas exports also fell, reflecting the downturn in European demand. A new directive was issued in December 2010 that delayed the transition to market prices for wholesale industrial gas until 2015.<sup>59</sup> Until then, wholesale prices are expected to increase 15 per cent per year, while prices for rail and utility companies will increase in line with inflation (Akin, 2011).

Russia's electricity sector is also undergoing significant reform. The Russian wholesale power market was liberalized, starting from the beginning of 2011 (Solanko, 2010). However, all generating companies continue to sell a part of their electricity to households under regulated prices (Fortum, 2011). The Russian power sector consumed over 180 bcm of natural gas in 2008, significantly more than total Russian gas exports to Europe (Table 9.14) (Pirani, 2011). Ongoing improvements in efficiency of electricity generation—a major government priority—is expected to reduce the rate of growth in domestic gas consumption, offsetting increases arising from economic development and regional gasification.<sup>60</sup>

District heating is also a large consumer of subsidized natural gas, but is unlikely to see significant reform within the next ten years. Heating is delivered along with other municipal services (such as water, gas, electricity and sewerage) and therefore significant reform is only possible in the context of comprehensive reform of municipal services (Pirani, 2011).

<sup>58</sup> Russian Government Directive No.333 on Improvement of State Gas Price Regulation dated May 28, 2007 (Gazprom, n.d. a).

<sup>59</sup> Russian Government Directive No.1205 on Improvement of State Gas Price Regulation dated 31 December 2010 (Energy News Weekly, 2011).

<sup>60</sup> Between 2008 and 2035, Russian consumption of natural gas is forecast to increase from 453 bcm to 528 bcm, a compound average annual growth rate of 0.6 per cent (IEA, 2011c).



**TABLE 9.14: SUMMARY OF GAS CONSUMPTION IN RUSSIA IN 2008 (BCM)**

Transformation	264.556
<i>Electricity plants</i>	2.574
<i>Combined heat &amp; power plants</i>	188.166
<i>Heat plants</i>	71.893
Other	1.923
Energy industry's own use	16.48
Distribution losses	6.538
Pipeline transport	43.669
Industry	66.716
Residential	49.408
Commercial and public services	4.852
Other	1.213
<b>Total domestic consumption</b>	<b>453.435</b>

Source: International Energy Agency, as cited in Pirani (2011).

Liberalizing domestic gas prices is a major objective of Russia's Energy Strategy to 2030 (Table 9.15). Several reasons are cited and can be summarized as:

- Improving energy security through pricing that promotes energy efficiency (thereby reducing consumption of domestic energy resources).
- Encouraging investment in infrastructure, particularly repairs to Russia's extensive network of gas distribution pipelines, and to extend regional gasification.<sup>61</sup>
- Providing equal profitability between the domestic and export markets for Russian suppliers of natural gas.
- Encouraging diversification of Russia's energy supply by reducing market distortions that favour gas.

Somewhat at odds with the deregulation objective are other stated goals in the strategy, including to provide a "reliable energy supply to the country's population at socially affordable prices" and the "consideration of Russia's national interests in the context of the developing system of world energy markets operation" (Ministry of Energy, Russia, 2010).

<sup>61</sup> The average age of the Gazprom trunk pipelines is now about 22 years, and an estimated 14 per cent of the pipelines are beyond their anticipated lifetime. The key barrier to pipeline investment is the low tariff derived from low internal gas prices (Victor, 2008).



**TABLE 9.15: RUSSIA'S ENERGY STRATEGY FOR THE FORMATION OF EFFICIENT AND STABLE TARIFF AND PRICING SYSTEMS FOR THE ENERGY MARKET**

IMPLEMENTATION PHASE	ACTION	END GOAL
One (by 2015)	<p>Enhancement of the system of targeted social assistance to the population in the context of the measures for cross-subsidization liquidation.</p> <p>Controlled liberalization of prices for energy carriers (including for gas and electricity) on the domestic market while retaining state regulation of the tariffs for gas and electricity transportation.</p> <p>Development of the regulatory and legal framework defining the principles for the state reservation of fuel and energy resources for organized commodity interventions in order to stabilize the energy markets under the conditions of crises. Cross-subsidization liquidation.</p>	Completion of liberalization of electricity and gas domestic markets.
Two (end date not specified)	Creation of the state reserves of oil, oil products and natural gas for organized commodity interventions in order to stabilize the energy markets under the conditions of crisis.	Completion of liberalization of the domestic market of heat supply.
Three (by 2030)	Formulation of a stable pricing policy meeting the interests of producers and consumers of energy resource.	

Source: Adapted from the Energy Strategy of Russia Appendix 5: "Master plan ("roadmap") of the state energy policy measures for the period up to 2030, ensuring the Strategy implementation" (Ministry of Energy, Russia, 2010).

### **Description of the Subsidy Reform Policy**

The Government of Russia has commenced introducing market mechanisms into the gas sector. Policies include allowing Gazprom to sell some gas within a price band (rather than a single fixed wholesale price), piloting of a Russian gas exchange and improving conditions for greater competition in gas production and supply.

### **Introduction of Market Pricing**

A government directive issued in 2007 establishes a new pricing mechanism for gas supplied by Gazprom to the regulated domestic market. Fixed gas prices for different consumer groups continue to be set by the Federal Tariff Service (FTS), but under the new mechanism the FTS price forms the minimum of a price range. The maximum price varies and from January 1, 2011, was set at 10 per cent above regulated wholesale price (Gazprom, n.d. a). Within this range, Gazprom can negotiate with buyers to determine the price. The pricing mechanism was applied to all new consumers that sign their first contract after July 1, 2007, and to gas supplies in excess of contracted volumes.

A revised directive issued in 2011 establishes the transitional arrangements before planned liberalization in 2015. From 2011 to 2012, the price regulation will not differ significantly from existing principles. For this period, however, the FTS will calculate regulated prices using a price formula based on the cost of alternative fuel. This will provide a unified gas tariff for the industry (excluding independent suppliers and long-term contracts established earlier) (Energy News Weekly, 2011).





In 2013–2014 the FTS will determine an average regulated price and Gazprom will be allowed to sell within a deviation of 6 per cent from this price (i.e., from -3 per cent to +3 per cent of the regulated average price) (Energy News Weekly, 2011). In 2014 the ministries for energy and economics will prepare suggestions on cancellation of state regulation of gas prices to consumers and transition to the state regulation of tariffs on gas transportation controlled by Gazprom. Between 2011 and 2014, average regulated prices are set to rise by 15 per cent each year.

The residential sector does not appear to be exempt from these reforms. The Energy Strategy to 2030 speaks of “the elimination of cross-subsidies at all levels” and the reduction of price regulation of energy products for the population (households) (Ministry of Energy, Russia, 2010).

### *Exchange Trade in Natural Gas*

Mezhregiongaz, the domestic marketing arm of Gazprom, ran an electronic trading platform (ETP) for Russian producers to trade natural gas tied to physical deliveries from 2006 to 2008. The ETP was a pilot to test a stock exchange approach to selling domestic gas and determining prices. It also provided an opportunity for domestic gas operators to experience exchange technologies in advance of market liberalization.

Stock exchange quotations are required as market price indicators for new contracts in a liberalized domestic market. Gazprom notes that 5 to 10 per cent of the industry output should be traded at an electronic platform for the exchange price to become a benchmark for contract prices (Gazprom, n.d. a).

The volume of fuel sold in the ETP was capped at 10 billion cubic metres, with approximately half coming from Gazprom and half from independent producers. The bulk of the gas was purchased by energy utilities at a weighted average price around 37 per cent above the regulated wholesale price (Gazprom, n.d. a). The gas trading session was suspended in 2009 due to the expiry of the experiment term. In April 2011, President Dmitry Medvedev ordered the government to establish a permanent natural gas exchange in Russia (Bloomberg, 2011a).

### *Expansion of Competition in the Domestic Market*

The potential to increase competition in Russia’s domestic gas market is constrained by Gazprom’s monopoly as the only supplier of natural gas at regulated prices and by Gazprom’s ownership of Russia’s extensive network of gas distribution pipelines.<sup>62</sup> The government has pressed Gazprom to provide greater access to the network for independent producers (RIA Novosti, 2011). Gazprom does provide access but states that the capacity constraints of the network are a limiting factor (Gazprom, n.d. b). Significant infrastructure upgrades are required and low tariffs are a disincentive for investment.

The Russia Energy Strategy states that legislation will be put in place to provide transparent and non-discriminatory procedures for access of all market participants to energy infrastructure (including pipelines, but also electric and heat networks). Antimonopoly laws will be strengthened to prevent cartels and technological monopolism.

<sup>62</sup> Gazprom’s Unified Gas Supply System (UGSS) includes 162 thousand kilometres of gas trunklines and branches and 215 compressor stations with a 42 mln kW capacity. The UGSS is the largest gas transmission system in the world. In 2010 Gazprom allocated around RUB 39.6 billion (US\$1.33 billion) for upgrading and replacing the gas transmission system. (Gazprom, n.d. c)





## Outcomes and Effectiveness

Russia's progress toward deregulation of the gas sector has been slower than anticipated. The 2003 Energy Strategy of Russia (to 2020) set an initial goal of "creating highly competitive energy markets with fair trade principles" by January 2011 (Ministry of Energy, Russia, 2010). The Energy Strategy for 2030 acknowledges that this goal was not achieved. Likewise, the goal of equal profitability for domestic and export gas markets by January 1, 2011, was not met.

Nonetheless, regulated prices of natural gas have risen substantially in the past decade (Table 9.16). Domestic prices also increased relative to the European border price. In 2003 Russia's industrial wholesale price was 17 per cent of the European border price. By 2011 it is projected to be 26 per cent. Similarly, wholesale residential prices have risen from 11 per cent of the border price in 2003 to 23 per cent in 2011. While these prices are far from parity, they represent a significant increase over a relatively short period of time.

**TABLE 9.16: RUSSIAN GAS SALES PRICES IN 2003-2011 (US\$ PER THOUSAND CUBIC METRES)**

	2003	2004	2005	2006	2007	2008	2009	2010	2011 (PROJ.)
Industry, wholesale	24.70	31.70	35.51	40.58	52.81	67.87	64.80	82.60	85.58
Residential, wholesale	16.30	20.80	25.61	31.72	40.27	51.85	49.47	63.43	75.28
European border price	147.60	157.80	213.70	285.70	285.20	294.10	418.90	307.80	323.70

Source: Pirani (2011)

The deregulation of gas prices in Russia, even if achieved in the government's time frame, does not necessarily mean the end to energy subsidies. While price-gap subsidies would be reduced, budgetary subsidies could increase to compensate economically vulnerable groups or politically important sectors of the population.

In early 2011, for example, a gas-producing conglomerate in the far eastern Russian province of Sakhalin Oblast refused to sell gas at subsidized prices to domestic consumers. Despite being majority owned by Gazprom, the partnership of international energy companies was not bound to provide gas at below-market prices. The Russian government stepped in to provide almost RUB25 billion (US\$832 million) in compensation from the 2011–2013 federal budget to ensure an ongoing supply of subsidized gas to the province. Subsequently, the FTS was obliged to provide similar subsidies to the far eastern province of Kamchatskaya Oblast's heat and energy station. Gazprom was promised subsidies of RUB5.7 billion (US\$190 million) within three years.

## Lessons Learned

### Introduction of market mechanisms

Russia's initial reforms introduced elements of market forces into the regulated gas pricing system. The trial of the natural gas exchange—with a capped volume of sales—provided useful experience for Gazprom and independent producers in electronic trade of gas and the potential to set contract prices based on exchange trades. Also, the inclusion of a price band in which Gazprom and clients can negotiate prices provides a controlled exposure to market forces in domestic gas sales before deregulation takes place.



### Some market forces are working for reform

Gazprom is a politically and economically powerful company. Equal profitability between domestic and international markets would be a major gain for Gazprom given that the majority of its market is domestic. Gazprom is therefore pushing for liberalized domestic prices. However, the break-up of its monopoly position over supply of regulated gas and its ownership of the Unified Gas Supply System (UGSS) will be a major challenge.

Significant investment is needed to develop new gas supplies and replace decaying UGSS infrastructure. Higher tariffs will be needed to fund this work, which also puts pressure on the government to allow higher domestic prices.

### Cheap energy as a social service

Reform of the domestic sector will be difficult due to the persistence of Soviet-era attitudes towards the supply of essential services by the State at subsidized rates. Municipal services deliver combined heat, power and hot water. From an infrastructure perspective, these will be difficult to unbundle to allow for separation of service delivery and to allow metering of individual household use and billing (or disconnection in the case of unpaid bills).

Since the 1990s the World Bank has made repeated recommendations that Russia replace blanket energy subsidies with targeted social assistance (World Bank, 2000). Russia's Energy Strategy to 2030 states that removal of subsidies will need to be accompanied by enhancement of the system for providing targeted social assistance to the population. How this is to be achieved is unclear. The 2005 World Bank Poverty Assessment found that 90 per cent of social assistance spending in Russia is not targeted directly at the poor, but at various groups of the population regardless of income level such as pensioners, war veterans and invalids. Only 8 per cent of social spending reaches the poorest 20 per cent of the population (World Bank, 2005).

Russia has been developing income-tested social assistance in several areas, including housing and utility allowances (World Bank, 2007). Aggregate spending on these targeted programs amounts to roughly 0.3 per cent of GDP or RUB80 billion (US\$2.62 billion). However, 2005 household survey data found that only 40 per cent of the beneficiaries of child and household allowances were indeed poor. Systemic improvement of Russia's social assistance delivery is clearly necessary if targeted transfers are to replace energy subsidies.

### *Implications for Policy*

**The presence of reform policies is not sufficient to ensure elimination of fossil-fuel subsidies.** The case examples show that the developing and emerging APEC economies examined have made repeated attempts to reduce subsidies (Indonesia and Thailand), have established policy instruments that could greatly assist the reform of subsidies (Chile, China and Mexico) or have policies in place for deregulation of the energy sector (Russia). Indonesia successfully increased prices for petroleum products in 2005 and 2008 through reform packages involving communications campaigns, social spending and cash transfers. Yet subsidies persist. Thailand has deregulated the market for some fuels but persists in fixing the prices of others. Chile has strong transparency policies in place, but the extent of its fuel subsidies is unclear. China has a price adjustment mechanism in place, but it is not consistently applied. Mexico has a model program for cash transfers with an energy component, but these are not linked to policies to reduce fuel subsidies. Russia has detailed plans to liberalize its domestic gas market, but these have been delayed.

Volatile international energy markets coupled with internal social, economic and political pressures have meant that many of the economies examined still have significant consumer subsidies in place.



Subsidy reform faces several barriers: (1) weak capacity to target mitigating measures to the poor, (2) lack of transparency in reporting of subsidies, (3) opposition by vested interests, (4) cross-border spill-over effects<sup>63</sup> and (5) ad hoc price-setting mechanisms (Coady et al., 2010).

**Addressing one or more of these impediments in isolation is likely to lead to only a temporary reduction in subsidies.**

A comprehensive policy that leads to deregulation of energy prices (or an automatic price adjustment mechanism) is more likely to deliver permanent elimination of consumer subsidies.

**There are no shortcuts on the path to deregulation.** Several conditions are necessary to support market deregulation:

- **Industry and the public need to accept their exposure to international market forces** that determine fuel prices (in the case of consumer subsidies) and investment decisions (in the case of producer subsidies). This can be facilitated through public inquiries into the subsidy, transparency and communications and consultation. Gradual approaches to deregulation are being applied in Chile and Thailand (with the prices of some fuels continuing to be fixed or stabilized) and China (with limited pass-through of international prices). A quarter of Russia's domestic gas market is deregulated and market forces are being introduced in the regulated sector.
- **Energy subsidies need to be decoupled from social and macroeconomic policy.** Reform will only lead to temporary or partial reductions in energy subsidies if the government feels compelled to continue to use energy policies to support social goals—such as assisting the poor or mining communities—or for macroeconomic objectives such as controlling inflation. Other policies, programs and economic tools need to be in place to address these issues, including an adequate social safety net. Mexico's *Oportunidades* program is an example of a non-distorting social assistance program that could be used as an alternative to fuel subsidies.
- **Assistance for the poor is necessary during reform and during subsequent periods of high energy prices.** Compensation programs will be needed whenever prices rise to avoid re-imposition of subsidies, until the economy and vulnerable communities have adapted to a more volatile environment for energy pricing. Thailand took advantage of falling world prices to deregulate fuel prices—removing the need for compensation measures—but was compelled to intervene again whenever prices rose during the subsequent two decades. Finally, in 2008 during record high prices, the government minimized price fixing and instead provided other assistance measures to minimize the impact of high energy prices. Such measures can make use of existing programs, as Indonesia demonstrated with its cash transfers and social programs. Communications campaigns would be necessary well after the reform effort in order to build acceptance of rising prices and associated compensation measures.
- **Government regulation is needed to oversee competition.** Regulatory frameworks may need to be strengthened, including the capacity to detect and prosecute price collusion.
- **Transparency is critical.** While transparency in itself is not a sufficient factor to cause subsidy reform, it is a necessary component to allow accurate assessment of subsidies, to ensure competitive behaviour and to build consumer understanding of the components and nature of energy pricing.

Liberalization would further require a transition to **open markets and access to energy infrastructure**. As the example of Russia's domestic gas market demonstrates, a liberalized market requires government to allow access to shared distribution infrastructure by all potential suppliers. In Thailand, the government liberalized imports and allowed new refineries and retailers to operate, thus increasing competition.

<sup>63</sup> Cross-border spill-over effects refer to fuel smuggling, impacts on international trade flows and environmental externalities such as GHG emissions.



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## Annex I: Consumer Fossil-Fuel Subsidies Overview for 12 APEC Economies

APEC ECONOMY	AVERAGE SUBSIDIZATION RATE	SUBSIDY (US\$/PERSON)	TOTAL SUBSIDY (AS SHARE OF GDP)	FUEL TYPE	SUBSIDY BY FUEL (BILLION US\$)			
					2007	2008	2009	2010
Brunei Darussalam	31.9%	840.1	2.6%	Oil	0.17	0.26	0.11	0.19
				Gas	0	0	0	0
				Coal	0	0	0	0
				Electricity	0.04	0.13	0.12	0.15
				<b>Total</b>	<b>0.21</b>	<b>0.39</b>	<b>0.23</b>	<b>0.34</b>
People's Republic of China	3.8%	15.9	0.4%	Oil	11.75	24.64	4.96	7.77
				Gas	0	7.11	0.49	0
				Coal	0.99	3.21	4.29	2.01
				Electricity	4.41	10.42	8.82	11.54
				<b>Total</b>	<b>17.15</b>	<b>45.38</b>	<b>18.56</b>	<b>21.32</b>
Chinese Taipei	1.8%	25	0.1%	Oil	0.6	1.27	0.53	0.24
				Gas	0	0.02	0	0
				Coal	0.06	0.24	0.09	0
				Electricity	1.45	3.55	0.5	0.34
				<b>Total</b>	<b>2.11</b>	<b>5.08</b>	<b>1.12</b>	<b>0.58</b>
Indonesia	23.2%	66.5	2.3%	Oil	11.3	13.19	8.57	10.15
				Gas	0	0	0	0
				Coal	0	0	0	0
				Electricity	1.87	4.73	3.61	5.79
				<b>Total</b>	<b>13.17</b>	<b>17.92</b>	<b>12.18</b>	<b>15.94</b>
Republic of Korea	0.4%	3.7	0%	Oil	0	0	0	0
				Gas	0	0	0	0
				Coal	0.04	0.07	0.07	0.18
				Electricity	0	0	0	0
				<b>Total</b>	<b>0.04</b>	<b>0.07</b>	<b>0.07</b>	<b>0.18</b>
Malaysia	20%	199.6	2.4%	Oil	2.69	4.79	2.32	3.89
				Gas	1.42	2.9	1.57	0.97
				Coal	0	0	0	0
				Electricity	0.49	2.25	0.61	0.81
				<b>Total</b>	<b>4.6</b>	<b>9.94</b>	<b>4.50</b>	<b>5.67</b>
Mexico	12.5%	83.8	0.9%	Oil	16.49	21.86	3.29	9.34
				Gas	0	0	0	0
				Coal	0	0	0	0
				Electricity	1.12	0.54	0.3	0.16
				<b>Total</b>	<b>17.61</b>	<b>22.4</b>	<b>3.59</b>	<b>9.50</b>



Peru	0%	0	0%	Oil	0.1	0.24	0	0
				Gas	0.06	0.14	0	0
				Coal	0	0	0	0
				Electricity	0	0.23	0	0
				<b>Total</b>	<b>0.16</b>	<b>0.61</b>	<b>0.00</b>	<b>0.00</b>
The Philippines	7.3%	11.8	0.6%	Oil	0.16	0.15	0.07	1.1
				Gas	0	0	0	0
				Coal	0	0	0	0
				Electricity	0	0	0	0
				<b>Total</b>	<b>0.16</b>	<b>0.15</b>	<b>0.07</b>	<b>1.10</b>
Russia	22.6%	274.3	2.7%	Oil	0	0	0	0
				Gas	18.38	30.67	18.7	16.95
				Coal	0	0	0	0
				Electricity	14.95	23.18	14.94	22.26
				<b>Total</b>	<b>33.33</b>	<b>53.85</b>	<b>33.64</b>	<b>39.21</b>
Thailand	20.7%	122.7	2.7%	Oil	1.55	2.41	1.46	2.11
				Gas	0.22	0.64	0.24	0.48
				Coal	0.17	0.69	0.57	0.44
				Electricity	0.88	3.99	1.83	5.44
				<b>Total</b>	<b>2.82</b>	<b>7.73</b>	<b>4.10</b>	<b>8.47</b>
Vietnam	14.4%	33.4	2.8%	Oil	0.32	1.12	0.24	0
				Gas	0.09	0.21	0.13	0.23
				Coal	0.01	0.01	0.01	0.01
				Electricity	1.68	2.49	1.18	2.69
				<b>Total</b>	<b>2.1</b>	<b>3.83</b>	<b>1.56</b>	<b>2.93</b>

Source: IEA (2011d)





## Annex II: Overview of Data Availability for Producer Subsidies

SUBSIDY TYPE	EASE OF VALUATION	DATA SOURCES
General resources on energy policy, industry structure, prices	Varies by country. Available data are not always accurate.	National energy ministries or statistics organizations; international agencies; trade press.
Government-owned energy minerals Includes: <ul style="list-style-type: none"> <li>Process for mineral leasing (auctions or grants)</li> <li>Royalty relief or reductions in other taxes due on extraction</li> <li>Problems with accurate payment or collection of royalties due</li> </ul>	Royalty relief, if visible, is fairly easy to quantify.  Quantifying the value of non-competitive leasing or improper royalty collections is much more difficult.	Countries with poor transparency will have little published information on what they are buying; complicated where government provides in-kind support or services to complex energy-related enterprises.
Government ownership of energy-related enterprises Includes: <ul style="list-style-type: none"> <li>Energy security-related enterprises (stockpiles, defense planning or policing)</li> <li>Support to bulk fuels transport</li> <li>Direct ownership of power generation, transmission or distribution assets</li> </ul>	Complex: Government-owned enterprises often include multiple levels of other subsidies, from operating grants to credit and insurance subsidies. Important subsidies, such as the lack of any required return on capital, often do not show up in any reporting.  Impacts on pricing may also be driven by organization of the industry—such as monopolization of natural gas in Russia. There is also a class of critical services provided by government entities, such as energy security and defense, construction and maintenance of energy transport hubs, and remediation of energy-related environmental damage.	Countries with good transparency in general have financial reporting that provides insights into these types of entities, especially if they must produce audited financial statements. Evaluating subsidies in opaque countries will be much harder.  Proxies such as poor returns on invested capital or under-pricing of output can be indicators of problems, and may not be picked up easily in any country. Cross-subsidies between different users of this infrastructure are also quite common and inadequately characterized.
Market price support and regulation Includes: <ul style="list-style-type: none"> <li>Consumption mandates or restrictions</li> <li>Direct price controls</li> <li>Border protection (often tariffs) or export restrictions</li> <li>Regulatory loopholes</li> </ul>	With the exception of regulatory loopholes and non-tariff barriers, these other policies are fairly easy to identify. Quantifying their impact tends to be much more difficult, as the direct impact (e.g., how much tariff revenue is collected) is far less important than the policy's impact on prices or which suppliers are competitive.  Regulatory loopholes require comparing complex compliance requirements across industries, and are therefore often difficult to spot or to value, even if you find them.	Country-level studies of energy policy by IEA, the World Bank, the Energy Information Administration and others are a good starting point to identify market price support or regulatory gaps. Trade cases or filings often identify border protection, and most official tariffs are published and readily available online.  The impact of consumption mandates or restrictions often comes through econometric modelling by international agencies, academics, or private firms. These assessments are not completed for all sectors or policies for which they would be relevant.
Direct spending Includes: <ul style="list-style-type: none"> <li>Direct appropriations to government ministries</li> <li>Government contracts to outside parties</li> <li>Government support for research and development</li> </ul>	Quality, frequency and coverage of data on direct spending varies by country. Gross data often need some adjustments—such as focusing on expenditures rather than authorized amounts and deducting any offsetting collections. Similarly, direct purchases of goods or services by governments need to be evaluated to separate basic operations from any incremental subsidy to favoured industries based on how the contracts are structured.  It may be useful to segment spending by data types (e.g., research and development, earmarks, contracts, direct appropriations) to better fit available data types.	Countries with poor transparency will have little published information on what they are buying; this is complicated where governments provide in-kind support or services to complex energy-related enterprises.  Some spending types benefit from focused national or international databases. For example, the United States separately (albeit imperfectly) tracks earmarks; the IEA compiles data on energy R&D spending (though largely self-reported by members with little IEA verification).



<p><b>Tax breaks and special taxes</b> Includes:</p> <ul style="list-style-type: none"> <li>• Tax expenditures</li> <li>• Aggregate measures of overall tax burden by industry</li> <li>• Excise taxes or special targeted taxes on energy industry</li> </ul>	<p>Difficult: Many countries have no tax expenditure budgets at all; others have aggregated data that are difficult to allocate back, even to the sector level. Tax breaks are also common at the state, provincial or municipal levels of government—with even less visibility.</p> <p>Information on energy-related fees or taxes tends to be more available than tax breaks, at least on a gross collections basis. Evaluating net impacts (e.g., is fee too high or too low for what it has been set up for?) requires separate analysis.</p>	<p>Start with tax expenditure budgets for countries that prepare these.</p> <p>For others, may be able to back-calculate using levels of investment combined with the rules for claiming a particular exemption.</p> <p>Subnational policies are difficult to track systematically.</p>
<p><b>Credit support</b> Includes:</p> <ul style="list-style-type: none"> <li>• Government loans and loan guarantees</li> <li>• Subsidized credit to government-owned energy enterprises or infrastructure</li> <li>• Subsidized credit to energy-related exports via export credit agencies or multilateral development banks</li> </ul>	<p>Difficult: Data availability rapidly declines with specificity. For example, there is good information on gross commitments by most developed governments (less so in developing countries). However, information declines sharply as gross commitments move to commitments by sector, by firm, specific loan terms and specific losses.</p> <p>The United States provides annual estimates of credit subsidies at the ministry level; few other countries do this.</p> <p>Provision of subsidized credit in less transparent countries is often done without public records. In all countries, provision of cheap financing to government-owned or led projects is often ignored entirely.</p> <p>Development of benchmarks against which to evaluate lending terms can be challenging.</p>	<p>Multilateral lending agency databases; major national export-import banks; NGOs such as the Institute for Policy Studies and Friends of the Earth have done some work in these areas, though not comprehensive.</p> <p>Analysis requires benchmarking to relevant projects in other sectors, and inputting appropriate costs of funds on government projects where it is missing entirely.</p>
<p><b>Insurance and indemnification</b> Includes:</p> <ul style="list-style-type: none"> <li>• Government provision of risk management or risk shifting services</li> <li>• Statutory caps on commercial liability</li> </ul>	<p>Direct government-run insurance programs are normally visible in government documents and budgets. Where annual reports or expenditures are filed, the direct cost to government of these programs can be quantified. Additional benchmarks are needed to evaluate risk-adjusted subsidies, however.</p> <p>Statutory caps on commercial liability for particular sectors or activities may not be commonly known; and if known, are generally quite difficult to value.</p>	<p>Government budget documents, or annual reports or audit documents for insurance-related activities.</p> <p>Information on statutory caps often comes from NGOs, from media reports if an accident makes the cap more visible or from debates that occurred at the time the cap was initially passed.</p> <p>Less transparent countries will often have implicit guarantees or gaps with little visibility or data.</p>
<p><b>Health and safety oversight</b> Includes:</p> <ul style="list-style-type: none"> <li>• Government oversight of existing extraction, transport, and beneficiation operations</li> <li>• Legacy health costs</li> </ul>	<p>For ongoing operations, the ability to quantify costs varies by general transparency of the country. The United States, for example, provided detailed budgetary data for each safety oversight agency. In China, even aggregate statistics on coal miner injuries and deaths were not readily available.</p> <p>Health impacts for fossil-fuel-related sectors—especially coal—are much higher than for other industries; but may be blended in with insurance pools for a wide range of industries.</p> <p>Separating out these impacts may not be easy. Legacy health costs are not that well characterized in most countries, though may become visible if a targeted government program to support injured workers is set up (as was done for black lung victims in the United States).</p>	<p>Data on ongoing operations can be gleaned from budget documents or annual reports from oversight agencies, where such documents exist.</p> <p>Data on legacy health costs normally rely on infrequent government studies, or work done by outside parties focused on obtaining resources for the injured workers.</p>



<p><b>Environmental issues, site closure, and postclosure care</b> Includes:</p> <ul style="list-style-type: none"> <li>▪ Legal structure governing financial and operational responsibility for closure and post-closure activities</li> <li>▪ Legal structure governing ability of injured parties to sue for compensation</li> <li>▪ Stringency and neutrality of environmental controls (as enforced, not as written)</li> </ul>	<p>All of these areas are difficult to quantify, though they offer the potential for very large subsidies to favoured sectors. Where policies cannot be quantified, it is still important to qualitatively identify gaps in environmental controls and site management.</p>	<p>Although statutory details on environmental laws are often readily available, enforcement of these laws often diverged sharply across countries, regions and industries. Some conclusions may be deduced by the absence of material (e.g., no evidence of ongoing litigation). Direct questions to government, industry and NGOs may be necessary to identify the basic structure of the rules as enforced.</p>
<p><b>Emerging issues</b> “Watch” list of emerging issues of potential benefits to fossil-fuel industries, even if not yet well captured by commonly monitored policies. Examples include:</p> <ul style="list-style-type: none"> <li>▪ Windfalls associated with carbon credit allocations or offset programs</li> <li>▪ Environmental damages from ground fracturing for natural gas extraction</li> <li>▪ Environmental damages associated with synthetic fuels production</li> <li>▪ Programs to underwrite the cost or risk of carbon capture and storage</li> </ul>		



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