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Petroleum Product Pricing and Complementary Policies

Experience of 65 Developing Countries Since 2009

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Abstract

Unable to cope fully with steadily climbing world oil prices since mid-2009, many of the 65 countries reviewed in this paper have progressed slowly or even reversed course in reforming pricing of petroleum products. End-user prices in July 2012 varied by two orders of magnitude across the countries. More than two-fifths, including some that had only recently adopted automatic pricing mechanisms, froze the prices of gasoline, diesel, or both for months or even years on end during the study period. When the prices were finally adjusted, the increases were sometimes substantial, leading to large-scale protests, partial or full reversals of price adjustments, or softening of pricing reform policy.

Governments' attempts to keep domestic prices artificially low—through price control, export or quantity restrictions, or political pressure put on oil companies—have helped curb inflation in the short term, but frequently with serious negative consequences: flourishing black markets, smuggling, fuel adulteration, illegal diversion of subsidy funds, large financial losses suffered by fuel suppliers, deteriorating refining and other infrastructure, and acute fuel shortages causing economy-wide damage. In several countries, subsidies, price controls, and other restrictions have helped protect inefficient refineries and oil marketers.

Mitigation responses have included fuel conservation programs; fuel diversification, particularly liquid biofuels to substitute gasoline and diesel; and efforts to lower costs of supply, including strengthening infrastructure, promoting price competition, hedging, negotiating price discounts with exporters, and bulk procurement. Various forms of assistance to consumers have also been offered, especially to households, agriculture, transport, and fisheries.

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Petroleum product pricing and complementary policies: Experience of 65 developing countries since 2009

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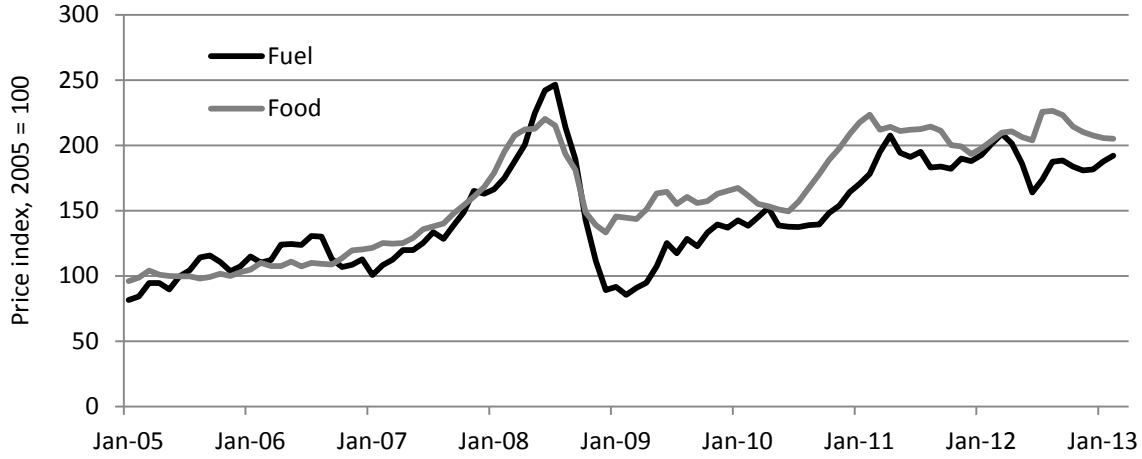
1. Introduction

The prices of internationally traded fuels and food surged until mid-2008, fell sharply, and then began rising again, reversing much of the price fall by 2011. By one measure, the prices on the world market have nearly doubled since 2005 (Figure 1). The fiscal breakeven price of oil needed to balance the budget in major oil exporters has risen sharply in recent years, making the prospect of prolonged periods of low prices unlikely in the future. Equally important, the marginal cost of oil production in 2011 was US$92 a barrel for the 50 largest listed oil companies and could rise further if it continues to follow the long-term trend (*Wall Street Journal* 2012). Similarly, long-term growth in global demand for food and continuing U.S. ethanol demand for maize and EU biodiesel demand for vegetable oils are expected to keep prices of maize, oilseeds, and many other crops at historically high levels (USDA 2012b).

Figure 1: Monthly indices for fuel and food prices since 2005 in low- and middle-income countries



Sources: World Bank 2013.

Note: All prices are world prices. Fuel consists of 84.6 percent crude oil, 10.8 percent natural gas, and 4.7 percent coal. Food includes cereals, vegetable oils, meat, sugar, and fruits. Weights are based on developing countries' export values in 2002–04. Indices are based on nominal prices in U.S. dollars.

Many governments in developing countries control petroleum product prices. In the face of mounting subsidies, a number of governments seriously explored options for pricing reform in the period leading up to mid-2008. The budgetary pressure to press on with reform subsided briefly following the price collapse in late 2008, but those governments that had done little were caught by rising prices again soon thereafter. To the extent that price increases on the world market have been transmitted to the domestic market, soaring prices have led to calls on governments across the world to take action, ranging from providing greater safety nets to the poor and increasing the minimum wage to releasing oil from strategic reserves, reducing taxes, and granting outright price subsidies.

Given the high share of household expenditure on food—in some low-income countries, the food share can be as high as half or more, and even in middle-income countries it is typically 20–30 percent (World Bank 2012b)—rising food prices have made fuel price reform, politically difficult under any circumstances, all the more challenging. Conversely, rising fuel prices have compounded the political difficulties of reducing food price subsidies, as households face rapidly increasing expenditures on other basic goods. As a result, some countries have seen people taking to the streets to protest both high food and energy prices.

Price transmission to the domestic market has differed markedly from country to country. In the case of petroleum products, aside from price differences due to transportation costs and differences in fuel quality, international crude oil and petroleum product prices are broadly uniform across all regions, so that differences in government pricing policies account for much of the differences in end-user prices. The price differences are significant: a recent price survey showed that the retail prices of four petroleum products in 65 developing countries in January 2012 varied by two orders of magnitude, with the lowest prices found predictably mostly in major net oil exporting countries (Kojima 2012). As in the years immediately following rising oil prices in 2004, which saw suspension of pricing policies linked to world price movements (Baig et al. 2007), some governments responded to high oil prices in 2011 and 2012 by freezing prices.

Many interlinked developments have affected costs, availability, and prices paid for petroleum products in recent years:

- Recent high oil prices have exacerbated the poor financial states of the national oil companies in some countries with price subsidies, leading to the inability to procure petroleum products on time, acute fuel shortages, and high black market prices.
- Fuel price subsidies in the face of high world prices have increased incentives for diversion to black markets and smuggling to neighboring countries. Both smuggling and black marketing can push up domestic prices markedly above the official prices.
- Power shortages in a number of countries have increased demand for diesel for emergency power generation, causing diesel fuel shortages in some markets and higher diesel prices. A growing cause of power shortage is declining rainfall, leading to falling hydropower generation in East Africa and elsewhere.
- Piracy in the Gulf of Aden and the Indian Ocean has increased insurance costs, led to shipping delays, and at times caused fuel shortages in East Africa.
- The challenges to the authorities mounted by citizens across the Middle East and North Africa since 2010 have stalled and sometimes reversed petroleum price reforms in several countries against the backdrop of declining perceived state legitimacy.

This paper looks at various ways by which governments in developing countries have tried to deal with oil price volatility on the world market in recent years. The paper examines, from the point of view of consumers, issues related to oil prices in the downstream petroleum sector and other sectors where oil is an important input. It does not consider macro-level policies (such as monetary or exchange rate policy) or the impact of oil price changes on the macroeconomic performance of countries, nor does it discuss management of the windfall income by large oil exporters and the long-term economic consequences of revenue management. The paper is part of a larger on-going study assessing the implications of high oil prices and oil price volatility on fuel use, the downstream petroleum sector, and household fuel consumption in developing countries, and follows four previous publications (Bacon and Kojima 2006, 2008; Kojima 2009, 2012). In addition to fuel pricing policy, other coping mechanisms covered include fuel conservation programs; energy diversification; pressure on oil companies to accept lower profits or even losses; negotiation on prices or payment terms with governments of oil-exporting countries; increasing strategic and commercial reserves; hedging; assistance to households; and assistance to large petroleum product users such as transport companies, farmers, and fishermen.

The German development agency, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), periodically provides a list of papers on policy responses (GIZ 2011).

GIZ conducts a global survey of gasoline and diesel prices in November every other year, the most recent having been completed in November 2012. It is also setting up a database of fuel pricing policy fact sheets, currently covering 136 countries and regions (Energypedia 2013). GIZ recently issued a sourcebook for policymakers on how to increase the energy efficiency of urban transport, one outcome of which would be a reduction in fuel consumption (GIZ 2012). Yépez-García and Dana (2012) reviewed how the power sector in oil-importing countries in Latin America and the Caribbean had handled exposure to oil price risk and propose a menu of options that include hedging, diversification from oil, energy efficiency improvement, and regional integration. Given the recent oil price levels, many reports on fuel price subsidies have been issued. They include a joint report by four international organizations on fossil fuel subsidies (IEA et al. 2011), various reports including case studies of fossil fuel subsidies published by the Global Subsidies Initiative (GSI), evidence on energy subsidies in developing countries (Vagliasindi 2012 and 2013), and papers by the staff of the International Monetary Fund (IMF), including IMF (2013a, 2013b), Arze del Granado, Coady, and Gillingham (2012), Coady, Flamini, and Antonio (2012), Guillaume, Zytek, and Farzin (2011), and Coady et al. (2010).

This paper complements the above work by including more recent developments, the impact of interlinkages among different sectors on supply and prices, the impact of government policies on supply conditions, and unintended consequences of government policies. It also includes two specific mitigation policies to reduce demand for petroleum products: diversification and energy efficiency improvement. It addresses gasoline, diesel, kerosene, and liquefied petroleum gas (LPG), the last of which is widely used for cooking and heating in many countries and less covered in other studies. The paper provides the policy context for a recently published study on vulnerability to oil price risks and domestic retail price adjustments (Kojima 2012) and covers the same 65 developing countries (Table 1).

Table 1: Characteristics of study countries

Feature	Number of countries
Income category	16 low income, 24 lower-middle income, and 25 upper-middle income
Region	9 in East Asia and Pacific, 4 in Europe and Central Asia, 17 in Latin America and the Caribbean, 8 in Middle East and North Africa, 5 in South Asia, and 22 in Sub-Saharan Africa
Status of domestic refining industry	46 with domestic refineries
Net oil export status	18 net oil exporters in 2010
Reliance on oil-based power generation	32 relying on petroleum products for 20% or more of power generated in 2010

Sources: Kojima 2012; IEA 2012b; *Oil and Gas Journal* 2012.

This paper uses the numerical notation adopted in the United States. A billion is a thousand million (10^9) and a trillion is a million million (10^{12}), in contrast to other parts of the world where a billion is a million million and a trillion is 10^{18}. Exchange rates used to convert from local currency units to U.S. dollars are those prevailing at the time the prices, costs, or subsidies are quoted. Where the period covers several months or years, the average exchange rate is computed first to convert the amount into local currency. The same amount in local currency is likely to be different in U.S. dollars at different points in time.

The experience of the 65 countries is presented as case studies in Appendices 1 and 2. Table A1.1 describes the pricing policies, subsidies and their consequences, demand and supply conditions, assistance to consumers, and in some cases hedging, strategic stockholding, and other

mitigation responses. Table A2.1 summarizes energy diversification policies, including liquid biofuels and compressed natural gas (CNG) to substitute gasoline and diesel, and energy conservation measures.

The main report draws upon these two comprehensive tables to highlight important developments and distill lessons. The paper begins with different approaches to setting retail prices, followed by different forms of government interventions to lower prices and their effects on supply and demand, conservation and diversification measures to reduce oil consumption, and finally steps to mitigate the adverse effects of high oil prices.

2. Approaches to Fuel Pricing

This study of 65 developing countries has found an array of pricing policies and mechanisms. Most study countries control prices, although the nature of control varies widely.

2.1 Retail prices

The retail prices for gasoline, diesel, and kerosene converted to U.S. dollars per liter, and LPG in U.S. dollars per kilogram (kg) in July 2012 are shown in Figures A3.1–A3.4 in Appendix 3. Table 2 provides summary statistics. The wide ranges of prices for the four fuels illustrate large differences in subsidies, taxes, and costs. Turkey had the highest retail prices for gasoline, diesel, and kerosene, and the third highest for LPG, in part because of high taxes—making up 49 percent of the retail price for gasoline, 39 percent for diesel, and 32 percent for LPG for residential consumers (IEA 2012a). Uruguay closely followed Turkey for gasoline and diesel. Aside from Turkey and Uruguay, all other countries in the top five were in Sub-Saharan Africa, except Cambodia which ranked fifth for kerosene. Malawi had an exceptionally high unit price of LPG, 60 percent higher than the second highest price found in Uganda. At the opposite end of the spectrum, the lowest prices were found in República Bolivariana de Venezuela and Egypt, closely followed by the Islamic Republic of Iran and Iraq for gasoline and diesel, Indonesia and India for kerosene, and Iraq and Bolivia for LPG. República Bolivariana de Venezuela stands out as having petroleum product prices far lower than in any other country, with the exception of LPG, for which the official price in Egypt was even lower.

Table 2: Summary statistics on retail prices in July 2012

Statistic	Gasoline	Diesel	Kerosene	LPG
Minimum price, US$/liter or US$/kg	0.02	0.01	0.18	0.04
Maximum price, US$/liter or US$/kg	2.20	1.97	1.60	4.74
Average price, US$/liter or US$/kg	1.13	1.01	0.86	1.17
Median price, US$/liter or US$/kg	1.17	1.05	0.93	0.99
Total number of countries	64	64	44	52

Sources: See Tables A2.1 in Kojima (2012) and sources under "information" in Table A1.1.
Note: Prices are in US$/liter for gasoline, diesel, and kerosene and US$/ kg for LPG. Prices available in Jamaica are tax-inclusive ex-refinery prices, and distribution margins can be significant. They are used for pass-through calculations but not for computing statistics on retail prices.

The prices in July 2012 were compared to those in June 2009 to compute the degree of pass through of rises in international prices to retail prices in the domestic market. Appendix 3 describes the methodology and tabulates the pass-through coefficients in individual countries. Table 3 summarizes the results. Several countries had pass-through coefficients that were less than zero, not because they lowered prices, but because their currencies depreciated against the

U.S. dollar. About half of the countries passed through more than three-quarters of world price increases to consumers. It is worth noting that the world prices of LPG in July 2012 were markedly low: they were the lowest in two years except in the United States, where the prices in June 2012 were lower. The average FOB price of LPG in 2012 was more than double the price in July in North America and about 50 percent higher in the rest of the world. Despite the low world LPG prices, two-fifths of the countries had negative pass-through coefficients, and half had pass-through coefficients smaller than 75 percent. More detailed discussion on pass-through coefficients and the limitations of the methodology employed can be found in Kojima (2012).

Table 3: Summary statistics on pass-through coefficients between January 2009 and July 2012

Statistic	Gasoline	Diesel	Kerosene	LPG
Average pass-through, %	73	75	63	96
Median pass-through, %	79	84	82	76
# of countries with pass-through less than 0%	7	11	8	10
# of countries with pass-through between 0 and 75%	24	17	12	15
# of countries with pass-through greater than 75%	34	37	24	25
# of countries with pass-through greater than 100%	26	26	12	21
Total number of countries	65	65	44	50

Sources: Author's calculations based on sources cited in Tables A2.1 and A2.3 in Kojima (2012) and sources under "information" in Table A1.1.

2.2 Considerations for price control

In countries with price controls, the first question is whether the government is setting price ceilings or price levels, and where along the supply chain they should be set (ex-refinery, landed cost, wholesale, ex-depot, retail). The prices or price ceilings can be the same throughout the country or vary by location (Table 4).

Table 4: Types of price control

Mechanism	Advantages	Potential problems
Price ceilings	There is scope for price competition. Divergence from ceilings suggests emerging competition. There is less need to get the prices "exactly right" than controlling price levels.	If price ceilings are too high, there is little incentive to improve efficiency. If they are too low, fuel business may cease to be financially viable.
Price levels	Greater control.	There is no scope for price competition. If price levels are set too high, there is little incentive to improve efficiency, and if set too low, fuel business may cease to be financially viable.
Control at retail	Easy for consumers to check compliance.	More assumptions are needed to calculate prices than controlling retail prices. Compliance is more difficult to monitor because the number of points to be checked is the largest at retail.
Control at wholesale or elsewhere upstream of retail	More transparent because of greater correlation with benchmark international prices, easier to monitor compliance because there are fewer points of sale.	If competition is inadequate, margins could grow and retail prices could be markedly higher than otherwise. If upstream prices are set too low, oil companies may try to recover losses by increasing retail prices to compensate.
Uniform prices	Sense of national unity: one country, one price. Easy for consumers to check compliance.	Freight equalization introduces additional scope for inefficiency as well as corruption. The size of cross-subsidization could become very large, to

Mechanism	Advantages	Potential problems
		the point of making the cost of compliance unacceptably high.
Pricing by location	Costs are better reflected.	Consumers in remote areas may compare themselves to those in major cities and feel a sense of injustice. If costs of serving remote areas are too high, some remote areas may not be served.

Source: Author.

Price ceilings allow price competition. They also give an indication of the degree of competition in the market: if all prices are at the ceiling, there is little evidence of competition, but divergence from the ceiling may be a sign of emerging competition. If price ceilings are set too low, however, not only will all prices be at the ceiling, marketing petroleum products may not even be financially viable. If price ceilings are comfortably high to allow competition but all prices are at the ceiling, inefficient oil companies can continue to operate while efficient ones are not passing efficiency gains to consumers and retaining large profits instead. Setting price levels by definition eliminates scope for price competition. The problem of prices being set too high or too low applies equally to controlling price levels.

Many governments control retail prices, but some control prices at wholesale or ex-refinery. In the extreme, where retail prices are controlled, wholesale prices may be higher than retail prices, undermining the financial viability of the retail business. An example is Kazakhstan where wholesale prices, which are not controlled and determined primarily by import prices, have matched or exceeded retail price ceilings set by the government in recent years; in response, the Kazakh oil ministry signed a memorandum with oil companies to limit wholesale prices to a maximum of 87 percent of the maximum retail price in August 2011 (*Nefte Compass* 2011). In rare cases, prices are controlled at several points in the supply chain, as in El Salvador, which sets maximum LPG prices at four points along the supply chain every month.

Even when based on clearly defined formulas, computation of controlled prices is not easy. Although free-on-board (FOB) prices relevant to a given market are externally set, import prices contain elements specific to the market and depend on a number of factors that could lead to significant variations for the same FOB price, such as the dates of landing and foreign exchange acquisition. The agency in charge of price control needs to estimate costs of storage and transport, and what would be a reasonable margin along the supply chain. In a deregulated market, profits are not guaranteed, but a cost-plus formula is often structured to assure a profit margin at every stage along the supply chain, at least in theory. All too often, however, whether price ceilings or price levels, they tend to be set too low in times of rising or high oil prices, discouraging market entry and investment in the downstream sector, and sometimes even making compliance with safety, health, environment, and technical standards difficult.

Dozens of governments in this study set uniform prices or price ceilings for at least one petroleum product, among other considerations to give a sense of equity. Freight equalization, however, provides additional scope for inefficiency as well as corruption—including claims of fuel delivery to areas far from import terminals or refineries, when they were actually sold in urban markets near these supply points.

Absent adequate competition, price deregulation may result in high prices paid by consumers. This is one reason some governments adopt a formula-based automatic price adjustment mechanism as an interim step before full deregulation. In small markets, governments

may consider it unlikely that full competition would ever emerge and may continue to set price ceilings as a permanent means of consumer protection. If current subsidized prices are low, overnight adoption of a formula-based adjustment mechanism may entail a sharp price increase initially. To avoid such price shocks, intermediate smaller price increases may be necessary. Options include regular, steady price adjustments until cost-recovery levels are reached; gradually reducing the total subsidy bill each year and adjusting prices, volume, or both accordingly; first eliminating subsidies that benefit the rich disproportionately with little economy-wide benefits, such as high-octane gasoline; and rationing subsidized fuel and charging market prices outside the quota.

More generally, where prices are controlled, one of the most important tasks for governments is establishing and implementing criteria for adjusting prices. Ad hoc pricing does not have clearly defined criteria. However, one unofficial trigger is the size of the total subsidy: governments start considering price increases seriously when the total subsidy starts exceeding the budget allocation or else what might be considered a "reasonable" share of the budget. Rule-based pricing requires decisions on the frequency of adjustments, selection of benchmark fuels, the averaging period for benchmark prices, and triggers for price adjustments. The longer the averaging period, the smoother the prices, but also the greater will be the probability of accumulating large deficits (Bacon and Kojima 2008, chapter 7). Triggers may be any deviation from the previous international benchmark price or a deviation exceeding a threshold amount. Where a price stabilization fund exists, criteria are needed to determine when to withdraw money from or deposit money into the fund.

Table 5 provides a typology of different price adjustment mechanisms with their strengths and weaknesses. Country-specific details are provided in Table A1.1 in Appendix 1.

Table 5: Typology of price adjustment mechanisms

Mechanism	Advantages	Potential problems
Steadily increase price at regular time intervals until cost-recovery levels are reached: By a pre-determined monetary amount (Thailand for LPG for vehicles and industry) By percentage (Mexico)	Each price increase is small and predictable	Could lose political commitment over time, and invite resentment if world prices are falling. If the increases are regular but small compared to world price increases, subsidies could continue for years (as in Mexico).
Deregulate prices for higher-grade fuels (Egypt, Indonesia, Malaysia)	End subsidies to the rich, who are the main consumers of higher-grade fuels.	Fuel switching by users from higher-grade to cheaper fuel, adulteration of higher-grade fuels with subsidized fuels
Ration heavily subsidized fuels, charge higher prices outside quota (kerosene and LPG in India, gasoline and diesel in Iran)	Limit subsidies	Diversion of rationed fuels to black markets or smuggling
Set different prices depending on user category (Costa Rica, India, Indonesia, Iran, Malaysia, Nepal, Thailand)	Limit subsidies	Selling the same product at different prices invites corruption, starting with diversion to consumers who are not entitled to the subsidized fuel (essentially every country)
Shift subsidy from one product to another (kerosene-to-LPG conversion in Indonesia)	Subsidy for one product is completely eliminated	Could lead to a growing subsidy on the product to which the subsidy is shifted (as in Indonesia)

Mechanism	Advantages	Potential problems
Introduce a temporary stabilization fund (Chile, Peru), temporary tax reduction (diesel in Thailand)	Deal with large price shocks while limiting the period of artificially low prices	Political pressure to repeatedly extend the phaseout date (Chile, Peru, Thailand), resulting in a growing budgetary outlay
Switch to rule-based pricing when world prices are low (China in Jan 2009)	No large price increases needed at the time of switching	When world prices begin to rise, the political will to adhere to rule-based pricing may weaken (as in China); a period of very low prices may not return in the future for governments to follow this approach
Adjust when world prices change significantly and subsidies become too costly to bear (Bolivia, Islamic Republic of Iran, Jordan, gasoline in Nigeria)	Stable prices between changes	Price changes are large when adjustments are finally made, adjustments almost always mean price increases, tendency to delay price increases, lack of predictability, possibility of growing subsidies, politicization of price increases, hoarding in response to rumors of imminent price increases and leading to fuel shortages
Adjust when world prices change by more than ±X% (Malawi, Togo)	Stability within the price band	If X is relatively large, potentially large changes when adjustments are made; possibility of losses exceeding savings within the price band
Float prices within a price band, smooth changes outside (Chile for small and medium consumers, Peru)	Avoid large price changes	Can lead to large subsidies unless price bands are frequently adjusted
Set different rules depending on world oil price (China)	Limit subsidies to times of high world prices	Unless price bands are adjusted from time to time, if world prices remain high, subsidies could grow
Agree on the total subsidy envelope for the fiscal year and adjust prices, volume, or both accordingly	Limit the total subsidy bill.	Politically difficult to raise prices when money runs out (Indonesia)
Adjust based on world prices averaged over past 3–6 months (no example in this study)	Prices change gradually	World and domestic prices could be moving in the opposite direction, inviting political backlash; could lead to large losses if world prices are rising over time.
Adjust regularly based on world prices averaged over 1–4 weeks (Dominican Republic, South Africa)	Tracking world prices well	World price volatility quickly transmitted.
Deregulate, subject to anti-trust regulations (Philippines, Turkey)	Market based, no subsidies	Downstream petroleum sector needs to be competitive or else consumers may be charged high prices; world price volatility immediately transmitted

Source: Author and Table A1.1.

3. Government Interventions to Influence Prices and Their Consequences

Many governments in developing countries are inclined to intervene with price-based policies when world oil prices rise appreciably. In order to limit the drain on the government budget, price-based policies may be accompanied by quantity-based policies in the form of rationing subsidized fuels. Indirect measures to influence prices include export restrictions and pressure brought upon oil suppliers. The end results have not always been lower prices enjoyed by consumers or lower vulnerability to oil price increases. These policy responses and their effects are briefly discussed below.

3.1 Pricing, tax, and export policies

A doubling of oil prices since 2005 has led to calls on governments to intervene. Recent oil price surges and collapses have intensified suspicions about "rockets and feathers"—when oil prices rise, retail prices rise quickly like a rocket, but when oil prices fall, retail prices fall slowly like a feather (Bacon and Kojima 2010b)—and prompted some governments to tighten price control or launch investigations into price collusions.

Price control

Price freezes for months or even years at a time continue to be common in a large number of countries. Predictably, nearly all have led to price subsidies, some amounting to a few percentage points of GDP. Countries that have frozen prices of gasoline, diesel, or both for several months or longer in the past three years include Angola, Bangladesh, Bolivia, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Ghana, India, Indonesia, the Islamic Republic of Iran, Iraq, Jordan, Kazakhstan, Madagascar, Malawi, Malaysia, Morocco, Mozambique, Nepal, Niger, Nigeria, the Russian Federation, Rwanda, Sri Lanka, Syria, República Bolivariana de Venezuela, and the Republic of Yemen. Among them, Malawi is rare in that it suspended automatic price adjustments in 2004 but resumed them in June 2012. Jordan also resumed monthly price adjustments in December 2012 after suspending them at the end of 2010.

No price freeze is permanent—although prices in República Bolivariana de Venezuela have not changed since 1999—and when prices are finally adjusted, the increases can be large, as in Bolivia and the Islamic Republic of Iran in December 2010 and Nigeria in January 2012. Such price shocks can invite a backlash. In the face of widespread popular protests, the government of Bolivia reversed the price increases completely after five days. In 2012, the Iranian parliament amended the Targeted Subsidies Reform Act, ratified in March 2010, to limit future price increases by changing one stipulation in the act: the original act required domestic prices to be raised to "no less than 90 percent" of Arab Gulf FOB prices, but this clause was rewritten to read "no more than 90 percent," thereby turning a floor into a ceiling and effectively entrenching a permanent subsidy (Hassanzadeh 2012a). Nevertheless, among the three countries, the Iranian price increases of December 2010 were the only ones that were not rolled back. Nigeria deregulated the price of gasoline in January 2012, causing retail prices to more than double. Immediately after the price increase, trade unions staged an eight-day strike, estimated to have cost the economy more than US$1 billion (Reuters 2012a). The government backed down and lowered the gasoline price to ₦97 (US$0.61) a liter within two weeks. Despite the partial roll-back of the initial price increase, ₦97 still represented a 49-percent price increase and the price of gasoline in Nigeria is higher than the higher of the two prices of regular gasoline in the Islamic Republic of Iran.

Some governments set target maximum prices informally and adjust taxes to keep fuel prices below the maximum. Two examples are the Lao People's Democratic Republic and Thailand, which have attempted to keep the price of diesel below 10,000 kip (US$1.25) and 30 baht (US$1) a liter, respectively.

Some previously deregulated markets have re-introduced a measure of price control. Concerned that oil companies may be over-charging, the government of Kenya in December 2010 began setting maximum retail prices every month for gasoline, diesel, and kerosene by location. Similarly, Tanzania in 2009 began setting maximum retail prices for gasoline, diesel, and kerosene by location and one maximum wholesale price across the country for each fuel.

Oil funds for smoothing or lowering prices

Colombia, Malawi, Morocco, Nigeria, Peru, Thailand, and Vietnam manage oil funds for lowering prices in times of high world prices. Ghana's ex-refinery differential also operates like a price stabilization fund, and Argentina has a fund for LPG. The funds in Malawi and Peru have clear rules for transferring money to and from the funds, while others, such as the one in Colombia, have no rules (Cárdenas Valero 2010).

Price stabilization funds are supposed to be self-financing over time. The government reduces domestic prices when world prices are higher than some ceiling threshold, and maintains domestic prices at the floor when world prices are below a predetermined floor threshold. The costs of support in periods of high world prices are meant to be balanced against additional receipts in times of low world prices. In practice, all of the funds in the study countries have receive budgetary transfers, or, in the case of Thailand, have had to borrow heavily commercially. The funds in Peru and Colombia are two examples of budgetary transfers. The government of Peru deregulated the sector in 2004, but set up a fund for an initial period of 120 days in May 2004, and has not been able to retire the fund since. Budgetary transfers to the fund between its inception and the end of 2011 totaled US$2.5 billion (Central Reserve Bank of Peru 2012 and earlier notes). The fund in Colombia began operating in 2008 with an initial deposit of about US$170 million. By the end of 2011, the deficit had grown to 2.35 trillion pesos, or US$1.2 billion (*Portafolio* 2012).

The fund that seems to have required the greatest budgetary transfers is the Petroleum Support Fund in Nigeria. The fund was established in January 2006 to stabilize the domestic fuel prices. With the Central Bank of Nigeria as the custodian of the fund, the fund follows the principles of under-recoveries to be reimbursed and over-recoveries to be paid into the fund (PPPRA 2009). The fuel subsidy subsidized from the fund and ultimately by the government budget increased six-fold between 2006 and 2011 and surpassed US$11 billion in 2011 (Nigeria 2012).

Price subsidies and reductions in taxes and other charges

About two-thirds of the study countries have kept domestic prices below market-clearing levels for one or more fuels in the past three years, subsidizing consumers. The government paid for the subsidy in every case through budgetary transfers, tax expenditures, or lower corporate tax revenues on account of financial losses suffered by oil companies. Subsidies or cumulative arrears owed to state-owned refineries in recent years have risen to several percentage points of GDP in countries such as Angola, Bolivia, Cameroon, Indonesia, Jordan, Malaysia, Morocco, Nigeria, and the Republic of Yemen. Although not as large as a percentage of GDP, the

government's share of fuel subsidies in India has also been considerable. Once the additional burden-sharing by oil and gas companies are included, the combined sum amounts to about 2 percent of GDP.

Universal price subsidies are common, as are tiered prices by consumer category. Subsidized fuels may also be rationed. Setting different prices by end use is most common for LPG, where the distinction may be between automotive LPG and LPG sold in small cylinders for household use, and between LPG sold in small cylinders (typically smaller than 15 kg but as large as 48 kg in Thailand) for residential consumers and LPG sold in large cylinders or in bulk for other consumers. The differences in unit prices have been as large as 280 percent favoring LPG sold in small cylinders in India, 220 percent in Tunisia, 175 percent in Indonesia, and 170 percent in Thailand. In deregulated markets, unit prices decline with increasing cylinder size, because of large economies of scale in bottling and distributing LPG (Kojima 2011, 42−44).

Price differentiation by use for gasoline, diesel, and kerosene also exists. Lower-priced diesel tends to be reserved for public transport, agriculture, and fisheries, and lower-priced gasoline for public transport and fisheries. These discounted fuels are typically rationed to discourage diversion. Lower-priced kerosene is almost always for households. Examples include subsidized kerosene for household use in India, two prices for the same grade of gasoline and diesel in the Islamic Republic of Iran, diesel for fishing boats in Malaysia, diesel for farmers in Kazakhstan and Russia, diesel for passenger transport in Peru, diesel for buses in Sri Lanka, and diesel for those consuming less than 4,000 liters a week in Nepal. An interesting case is the Green Fuel project in Thailand, which state-owned PTT (formerly Petroleum Authority of Thailand) launched in 2002 in response to fuel smuggling into the country. The project provides tax-free diesel, dyed green, to fishing boats to reduce incentives to use smuggled fuel. The Excise Department in 2010 stated that boats using green fuel were required to be fitted with a tracking device using a global-positioning system to monitor their whereabouts (Thai News Service 2010b).

Another way of lowering prices is to reduce taxes and fees levied. Tax cuts tend to be ad hoc, except in Chile which has formalized rules for adjusting the specific fuel tax to smooth end-user prices for small and medium-size consumers. Brazil, China, the Dominican Republic, El Salvador, Kenya, the Philippines, Rwanda, Senegal, Thailand, and Vietnam have all reduced taxes to lower end-user prices.

Several reasons are cited for providing fuel price subsidies, and helping the poor is always among them. In practice, universal price subsidies—even if they are available only to households—have been shown time and again to benefit the rich disproportionately. For example, studies of petroleum product subsidies in 13 countries consisting of eight in Sub-Saharan Africa, three in Latin America, Bangladesh, and Jordan show that, on average, the top two expenditure quintiles captured more than 60 percent of universal price subsidies (Coady et al. 2010). When diversion of subsidized fuels set aside for households—such as kerosene and LPG—is taken into account, petroleum product price subsidies become even more regressive, although when confined to household consumption only, kerosene subsidies have been found to be least regressive (Bacon and Kojima 2010a, 75–79; Kojima 2011, 28–30).

Subsidies borne by fuel suppliers

In most countries with fuel subsidies, fuel suppliers bear some costs because reimbursements are seldom delivered immediately, or even at all, and fuel price increases are

frequently delayed. Oil companies may also be asked explicitly to carry some of the costs of subsidizing consumers. Under such circumstances, a vertically integrated oil company can use upstream profits to cross-subsidize downstream losses. Companies such as Shell Argentina and Esso Petrolera Argentina that operate only in the downstream segment have no upstream profits to cross-subsidize losses and face greater difficulties.

Some governments have negotiated price discounts with oil companies for certain consumers. The government of the Philippines in 2003 forged an agreement with oil companies to offer a discount on the price of diesel sold to public transport companies (Bacon and Kojima 2006); the discount program is continuing today. In Russia, the government over the last several years has "recommended" that oil companies sell diesel at a discount to farmers twice a year. For the first agricultural season of 2012, the price discount offered was 30 percent, up from 10 percent in 2010 and 2011 (Platts 2012c).

Through "voluntary" price agreements, the government of Argentina for years has put constant pressure on oil companies not to increase prices. Earlier examples of the steps taken by the government are described in Bacon and Kojima (2006, 191–195) and Kojima (2009, 35). Since then, similar actions by the government have continued. In August 2010, the government ordered oil companies to roll back price increases and again threatened to apply the 1974 Law of Supply—which allows the imposition of fines or imprisonment of company executives in the case of shortages of goods, including fuels—following which prices remained frozen until mid-December (IHS 2010e, Reuters 2010c). In January 2012, the government accused oil companies of over-charging cargo transporters, launched an investigation, and later in the month ordered the companies to lower diesel prices for both cargo and passenger transport companies (*Platts Oilgram News* 2012b).

Some national oil companies have paid high prices to subsidize consumers, leading to large losses. On account of price freezes to help combat inflation, Petrobras in Brazil has suffered large refining losses; most recently, its refining, transportation, and marketing division reported an annual loss of US$17.5 billion in calendar 2012 (Petrobras 2013). The recent decline in the company's financial performance, including its first quarterly loss in 13 years posted in August 2012, has been blamed in large part on low domestic fuel prices (*Economist* 2012). In China, despite the new pricing mechanism introduced in January 2009, price adjustments have not adhered strictly to the formula, causing large losses to the refining industry. PetroChina and Sinopec, two largest refiners in the country, reportedly suffered combined losses of 96 billion yuan (US$15 billion) in 2011 and 42 billion yuan (US$6.6 billion) in the first half of 2012 (*Wall Street Journal* 2012; *Platts Oilgram News* 2012c; Xinhua News Agency 2012e). India's three state-owned oil companies supplying subsidized fuels reported combined losses in excess of Rs 405 billion (US$7.5 billion) in the first three months of fiscal 2012/13 starting in April (Reuters 2012d).

Export restrictions

Export restrictions reduce domestic prices, with negative consequences for the oil companies and for neighboring countries to which the petroleum products are exported. Argentina, Bolivia, China, Kazakhstan, and Russia are among the countries that have high export taxes, low domestic crude oil prices, or have banned exports. Export bans are prompted by fuel shortages, which in turn arise mostly from artificially low domestic prices.

In the face of serious fuel shortages, Russia increased export taxes on petroleum products steeply in 2011. The export tax on gasoline in May and June 2011 corresponded to nearly US$50 a barrel, effectively acting as a de factor export ban, with serious adverse effects on Kazakhstan, Mongolia, Tajikistan, and other importers from Russia.

Kazakhstan in recent years has banned exports of light petroleum products annually for about six months at a time to deal with fuel shortages during the agricultural season. A temporary ban that began in May 2010, however, has been repeatedly extended to the end of June 2013. China imposed a temporary ban on diesel exports in 2012.

3.2 Impact on supply and demand

Policies intended to help consumers by keeping prices low have had negative consequences on supply in a number of countries. Commercial malpractice—black marketing, diversion to ineligible consumers who are otherwise required to pay higher prices, fuel smuggling, fuel adulteration, and short-selling—and fuel shortages are two of the most common negative outcomes of governments' efforts to keep domestic prices low. In the extreme, low prices have made the downstream oil business not financially viable, retail outlets have run out of petroleum products altogether, or have even shut down. At the same time, artificially low prices have done little to discourage inefficient or nonessential fuel consumption, and large price differences for otherwise similar fuels have distorted consumption patterns.

Lack of essential investment and disinvestment

The combination of total lack of competition due to their monopoly status and negotiating subsidy repayments, capital expenditures, or both with the government has harmed government-owned refineries in the Islamic Republic of Iran, Iraq, Mexico, and Nigeria. As a result, all are major net oil exporters but have had to import some or significant amounts of petroleum products at world prices and sell below costs of supply. One consequence is that refinery rehabilitation and expansion plans have languished for lack of capital, and shortages of fuels at subsidized prices, or even of fuels at any price, have occurred except in Mexico.

In March 2010, it was reported that some 3,500 filling stations in Argentina had closed since 2005 on account of poor profitability (IHS 2010d). In India, the largest private oil company, Reliance Petroleum, closed down all of its 1,432 filling stations in 2008. Earlier, in 2005, Essar Oil had closed all of its 1,250 filling stations (Kojima 2009). Essar has since re-opened its retail outlets.

Fuel shortages

Although not related to pricing policies, events outside the country (such as those in transit countries), events outside the petroleum sector (especially power), or protection provided to inefficient domestic refineries can lead to fuel shortages. Two land-locked countries—Rwanda and Uganda—rely on Kenya as a transit country for fuel supply, and supply disruptions in Kenya are inevitably transmitted to these markets (see Kojima 2009 for earlier examples). Power shortages in Kenya have shut down refinery and oil pipeline operation, leading to fuel shortages in all three countries. Power shortages also increase demand for diesel for backup power generation, and diesel fuel shortages can occur if the demand increase is large enough. In Zambia, where the sole domestic refinery is protected with high import tariffs, unscheduled or

longer-than-planned refinery closures for maintenance and repair have frequently led to fuel shortages.

Fuel shortages are far more common when fuel suppliers cannot fully recover costs with reasonable returns and cut back on fuel acquisition and sales, or when they decide to pursue higher-return opportunities elsewhere, such as exports, diversion, and out-smuggling. Shortages have occurred in many countries with artificially low prices, including Argentina, Bangladesh, Cameroon, China, Egypt, Gabon, Ghana, India, Indonesia, the Islamic Republic of Iran, Iraq, Kazakhstan, Malawi, Mozambique, Nepal, Nigeria, Pakistan, Russia, Senegal, Syria, Togo, and the Republic of Yemen.

In extreme cases, oil companies are no longer able to pay to buy crude oil or petroleum products. In Malawi, by early 2011, black-market fuel prices were reported to be more than double official prices. The finance minister told the parliament that commercial banks did not honor letters of credit on time because foreign exchange was scarce (IHS 2011b). Crippling fuel shortages forced rationing and some drivers resorted to parking overnight at filling stations to secure a place in the queue. In July 2011, 19 people were killed and scores injured when demonstrations broke out throughout the country, protesting shortages of fuel and foreign exchange (*Guardian* 2011a; AFP 2011b). Nepal's sole importer, Nepal Oil Corporation, has had difficulties paying Indian Oil Corporation, prompting the latter to withhold delivery and causing fuel shortages. Senegal experienced a prolonged LPG shortage in early 2009, caused by the inability to pay for imports due to mounting subsidies. The shortage doubled the unofficial price of LPG and also pushed up the price of charcoal, which competes with LPG in that market (IHS 2010g; *Global Post* 2011). By 2011, the Republic of Yemen was no longer able to obtain credit to buy petroleum products on the open market, leading to serious fuel shortages and prompting Saudi Arabia, Oman, and the United Arab Emirates to donate oil (*International Oil Daily* 2011; IHS 2010a).

Even when there is no explicit policy of subsidizing fuel prices, disagreement over controlled prices may lead to shortages. In August 2011 in Tanzania, for example, disagreement over price levels prompted oil marketing companies to stop selling and the government threatened to revoke their licenses. The government increased prices 12 days later (Platts 2011f).

Fuel shortages can invite panic buying and hoarding, worsening the shortages. Even when supplies are adequate, rumors or prospects of imminent price increases may prompt panic buying by consumers while sellers hold back selling. If a pricing mechanism is based on an average over a fixed period of time of benchmark world prices and adhered to strictly, it might be relatively easy to predict when the next round of price increases is likely to occur. The Xinhua News Agency (2012a) has partially blamed hoarding by refiners and traders before price increases for fuel shortages. This behavioral response to the price adjustment mechanism is said to be one of the reasons the government of China is reconsidering the current formula.

Where fuel prices are adjusted infrequently, rumors of a price hike could be even more damaging because the public would fear a large price increase. In January 2012 in Egypt, panicked motorists—forming long lines when rumors about a price increase spread—were blamed for serious fuel shortages (AFP 2012a). Consumers fighting over scarce fuel supplies have led to scuffles, injuries, and even deaths (Egypt Independent 2012a, 2012b).

Fuel shortages can get to the point where some consumer groups start asking governments to remove fuel price subsidies. This occurred in Ghana, where the expansion of the

automotive LPG market and large price subsidies have both been blamed for acute LPG shortages, prompting commercial LPG vehicle drivers to ask the government for subsidy removal so as to ensure reliable supply (All Africa 2011e). Ghana raised the price of LPG by 50 percent in February 2013.

Abuses

Commercial malpractice is one of the most common outcomes of price control that keeps prices artificially low. A news report from Nigeria offers an illustration. The report cites five illegal alternative markets for subsidized kerosene, the price of which has been kept at about one-third of the market price to help poor households with lighting and cooking (All Africa 2011d):

1. Much higher prices of kerosene on the black market
2. Adulteration of diesel with kerosene
3. Diversion of subsidized kerosene for household use to the aviation fuel sector
4. Out-smuggling to neighboring countries
5. Presenting subsidized kerosene as having just been imported to claim the subsidy reimbursement for the second time

Governments around the world have tried chemical markers, color dyes, and tracking of delivery trucks to stem adulteration of diesel with kerosene. Unlike addition of kerosene to gasoline, which can be fairly readily detected by vehicle drivers unless kerosene is added in small quantities, large amounts of kerosene can be added to diesel fuel without immediate detection. In South Africa, where there is a price difference of about US$0.30 a liter between kerosene and diesel, there is a levy charged to diesel for a dye added to kerosene to distinguish it from diesel. Similarly, the Petroleum (Amendment) Rules of 2000 in Kenya stipulate that all fuels intended for export and illuminating kerosene for domestic sale be chemically marked. However, color dyes can be removed, effective use of chemical markers requires tests, and all detection procedures require honest and competent inspectors who will not be tempted to overlook violations for informal fees. Perhaps just as important, if financial returns are sufficiently high as to attract organized crime, whistle blowers may even be physically threatened. In India, several murders have been linked to exposure of diversion of subsidized kerosene (*Hindu* 2011; *Hindustan Times* 2011).

Ultimately, as long as the price of kerosene is markedly lower than that of diesel, commercial malpractice will occur. Comparison of kerosene and diesel prices in July 2012 in 44 of the study countries shows that kerosene was much cheaper than diesel in nearly one-third of the countries (Table 6). In Bangladesh, Nepal, Tanzania, and Vietnam, which at one point in time in the past priced kerosene below diesel but have equalized them since, kerosene consumption fell and diesel consumption rose markedly immediately after price equalization, strongly suggesting that cheaper kerosene was indeed being added to diesel.

Table 6: Ratio of retail prices of kerosene to diesel in July 2012

Ratio of kerosene to diesel prices			Number of countries with price ratio in given range			
Minimum	Maximum	Median	<0.5	0.5–0.75	0.75–1.0	≥1.0
0.30	1.22	0.85	3	10	18	13

Source: Figure A3.5 in Appendix 3.

Fuel smuggling is a serious problem in a number of countries. Notable examples of countries battling out-smuggling include Angola, Bolivia, Egypt, Ghana, Indonesia, the Islamic

Republic of Iran, Iraq, Malaysia, Nigeria, Reública Bolivariana de Venezuela, Vietnam, and the Republic of Yemen. As with diversion and adulteration, financial incentives for smuggling are so powerful that it is difficult to control it. Steps to curb it include raising prices substantially along the borders in the Islamic Republic of Iran and República Bolivariana de Venezuela, provision of subsidized petroleum products by República Bolivariana de Venezuela to Colombia, expropriation of retail outlets accused of smuggling in República Bolivariana de Venezuela, and restrictions on fuel purchase along the borders in Malaysia.

A related problem is fuel tourism, where drivers in other countries cross the border to refuel to exploit differences in taxes and subsidies. In Argentina, filling stations near the Brazilian border list two different prices for gasoline, one for cars with Argentinian license plates and another one for foreign plates, to restrict Brazilian drivers from buying cheaper fuel in Argentina (Energypedia). Since 2009, Bolivia has been charging international prices, set every quarter, to vehicles with foreign license plates. Malaysia's restrictions on fuel purchase—a maximum of three quarters of a tank for refill for Singaporean license plates and 20 liters within a 50-kilometer radius for other foreign license plates—also target fuel tourists.

At the opposite end of the spectrum are those markets into which fuels are smuggled. In 2009, citing a study, Petron Corporation in the Philippines said that fuel smugglers were controlling one-third of the petroleum market, resulting in an annual government revenue loss of ₱30–35 billion (US$630–730 million) (HIS 2009). A country surrounded by lower-price neighbors would find it particularly challenging to reform price subsidies, which would increase the price differences further and enhance the incentives for in-smuggling, as happened in Togo in 2009 (IMF 2010). Turkey requires all fuel importers and distributors to add a fixed proportion of a national marker to gasoline and diesel to discourage in-smuggling and adulteration (Platts 2011d).

Selling the same product at different prices provides another avenue for making illegal gains. If the price difference is sufficiently large, it may even be more profitable to concentrate on illegal diversion than on the beneficiaries' main line of business. This is particularly problematic in fisheries where fishing boats are suited to transporting large quantities of subsidized fuel. In August 2012, the government of Malaysia announced that, in order to reduce abuses by fishermen receiving subsidized fuel for their boats, a representative of the Malaysian Fisheries Development Authority would in the future verify each catch landed, and those with insufficient catch would no longer be permitted to buy lower-priced fuel (*Borneo Post* 2012). The Philippines abandoned a plan for a fuel subsidy scheme for agriculture and fisheries in May 2011, citing difficulties with beneficiary identification (*Philippine Star* 2011).

Electronic monitoring of subsidized fuel purchase has been proposed as one way of combatting illegal purchase of subsidized petroleum products. This could be designed to enable monitoring of all fuel transactions, including information on the vehicle, the customer, the amount purchased, the time of purchase, and the location. The three state-owned companies in India supplying subsidized fuels are automating transactions to curb commercial malpractice (*Automation World* 2011). Similarly, President Yudhoyono of Indonesia announced in May 2012 that the government was planning to start electronic monitoring of subsidized fuel purchase (*Jakarta Globe* 2012a), although there has been little progress to date.

Diversion of LPG subsidized for household use to the automotive, commercial, and industrial sectors is common. Aside from misuse of subsidy funds, such diversion can pose a serious threat to public safety. LPG cylinders have been known to be chained to cars without

proper installation to serve as fuel tanks. Equally dangerous is siphoning off LPG from small cylinders (reserved for heavily subsidized LPG for household use) to transfer it to larger cylinders, a practice that has been blamed for some of the series of LPG cylinder explosions in Indonesia—responsible for at least 22 deaths—in the early stages of kerosene-to-LPG conversion campaign (*Platts Oilgram News* 2010b; *Jakarta Globe* 2012b).

Claiming subsidy reimbursement also provides scope for corruption. Nigeria's Petroleum Support Fund provides a recent example. A series of government-led investigations were not able to reconcile US$1.5 billion of reimbursements (All Africa 2013).

Publicized cases of large-scale corruption have led to a public perception in some countries that price subsidies are affordable if only they can be implemented efficiently and without corruption. The political debate then becomes focused on how to cut the "fat" out of subsidy delivery, or even how to get rid of corruption in the government in general. The public comes to believe that eliminating corruption will free up funds for subsidies to keep prices of fuel and food low. The scale of corruption also discredits the government's argument that savings from subsidy removal can be used more productively and equitably, as voiced by a former secretary general of a workers' union in Nigeria, "Until they stop corruption, all these ideas will not work… Nigeria is rich, we have money" (*Guardian* 2011b).

Inefficiency and environmental impact

Ironically, price controls can end up protecting inefficient, high-cost suppliers of petroleum products, resulting in larger subsidy bills when prices are subsidized, and higher prices when subsidies are removed. This is particularly true for refineries. Globally, tightening fuel specifications and a shift away from heavier fractions to white products (gasoline, kerosene, and diesel) have resulted in economies of scale being critically important. In response, deregulated and competitive markets have seen consolidation and closure of small refineries (World Bank 2008a and 2008b). The trend in the United States is informative. In 1982, the *Oil and Gas Journal*'s "Worldwide Refining Survey" found 301 refineries in the country; by January 2013, the number had declined to 125, with an average size of 145,100 barrels per day (bpd). In the intervening years, 176 refineries—more than half of the refineries that existed in 1982—had been shut down and replaced by fewer, much larger refineries through expansion of existing refineries. Globally, the average size of refineries had increased to 135,800 bpd by 2013.

Against this backdrop, to give just two examples, Tunisia and the Dominican Republic have one refinery each of 34,000 bpd with the simplest configuration needed to produce gasoline and other petroleum products. Neither country is landlocked; both are close to major refining centers. If the current policy of strict price control were to be discontinued, exposing both refineries to open competition, it is far from clear that these refineries would be able to continue to operate. In the meantime, the high cost of operating these refineries is ultimately being borne by the government (Tunisia) or consumers (Dominican Republic). Many refineries in Sub-Saharan Africa and other regions are also uncompetitive and high-cost. Essentially all of these refineries have plans to increase capacity and modernize for this reason, but these plans are suffering from years, if not decades, of delay because they cannot attract investment, nor is it clear that it would make sense for refineries with chronic operational inefficiencies to expand.

One consequence of uncompetitive refineries is that fuel quality lags behind the EU or U.S. standards, or even the country's own fuel specifications. For example, in Russia, the inability to meet Euro-3-compliant fuel quality standards which came into effect in January 2011

prompted a number of Russian refineries to curb production or increase exports, contributing to acute gasoline shortages in many regions in early 2011 (*Energy Economist* 2011b). In response, Prime Minister Putin lifted the fuel quality standards on a temporary basis (*Financial Times* 2011) while simultaneously increasing the gasoline export tax sharply. The timeline for fuel quality standards was subsequently postponed for the third time since 2008, delaying the ban on Euro-2-compliant gasoline and diesel until the end of 2012 (*International Oil Daily* 2012b), or a full 13 years after Euro 3 standards came into effect in the European Union. The public pays indirectly through higher health costs arising from exposure to greater vehicular exhaust.

4. Steps to Reduce Oil Consumption

Reducing oil consumption is one means of decreasing vulnerability to high oil prices. Fuel efficiency improvement, reducing nonessential oil use, and diversifying away from petroleum products can all help lower oil consumption. Where petroleum products are used for power generation, and to the extent that power shortages may require diesel power generation to make up for the shortfall, electricity conservation also contributes to decreasing vulnerability. Table A2.1 in Appendix 2 provides detailed information on energy conservation and diversification for each country.

4.1 Conservation

Nearly all governments have energy efficiency improvement and conservation policies, programs, campaigns, or targets. The rigor of implementation, however, varies markedly from country to country.

China's central government sets an ambitious target for reducing energy intensity per unit of GDP every five years and enforces it. Thailand and the Philippines have also been active. Thailand has had energy saving-campaigns for more than two decades. The Philippines has issued a series of administrative orders designed to reduce energy consumption. Many of these measures have been driven by rising energy prices. Prospects of plentiful energy could change the incentive structure. For example, the government of Uruguay approved an energy efficiency improvement program in 2008 and formed a technical group to advise the public sector on the implementation of energy-saving measures, but disbanded the group in 2010 due to plentiful rainfall for hydropower generation (Business News Americas 2010a).

One of the most efficient ways to promote fuel conservation is through price signals: the higher the price, the more financially attractive are fuel-efficient appliances, vehicles, and equipment. High prices also discourage nonessential fuel use, such as nonessential car trips. The pricing policies of many study countries militate against this approach. In República Bolivariana de Venezuela, for example, the government has launched energy conservation campaigns, but sharply falling prices of petroleum products and electricity in real terms have presented serious barriers to such efforts.

The Department of Energy in the Philippines has been promoting automotive fuel conservation for more than a decade. There is a vehicle-use reduction program as part of national energy efficiency and conservation efforts. The department's Web site posts fuel-saving driving habits for awareness-raising. There are also initiatives by oil companies to help drivers conserve automotive fuel. Total Jordan in June 2011 launched a program to help customers reduce fuel consumption by checking tires and pumping them if necessary to ensure that they are properly inflated, checking the engine oil level, and offering advice on how to reduce fuel consumption,

all free of charge (Trade Arabia 2011). Optimal tire inflation alone can reduce fuel consumption significantly (IEA 2005). Shell has been conducting a Shell FuelSave campaign for some time. The goal of its Target One Million program under the campaign is to help one million motorists around the world drive more efficiently, and the Shell FuelSave Challenge shows drivers what practical steps can help reduce fuel consumption (Shell 2012). As part of the campaign, Shell in 2007, 2009, and 2010 surveyed thousands of drivers in Asia and Europe about their awareness of how driving habits affect fuel economy. The surveys found that drivers in developing countries in Asia were far more aware of, and likely to use, eco-friendly driving habits, and more willing to change their driving habits to save fuel (Shell 2010).

Another, although rarer, approach is to set fuel efficiency standards. China has been tightening vehicle fuel economy standards since 2004, and India is in the process of establishing them.

Over the medium to long term, fuel conservation should include increasing the transport system efficiency by reducing or avoiding travel or the need to travel and shifting to more efficient travel modes. Urban planning—management of the spatial organization of cities for efficient allocation of urban infrastructure and land use—can encourage a city structure that would minimize travel. Shifting from private motorized trips to efficient, clean, and attractive public transport and from road to rail can substantially reduce fuel use (GIZ 2012).

Far more common than fuel efficiency standards are energy efficiency standards and labeling for electric appliances. Efficient lighting programs have been particularly popular. Argentina, Brazil, Bolivia, China, Ethiopia, the Islamic Republic of Iran, Kazakhstan, Malaysia, Mexico, the Philippines, Russia, and Tajikistan have set a timetable, or drafted legislation, for banning manufacture, imports, or sale of incandescent light bulbs, and numerous others have had voluntary exchange programs to replace incandescent light bulbs with compact fluorescent light bulbs (CFLs). Many of these exchange programs have been government-funded, and CFLs are often distributed free of charge in exchange for incandescent light bulbs, which are subsequently destroyed. It is in the interests of every utility company to shave off peak power consumption to reduce capital expenditure. An initiative of the Ministry of Mines and Energy, the Electricity Control Board, and NamPower in Namibia used NamPower's profits to distribute 900,000 CFLs free of charge in 2007–09 in exchange for five incandescent light bulbs per household (NamPower 2007).

Concerned about power shortages, rising costs of electricity generation from petroleum products, or both, several governments have restricted power consumption. Examples include limiting thermostat settings or restricting the use of air conditioning (Bangladesh, Panama, Sri Lanka, Vietnam), restricting street lighting (Jordan), reducing the number of work days (Pakistan), restricting business hours in certain sectors (Pakistan, Panama), and ordering reductions in government consumption of power (Jordan, Sri Lanka, Vietnam). Brazil, Jordan, and Pakistan have introduced daylight savings time in summer.

Some utilities and governments have introduced incentives for reducing energy consumption, penalties for over-consumption, or both. Hoping to reduce energy imports, the government of Morocco in 2009 signed an agreement with the private sector to reduce energy consumption to reduce energy imports, and offered a 20-percent bonus for reducing electricity consumption by 20 percent (ISI Emerging Markets 2009). As part of "Today for Tomorrow" national energy conservation program in Sri Lanka, the Ceylon Electricity Board announced in April 2012 that it would provide free electricity for a month to 1,000 consumers—selected

through a raffle draw—who reduce consumption by 20 percent, and a 50-percent discount to 5,000 consumers who reduce consumption by 10 percent (Lanka News 2012). Effective July 2011, the government of República Boliviana de Venezuela imposed harsh penalties on those whose consumption was markedly higher than in 2010 (EIU 2011).

Restricting oil use is less prevalent. In Kenya, the budget for the fiscal year beginning in July 2009 restricted the engine size of ministerial cars to 1.8 liters, and warned that vehicles not in compliance would be confiscated by September 2009 (Kenya 2009). The Ministry of Finance and Planning of Sri Lanka in February 2012 issued a circular instructing all government institutions to limit fuel and power consumption as a priority (Sri Lanka News 2012b).

4.2 Diversification

There are several paths to diversification away from oil:

- In the power sector, shift to natural gas, coal, and, above all, renewable forms of electricity such as hydropower, geothermal, solar, wind, and biomass. Fuel costs for hydropower, geothermal, solar, and wind are essentially zero, representing a break from oil prices. World prices of natural gas and coal have been correlated with oil prices, with the exception of U.S. natural gas prices. Between January 2004 and October 2012, correlation coefficients for the spot prices of benchmark crudes (Brent, West Texas Intermediate, and Dubai); FOB coal prices in Australia, South Africa, and Colombia; and natural gas border prices in Japan and Europe ranged from 0.66 (Colombian coal with gas in Japan) to 0.84 (Australian and South African coal with West Texas Intermediate). Coal and natural gas are traded much less than oil on the world market, and these price correlations can be much weaker on many domestic markets. The U.S. natural gas market is a case in point, for which the correlation coefficients with all other fuels are negative.
- For heating water, switch to solar water heaters.
- Substitute gasoline with bioethanol and petroleum diesel with biodiesel.
- Switch from road transport to rail, and from gasoline and diesel to compressed natural gas (CNG). Switching from gasoline to automotive LPG would be less attractive because of strong correlations between oil and LPG prices on the world market. Nevertheless, switching to automotive LPG has been made financially attractive in some markets on account of much lower taxes on LPG, or diversion of subsidized LPG for household use to the automotive market.

More than three-quarters of the study countries have set specific targets for renewable energy, mostly to do with power generation (Table A2.1 in Appendix 2). Of the top ten largest CNG vehicle markets in the world, eight are among the study countries. The top two (the Islamic Republic of Iran and Pakistan) account for more than one-third of the world's total CNG vehicle population, and the top five (top two and Argentina, Brazil, and India) for more than two-thirds. Between 2002 and 2012, the global CNG vehicle population grew at an annual rate of 23 percent (IANGV). Not all markets, however, are enjoying robust growth. Argentina and Pakistan in particular are experiencing serious gas shortages, and the number of CNG vehicles in Argentina has been declining. The governments of Bolivia and the Islamic Republic of Iran have promoted CNG to reduce the consumption of petroleum products, which are heavily subsidized. In contrast, the CNG program in India was launched largely in response to concerns about urban air pollution.

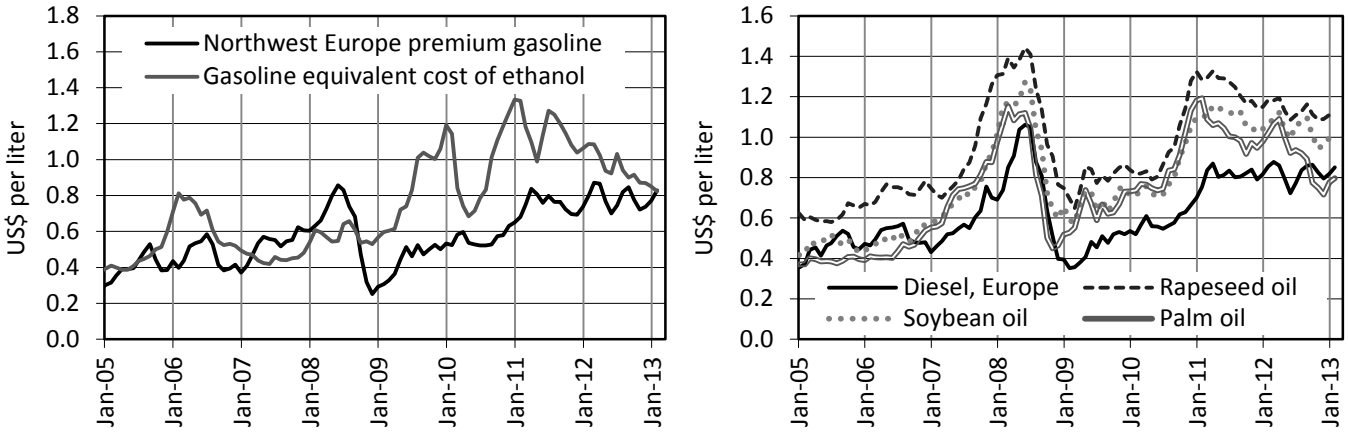
Given that gasoline and diesel account for about one-half of oil consumption in developing countries, substituting them with liquid biofuels is viewed as an attractive option. High oil prices, a desire to increase the share of renewable energy and reduce reliance on oil, and support for agriculture and rural development have been the main drivers for growing interest in liquid biofuels as transportation fuels. Ethanol (as a substitute for gasoline) and biodiesel are the two most common liquid biofuels. Straight plant oils (sunflower, palm, coconut) have been used in limited circumstances for power generation and, in rare cases, automotive use. Ethanol is manufactured from sugarcane—by far the most technically efficient route—and starch crops (maize, wheat, cassava) by fermenting sugar. There are large economies of scale associated with ethanol production. Biodiesel, made from reacting methanol with plant oils (soy, palm, rapeseed, *Jatropha curcas*), is easy to make on a small scale. However, there are economies of scale in making biodiesel that meets tight automotive diesel specifications.

Argentina, Brazil, China, Colombia, Ethiopia, India, Jamaica, Malawi, Malaysia, Pakistan, Peru, the Philippines, Thailand, and Uruguay have been blending ethanol in gasoline, biodiesel in petroleum diesel, or both for some time, and Mozambique began mandating blending in 2012. Brazil has the longest history, having authorized blending of 5 percent ethanol in gasoline (referred to as E5) in 1931 and mandating E5 in 1938. In percentage terms, Brazil also has the highest share of ethanol displacing gasoline in the world. Factors contributing to the success of the ethanol program in Brazil have been described elsewhere (Kojima and Johnson 2005; Kojima, Mitchell, and Ward 2007). Plagued by diesel shortages, Argentina aims to eliminate diesel imports and eventually move to B20 (diesel containing 20 percent biodiesel) from the current B5 (*Platts Oilgram News* 2010a).

The economics of biofuels are location- and feedstock-specific. The economics are more favorable where there are high costs associated with importing petroleum products and domestic biofuel feedstocks have low costs, such as a landlocked country importing oil and producing ethanol from molasses, which is made in the process of converting sugarcane to sugar. Malawi, which is landlocked, produces ethanol from molasses and fits this category.

The availability of molasses is limited, and for large-scale ethanol production, as in Brazil and Colombia, all of sugarcane juice is converted to ethanol. The economics of ethanol from sugarcane, although technically efficient, have not been favorable in recent years because of soaring world sugar prices. It is important to note that the economics depend on both the price of oil *and* the price of the feedstock in the alternative market, for example the world price of sugar for sugarcane. The economics of ethanol from sugarcane as a substitute for gasoline are shown in the left panel in Figure 2. Ethanol is economic when the black line is above the gray line. Despite high world oil prices, ethanol from sugarcane has not been economic since October 2008 because of high world sugar prices. Taking the last 13 years since January 2000, globally, ethanol from sugarcane has been economic less than one sixth of the time. Similarly, the economics of biodiesel have been challenging. As the right panel in Figure 2 shows, the opportunity costs of one of the two principal feedstocks (plant oil, the other feedstock being methanol) have been higher than diesel prices. To feedstock costs must be added the capital, operating, and maintenance costs for the manufacturing plant.

Figure 2: Economics of ethanol from sugarcane and comparison of feedstock prices for biodiesel



Sources: Author's calculations based on data from World Bank (2013), various issues of USDA (2013), and industry sources.
Note: Opportunity costs of ethanol are calculated based on the following parameters used to compute the equivalencies between sugar and ethanol in Brazil: 1.0495 kg of sucrose equivalent to 1 kg of sugar, and 1.8169 kg sucrose equivalent to 1 liter of anhydrous ethanol. Sugar cane is assumed to yield 83 percent sugar and 17 percent molasses. Prices of molasses are assumed to be equal to 25 percent of sugar prices on a weight basis, and the sucrose content of molasses is 55 percent that of sugar. A fuel economy penalty of 20 percent is assumed for ethanol. Sugar prices are raw, FOB, and stowed at greater Caribbean ports. Soybean oil prices are in Decatur, Illinois; rapeseed oil prices are Dutch, FOB, ex-mill; and palm oil prices are for palm oil from Malaysia delivered in Northwest Europe.

As a result of weak economics in many parts of the world, most liquid biofuel programs have required subsidies, mandates, or both. The subsidies can be substantial. In Thailand, the total reduction in taxes and charges on E10 for gasoline with 91 RON was US$0.63 *per liter of ethanol blended* (US$0.06 per liter of blend) in February 2007. By mid-2008, the overall reduction rose to US$2 per liter of ethanol blended, and remained above US$2 in 2012 (EPPO 2012a), or triple the FOB price of gasoline in Singapore. From the point of view of mitigating the adverse effects of high oil prices, a program requiring large subsidies for alternative fuels to combat high oil prices raises questions about efficacy. Another concern is the competition for fertile land and water, which could contribute to food price increases. Concerns about food security have prompted China to ban grains for ethanol production, India to restrict ethanol production to molasses, and South Africa to exclude maize and *Jatropha curcas* (which is not edible but may nevertheless compete for water and land) from its national biofuel policy (South Africa 2007).

In rare circumstances, biofuels are claimed to lower prices. Ethiopia, which makes ethanol from sugarcane, switched from E5 to E10 in March 2011 and lowered the price of gasoline in Addis Ababa by 0.45 birr (US$0.027) per liter. The economics of this move are not clear. Sugarcane cultivation is water-intensive but farmers do not pay for irrigation water, and the government has been subsidizing sugar to keep its price low (*Capital* 2012).

5. Mitigating Adverse Effects

There have been supply-side responses to lower prices paid for oil, as well as helping consumers cope with high oil prices. Among the supply-side measures are fuel price hedging, negotiating price discounts, bulk procurement, other means of lowering supply costs, and

promotion of price competition. Assistance to consumers includes price discounts on petroleum products, cash transfers, and other forms of social protection.

5.1 Efforts to lower costs of supply

Hedging

Fuel price hedging has been widely used by airlines and other companies. Predictably, timing has been the most important determinant of the success of hedging strategies (Bacon and Kojima 2008, chapter 5). As world oil prices began to rise again, the Ghanaian cabinet in March 2010 approved a Commodity Price Risk Management Policy, and the government began hedging gasoline and diesel. This strategy has met with success. Sizable hedging gains in the first half of 2011 paid for fuel subsidies through July, and in 2012 Ghana hedged petroleum products on a quarterly basis (*Ghanaian Times* 2010 and 2012; IMF 2012b).

In 2008 and 2009, companies in other parts of the world reported large losses after previously soaring oil prices rapidly fell in late 2008 and into 2009. To lower costs, many companies chose options that provided some upside if oil prices remained high but did not protect against a price collapse. Airlines in China, Malaysia, Pakistan, the Philippines, and Vietnam were among those reporting hedging losses, in some cases amounting to US$1 billion. The large losses invited governments to raise questions, investigate the hedging contracts signed, and even imprison executives for allegedly acting irresponsibly and causing losses (Market News International 2009; Dow Jones 2010b; *South China Morning Post* 2011; Platts 2009b; Plus News Pakistan 2010; *Philippine Star* 2009; Platts 2010).

Oil companies have also suffered losses. Arguably one of the most politicized turns of events occurred in Sri Lanka, when the hedging strategy of state-owned Ceylon Petroleum Corporation (CPC) turned sour in 2008. CPC entered into a series of contracts to hedge a portion of its oil imports beginning in 2007, increasing the amount hedged over time to about one-third of oil imports. The other oil marketer in the country, Lanka IOC, also hedged. As long as oil prices were rising, hedging was advantageous, but hedging proved to be extremely costly once oil prices began to crash in the last few months of 2008. The perception that the hedging deals were unfairly structured and that the public was being asked to pay for the hedging losses through higher retail prices and not benefiting from falling oil prices rapidly gained wide acceptance, and petitions to that effect were filed. The cabinet appointed a risk management committee to review all hedging contracts and to minimize the losses in November 2008. The supreme court ordered a temporary suspension of the CPC chairman and payments to the banks until two petitions, alleging fraud and corruption in the hedging deals, had been dealt with. In the end, Sri Lanka's treasury was exposed to about US$464 million in claims from three foreign and two local banks (Kojima 2009; Reuters 2011a).

Price discounts for fuel imports and bulk procurement

Some governments and national oil companies have negotiated price discounts with governments and national oil companies in oil-producing countries. Through PetroCaribe, which claims 18 members and 12 joint ventures, República Bolivariana de Venezuela provides petroleum products under concessionary terms to countries in Central America and the Caribbean. In October 2011, PetroCaribe reported delivering 92,000 bpd of crude oil and petroleum products to its members (PetroCaribe 2011 and 2012). State-owned Bangladesh Petroleum Corporation negotiated favorable payment terms for fuel oil with Malaysia's national

oil company Petronas and Philippines National Oil Company in 2011 (Reuters 2011c). Iraq has historically provided Jordan with price discounts for a limited amount of crude oil and fuel oil. Unable to purchase oil for lack of cash, the Republic of Yemen has been given free crude oil and petroleum products from Saudi Arabia, Oman, and the United Arab Emirates (*Yemen Times* 2012; Reuters 2011d).

The rationale for bulk procurement is that unit costs fall with scale. Government-mandated bulk procurement, however, has met with mixed results. Mozambique since the 1990s, Kenya since 2004, and Tanzania since January 2012 have implemented bulk procurement. In Kenya and Tanzania, there is an open tender organized by the government at regular intervals. In Mozambique, Imopetro, an oil industry consortium, imports petroleum products.

Questions have been raised on and off in Kenya about whether its bulk procurement system actually results in cost savings. In May 2011, the Ministry of Energy reportedly blamed high fuel costs on the refiner's needing to go through a third party to procure crude oil and manipulation of the crude oil price by traders who alter the date when crude oil enters the country (BMI 2011). In Tanzania, questions have been raised about the same company winning the first three tenders in succession and importing gasoline failing to meet fuel specifications, which reportedly damaged vehicles (Tanzania Daily News 2012). A similar incident involving imports of contaminated gasoline prompted the government of Mozambique to give the state oil company a 51-percent stake in Imopetro in 2011 (All Africa 2012c).

Private companies have also considered bulk procurement. In January 2012, the African Airlines Association 2012 announced the Joint Fuel Purchase Project, with participation of airlines from nine Sub-Saharan African countries (AFRAA 2012).

Strengthening infrastructure for fuel imports, storage, and transport

Expanding the port capacity to receive liquid fuels in greater quantities or increasing the speed of unloading, increasing fuel storage capacity, and enabling cheaper transport of petroleum products (by pipeline or rail rather than road transport) are some of the ways to lower costs and fuel prices. Shortening the time to unload imported fuels will slash demurrage charges and relieve port congestion, with positive economy-wide effects on both accounts. Some countries, especially those in Sub-Saharan Africa, suffer from inadequate fuel storage capacity, leading to fuel shortages and hence higher prices, and underutilization of rail and pipeline transport due to the rundown state of the infrastructure, all of which exacerbate the adverse effects of high world oil prices (Kojima, Matthews, and Sexsmith 2010).

Among the study countries, China has proceeded furthest in establishing strategic reserves. In the first phase of the program, China managed to fill 103 million barrels of crude oil storage at a cost of about US$60, and is working to build 169 million barrels of storage by 2013 and 228 million barrels by 2016. Guidelines published in 2011 call for commercial stocks of petroleum products and allowing local governments to look into setting up local diesel reserves (Xinhua News Agency 2011). In December 2011, a senior official in India said that the government was planning to build strategic petroleum reserves of nearly 18 million tonnes (about 130 million barrels) by 2020, expanding on a 5.3-million-tonne stockpile, the storage tanks of which were under construction, to be used in case of supply disruptions or large price increases (Dow Jones 2011d).

Kenya in 2008 issued regulations, stipulating minimum operational stockholding of 25 days for gasoline, 20 days for diesel and kerosene, and 15 days for LPG (Kenya 2008). Under

consideration are plans in Malawi, Mongolia, Rwanda, and Zambia to increase storage capacity (MERA 2010; Dow Jones 2012a; All Africa 2012b; All Africa 2011a).

Minimum stockholding requirements are often not enforced for cost reasons. In theory, a small fee can be levied on each fuel to finance construction of additional storage capacity and its management, but governments are reluctant to increase costs of supply and add to world oil price increases. The government of Togo acknowledges that the country has little storage capacity but does not have the financial means to expand it (Togosite 2011). Uganda's only reserve storage facilities for gasoline and diesel in Jinja, in need of rehabilitation, have been empty since 2006 (Dow Jones 2011c).

At the opposite end of the spectrum are policies outside the petroleum sector that can amplify price increases. For example, in late 2010 in China, severe diesel shortages forced thousands of filling stations to shut down and others to ration, as firms turned to diesel power generation when power was rationed to meet the energy intensity target in the 11th Five-Year Plan (2006–10). Power tariff subsidies, which lead to financial difficulties for utilities resulting in insufficient operating capacity for generation, transmission, and distribution, have led to similar scenarios.

Promoting price competition

Where prices are not controlled or only price ceilings are set, the government can promote price competition by making information available. The price information needs to be broken down by company, and preferably by filling station. In addition, it is important to promulgate and enforce a rule that requires prices to be posted on display boards at readable heights that are clearly visible to drivers.

Some governments post detailed information about fuel prices to help consumers. Some list current prices only, others post recent but not current prices, and a handful lists both current and historical prices. Among the most detailed and timely is the online price database in Chile—mandated by a resolution issued in January 2012—which is also available on iPhone, BlackBerry, and Android. The database gives viewers the choice of displaying data in order of increasing or decreasing price and the address of each filling station, prices, and the date and time of the last price change. The government of Guatemala highlights on its Web site the filling stations with the lowest prices in the Guatemala City Metropolitan Area with their addresses and street maps every week. Instituto Nicaragüense de Energía (Nicaraguan Institute of Energy) surveys about 75 filling stations in Managua every week and provides details on the three highest-priced and three lowest-priced filling stations. The Authority for Consumer Protection and Competition in Panama, proclaiming "an informed consumer has power," collects and posts gasoline and diesel prices at filling stations every four weeks, highlighting those with low prices. The Ministry of Economy in El Salvador until 2012 was posting lowest prices in three parts of the country as saving tips. Argentina, Pakistan, Peru, and the Philippines also post detailed price information by company.

For price competition to benefit consumers, however, it is important that there be effective monitoring and enforcement of technical standards, or else a competitive fuel market can lead to partial or total product degradation, with a low-quality product (adulterated, mislabeled, or short-weighted) driving out a high-quality product.

5.2 Assistance to consumers

Several governments have made use of targeted subsidies and tax reductions to help consumers, usually aimed at agriculture, public passenger transport, goods transport (such as for the trucking industry), and fisheries. Examples of having multiple prices for the same fuel by user category are discussed in section 3.1. As the case of provision of subsidized fuel to fishing boats in Malaysia illustrates, however, even rationing subsidized fuel using smart cards has had limited success. Unlike electricity or piped natural gas, there are few examples of well-executed targeted fuel price subsidies for liquid fuels because they are easy to transport and distribute, making it virtually impossible to stop diversion and black market sales.

Instead of subsidizing prices, an alternative is to provide cash and other forms of assistance to consumers of petroleum products. Cash subsidies have been provided to agriculture, public transport, and fisheries in Bangladesh, China, and the Philippines (Bangladesh 2012b, *China Daily* 2012, Xinhua News Agency 2012d, *Philippine Daily Inquirer* 2012). Cash transfers to households are offered in El Salvador for LPG (*El Mundo* 2011), in Sri Lanka for kerosene as part of the national poverty alleviation program (Central Bank of Sri Lanka 2012), and in Syria for heating oil (IHS 2011a). In El Salvador, the government in August 2011 began depositing the cash through the electricity bill. Other examples of assistance include transport vouchers in Mozambique (IMF 2011c) and a utility subsidy program for low-income households in Thailand, which includes free rides on non-air-conditioned public buses and third-class trains.

Targeted cash transfers are generally considered among the best means of compensation for petroleum product price reform. Unlike targeted price subsidies, which can have large leakage and introduce market distortions, cash transfers leave market forces largely alone while enabling the poor to cope with multiple shocks. This is not to say that cash transfer programs face few administrative difficulties—beneficiary identification and timely delivery in full amounts are arguably the top two challenges. In addition, some fuels are merit goods when used for cooking or heating: compared to combustion of solid fuels in traditional stoves, kerosene in high-pressure stoves and LPG substantially reduce indoor air pollution, thereby improving health, and also eliminate the time spent on biomass collection. Given cash, however, households may choose to spend it on what they regard as more pressing needs and switch to biomass for cooking, because they do not fully value the health and time-saving benefits of using cleaner-burning fuels.

One of the best-known cash transfer programs to mitigate adverse effects of large oil price increases is that in Indonesia after the government raised the prices of gasoline, diesel, and kerosene sharply in 2005. Rp 100,000 (US$11) a month was delivered to more than 19 million households starting in October 2005 through the national postal system for a total of Rp 1,200,000 (US$128) in four tranches. The program was intended to help the poor and the near-poor adapt to the adverse effects of higher oil prices by distributing cash over one year. A review found that the top four expenditure items using the cash transfers were rice, kerosene, debt repayment, and health, in that order. After more moderate but still significant price increases in May 2008, the government again implemented cash transfers of Rp 100,000 (US$10) a month to 18.5 million households starting in June 2008, this time for a total of nine months in three tranches. Some households switched back to biomass from kerosene for cooking, in part because kerosene was more expensive and also because of kerosene shortages (World Bank 2012a; Widjaja 2009; Satriana 2009).

Partly on account of compressed preparation and delivery schedules, implementation of the two temporary unconditional cash transfer programs in Indonesia encountered several problems and invited complaints, of which the top three most commonly voiced were the lack of transparency in beneficiary selection, unfair distribution, and assistance given to those who were not eligible. Informal levies were extracted from the cash being transferred, amounting to a sizable fraction of the benefits. The frequency of deductions increased from about 10 percent in 2005–2006 to 50 percent in 2008–2009. These problems notwithstanding, against the history in Indonesia of sometimes violent and sweeping opposition to fuel price increases in the past, these just-in-time cash transfers have been widely credited for the price increases in 2005 and 2008 meeting with few protests. This is all the more remarkable given the first program was designed and deployed in less than five months. Nearly two-thirds of the total benefits went to the bottom 40 percent of the population. The recipients showed slightly improved education, labor, and health outcomes (World Bank 2012a).

Untargeted cash transfers can be costly. The Iranian economic reform of December 2010 saw the prices of petroleum products, natural gas, and bread, and electricity and water tariffs increase sharply. The Targeted Subsidies Reform Act as ratified in 2010 limited compensation cash transfers to households to a maximum of 50 percent of the net proceeds from the implementation of the law, but the government in the end transferred more than double the legal limit by the end of 2011: the government handed out RIs 455,000 (US$43 at the official exchange rate in 2011) per person per month to about 73 million Iranians for a total of more than RIs 40 trillion (US$3.8 billion), against the total savings from all price increases of about RIs 30 trillion (US$2.8 billion). The law envisaged only half of the savings going to households, 30 percent to compensate industries and help them improve energy efficiency, and 20 percent for other government programs and infrastructure investment. In the end, the government used all of the savings from price increases, took out loans from the Central Bank, and used other sources of revenues to pay for the cash transfers (Hassanzadeh 2012a). That said, the cash transfers, combined with proactive communication by the government, undoubtedly helped minimize political opposition to the very large price increases implemented across several sectors in December 2010 (Guillaume, Zytek, and Farzin 2011).

The very poor with no electricity have virtually no choice but to use kerosene for lighting, and, depending on the magnitude, may be seriously affected by a kerosene price increase. The ultimate mitigation in this context is connecting these households to electricity, which may also enable them to engage in new income-generating activities. Indeed, using savings from subsidy reduction to expand rural electrification was an important component of the mitigation package in Ghana when fuel prices were increased significantly in February 2005 (Coady and Newhouse 2006).

6. Observations

Some countries that deregulated the downstream petroleum sector years ago continue to operate with little government interference, notably Turkey, which deregulated prices in 1989. Argentina, which deregulated prices in the same year, has chartered a different course and the government remains heavily involved in controlling the oil sector. The petroleum sector in the Philppines has remained deregulated since 1998, although the government has been more active in influencing prices than in Turkey. Kenya and Tanzania have introduced a measure of price

control by reverting to price ceilings, reflecting concerns about lack of adequate price competition.

The political challenge of keeping up with world oil price increases is evident in policy reversals found in this study—many governments that adopted automatic pricing mechanisms earlier have suspended adjustments, in the case of Cameroon following deadly protests (AFP 2008). These political difficulties have been compounded by rising food prices: between January 2004, when world oil prices began to soar, and January 2013, energy and food prices on the world market rose and fell in tandem, with a correlation coefficient of 0.89. Where they occurred, public protests were often against both high fuel and food prices. Some governments, such as Egypt and the Islamic Republic of Iran, faced not only growing fuel subsidy bills but also rising food subsidy bills.

This study found that government control of the downstream petroleum sector and its interactions with policies in other sectors have led to a variety of negative consequences that were replicated in a wide range of countries:

- Fuel shortages are common. They have economy-wide effects, and at times tragic human consequences. In Egypt, fights over fuel in short supply have resulted in injuries and deaths.
- National oil companies with monopoly over refining and other segments of the downstream sector have often suffered from decades of chronic inefficiencies as well as having to shoulder the burden of fuel subsidies. One outcome is that major oil exporting countries with the requisite scale economy were forced to import petroleum products —because of mismanagement and subsidies that have decapitalized their refineries—at world prices and sell below costs on the domestic market. Some have run out of cash reserves altogether and at times could not pay for fuel imports, leading to acute fuel shortages and high prices. The situation is aggravated by the obligation placed on the national oil companies to supply petroleum products to government entities that do not pay on time and have accumulated large debts. Among the heaviest debtors are state-owned power utilities, which are themselves heavily indebted because of subsidized power tariffs.
- Protection of government-owned refineries that are uneconomic has pushed up domestic prices, increased subsidies, or both, all too often leading to fuel shortages.
- The monopoly status granted to national oil companies or protection accorded to government-owned refineries often arises because of subsidies: governments wish to channel subsidies through one entity rather than numerous actors in order to exercise greater control over subsidies. But years or decades of not having to face any competition have made these operators inefficient, raising costs, with opaque governance.
- Even where there are several large private oil companies operating, keeping domestic prices artificially low tends to decapitalize the downstream sector. One consequence is a large lag in the introduction of tighter fuel specifications to enable more stringent vehicle emissions standards, as in Russia.
- Price control interferes with efficiency improvement. Typically based on a cost-plus formula, ensuring reasonable cost recovery to suppliers provides little incentive for cost minimization and efficiency improvement, and may enable inefficient operators to survive. Subsidy calculations are often based on what is essentially self-reporting. Oil

companies present the government with total costs incurred, which are almost always higher than industry benchmark costs for efficient operation.

- Dual pricing of the same fuel or pricing kerosene far below diesel in the name of protecting the poor is universally accompanied by varying degrees of commercial malpractice. In the extreme, black markets flourish, criminal elements enter the market, the governance of the petroleum sector declines steadily, responsible firms are deterred from entering the market, and infrastructure deteriorates for lack of investment.

The foregoing argues for not interfering with pricing in the downstream petroleum sector except through competition policy, and addressing concerns about the adverse effects of high oil prices on the poor and the economy through other means. Within that framework, the government can help lower prices for consumers by taking steps to ensure the development of an efficient downstream petroleum sector with fair competition, where efficiency gains are passed on to consumers in the form of low prices. Evidence from global experience is clear—nothing increases efficiency more than subjecting all firms to relentless competition in a level playing field with sound regulations that are effectively enforced.

Virtually all governments recognize that universal price subsidies are generally regressive and inefficient. But various political forces make it difficult to alter these subsidies, for which a delivery mechanism is readily available and requires little administrative capability. Equally important, governments providing large subsidies are often failing to deliver essential social services effectively, and subsidies are given to stay in power and to make up for inconsistent and poor service provision (Victor 2009). For these reasons, it is difficult to divorce price reforms that will have economy-wide consequences from the perceived legitimacy and credibility of the government and its ability to deliver in important areas.

Whatever the circumstances, one of the first steps in reforming prices is making fuel pricing policy transparent. Where there is a measure of price control, however limited, the government should establish, through regulations or laws, which agency is in charge of determining prices and the principles governing price control. Costa Rica's price-setting mechanism formally includes citizen participation, whereby objections can be lodged and considered by the regulatory authority. The criteria for price adjustments, historical and current price calculations, and associated costs—for example, benchmark FOB prices in the relevant markets, exchange rates, various taxes and charges—should be available on the government Web site and through other forms of the media. It is important to disclose price controls at different points along the supply chain and the magnitude of under- and over-recoveries. Brazil, Ghana, and Thailand regularly report price structures but the subsidies at the refinery gate are not explicitly shown, giving a false impression to consumers. Where there is a price stabilization fund, flows in and out of the fund and the fund balance should be regularly reported; such reporting is rare. Equally important, information should be easily accessible, easy to follow, and timely. The pricing information should be consolidated in one place so that consumers are not forced to hunt for information that is scattered on different Web sites, some buried in hundreds of pages of government gazettes. It should not be difficult to post information as soon as new prices are set. If prices are frozen, it is important to keep on reporting world oil prices in local currency units on a regular basis and the cumulative subsidies.

For the purpose of helping the poor cope with high oil prices, the most efficient and least distorting approach is arguably to transfer cash as part of an integrated, comprehensive poverty alleviation program, while deregulating the downstream petroleum sector once sufficient

competition is demonstrated. The poor do not purchase much gasoline or diesel, because they do not own automotive vehicles for the most part. If subsidies are removed, the poor would be affected just as much, if not more, by indirect effects of subsidy removal through high prices of food and other essential goods and services they consume. Government interventions to keep prices low for each good and service through sectoral subsidies are generally sub-optimal.

The transport sector merits special attention, not only because it is affected significantly by oil prices, but also because public transport fare adjustments tend to be regulated and widely publicized. For mitigating the effects of higher public transport fares, one review of various measures adopted to make passenger transport more affordable to the poor concluded that supply-side subsidies given to operators are neutral or regressive. Demand-side subsidies (discounted fares, vouchers) perform better, but not markedly so, because public transport is not an inferior good and the share of household expenditure on public transport tends to have an inverted U shape with respect to income in many countries. Means-tested cash assistance, as in Chile, would be more efficient (Estupiñán 2007).

Transport fares are increased for a number of reasons—higher fuel prices, higher labor costs, higher costs of parts and maintenance, high costs of vehicle stock addition or renewal, the need to recover losses from the inability to raise fares earlier, or even to reduce subsidies in the transport sector—but tend to be raised when fuel prices are increased. In countries where governments control fuel prices and adjust them infrequently, fare and fuel price increases often coincide. The public is then inclined to believe that all of transport fare increases and subsequent increases in the prices of other essential goods are due entirely to fuel price increases, giving fuel price reform an excessively negative image. While fuel costs make up only a fraction of the total operating costs and even a smaller fraction when capital costs are taken into account, fare increases in percentage terms can be even higher than the percentage increases in fuel prices. For example, when the price of diesel was raised by 11 percent in September 2011 in Bangladesh, one trucking company raised the fare by 22 percent (*Financial Express* 2011) and vegetable sellers claimed that transport costs had gone up by one-third or more (*New Nation* 2011). This points to the critical importance of both having a good communication strategy so that the public does not immediately equate transport cost and fuel price increases, and working closely with the transport sector to manage tariff adjustments.

For protecting households, the long-term goal should be to replace fuel price subsidies with effective social service delivery. This takes time, especially because large price subsidies tend to be given in countries with a poor track record of effective service provision, signaling weak institutional capacity, poor governance, or both. To gain public acceptance, mitigation measures with immediate and visible results would be helpful. In countries with widespread commercial malpractice, merely reducing such malpractice could go a long way—reducing or eliminating fuel shortages, which would lower prices; monitoring and enforcing regulations against short-selling, which would lower effective prices for consumers; and monitoring and enforcing regulations against sales of sub-standard fuels, which could save consumers money by eliminating unnecessary damage to vehicles and equipment.

Addressing the impact of higher oil prices on businesses and industries is more complex. To the extent that all countries face similar oil prices on the world market, oil price increases should not reduce the competitiveness of a firm unless it is competing with firms in countries that have not curbed price increases using subsidies, tax reduction, or both. For firms that cannot compete without cheap fuels, the question for the government may be how to close down such

firms in an orderly fashion and retrain and redeploy their employees. Governments interfere with petroleum product prices in part because they are concerned about inflation. But, as this study shows, it is not clear that the benefits of low fuel prices exceed the many distortions and unintended consequences caused by such a pricing policy over the medium to long run.

Ultimately, the issue for all countries since 2004 is how to adjust to a world with much higher oil prices. Oil prices are unlikely to return to the levels last seen in the early 2000s and stay there for a prolonged period of time. The coping mechanism needs to be multi-faceted, including efficient social service provision, especially for the poor, instead of reliance on fuel price subsidies; establishment of a competitive downstream petroleum sector with healthy competition and adequate infrastructure, instead of a sector relying on a cost-plus formula for cost recovery; increasing fuel efficiency driven by price signals and other incentives; and development of a diverse portfolio of energy sources based on sound economics to reduce price risks.

Appendix 1: Pricing Policy Information by Country

Table A1.1 provides detailed information on the downstream petroleum sector in each country, focusing especially on pricing policies. The table indicates whether a given country is a net oil exporter (√ appears if it is under E in the second column) and whether it has at least one domestic refinery (R in the third column). Where refineries are described as being small, they are of uneconomic scale. In discussing refineries, topping refineries, which cannot make gasoline, are excluded. The table also describes the country's pricing policy and strategy, supply conditions, and factors affecting fuel demand, such as power outages driving demand for diesel for emergency electricity generation, and supply conditions, such as unscheduled refinery shut-downs. The subsidy figures are based on the country staff reports by the International Monetary Fund (IMF) or government sources—including annual budgets, central banks, and governments' own news reports. Government and central bank reports are likely to be accurate, but IMF staff reports sometimes report energy subsidies (that is, fuel and electricity) as fuel subsidies, as in Table III.1 in IMF (2012l). Because of the uncertainty regarding the coverage of what is reported as "fuel subsidies" in IMF staff reports, the source of the subsidy data (namely IMF or government) is indicated.

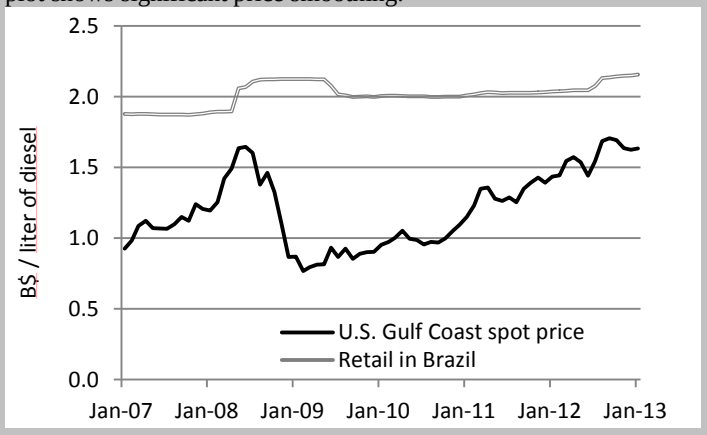
Graphs of domestic and benchmark FOB diesel prices for the last five to six years in local currency are shown for 11 countries to illustrate the workings of different pricing policies and what consumers have faced. FOB benchmark prices in the relevant regional refining centers are also plotted to show how world diesel prices were moving during the same period. The sources of the data are described in Table A2.1 in Kojima (2012). Of all the petroleum products, gasoline and diesel are widely consumed in every country, while the consumption of other petroleum products depends on country circumstances. Of the two most widely consumed fuels, governments are more likely to intervene in diesel fuel pricing, regarded in many countries as a "social" fuel because of the economy-wide effects of its price levels. For this reason, diesel fuel is selected for plotting to illustrate pricing policies of different governments. In addition, the recent price trajectory of LPG in Thailand is also shown, as it provides useful information.

Table A1.1: Oil export status in 2010, current refining status, pricing and tax policy and strategy, and fuel supply conditions

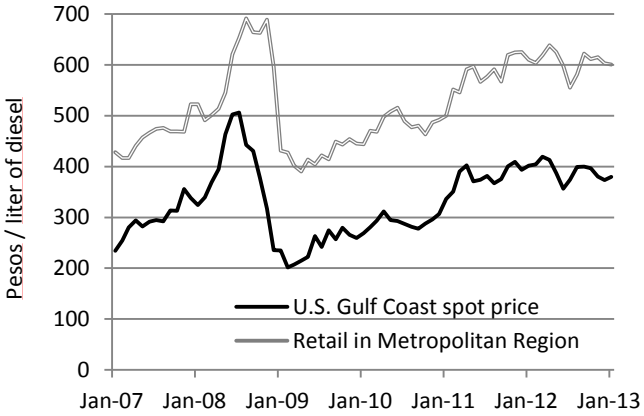
Country	E	R	Pricing policy and strategy	Fuel supply conditions
Angola	√	√	**Pricing policy**: Fuel prices are uniform in the country, controlled by government, heavily subsidized, and last changed in Sep 2010, when the prices of gasoline, but no other fuel, were raised. **Subsidies**: IMF said in Aug 2012 that fuel subsidies in 2011 amounted to 7.8% of GDP (US$7.9 billion), equivalent to more than 90% of public investment spending.	**Supply**: There is one small, old refinery. The plan to build a new large refinery has encountered a series of problems attracting investment. **Smuggling**: Fuels are smuggled out of the country.
Argentina	√	√	**Pricing policy**: The sector was deregulated in 1989, but in recent years government has kept prices of all forms of energy low through domestic gas and electricity tariff freezes, indirect price controls on petroleum products, and heavy export taxes on oil. Government has been controlling prices in many sectors of the economy through "voluntary" price agreements since 2005 to curb inflation, including those with petroleum product retailers. In Jul 2012, an executive decree 1277/2012 was issued, abrogating sections of 1989 decrees that provided for the freedom to set prices and to import and export fuel. The decree established a new commission that has authority over pricing. Prices of LPG in 10-, 12-, and 15-kg cylinders sold to low-income households have been frozen for years. A federal fund for LPG provides stable LPG prices and helps expand natural gas	**Supply**: Four large refineries provide the bulk of domestic production. Venezuela and Argentina signed a fuel purchase agreement in May 2009. By end-2011, the debt owed by Argentina had grown to US$1.3 billion. The 1974 Law of Supply allows the imposition of fines or imprisonment of company executives for shortages of goods, including fuels. Argentina began using a tax-free import system in 2005 to help make up for a domestic diesel shortfall during the agricultural seasons (middle and end of

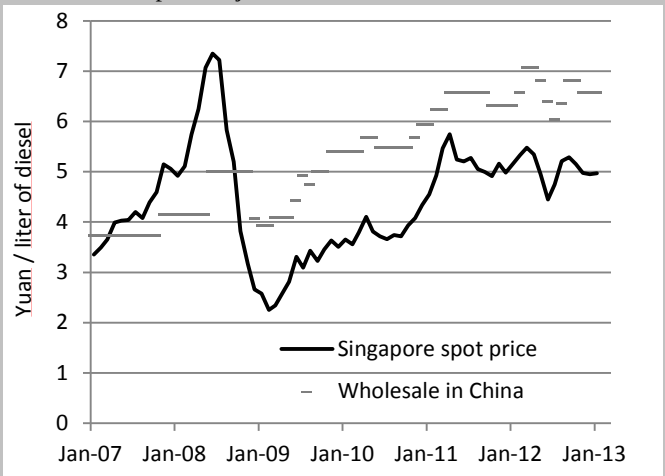
Country	E	R	Pricing policy and strategy	Fuel supply conditions
			pipeline networks. The diesel price for public transport used to be subsidized, costing government 6.5 billion pesos (US$1.5 billion) in 2011. Government brought the diesel price for public transport to be in line with the regular retail prices in early 2012. **Response to fuel tourism**: Filling stations near the Brazilian border list two different prices for gasoline, one for cars with Argentinian license plates and another one for foreign plates, to restrict Brazilian drivers from buying cheaper fuel in Argentina. **Pressure on oil companies to lower prices**: In Aug 2010, government ordered oil companies to roll back price increases, while simultaneously threatening to apply the 1974 Law of Supply. Prices remained frozen between mid-Aug and mid-Dec. In February 2011, government issued a resolution after Shell Argentina raised gasoline and diesel prices by up to 3.6%, ordering Shell to reverse the price increases, imposing a price freeze, and requiring oil companies to maintain supplies to the local market at prior-year levels. The resolution was repealed in the following month. In Jan 2012, government accused oil companies of over-charging cargo transporters, launched an investigation, and later in the month ordered the companies to lower diesel prices for both cargo and passenger transport companies. **Consequences of subsidies**: Some 3,500 retail outlets closed between 2005 and Mar 2010 because of poor profitability. **Use of export tax to lower domestic prices:** Until Jan 2013, the export tax on crude oil was 100% above US$45/barrel (bbl), making the export price US$42/bbl. Government relaxed the export tax in Jan 2013, raising the oil export price from US$42 to US$70/bbl. **Information**: There is comprehensive coverage on the Web of current and historical gasoline, kerosene, and diesel prices by location and company. Government uses price surveys to boost transparency and indirectly press companies to reduce prices. Monthly price surveys are carried out at filling stations and the National Statistics and Census Institute (Instituto Nacional de Estadistica y Censos, or INDEC) posts price and volume information for each filling station every month on its Web site, going back to Dec 2004.	year), on the condition that the participating companies sell diesel at government-controlled prices. **Upstream sector**: The exceptionally low export price of oil until Jan 2013 has led to oil production falling from 0.72 million bpd in 2006 to 0.61 million bpd in 2011, while consumption grew from 0.47 million to 0.61 million bpd. Government increased the export tax on natural gas from 45% to 100% in 2008. Natural gas production fell from 46 billion cubic meters (bcm) in 2006 to 39 bcm in 2011, while consumption grew from 42 to 47 bcm. **Shortages**: Diesel shortages are frequent. Refining capacity is inadequate, because price controls and export restrictions discourage investment in new capacity addition. Gasoline shortages have also been increasing, especially of non-premium gasoline. Power plants are forced to switch from natural gas to diesel during the peak winter season for lack of gas. The Total Energy program, established in 2007, subsidized fuels used as substitutes for natural gas to address gas shortages, but increased petroleum product consumption. Besides the foreign-exchange controls put in place in 2011, since Feb 2012 government has required prior approval for all import transactions, a move that may worsen fuel shortages. Fuel shortages have prompted government to invoke the Supply Law of 1974. Amidst a gasoline shortage in Mar 2010, government accused Shell and Petrobras of intentionally lowering refining production to create a supply shortage. For the first time in 30 years, Argentina imported gasoline. Government in Feb 2012 told oil companies to increase production. Because of tightening government control, the trade balance of the energy sector turned negative for the first time in 2011. To stem this trend, government has steadily tightened trade restrictions.
Bangla-desh		√	**Pricing policy**: Fuel prices are controlled by government and not adjusted regularly. Prices were raised several times in 2011, but were not adjusted between Dec 30, 2011 and Jan 4, 2013. In Mar 2012, the price of diesel needed to rise by another 45% to break even. IMF reported in Mar 2012 that government was expected to adopt an automatic adjustment formula by December 2012, which would ensure full pass-through of changes in international prices. Government raised fuel prices by up to 11% in Jan 2013. Even after the Jan 2013 price increases, diesel and kerosene were reported to be suffering from under-recoveries of about Tk 12 (US$0.15)/liter. The price of LPG in 12.5-kg cylinders sold by Bangladesh Petroleum Corporation (BPC) has not changed since Jun 2009.	**Supply**: One small refinery meets less than 30% of the country's demand. A plan to triple the refinery capacity has been under consideration. Various projects are underway to increase storage capacity for petroleum petroleum products and install a single-point mooring that will reduce the time for unloading crude oil and diesel from 15 to 2 days. **Shortages**: Shortages of natural gas and power, the prices of which have been kept low, are serious and have contributed to

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			Consequences of subsidies: BPC has taken out loans from state-owned commercial banks, received budgetary transfers to cover its operating losses, and relied on banks to provide much of the foreign exchange needed, because delayed budgetary transfers have caused BPC to regularly lack funds to purchase foreign exchange for oil imports. Banks are reluctant to issue letters of credit. An official figure reportedly shows that BPC's bank liabilities stood at Tk 192 billion ($2.3 billion) in 2012 and Tk 172 billion ($2.3 billion) in 2011. BPC in 2011 negotiated with Malaysia's national oil company Petronas and the Philippines National Oil Company to extend US$550 million and US$250 million, respectively, on deferred payment for fuel oil for up to one year with minimal interest. Government established a technical committee in January 2012 to monitor closely the finances of BPC to ensure regular budget transfers to cover subsidy-related losses and to enable it to buy foreign exchange from domestic banks to pay for petroleum imports. In 2012, government decided to reduce fuel imports by BPC to save foreign exchange, Bangladesh Power Development Board decided to lower electricity purchases from oil-based power plants to cut costs, 22 of the 29 oil-fired power plants were shut down in early Mar 2012, and Dhaka Electric Supply Company served notice to mills and factories to keep their units shut from 6 P.M. to 6 A.M. **Compensation**: Government has been providing cash subsidies to farmers for diesel for irrigation. **Information**: BPC posts current fuel prices on its Web site.	increasing demand for petroleum products. **Smuggling**: Smuggling of diesel to India and Myanmar has been reported.
Bolivia	√		**Pricing policy**: Fuel prices are uniform, controlled by government, and frozen for years at a time. Since Jan 2009, vehicles with foreign licence plates have been charged international prices, set every quarter. On the domestic market, the price of oil is US$27/bbl. Concerned about declining oil production, government issued Supreme Decree 1202 in Mar 2012, providing a tax credit of US$30/bbl to foreign companies in addition to US$10 in cash they were receiving. As late as Dec 24, 2010, government was reportedly denying any intention to reform subsidies. However, just two days later, as part of a broader subsidy reform, government increased diesel price by 83% and gasoline by 73%, the largest since 1991 when prices were raised by 35%. Government was also to raise the fee paid to oil producers from US$27 to US$59 a barrel. **Protests**: The increases in Dec 2010 were completely reversed 5 days later following widespread protests, as was food subsidy reduction. **Consequences of subsidies**: Fuel subsidies have amounted to about 3% of GDP in recent years. Year 2005 2006 2007 2008 2009 2010 2011 US$ billion 108 140 288 487 462 666 706 % of GDP 1.1 1.2 2.2 2.9 2.7 3.4 2.9 Government newspaper *Cambio*. **Information**: Government posts current fuel prices on its Web site. In Feb 2011, government created a new ministry of communications, 8 years after such a ministry had been abolished.	**Supply**: Bolivia has two small refineries. **Smuggling**: There is significant smuggling of subsidized fuels to neighboring countries.
Brazil	√		**Pricing policy**: Prices were deregulated by law in Jan 2002, but in practice the national oil company, Petrobras, has frozen ex-refinery prices for years on end, with mounting losses. The national average producer price of pure gasoline were kept within a narrow band of R$1.51−1.55/liter between Sep 2005 and Jan 2013, that of diesel within R$1.33−1.37 between Aug 2009 and Jul 2012, and that of LPG sold in 13-kg cylinders has been kept within R$1.03−1.05 per	**Supply**: Petrobras owns 98% of the country's refining capacity. In May 2011, government announced that it was launching an investigation into Petrobras' fuel distribution and retail division for alleged abuse of its dominant market position in Brasilia. Pure gasoline is not

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			kg since Nov 2003 (with higher prices earlier). Ex-refinery prices of gasoline and diesel were raised twice in 2012, and in Jan and Feb 2013. Government adjusts a tax on gasoline and diesel contributing to intervention in the economic domain, called CIDE (Contribuição e Intervenção no Domínio Econômico), to further stabilize retail prices. A negative CIDE tax was levied on LPG until Apr 2002. Monthly average retail prices of diesel (averaged across the country) and FOB benchmark prices relevant to Brazil since 2007 are shown below. The plot shows significant price smoothing.  **Consequences of pricing policy**: Petrobras' refining, transportation, and marketing division lost US$8.5 billion in 2011 and US$17.5 billion in 2012. The recent decline in the company's financial performance, including its first quarterly loss in 13 years posted in August 2012, has been blamed in large part on low domestic fuel prices. Cuts in CIDE in recent years have cost hundreds of millions of dollars. **Social protection**: In Apr 2002, the LPG subsidy was eliminated and replaced with assistance to enable the poor to use LPG through LPG vouchers in Bolsa Familia, government's social welfare program. **Information**: Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP, National Agency of Petroleum, Natural Gas and Biofuels) posts detailed historical and current information on prices on its Web site. Information posted includes weekly surveys of retail prices of gasoline, diesel, and LPG and marketing margins. In May 2004, the survey coverage was expanded to a total of 555 locations. ANP also issues annual reports on global and domestic prices.	available on the market; instead hydrous ethanol and a gasoline-anhydrous ethanol blend are sold for spark-ignition vehicles. The amount of ethanol in the gasoline-ethanol blend is regulated and varies between 18% and 25%. The blending percentage is determined largely by sugarcane production and world sugar prices. Decreasing the percentage of ethanol increases demand for gasoline, requiring gasoline imports in recent years and forcing Petrobras to import at world prices and sell at a loss on the domestic market.
Cambodia			**Pricing policy**: Fuel prices are deregulated, but government has engaged oil companies, urging them to lower prices from time to time.	**Supply**: There is no oil production in Cambodia, but government has been pursuing a domestic refinery project since the commercial oil discovery in 2005.
Cameroon	√	√	**Pricing policy**: Government operates a stabilization fund, Caisse de Stabilisation des Prix des Hydrocarbures (CSPH, Fund for Hydrocarbon Price Stabilization). Automatic fuel price adjustments were suspended following protests in Feb 2008 (see below) and fuel prices were lowered. Fuel prices were frozen until Dec 2008 when they were lowered, and have not been adjusted since. Government's policy since 2008 is to compensate the national oil company's refinery for the difference between the prices set by the formula adopted in 2007 and the administratively fixed prices. Government announced fuel price increases effective Jan 2012, but backed down after threats of a strike. A finance ministry official told Reuters that the events of 2008 as well as the protests in Nigeria in January 2012	**Supply**: There is one small refinery, which is not designed to process domestic crude and uses imported crude oil. **Shortages**: Shortages of LPG have been frequently reported.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			against gasoline price liberalization ruled out subsidy cuts. **Protests**: In Feb 2008, a strike by transport workers against high fuel prices and poor working conditions was followed by a series of violent demonstrations against broader political issues as well as the high cost of living. These protests left at least 30 people dead (official figure), while some have cited more than 100. **Consequences of subsidies**: IMF reported that government had spent FCFA 146 billion (US$0.3 billion) in 2010 (1.3% of GDP) and FCFA 309 billion (US$0.65 billion) in 2011 (2.5% of GDP) on fuel subsidies, and subsidies in 2012 were expected to reach FCFA 400 billion (US$0.8 billion). Cumulative obligations and arrears to the refinery at the end of 2011 amounted to FCFA 445 billion (US$0.9 billion), or 3.7% of GDP. In Mar 2012, as part of the measure to clear the arrears, government agreed to cancel FCFA 87 billion (US$0.2 billion) worth of taxes due from the refinery in the second half of 2011.	
Chile	√		**Pricing policy**: Various stabilization mechanisms have been in effect since 1991 following the Gulf War, when government established FEPP (Fondo de Estabilización de Precios del Petróleo, Stabilization Fund for Petroleum Prices). In September 2005, government established a new temporary price stabilization fund, FEPCO (Fondo de Estabililización de Precios de Combustibles Derivados de Petróleo, Petroleum Product Price Stabilization Fund), intending to retire it by June 2006. After FEPCO became effective, FEPP was restricted to LPG and fuel oil. Subsequent world price movements prompted government to keep the fund operating until 2010. A law published in February 2011 replaced FEPCO with SIPCO (Sistema de Protección al Contribuyente ante las Variaciones en los Precios Internacionales de los Combustibles, System of Protection against Variations in International Fuel Prices). SIPCO covers small and medium enterprises and dampens the impact of price volatility of four automotive fuels—gasoline, diesel, automotive LPG, and CNG—through a variable component that is subtracted from or added to the base component of the specific fuel tax, determined by the price difference between import parity and the upper or lower band of reference prices. Adjustments are made if world oil prices differ from the reference price by more than a certain percentage point, which was initially 12.5% but changed to 10% in Sep 2012, when the duration of the tax adjustments was also changed to 4–52 weeks. The reference price is established by Ministry of Economy, which considers both current and future prices (future prices are given a weight ranging from 0 to 50%) and adjusts the price band every four weeks. SIPCP does not cover large diesel consumers such as power plants and mining companies. Monthly average retail prices of diesel in the Metropolitan Region and FOB benchmark prices relevant to Chile since 2007 are shown below. Except in 2008, the degree of price smoothing has been small, if any.	**Supply**: Chile has two large sophisticated refineries. **Impact of power shortages**: Low rainfalls reducing hydropower and much lower gas imports from Argentina increased demand for diesel in 2007−08. ENAP (Empresa Nacional del Petróleo, National Oil Company), Chile's sole refiner, lost almost US$1 billion in 2008 after being caught with large inventories of crude oil and diesel when a surge in hydropower production cut diesel demand.

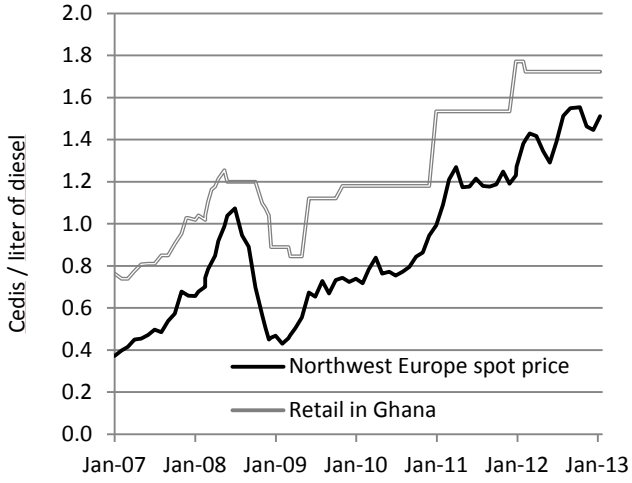
Country	E	R	Pricing policy and strategy	Fuel supply conditions
			 **Protests**: Taxis and mini-buses went on strike in Oct 2011, protesting fuel price hikes and asking to be included in transport policy, including subsidies. **Hedging**: Hedging is explicitly regulated by law. **Information**: The National Energy Commission (Comisión Nacional de Energía, CNE) posts monthly average prices of all fuels by region, dating back to Jan 1994. A resolution issued in Jan 2012 require that prices of gasoline, diesel, kerosene, CNG, and automotive LPG at each filling station be published on CNE's Web site, and they are ranked in order of increasing or decreasing price depending on the viewer's preference. Resolution No. 60 issued in Jan 2012 requires that each filling station enter price information in a national online price database, which is published on CNE's Web site, and also made available on iPhone, BlackBerry, and Android. The Web site displays minimum and maximum prices, the address of each filling station, prices, and the date and time of the last price change. Retailers are required to enter new prices no earlier than 15 minutes before price changes are implemented.	
China		√	**Pricing policy**: A new mechanism introduced in Jan 2009 bases fuel prices on a 22-day moving average of a basket of crude oil prices. When the average is below US$80/bbl, prices move relatively freely and refiners are expected to earn "normal" margins. Between US$80 and US$130/bbl, domestic prices are responsive but refiners no longer make a profit. Above US$130, tax measures are used to keep domestic prices low. Although price adjustments are triggered if the 22-day moving average changes by more than 4% from the previous price-setting level, concerns about inflation often delay the implementation of price increases. Retail prices were changed only three times in 2008, eight times in 2009, four times in 2010, three times in 2011, and eight times (half of which were price reductions) in 2012. In Jul 2011, government cut or removed import duties: eliminated them for diesel and jet fuel (both previously 6%), and reduced them to 1% for gasoline (5%) and fuel oil (3%). In Aug 2011, government moved to monthly adjustments of jet fuel prices. The price increases in 2011 were fractions of global price increases. The scale of these losses are consistent with government's own statement that, according to the 4% rule, the prices should have been raised nearly triple the actual increases. Government canceled value-added tax (VAT) on fuel imports in 2008, and announced a 5% sales tax on oil and gas in Oct 2011. The most recent proposal reported for pricing would allow oil companies to set prices as long as world oil prices are between US$40 and US$130 a barrel, while shortening the averaging period to 10 days. Wholesale prices of diesel set by	**Supply**: The 2012 worldwide refining survey of the *Oil and Gas Journal* reports 54 refineries with combined capacity of 7 million bpd at end-2012. **Fuel shortages**: There have been frequent fuel shortages as refiners cut back on production to minimize financial losses. Severe diesel shortages forced thousands of filling stations to shut down and others to ration in late 2010 as firms turned to diesel power generation when power was rationed to meet the national energy intensity target for 2006−10. Power shortages in May 2011, caused in part by the failure of power tariffs to keep up with rising coal prices as well as hydropower shortages, led to surging demand for diesel, which led government to impose a temporary ban on diesel exports. Price cuts in Oct 2011, the first in 16 months, led to serious diesel fuel shortages. The Xinhua News Agency has partially blamed hoarding by refiners and traders before price increases for fuel shortages. This behavioral response to the price adjustment mechanism is one of the reasons

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			government and FOB benchmark prices relevant to China since 2007 are shown below. Moving to more frequent price adjustments just as world oil prices collapsed at the end of 2008 made moving to formula-based price adjustments easier.  **Consequences of subsidies**: Refiners have suffered significant losses. Two largest refiners, PetroChina and Sinopec, suffered refining losses of 60.09 billion yuan (US$9.30 billion) and 35.78 billion (US$5.54 billion), respectively, in 2011. In 2012, their combined losses from refining due to government controls of gasoline and diesel prices amounted to 55.4 billion yuan (US$8.8 billion). In 2007−08, the losses suffered by PetroChina and Sinopec were so large that government compensated them. **Temporary ban on exports to lower domestic prices:** Government imposed a temporary ban on diesel exports in 2011. **Hedging**: The extent of losses from hedging has attracted regulatory scrutiny. To lower costs, companies chose options that provided some upside if oil prices remained high but did not protect against a price collapse. China Eastern's hedging loss of 6.2 billion yuan (US$906 million) by Dec 2008 prompted an investigation by the National Audit Office. After large losses suffered by 68 state-owned companies in 2008, including Air China's 6.8 billion yuan (US$1 billion), State-Owned Assets Supervision and Administration Commission announced in Sep 2009 that government was investigating the hedging contracts signed. In Oct 2009, government imposed limits on hedging: 50% of fuel for those reporting significant losses previously or those deemed inexperienced, and 90% otherwise. In 2011, airlines received authorization to resume hedging. **Compensation**: In Apr 2009, government announced that it would subsidize public transportation, fisheries, and state-owned forestry firms when the state-set ex-refinery prices for gasoline and diesel exceed 4,400 yuan (US$700, or about US$0.94/liter) and 3,870 yuan (US$615, or US$0.73/liter) a tonne, respectively. Central government pays for all fuel costs above the threshold prices for individual fishermen or fishing enterprises operating inshore or inland, as well as state-owned forestry and urban public transportation companies, and half of the surplus costs for rural road and water transportation companies and ocean fishing firms when ex-refinery price for gasoline is between 4,400 and 5,480 yuan (US$870) a tonne and that for diesel between 3,870 yuan and 5,070 yuan (US$805). Above these prices, central government pays all	government is said to be reconsidering the current formula. **Strategic reserves**: China has completed and filled 103 million bbl of storage in the first phase of its strategic petroleum reserve (SPR) plan and is working on building 169 million bbl of storage by 2013 and 228 million bbl by 2016. China filled its first phase of SPR at US$60/bbl. The Ministry of Commerce published the Guidelines on the Development of Oil Circulation Industry in 12th Five-Year Plan (2011−2015) in Dec 2011, calling for commercial stocks of products and allowing local governments to look into setting up local diesel reserves.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			additional costs. In March 2012, the National Development and Reform Commission, which sets fuel prices, said a monthly subsidy of about 300 yuan (US$48) would be given to taxi drivers across the country to compensate for the fuel price increase, and finance ministry said it had earmarked 67.4 billion yuan (US$11 billion) for oil subsidies for fisheries, forestry, public transport, and taxis, as well as 24.3 billion yuan (US$3.9 billion) for agriculture to ensure that farmers' income is not adversely affected by oil price increases and possible price increases for agricultural materials later in the year.	
Colombia	√	√	**Pricing policy**: Fuel prices are controlled and price ceilings are set by Ministry of Mines and Energy, subject to the ultimate authority of Superintendency of Industry and Commerce (Superintendencia de Industria y Comercio, SIC), which exercises control over price increases. Price setting is at the discretion of government. A fuel stabilization fund for gasoline and diesel was created at end-2008, the purpose of which was to eliminate fuel price subsidies. An initial deposit of about US$170 million was transferred to the fund at the time. Budgetary transfers for fuel subsidies in 2009 amounted to 4,906 billion pesos (US$2.3 billion). There are no rules governing withdrawals from the fund, as in Chile. By end-2011, the fund's deficit had grown to 2.2 trillion pesos (US$1.2 billion). In Mar 2013, government agreed not to raise diesel prices after a transport strike. **Protests**: In Mar 2013, thousands of truckers went on an indefinite strike to protest against rising fuel prices. The strike ended after three days after government agreed to reverse a price increase and not to increase the diesel price for three months. **Hedging**: Although different from hedging petroleum product prices, Ecopetrol, the national oil company, hedges crude oil exports. Hedging cost Ecopetrol US$450 million in 2011, and incurred costs in six out of the past seven years, prompting a congressional hearing in 2012. **Information**: Ministry of Mines and Energy posts detailed price information by location for gasoline and diesel every month, dating back to Jul 2003.	**Supply**: Colombia has one large refinery and another reasonably size one. **In-smuggling**: There is significant smuggling of heavily subsidized fuel from Venezuela. To curb smuggling, Venezuela has been providing Colombia with subsidized petroleum products. In 2009, Colombia was provided with 30,000 bpd, the same amount as smuggled fuel, at half the world price. This arrangement was suspended between Aug 2009 and Dec 2010 due to political tension between the two countries.
Costa Rica		√	**Pricing policy**: The regulatory authority adjusts fuel prices, uniform throughout the country, every month based on the average international prices during the previous 15 days and the exchange rate. LPG prices are independent of cylinder size, reflecting cross-subsidization. The price-setting mechanism formally includes citizen participation whereby objections can be lodged and considered by the regulatory authority. In Jun 2008, government eliminated taxes on diesel and switched the levy to gasoline to protect the vulnerable from surging oil prices. Costa Rica is a member of the Friends of Fossil Fuel Subsidy Reform. **Information**: The national refining company posts detailed information on price adjustments on its Web site going back to 1994. **Compensation**: An audit reported in 2012 found that fishing boats had received a total of US$112 million in subsidized fuel (on which taxes had been levied) in the last seven years.	**Supply**: Costa Rica has one small refinery.
Côte d'Ivoire	√	√	**Pricing policy**: Fuel prices are subject to ceilings, uniform throughout the country for gasoline, diesel, and kerosene. LPG prices were frozen between 2008 and Jan 2013, and other fuel prices have been frozen since April 2010 except the price of gasoline, which was raised in Jan 2013. LPG prices set by government are meant to be maximum prices, but often they represent minimum	**Supply**: Côte d'Ivoire has one refinery of reasonable size and complexity. **Strategic reserves**: Côte d'Ivoire set up Société de Gestion des Stocks Pétroliers de Côte d'Ivoire (GESTOCI, Oil Stock Management Company of Côte d'Ivoire) in

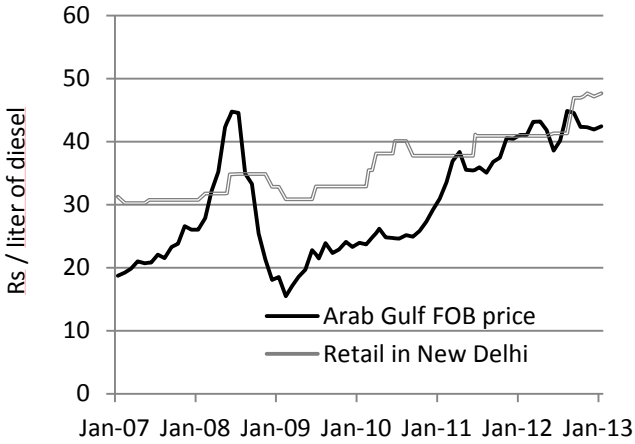
Country	E	R	Pricing policy and strategy	Fuel supply conditions
			prices on the market. The Jan 2013 price increases eliminated the price subsidy for LPG sold in 28-kg cylinders, significantly widening the differences in unit prices of LPG sold in 6-, 12.5-, and 28-kg cylinders; the price per kg of LPG sold in 6-kg cylinders is now half of that in 28-kg cylinders. **Protests**: In Mar 2008, sharp increases in food and fuel prices sparked riots, injuring more than a dozen people. **Information**: Ministry of Commerce posts minimum and maximum prices of essential food and other items, including, gasoline, kerosene, diesel, and LPG, by location several times a month.	1983 under the technical supervision of Ministry of Mines and Energy and the financial supervision of Ministry of Economy and Finance to manage depots at three locations and security stocks, required to be equivalent to two months of average sales. There is a legal requirement to maintain operational stocks equivalent to half a month of sales and strategic stocks equivalent to two months of sales. GESTOCI and other companies have been engaged in increasing storage capacity (especially for LPG), building a petroleum product pipeline from Abidjan to Bouaké, and rehabilitating the depot in Bouaké.
Dominican Republic		√	**Pricing policy**: Prices are uniform. Since Nov 2000, official prices have been published weekly according to an import-parity pricing formula. Petroleum products are taxed with a specific and an ad-valorem tax which vary by fuel type. By law, the specific tax should be indexed to inflation with quarterly adjustments, but government starting in 2007 has chosen not to implement the indexation. By regulation, maximum prices for LPG must be the same for residential, commercial, and industrial consumers. **Social protection**: In Sep 2008, the price subsidy for LPG was eliminated and replaced with a social protection scheme whereby 730,000 *bonogas* cards were issued to poor families, entitling them to a monthly reduction of RD$228 (US$6.30 at the time) for LPG purchase. **Information**: Government posts current and historical fuel prices every week on its Web site, showing data going back to Jan 2008. In addition, selective data going back to 2001 are also posted.	**Supply**: PetroCaribe member. In Sep 2011, Venezuela announced that it would increase the amount of oil provided to the Dominican Republic under the accord from 30,000 to 50,000 bpd. There is a 34,000 bpd refinery.
Egypt, Arab Rep.	√	√	**Pricing policy**: Fuel prices are uniform in the country, controlled by government, and frozen for years at a time. The official price of LPG has not changed since 1991, and is among the lowest in the world. In Nov 2012, government eliminated the subsidy for 95 RON gasoline and raised the price from LE 2.75 (US$0.45) to LE 5.85 (US$0.96). In Sep 2012, the new petroleum minister gave the details of the pricing structure to reduce the fuel subsidy burden, marking the first time the details were made public, although most of the proposals had been under discussion for several years. About 12 million households would be eligible to receive two 12.5-kg LPG cylinders a month at LE 5 (US$0.82). Households connected to the natural gas grid would not be eligible. LPG outside the quota would be available for LE 30 (US$5) a cylinder, still half the market price at the time of the announcement. A coupon system would be introduced for diesel, enabling certain users, including farmers and taxi-drivers, to purchase specified quantities at LE 1.10 (US$0.18)/ liter, while the remainder of consumers would be charged the full price of LE 4.85 (US$0.80)/liter. In Dec 2012, modified details about LPG subsidies were reported, raising the coupon price of LPG in 12.5-kg cylinders to LE 8 (US$0.11/kg). The price of fuel oil would be raised from LE 1,000 (US$164)/tonne to LE 2,300 (US$378)/ tonne except for food and a few other industries. In Jan 2013, Ministry of Trade and Industry announced that it would raise the price of fuel oil for the cement and ceramics industries from LE 1,000/tonne to LE 1,500 (US$246)/tonne. In Feb 2013, Minister of Petroleum and Mineral Resources said that rationing of subsidized fuel would be implemented using a system of smart cards between	**Supply:** Egypt has 4 refineries that are 100,000 bpd or larger, and several smaller ones. Diesel imports account for about one-fourth of consumption. Egypt imports 2 million tonnes of LPG a year and sells it at less than one-tenth of the import cost. Government has LPG reserves. **Smuggling**: In Feb 2013, Minister of Petroleum and Mineral Resources said that curbing fuel smuggling would save roughly LE 10 billion (US$1.5 billion). **Shortages**: Fuel shortages, historically a problem, worsened in 2012, in part because importers faced long delays in securing letters of credit. Smuggling of subsidized fuels out of the country and diversion of fuels to black markets also contribute to fuel shortages. LPG shortages in winter are the norm, but in 2012, shortages did not ease in Mar. LPG shortages in Nov– Dec 2011 led to two deaths and increased prices on the black market by as much as 20-fold. The dealer commission of LE 0.1 (US$0.02) per cylinder is too small and the reason cited by the petroleum minister in Feb 2012 for the flourishing black market

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			Apr and Jul 2013. In Mar 2013, government announced that it would begin experimental implementation of smart cards for the distribution of subsidized fuel for government vehicles starting from May 1 and for the public from July 1. Continuing diesel shortages for buses and trucks in Mar 2013 led the oil minister to dismiss top officials at two government-owned oil companies. **Protests**: Protests, sit-ins, and strikes about LPG shortages have forced Egypt's police and army to provide armed guards for gas deliveries. **Consequences of subsidies**: Subsidies for liquid fuels and natural gas in fiscal 2007/08 (July–June) were estimated to amount to 7.1% of GDP, diesel accounting for half. The budget for fiscal 2012/13 cut fuel subsidy allocation to LE 70 billion (US$11.6 billion) from LE 95.5 billion (US$16 billion) in the 2011/12 budget. Fuels are diverted to black markets or smuggled out of the country.	and the serious LPG shortage across the country. Diesel shortages harm agriculture and fisheries, and occur every year during the harvest season (May). Bakeries need diesel, but bread prices are controlled and subsidized, making it difficult to pay higher prices for diesel. In Jan 2012, panicked motorists—forming long lines when rumors about a price increase spread—were blamed for serious fuel shortages that led to one death and several injuries. Six more were killed in fights over LPG cylinders in Jul 2012.
El Salvador		√	**Pricing policy**: Ministry of Economy announces maximum LPG prices for four points in the supply chain every month. Legislation passed in May 2011 waived gasoline's contribution to a stabilization fund (Fondo de Estabilización y Fomento Económico) in the second half of 2011 to lower prices. **Social protection**: El Salvador provides cash transfer of US$9.10 a month to the poor and institutions catering to the poor for LPG. Beginning in Aug 2011, the recipients could choose to have subsidies deposited through their electricity bills. **Compensation**: Public transport is subsidized in proportion to fuel prices, although fiscal problems have made it difficult to continue the subsidies and the administration of President Funes in 2012 was considering a proposal to cut subsidies by 40%. **Information**: Ministry of Economy posts lowest prices in three parts of the country every week as saving tips for consumers.	**Supply**: There is a 22,000 bpd refinery. **Shortages**: When shortages occurred due to heavy rain in Oct 2011, the Directorate of Hydrocarbons and Mines of the Ministry of Economy was in constant communication with all oil companies to ensure 15 days of stockholding.
Ethiopia			**Pricing policy**: Ministry of Trade examines fuel prices every month and adjusts them, although not regularly. Government stopped the policy of subsidizing petroleum fuels in 2008 and set domestic prices higher than import costs beginning in Oct 2008 to repay the debt accumulated in the Oil Stabilization Fund. The price of kerosene, which is untaxed and also cross-subsidized to some extent, is lower than other fuel prices. Prices are frozen for months at a time: kerosene prices did not change between Mar and Oct 2011, and between Oct 2011 and Jul 2012 (the last month for which price data are available on the Web site of Central Statistical Agency); gasoline and diesel prices did not change between Jan and July 2012. The content of ethanol blended in gasoline was increased from 5% to 10% in mid-Mar 2012 to lower gasoline prices. **Information**: The historical data from monthly consumer price surveys, including petroleum products, used to be posted on the Web site of Central Statistical Agency by location. The last month for which the price information was available is Jul 2012.	**Shortages**: Prolonged LPG shortages in 2011 prompted households to turn to electricity for cooking. A shortage of ethanol caused a gasoline shortage in early 2012. **Commercial malpractice**: Adulteration of gasoline and diesel with kerosene is a problem.
Gabon	√	√	**Pricing policy**: Fuel prices are controlled by government, subsidized, and adjusted infrequently. The last price increase took place in Jan 2009. The price of kerosene has been frozen longer.	**Supply**: There is a 24,000 bpd refinery. **Shortages**: Fuel shortages have led to prices rising above the official levels.
Ghana		√	**Pricing policy**: Ghana liberalized fuel prices in Feb 2005 and began setting price ceilings in line with world prices. A 2005 law establishing the National Petroleum Authority (NPA) also established the Unified Petroleum Price Fund (UPPF) to equalize transport costs. A UPPF levy is imposed on each fuel, about US$0.03/liter in Feb 2013. The ex-refinery differential, which	**Supply**: Ghana has one 45,000 bpd refinery. It has been experiencing financial and operational problems for years, forcing the refinery to shut down for technical and financial reasons, including the inability to secure letters of credit to buy crude. Until

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			operates like a price stabilization fund, was introduced in the last quarter of 2006 to pay fuel marketers for under-recovery of costs for selling kerosene, LPG, and premix. Government began reviewing prices twice a month in Oct 2007, but suspended price adjustments between May and Nov 2008. The frequency of price adjustments fell sharply beginning in 2009. There was a 30% price increase in Jun 2009. There were no price adjustments in 2010, two price increases in 2011, and one downward price adjustment in 2012, with several of these adjustments tending to be large. In Feb 2013, prices were raised by between 15% (kerosene, the price of which had been frozen since end-Oct 2009) and 50% (LPG). The price of pre-mix was not adjusted, widening the price difference between gasoline and pre-mix to a factor of nearly 4. A cross-subsidy levy is charged on each fuel, with gasoline contributing to the cross-subsidy and all other fuels benefiting from it. The price ceilings for diesel and monthly average benchmark FOB prices relevant to Ghana since 2007 are shown below. The plot shows that the frequency of price adjustments has fallen sharply in recent years.  The bulk of the subsidy is provided not by the cross-subsidy levy but at the point of setting the ex-refinery price. In Nov 2011, the ex-refinery price differential was declared illegal, and the stay of execution was denied in Jan 2012. Premix (gasoline mixed with lubricant) is used in fishing boats and heavily subsidized, priced at less than one-third of gasoline since Dec 2011. In Feb 2013, NPA called on government to eliminate subsidies by Dec 2013. **Protests**: A price increase of 30% for gasoline and diesel in Jan 2011 sparked street protests in Accra. **Consequences of subsidies**: NPA said in Feb 2012 that the fuel subsidy in 2011 was in excess of 450 million cedis (US$276 million). There have been fraudulent claims against UPPF of products being delivered to remote areas when they were actually delivered to major consumption centers in urban areas. LPG subsidies have led to soaring consumption of automotive LPG, causing shortages and prompting commercial LPG vehicle drivers to ask government for subsidy removal so as to ensure reliable supply. **Hedging**: Ghana's cabinet in Mar 2010 approved a Commodity Price Risk Management Policy, paving the way for hedging petroleum products and crude oil. Ghana hedged half of its crude oil requirements in 2010−11. In Jun 2011, the finance minister announced that government would hedge 100% of crude output and about half of crude purchase. IMF reported in Feb 2012 that sizable	2011, the refinery was the monopoly importer of petroleum products. **Strategic reserves**: A state-owned company, Bulk Oil Storage and Transportation Company (BOST), is mandated to develop a network of storage tanks and keep strategic reserves. Gasoline, kerosene, and diesel are charged a BOST margin. **Storage capacity**: The available storage capacity can cover more than 4 months of gasoline, diesel, and kerosene consumption. In contrast, LPG storage capacity is limited, forcing LPG imports in small parcels and pushing up costs. **Shortages**: There are frequent shortages of premix because it is diverted on a large scale and mixed with gasoline. **Smuggling and diversion**: Fuel is smuggled out to Togo and other countries.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			hedging gains in the first half of 2011 allowed fuel subsidies to be covered through July. In Jan 2012, government announced that it was hedging crude on a quarterly basis. **Information**: NPA posts detailed information on current and historical prices and price structures on its Web site, although subsidies at the refinery gate are not made explicit. Negative taxes are shown for kerosene, premix, and LPG, but their sizes are much smaller than the actual subsidies, hidden in the ex-refinery prices.	
Guatemala			**Pricing policy**: Fuel prices are deregulated. **Information**: Government posts on its Web site weekly surveys of gasoline and diesel prices in different parts of the country, average weekly prices of LPG by cylinder size and company, and daily international prices and retail prices in the capital. Filling stations with lowest prices in the Guatemala City Metropolitan Area are highlighted with addresses and street maps every week.	**Supply**: There has been some confusion about whether Guatemala is a member of PetroCaribe. After the Guatemalan president's statement in early 2012 that his administration was considering joining the accord, Venezuela replied that Guatemala was already a member.
Guinea-Bissau			**Pricing policy**: The pass through of world price increases was full in 2011 but only half in 2008–10. Government has since been adjusting fuel prices monthly, aiming at full pass through. Raising the import reference price for diesel further is part of the 2012 budget. There is a duty-free category for diesel, the volume of which government is trying to reduce.	**Supply**: PetroGuin, the national oil company, is responsible for importing and distributing all petroleum products.
Honduras			**Pricing policy**: By a 2007 executive decree, government sets maximum retail fuel prices every week. LPG for household use is subsidized. **Information**: Fuel prices used to be posted on the Web site of the Petroleum Administrative Commission, but the site is no longer functioning.	**Supply**: Honduras severed its membership in PetroCaribe in Jan 2010, although Venezuela stopped supplying fuel in Jun 2009. The halting of fuel purchase under Petrocaribe had little or no impact on local fuel prices because the amount of imports under the accord was a fraction of the total imports.
India	√		**Pricing policy**: Subsidized fuels are provided only through state-owned oil companies. The administered pricing mechanism was dismantled in Apr 2002 except for kerosene and LPG for household use. The price of household kerosene has been set at about Rs 15 (US$0.28)/liter since October 2012, against the average FOB benchmark price in the Arab Gulf of US$0.78/liter. Industrial users of kerosene pay more than triple those paid by households. Although gasoline and diesel prices are meant to be market-based, their prices since fiscal 2004/2005 have been kept lower than what would have prevailed under market conditions. In 2003, government introduced a scheme for allocating price under-recoveries to upstream oil and gas companies, oil marketing companies, and cross-subsidization from gasoline and diesel, but low gasoline and diesel prices have ruled out cross-subsidization since fiscal 2004/2005. Government introduced a price band mechanism with price adjustments every two weeks in 2004, but abandoned it following steady increases in world oil prices. Government in Sep 2012 increased the price of diesel by Rs. 5 (US$0.09)/liter, steepest-ever once-time increase. Retail prices of diesel as charged by India Oil Corporation in New Delhi and benchmark FOB prices relevant to India are shown below. At times retail prices have fallen below the FOB price, signaling a large subsidy. In 2008 and for half of 2012, retail prices were lower than FOB benchmark prices.	**Supply**: India has 22 refineries with a combined capacity of 4.3 million bpd. Some are among the largest and most sophisticated in the world. Unable to compete with state-owned oil companies that are the only entities authorized to sell subsidized fuels, India's largest private oil company, Reliance Petroleum, closed down all of its 1,432 filling stations in 2008, and earlier in 2005 Essar Oil closed its 1,250 filling stations. Essar has since re-opened its stations. **Strategic reserves**: In Dec 2011, the government reported a plan to build strategic petroleum reserves of nearly 18 million tonnes, or 132 million bbl, by 2020, expanding on a 5.3 million-tonne stockpile, the storage tanks for which are under construction, to be used in case of supply disruptions or large price increases. **LPG supply to households**: As of 2010, there were 120 million LPG customers and 850 million cylinders in circulation. Government's vision of covering 100% of population with gas has led to a target of adding another 50 million customers to increase coverage from 50% to 75%. **Shortages**: Regional fuel shortages occur,

Country	E	R	Pricing policy and strategy	Fuel supply conditions



Governmetn in Sep 2012 also limited the number of subsidized LPG refills to six a year per household. The price of LPG outside the quota is more than double and that of LPG for commercial use triple the subsidized price. Price differences are considerable. In Jan 2013 in New Delhi, Indian Oil Corporation charged Rs 29 (US$0.53)/kg for refilling 14.2-kg cylinders for the first six refills, Rs 66 (US$1.22)/kg for 14.2-kg cylinders outside of the quota, Rs 81 (US$1.50)/kg for LPG sold in 14.2-kg cylinders to commercial customers, and Rs 83 (US$1.52)/kg for LPG sold in 19-kg cylinders.

Rationing subsidized fuels: Subsidized kerosene is rationed: the central government allocates kerosene to each state based on historical consumption, and each state in turn has its own rules for kerosene allocation to households. Kerosene is sold through the Public Distribution System, the main function of which is to provide subsidized food to the poor. In addition to limiting subsidized LPG to six cylinders a year, the petroleum ministry is piloting a biometric scheme for distribution of subsidized LPG. The 2012/13 budget expands pilot programs, allowing eligible consumers to recoup LPG and kerosene subsidies via the Aadhaar platform (a 12-digit number which the Unique Identification Authority of India will issue for all residents in India).

Social protection: Two separate government committees in 2006 and 2008 recommended moving away from subsidizing the kerosene price to cash transfers to the poor. In 2011, another proposal was made, shifting from a price subsidy to monthly cash transfers of Rs. 300 (about US$6.50) delivered to women.

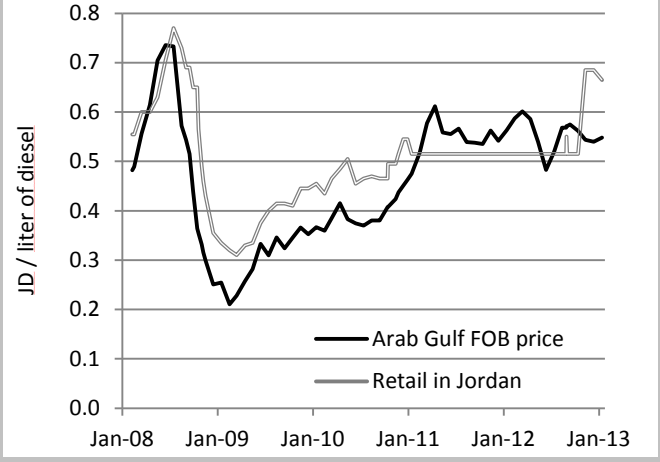
Consequences of subsidies: Compensation for losses suffered by the three state-owned oil companies marketing subsidized fuels was Rs. 120,000 million (actual, US$2.5 billion) in fiscal 2009/10 (Apr–Mar), Rs. 350,000 million (actual, US$7.7 billion) in fiscal 2010/11, Rs. 650,000 million (revised budget, US$13.6 billion, up from Rs. 200,000 million originally budgeted) in fiscal 2011/12, and Rs. 400,000 million (original budget, US$7.7 billion as of Apr 2012) in fiscal 2012/13, apart from US$0.6 billion set aside for LPG and kerosene in each fiscal year. In addition, oil and gas companies' contributions have been considerable, amounting, for example, to US$6.6 billion and US$1.5 billion provided by upstream and downstream companies, respectively, in fiscal 2010/11. In the first quarter of fiscal 2012/13, the three downstream state-owned oil companies posted combined losses of Rs. 405 billion (US$7.5 billion) on fuel sales. Lack of timely reimbursement forces oil companies to borrow heavily. Diversion of subsidized kerosene to especially LPG, as in Oct–Nov 2010. Reasons cited are often infrastructure-related, such as pipeline repair and refinery closure. Diversion of subsidized kerosene and domestic LPG for commercial use has also caused shortages.

Response to commercial malpractice: In 2006, a marker scheme aimed at curbing adulteration was introduced but later suspended. In Jan 2011, the petroleum minister announced that his ministry would, within six months, re-introduce a chemical marker to check diversion of subsidized kerosene for adulteration of diesel, and asked states to fit satellite tracking systems on tankers used by civil supplies departments. The marker system has not yet been re-introduced. To address consumer complaints about adulteration, pilferage and over-invoicing, Indian Oil Corporation announced in May 2011 that it would automate fuel sale. Similarly, to curb adulteration and theft, Bharat Petroleum has introduced Pure for Sure Platinum, which includes automation and fitting delivery trucks with global positioning systems.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			diesel and other users and of domestic LPG for commercial use has plagued the subsidy program for decades. Points of diversion of subsidized kerosene are well known and investigations have pointed to collusion by civil supplies officials and police. At least three murders, occurring in 2005 and 2011, have been linked to attempts to expose kerosene diversion, including the murder of an investigative journalist publishing a series of articles on diesel adulteration. **Information**: State-owned oil companies post detailed information on prices on their Web sites, together with price breakdowns and under-recoveries.	
Indonesia		√	**Pricing policy**: The prices of one grade each of gasoline and diesel, kerosene (for households and small businesses), and LPG are controlled and heavily subsidized. LPG sold in 3-kg cylinders is heavily subsidized at Rp 4,250 (US$0.44)/kg. LPG in 6-kg and 12-kg cylinders is sold at Rp 5,950 (US0.62)/kg and LPG in 50-kg cylinders at Rp 7,455 (US$0.79)/kg. The prices of other grades of gasoline and diesel are market-based, but the national oil company Pertamina, and not government, subsidizes LPG sold in larger cylinders, reportedly costing Pertamina Rp. 3.8 trillion (US$0.43 billion) in 2011. The price of LPG subsidized by government has been frozen for years. After raising fuel prices twice in 2005 and once in 2008, government lowered the prices of gasoline and diesel (but not kerosene) in Dec 2008 and Jan 2009, and has not adjusted prices since. In Mar 2012, the parliament voted to block government's revised 2012 budget proposal to raise subsidized fuel prices and agreed to allow for the option of a price increase only if the six-month average price of Indonesian crude oil rose 15 percent above the budget oil price (to US$121/bbl). Government sets an annual subsidized fuel sales quota and fuel subsidy budget, both of which are typically exceeded. Government revised its subsidized fuel quota in 2011 to 40.49 million kiloliters (kl) from the original volume target of 38.59 million kl, but the final figure was 41.8 million kl, 8% higher than the original budget. The quota for 2012 was 40 million kl, which was revised upwards as consumption exceeded 45 million kl. **Shifting subsidy from kerosene to LPG**: To reduce government's expenditure on the kerosene subsidy, Pertamina launched a kerosene-to-LPG conversion program in May 2007, in which the coverage of areas where subsidized kerosene is being sold is being diminished to zero over time. The free starter package includes a stove, a 3-kg cylinder, a hose and a regulator. The program targets households and micro-businesses. In July 2012, Pertamina reported that it had distributed 54 million packages and saved Rp. 61.6 trillion (US$6.5 billion) in fuel subsidies since the start of the conversion program. It is not clear if these savings are net of (now much larger) LPG subsidies. **Consequences of subsidies**: Annual government expenditures on fuel subsidies soared to US$23 billion in 2012. Year 2006 2007 2008 2009 2010 2011 2012 US$ billion 7.0 9.2 14.3 4.3 9.1 18.8 22.6 % of GDP 1.9 2.1 2.8 0.8 1.3 2.2 2.6 *Source*: Government of Indonesia. Siphoning off LPG from small cylinders to transfer it to larger cylinders has been partially blamed for some of the series of LPG cylinder explosions—responsible for at least 22 deaths—in the early stages of kerosene-to-LPG conversion campaign.	**Supply**: Pertamina is the sole refiner in Indonesia. There are five refineries larger than 100,000 bpd. Only Pertamina can sell subsidized fuels, inhibiting market entry by other oil companies. **Shortages**: In Jun 2011, Pertamina said that diversion of subsidized fuels to industries, driven by the very large price difference between LPG sold in 3-kg cylinders and LPG for industrial use, was creating fuel shortages. **Response to commercial malpractice**: To combat illegal purchase of subsidized petroleum products, President Yudhoyono announced in May 2012 that the government was planning to start electronic monitoring of subsidized fuel purchase. Pertamina started implementing the point-of-sale system, which records all fuel transactions made at filling stations, including the identity of the vehicle and the customer, volume purchased, time of purchase, and the location. The date and volume will be used as a benchmark for tracking the sales of subsidized fuels. There has been little progress on implementation to date.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			Rationing subsidized fuels: Despite a 2006 presidential decree forbidding consumption of subsidized gasoline and diesel by industrial consumers, downstream regulator at the time, BPH Migas, said in Sep 2010 that such consumption was continuing and ordered Pertamina to stop selling—BPH Migas estimated that industries consumed no less than 15% of the subsidized fuel quota. In May 2012, the Indonesian president announced new measures to contain fuel subsidies, including a ban on the purchase of subsidized fuels by state enterprises, government officials, plantation, and mining companies, and electronic tracking of sales of subsidized fuels. The impact of these measures on overall consumption has been limited. **Social protection**: In both 2005 and 2008, government carried out a time-bound, large-scale unconditional cash transfer program, intended to compensate the poor and near-poor for fuel price increases. After the sharp price increases in 2005, Rp 100,000 (US$11) a month was delivered to more than one-third of all households—numbering more than 19 million households—through the national postal system starting in Oct 2005 for a total of Rp 1,200,000 (US$128) in four tranches. The program was designed and deployed in less than five months. The cash transfers provided approximately 15% of households' regular expenditures. The top four expenditure items using the cash transfers were rice, kerosene, debt repayment, and health, in that order. After more moderate but still significant price increases in May 2008, government again implemented cash transfers of Rp 100,000 a month to 18.5 million households starting in June 2008, this time for a total of nine months in three tranches. The administrative cost per recipient in 2008–2009 was 6% of the benefits received. Some households switched back to biomass from kerosene for cooking, in part because kerosene was more expensive and also because of kerosene shortages. Partly on account of compressed preparation and delivery schedules, implementation encountered several problems and invited complaints, of which the top three most commonly voiced were the lack of transparency in beneficiary selection, unfair distribution, and assistance given to those not eligible. Informal levies were extracted from the cash being transferred, amounting to one-fifth to one-third of the quarterly benefit. The frequency of deductions increased from about 10% in 2005–2006 to 50% in 2008–2009. These problems notwithstanding the just-in-time cash transfers have been widely credited for the price increases in 2005 and 2008 meeting with few protests. Nearly two-thirds of the cash went to the poorest 40%. The recipients showed slightly improved education, labor, and health outcomes.	
Iran, Islamic Rep.	√	√	**Pricing policy**: Government controls and subsidizes fuel prices. Parliament ratified the Targeted Subsidies Reform Act in Mar 2010, calling for gradually increasing fuel prices to no less than 90% of the Persian Gulf FOB prices between 2010 and 2015, and similarly increasing natural gas, power, and water tariffs. The first price increase was implemented in Dec 2010, and introduced three different price levels for regular gasoline and two for diesel, depending on the consumer category. Prices in Iranian rials per liter are shown below: Fuel / Initial / New price 1 / New price 2 / New price 3 Regular gasoline / 1,000 / 1,000 / 4,000 / 7,000 Super gasoline / 4,000 / / / 8,000 Diesel / 165 / / 1,500 / 3,500	**Supply**: Iran has nine refineries with a combined nameplate capacity of 1.45 million bpd, but in varying states of disrepair after decades of subsidies. Only one is designed to produce significant quantities of gasoline. A sizable portion of gasoline demand is met by imports, and economic sanctions have made it difficult to match demand with supply because Iran can no longer import petroleum products in large quantities. This imbalance has forced government to require petrochemicals plants, which are not refineries and are not

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			Note: US$1=Rls 10,616 in 2011 and 12,176 in 2012, but as high as 35,000 in 2012 on the parallel market. For regular gasoline, government vehicles and those used mostly in agriculture and industry were in the first price category until Jun 2011, after which this category was eliminated altogether; domestic vehicles with an engine size smaller than 2 liters in the second, with the engine size reduced to 1.8 liters in Jan 2013; and all others in the third. For diesel, public transport and industry are in the second category and others in the third. There is a quota for each category, depending on vehicle type, size, and location. The large price increases invited much criticism from Parliament, which in 2012 amended the Targeted Subsidies Reform Act to change "no less than 90%" of FOB prices to "no more than 90%," thereby turning price floors into ceilings and entrenching price subsidies. Parliament rejected the proposal to increase prices in 2012, and depreciating currency means that domestic prices are declining in real terms. Nevertheless, it is significant that price increases as large as the ones effected in Dec 2010 were not rolled back. Government combined an effective communication strategy with nationwide cash transfers to mitigate the adverse effects of price increases for petroleum products, natural gas, electricity, and water. **Social protection and compensation**: To compensate for higher energy prices, the reform law authorizes using up to 50% of the savings from subsidy reduction for cash and in-kind payments to families, taking their income levels into account, and for a social security system; 30% of the savings to provide soft loans and credit lines to industries; and the remaining 20% to other government programs and infrastructure investment. In 2011, government did not target cash transfer to low-income households and instead paid Rls 455,000 (US$43 at the official exchange rate in 2011) a month to virtually all Iranians (about 73 million recipients), the total amount of which exceeded the savings from all the price and tariff increases of about Rls 30 trillion. Parliament in 2012 increased the allocation to cash transfers to families from 50% to 80%. **Effect on demand**: The consumption of every fuel fell in 2011, led by a 36% drop for fuel oil, 11% for LPG, and 10% for diesel. Apparent consumption, however, increased markedly in 2012.	designed to produce gasoline, to produce it. **Smuggling**: Fuel is smuggled out of Iran along the borders with Pakistan, Turkey, and Iraq, and southern coasts of Iran. In Feb 2012, the deputy director of the Department for Campaign against Smuggling of Goods and Foreign Currency said that some 3 million tonnes of fuel had been smuggled out of Iran since Mar 2011, significantly lower than the corresponding period two years earlier. In Dec 2012, Oil Minister announced that subsidized gasoline would no longer be available in the border areas. In Feb 2013, government was reported as having begun coding smart cards to prevent misuse, particularly loaning smart cards to smugglers, and selling gasoline at Rls 15,000 (US$1.22)/liter in the border areas. Official statistics further reportedly showed that fuel smuggling declined from 10 million liters a day in 2008 to 3 million liters in early 2011, but, with currency depreciation, rose to 8 million liters (6 million of diesel and 2 million of gasoline) a day by late 2012 and early 2013.
Iraq	√	√	**Pricing policy**: Government initiated administered official price adjustments at the end of 2005. Direct budgetary subsidies for imported fuels (except kerosene) were eliminated in 2007. Indirect subsidies for domestic crude/products were reduced from 10.5% of GDP in 2006 to 1.5% in 2009, but remain (source IMF). **Consequences of subsidies**: Large differences between black market and official prices persist.	**Supply**: Iraq's refineries are in disrepair after decades of heavy subsidies. **Impact of power shortages**: Gasoline demand soared in 2010 as many turned to it to compensate for power shortages. **Commercial malpractice**: Black markets for petroleum products continue to flourish.
Jamaica		√	**Pricing policy**: Although petroleum product prices are deregulated in Jamaica, ex-refinery prices continue to be set based on import parity prices. The current pricing mechanism is being administered by Petrojam, which is government-owned. Government in Apr 2011 reduced ad valorem tax on fuel, reinstituted in Jan 2010, from 15% to 10% on a temporary basis, and said that it would be reviewed quarterly. **Information**: Petrojam posts historical and current ex-refinery prices, inclusive of taxes, on its Web site. Distribution margins are added to the posted prices, and retail prices can be quite a bit higher.	**Supply**: Jamaica has a 35,000 bpd refinery, owned by Petrojam. A PetroCaribe member since 2005, Jamaica imports oil from Venezuela at only 60% of the market price, with the remainder offset as a long-term, low-interest loan. As part of the PetroCaribe agreement, Venezuela bought 49% of the shares in the refinery in 2008. The planned expansion of the Petrojam refinery would cost 10% of GDP in cumulative terms. The number of oil shipments per week under the PetroCaribe accord was reduced from 3 to 2 in May

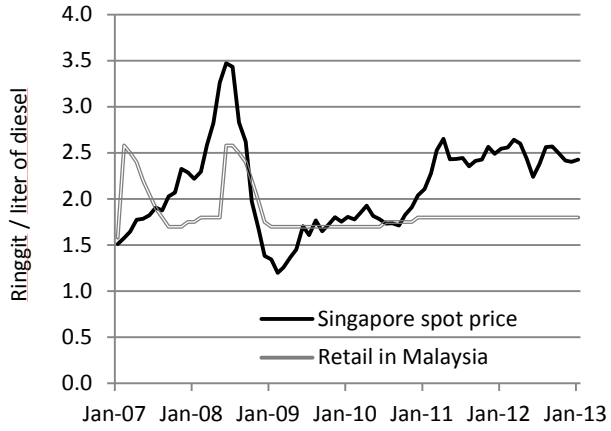
Country	E	R	Pricing policy and strategy	Fuel supply conditions
				2011.
Jordan		√	**Pricing policy**: Government controls fuel prices. Government removed subsidies from all fuels except LPG in Feb 2008 and adopted a monthly price adjustment mechanism, but stopped adjusting prices (of gasoline, diesel, and kerosene) in Jan 2011. Gasoline, kerosene, and diesel prices were raised in Dec 2010, but lowered in Jan 2011 in response to the events in Tunisia and elsewhere in the region. An expert panel formed by the prime minister in May 2011 recommended smart cards for subsidized goods instead of price subsidies. The kerosene and diesel prices remained unchanged, except for a brief rise in Sep 2012. Until Nov 2012, the price of LPG sold in 12.5-kg cylinders had remained frozen for years, except for four weeks in early 2009 when the price was lowered slightly. In May 2012, Jordan raised the price of 95 RON gasoline to JD 1 (US$1.41)/liter from JD 0.795 (US$1.12), and substantially raised electricity tariffs for major industrial and service sectors. In Nov 2012, unable to shoulder the growing budget deficit, government increased the price of LPG in 12.5-kg cylinders by 54% and kerosene and diesel prices by 33%. Government began making monthly adjustments in Dec 2012 for all fuels except LPG. The price of diesel for non-power users and average monthly benchmark FOB price relevant to Jordan since 2008 are shown below. For a period of time, the retail price was lower than the FOB price, signaling a large subsidy.  **Protests**: The prices of 90 RON gasoline and diesel were increased in Sep 2012 but reversed within two days following street protests. The price increases in Nov 2012 were met with nation-wide protests, turning violent in some areas, killing one person, injuring 71, and quickly escalating into calls for a change of government. Government, however, did not roll back price increases. **Consequences of subsidies**: The fuel subsidies since 2005 have fluctuated by an order of magnitude from year to year: Year 2005 2006 2007 2008 2009 2010 2011 US$ million 707 394 432 278 61 94 714 % of GDP 5.6 2.6 2.5 1.3 0.3 0.4 2.4 *Source*: IMF. **Information**: Jordan Petroleum Refinery Company, a national oil company and Jordan's sole refiner, posts current and historical fuel prices since 2008 on its Web site.	**Supply**: Jordan has one refinery of about 100,000 bpd and imports 100% of its oil demand. **Impact of natural gas shortages**: The pipeline carrying natural gas from Egypt to Jordan has been repeatedly attacked, forcing Jordan to rely more on diesel and fuel oil for power generation. The finance ministry estimated that natural gas supply disruptions in the first half of 2011 cost a total of JD 637 million (US$0.9 billion). By Apr 2012, there had been more than a dozen attacks since 2011, and Jordan warned that the disruptions could cost more than JD 1.5 billion (US$2.1 billion) in 2012. **Oil price discount**: Until 2003, Iraq provided 100,000 bpd—half free and half at preferential prices—to Jordan. In 2006, Iraq agreed to supply 10,000–30,000 bpd of crude at a discount of US$18/bbl; delivery started in Oct 2007. The two countries negotiated a further discount of US$22/bbl below the market rate in 2008 for 3 years for 10,000 bpd. The volume was increased to 15,000 bpd in Jun 2011 but at a discount of US$18/bbl. At the same time, Iraq began providing 30,000 tonnes a month of fuel oil at a discount of US$88/tonne. In Nov 2012, Iraq offered 100,000 bbl of free oil, and reiterated its commitment to supply 33,000 bpd at a preferential price provided there is infrastructure in Jordan to transport the oil. However, in Jan 2013, Iraq closed the border citing security concerns in Jordan, cutting off Jordan from 10,000 bpd offered at a discounted price.
Kazakh-stan	√	√	**Pricing policy**: Government sets ceilings on retail prices and influences fuel prices. Retail prices have been frozen for months at a	**Supply**: Kazakhstan is investing heavily in modernization and expansion of its refining

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			time, for example the price of 92 RON gasoline in Astana between August 2011 and March 2012. Because wholesale prices are not controlled, recently wholesale prices—governed in part by import prices—have exceeded retail prices. In Aug 2011, the oil ministry and oil companies signed a memorandum to limit wholesale prices to 87% of maximum retail prices. There is a preferential lower price for diesel supplied to farmers. In 2012, the preferential price was 10–15% below the non-agricultural diesel price level. **Use of export ban to lower domestic prices**: Regional shortages of gasoline and diesel have prompted government to introduce seasonal export bans on petroleum products to ensure sufficient domestic supplies. In May 2010, government banned exports for six months. The expiration of this ban has since been repeatedly extended, from Nov 2010 to May 2011, July 2011, Dec 2011, Jul 2012, Dec 2012, and most recently to end-Jun 2013. **Use of export tax to lower domestic prices**: Although not as high as those in Russia, export duties are sizable, and were increased to US$114.05 /tonne in Aug 2011 for light products. **Information**: The Statistical Agency of Kazakhstan posts monthly average prices of gasoline and diesel in 18 cities on its Web site.	sector to boost capacity and improve product quality over the next several years for self-sufficiency. Revamping of its three main refineries for modernization through the end of 2015 has led Russia and Kazakhstan to sign a crude-for-fuel agreement in 2012, whereby Russia provides tariff-free petroleum products to Kazakhstan and Kazakhstan supplies crude oil. Disagreement over the formula to calculate the amount of crude oil led Kazakhstan in Jan 2013 to consider China for refined products through a tolling arrangement. **Shortages**: Shortages in Jul–Aug 2009 in southern regions prompted the anti-monopoly agency to accuse oil companies of creating artificial shortages to push up prices and launch an investigation. The agency began investigating into 44 companies in July 2011, stating that there was no reason for price increases. Fuel shortages began in Apr 2011 caused by a price freeze imposed in Dec 2010, and continued into the summer as wholesale prices exceeded retail prices. Shortages continued to be reported in Oct 2011. Lower domestic prices than those in Russia also discourage fuel imports from Russia. Shortages of high-octane gasoline, one-third of which is imported from Russia, are common. Southern Kazakhstan experienced severe fuel shortages in Nov 2011. Fuel shortages were again reported in Mar 2012.
Kenya		√	**Pricing policy**: Kenya deregulated its oil industry in 1994. After concerns about over-charging by oil companies had been voiced in several quarters, government in Dec 2010 began setting maximum retail prices by location every month for gasoline, diesel, and kerosene. Price calculations are based on volumes and costs in the previous three months. Government removed the VAT on LPG in 2005. In Apr 2011, government cut diesel and kerosene taxes by 20% and 30%, respectively, and in May 2011 eliminated all taxes and levies on kerosene (as well as maize and wheat). Kerosene was nearly 20% cheaper than diesel in Jan 2013. The price difference between kerosene and diesel, and the tax difference between products destined for the domestic market and those for export, are two drivers of commercial malpractice. **Information**: The Energy Regulatory Commission posts landed costs of crude oil, gasoline, diesel, and kerosene, and maximum pump prices allowed in 70 towns on its Web site every month. The Petroleum Institute of East Africa also posts industry statistics and price and tax data, including statistics on the results of fuel marking—kerosene marker and export marker—and tracing tests. The results from 2012 found that independents were more likely to be in violation than integrated companies.	**Supply**: There is one refinery in Kenya, which is in need of rehabilitation and not capable of operating at anywhere near its design capacity. During the first 9 months of 2012, the refinery operated at a fraction of its capacity, meeting about 30 percent of domestic demand. The product pipelines are also in disrepair and outages are frequent. Power shortages have on occasion shut down the refinery and the pipelines. **Bulk procurement**: Effective Jan 2004, to take advantage of economies of scale in importation, government centralized the purchase of certain petroleum products and all crude oil through an open tender system coordinated by Ministry of Energy. Questions have been raised on and off in Kenya about whether its bulk procurement system actually results in cost savings. For example, in May 2011, Ministry of Energy reportedly blamed high fuel costs on the refiner's having to go through a third party to procure crude oil and manipulation of the crude oil prices by traders who alter the

Country	E	R	Pricing policy and strategy	Fuel supply conditions
				dates when crude oil enters the country. **Restrictions on private importers**: Citing private imports as the primary causes of congestion at the port of Mombasa and attendant demurrage charges, government in Sep 2010 banned private imports for transit fuels to Uganda, Rwanda, and the Democratic Republic of Congo, and mandated the open tender system for these transit fuels. Government lifted this requirement in Jan 2011, but banned private importers from using pipeline transport. **Stockholding**: 2008 regulations mandate minimum operational stock for various products, including 25 days for diesel, 20 days for gasoline and kerosene, and 15 days for LPG. **Strategic reserves**: 2008 regulations provides for 30 days of consumption to be procured by National Oil Corporation of Kenya and stored by Kenya Pipeline Company initially and gradually increased to 90 days, all to be funded by monies appropriated by Parliament. **Shortages**: There are frequent fuel shortages due to unplanned refinery outages, pipeline leaks, power outages affecting the refinery and/or pipeline operation, delayed ship unloading, and attacks on infrastructure. In Dec 2011 alone, there were two attacks on towers supplying electricity to the oil pipeline to steal steel, causing fuel shortages. **Response to commercial malpractice**: Fuel marking was first implemented in 1998 to curb the illicit adulteration of domestic Kenyan fuel with fuel destined for export to surrounding countries. The Petroleum (Amendment) Rules, 2000, stipulate that all fuels intended for export (except jet fuel) and illuminating kerosene for sale in Kenya be chemically marked. In Mar 2009, government started mandatory inspection of all fuel discharged at Mombasa.
Lao PDR			**Pricing policy**: Ministry of Industry and Commerce controls gasoline and diesel prices by region, and also LPG prices, which are adjusted less frequently than gasoline and diesel prices. The ministry reported subsidizing fuel prices in the first half of 2008. Prices were adjusted 18 times in 2009, 14 times in 2010, 15 times in 2011, and and 14 times in the first 10 months of 2012. In Apr 2011, the ministry reported that government would do its best to keep the diesel price below 10,000 kip (US$1.24)/liter and regular gasoline below 11,000 kip (US$1.37), using such short-term measures as taxing premium gasoline more to cross-subsidize diesel to curb inflation, and has been following this policy. A fuel surcharge was added in Oct 2011 to make up for removal of bridge tolls earlier in	**Supply**: Aside from Lao State Fuel Company, there are several private companies operating in the country. **Fuel tourism**: Consumers go to Thailand to buy subsidized LPG.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			2011. **Information**: Lao State Fuel Company, which is government-owned, used to post historical gasoline and diesel prices in the capital and five provinces on its Web site dating back to 2000. As of Feb 2013, the oil price history page was shown as being under construction and only current prices in 16 provinces were shown.	
Liberia			**Pricing policy**: Ministry of Commerce and Industry sets price ceilings for gasoline, diesel, and kerosene. In Apr 2012, government eliminated customs duties on fuels for schools, clinics and hospitals that are deemed by the minister of finance to be inadequately covered by budgetary appropriation or subsidies, as well as Liberia Electricity Corporation, Liberia Broadcasting System, and National Transit Authority. **Information**: Ministry of Commerce and Industry announces new wholesale and retail prices of gasoline, diesel, and kerosene on its Web site.	**Supply**: Liberia Petroleum Refining Company, wholly owned by government, is mandated to supply petroleum products to the domestic market. Despite its name, it does not operate a refinery.
Madagas-car			**Pricing policy**: A law issued in 2004 deregulated the downstream petroleum sector, including pricing. Retail price adjustments, however, began to lag behind world price movements in 2008. Starting in 2011, maximum prices were set by decrees and prices were also negotiated between government and oil companies to stabilize them. There were only two adjustments in 2011 and three in 2012. To keep prices low, government has reduced import tariffs and road maintenance fees. There is an equalization fund. Oil companies reported that government provided 15 billion ariary (US$7.4 million) in 2011 for keeping prices below market levels, against losses amounting to 150 billion ariary. **Information**: The Malagasy Office of Hydrocarbons (OMH) posts historical prices dating back to 2000.	**Supply**: Madagascar is a small island economy that relies entirely on product imports. Supply costs are high because of small demand, less than 15,000 bpd in 2012. **Shortages**: In Jun 2011, government accused oil companies of creating artificial fuel shortages and selling fuel on the black market, and opened an investigation.
Malawi			**Pricing policy**: Automatic price adjustment mechanism was suspended in 2004 and resumed in Jun 2012. Government sets maximum retail prices, uniform throughout the country, for gasoline, diesel, and kerosene every month. The prices are adjusted when landed costs in local currency vary by more than ±5%. When the variation is less than ±5%, a price stabilization fund is used. There are numerous fuel levies: energy regulation levy to finance the activities of the Malawi Energy Regulatory Authority (MERA), road levy, Malawi Bureau of Standards cess, safety net levy which contributes to development projects for the poor including a fertilizer subsidy program, and contribution to the price stabilization fund. The price of kerosene for domestic use has been frozen at MK 171 (US$0.47)/liter, against MK 591.4 (US$1.64)/liter for other uses and MK 683.6 (US$1.90)/liter for diesel in Feb 2013. **Protests**: Fuel and foreign exchange shortages led to deadly protests in Jul 2011. **Information**: MERA posts new fuel prices on its Web site.	**Shortages**: Malawi suffered fuel shortages in 2009, lasting almost two months. A serious diesel shortage began in Sep 2010. Gasoline and diesel shortages intensified in Nov 2010 and continued into 2011. By early 2011, black-market fuel prices were reported to be more than double official prices. The finance minister told the parliament that commercial banks did not honor letters of credit on time because of scarcity of foreign exchange. Government rationed fuel in response. Serious fuel shortages occurred in Feb 2012. MERA indicated in its 2010 report that kerosene imports had dropped by 22.5% from 2008 to 13.9 million liters in 2010. **Stockholding**: Government's strategic plan for the energy sector for 2009–2012 sets as one objective promotion of minimal storage capacity to 30 days for every oil marketing company. MERA reported in 2010 that it was planning to increase the country's fuel storage facilities from less than 10 days to 30 days of fuel import cover.
Malaysia	√	√	**Pricing policy**: Gasoline, diesel, and LPG are among controlled goods. Prices of 95 RON gasoline, diesel, and LPG prices for residential consumers have been frozen since Dec 2010. In Jul 2010,	**Supply**: Malaysia has several large refineries. In May 2009, 92 RON gasoline was withdrawn and replaced with 95 RON. **Diversion and smuggling**: LPG for non-

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			government stopped subsidizing 97 RON gasoline. The price difference between 97 RON and 95 RON gasoline has widened since, from RM 0.25 (US$0.08)/liter to RM 0.80 (US$0.26)/liter in early 2013. In May 2010, a five-year plan to cut subsidies that could save US$31 billion was proposed, but not approved by government which feared a voter backlash ahead of general elections in 2013. Retail diesel prices and average monthly benchmark FOB prices relevant to Malaysia since 2007 are shown below. After two relatively sharp price spikes followed by rapid reductions in 2007 and 2008, the retail diesel price has essentially been frozen since 2009. The plot shows a large subsidy, especially in the last two years.	residential use is nearly twice as expensive as that for households, leading to diversion. Illegal diversion of subsidized diesel has been reported. Vehicles and even motorcycles with modified fuel tanks to carry more fuel have been caught. **Response to fuel tourism and out-smuggling**: Effective Dec 2009, foreign motorists are allowed to refuel a maximum of 20 liters within a 50-kilometer radius from the country's borders; filling stations selling more than 20 liters would have their licenses revoked and the foreign cars would be confiscated. Vehicles from Singapore cannot fill their fuel tanks more than ¾ full. **Response to commercial malpractice**: In Aug 2012, government announced that, in order to reduce abuses by fishermen receiving subsidized fuel for their boats, a representative of Malaysian Fisheries Development Authority would verify each catch landed, and those with insufficient catch would no longer be permitted to buy the lower-priced fuel.



Prices in remote areas are higher and government has been taking steps to implement a "one nation, one price" policy to equalize prices across the country. An additional diesel subsidy scheme for eligible commercial vehicles and river passenger boats was introduced in the 2002 budget. Four groups of consumers have been entitled to additional diesel price subsidies: fishing boats, which paid the lowest price per liter; passenger river boards; fleet card holders; and public transport operators. In Jun 2011, government suspended the additional subsidy scheme for nine vehicle categories and certain fishing boats.

Consequences of subsidies: Annual subsidies for the three fuels increased to US$6.6 billion by 2011, with gasoline and diesel dominating in most years.

Year	2005	2006	2007	2008	2009	2010	2011
US$ billion	2.2	2.0	2.6	4.6	1.6	2.8	6.6
% of GDP	1.6	1.3	1.4	2.1	0.8	1.2	2.4

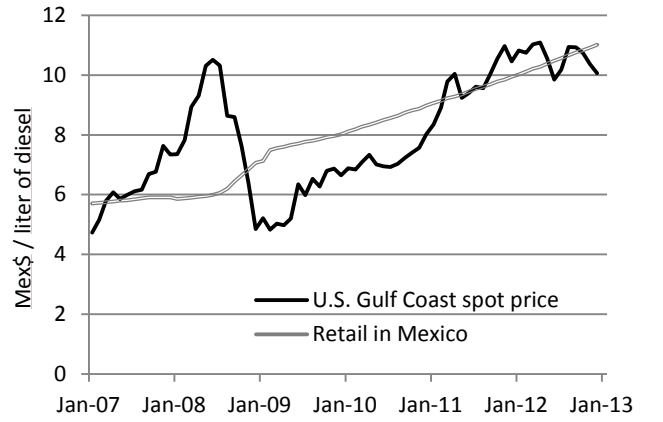
Source: Government of Malaysia.

Energy subsidies have remained high in 2012, but increased revenues from high oil prices and strong tax collection have more than offset subsidy increases.

Hedging: Malaysia Airlines lost US$183 million from fuel hedging in the first three months of 2009.

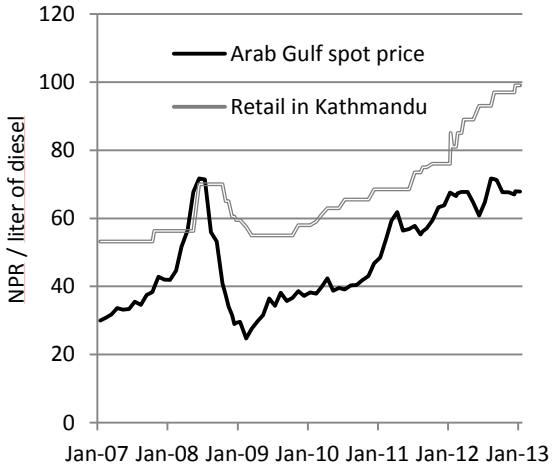
Information: Ministry of Domestic Trade, Cooperatives, and Consumerism posts information on fuel price subsidies every month on its Web site, including comparison of retail prices in Malaysia with those in the neighboring countries.

Mexico	√	√	**Pricing**: Retail price adjustments are decoupled from world price movements and smoothed by adjusting the special tax on production and service. For gasoline and diesel, this tax was negative for three years until May 2009, when it became positive gasoline, and has	**Supply**: Mexico's national oil company, Pemex, is the sole refiner. Its refinery modernization and capacity expansion projects have experienced substantial

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			been negative since Jun 2009 for gasoline and since Jul 2009 for diesel. In 2012, the special tax averaged –US$0.22/liter for regular gasoline, –US$0.23 for diesel, and –US$0.30 for premium gasoline. Regular gasoline and diesel prices were raised at a nominal annual rate of 10–11% in 2010, 2011, and 2012. In 2007, the price of diesel rose by only 4% and gasoline by 5%. The price of regular gasoline grew at only 7% in 2008 and 6% in 2009, but the price of diesel rose by 21% and 16%, respectively. The pace of increase has not been enough to catch up with rising world prices since 2010. Monthly average retail diesel prices and benchmark FOB prices relevant to Mexico are shown below. It is clear that, although not as large as in 2008, a sizable subsidy continues.  When the benchmark LPG prices in Belvieu, Texas, United States, are high, LPG prices in Mexico are kept below import-parity levels, despite Mexico's being a large net importer of LPG. Under Mexico's climate law, passed in Apr 2012 and only the second in the world after UK's Climate Change Act of 2008, government will formulate rules to phase out fossil fuel subsidies. **Consequences of subsidies**: The annual implicit subsidy in 2011 for LPG alone amounted to MXN40 billion (US$3.2 billion). Pemex has had trouble moving refinery projects forward, turning Mexico into a significant importer of petroleum products. **Hedging**: Although different from hedging petroleum product prices to protect consumers, Mexico hedges crude exports every year to protect fiscal revenues. Government achieved remarkable success by hedging crude oil exports in 2009, spending US$1.5 billion for hedging contracts and earning US$5 billion in return. **Information**: Ministry of Energy posts detailed price information on petroleum products. For LPG, Ministry of Energy regulates transport and distribution tariffs, and Ministry of Economy gazettes maximum consumer prices in 145 distribution zones every month.	delays. Despite being a significant oil exporter, Mexico is a significant importer of petroleum products. In 2012, Mexico imported 30% of its LPG, 32% of diesel, and 40% of gasoline consumption.
Mongolia			**Fuel pricing policy**: Fuel prices were deregulated until 2012. Government frequently adjusts excise taxes on fuels to keep prices stable. A proposal to regulate gasoline prices was accepted and a price control council was established in Jan 2012 to regulate gasoline, food, and public transport prices. The Bank of Mongolia in late 2012 granted soft loans totaling US$120 million to fuel importers to keep prices low.	**Supply**: Mongolia imports petroleum products from Russia, China, Kazakhstan, and, starting in 2012, the Republic of Korea. Historically, Mongolia has imported primarily from Russia. **Shortages**: After Russia started restricting exports, Mongolia experienced serious fuel shortages in the summer of 2011, with China (diesel) and Kazakhstan (gasoline and diesel) also imposing export bans. **Stockholding**: Government tries to ensure fuel reserves of 30–40 days.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
Morocco		√	**Pricing policy**: Government controls and subsidizes fuel prices and adjusts them infrequently. The price of LPG has been frozen since 1995, and other fuel prices were not adjusted between 2008 and Jun 2012, when the sharpest price increases in years were implemented for gasoline, diesel, and industrial fuel. The Compensation Fund (Caisse de Compensation) pays for subsidies for certain commodities, including petroleum products, sugar, and wheat. **Social protection**: Under draft plans released in Jan 2013, the subsidy system would be fully or partially replaced with monthly cash payments of DH 1,000 (US$116), with the new program potentially taking effect as early as June but taking about four years to implement rather than a sudden one-off hike in prices. **Consequences of subsidies**: Subsidies for petroleum products including LPG increased to US$5.4 billion by 2011, of which diesel had the largest share at 47%, followed by butane at 30%. Year 2007 2008 2009 2010 2011 US$ billion 1.3 3.2 0.9 2.9 5.4 % of GDP 1.7 3.6 1.0 3.2 5.3 *Source*: Caisse de Compensation. Because of the magnitude of the subsidy and the pricing policy that sets the same unit price independently of cylinder size (3, 6, or 12 kg), household use of LPG is virtually universal and there are many 3-kg cylinders in circulation, against the backdrop of most other LPG markets elsewhere having opted for 10–15-kg cylinders because of large economics of scale associated with cylinder size.	**Supply**: Domestic refining meets about three quarters of demand and the rest is imported. **In-smuggling**: Fuels are smuggled from Algeria into Morocco.
Mozam-bique			**Pricing policy**: A 2006 decree provides for government control of prices of gasoline, diesel, kerosene, and LPG. Petroleum product prices are reviewed every month and maximum retail prices in cities with terminals are published. For other areas, transport costs are added. Energy and finance ministers handle fuel prices as long as price changes are smaller than 20%; if changes are larger, Council of Ministers is responsible for determining prices. Government used to adjust fuel prices every month according to a market-based formula. VAT and fuel tax are not levied on kerosene. The diesel fuel tax is halved for agriculture, fisheries, and power generation. In response to the food and fuel price shock of 2008, government introduced an urban transportation subsidy in Feb and suspended fuel-related taxes until Jul 2009. Government froze fuel prices in Apr 2009 and asked fuel importers to sell below market prices. In Mar 2010, government began raising fuel prices gradually. The prices of petroleum products other than diesel were increased by more than 70% and reached market levels by Aug 2010; diesel prices were raised by 38% to May 2010 but not raised further, incurring losses. In Feb 2010, an agreement between government and fuel importers to settle outstanding claims for 2008–09 came into effect. Government also paid compensation for below-market fuel prices in 2010 until end-May. Government in Dec 2010 paid importers fully for the losses incurred in that year by charging other petroleum products more to cross-subsidize diesel. Government increased gasoline and diesel prices by 10% in Apr 2011 and 8% in Jul 2011, but has not adjusted fuel prices since. Government had hoped to phase out fuel subsidies by the end of 2010, but the events in the Middle East and North Africa were considered extraordinary and government extended the phase-out date. In Feb–Apr and Aug–Sep 2012, world fuel prices rose above the Jul 2011 levels, again leading to losses. In Oct 2012, government completed payments to importers for fuel subsidies incurred in 2011.	**Supply**: Petromoc was the sole importer until 1998, but had run up sizable losses. Its monopoly position was abolished and replaced by Imopetro, owned jointly by main fuel distributors. A 2006 decree specified that Imopetro be the sole importer of petroleum products, but the decree was amended in Mar 2009, giving government the authority to designate an alternative importer. Until May 2012, government had a public tender system for LPG, but the system was abandoned in favor of appointing Petromoc as the sole supplier. **Shortages**: In Jul 2009, fuel distributors stopped selling because they were not being reimbursed for price subsidies, creating severe fuel shortages. In 2011, serious LPG shortages were experienced when South Africa, from which Mozambique imports LPG, ran out of LPG. **Maritime security**: To fight piracy, which resulted in increased transport costs, fuel prices, and insurance bills, Mozambique, South Africa, and Tanzania in early 2012 signed a tripartite pact to strengthen maritime security in the Indian Ocean.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			Consequences of subsidies: Compensation paid by government, including arrears, is shown below: Year 2009 2010 2011 2012 US$ million 102 138 141 95 % of GDP 1.1 1.5 1.1 0.6 *Source*: IMF. **Social protection**: Government in Mar 2011 announced a subsidy program targeting 1.8 million poor people in 11 provincial capitals that would include bus passes for workers, students, and the elderly. Urban transport vouchers were introduced in 2012. **Compensation**: Urban public transport is reimbursed for the price difference between the diesel price in effect and Mt 31 (US$1.03)/liter.	
Namibia			**Pricing policy**: A 1990 act regulates gasoline and diesel prices, and Ministry of Mines and Energy (MME) announces retail prices of gasoline and wholesale prices of diesel by location once a month. The National Energy Fund subsidizes fuel supply to remote areas, and in addition has been used to subsidize regulated fuel prices from time to time. **Information**: Prices of gasoline and diesel are posted on MME's Web site every month.	**Supply**: Namibia imports petroleum products from South Africa. **Shortages**: LPG shortages in South Africa in 2011 affected Namibia.
Nepal			**Pricing policy**: Government controls fuel prices and subsidizes diesel and LPG, and at times kerosene. Prices of kerosene and diesel have been equalized since Nov 2008. Kerosene, but not diesel, is exempt from a VAT of 13%, a road maintenance cess of Rs 2 (US$0.02)/liter, and a pollution charge of Rs 0.5/liter. Protests following the fuel price increases on Jan 18, 2012, forced government to reduce prices on Jan 26. To make up for losses, Nepal Oil Corporation (NOC), wholly owned by government, introduced higher diesel prices for bulk and industrial users in Aug 2008 but withdrew dual pricing in Oct 2008. NOC re-introduced dual pricing of diesel in Jan 2012, whereby those consuming more than 4,000 liters a week are charged markedly higher unit prices. In early 2011, following a government decision, NOC began providing subsidized diesel to factories and hotels, offering a discount of Rs 1.80 (US$0.02)/liter. On Feb 12, 2013, NOC raised the price of LPG by 43%, but after meeting with various student unions rolled back the price increase on Feb 24, citing lack of preparation of color-coded cylinders and consumer cards. Retail prices of diesel in Kathmandu and benchmark FOB prices relevant to Nepal since 2007 are shown below. The plot shows that the largest subsidies were provided in 2008.	**Supply**: NOC is the sole importer of petroleum products and Indian Oil Corporation is the sole supplier to NOC. Costs of supply are high because Nepal is landlocked and fuel imports are trucked. Cash-strapped as a result of mounting losses from price control, NOC has not been able to pay its bills to IOC, prompting IOC to withhold delivery. **Effect of hydropower on diesel demand**: Hydropower shortage in 2008 forced government to turn to emergency diesel generation after extended load shedding. The quantity of diesel imports doubled in just two years between fiscal 2007/08 (Jul 16–Jul 15) and fiscal 2009/10. **Shortages**: There are frequent fuel shortages, in part because of NOC's inability to pay for fuel imports. Diesel shortages prevent backup power generation from running, affecting industries, but rising demand for diesel for power generation is one reason for diesel shortages. Because diesel is subsidized, the more NOC imports, the larger the loss, and hence NOC cut diesel imports in 2011 while trying to increase gasoline imports, on which NOC earns a profit. LPG imports have also been curtailed to reduce NOC's losses, creating LPG shortages. Serious fuel shortages began in Dec 2011, and by Feb 2012, lack of power, diesel (for school buses), and LPG (for cooking) threatened school closure. India was also facing LPG shortages at the time. Black market prices have been higher than official prices as a

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			 In Sep 2012, government announced that students in state colleges would be entitled to price discounts, over and above the subsidies already provided, on four LPG cylinders a year and 10 liters of kerosene a month. In response, students changed the planned one-day strike to protest against price increases on Sep 2 to half-day. This discount program has not been implemented. **Consequences of subsidies**: NOC has been reporting large monthly losses, reaching as high as US$18 million in Jan 2012. In recent months, losses have been dominated by underpricing of LPG. In Dec 2012, NOC proposed a new subsidy mechanism for LPG, which would limit price subsidies to households only who would be entitled to one 14.2-kg cylinder a month at the subsidized price, and deliver the subsidy through a post-purchase cash refund. LPG cylinders for households would be colored red, and other cylinders blue, in addition to households receiving red cards and all other consumers blue cards. **Protests**: Protests against fuel price hikes by students are common. **Information**: NOC posts historical fuel prices going back to 1996, current prices at 13 locations, monthly losses for each fuel per liter and in total, and the price structure for each fuel. In 2012, the highest monthly loss occurred in Apr, amounting to US$19 million. The frequency of retail price adjustments is shown below:	result. There have been charges of artificial shortages to push up prices. **Response to commercial malpractice**: NOC in Apr 2012 began distributing red (1.5 million for households) and blue (0.5 million for commercial consumers) LPG cards. Only red-card holders are eligible for subsidized LPG after card distribution is completed. After 5 months, NOC had completed verification of only 5,000 consumers.

Year	2008	2009	2010	2011	2012
Gasoline	5	1	4	3	6
Diesel and kerosene	4	3	5	3	7
LPG	2	1	2	0	3

Nicaragua		√	**Pricing policy**: Prices were deregulated in 1999 except LPG, for which maximum prices are set by location. When Tropigas, which controlled 60% of the LPG market at the time, asked for a 100% price increase amidst serious LPG shortages, the president in Sep 2008 declared an economic state of emergency for six months, authorizing Nicaraguan Institute of Energy to import and sell LPG. The state of emergency was repealed in Jan 2009. **Information**: Instituto Nicaragüense de Energía (Nicaraguan Institute of Energy) posts the average prices of three deregulated products—gasoline, diesel, and kerosene—surveyed at about 75 filling stations in Managua every week, and provides details on the three highest-priced and three lowest-priced filling stations as money-saving tips.	**Supply**: PetroCaribe member. **Stockholding**: There is a minimum stockholding requirement of 10 days of supply.
Niger		√	**Pricing policy**: Prices have been uniform throughout the country since Aug 2001. Beginning in Jan 2012, gasoline and diesel prices	**Supply**: The first refinery in the country began operating in Nov 2011, together with

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			are set by a ministerial decree. Prices were adjusted once in 2009 and 2010, and four times in 2011. In Jan 2012, prices of all fuels except kerosene were lowered, and were not adjusted for the rest of the year. In Jan 2013, the prices of gasoline and diesel were lowered, while kerosene and LPG prices did not change. An energy fund, created in 1994, has taken a few francs a liter from gasoline and diesel and cross-subsidized LPG. Fuel subsidies amounted to US$29 million in 2009 (0.5% of GDP), US$61 million in 2010 (1.1% of GDP), and US$70 million in 2011 (1.2% of GDP). With the start-up of oil production and refinery operation in 2011, explicit fuel price subsidies were eliminated in 2012 (source IMF). **Protests**: The start-up of the refinery in Nov 2011 raised expectations about dramatic reductions in the prices of petroleum products. When the reductions did not occur, protests broke out against the high cost of living and turned violent in Dec 2011. Government in Jan 2012 in response increased civil service pay by 5–10% and reduced electricity tariffs by 25% and water by 5%. **Information**: SONIDEP (Nigerien Petroleum Products Company) posts current and historical prices going back to 2001 on its Web site.	domestic oil production.
Nigeria	√	√	**Pricing policy**: Gasoline prices are uniform, controlled by government, and infrequently adjusted. The gasoline price was ₦65/liter between Aug 2005 (US$0.50) and Dec 2011 (US$0.41), except in 2007 and 2008 when it was raised to ₦75/liter for a month and then lowered to ₦70/liter. Diesel prices have been deregulated for several years. Government removed the gasoline subsidy on Jan 1, 2012 and allowed the retail price to rise above ₦140 (US$0.88)/liter or higher, but following widespread protests lowered it within two weeks to ₦97 (US$0.61), still representing a 49% increase from the price in 2011. A Jun 2009 presidential directive deregulated the price of kerosene for household use, but Nigerian National Petroleum Corporation (NNPC) continues to sell kerosene at a heavily subsidized price of ₦50 (US$0.32)/liter and receive reimbursement from government. The kerosene price is about one-third of the market price and the subsidy is intended to help poor households with lighting and cooking. **Regulatory agencies**: Petroleum Products Pricing Regulatory Agency (PPPRA) manages Petroleum Support Fund (PSF), which was established in Jan 2006 to stabilize domestic fuel prices. With the Central Bank of Nigeria as the custodian of the fund, PSF follows the principle of under-recoveries to be reimbursed and over-recoveries to be paid into the fund, based on international costs, charges, and controlled profit margins using a pricing template. Petroleum Equalization Fund Management Board equalizes transportation costs for pan-territorial pricing. PPPRA approves import quotas for gasoline and eligibility for subsidy reimbursement. **Social protection:** Leading up to the removal of the gasoline subsidy in Jan 2012, government developed a Subsidy Reinvestment and Empowerment (SURE) program. The objective of the SURE program is three-fold: to mitigate the immediate impact of subsidy removal, accelerate economic transformation through investing in critical infrastructure, and lay a foundation for a national safety net program. Social protection mechanisms under SURE include maternal and child health services, public works for women and youth, urban transport development, and vocational training. However, the full document was not issued until Nov 2011, less than two months before the subsidy removal, giving inadequate time for	**Supply**: Years of subsidies and mismanagement have left the refining sector in Nigeria in disrepair, forcing the world's eighth exporter of crude oil to become a significant importer of petroleum products. In Nov 2012, government said that attacks on petroleum product pipelines cost Nigeria ₦105 billion (US$7 billion) a year. There are significant delays in discharging fuel at ports, incurring considerable demurrage charges; gasoline unloading of 20-40 days was said to be common until 2012, when imports dropped and the waiting time was reduced to more like three weeks. **Shortages**: Attacks on oil pipelines and disagreement between oil companies and government over subsidy payments have resulted in frequent acute fuel shortages. Following government's decision to no longer include the subsidy provision in the 2009 budget, private oil marketers stopped importing, causing serious fuel shortages. Delays in reimbursements continued to discourage imports, and serious fuel shortages were reported in late 2009 and early 2010, when it was also reported that marketers were not importing because of uncertainties about when deregulation would be announced. Shortages continued in Jan 2012, after licenses were suspended following the investigation in the House of Representatives. Serious shortages were experienced particularly in the last quarter of 2012. Serious and continuing kerosene shortages have meant that consumers rarely benefit from the large unit price subsidy, and black market prices could even exceed

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			communication and preparation of the mitigation measures. The 2013 budget allocates ₦273.5 billion (US$1.7 billion) for the SURE program. **Protests**: Gasoline pricing has been highly politicized in Nigeria and labor unions strongly oppose deregulation. Immediately after the price increase in Jan 2012, the unions staged an eight-day strike, estimated to have cost the economy more than US$1 billion. **Consequences of subsidies**: Fuel subsidies (implicit and explicit) increased six-fold in local currency between 2006 and 2011 and surpassed US$11 billion in 2011, constituting 4.7% of GDP:	US$2/liter at times, several times the official price. **Smuggling**: Fuel is smuggled to Benin, Cameroon, and other countries. The gasoline price increase in Jan 2012 led to fuel shortages and price hikes in the neighboring countries, which were relying on cheap smuggled fuel from Nigeria.

Year	2006	2007	2008	2009	2010	2011
US$ billion	2.0	2.3	5.4	2.7	5.3	11.4
% of GDP	1.3	1.4	2.6	1.6	2.3	4.7

Souces: IMF for 2006–2010, and the Central Bank of Nigeria as cited in Nigeria (2012) for 2011.

A market with deregulated diesel and regulated gasoline prices is unusual, leading to much greater apparent consumption of gasoline than diesel. According to IEA data, the gasoline-to-diesel consumption ratio increased from 2 in 2000 to 7 in 2010, nearly triple the second highest ratio in the world (United States) and possibly suggesting increasing smuggling of subsidized gasoline. Five illegal alternative markets for subsidized kerosene have been reported in the media: (1) much higher prices of kerosene on black markets, (2) adulteration of diesel with kerosene, (3) diversion of subsidized kerosene for household use to the aviation fuel sector, (4) out-smuggling to neighboring countries, and (5) presenting subsidized kerosene as having just been imported to claim the subsidy reimbursement for the second time. In Dec 2011, Major Oil Marketers Association of Nigeria warned that selling household kerosene as jet aviation fuel posed a serious safety threat. The scale of corruption also discredits government's argument that savings from subsidy removal can be used more productively and equitably. A former secretary general of a workers' union captured this sentiment as follows: "Until they stop corruption, all these ideas will not work… Nigeria is rich, we have money."

Investigations into subsidy abuse:

Protests against the gasoline subsidy removal in Jan 2012 and criticisms of the poor governance in the sector led to establishment of several government committees and task forces in 2012:

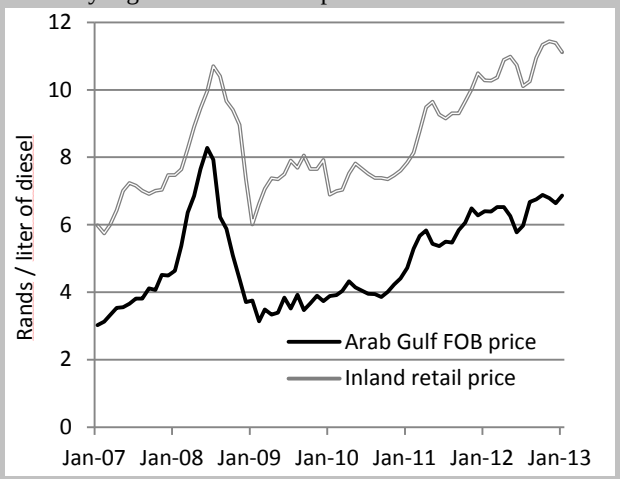
- In Jan, the House of Representatives named an eight-member ad hoc committee led by Hon. Farouk Lawan to probe the subsidy regime between 2009 and 2011"to verify and determine the actual subsidy requirements and monitor the implementation of the subsidy regime in Nigeria." The committee's report, submitted in Apr, pointed to abuses on an enormous scale and massive overpayments in 2011. Against the appropriated sum of ₦245 billion (US$1.6 billion), the committee found effective subsidy payments amounting to ₦2,587 billion (US$16.7 billion). The number of eligible importers increased sharply from six in 2006 to 140 by 2011. Many transactions appeared suspect. However, a bribery allegation against Hon. Lawan led the executive branch to establish its own committee.
- Federal Ministry of Finance set up a committee in May to scrutinize the fuel subsidy payments in 2011. Headed by Aigboje Aig-Imoukhuede, a member of the Economic Management Team, the committee submitted a report in July, claiming that marketers and importers had committed 17 infractions at a cost of ₦423

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			billion (US$2.7 billion) in overpayments. • Protests by marketers that they had not been invited by the technical committee to challenge the allegations prompted establishment in July of a Presidential Committee on Verification and Reconciliation of Subsidy Payments, also headed by Aig-Imoukhuede. This committee lowered the estimates of the overpayments to ₦382 billion (US$2.5 billion), indicting 25 companies. One of the committee's recommendations was to verify shore tank certificates and records of sales proceeds. • President Jonathan directed the committee to implement the above recommendation. The report submitted in Nov indicated that transactions of 50 companies, amounting to ₦232 billion (US$1.5 billion), had not been legitimate. **Information**: PPPRA's Web site posts the pricing template for gasoline and kerosene, indicating the magnitude of under-recoveries. The status of PSF after 2008 is difficult to find on PPPRA's Web site, although it is available through Oct 2011.	
Pakistan		√	**Pricing policy**: Ex-depot prices of automotive diesel have been deregulated since Jun 2002. Government was setting ceilings for ex-depot prices of other fuels based on an import-parity formula until Jun 2011, when these prices were also deregulated except kerosene. Ex-refinery prices cannot exceed the average of Pakistan State Oil's (PSO) import prices in the preceding two weeks, excluding PSO import incidentals. If PSO prices are not available, ex-refinery prices are based on an import-parity formula. For LPG, government sets ceilings for ex-refinery or ex-processing plant prices of domestically produced LPG but not imported LPG. In 2012, Ministry of Petroleum and Natural Resources reported on its Web site that fuel prices were being subsidized through adjustments in the Petroleum Levy. E10 has higher octane and is cheaper than pure gasoline. **Hedging**: In Aug 2009, State Bank of Pakistan rejected the finance ministry's proposal to hedge oil prices for a year. Hedging losses suffered by the Pakistan International Airlines in 2008 were questioned by the Public Accounts Committee of the National Assembly in June 2010. **Information**: Oil companies are required to notify their selling prices to Oil and Gas Regulatory Authority (OGRA), and the prices are posted on OGRA's Web site by company and location. In addition, OGRA continues to compute and notify ex-refinery prices of diesel, kerosene, and gasoline (containing 10% ethanol) every month. Maximum prices of other fuels computed by Pakistan State Oil (PSO) are also posted for information. OGRA also posts the findings of inspections to check compliance and commercial malpractice.	**Shortages**: When maximum fuel prices were set by government, fuel shortages were common just prior to price revision. Gasoline shortages in early Jan 2009 prompted demonstrations across Pakistan. There was an accusation that dealers stopped buying fuel in late Jan 2009 in anticipation of a price decrease, leading to fuel shortages, and prospects of a price increase in early Sep 2009 also reportedly led to many filling stations stopped gasoline sale. In Sept 2010, oil marketing companies said that not being able to recover costs on account of late payments by consumers and of price differential claims prevented them from complying with stock requirements. **Stockholding**: The May–Jun 2011 shortage prompted Pakistan Economy Watch to ask the Supreme Court to intervene, and prompted government to direct all oil marketing companies to maintain stocks of up to 20 days of consumption and give them 6 months to comply or risk license revocation or heavy penalties. While PSO had been required to maintain 20 days of petroleum product stocks, smaller companies had to maintain only 7–14 days of stocks. At the end of Jun 2011, OGRA suspended the licenses of six companies for failing to maintain gasoline stocks equivalent to 14 days of typical consumption. **Impact of power and natural gas**: The inability of power utilities to pay for fuel oil has led to PSO's cash flow problems and eventually fuel shortages. PSO's receivables in May 2010 stood at PRs 114 billion ($1.35 billion), and by Jun 2011 PRs 131 billion ($1.5 billion). Natural gas shortages have increased demand for LPG, pushing up LPG prices. Falling hydropower

Country	E	R	Pricing policy and strategy	Fuel supply conditions
				generation and gas supply to CNG stations and power plants increased demand for gasoline and fuel oil at the end of 2011. **Commercial malpractice**: LPG was being sold far above the maximum prices set by OGRA in Jan 2009. All Pakistan LPG Distributors Association claimed in Mar 2012 that the 'Gas Mafia' had made estimated billions of rupees during the previous six years by creating artificial shortages of LPG, especially in winter, and selling the domestic product as imported gas. OGRA said in Dec 2011 that smuggling of low-quality LPG and LPG cylinders from Iran was a serious concern, which also posed a threat to public safety.
Panama			**Pricing policy**: Government sets maximum selling prices for gasoline and diesel every 14 days. The price of LPG sold in 25-pound (11.4-kg) cylinders has been subsidized and frozen since 1992. **Information**: Authority for Consumer Protection and Competition, proclaiming "an informed consumer has power," collects and posts on its Web site gasoline and diesel prices at filling stations every four weeks, highlighting those offering lowest prices.	**Supply**: PetroCarib member.
Peru	√	√	**Pricing policy**: A 2004 law deregulated prices, but government in May 2004 set up a Petroleum Product Stabilization Fund for an initial period of 120 days when benchmark gasoline and diesel prices soared by about 35% and 50%, respectively, from their December 2003 levels. In the face of volatile and rising world oil prices, government has not been able to retire the fund to this day. Budgetary transfers to the fund between its inception and the end of 2011 totaled US$2.5 billion. The fund covers gasoline, diesel, LPG, and industrial oil for power generation. Government publishes reference fuel prices every week and adjusts them within a price band. If the import- or export-parity price (depending on the trade status of the fuel) at the refinery gate or some other equivalent point in the supply chain lies within a price band, there is no government intervention. If the import- or export-parity price lies outside the band, the difference is transferred to or withdrawn from the fund. The fund's debt in 2008 reached 3,000 million S/ (US$1 billion), which was retired in 2009. After a large budgetary transfer to the fund, an emergency decree was issued in April 2010, requiring the regulatory agency to adjust price bands every two months. The decree stated that the band for price variation was to be 5% except LPG, for which the band was to be 1.5%. **Consequences of price smoothing**: Budgetary transfers to the fund since inception totaled US$2.5 billion by end-2011: Year 2005 2006 2007 2008 2009 2010 2011 US$ million 55 1 61 735 365 423 900 *Source*: Government. **Compensation**: The Peruvian tax agency in August 2010 approved reductions of up to 30% in special selective consumption taxes on diesel for passenger transport for three years. Only transportation companies that operate with all documentation and up-to-date permits were eligible, a move that would also help companies facing unfair competition from illegal operators. **Information**: The Website of Osinergmin (Organismo Supervisor	**Supply**: Peru has one complex refinery with capacity of about 100,000 bpd. **Stockholding**: A minimum of 15 days or 5 days of storage is required by regulation, depending on the nature of the facility.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			de la Inversión en Energía y Mineria, Supervisory Agency for Investment in Energy and Mining) posts detailed retail prices by location and company and the date of the last price change, but not historical price data.	
Philip-pines		√	**Pricing policy**: The downstream petroleum sector was deregulated in 1998. The import duties on crude oil and petroleum products were reduced from 3% to 0% by an executive order in Jun 2010. In Feb 2009, the Department of Energy asked oil companies to explain in writing within 48 hours the justification for price increases, and added that it was checking the dates of the acquisition of the supply, the volume, the value, and the shipment date. On Oct 23, 2009, government imposed price ceilings in response to devastating typhoons, forcing oil companies to lower prices back to the Oct 15 level. This led to early closure of some filling stations. The ceilings were lifted on Nov 16, on condition that the oil companies agree to implement discounts and stagger future price increases. Under the label "jump-starting" strategic reserves, the president ordered Philippine National Oil Company-Exploration Corporation, which is 99.8% owned by government, to sell diesel at ₱2–3 (US$0.05–0.07)/liter below the market level starting in Jul 2011. **Price negotiation**: Government in 2003 negotiated voluntary diesel price discounts with oil companies for transport operators, and there were 803 filling stations offering discounts as of Dec 2012. The size of the discount has varied over the years. **Compensation**: In April 2011, an executive order established a Public Transport Assistance Program and allocated ₱450 million (US$10 million) for compensation using smart cards to registered jeepney and three-wheel drivers. At ₱1,050 (US$24) per jeepney, only 95,000 out of 150,000 cards printed for jeepneys were claimed, enabling the government to offer an additional ₱1,200 (US$28) per vehicle in 2012. Government abandoned a plan for a fuel subsidy scheme for agriculture and fisheries in May 2011, citing difficulties with beneficiary identification. **Hedging**: Philippine Airlines reported fuel-price hedging losses for the financial year ending in March 2009. **Information**: The Department of Energy monitors both wholesale and retail prices, and posts detailed current and historical data by location and company as well as the location of each filling station offering a diesel fuel discount on its Web site.	**Supply**: With closure of two refineries, refining capacity has gone down, and in addition the utilization rate is low at less than 65%. Product imports are growing, now accounting for half of consumption. **Shortages**: LPG shortages were experienced in Jan–Feb 2009, and again in Sep 2009 when announcements by some LPG suppliers of impending price increases led to stockpiling and a temporary shortage. Damage to a vital bridge by a typhoon in Dec 2009 caused LPG shortages in Manila and other provinces. Manila experienced fuel shortage in Nov 2010 after government shut down a leaking pipeline. **Smuggling**: In 2009, citing a study, Petron Corporation said that fuel smugglers were controlling one-third of the petroleum market, resulting in an annual government revenue loss of ₱30–35 billion (US$630–730 million). Government had earlier charged a fishing company with illegally importing more than two million liters of diesel.
Russian Federation	√	√	**Use of export tax and other means to lower prices**: Government uses export taxes on petroleum products and other means to influence domestic fuel prices. In Feb 2011, Prime Minister Putin ordered Fededral Antimonopoly Service to investigate any cases of unjustified price increases, effectively lowering domestic prices, at which point gasoline exports (typically making up 10% of total production) began to increase. Faced with gasoline shortages on the domestic market, government increased gasoline export tax to US$408.30 a tonne (US$0.55/liter) in May 2011 and to US$415.80 a tonne (US$0.56/liter) in Jun 2011, levels high enough to act as a de facto export ban. Prior to this move, Russia's Federal Antimonopoly Service had found companies guilty of over-charging and fined them. Government over the last several years has "recommended" that oil companies sell diesel at a discount to farmers twice a year. For the first agricultural season of 2012, the price discount offered was 30%, up from 10% in 2010 and 2011. In 2012 government reached an agreement with oil companies to keep gasoline prices at the Dec 2011 level until the Mar 2012 presidential elections, and	**Supply:** The refining industry in Russia has struggled to meet tightening fuel specifications. Its inability to meet Euro-3-compliant fuel quality standards, which came into effect in January 2011, prompted many refineries to curb production or increase exports, contributing to acute gasoline shortages in many regions in early 2011. In response, Prime Minister Putin waived the fuel quality standards on a temporary basis while simultaneously increasing the gasoline export tax sharply. The timeline for fuel quality standards was subsequently postponed for the third time since 2008, delaying the ban on Euro-2-compliant gasoline and diesel until the end of 2012, or a full 13 years after Euro 3 standards came into effect in the European

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			then extended the price freeze until May 2012.	Union. **Shortages**: There are often gasoline shortages in summer and diesel shortages in winter. In Apr 2011, gasoline purchases were limited to 20 liters per vehicle in some regions. A sharp increase in gasoline exports in early 2011 was caused by the profitability of exports over domestic sales and the inability of some Russian refineries to meet Euro 3 specifications. The Tuva region introduced ration coupons for gasoline in May 2012, the first time since the Soviet era, when the price of gasoline soared to 50 rubles (US$1.78)/liter. **Strategic reserves**: In Jul 2011, the energy minister announced a plan to build reserves holding 2 million tonnes of petroleum products, but did not provide a timetable or how much of each product. Establishing crude oil reserves has been discussed for years but without concrete progress.
Rwanda			**Pricing policy**: Government sets maximum prices for gasoline and diesel in Kigali. Since Jul 2011, government has tried to maintain constant prices for at least three months at a time. The retail diesel and gasoline prices are the same if the international diesel price is higher than the international gasoline price, and the retail diesel price is lower otherwise. At a cost equivalent to 0.4% of GDP, government reduced fuel taxes in Jul 2011 by RF50 (US$0.08)/liter and in Jan 2012 by another RF50 to bring fuel taxes more in line with those in the neighboring countries as well as to curb inflation. Measures to keep prices lower include increasing stockholding and bulk procurement.	**Supply**: Rwanda imports through Tanzania or Kenya and Uganda, and are adversely affected by supply disruptions in these transit countries. **Shortages**: Rwanda in early 2009 suffered from the fuel shortages affecting east Africa. **Stockholding**: Rwanda's Permanent Secretary for the Ministry of Trade and Industry in March 2012 spoke of a plan to quintuple fuel storage capacity by 2017.
Senegal		√	**Pricing policy**: The National Committee for Hydrocarbons regulates prices based on an import-parity formula and reviews them every four weeks. Fuel price subsidies have incurred budgetary expenditures every year except 2010. For decades, government heavily subsidized LPG for household use. Today, the unit prices of LPG sold in 2.7-, 6-, and 9-kg cylinders are still slightly lower than those for LPG sold in larger cylinders; the price differences used to be much larger in the past. In deregulated markets, unit prices should decrease with cylinder size on account of large economies of scale in storing, bottling, and transporting LPG. There is no specific tax on kerosene, leading to a large price difference between kerosene and diesel. Government in Feb 2012 decided to reduce fuel taxes at an estimated cost of CFAF35 billion (0.5% of GDP). **Consequences of subsidies**: The subsidies to the refinery and for LPG in 2009 are estimated to have amounted to US$70 million. The inability to reimburse the refinery resulted in closure of the refinery for a while, causing serious fuel shortages.	**Supply**: There is one small refinery, which needs tariff protection to be able to compete with fuel imports. During much of 2006 and 2007, the refinery was shut down due to financial difficulties. **Shortages**: Serious fuel shortages have occurred, such as LPG shortages in early 2009 and again in 2010. The prolonged LPG shortages in early 2009 were caused by the inability of the refinery to pay for imports due to mounting subsidies and government's falling fell behind in subsidy reimbursement. The shortage doubled the unofficial price of LPG and also pushed up the price of charcoal, which competes with LPG in that market. A lack of fuel supply for power generation has led to recurrent power outages. In October 2010, the energy minister was replaced, in part in response to the public anger over electricity and LPG shortages. **Response to commercial malpractice**: There is a fuel chemical marker program to check for adulteration of diesel with kerosene and other types of commercial

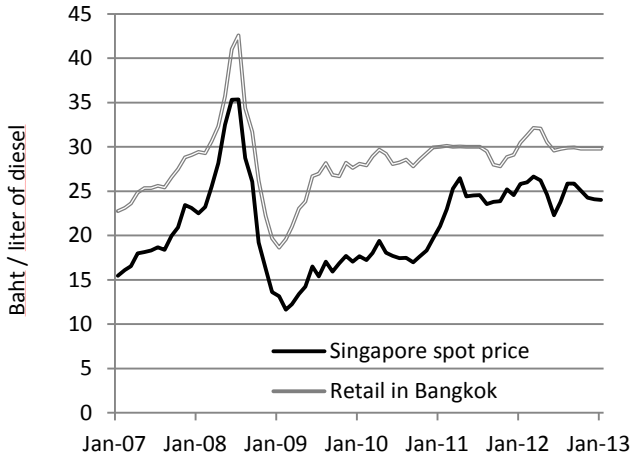
Country	E	R	Pricing policy and strategy	Fuel supply conditions
				malpractice.
South Africa		√	**Pricing policy**: Government regulates gasoline, kerosene, and diesel prices, and in addition LPG prices have been regulated since Jul 2010. Once a month, government announces basic fuel prices for gasoline, diesel, and kerosene; maximum LPG retail prices by location; maximum national retail price of illuminating kerosene; and maximum ex-refinery price of LPG. Basic fuel prices sum CIF, 0.3% ocean losses, cargo dues, coastal storage, and stock financing (currently for 25 days). To the basic fuel price are added customs and excise, specific fuel tax, road accident fund levy (gasoline and diesel), slate levy (gasoline, diesel, and kerosene), petroleum pipeline levy (gasoline and diesel), illuminating kerosene dye levy (diesel; the price difference between kerosene and diesel is about US$0.30/liter), demand-side management levy (gasoline), inland transport recovery levy (gasoline and diesel), wholesale and retail margins, and transport costs. The slate levy settles under- or over-recoveries by oil companies arising from differences between the basic fuel prices, which remain the same for one month at a time, and daily fluctuations in world oil prices. The pricing formula allows for a total of 3 days of demurrage. Monthly retail prices for diesel in the inland area and monthly average FOB benchmark prices relevant to South Africa since 2007 are shown below. The retail price tracks the world price movement closely, and is also markedly higher than the FOB price.  	**Supply**: South Africa has four large, sophisticated crude oil processing refineries. In addition, South Africa has coal-to-liquid and gas-to-liquid plants, which produce high-quality diesel with essentially no sulfur and a very high cetane number. **Shortages**: South Africa experienced serious fuel shortages in Dec 2011−Jan 2012, on account of four refineries shutting down and a technical problem at the port in Durban, affecting fuel supplies in the neighboring countries importing from South Africa. Government's media release in response to the shortages underscored the importance of expanding refining capacity and improving the import infrastructure. **Maritime security**: To fight piracy, which resulted in increased transport costs, fuel prices, and insurance bills, South Africa, Mozambique, and Tanzania in early 2012 signed a tripartite pact to strengthen maritime security in the Indian Ocean.
Sri Lanka		√	**Pricing policy**: Following a balance-of-payment crisis, government adopted a pricing formula, which was abandoned in 2004. The formula was revived in Jul 2007 for two months before it was abandoned again. LPG price increases require prior authorization by Consumer Affairs Authority. Government sets base prices, uniform throughout the country, of gasoline, diesel, and kerosene sold by Ceylon Petroleum Corporation (CPC). Lanka Indian Oil Corporation (IOC) is free to set its prices, but given that CPC controls two-thirds of the market and is the price setter, CPC's prices effectively limit Lanka IOC's price movement. The VAT on gasoline was reduced from 15% to 5% in Jan 2008 and then increased to 12% in Jan 2009. CPC did not adjust prices in 2010, except that of subsidized fuel oil supplied to Ceylon Electricity Board (CEB). CPC froze prices of other fuels between Dec 2009 and April 2011. CPC made only two price adjustments (both increases) in 2011 and two in 2012, the second one of which in Dec involved a price increase only for 90 RON gasoline. Import duties are frequently reduced or waived,	**Supply**: CPC's small refinery is in need of expansion and modernization but the factors plaguing the financial viability of CPC have deterred investment. Fuel quality improvement is one of the casualties, with reduction in diesel sulfur to 0.05% postponed from 2008 to 2012. **Concessional financing**: The Iranian government granted an interest-free credit facility for 210 days to purchase crude in 2008, and CPC used up to US$1.2 billion and repaid US$0.845 billion by end-2008.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			particularly on gasoline, to compensate oil companies for losses suffered. Social Responsibility Levy and VAT on gasoline imports were removed in 2010. Government increased the prices of gasoline (by 9%), diesel (37%), kerosene (49%), and fuel oil (80%) in Feb 2012. Although the price of fuel oil sold to CEB was raised by 50% in Feb 2012, it remains subsidized. **Protests**: The large price increases in Feb 2012 sparked protests. Some private bus operators stopped operating, and violence broke out when fishermen protested, killing one. **Social protection**: The national poverty alleviation program, Samurdhi, provides a monthly allowance for kerosene to households without electricity, raised from SL Rs 100 (US$0.85) to SL Rs 200 (US$1.71) in February 2012. **Compensation**: Following a 37% price increase, government in Feb 2012 agreed to provide 50 liters of fuel per day to short-distance buses and 80 liters to long-distance buses at the old diesel price. In addition, SL Rs 1,550 (US$13) will be provided to each short-distance private bus owner and SL Rs 2,480 (US$21) to each long-distance private bus owner. Government also granted per-liter subsidies of SL Rs 25 (US$0.21) and SL Rs 12 (US$0.10) to fishing boats fueled by kerosene and diesel, respectively. **Hedging**: CPC entered into a series of contracts to hedge a portion of its oil imports beginning in 2007, increasing the amount hedged over time to about one-third of oil imports. Lanka IOC also hedged. As long as oil prices were rising, hedging was advantageous, but hedging proved to be extremely costly once oil prices began to crash in the last few months of 2008. In the end, Sri Lanka's treasury was exposed to about US$464 million in claims from three foreign and two local banks. The perception that the hedging deals were unfairly structured and that the public was being asked to pay for the hedging losses through higher retail prices and not benefiting from falling oil prices rapidly gained wide acceptance, and petitions to that effect were filed. The cabinet appointed a risk management committee to review all hedging contracts and to minimize the losses in Nov 2008. The supreme court ordered a temporary suspension of the CPC chairman and payments to the banks until two petitions, alleging fraud and corruption in the hedging deals, had been dealt with. The supreme court ordered the treasury to handle fuel imports between Dec 2008 and Nov 2009. Lanka IOC also reported losses from hedging. **Consequences of subsidies**: CPC's operational losses were SL Rs26 billion (US$0.23 billion) in 2009, SL Rs27 billion (US$0.24 billion) in 2010, and SL Rs94 billion (US$0.85 billion) in 2011, due to provision of heavily subsidized fuel oil to the power sector, price control, and non-payment by several institutions, particularly CEB. SL Rs55 billion (US$480 million) worth of treasury bonds were issued in Jan 2012 to settle outstanding debts owed to CPC by CEB and other state-owned enterprises (source Central Bank of Sri Lanka). **Information**: Historical prices are posted on CPC's Web site. The Central Bank of Sri Lanka in its reports regularly provides statistics on subsidies.	
Syrian Arab Rep.	√	√	**Pricing policy**: Government controls, subsidizes, and infrequently adjusts fuel. Most gasoline is 90 RON, the price of which was raised to S£44 (US$0.93)/liter in Sep 2010, and raised again in Dec 2011. In Nov 2010, government said it would allow imports of 95 RON gasoline, to be sold at S£50 (US$1.08)/liter. In 2010, government	**Supply**: Syria has two refineries, both of which are slightly larger than 100,000 bpd and the larger of which has a processing unit for making more diesel. **Shortages**: Severe diesel shortages were

Country E R	Pricing policy and strategy	Fuel supply conditions
	had put forward 2015 as the year in which to move to market pricing. The diesel price was raised in Apr 2008 from S£7 (US$0.15) to S£25 (US$0.52), but cut to S£20 (US$0.43) in Apr 2009 and further to S£15 (US$0.32) in May 2011 before being raised to S£20 (US0.32) in May 2012 and later to S£25. In Jan 2013, government raised the gasoline price from S£50 to S£60 (US$0.85) a liter and diesel from S£25 to S£35 (US$0.49) a liter. **Consequences of subsidies**: Mahrukat, Syria's sole buyer and distributor, reported losses totaling S£372 billion (US$7.9 billion) in 2008, falling dramatically to S£14 billion (US$0.3 billion) in 2009 due to lower world prices and higher domestic prices. Subsidy in 2010 was reported to have topped US$2.9 billion. In May 2012, when the diesel price was raised to S£20/liter, government said the subsidies had exceeded S£250 billion (US$4 billion). **Social protection**: Every household received a coupon to buy 1,000 liters of diesel at S£9 (US$0.19)/liter when government nearly tripled the diesel price in Apr 2008. Government in Jan 2011 increased the heating oil allowance for two million public workers and retirees by 72 percent to about 1,500 Syrian pounds (US$32) a month.	reported in the winter of 2011–12. For heating Syrian families use 200–400 liters of diesel a month. Severe LPG shortages meant that a 12.5-kg LPG cylinder could cost as much as S£1,200 (US$22) instead of S£250 (US$4.7). The diesel shortages were blamed for illegal logging in the winter of 2011–12.
Tajikistan	**Pricing policy**: Fuel prices are deregulated, but Gazpromneft Tajikistan is considered a monopolist and its prices are subject to approval by Antimonopoly Agency. **Impact of Russian export taxes**: Tajikistan was exempt from Russian export taxes between 1995 and 2010, but on May 1, 2010, Russia removed tax exemption status. The sharp rise in the export taxes in May 2011 led to a sharp price hike. In Jun 2011, the Russian export tax on gasoline rose as high as US$415.80 per tonne (US$0.56/liter).	**Supply**: Heavily reliant on fuel imports from Russia. Although there are six major oil distributors in Tajikistan, after Gazpromneft Tajikistan's 52%, the second largest market share is Nuri Dilshod's mere 5.3%. **In-smuggling**: There is much smuggling of petroleum products from the Kyrgyz Republic, which is not subject to Russian export taxes. **Shortages**: Dushanbe experienced fuel shortages in Mar 2010. Severe shortages of 92 and 95 RON gasoline occurred in Sep 2011, when filling stations stopped selling gasoline on Sep 13.
Tanzania	**Pricing policy**: The downstream petroleum sector was deregulated in 2000. In July 2007, Petroleum (Conservation) Act was amended to make Energy and Water Utilities Regulatory Authority (EWURA) the economic regulator of the sector. There is a regulatory levy on petroleum products to finance EWURA. Energy and Water Regulatory Authority (Petroleum Products Price Setting) Rules, published in Jan 2009, requires indicative and maximum prices to be issued; rules and pricing formulae were amended in Jul 2011. Prices were issued twice a month but switched to once a month in 2012. Currently price ceilings on gasoline, diesel, and kerosene are set for wholesale (one uniform price for each fuel) and retail (differing by region). Government removed VAT on petroleum products in the 2006/07 budget. Excise duties for diesel and kerosene were adjusted in Jul 2011 to narrow and even eliminate the price difference between the two fuels, which previously favored kerosene by a wide margin and led to large-scale adulteration of diesel with kerosene. In mid-Oct 2011, government reported that kerosene imports had fallen by two-thirds and diesel imports rose by 50% as a result. Oil marketing companies complained in Aug 2011 that the new ceilings on Aug 3 forced them to operate at a loss, said they would operate at a loss for only 24 hours, and stopped selling for a week. After threatening to revoke	**Supply**: Tanzania stopped government involvement in fuel imports in 2000 and shut down its sole refinery in the early 2000s. An order issued in Oct 2007 requires all product importation to be carried out using a bulk importation system, and government issued Petroleum (Bulk Procurement) Regulations in Jun 2011. Aside from exploiting economies of scale, bulk importation was also considered to help reduce tax evasion by collecting oil importation data. By Mar 2012, there were complaints about lack of transparency by Petroleum Importation Coordinator, which awarded the contract to the same company three times in succession and which was accused of rejecting too many bids from established international oil companies on minor technicalities. In Apr 2012, oil companies issued a letter complaining about the non-compliance of the imported fuel with fuel quality, damaging vehicles.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			licenses, government raised prices 12 days later, but not before suspending BP Tanzania's wholesale license for three months. In Feb 2012, Director of the Environment Division in the Prime Minister's Office said government was considering subsidizing LPG to stem deforestation. **Information**: EWURA posts price ceilings by fuel type and location on its Web site in English and Kiswahili. All filling stations are required to post petroleum product prices on boards that are clearly visible and show prices charged, discounts offered, and any trade incentives or promotions on offer.	In Jun 2012, a government laboratory confirmed that gasoline samples from 10 out of 11 ships did not meet fuel specs. In Aug 2012, Minister of Energy and Minerals requested EWURA, Petroleum Importation Coordinator, and oil marketing companies to submit detailed reports on the implementation of the procurement system. **Shortages**: Power shortages due to drought in 2011 forced mining companies and other industries to resort to diesel power generation. There were localized fuel shortages in Jan 2012, with soaring black market prices. **Response to commercial malpractice**: Between June and Dec 2009, 57 filling stations out of 164 sampled were found to be selling adulterated fuel. This 35% was much lower than 80% when EWURA started inspection in 2007. Government has resumed chemical marking of fuels, and in Apr 2012 launched an electronic cargo tracking system. **Strategic stocks**: Petroleum Act of 2008 requires Tanzania Petroleum Development Corporation (TPDC) to maintain strategic stocks at all times. **Maritime security**: To fight piracy, which resulted in increased transport costs, fuel prices, and insurance bills, Tanzania, Mozambique, and South Africa in early 2012 signed a tripartite pact to strengthen maritime security in the Indian Ocean.
Thailand		√	**Pricing policy**: Thailand established an oil fund after the oil shock of 1973. It has been used both to smooth price swings on the world market and to cross-subsidize socially sensitive fuels. LPG was cross-subsidized until Nov 2007, and for two months in 2009. Gasoline and diesel were subsidized for many months in 2004. Diesel was subsidized in 11 out of 12 months in 2004, and diesel, but not gasoline, continued to be subsidized by the fund in 2005 until Aug. Diesel was again subsidized in 2008, in Jun 2009, in the first four months of 2011 leading up to a closely contested national election in July 2011, and again in Aug and Sep 2012. In addition, the oil fund levy was eliminated for both gasoline and diesel in the last four months of 2011. By Apr 2011, the oil fund reserves had been depleted. Aside from periodic subsidization of gasoline and diesel, the oil fund has been used mainly to subsidize bioethanol and biodiesel in recent years. The Oil Fund had a deficit of 22 billion baht (US$0.7 billion) in Jun 2012. In 2011, the issue at hand was how long government could prevent the diesel price from rising above 30 baht (US$1)/liter. Monthly average prices of diesel in Bangkok and monthly average benchmark FOB prices relevant to Thailand since 2007 are shown below. The plot illustrates government's attempts to keep the retail price at or below 30 baht/liter.	**Supply**: For diversification of supply, Thai Oil started shifting sources of oil imports to Russia and Australia in 2010, with the new sources accounting for 10% of total imports. The share of new sources is expected to rise to 40% by 2013. **Shortages**: Thailand experienced CNG shortages in 2011 due to soaring CNG consumption. **In-smuggling and response**: Public Sector Anti-Corruption Commission reported in Mar 2011 that smuggling was rampant, involving politicians, and large fishing vessels were smuggling fuel from Malaysia. The Excise Department in Sept 2010 reported that smuggling was costing 77 billion baht (US$2.4 billion) annually. To stem fuel smuggling into the country, PTT launched the Green Fuel project in 2002 to provide tax-free diesel, dyed green, to fishing boats. The Excise Department in 2010 stated that boats using green fuel were required to be fitted with a tracking device using a global-positioning system to

Country E R	Pricing policy and strategy	Fuel supply conditions



Tax reductions: In Apr 2011, the cabinet approved a cut in the excise tax for diesel from 5.31 baht (US$0.18)/liter to 0.005 baht (US$0.0002) effective from Apr 21 until Sep 30 to keep diesel price at or below 30 baht (slightly less than US$1)/liter, a move widely criticized for being political even by the Federation of Thai Industries. Although launched initially as a temporary measure, this excise tax reduction has remained in effect to this day. In Jul 2011, the Excise Department said the decision had led to higher diesel consumption and government had lost 9 billion baht (US$300 million) a month. Government in Aug 2011 suspended contributions of 91 and 95 RON gasoline and diesel to the Oil Fund. Officials were sent to 18,000 filling stations nationwide to check the amount of stocks before the new prices became effective; government had set aside about 3 billion baht (US$100 million) to compensate retailers for the inventory. In addition, biofuels enjoy large tax reductions. The total reduction in taxes and charges on E10 for gasoline with 91 RON was US$0.63 *per liter of ethanol blended* in Feb 2007. By mid-2008, the overall reduction rose to US$2 per liter of ethanol blended, and remained above US$2 in 2012, or triple the FOB price of the same grade of gasoline in Singapore.

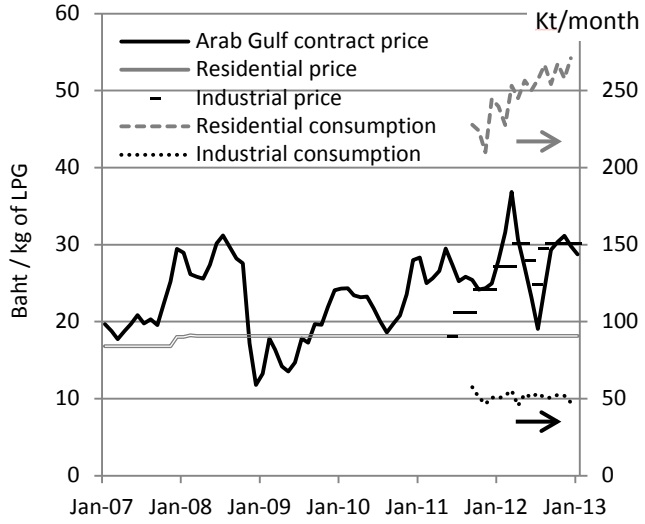
LPG pricing: The primary source of the subsidy for LPG is not the Oil Fund but the subsidy applied at the refinery gate: the ex-refinery price has been frozen at US$333 a tonne for more than two decades under a program intended originally to help relieve the burden of households and food vendors. The benchmark FOB price for LPG has been consistently above US$333 since Aug 2004, rising to an average of US$850 a tonne in 2011 and US$920 in 2012. Government's plan to float the price of LPG for industries in 2008 faced strong opposition and was delayed until Jul 2011, when government began to raise the price by 3 baht/kg every three months until it reached 30.13 baht/kg; price increases above 30.13 baht/kg would require the approval of the National Energy Policy Council, chaired by the prime minister. Many companies switched to 48-kg cylinders, normally reserved for household use. Government began to raise the price of automotive LPG in 2012. The LPG subsidy is borne by government and the CNG subsidy by PTT (formerly known as Petroleum Authority of Thailand), and hence government has used the Oil Fund to finance conversion of taxis from LPG to CNG. PTT is eventually reimbursed for LPG subsidy, but with a long delay. In Sep 2012 in Bangkok, LPG was sold at 18.13 baht (US$0.58)/kg to households, 30.13 baht (US$0.97)/kg to industrial consumers, and 21.38 baht (US$0.69)/kg as an automotive fuel, and monitor their whereabouts.

Commercial malpractice: Promotion of biodiesel blend B5 by pricing it less than B2 and other blends with lower biodiesel earlier led to B5 being sold as B2, prompting government to change the color dyes. Widening price differences for LPG between household and other users in 2012 led to a large, unprecedented increase in consumption of LPG for household use. There have been reports of industrial users switching to 48-kg cylinders, the largest cylinder size in which subsidized LPG for residential users is sold.

Response to commercial malpractice: Mobile laboratories were set up to test fuel quality in 2011. The extent of adulteration of oil reportedly fell from 3% in 2009 to 1% after different types of fuel were colored for identification.

Strategic reserves and stockholding: Refiners are required to stock crude oil at 5% of refining capacity, enough for 18 days of consumption, and stock petroleum products for 19 days of consumption. In Sep 2011, the energy minister said government was planning to set up strategic oil reserves.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			these prices were maintained through early 2013. The prices of LPG for residential and industrial consumers in Bangkok, together with recent national monthly consumption, are shown below. The plot shows stagnating consumption of LPG by industrial users and sharply rising consumption of LPG by households, supporting reports that some industrial users may have switched to residential LPG for cost savings.	



Kt = kilotonnes.

In Nov 2012, government announced a plan to raise LPG prices for all consumers over time to 36 baht (US$1.17)/kg, based on an assumed benchmark price of US$0.90/kg in 2013–2014. The retail price would be raised by 0.5 baht (US$0.02)/kg every month for residential and automotive consumers and by 1 baht (US$0.03)/kg a month for industrial users until 36 baht is reached. In Jan, government announced that the start of the monthly price increases would be delayed from Jan to Apr, on the grounds that a survey would need to be conducted first to identify the recipients of government assistance after the price increase.

Consequences of subsidies: The Oil Fund received authorization to borrow 10 billion baht (US$0.32 billion) in Oct 2011, and another 20 billion baht (US$0.65 billion) in Mar 2012. In Jan 2013, the oil fund was reported to have a deficit of 16.4 billion baht (US$550 million).

Social protection: Government has repeatedly extended a utility subsidy program for low-income households, first introduced in 2008 as world oil prices soared: free electricity to households using up to 90 KWh a month, reduced to 50 kWh in Nov 2011, and free rides on non-air-conditioned public buses and third-class trains.

Information: Energy Policy and Planning Office (EPPO) of Ministry of Energy stopped posting monthly information on the balance of the Oil Fund on its Web site in 2011 in the months leading up to a closely contested general election in July, and has not resumed since. EPPO's Web site otherwise has detailed information on prices, but subsidies at the ex-refinery level are opaque and not indicated.

Togo			**Pricing policy**: A 2002 decree established an automatic pricing mechanism, requiring adjustments when benchmark prices varied by ±5%. In the face of soaring world oil prices in 2007–08, government did not adjust prices in line with world prices, and a government	**Shortages**: Fuel shortages pushed gasoline prices significantly in Jan 2012. Government acknowledges that there is little storage capacity and that it does not

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			audit found that the net shortfalls borne by oil companies had grown to 1.5% of GDP. When world prices fell in 2008 and 2009, government maintained price levels in the hope of making up for the accumulated shortfall. The principle of automatic price adjustments was reaffirmed in a decree issued in Nov 2010, but government did not start adjusting retail prices until Jun 2011 and fuel subsidies soared between Jan and May 2011. Taxes on petroleum products were waived in mid-2011. Prices have been frozen since, except for LPG.	have the financial means to expand it. **In-smuggling and response**: Smuggling of fuel from Nigeria and Ghana is a problem, and is one of the reasons government was not able to make up for the losses suffered by oil companies by keeping prices high in 2009. A fuel marker system was introduced in Aug 2010. Government launched Operation Funnel II to combat fuel smuggling in Sep 2010.
Tunisia	√		**Pricing policy**: Government controls, subsidizes, and infrequently adjusts fuel prices. The prices of gasoline, diesel, and fuel oil were frozen between Dec 2010 and Sep 2012. The kerosene price has not been adjusted since Dec 2010. The price of LPG for household use was lowered in Jan 2011 and has not been adjusted since.	**Supply**: There is one small refinery, which acquires domestic crude oil at a heavily discounted price. **In-smuggling**: Smuggling of cheaper fuels from neighboring countries increased sharply in 2012. The interim government in early March 2012 pledged to end the sale of smuggled fuel from neighboring countries after complaints from gasoline station owners troubled by a sharp drop in business.
Turkey	√		**Pricing policy**: Fuel prices have been deregulated since 1989 and tax rates are high. At the end of 2008, Turkey equalized taxes on all petroleum products, but reversed this decision in mid-2009. In 2011, taxes constituted 40% of the retail price of diesel, 51% of gasoline, 39% of automotive LPG, 39% of light fuel oil for household use, and 26% of heavy fuel oil.	**In-smuggling**: Smuggling has long been a problem, particularly across Turkey's borders with Iraq and Iran. Turkey's petroleum industry association estimates that about 2 million tonnes of illegal fuel enters the market annually. **Commercial malpractice and response**: Unequal taxation has led to large-scale adulteration of less-taxed petroleum products with higher-taxed products, especially by unlicensed operators. All fuel importers and distributors are required to add a fixed proportion of a national marker to all gasoline and diesel in an effort to prevent adulteration and the sale of smuggled fuel.
Uganda			**Pricing policy**: Fuel prices are deregulated. **Information**: Uganda Bureau of Statistics posts detailed data on price surveys every month, although no information is available by company or filling station.	**Supply**: Uganda was required to join the Open Tender System in Kenya and did so in Oct 2010. Transit through Kenya has repeatedly led to supply problems. **Shortages**: Uganda has experienced numerous serious fuel shortages. The factors in Kenya contributing to fuel shortages in Uganda include disruption of road and railway transit cargo, pipeline leaks, pipeline and refinery outages, delays in unloading of imported fuels, and slow customs clearance. Ministry of Energy and Mineral Development estimated that, in Feb and Mar 2011, the gasoline shortfall was 32% and diesel shortfall 47%. LPG shortages push up charcoal prices, and diesel shortages reduce power generation and result in load shedding, as in Oct 2010. **Commercial malpractice and response**: Smuggling of fuels not paying taxes is a

Country	E	R	Pricing policy and strategy	Fuel supply conditions
				problem. Government introduced a fuel marking program in 1999. Petroleum (Fuel Marking and Quality Control) Regulations 2009 requires marking (by bio-coding) of all petroleum products imported into the country. **Stockholding**: All oil companies are required to maintain a minimum stock of 10 days. Uganda's only reserve storage facilities for gasoline and diesel empty since 2006.
Uruguay		√	**Pricing policy**: Government sets maximum wholesale prices for gasoline, diesel, and kerosene from time to time. They were changed only once in 2012. LPG prices are independent of cylinder size. Administración Nacional de Combustibles, Alcoholes y Portland (ANCAP, National Administration for Fuel, Alcohol, and Portland) posts prices dating back to 1974 on its Web site.	**Supply**: ANCAP runs the country's relatively small sole refinery.
Venezuela, R. B. de	√	√	**Pricing policy**: Fuel prices are subsidized and controlled by government. Earlier attempts to reform price subsidies were not successful. Since 1996, government has frozen prices, while the official exchange rate has depreciated to one-tenth of its value in 1996 while the rate on the black market is more than four times the official rate, signaling a very large reduction in fuel prices in real terms. Fuel prices along the border are set higher to discourage out-smuggling. Border filling stations sell fuels at much higher prices except those within the quota. **Protests**: The protests against the sweeping economic reforms in 1989 turned especially violent. The demonstrations started in part in response to a substantial increase in public transportation costs following elimination of fuel price subsidies. The official figure is 276 killed in the aftermath of police and army intervention, but some observers have cited thousands. **PetroCaribe**: Venezuela has been operating a regional program, PetroCaribe, since 2005. PetroCaribe has 18 members and 12 joint ventures. In Oct 2011, the president of Venezuela's national oil company, PDVSA, reported that members received 92,000 bpd of crude oil and petroleum products.	**Response to smuggling**: To curb smuggling, Venezuela has been providing Colombia with subsidized petroleum products. Government in mid-2010 expropriated more than 20 filling stations suspected of smuggling fuels to Brazil and Colombia. In Dec 2010, law makers tightened penalties to 10–14 years for smuggling and 5–9 years for police and other officials reselling confiscated fuels. The energy and oil ministry began tagging vehicles in San Cristóbal municipality in 2011, carried out by PDVSA. In the first phase transport, government, and goods vehicles are tagged, and in the second phase private vehicles are also tagged. In Jul 2011, government uncovered a 1 million-liter hidden underground storage site run by a smuggling ring. In 2011, government introduced additional measures, requiring drivers in border states to register and present identity documents before purchasing fuel.
Vietnam		√	**Pricing policy**: Vietnam has a price stabilization fund and every liter sold contributes to it, with the contribution varying from time to time. The money from or to oil companies goes through the fund and nothing goes to government: suppliers are instructed to either apply an extra levy (and retain it in their accounts) or use part of the imputed value of suppliers' funds. Until recently, fuel prices were set by government with irregular adjustments. The stabilization fund was D703 billion (US$33 million) in the deficit in early 2011. In Apr 2012, Ministry of Trade and Industry said outflows from the fund exceeded inflows by more than D2.3 trillion (US$110 million), and yet still leaving companies with losses of D5 trillion (US$239 million). Since mid-2012, price adjustments have been more market-based, with wholesalers allowed to adjust prices (although still subject to final government approval). Where price adjustments exceeding 7% are necessary, government is to consider other options to stabilize prices, such as reducing import tariffs and drawing down on the stabilization fund. Government was going to	**Supply**: Vietnam's first domestic refinery began operating in 2009. **Smuggling**: Fuel smuggling out of the country is a serious problem.

Country	E	R	Pricing policy and strategy	Fuel supply conditions
			start deregulating prices in May 2007 but stopped because of price volatility. Government abolished subsidies to importers, but they were not allowed to raise retail prices without approval from the trade and finance ministries. With increases in retail prices failing to stay in line with rising international prices, importers suffered from negative margins. In Jan and Feb 2013, government did not allow prices to rise and instead asked fuel suppliers to draw from the stabilization fund to reduce losses. **Tax reductions**: Import tariffs on gasoline and jet fuel were abolished in Feb 2012 and on diesel and kerosene in Mar 2012. Government has historically adjusted import tariffs frequently to smooth retail prices. **Hedging**: After fuel-hedging losses of some US$30 million in 2008, several airline executives were jailed, allegedly for acting irresponsibility and causing losses, and two foreign executives were barred from leaving the country.	
Yemen, Rep.	√	√	**Pricing policy**: Government controls, subsidizes, and infrequently adjusts fuel prices. In 2005, government began and then stopped reforming fuel price subsidies. In 2011, regular gasoline was withdrawn from the market, leaving only super gasoline priced at 175 rial (US$0.82)/liter. In Apr 2012, super gasoline was withdrawn from the market and regular gasoline, previously priced at 75 rial/liter, was re-introduced at 125 rial (US$0.58). **Protests**: In Jul 2005, at least 39 people were reportedly killed and more than 300 were wounded in riots sparked by fuel price hikes. After the price of diesel doubled in Apr 2012, farmers protested by blocking roads. **Consequences of subsidies**: Fuel subsidies reached 14% of GDP in 2008. Year 2006 2007 2008 2009 2010 US$ billion 1.5 2.0 3.7 1.9 1.5 % of GDP 8.1 9.3 13.8 7.7 8.2 *Source*: IMF.	**Supply**: There is one large refinery in disrepair. **Shortages**: There have been frequent fuel shortages, caused by hijacking of delivery trucks from the refinery in Aden, road blocks preventing fuel delivery to Sana'a, smuggling to Somalia and Djibouti, oil pipeline attacks (which brought the Aden refinery to a halt for more than two months in 2011), and the inability to obtain credit to buy petroleum products on the open market. Traders are reluctant to export fuels to Yemen, fearing payment problems. Severe diesel shortages have damaged agriculture, cut back-up power generation in hospitals and government buildings, and caused strikes. Black market prices can increase prices several-fold. In Jan 2011, Minister of Oil and Minerals and the Director General of Yemen Petroleum Company were suspended over fuel shortages. In response to fuel shortages in Apr and May 2011, government ordered fuel rationing. Saudi Arabia, Oman, and the United Arab Emirates have donated fuels.
Zambia		√	**Pricing policy**: Government sets wholesale prices according to a cost-plus formula. Government adopted a uniform pricing mechanism in Sep 2010, to be implemented in phases, for gasoline, diesel, and kerosene sold at filling stations. Uniform pricing is meant to be self-financing and achieved through the Rural Fuel Subsidy Fund. Recently prices have been adjusted infrequently, raising concerns that they may have fallen below cost-recovery levels. Government has frequently reduced or suspended excise taxes and customs duties on petroleum products, especially when the country's sole refinery, Indeni, is shut down, such as in Oct 2009. There is a 25% import tariff. In August 2008, after the refinery shut down twice, oil companies began importing petroleum products directly. In Jan 2009, the import duty was increased from 5% to 25% to protect the refinery and Tazama Pipelines, which was left with a large inventory surplus.	**Supply**: Indeni is small and old, as is the pipeline carrying crude to the refinery. The Indeni refinery has been protected by a 25% import tariff, without which it cannot compete with product imports. Unscheduled or longer-than-planned refinery closures for maintenance and repair have frequently led to fuel shortages. When copper production is low, the refinery may be left with surplus fuel, and even had to shut down in Apr 2010. In Oct 2009, government took over the refinery, taking the other 50% share from Total. Even by the standards of landlocked countries, fuel prices in Zambia have historically been high. Aside from the high

Country	E	R	Pricing policy and strategy	Fuel supply conditions
				costs imposed by the refinery, government's investigation has identified having too many middlemen as another factor, with the potential to reduce the number from 13 to 5. The Zambia Development Agency (ZDA) and an international corporation of Angola in Apr 2012 signed a memorandum of understanding for a multi-billion dollar project to construct a petroleum pipeline to run from Lobito, Angola to Lusaka. **Shortages**: Fuel shortages are frequent, primarily due to supply disruptions from the refinery. Since Jul 2007, Tazama Pipelines Ltd has been appointed by government to be in charge of fuel imports. The diesel shortage in Sep 2008 was blamed on Tazama's inability to import diesel. **Strategic reserves**: Zambia's Sixth National Development Plan aims to build 30 days of strategic reserves. Smuggling is a problem.

Sources: WDI 2012; IEA 2012b; *Oil and Gas Journal* 2012; Kojima 2012; IMF 2012i; Montaq 2013; *Upstream* 2013; Platts 2012a; IHS 2010d and 2012c; Argentina 2007; Energypedia; Reuters 2010c; Bangladesh 2012b; Reuters 2011b; *Nation* (Bangladesh) 2013; IMF 2012c; *Petroleum Intelligence Weekly* 2011a; *Cambio* 2012; Petrobras 2013; *Economist* 2012; Platts 2011a; Kojima 2011; AFP 2008; BMI 2012; IMF 2012k; IHS 2012d; Platts 2009a; *China Daily* 2012; Xinhua News Agency 2011, 2012a, 2012d, 2012e; Platts 2012f; *Wall Street Journal* 2012; Market News International 2009; Dow Jones 2010b; *South China Morning Post* 2011; *Platts Oilgram News* 2012b; *JRJ* 2012a, 2012b; *Financial Times* 2013; Cárdenas Valero 2010; *Portafolio* 2012; Reuters 2013b, 2013c; GESTOCI undated; PETROCI undated; IMF 2012h; *Costa Rica Star* 2012; IMF 2011a; Gámez 2012; *Mist News* 2012, 2013; Egypt Independent 2012a, 2012b; Reuters 2013a, 2013d, 2013e; EIU 2012; AFP 2012a; IHS 2011e; AP 2012; Ahram online 2013; Trend News Agency 2012a; *El Mundo* 2011; Business News Americas 2012; Walta Information 2012; *Ethiopian Reporter* 2012; All Africa 2011b; Infos Plus Gabon 2012; Reuters 2012c; Citi FM 2013; *All Africa* 2011e; *Ghanaian Times* 2010 and 2012; IMF 2012b; *Hindu* 2011; *Hindustan Times* 2011; *Automation World* 2011; Dow Jones 2011d; IOC 2013; India 2012; *International Oil Daily* 2012c; Antara News 2012; *Jakarta Globe* 2012a, 2012b; Pertamina 2012a, 2012b; IHS 2010f; *Platts Oilgram News* 2010b, 2013; Widjaja 2009; World Bank 2012a; Platts 2012e; Asia Pulse 2011b; Lang and Wooders 2012; Hassanzadeh 2012a, 2012b; Iran Economy Review 2012; Payvand News 2013; Trend News Agency 2012b, 2012d, 2013; Guillaume, Zytek, and Farzin 2011; Platts 2011b; BBC 2012; Jordan News Agency 2012; Mena Report 2011; AFP 2012b, 2012c; UPI 2013; IMF 2012d; Trend News Agency 2012c; RIA Novosti 2013; Interfax 2009b, 2011, 2012; *Nefte Compass* 2011; Kenya 2008; BMI 2011; PIEA; *Business Daily* 2011; *Vientiane Times* 2011; Lao State Fuel Company 2012; *Afriquinfos* 2012; *Indian Ocean Newsletter* 2011; IHS 2011b; AFP 2011b; MERA 2010; *Borneo Post* 2012; AP 2010a; Platts 2009b; IHS 2010c; Malaysia 2011, 2012a, 2012b; *International Oil Daily* 2012a; ADP 2011; Xinhua News Agency 2012b; *UB Post* 2012; Dow Jones 2012a; BMI 2013; Morocco 2012; SAPO Moçambique 2009; All Africa 2011c; IMF 11/350; APA 2011a, 2011b; Xinhua News Agency 2012c; IMF 2012g; *Himalayan Times* 2012a–2012d; *Kathmandu Post* 2011, 2012; República 2012; IMF 2012d; IHS 2012a; Reuters 2012a; *Guardian* 2010, 2011-10-26; All Africa 2011d, 2013; Platts 2009d, 2011g, 2012b, 2012g; Nigeria 2011 and 2012; PPPRA 2009; IEA 2012c; Plus News Pakistan 2010; *Business Recorder* 2009a, 2009b, 2010b, 2011; *Financial Daily* 2011, 2012; Platts 2011e; Central Reserve Bank of Peru 2012 and earlier notes; Dow Jones 2010a; Asia Pulse 2009, IHS 2009; Platts 2003; *Philippine Daily Inquirer* 2012; *Philippine Star* 2009 and 2011; Thai News Service 2009; *International Oil Daily* 2009, 2012b; SKRIN 2012; *Petroleum Intelligence Weekly* 2011b; IHS 2011c; *Energy Economist* 2011b; *Financial Times* 2011; Platts 2011c, 2012c; AFP 2011a; All Africa 2012b; IMF 2012a; All Africa 2011f; *Global Post* 2009; IMF 2012j; Reuters 2011c; IHS 2010g; Authentix 2012; South Africa 2011; Lanka Business Online 2012; Sri Lanka News 2012a, 2012b; Kojima 2009; Reuters 2011a; Central Bank of Sri Lanka 2012; Reuters 2012b; IHS 2010b, 2011a; *Akhbar* 2011; AFP 2012; Trend News Agency 2011; IHS 2011d;

Xinhua News Agency 2012c; *Daily News* (Tanzania) 2011, 2012a, 2012b; Platts 2011f; Tanzania Daily News 2012; *East African* 2010; IMF 2012f; EPPO 2012a, 2012b; Thai News Service 2010b, 2011b–2011e, 2011g, 2011i, 2011j, 2012a, 2013a–2013c; Platts 2012d, 2012h; Africa Energy Intelligence 2011; Togosite 2011; IMF 2011b; Platts 2011d, 2011h; IACtHR 2002; Business News Americas 2011a; *Economist* 2013-2-9; AP 2010b; AP 2011-7-30; Info.VN 2012; Platts 2010; Asia Pulse 2011a; TuoiTreNews 2013; IHS 2005; Reuters 2010b; *International Oil Daily* 2011; *Yemen Times* 2012; Reuters 2011d; IHS 2010a; All Africa 2012a; IMF staff country reports from 2009 to 2012; Government Web sites and announcements; Web sites of national oil companies and central banks.
a √ under P signals the presence of at least one operating refinery.
b √ under E signals a net exporter in 2010.

Appendix 2: Fuel Diversification and Energy Conservation Measures by Country

Table A2.1 indicates whether 20 percent or more of power (P in the second column) in each country was generated from petroleum products in 2010, the last year for which the International Energy Agency (IEA) has data. It also describes each country's diversification strategy—covering gaseous automotive fuels, biofuel policy, renewable energy (RE) strategy and targets—and energy efficiency (EE) improvement and energy conservation measures. E followed by a number, such as E5 and E10, stands for a blend of gasoline and ethanol where the number is the percentage by volume of ethanol in the blend. Similarly, B followed by a number is a blend of petroleum diesel and biodiesel; B5, for example, is a blend containing 5 percent biodiesel.

Table A2.1: Fuel diversification and energy conservation measures

Country	P[a]	Diversification	Conservation
Angola	√	No meaningful promotion of RE.	No meaningful EE measures.
Argentina		***Liquid biofuels***: E5 and B7 mandatory since 2010, but the E5 mandate has not yet been complied with. Biofuel law and regulations offer many incentives to producers. A 2008 law promotes ethanol from sugarcane. Biodiesel is made from soybeans, ethanol from sugarcane. Export taxes discriminate against soybean oil in favor of biodiesel. Biodiesel production in Argentina in 2011 ranked third in the world. Argentina is a leading exporter of biodiesel, having exported 70% of production in 2011. In 2010, a project for a power plant burning soy oil was started in the face of natural gas, diesel, and fuel oil shortages. Government wants to eliminate diesel imports and eventually move to B20. In Jan 2012, government eliminated tax exemption for biodiesel. ***Gaseous automotive fuels***: Largest CNG vehicle population in the world until 2007, but growth has stagnated since, due to serious gas shortages and now third largest population. Second largest number of refueling stations. Incentives have been offered to switch away from CNG. ***Alternative energy targets***: A RE law, passed in Jan 2007, sets out a 10-year strategy to boost national RE generation to 8% of total national capacity by 2017, excluding hydropower larger than 30 megawatts (MW).	The Energy Efficiency Commission promotes EE improvement. ***Efficient lighting***: The Energy Efficient Lighting Program was carried out between 2009 and 2011, distributing free CFLs. Argentina banned imports and sales of incandescent light bulbs for residential use starting in 2011.
Bangladesh		***Gaseous automotive fuels***: 0.20 million CNG vehicles at the end of 2011, having grown at an annual rate of 20% since 2007. ***Alternative energy targets***: RE share of power generation 5% by 2015 and 10% by 2020, with specific targets for biogas, solar, and biomass in power generation. The 2009 RE policy is under review.	The Sixth Five Year Plan for 2011–2015 targets reducing system losses and improving energy use efficiency. Government introduced daylight savings time in Jun 2009 on a trial basis, but abandoned it in 2010 after complaints. In Sep 2009, government banned government employees from wearing suits, jackets, and ties during the summer season, which runs from Mar to Nov, and asked officials and ministers to set thermostats no lower than 25°C. The Cabinet in Sep 2009 approved a 14-point plan to save energy, including making use of CFLs and solar panels mandatory, to be phased in over three years, in all government buildings, and promoting solar-powered irrigation pumps. In Mar 2010, government ordered all consumers except hospitals, restaurants, and hotels to turn off air conditioning between 6 and 11 P.M. or else risk disconnection. A 2012

Country	P[a]	Diversification	Conservation
			update issued by the finance ministry highlighted several steps to reduce power consumption, including shutting down markets and shopping malls after 8 P.M., shifting irrigation to off peak hours (11 P.M. to 5 A.M.), and setting thermostats in all offices at or above 25°C. ***Efficient lighting***: Government distributed 10.5 million CFLs for free in exchange for incandescent light bulbs (which were destroyed) in 2010–2011. The second phase of the program will give out 17.5 million CFLs.
Bolivia		***Gaseous automotive fuels***: 0.16 million CNG vehicles at the end of 2011, having grown at an annual rate of 16% since 2007. Ministry of Hydrocarbons and Energy has a vice ministry for electricity and alternative energy, which is in charge of promoting RE.	***Efficient lighting***: As part of an EE plan, government distributed 8.5 million CFLs in 2008–09, and introduced a bill that would outlaw incandescent light bulbs by Jan 2014. Government predicts 50% of power usage will be saved by the 10 million CFLs that 20,000 soldiers were to distribute to Bolivian homes starting in 2012.
Brazil		***Liquid biofuels***: Blending of gasoline with ethanol mandatory since 1938. B5 mandatory since Jan 2010. Biodiesel import tariff of 14% in place. Large tax deductions for biodiesel. Ethanol is made from sugarcane juice; earlier efforts to scale up production from cassava were not successful. Since Apr 2011, government has varied the blended amount between 18 and 25%, most recently 20% since Oct 2011; the blended percentage will increase to 25% in May 2013. Most of Brazil's sugarcane mills are equipped to produce both sugar and ethanol. In Apr 2010, government temporarily removed the 20% import duty on ethanol, and the waiver has since been extended to Dec 2015. When hydrous ethanol is uncompetitive, demand for gasoline increases. Two consecutive years of poor harvests reduced ethanol production, and Brazil began importing ethanol for the second time in history in 2011 and gasoline in late 2010. Gasoline is imported at world prices and sold below cost. Low ex-refinery gasoline prices threaten ethanol industry and deter investment. Government in Feb 2012 unveiled a strategic plan to increase ethanol production, with 65-billion-reais-worth (US$38 billion) of financing up to 2015. Poor harvests, underinvestment, and ageing crops have been blamed for a fall in production of ethanol. An executive order was signed in Apr 2011, authorizing Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP, National Agency of Petroleum, Natural Gas and Biofuels) to regulate ethanol by changing its status from an agricultural commodity to a strategic fuel. The Brazilian development bank, Banco Nacional de Desenvolvimento Econômico e Social (BNDES), contributed more than US$4 billion in 2010 to foster productivity, most of it used on the renewal of aging sugarcane fields. Ethanol prices increase during inter-harvest periods (Dec–Apr), making high world sugar prices in Mar–Apr the worst-case scenario for ethanol supply. In 2009, total ethanol sales for the first time exceeded gasoline sales. Aside from converting bagasse to electricity which is sold to the grid, natural gas turbines have been adapted to burn ethanol. First such turbine began operating in 2010. ANP began to monitor trade between producers and distributers in Apr 2012. Fuel distributors are required to adopt an annual supply contract to meet purchasing targets, equivalent to 90% of the sales of the gasoline-ethanol blend. If distributors choose	In Oct 2011, Ministry of Mines and Energy approved a national plan for EE. The 2030 National Energy Plan has a target to reduce energy consumption by 10% by 2030. Daylight savings time from Oct to Feb. ***Efficient lighting***: A decree published in June 2012 prohibits manufacture of incandescent light bulbs of 150 watts (W) or higher in 2012, 100 W or higher in 2013, 60 W or higher in 2014, and all incandescent bulbs in 2016.

Country	P[a]	Diversification	Conservation
		not to set a supply contract, they are required to have stocks on the last day of the month equivalent to the volume of the blend marketed in the subsequent month of the previous year. ***Gaseous automotive fuels***: Fourth largest CNG vehicle population in the world and third largest number of refueling stations, but with stagnant population growth in recent years. ***Alternative energy targets***: Capacity targets for gigawatts (GW) of wind, small hydropower, and biomass installed for 2020. The new Decennial Plan for Energy Expansion to 2020 plans no new fossil-fuel power plants after 2014.	
Cambodia	√	Government, in 2006, approved the Rural Electrification by Renewable Energy Policy. Cambodia aims to have 15% of rural electricity supply from solar and small hydropower by 2015.	The power sector, reliant mainly on oil, is inefficient. The scope for EE improvement is considerable. Power Sector Strategy 1999–2016 defines efficient use of energy as one of the objectives. National Strategic Development Plan 2009–2013 gives priority to ensuring efficiency and sustainability of energy production. In 2011, government announced an EE and conservation goal for 2030: a 10% reduction in final energy demand from the business-as-usual scenario by introducing more efficient equipment and EE labeling, and raising awareness about EE.
Cameroon	√	A RE policy is being prepared.	Cameroon's national energy policy does not focus much on EE improvement.
Chile	√	***Liquid biofuels***: No mandates, but E5 and B5 set as targets. Biofuels not subject to specific taxes. ***Alternative energy targets***: RE share of power generation (excluding large hydropower) 8% by 2020, 10% by 2024.	Chilean EE Agency was established in 2005. The agency focuses on transport, industry, mining, and public, commercial, and residential buildings and appliances. Daylight savings time implemented. Chile in Sep 2009 launched a new program to take 500 old trucks off the road and replace them with more fuel-efficient newer models to reduce fuel consumption and cut emissions. Government would offer truckers and small cargo transport companies subsidies ranging from 4 million to 12 million Chilean pesos (US$7,273–21,818) per truck, depending on the vehicle's weight. Chile has a national action plan for EE for 2010–2020. In Jan 2012, Chile launched "Energy Matters," an EE campaign aimed at decreasing domestic power consumption. Publicity for the campaign will be disseminated using all forms of media: radio, TV, Web, and press.
China		***Liquid biofuels***: E10 mandatory in 10 provinces. There is a ban on new ethanol plants using grains for fear of competition with food production. The subsidy for grain-based ethanol has been steadily cut, from US$0.19/liter in 2009 to US$0.16 in 2011 and US$0.06 in 2012. Maize accounted for 82% of ethanol production in 2011. No mandates or incentives for biodiesel. ***Gaseous automotive fuels***: 1 million CNG vehicles at the end of 2011. In Feb 2009, government announced an ambitious program to subsidize alternative-energy vehicles, with subsidies ranging from RMB 50,000 ($7,300) to RMB 600,000 ($87,700), depending on the	An Energy Conservation Law was approved in 1998. The law has given rise to more than 160 EE standards. In 2004, government launched China's first medium- and long-term energy conservation plan. Government in its five-year plans has set targets for reducing the energy intensity of GDP: 20% between 2006 and 2010, and 16% between 2011 and 2015. Government has also set an energy conversation target for each province and city. China has been tightening vehicle

Country	P[a]	Diversification	Conservation
		vehicle's size and cost. ***Alternative energy targets***: RE share of final energy 11.4% by 2015 and 15% by 2020. The Renewable Energy Law was passed in 2005 and supporting regulations and guidelines have been issued since. Article 4 requires that targets for RE be established. China in 2010 had nearly two-thirds of the world's total installed capacity of solar water heaters.	fuel economy standards since 2004. ***Efficient lighting***: China is implementing a program to phase out incandescent light bulbs: bulbs of 100 W or higher are banned from Oct 2012, 60 W or higher from Oct 2014, and 15 W or higher from Oct 2016.
Colombia		***Liquid biofuels***: Ethanol mandate started in 2006. Targets of E10 by 2008 and B10 by 2010 were both missed. E8–E10 (depending on region) and B10 mandatory in 2012. Ethanol from sugarcane juice and biodiesel from palm oil. ***Gaseous automotive fuels***: 0.35 million CNG vehicles at end- 2011, having grown at an annual rate of 11% since 2007. ***Alternative energy targets***: RE 5% of total energy mix by 2015 (excluding large hydropower), 6.5% of interconnected electricity system by 2020; rural off-grid renewable share of installed capacity 20% by 2015 and 30% by 2030 (currently 8%).	A decree approved in 2007 enacts provisions to promote rational and efficient use of energy and defines some general guidelines. The Indicative Action Plan 2010−2015, adopted in 2010, develops a program on rational and efficient use of energy and other forms of non-conventional energy.
Costa Rica		***Alternative energy targets***: RE share of power generation 100% by 2021. Government provides tax and other incentives for solar panels and biomass generation systems.	The National Strategy for De-carbonization of the Economy aims to reduce dependence on fossil fuels and promotes the electrification of land transport and EE policies in industry and general consumption. In Jun 2008, amidst soaring oil prices, government restricted vehicle movement in the capital, San José, whereby every car was forbidden from entering the city center on one specific day a week during the rush hours depending on a vehicle's registration plate.
Côte d'Ivoire		***Alternative energy targets***: RE share of primary energy 3% by 2013 and 5% by 2015.	Ministry of Mines and Energy has a technical body named the Office for the Promotion of Energy Efficiency.
Dominican Republic	√	***Gaseous automotive fuels***: Ninth largest automotive LPG market in the world in 2011. Government also launched a CNG program in May 2011. A 2007 law sets the regulatory framework to promote development and investment in RE projects, including biofuels. The law gives fiscal and financial incentives to certain renewable energy projects. Regulations were issued in Jun 2008.	Government's Comprehensive Plan for the Electric Sector for 2006–2012 includes demand-side management through EE improvement.
Egypt, Arab Rep.	√	***Gaseous automotive fuels***: 0.16 million CNG vehicles at the end of 2011, having grown at an annual rate of 13% since 2007. ***Alternative energy targets***: RE share of final energy 20% by 2020, RE share of power generation 20% by 2020 (12% from wind and 8% from others). Government in 1986 established the New and Renewable Energy Authority, and in 2008 issued the Renewable Energy Strategy.	A member of the Regional Center for Renewable Energy and Energy Efficiency (RCREEE). Government has formulated a National Energy Conservation plan and set up an inter-ministerial energy conservation coordination group. The group focuses on increasing lighting efficiency, increasing EE in public buildings, and scaling up solar water heaters. An EE program for small and medium enterprises is under implementation. ***Efficient lighting***: The inter-ministerial energy conservation coordination group focuses on increasing lighting efficiency through greater use of CLFs and more efficient street lighting.
El Salvador	√	The National Energy Policy sets diversification as one of the	An EE program was launched in 2006 to

Country	P[a]	Diversification	Conservation
		objectives. The diversification strategy for oil promotes gaseous fuels and biofuel for transport. The current administration, however, has not yet approved the law on ethanol created by the previous administration. A law on RE was passed in Jun 2008.	promote energy savings through helping people identify their own energy consumption. In 2011, government launched "El Salvador Saves Energy," the first cross-cutting initiative coordinated by the National Energy Council, in which public institutions, private companies, universities, and civil society representatives signed a memorandum of understanding to join efforts to press for electricity conservation and efficiency improvement, based on the National Energy Policy.
Ethiopia		***Biofuel***: Blending ethanol from sugarcane in gasoline since 2008. Switched from E5 to E10 in Mar 2011 to lower the price of gasoline. The price in Addis Ababa fell by 0.45 birr (US$0.027)/liter at the time. The economics of this move are not clear, however, because sugarcane cultivation is water-intensive but farmers do not pay for irrigation water, and government has been subsidizing sugar to keep its price low to domestic consumers. ***Alternative energy targets***: There are specific targets for MW of wind, hydro, geothermal, and bagasse.	***Efficient lighting***: Ethiopia distributed 5 million CFLs for free in 2010 in exchange for incandescent light bulbs. In 2012, it began distributing another 5 million CFLs at subsidized prices. Government has drafted a law banning the use of incandescent light bulbs.
Gabon	√	***Alternative energy targets***: RE share of final energy 80% by 2020, RE share of power generation 70% by 2020.	Little information on EE available.
Ghana	√	***Alternative energy targets***: RE share of power generation 10% by 2020. Renewable Energy Act of 2011 sets a framework for feed-in tariffs and requires power distribution utilities and bulk consumers to purchase a certain percentage of RE.	Parliament approved regulations for EE and labeling standards for lighting and air conditioning in 2006. ***Efficient lighting***: Government has launched a program to replace 6 million incandescent light bulbs with CFLs free of charge.
Guatemala	√	***Liquid biofuels***: Law on ethanol, making E5 mandatory and dating back to 1985, has failed in implementation for lack of sufficient incentives. ***Alternative energy targets***: The 2012–2026 Generation System Expansion Plan, approved in Jan 2012, targets 78% of power from RE by 2026. The 2003 Law of Incentives for the Development of Projects in Renewable Energy has never been implemented.	EE programs in Guatemala are modest but ambitious targets for EE have been proposed.
Guinea-Bissau	√	Other than solid biomass, the country is completely dependent on oil. ***Alternative energy targets***: Solar photovoltaic (PV) 2% of primary energy by 2015. There are no regulations or incentives in support of RE.	Government plans to promote EE in buildings, residential, and industrial sectors.
Honduras	√	***Liquid biofuels***: Biofuel producers are given various tax incentives for 12 years. Making E5 mandatory has been proposed but no commercial production or consumption of any biofuel is taking place. A law promoting RE was passed in 2007.	The program, Autonomous Generation and Rational Use of Electricity, promotes EE. ***Efficient lighting***: Government has distributed millions of CFLs.
India		***Liquid biofuels***: Government unable to implement the E5 mandate, first introduced in Nov 2006. Ethanol is produced from molasses; the use of sugarcane is prohibited for fear of competition for land and water. Imported ethanol does not qualify under the mandate. Biodiesel not mandated. There was a national target of B20 by 2012, but biodiesel production is negligible. Aside from 16% excise tax, no other central taxes are imposed on ethanol or biodiesel. Central and some state governments offer fiscal incentives for planting *Jatropha curcas* and other non-edible oilseeds for biodiesel. Subsidized loans	Ministry of Petroleum and Natural Gas established the Petroleum Conservation Research Association (PCRA) in the 1970s. PCRA carries out energy audits and conservation awareness campaigns. The Energy Conservation Act of 2001 established the Bureau of Energy Efficiency (BEE) under Ministry of Power. BEE has been actively promoting energy

Country	P[a]	Diversification	Conservation
		to sugar mills are offered for ethanol, up to 40% of the plant cost. ***Gaseous automotive fuels***: Fifth largest CNG vehicle population in the world at 1.1 million at the end of 2011, having grown at an annual rate of 20% over the past 5 years. ***Alternative energy targets***: RE share of power generation 10% by 2012, specific capacity installation targets for wind and solar. India has a national solar mission, issued in 2009, targeting 22 GW of solar power by 2022.	conservation through energy audits and efficiency labeling of appliances and equipment. In Oct 2011, BEE released a consultation paper entitled "Passenger Car Fuel Economy Standards and Labelling Framework." The comments received raised concerns about the lack of minimum standards and the standards being less stringent than what the automotive industry would have achieved in the absence of standards.
Indonesia	√	***Liquid biofuels***: A 2008 biofuel decree includes a framework for mandatory biofuel consumption to 2025, and biofuel subsidies were announced in 2009. Ethanol is made from molasses, but ethanol production was suspended in 2010 despite a subsidy of Rp 2,000 (US$0.20)/liter because of high feedstock prices. Biodiesel is made mainly from palm oil. In 2011, 90% of biodiesel produced was exported. Mining companies are required to have 2% biofuel in their total fuel consumption. Pertamina increased the content of subsidized biodiesel from B5 to B7.5 in Feb 2012. Starting May 2012, all filling stations have been required to sell non-subsidized biofuels. In 2013, government will provide subsidies of Rp 3,000 (US$0.31) per liter for biodiesel and Rp 3,500 (US$0.37) per liter for ethanol. ***Gaseous automotive fuels***: 5,500 CNG vehicles at the end of 2011. Government is trying to diversify to LPG and CNG to reduce consumption of the heavily subsidized 88 RON gasoline. However, against the low gasoline price, automotive fuel diversification is facing challenges. ***Alternative energy targets*** for 2025: RE share of primary energy 25%, RE share of power generation 15%, biofuel 10.2% share in primary energy, and specific targets for wind, solar, hydropower, and geothermal.	In 2008, government issued a decree ordering industries to move some of their working days to the weekend to avoid blackouts (diesel used in power generation). A Nov 2009 regulation includes implementation of mandatory EE standards and labeling. In Aug 2010, government established a new director general at Ministry of Energy and Mineral Resources to be in charge of RE and energy conservation, and the directorate established an Energy Efficiency and Conservation Clearing House. Following a similar campaign in 2008, the president launched an energy and fuel efficiency improvement campaign in Aug 2011. President announced 5 policies to reduce subsidized fuel consumption and power use in May 2012: (1) electronic monitoring of subsidized fuel purchase; (2) a ban on purchase of subsidized fuel by government-owned vehicles; (3) a ban on purchase of subsidized fuel by vehicles belonging to mining companies and plantations; (4) liquid fuel to gas conversion; and (5) a campaign to minimize fuel consumption through reduced use of electricity in state enterprise and government offices and on the streets.
Iran, Islamic Rep.	√	***Gaseous automotive fuels***: Conversion from gasoline to CNG aggressively promoted to reduce gasoline consumption and imports. Largest CNG vehicle population in the world at 2.9 million end-2011, having grown at 55% a year since 2007. The number of refueling stations ranks fourth worldwide. Government established Renewable Energy Organization of Iran in 2000, but the potential for RE has not been exploited much to date.	Government established Energy Efficiency Organization of Iran in 1996. ***Efficient lighting***: Government has banned incandescent light bulbs with wattage exceeding 40 W beginning in 2014.
Iraq	√	Not much RE promotion.	Not much EE promotion.
Jamaica	√	***Liquid biofuels***: Only E10 sold from Nov 2009. Ethanol is imported. ***Alternative energy targets***: RE share of primary energy 15% by 2020 and 20% by 2030, RE share of power generation 15% by 2020. Jamaica's National Energy Policy Framework 2009–2030 identifies RE as one of the seven priority areas. A policy working group in Aug 2010 issued a draft National Renewable Energy Policy 2009–2030.	National Energy Policy Framework 2009–2030 identifies EE and energy conservation as one of the seven priority areas, and targets reducing the energy intensity of the economy by more than 60% between 2008 and 2030. Ministry of Energy and Mining in Oct 2010 issued National Energy Conservation and Efficiency Policy 2010–2030, setting specific strategies for industry, transport, buildings, and electricity

Country	P[a]	Diversification	Conservation
			generation.
Jordan		***Alternative energy targets***: RE share of primary energy 7% by 2015, 10% by 2025, specific 2020 targets for MW of wind and solar thermal, solar water heaters in 30% of households by 2020 (from 13% in 2010). A RE and EE law was passed in Jan 2010, focusing on the power sector. The law stipulates establishment of a RE and EE fund, financed in part by government's annual budget. RCREEE member.	EE improvement is supported by the 2010 RE and EE law. Daylight savings time in summer. Switching power generation from gas to diesel in Feb–Mar 2011 forced government to order a 50% reduction in street lighting and a 50% reduction in electricity use by all government bodies. In Jun 2011, Total Jordan launched an eco-service program aimed at helping customers reduce fuel consumption. Provided free at all filling stations across Jordan, Total Jordan checks the tire pressure and re-inflates if necessary, checks the engine oil level, and offers advice on steps to reduce fuel consumption.
Kazakhstan		Government adopted the Law on the Use of Renewable Energy Sources in Jul 2009; the law was last amended in Jul 2011. The law requires electricity transmission companies to allow RE to be connected to the grid, and targets 5% of the country's total energy balance to be renewable by 2024.	In Mar 2011, government reported introduction of peak-load tariffs enabled a 2.3% reduction in electricity consumption in 2010. The Law on Energy Saving and Energy Efficiency, signed in Jan 2012 with associated amendments, aims at reducing energy consumption by industry by 10% by 2015 and by 25% by 2020. ***Efficient lighting***: The above Jan 2012 law bans the sales and manufacture of 100-W light bulbs starting in July 2012, 75-W bulbs in Jan 2013, and 25-W bulbs in Jan 2014.
Kenya	√	***Liquid biofuels***: Ethanol blending in motor gasoline was made mandatory in a regulation issued in May 2010, but the percentage to be blended is not specified and the implementation status has not been reported. ***Alternative energy targets***: Capacity targets set for 2030 for geothermal, wind, and hydropower. National Climate change Response Strategy of 2010 promotes development of renewable energy.	The finance ministry in fiscal 2009/10 directed all ministers and other staff to a single vehicle with an engine no larger than 1.8 liters, and to surrender non-compliant vehicles by Sep 2009. The National Task Force on Accelerated Development of Green Energy was inaugurated in mid-2009. The Kenya Association of Manufacturers (KAM) provides training for EE and energy audits through the Centre for Energy Efficiency and Conservation, and offers the annual Energy Management Award to recognize significant, sustainable gains in EE and energy and cost reductions. In Jun 2009, KAM asked its members to reduce peak time consumption to avoid forced rationing of power. ***Efficient lighting***: In Aug 2009, as power rationing started, government said 1.5 million CFLs were being imported for free distribution in exchange for incandescent light bulbs to be surrendered. Energy minister also announced that regulations to mandate CFLs would be drafted.
Lao PDR		***Liquid biofuels***: Government aims to meet 10% of transportation fuel demand with biofuel by 2025. Government plans to issue a biofuels decree and a biofuel action plan, and starts mandating blending of ethanol and biodiesel in 2015. ***Alternative energy targets***: RE share of total energy consumption	The EE and conservation goals released in Sep 2011 set a target of a 10% increase in EE by 2030 but without concrete action plans.

Country	P[a]	Diversification	Conservation
		30% by 2025. Lao PDR National Strategy on Renewable Energy, launched in Oct 2011, aims to ensure adequate supply of energy; promotes EE improvement, energy conservation, and cultivation of biofuel feedstocks; and outlines steps and targets to 2025.	
Liberia	√	***Liquid biofuels***: Aspirational goal of meeting 5% of transportation fuel demand with biofuel by 2015. ***Alternative energy targets***: RE share of power generation 30% and RE share of total energy consumption 10% by 2015. National Energy Policy of 2009 promotes RE, and substitution of petroleum fuels with liquid biofuels in the long term.	National Energy Policy of 2009 targets a 20% EE improvement by 2015.
Madagascar	√	***Alternative energy targets***: RE share of final energy 54% by 2020, RE share of power generation 75% by 2020. Power generation is largely dependent on diesel. Incentives are offered for wind and hydropower.	Little information on EE improvement plans.
Malawi		***Liquid biofuels***: Mandatory minimum oxygen blending corresponds to a minimum of E9.5 for 93 RON gasoline and E7.5 for 95 RON gasoline. Gasoline has been E10 made from molasses since 2006. Prior to 2006, the blended amount was 20%. ***Alternative energy targets***: RE share of primary energy 7% by 2020, hydropower installation capacity target set for 2014. The Promotion of Alternative Energy Sources Project seeks to promote non-traditional fuels for cooking and heating to reduce environmental degradation, and a National Sustainable and Renewable Energy Program promotes RE technologies.	Government announced in Aug 2010 that it would start distributing 1.2 million CFLs free of charge. The World Bank's Energy Sector Support Project for 2011–16 supports demand-side management and EE improvement.
Malaysia		***Liquid biofuels***: National Biofuel Policy issued in 2005. B5 was mandated in 2009, but implementation of the mandate has been slow in the face of high palm oil prices and subsidized diesel prices. B5 is mostly unavailable on the market. ***Alternative energy targets***: RE share of power generation 10% but without a target date. RE share of electricity (excluding large hydropower) 10% of national supply, 6% of capacity, and 5% of generation by 2015; 11% of capacity and 9% of generation by 2020; 14% of capacity and 11% of generation by 2030; and 36% of capacity and 15% of generation by 2050. Renewable Energy Act passed in Apr 2011.	Malaysia established Ministry of Energy, Green Technology, and Water in early 2009. Government launched a green building index in May 2009, and is providing, between 2009 and end-2014, building owners obtaining green building index certificates with income tax exemption equivalent to the additional capital expenditure in obtaining the certificates. The Green Technology Financing Scheme was launched in the 2010 budget, providing RM 1.5 billion ($480 million) for supply-side and demand-side management and RE projects. The phaseout of incandescent light bulbs is under implementation and will be completed in 2014.
Mexico		***Liquid biofuels***: The Law for the Promotion and Development of Bioenergy, passed in Feb 2008, promotes liquid biofuels. Ethanol and biodiesel, however, are more expensive than gasoline and diesel and government keeps postponing commercial introduction of liquid biofuels on a large scale. Government is promoting *Jatropha curcas* and palm plantation. A new ethanol introduction program was launched in Nov 2011, setting annual targets for ethanol in 2012–16. ***Alternative energy targets***: RE share of power generation 35% by 2025. Government in Nov 2008 approved Law for Renewable Energy Development and Financing for Energy Transition.	A law on sustainable energy, including EE, was signed in Nov 2008 and its implementation regulations were adopted in 2009. The law and regulations cover EE labeling requirements and a voluntary product certification program. Government in Nov 2009 adopted an energy savings program for 2009–2012. Government is carrying out a number of EE programs, including distribution of more than 200 million CFLs and replacement of more than 5.5 million appliances over five years, efficient public lighting, industrial and commercial EE programs, and supply-side EE in the power sector.

Country	P[a]	Diversification	Conservation
			Efficient lighting: A schedule is in effect for banning incandescent light bulbs: 100 W starting in Dec 2011, 75 W in Dec 2012, and 40–60 W in Dec 2013.
Mongolia		***Alternative energy targets***: RE share of power generation 20–25% by 2020. Government approved a national RE program in 2005 for 2005–2020, and adopted a law on RE E in 2007. The RE law sets feed-in tariff ranges by type of energy.	A project for EE improvement in buildings was launched in 2009.
Morocco	√	Morocco in 2007 became the first country in the region to pass a RE law similar to Germany's feed-in model. ***Alternative energy targets***: RE share of power generation 20% by 2012; various capacity targets for wind, solar, and small hydropower; 0.28 GWth (thermal gigawatts) of solar water heating by 2012, 1.19 GWth by 2020; RE share of primary energy demand 10–12% by 2020 and 15–20% by 2030. There is a National Program of Development of Renewable Energy and Energy Efficiency. Government established an Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE) in 2011.	RCREEE member. The new energy strategy adopted in 2009 has EE improvement as one of its pillars. Government in 2009 signed an agreement with the private sector, offering a 20% bonus for each 20% of reduced consumption in electricity. ADEREE is tasked with monitoring and coordinating energy audits, and developing standards, labels, and appropriate incentives for EE improvement. ANDEREE has launched national programs for EE in buildings and industry.
Mozam-bique		***Liquid biofuels***: E10 and B3 mandatory beginning in 2012. ***Alternative energy targets*** (no timetable): 2,000 MW each of wind, solar, and hydropower; 82,000 solar PV systems; 1,000 bio-digesters; 3,000 wind pumping stations; 100,000 solar heaters in rural areas; and 5,000 RE-based productive systems.	Little information on EE improvement plans.
Namibia		The Namibia Renewable Energy Program was first launched in 2004, and the second phase was started in 2007. The Renewable Energy and Energy Efficiency Institute (REEEI) was launched in 2006 under the auspices of Ministry of Mines and Energy. The Solar Revolving Fund, launched in 1996, has financed solar home systems, solar water pumping, and solar water heating.	NamPower has a demand-side management program, which distributed 900,000 CFLs free of charge in 2007–09 in exchange for five incandescent light bulbs per household, financed out of the company's profits. REEEI has developed an EE strategic action plan.
Nepal		***Alternative energy targets*** for 2013: 1 MW of wind, 3 MW of solar, and 15 MW of micro-hydropower. Government in 2009 issued a subsidy policy for renewable (rural) energy. The Biogas Support Program is the second largest alternative rural energy program in Nepal. Government announced a National Biofuel Program in fiscal 2008/09, focusing particularly on *Jatropha curcas* for biodiesel.	National Electricity Crisis Resolution Action Plan 2008 promotes EE improvement through efficient lighting, energy audits, a code of conduct to save energy, and raising public awareness for demand-side management.
Nicaragua	√	***Alternative energy targets***: RE share of power generation 38% by 2011. The general law on environment and natural resources was amended in 2008 to permit RE development in 76 protected areas that previously were off-limits to developers. The Geothermal Law approved in 2002 regulates exploration and production of geothermal energy.	The National Energy Commission has a division dealing with energy efficiency.
Niger	√	***Alternative energy targets***: RE share of primary energy 10% by 2020. The National Strategy for Renewable Energy guides the promotion of RE.	The National Strategy for Domestic Energy promotes efficient appliances.
Nigeria		***Alternative energy targets***: RE share of power generation (excluding large hydropower) 18% by 2025, 20% by 2030. Specific installation targets by 2015 and 2025 for wind, solar PV, small hydropower, and biomass-fired power generation. Government formulated a Renewable Energy Master Plan for	The National Centre for Energy Efficiency and Conservation was established in 2010 at the University of Lagos.

Country	P[a]	Diversification	Conservation
		Nigeria in 2006.	
Pakistan	√	***Liquid biofuels***: E10 marketed since 2010, and priced lower than pure gasoline. The biodiesel policy recommends B5 by 2015 and B10 by 2025. ***Gaseous automotive fuels***: At end-2011, second largest CNG vehicle population in the world at 2.9 million and the largest number of refueling stations at 3,285. Following gas shortages, a ban on conversion to CNG was imposed in Dec 2011. ***Alternative energy targets***: RE share (excluding large hydropower) of power generation 10% by 2012. A 2010 act established an Alternative Energy Development Board under Ministry of Water and Power.	Introduced daylight savings time in Apr 2009. Pakistan Electric Power Company (PEPCO) in May 2009 introduced time-of-day tariffs with higher tariffs in the evening than in the morning to reduce peak demand. PEPCO declared 2010 the year of elimination of power theft, and also started a public awareness and social outreach program. Government in April 2010 announced several measures (in effect until Jul 30) to cut power consumption further: closure of commercial centers at 8 P.M.; 5 work days a week; a 50% reduction in lighting in government buildings; allowing air conditioners only to officials at or above grade 20 after 11 A.M.; not providing power for irrigation during peak hours; cutting off power to billboards, neon signs, and commercial decoration lights; and limiting weddings at wedding halls to 3 hours. PEPCO reported that this saved 1,000 MW. Office and bank closure on Sat was expected to reduce consumption of gasoline and diesel also. ***Efficient lighting***: The National CFL Program will provide 30 million CFLs free of charge in exchange for incandescent bulbs with estimated savings of 2 billion kWh.
Panama	√	***Alternative energy targets***: 706 MW of hydropower and 120 MW of wind power by 2023. National Energy Plan 2009–2023, issued in 2009, sets targets for additional power generation capacity by 2023, including 473.5 MW of thermal power.	The National Energy Plan recognizes EE as part of energy planning and includes demand-side management. An executive decree in Oct 2009, motivated by a drop in hydropower, included reducing government office hours and air conditioning use, and the designation of an energy administrator at government agencies to ensure compliance.
Peru		***Liquid biofuels***: E7.8 mandatory since 2010 and B5 since 2011. Ethanol from sugarcane and biodiesel from palm oil. Peru is a net exporter of ethanol, but the bulk of biodiesel consumption is imported: 77% in 2010, 74% in 2011, and more than 90% (forecast) in 2012. A law on biofuel market promotion was approved in 2003. ***Gaseous automotive fuels***: Rapid growth of CNG vehicle population, rising from virtually none in 2005 to 122,000 in 2011, representing an annual growth rate of 58%. ***Alternative energy targets***: A 2008 decree promotes RE to reach 5% in 5 years.	Government in 2009 approved a plan for efficient use of energy for the period 2009–18, and in 2010 established a General Directorate of EE under Ministry of Energy and Mines. New regulations were issued in Mar 2011. ***Efficient lighting***: A CFL program distributed 1.5 million bulbs in 2009 and 2010.
Philippines		***Liquid biofuels***: E5 mandatory by Feb 2009 and E10 by Feb 2011; B1 by Feb 2007 and B2 by Feb 2009. The Biofuels Law of 2006 sets a timeline for mandatory blending percentages and offers fiscal incentives and financial assistance. Compliance with B2 has not been a problem, but domestic production capacity is inadequate for compliance with E10 and imports are expected to continue to increase until at least 2014. ***Alternative energy targets***: RE share of power generation 40% by 2020, tripling 2010 renewable power capacity by 2030 with various	The National Energy Efficiency and Conservation Program sets as its goal making EE and conservation a way of life. Government has issued a series of administrative orders designed to reduce energy consumption in government, including Administrative Order 126, which requires air conditioning to be turned on no earlier than 9 A.M. and turned off no later

Country	P[a]	Diversification	Conservation
		installation targets for wind, solar, hydropower, geothermal, biomass, and ocean energy. Government approved a Renewable Energy Act in 2008 and issued implementing regulations and rules in 2009.	than 4 P.M., and switched to the fan mode during lunch hours. Since 2003, the Manila Electric Company has had an appliance calculator on its Web site, showing the cost of operating different appliances, total electricity bill, and tips for EE improvement. In 2011, the Department of Energy urged the public to conserve energy under its banner, "Bright Now!". **Automotive fuel conservation**: The Department of Energy has been promoting automotive fuel conservation for more than a decade. There is a vehicle-use reduction program as part of national energy efficiency and conservation efforts. The department's Web site posts fuel-saving driving habits for awareness-raising. "Bright Now!" in 2011 advertised fuel-saving tips for drivers. A Shell market research survey in the first quarter of 2009 found 90% of those surveyed were willing to change driving habits to save fuel. Three most common fuel-saving driving habits adopted by Philippine drivers were (1) keeping the engine properly tuned, (2) keeping the tires properly inflated, and (3) driving sensibly and within speed limits. Shell's survey in Mar 2010 found 91% of drivers were willing to change behavior to save automotive fuel, and 64% were proactive in adopting fuel-saving habits. ***Efficient lighting***: Between 2009 and 2011, the Department of Energy distributed 5 million CFLs, and planned to distribute another 3.6 million CFLs in 2012. Legislation to ban incandescent light bulbs has been under consideration for several years.
Russian Federation		***Liquid biofuels:*** No industrial production of bioethanol or biodiesel, and no government-backed biofuel projects in operation. ***Gaseous automotive fuels***: Third largest automotive LPG market in the world in 2011. Declining CNG vehicle population, falling to 86,000 in 2011. ***Alternative energy targets***: RE share of power generation 2.5% by 2015, 4.5% by 2020.	A federal law on EE was issued in Nov 2009. One objective is to reduce the country's energy intensity by 40% by 2020. ***Efficient lighting***: Russia has a timetable for banning incandescent light bulbs in phases, starting with high-wattage bulbs, to be completed by 2014.
Rwanda	√	***Alternative energy targets***: RE share of power generation 90% by 2012, 42 MW of small hydropower by 2015.	***Efficient lighting***: A project to distribute 800,000 compact CFLs is included in the 2011 National Energy Policy and Strategy, limiting the number of subsidized CFLs to five per household. CFL distribution has become a part of the National Energy Access Program, providing 3–4 bulbs to each new customer.
Senegal	√	***Alternative energy targets***: RE share of primary energy 15% by 2025, RE share of power generation 15% by 2020. The parliament passed a RE Law in 2010, which provides support schemes including tax breaks. The National Biogas Program, in	The Program to Promote Rural Electrification and a Sustainable Supply of Domestic Fuel for 2003–15 promotes EE and offers subsidies of up to 80% for higher-

Country	P[a]	Diversification	Conservation
		implementation since 2009, aims to install 8,000 biogas digesters. The Program to Promote Rural Electrification and a Sustainable Supply of Domestic Fuel 2003–2015 offers subsidies of up to 80% for solar street lighting and solar home systems.	efficiency equipment, such as efficient light bulbs. ***Efficient lighting***: A rural lighting efficiency project is distributing 1.5 million CFLs during the period 2009–13.
South Africa		***Liquid biofuels***: August 2012 regulations made B5 and E2–E10 mandatory, with effectiveness date to be set by the energy minister. The biofuel strategy of Dec 2007 excluded maize and *Jatropha curcas* from potential feedstocks out of concerns for food security. ***Alternative energy targets***: RE share of power generation 4% by 2013 and 13% by 2020; 3,100 MW of renewable energy installed and 10,000 GWh (gigawatt-hours) generated by 2013. In 2009, the energy minister announced a target to install 1 million solar water heaters over the next 5 years.	Government published "Energy Efficiency Strategy for South Africa" in 2005, setting a long-term target of improving EE by 12% by 2015 relative to a baseline scenario. There are specific sub-sector targets, such as reducing final energy demand by 20% in public buildings and 15% in the residential sector. The Department of Energy has an appliance labeling campaign. Government issued a review of the strategy in 2009. In Mar 2011, government launched "49M," a 5-year electricity-saving initiative where the name of the campaign refers to all 49 million South Africans.
Sri Lanka	√	Diversifying away from oil for power generation to coal. First coal-fired power generation plant commissioned in Mar 2011. ***Alternative energy targets***: RE share of power generation 10% by 2015 and 20% by 2020, biofuels 20% of supply by 2020. The Sustainable Energy Authority, which became operational in Oct 2007, is tasked with developing and implementing Sri Lanka's policy for RE development, demand-side management, and energy conservation.	Government updated the targets in the 2006 national energy policy to aim reduction in total losses in electricity transmission and distribution from 14.6% in 2009 to 14.0% by 2012, 13.0% by 2016, and 12.0% by 2020, and energy savings of 4.3% in 2012, 6.4% in 2016, and 8.7% in 2020 through energy conservation. Import tax concessions to hybrid vehicles were given in Feb 2011. Government issued many announcements about the need to conserve energy in 2012, including requiring government institutions to limit fuel and power consumption, as a priority and a national responsibility to save foreign exchange. A national power conservation program was inaugurated in Mar 2012 with participation of school children. The Ceylon Electricity Board (CEB) conducts awareness campaigns. Ministry of Power and Energy launched a "Today for Tomorrow" national energy conservation program to conserve power in 2012. As part of the program, CEB announced in Apr that it would provide free electricity for a month to 1,000 consumers—selected through a raffle draw—who reduce consumption on their April, May, or June bills compared to the Mar statement by 20%, and a 50% discount to 5,000 consumers who manage to reduce consumption by 10%. The minister instructed ministry staff to reduce power consumption by 10% and restricted air conditioning to 10 A.M.–3 P.M. CEB launched a campaign, "Switch off at least one bulb during peak hours." Government urged users to refrain from using irons and other appliances between 6:30 and 9:30

Country	P[a]	Diversification	Conservation
			P.M., and turned off street lights. ***Efficient lighting***: A gazette notification issued in Jul 2009 allows only CFL bulbs labeled with the certification label issued by Ministry of Power and Energy to be manufactured, imported, or sold. CFLs have star ratings ranging from 1 to 5.
Syrian Arab Rep.	√	***Alternative energy targets***: Specific capacity installation targets for 2015, 2020, 2025, and 2030 for wind, solar PV, concentrating solar power, and biomass power.	RCREEE member. The Energy Conservation Law issued in 2009 requires specified entities to establish an energy conservation unit.
Tajikistan		The Complex Program on Alternative Energy Sources was issued in 2007, dividing the period between 2007 and 2009 into three phases and focusing on small rivers, solar, wind, biomass, and geothermal energy.	A 2002 law on energy conservation supports establishing a legal framework for conservation. A presidential order issued in Apr 2009 addresses additional measures for efficient energy use and energy savings. ***Efficient lighting***: Effective October 2009, government banned imports of incandescent light bulbs.
Tanzania		***Gaseous automotive fuels***: Government keen on CNG but as of Aug 2011 only one filling station in the whole country. The 2003 national energy policy supports research and development as well as creation of an enabling environment for RE development.	The 2003 national energy policy targets implementing energy audits in industry.
Thailand		***Liquid biofuels***: B2 mandatory since 2008, and currently B3/B4 mandatory, depending on biodiesel availability. Government has thus far reversed the previous policy of mandating ethanol in gasoline, and instead promotes ethanol through a sizable price discount enabled by tax reductions. Starting in 2013, to further encourage ethanol use, production of pure 91 RON gasoline was discontinued. The 2021 consumption targets are 9 million liters a day of ethanol and 6 million liters a day of biodiesel. Ethanol is made from cassava and sugarcane, biodiesel from palm oil. E10, E20, and E85 are sold. The total reduction in taxes and charges on E10 for gasoline with 91 RON was US$0.63 *per liter of ethanol blended* (or US$0.06 per liter of blend) in February 2007, rising to US$2 per liter of ethanol blended by mid-2008, and remained above US$2 in 2012. Aside from price subsidies for both ethanol and biodiesel, profit incentives are given to filling stations for selling E20 and the excise tax on flex-fuel vehicles was reduced in Apr 2010. Government in Feb 2011 said that the daily biodiesel subsidy would rise from 148 million baht (US$4.8 million) to 165 million baht (US$5.4 million). ***Gaseous automotive fuels***: 301,000 CNG vehicles at end-2011, having grown at an annual rate of 40% since 2007. Between 2004 and the end of 2011, the combined CNG subsidy was 31 billion baht (US$1 billion). Eighth largest automotive LPG market in the world in 2011. Starting in Jan 2012, automotive LPG price was meant to be raised by 0.75 baht/kg every month to 27 baht/kg (US$0.86/kg), but fell short of the goal and stopped at 21 baht. ***Alternative energy targets*** for 2021: RE share of final consumption 25%; RE share of power generation 10%; substitution of oil with biofuel 44%; and specific capacity installation and/or energy production targets for wind, solar, hydropower, biomass, biogas, and municipal solid waste.	Thailand has had energy saving campaigns for more than two decades. Incentives started being offered only in 2003. Combined spending by both companies and state agencies from 2003 to Jun 2011 is an estimated 216 billion baht (US$6 billion). Government offers tax deductions on corporate and personal income tax for buying products carrying the No. 5 energy-saving label. Ministry of Energy issued new regulations for designing buildings to conserve energy in Feb 2009. There is an Energy Conservation Promotion Fund. The Energy Regulatory Commission has raised the concern that free electricity provided for social protection might not help the poor while reducing incentives for EE, and instead recommended a program similar to Australia's Hardship Utilities Grant Scheme. In 2011, the cabinet rejected proposed changes to the automobile excise tax structure that would have taken fuel efficiency and carbon emission into account. The 20-Year EE Development Plan for 2011–30 targets a 25% reduction in energy intensity of the economy between 2005 and 2030. In Mar 2012, government approved a five-year expenditure plan for the fund for energy-conservation promotion totaling 35 billion baht (US$1.1 billion), and authorized a project to save energy in government buildings by setting up an energy service panel, which will provide a one-stop service for inspecting energy usage, setting

Country	P[a]	Diversification	Conservation
			conservation measures, and designing systems and helping secure sources of funds as well as assessing the project. Shell's survey of drivers in Mar 2010 found that 93% of Thai drivers were willing to change behavior to save automotive fuel, and 80% proactively practiced fuel-saving habits.
Togo	√	No information.	No information.
Tunisia		***Alternative energy targets***: RE share of power generation 4% by 2011, 16% by 2016, and 40% by 2030; specific capacity installation targets for wind and solar water heaters by 2011; RE capacity targets for 2016 and 2030.	RCREEE member. There is a substantial body of law governing EE, including provisions for mandatory audits, incentives for investment in EE improvement, and establishment of an EE fund. National Agency of Energy Conservation established in 1985. It set up an energy-saving program for the period 2008–11.
Turkey		***Alternative energy targets***: RE share of primary energy 30% by 2023. Turkey in 2010 was second only to China in the installed capacity of solar water heaters. Turkey's automotive LPG market in 2011 was second only to that in the Republic of Korea. A law on the use of RE for power generation was adopted in 2005.	An EE law came into force in May 2007 and is expected to achieve 25–30% savings in total energy consumption through administrative structuring, energy audits, financial instruments and incentives, awareness-raising, and energy service companies for EE.
Uganda	√	***Alternative energy targets***: Specific targets set for 2012 and 2017 for hydropower, geothermal, solar water heaters, ethanol, biodiesel, and biogas. The overall goal of the RE policy issued in 2007 is to increase the use of modern RE from 4% to 61% of total energy consumption by 2017.	The 2007 RE policy also set EE targets for 2012 and 2017, including the number of energy audits and EE equipment installed in industry. The program to promote RE and EE supports development of a legal and regulatory framework for EE, EE standards for household appliances (refrigerators, lighting appliances, air conditioners) and electric motors, training programs for energy audits, and awareness-raising about EE. ***Efficient lighting***: Government has distributed 800,000 CFLs to residential consumers, each receiving 3 CLFs free of charge.
Uruguay	√	***Liquid biofuels***: B2 mandatory between 2009 and 2011, and B5 in 2012. Biodiesel is made from beef tallow. E5 mandatory from 2015. Energy Action Plan for 2005–30 seeks to reduce the share of fossil fuels, including a 15% reduction in fossil fuel consumption in transportation. ***Alternative energy targets*** for 2015: RE share of primary energy 100%, RE share of power generation (excluding large hydropower) 15%, 1,000 MW of wind, and 200 MW of biomass. A law on solar energy enacted in 2009.	The Energy Strategy Guidelines for Uruguay, issued in 2006, aimed to raise public awareness about demand-side management and increase the availability and acquisition of energy efficient goods and services. Government formed a technical group in 2008 to advise the public sector on the implementation of energy-saving measures as part of an EE program approved in April 2008, but the group was disbanded in 2010 due to good hydrology. A law on EE was enacted in 2009. It provides for the establishment of Fideicomiso Uruguayo de Ahorro y Eficiencia Energética (FUDAEE, Uruguayan Trust for Energy Saving and Efficiency). A decree approving FEDAEE was promulgated in Mar 2012.
Venezuela, R. B. de		***Gaseous automotive fuels***: 106,000 CNG vehicles at end-2011. A Jul 2008 official gazette set a goal for bifuel (gasoline/CNG)	Sharply falling power tariffs and petroleum product prices in real terms have made

Country	P[a]	Diversification	Conservation
		vehicles. Government reports that its 2011 goal for bifuel vehicles was nearly met. The Development Plan for Renewable Energy Sources, which is a part of the Plan for Economic and Social Development of the Nation 2007–2013, includes incentives for alternative, renewable, and environmentally sustainable energy sources (solar, wind, biomass, mini- and micro-hydropower, geothermal) while concurrently aiming to increase electricity generation with fossil fuel.	energy conservation campaigns ineffective. In Oct 2009, government issued a decree creating a power ministry and banning imports of inefficient electric devices. In 2009, football teams played during the day to save electricity. Effective Jul 2011, government imposed surcharges on those who did not reduce consumption by 10%, and offered discounts to households that reduced by 10–20% and higher discounts for reductions of more than 20%. The parliament passed an EE law in Nov 2011, limiting monthly consumption to 500–1500 kWh depending on location, above which much higher charges are incurred. ***Efficient lighting***: Tens of millions of CFLs have been distributed.
Vietnam		***Liquid biofuels***: Vietnam targets meeting 1% of gasoline demand with ethanol by 2015. Ethanol feedstocks are cassava and sugarcane. As part of government's biofuel development master plan, PetroVietnam started selling E5 in 5 cities in Aug 2010, and plans to sell it nation-wide in 2012. Vietnam plans to diversify to coal in power generation, targeting 50% of power from coal by 2020. ***Alternative energy targets***: RE share of primary energy 5% by 2020, 8% by 2025, and 11% by 2050; RE share of power generation 5% by 2020. Electricity of Vietnam (EVN) in Dec 2011 signed an agreement with 6 local companies to promote solar water heater.	Vietnam had a power efficiency and conservation program in 2006–10. Government holds national contests for effective energy management. Law on Energy Efficiency and Conservation came into effect in Jan 2011. EVN has an annual campaign during the dry season between Apr and Jun, aiming to reduce power consumption by 10% from the year before. EVN also promotes solar water heating. Hanoi turned off one-third of street lights after 11 P.M. in Apr–Jun 2011, and required every office to turn off power after work hours. A project promoting energy conservation in small and medium enterprises funded by the Global Environment Facility reportedly saved 232,000 tonnes of oil equivalent during 2006–2010. Hanoi announced higher parking fees in Jan 2012, which would discourage driving.
Yemen, Rep.	√	***Alternative energy targets*** for 2025: RE share of power generation 15%, specific installed capacity targets for wind, solar PV, concentrating solar power, geothermal, and biomass. A national strategy for RE and EE approved in Jun 2009.	RCREEE member. The national strategy for RE and EE targets a 15% increase in EE by 2025, but the baseline is unclear.
Zambia		***Liquid biofuels***: The 6th National Development Plan for 2011–15 sets a series of increasing annual targets for blending ethanol in gasoline and biodiesel in diesel, with E10 and B5 in the final year.	The 6th National Development Plan calls for formulation and implementation of an EE strategy.

Sources: IEA 2012b; USDA 2012a; REEEP; REN21 2012; IANGV; WLPGA 2012; Platts 2009c; Platts 2011a; Reuters 2010a; Bangladesh 2012a; *Cocha Banner* 2011; IHS 2012b; *Platts Oilgram Price Report* 2010; *Energy Economist* 2011a; Xinhua News Agency 2012f; Dow Jones 2009b; IHS 2008; European Union 2012; Interfax 2009a; APA 2012; *Sudan Tribune* 2009; *Capital* 2012; UNECA 2012; Energy Foundation Ghana 2011; Asia Pulse 2011c; *Jakarta Globe* 2012a; Dow Jones 2011a; Energy Partner 2012; Dow Jones 2009a; Kenya 2009; BBC 2009; APA 2010; Malaysia Digest 2012; Business News Americas 2010b; ISI Emerging Markets 2009; NamPower 2007; *Daily Times* 2010 and 2012; *Baluchistan Times* 2009; *Business Recorder* 2010a; Business News Americas 2009; ADP 2010; Asia Pulse 2009; Shell 2010; SKRIN 2011; World Bank undated; *Sunday Observer* (Sri Lanka) 2012; Sri Lanka News 2012b; *Daily News* (Sri Lanka) 2012; Lanka News 2012; Asia-Plus 2009; Thai News Service 2011a, 2011e, 2012b, 2013a; *Platts Oilgram News* 2012a; *Bangkok Post* 2011; *Nation* (Thailand) 2011; Dow Jones 2011b; EPPO 2012a; Business News Americas 2010a; Canadian Press 2009; Business News Americas 2011b; ADP

2009; *Saigon Times* 2009; Vietnam News Brief Service 2011a and 2011b; VietBiz24 2012; Thai News Service 2010a, 2011f, 2011h; Asia Pulse 2010; ESMAP 2009; government, utility, and national oil company Web sites and their announcements.

a. √ under P signals 20 percent or more of power generation from petroleum products.

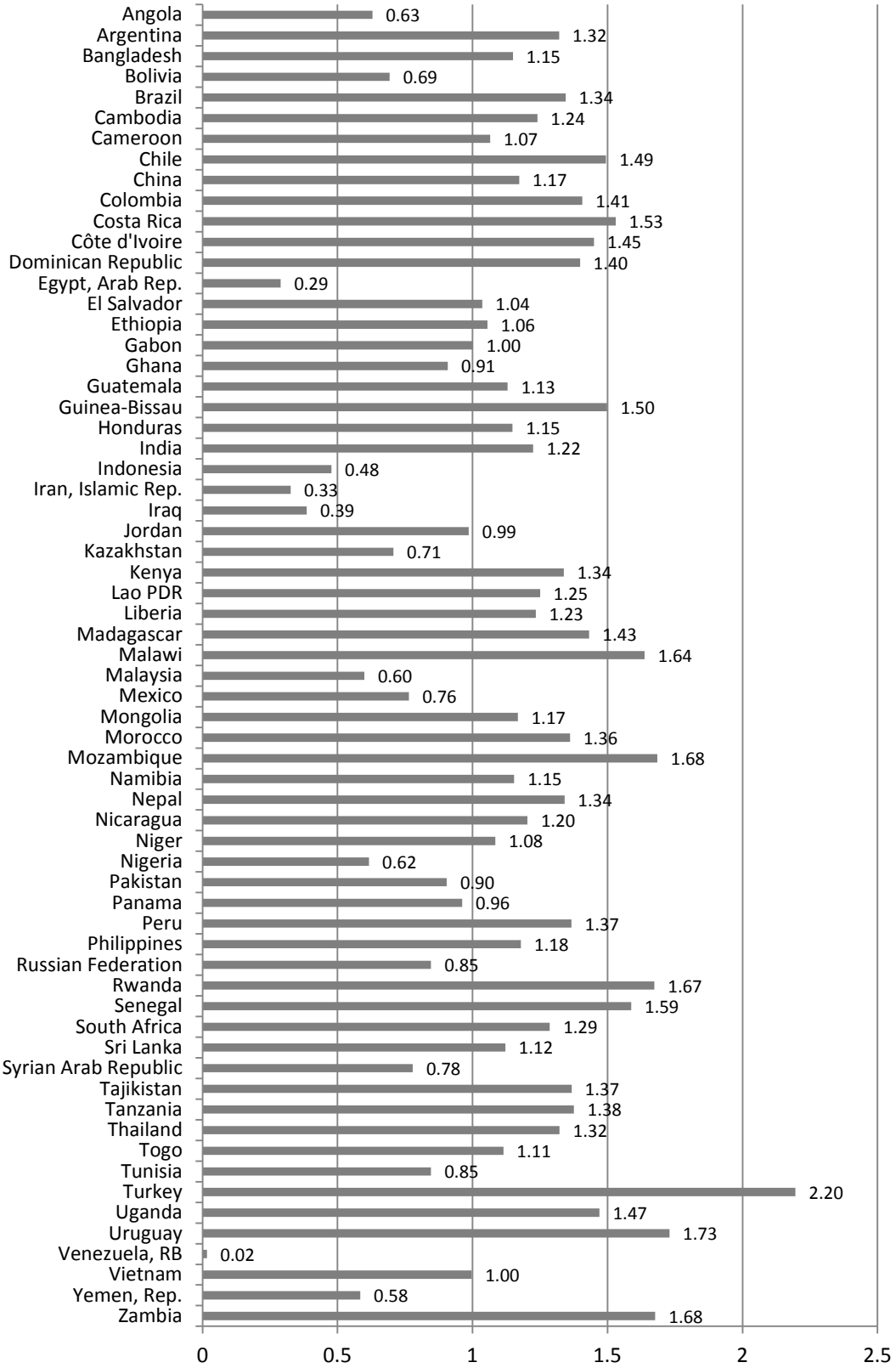
Appendix 3: Fuel Prices and Pass-Through Coefficients

Figures A3.1–A3.4 show retail prices in the study countries in July 2012 for gasoline, diesel, kerosene, and LPG, respectively. FOB prices of the fuels in four major refining centers—Northern Europe, Arab Gulf, Singapore, and U.S. Gulf Coast—are noted for comparison. Because of transport, storage, and retailing costs, taxes and other fees, and profit margins at each stage in the supply chain, retail prices are considerably higher than the benchmark FOB prices in deregulated markets. If retail and FOB prices are close, that is likely to signal subsidies. Figure A3.5 plots the ratio of the price of kerosene to that of diesel in countries where information on kerosene prices was available.

Table A3.1 lists pass-through coefficients between January 2009 and July 2012. The calculation methodology and the sources of benchmark FOB prices are the same as those described in Kojima (2012), with one difference. A much more detailed study of the transmission of world oil price increases in 12 major EU countries found that the increases were passed on to consumers within three to five weeks (Meyler 2009), or about a month. These countries can safely be assumed to be passing on prices increases on the global oil market fully to their domestic markets. This study therefore takes reference benchmark prices from the month before—December 2008 and June 2012—as more appropriate measures of gauging the extent of pass through between two time periods. The sources of retail information are the same as those in Kojima (2012) except Uganda, where the price survey results reported by the Uganda Bureau of Statistics were used instead. As mentioned in Kojima (2012), the pass-through coefficients in Uganda are low because the country experienced acute fuel shortages in January 2009, pushing up prices. The limitations of the methodology approached to compute these coefficients are discussed in detail in Kojima (2012, 6–8).

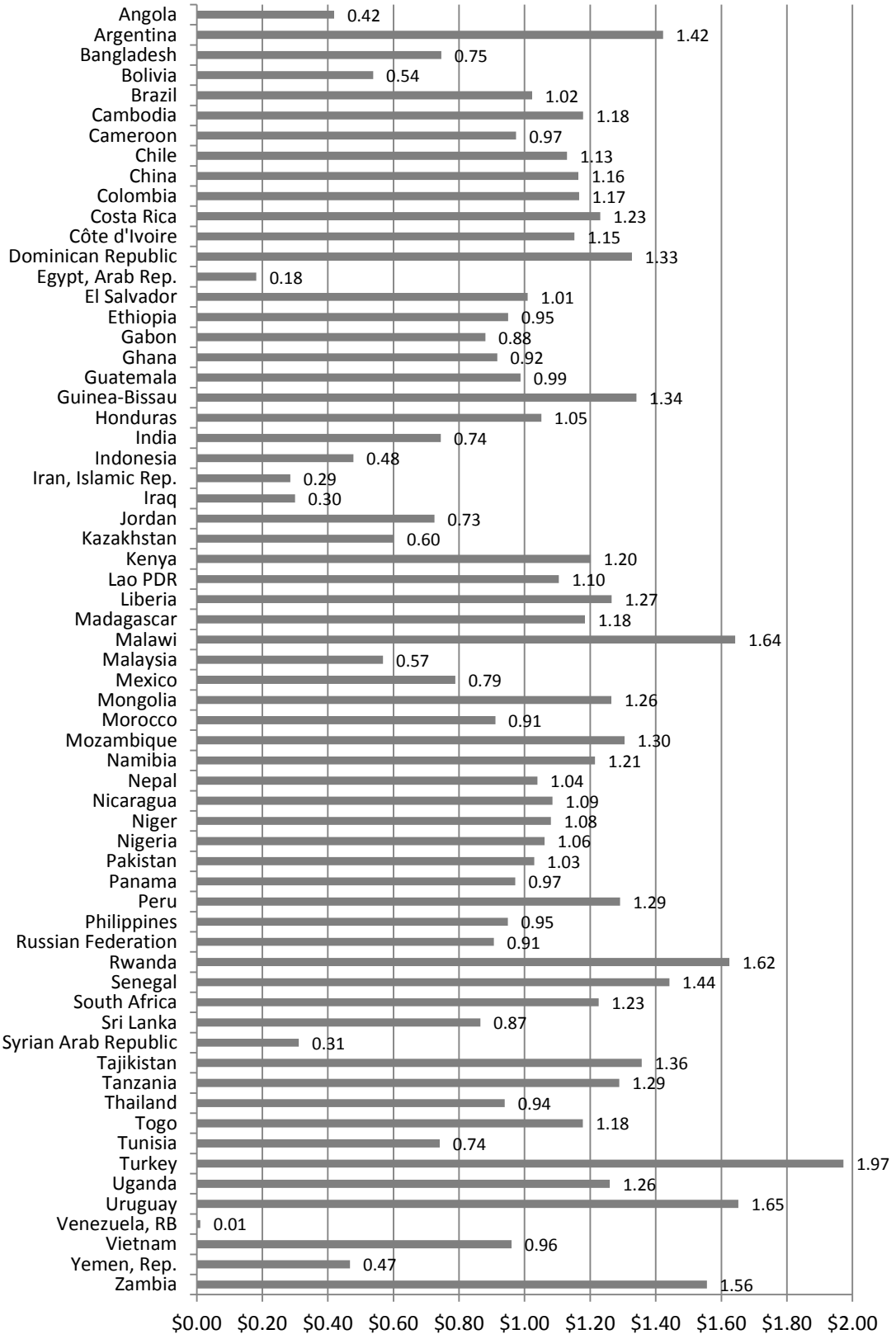
The prices available in Jamaica are ex-refinery inclusive of taxes and exclude distribution margins. The tax-inclusive ex-refinery prices were used for computing the ratio of kerosene to diesel prices in Figure A3.5 and pass-through coefficients for the four fuels in Table A3.1. The fuel prices in Uruguay are ceilings on wholesale prices set by the government and adjusted from time to time. They appear to be close to retail prices, and hence have been retained as retail.

Figure A3.1: Retail gasoline prices in July 2012, US$ per liter



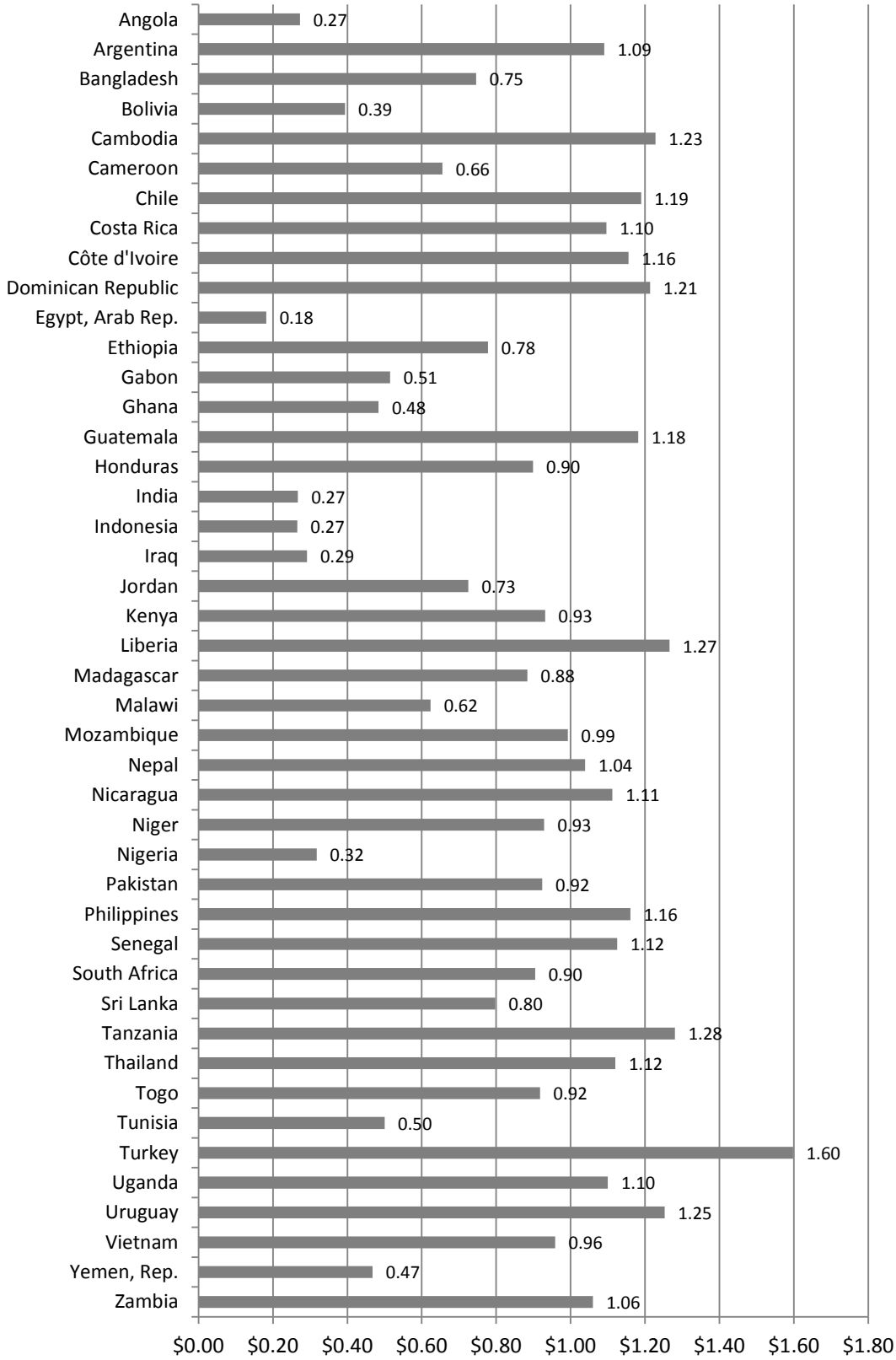
Sources: See Table A2.1 in Kojima (2012).
Note: The FOB prices in July 2012 varied between US$0.69 and 0.76 per liter depending on location and quality.

Figure A3.2: Retail diesel prices in July 2012, US$ per liter



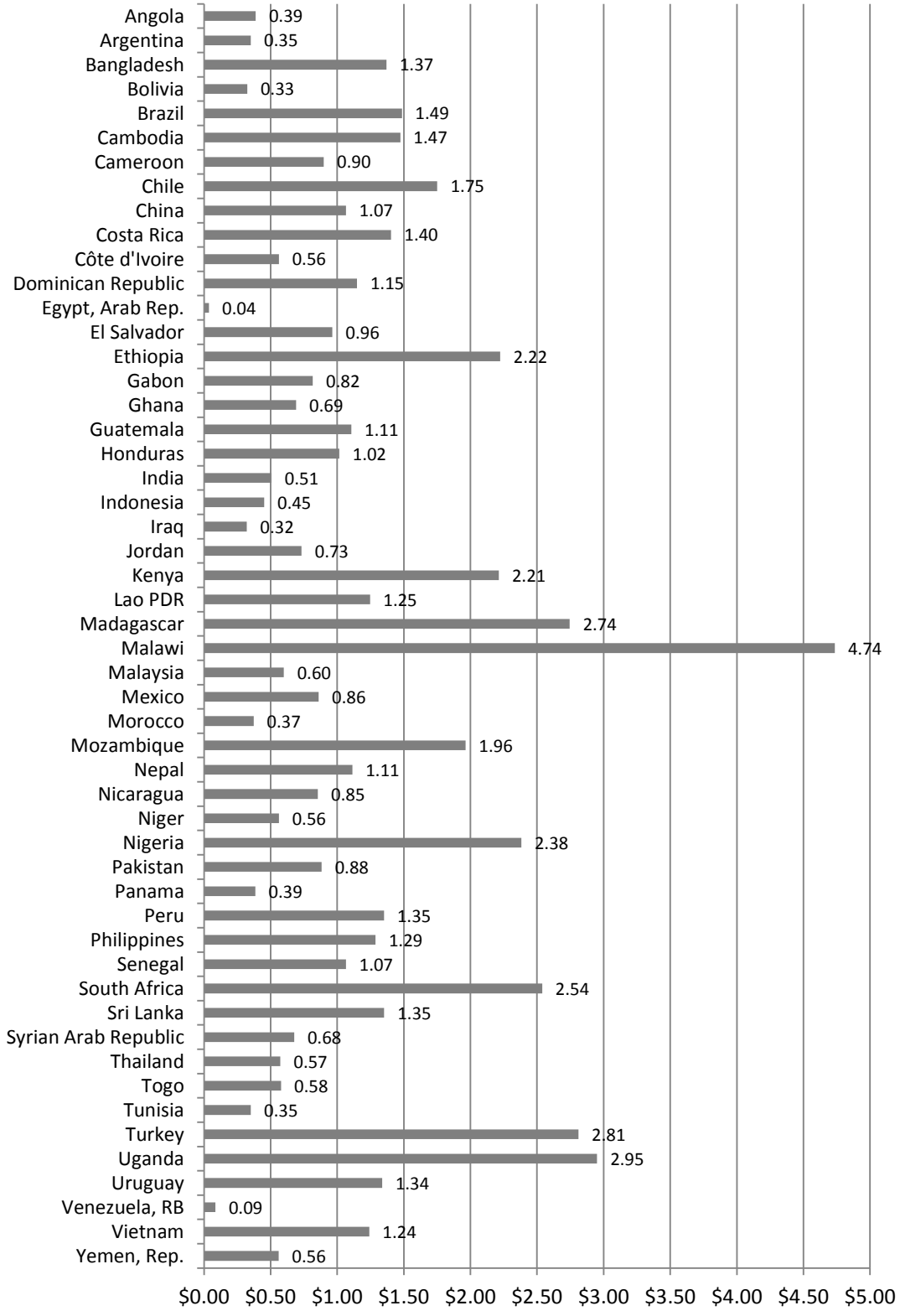
Sources: See Table A2.1 in Kojima (2012).
Note: The FOB prices in July 2012 varied between US$0.72 and 0.77 per liter depending on location and quality.

Figure A3.3: Retail kerosene prices in July 2012, US$ per liter



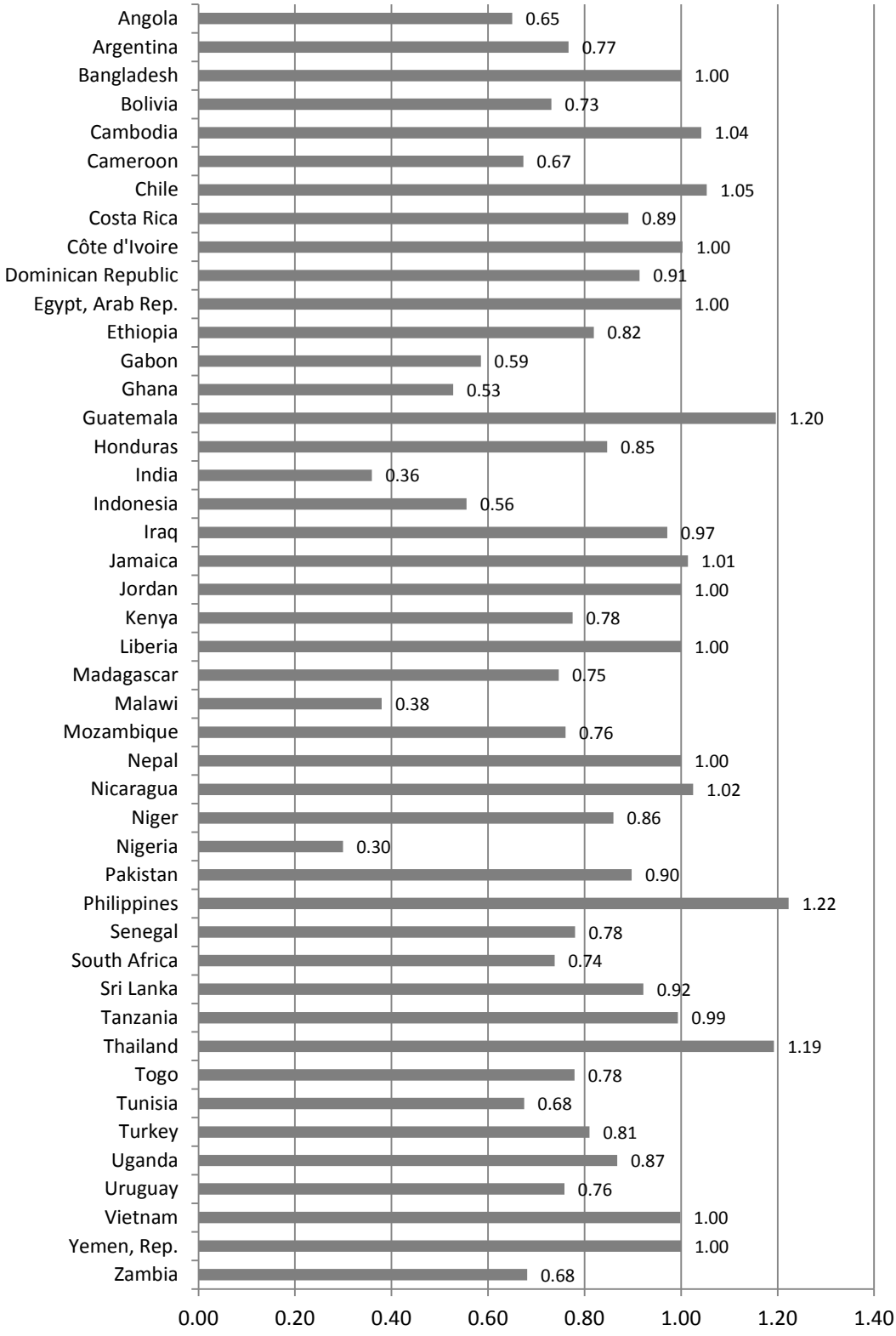
Sources: See Table A2.1 in Kojima (2012).
Note: The FOB prices in July 2012 varied between US$0.72 and 0.76 per liter depending on location.

Figure A3.4: LPG prices in July 2012, US$ per kilogram



Sources: See Table A2.1 in Kojima (2012).
Note: The FOB prices in July 2012 varied between US$0.45 and 0.62 per kg depending on location and LPG composition.

Figure A3.5: Ratio of retail kerosene prices to retail diesel prices in July 2012



Sources: Figures A3.2 and A3.3.
Note: The ratio for Jamaica is that of ex-refinery prices and taxes but excludes distribution margins.

Table A3.1: Pass-through coefficients between January 2009 and July 2012

Country	Gasoline	Diesel	Kerosene	LPG
Angola	24	11	-22	-27
Argentina	102	143	94	-60
Bangladesh	8	33	33	135
Bolivia	2	2	2	3
Brazil	57	30	—	199
Cambodia	133	142	150	155
Cameroon	-18	-24	-15	-17
Chile	188	127	91	297
China	100	127	—	87
Colombia	91	126	111	256
Costa Rica	134	104	89	224
Cote d'Ivoire	21	-18	69	-11
Dominican Republic	133	155	150	182
Egypt, Arab Rep.	-6	-5	-5	-1
El Salvador	103	118	—	306
Ethiopia	82	89	81	185
Gabon	-20	-9	-12	-24
Ghana	57	64	-23	46
Guatemala	101	100	90	11
Guinea-Bissau	61	77	—	—
Honduras	114	123	123	287
India	76	24	25	18
Indonesia	19	23	13	18
Iran, Islamic Rep.	57	82	—	—
Iraq	11	-13	51	10
Jamaica	119	136	147	277
Jordan	124	69	70	7
Kazakhstan	32	7	—	—
Kenya	95	93	—	—
Lao PDR	138	140	—	101
Liberia	128	124	120	—
Madagascar	18	9	13	216
Malawi	-36	-8	-170	—
Malaysia	30	28	—	28
Mexico	53	80	—	119
Mongolia	70	57	—	—
Morocco	5	-91	—	-6
Mozambique	177	66	71	95
Namibia	134	145	—	—
Nepal	79	88	86	20
Nicaragua	101	110	84	65
Niger	15	-9	26	—
Nigeria	39	166	-8	325
Pakistan	45	94	84	7
Panama	100	113	—	0
Peru	112	133	—	185

Country	Gasoline	Diesel	Kerosene	LPG
Philippines	132	101	114	109
Russian Federation	49	74	—	—
Rwanda	82	84	—	—
Senegal	122	132	99	58
South Africa	168	177	124	143
Sri Lanka	17	77	111	91
Syrian Arab Republic	-20	-69	—	64
Tajikistan	143	202	—	—
Tanzania	105	61	187	—
Thailand	176	128	17	13
Togo	24	56	—	—
Tunisia	-18	-19	-5	-15
Turkey	127	175	104	165
Uganda	12	14	3	209
Uruguay	139	166	129	197
Venezuela, RB	-4	-3	—	-46
Vietnam	89	96	78	-18
Yemen, Rep.	72	90	91	94
Zambia	125	146	91	—

Sources: Author's calculations based on sources cited in Tables A2.1 and A2.3 in Kojima (2012) and sources under "information" in Table A1.1.

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