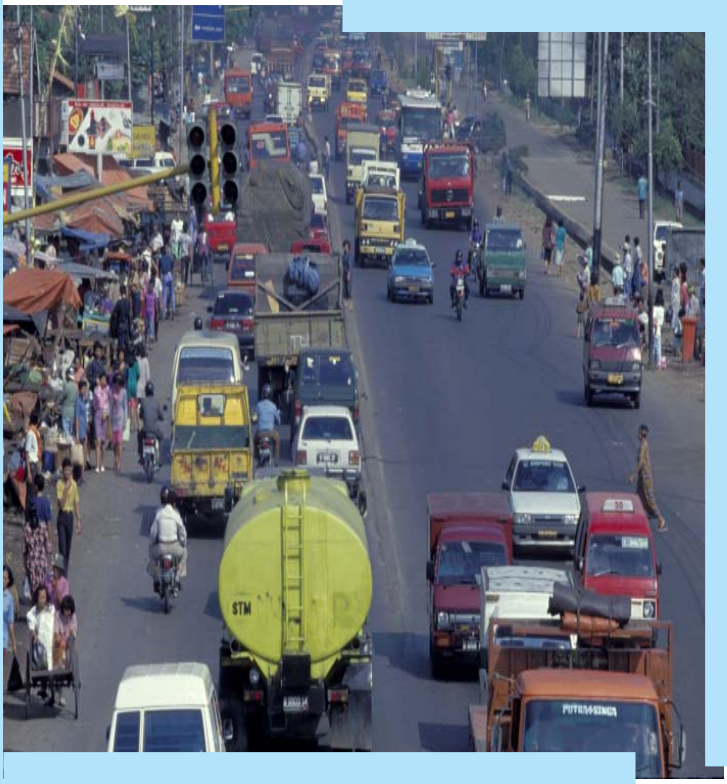
Coping with Higher Oil Prices



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PURPOSE

The Energy Sector Management Assistance Program (ESMAP) is a global technical assistance partnership administered by the World Bank and sponsored by bi-lateral official donors, since 1983. ESMAP's mission is to promote the role of energy in poverty reduction and economic growth in an environmentally responsible manner. Its work applies to low-income, emerging, and transition economies and contributes to the achievement of internationally agreed development goals. ESMAP interventions are knowledge products including free technical assistance, specific studies, advisory services, pilot projects, knowledge generation and dissemination, trainings, workshops and seminars, conferences and roundtables, and publications. ESMAP work is focused on four key thematic programs: energy security, renewable energy, energy-poverty and market efficiency and governance.

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FURTHER INFORMATION

For further information on a copy of the ESMAP Annual Report or copies of project reports, please visit the ESMAP website: **www.esmap.org**. ESMAP can also be reached by email at **esmap@worldbank.org** or by mail at:

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ESMAP Reports are published to communicate the results of ESMAP's work to the development community with the least possible delay. The typescript of the paper therefore has not been prepared in accordance with the procedures appropriate to formal documents. Some sources cited in this paper may be informal documents that are not readily available.

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Abbreviations and Acronyms

ASEAN	Association of Southeast Asian Nations
BPCL	Bharat Petroleum Corporation Limited
CBS	Central Bureau of Statistics
CNG	Compressed natural gas
CPC	Ceylon Petroleum Corporation (Sri Lanka)
DOE	Department of Energy
ENAP	Empresa Nacional del Petroleo (National Petroleum Company) of Chile
ENARSA	Energía Argentina Sociedad Anónima
EPE	Ehiopian Petroleum Enterprise
ESMAP	Energy Sector Management Assistance Programme
ETAP	Entreprise Tunisienne d'Activités Pétrolières (Tunisian Enterprise for Petroleum Activities)
IEA	International Energy Agency
GAIL	Gas Authority of India Limited
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Association for Technical Cooperation)
HPCL	Hindustan Petroleum Corporation Limited
IMF	International Monetary Fund
IOC	Indian Oil Corporation
KPC	Kenya Pipeline Company
KPRL	Kenya Petroleum Refineries Ltd.
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
MPNR	Ministry of Petroleum and Natural Resources (Pakistan)
NDRC	National Development and Reform Commission (China)
NNPC	Nigerian National Petroleum Corporation
NPA	National Petroleum Authority (Ghana)
OCAC	Oil Companies Advisory Committee (Pakistan)
OIL	Oil India Limited
ONGC	Oil and Natural Gas Corporation

OPEC	Organization of Petroleum Exporting Countries
OTS	Open tender system (Kenya)
PDC	Price differential claims (Pakistan)
PDL	Petroleum development levy (Pakistan)
PDR	People's Democratic Republic
PDS	Public Distribution System
PdVSA	Petróleos de Venezuela, S.A.
PEMEX	Petróleos Mexicanos (Mexican Petroleum)
PLN	Perusahaan Listrik Negara
PPPRA	Petroleum Products Pricing Regulatory Agency (Nigeria)
PSIA	Poverty and social impact assessment
PSO	Pakistan State Oil
RON	Research octane number
SAMIR	Société Anonyme Marocaine de l'industrie du Raffinage (Cameroon)
SONARA	Société Nationale de Raffinage (Cameroon)
VAT	Value added tax
WTI	West Texas Intermediate

Units of Measure

Bpd	Barrels per day
CFA francs	Communauté francière africaine francs
€	Euros
km/h	Kilometers per hour
m^3	Cubic meters (1 m^3 is 1,000 liters)
MMBtu	Million British thermal units
MW	Megawatts
Rp	Rupiahs (Indonesian)
Rs	Rupees
R$	Brazilian Real
Sh	Shillings

Executive Summary

1 The rise in oil prices and the associated increase in the prices of petroleum products that has occurred since the beginning of 2004 are having adverse effects on the users of petroleum products in all countries. In many developing countries, price increases have generated considerable pressure for government response to lessen the burden of higher world oil prices, and policies to minimize budgetary support have met with fierce opposition.

2 The individual characteristics of petroleum products strongly influence the way consumers react to various policies that might be tried. Some policy measures that are effective for other items for the purpose of protecting consumers, and especially the poor, from price increases are not necessarily suitable or effective for petroleum products.

3 All governments, but especially petroleum importers, are considering several questions:

- How can the increasing burden of the higher costs be shared between various parties in the economy in order to optimize social welfare?
- How can the costs of supply to users be reduced, so that the total burden is reduced?
- How can governments encourage the reduction of petroleum product consumption (and of the aggregate petroleum import bill in the case of an importer)?
- How can governments achieve "buy-in" from the public to the policies they pursue?

4 This study focuses on the impact of higher fuel prices on consumers and evaluates the various approaches to answering the four questions posed above. It does not consider the use of macro-level policies (such as monetary or exchange rate policy) to cope with the impact of the oil price shock on the macroeconomy, nor the measurement of the impact of the oil price shock on the macroeconomic performance of countries. Also, it does not discuss the management of the windfall income by large oil exporters and the long-term economic consequences of the revenue management. The study draws its evidence and conclusions from the recent experiences of 38 developing countries that have tried various policy alternatives.

Policy Options

5 The first part of the study reviews potential policies that can be used to mitigate the effects of higher oil prices on consumers, the government budget, and the total demand for oil. Policies are grouped into those that are price-based, those that are quantity-based, those that encourage fuel switching, and those that can affect the success of the governments' strategies for coping with higher oil prices.

6 Price-based policies determine the extent to which various groups in society (users, the government, and suppliers) bear the cost of the higher prices and reflect a mixture of three broad strategies:

- Pass the full price increase on a given product onto final users.
- Pass on only a part (or none) of the price increase and either finance the subsidy or tax reduction involved through the budget or through a cross-subsidy from other products, or reduce the profits of oil companies.
- Adjust prices in such a way that companies supplying the petroleum products receive a lower margin for each unit sold, or negative margins cross-subsidized by other business units, thus absorbing some of the price increase.

7 Subsidies are provided by a number of different mechanisms, including direct subsidies to users (possibly targeted to certain fuels or consumer groups), indirect subsidies through the reduction of taxes on petroleum products, and targeted income subsidies. If the conditions exist to identify low-income households and to transfer cash only to them, then targeted income subsidies may be the preferred policy instrument. They can be designed to provide support to low-income households to compensate for some or all of the effects of the increase in oil prices without distorting the relative prices of products, while reducing the overall cost to the budget. This has the effect of allowing consumption to adjust to prices, and does not provide incentives for various illegal activities such as fuel adulteration and smuggling.

8 A second group of price-related policies are those that aim to reduce the domestic costs of supply of products. These policies are largely related to attempts to make the domestic markets more competitive so that cost reductions will be passed on to consumers. By their nature such policies are unlikely to offer a short-run improvement in prices, but may be able to make a contribution in the longer run.

9 Quantity-based policies focus on placing restrictions on the use of activities that require the consumption of oil products. These activities are principally vehicle travel and the use of electricity when the power system uses heavy fuel oil or diesel for generation. Policies can be either mandatory or exhortatory.

10 Reliance on oil can also be reduced by energy efficiency improvement and diversification into non-petroleum sources of energy. The most common alternatives are natural gas and renewable sources of electricity such as hydro and geothermal. Biofuels are attracting growing attention as substitutes for liquid transportation fuels.

11 An increasing number of countries are promoting oil and gas development. With rising oil prices, the economics of exploration, development, and production have changed. Even in areas where past exploration did not yield promising results, there are hopes that newer exploration technologies might lead to commercial discoveries.

12 Governments that wish to introduce unpopular policies, such as eliminating subsidies on petroleum products because of their high fiscal burden, have faced opposition to these policies from civil society. The reaction of the public to possible measures designed to cope with the price rises depends on:

- The extent to which there is understanding for the necessity of a price increase or other effects that will be felt directly
- The perceived legitimacy and the general popularity of the government
- The credibility of the government in delivering promises that it may make, especially with respect to compensation measures or how budgetary savings may be used, in designing these policies
- The extent to which the burden is seen to be shared equitably, the speed with which the policy changes are implemented, and transparency of adopted policies.

13 Policies that are transparent in formulation and implementation are more likely to be accepted than those that are not. Transparency entails both making information available widely to the public and selecting accompanying compensation mechanisms (such as cash grants or suspension of school fees) that are easily verifiable.

International Experience

14 The second part of the study reviews the response of representative developing country governments to rising oil prices in recent years, drawn from 38 countries with varying income levels, size of the economy, degree of downstream petroleum market liberalization, and fuel pricing policy. The countries are categorized into non-oil producers, oil producers that are net oil importers, and oil producers that are net oil exporters. Individual country cases are not intended to provide an in-depth analysis but an overview of different circumstances, problems, and responses.

15 Important in all cases is the potential impact of changes in fuel prices and income on demand for oil. Everything else being equal, demand increases with increasing income and falling prices. A recent study found that, for the demand for oil products in developing countries, the long-run income elasticity was almost equal to unity while the long-run price elasticity was between 0.1 and 0.2. This suggests that, for example in the long run, if GDP in a country grew a total of 20 percent over a five-year period (that is, about 4 percent a year) and retail petroleum product prices doubled, long-run elasticities of unity for income and 0.15 for price would give a net increase in consumption of 5 percent. Unless there is a substantial reduction in growth rates, which has not happened so far, even those countries passing through the full effect of price increases will see a continuing increase in the demand for oil, albeit at a lower rate thanks to higher prices. Other policies will still be needed to complement the effects of letting the market speak in order to reduce the overall impact of higher prices on the economy.

16 A key measure of countries' response to higher oil prices is the extent to which these are passed on to consumers. Table 1 compares the pass-through coefficients (measured as the ratio of the increase in the retail price to the increase in the international price, both measured in local currency) for the period January 2004 to April 2006 for gasoline and for diesel. The mean of the coefficients for the developing countries studied (for which price data could be found) is compared to the coefficients for a sample of industrial countries. Table 1 indicates that, with the exception of Japan and the United States (for gasoline), industrial countries passed through more of the price increase to

users. Indeed, one-third of the developing countries passed through less than 90 percent of the international price increase for gasoline, and more than one-half passed through less than 90 percent for diesel.

Table 1 Pass-Through Coefficients for Selected Industrial and Developing Countries (January 2004–April 2006)[a]

Country	*Gasoline*	*Diesel*
Germany	1.20	0.98
Japan	0.85	0.65
United Kingdom	1.25	1.08
United States	1.02	1.05
Mean of case studies (31 countries)	1.03	0.88
Mean for net oil importers (25 countries)	1.19	1.01
Mean for net oil exporters (6 countries)	0.35	0.32

[a] For some developing countries, price information was not available during the specified period. See annex 4 for more detail.

17 This study investigated possible macroeconomic factors that could affect the degree of the price increase pass through for gasoline and diesel. The macroeconomic variables examined were

- The vulnerability of the economy to an oil shock defined as the ratio of value of the net oil imports to GDP
- The terms of trade
- The overall financial surplus of the government relative to GDP
- The real growth of GDP per capita
- Implicit GDP deflator
- Ratio of debt to GDP
- Per capita GDP
- Whether the country is a net oil exporter
- Whether the country is an oil producer
- Initial product price.

The year 2003 was selected as the initial condition likely to affect future government pricing policies, and the pass throughs in 2004–06 were regressed on the above parameters using data from 2003. Statistical analysis showed that the major factor distinguishing the degree of response of the sample countries was whether or not they are net oil exporters. For both fuels this group passed through much less of the international price increase. In addition, the analysis showed that, for diesel, the degree of pass through was also influenced by the ratio of debt to GDP (the higher the debt, the greater the pass through) and the terms of trade (pass-through increasing with improving terms of trade). Other macroeconomic variables were found to be statistically insignificant.

18 Drawing from the case studies of the range of policy responses identified in various countries, an overall summary of key policy responses was constructed. Ten policy questions are considered for the purpose of summarizing key policy responses adopted in 2004–06. Most relate to policies specifically designed to address higher oil prices.

(1) For countries with deregulated prices or an automatic pricing formula that follows international prices, has the government suspended its pricing policy so as not to pass higher world prices fully to consumers at any time in 2004–06?

(2) Has the government lowered taxes or fees levied on petroleum products to lower end-user prices?

(3) Has the government financed fuel price subsidies explicitly from the budget?

(4) Is there an oil product price stabilization fund that is either functioning presently, or has been depleted and is not presently functioning, or has been proposed by the government?

(5) Aside from the measures in (1) and (2), has the government used its influence in other ways in an attempt to lower end-user prices? Examples from the countries studied include threatening to withdraw licenses for increasing prices, calling upon the public to boycott firms that raise prices, requiring that justification be provided for every price increase, and forcing the oil companies to absorb losses from under-pricing of fuels.

(6) Have prices to certain consumers been set lower than for others for the same fuel? Targeted consumers might include farmers, fishermen, public transport operators, power producers, and households, and the sale of smaller LPG cylinders at lower prices on a unit weight basis.

(7) Have mandatory conservation measures been announced or implemented, or have financial incentives been given for improving energy efficiency? These include conservation requirements implemented by a government agency.

(8) Has the government introduced a cash transfer or any other compensation mechanism that targets the poor specifically in response to higher oil prices?

(9) Has refined product or electricity rationing or shortage occurred in 2004–06?

(10) Has the government implemented or actively promoted switching to alternative sources of energy to reduce dependence on oil: natural gas, renewable energy, biofuels, and coal to liquids?

19 Question (3) is not specific to fuel price increases but simply answers whether the budget has been used to lower fuel prices at any time since the beginning of 2004. The stabilization fund in question (4) is specifically for smoothing prices over time and excludes freight equalization funds used to reduce regional price differences or to achieve pan-territorial pricing. Question (8) excludes subsidies that existed prior to the

steep price increase in 2004–06. Such subsidy schemes may have responded to higher oil prices by increasing subsidies. However, it is difficult to establish the counter-factual—how much subsidies might have been increased if oil prices had not increased. For this reason, only new compensation schemes are considered. For question (9), shortages and rationing have occurred for reasons unrelated to higher oil prices, such as operational failures at refineries (Zambia), changes in tax collection (Kenya), and serious drought (East Africa). Nevertheless, higher oil prices have exacerbated the situation in many cases. Examples include not being able to afford diesel for emergency power generation, and price ceilings leading to products being diverted to the export market or lower refinery throughput, resulting in shortages and rationing. Identifying the counter-factual for question (10) is difficult, and for this reason only those instances in which the government explicitly stated that fuel switching was promoted to reduce dependence on oil are cited. Coal was not included among alternative fuels—except when used in coal to liquids, an emerging alternative fuel technology—because the counter-factual is difficult to estimate in countries that are already using coal, and especially among such large coal producers as China and India. The results are shown in Table 2.

Table 2 Summary of Responses to Higher Oil Prices in 2004-06 (Number of Countries Answering "Yes")

Question	*Non-oil producers (16)*	*Net oil importers (13)*	*Net oil exporters (9)*	*All countries (38)*
(1) Suspend pricing policy[a]	5	6	3	14
(2) Taxes adjusted	10	6	7	23
(3) Budget financing fuel subsidies	4	7	9	20
(4) Stabilization fund	5	2	2	9
(5) Government influence used to lower prices	3	7	2	12
(6) Lower prices to certain consumers	5	5	7	17
(7) Mandatory conservation measures or financial incentives	4	6	2	12
(8) Cash transfer or other measures to compensate	1	5	1	7
(9) Oil product or electricity rationing or shortage	11	8	7	26
(10) Fuel switching	11	11	6	28

[a] Twelve countries out of 38 did not have market-based pricing.

20 Of the 38 countries, 14 have suspended market-based pricing (for some, if not all, fuels) to avoid full pass through of price increases. More than one-half (23 out of 38) have lowered taxes to lower end-user prices. The percentage of those that have resorted to tax reduction is disproportionately high among net oil exporters, almost 80 percent. Half the governments have financed fuel subsidies from the budget, and the tendency to do so

increases with increasing contribution of domestic oil to meeting domestic demand. Among net oil exporters, all have used the budget to subsidize fuel prices. Only five countries have effectively functioning consumer price stabilization funds, one of which has just been launched (Nigeria). About one-third of governments have tried to lower end-user prices indirectly.

21 About 45 percent of the countries have price discrimination based on consumer categories. Among net exporters, four-fifths have offered price discounts to certain consumer classes. Mandatory conservation measures or financial incentives for conservation have been implemented or announced in one-third of the countries. Not surprisingly, the lowest percentage was among net oil exporters (22 percent implemented or announced conservation measures), but somewhat surprisingly, the percentage was not much higher among non-oil producers.

22 Compensation mechanisms set up specifically in response to recent oil price surges were not all that common. Indonesia, Chile, and China introduced cash transfer schemes. Another four set up other types of compensation schemes.

23 Petroleum product and electricity shortages have been common, occurring in nearly two-thirds of the countries. Ironically, those most likely to experience energy shortages are net oil exporters, suggesting a high indirect cost of fuel price subsidies. In almost two-thirds of the countries that have experienced shortages, the government has suspended market-based pricing, financed price subsidies from the budget, or both.

24 Three-quarters of the governments are promoting fuel switching to alternative fuels or are proposing to do so. Twenty-three countries are engaged in or planning to start biofuel production. Somewhat unexpectedly, more than one-half of net oil exporters surveyed have already begun, or have plans to establish, biofuel production.

25 Some governments have been more successful than others in implementing policies that reduce price subsidies and encourage energy conservation. Useful lessons can be gleaned from their experience.

- The government of Ghana used information dissemination and awareness-raising effectively in February 2005 to win the public opinion over, against opposition from trade unions, to their policy of eliminating fuel price subsidies entirely, coupled with compensation schemes targeting the poor. In engaging the public, they made extensive use of the findings of the poverty and social impact assessment of subsidy elimination conducted with a wide range of stakeholders in 2004.
- In 2005 in Indonesia—which has a history of violent protests against fuel price increases—the government raised prices by 29 percent in March and by another 114 percent in October. The public acceptance of these very large price increases was helped by the credibility of the newly elected government and by the government's decision to redirect the savings from the subsidy reduction to rapidly put in place a cash transfer program for the poor. The government conducted nation-wide information campaigns to inform the public about this compensation mechanism, which for the poor more than compensates for the price increases. The government has

also conducted on-going assessments of the implementation of the cash transfer program and addressed the problems identified. In addition, the government is using the savings to finance poverty-reduction programs in education, rural development, and health. The government has indicated that the cash transfer program will be made conditional after a year. In this way, the government is moving from universal price subsidies to targeted assistance, and is further formulating an exit strategy.

- The government of Philippines has mounted a very active energy conservation campaign, beginning with government ministries and agencies, thereby setting an example. Although attribution is difficult, this large effort by the government together with other factors (including full pass through of world market price increases) have helped to reduce fuel consumption by 8 percent during the first 11 months of 2005 compared to a year earlier.
- The government of Chile has maintained a prudent fiscal policy despite rising world prices of copper, Chile's major export commodity, and used a portion of the windfall income to subsidize fuel prices in times of very high world oil prices. The government has also used cash transfer to compensate the poor for higher oil prices.

Long-Run Policy Considerations

26 Given the time frame under study, many responses so far experienced are necessarily short run, or else it is too early to assess the effects of longer-term policies. So far, higher oil prices have not diminished economic growth, nor have they increased inflation much in most countries. Higher prices of other commodities (as seen with Chile above) and higher remittances from citizens working abroad have also helped to mitigate the impact of higher oil prices in a number of developing countries. Should high oil prices continue, however, they could begin to have larger adverse effects. The final section of the study appraises how governments should respond in the coming years in the light of uncertainties about future world oil prices. Three future oil price scenarios—rising, falling, and remaining the same—are treated separately.

27 Given the diverse circumstances in which developing countries find themselves—different income levels, budgetary situations, amounts spent on price subsidies, availability of indigenous petroleum resources, sources of electricity, and the impacts of weather on hydropower, to mention a few—there is no simple or universal strategy for dealing with higher oil prices. In addition, no single policy step can be expected to meet multiple government objectives, such as minimizing the foreign exchange outflow for oil product purchase, controlling inflation, ensuring that higher energy prices do not damage the economy markedly, and protecting the poor from higher prices. A package of measures needs to be formulated, whereby each measure may make only a small contribution but their combined impact is measurable and helps the government and the public deal with higher oil prices effectively.

Coping with a Further Oil Price Increase

28 The price variations in 2004 and 2005 serve to show that the oil market is currently very sensitive to actual or potential supply disruptions. The events in Nigeria and Iran have been major factors exerting upward pressure on the oil price. Further disruptions to world oil supply could come from other civil disturbances or from weather related incidents. Faced with these developments, oil-importing countries need to plan for the possibility that the oil price may rise even higher. Policies of not planning for such an eventuality and instead waiting for the oil price to fall by a considerable amount to some "historical mean" could seriously exacerbate the problems of adjustment that would be forced on governments, should prices indeed rise much further.

29 For countries that have elected to subsidize petroleum products through a direct transfer to consumers or oil marketers, the fiscal costs would continue to escalate unless prices are raised. Delaying the implementation of a subsidy removal policy runs the risk that the size of the adjustment would be so large that it becomes politically very controversial. A phased approach, in which the price adjustment takes place over several months in steps, may be necessary. A key issue is then the relative size of such steps: starting with too small steps runs the risk of policy fatigue after a number of adjustments have been made while still leaving domestic prices below the international equivalent. Lessons on how to manage a reduction in subsidies can be drawn from those governments that have done so in recent years.

30 If oil prices continue to rise, the potential attractiveness of alternative fuels will steadily increase. Examples include renewables and biofuels. Where oil prices continue to rise and appear to be staying high for some period, encouraging fuel switching is likely to be one of the most powerful policies available to a government, even though its effects may be felt only gradually due to the need to invest in new capital equipment by producers and, for some applications, by users.

31 In countries where direct and indirect expenditures on petroleum products form a substantial fraction of the budget of lower-income households, governments will likely face increasing pressure to find a way to shield such households from the full effects of oil price increases. If long-run oil prices are to rise, the cumulative costs of any targeted subsidy will increase. The danger for governments is that the targeted subsidies will come to be seen as permanent. If such schemes are to be time-bound, then governments should be making this transparent now and developing a re-entry strategy in which the level of such subsidies is phased down over time.

32 To minimize the cost of such targeted support, governments need to choose schemes with the smallest leakage to higher-income groups, and also to define the support given to lower-income groups as a sustainable proportion of the extra costs they are bearing. This calls for detailed analysis of household expenditure data (if surveys are available) and the acceptance of a principle of limited support, rather than full compensation, even for the lowest-income groups.

Responding to Lower Oil Prices

33 A decline in world oil prices would allow governments to move toward a removal of subsidies without an increase in domestic prices. Users need to be informed of

the rationale for such a policy since they are likely to expect that domestic prices to fall with falling international prices. A phase-out of targeted subsidies, such as cash transfers, could also be undertaken at such a time without consumers feeling that they had suffered a loss of welfare.

34 If oil prices fall back by a substantial amount, the immediate fiscal and welfare adjustments would be easier to sustain. Nevertheless, the lessons from this recent episode should reshape government and individual policies to the use of oil. Further periods of sustained price shocks are possible and even probable, and economies need to adjust to be in a position to face them at lower costs. Policies to encourage the diversification of fuel source away from oil take time to become effective, and a period of lower oil prices should be used to begin this process, rather than wait for the next oil shock.

35 For countries that are facing possible supply disruptions, a particularly good time to start to accumulate strategic stocks would be once prices had fallen back by a reasonable amount. Similar considerations apply to governments considering setting up stabilization funds to smooth out future price fluctuations. Putting resources aside to provide cover against future supply disruptions and price hikes would be best done once prices had move substantially lower, when a levy on fuels could be introduced to provide the fund with some initial financing that could be accommodated without having to raise prices.

Long-Run Average Price at the Current Level

36 If oil prices remain at the current level, governments have to consider whether the policies that they adopted to cope with the initial surge in prices are sustainable. Where prices were fully passed on to consumers and there has been no major backlash, then the policy of leaving it to the market should continue. If governments are able to continue or intensify their efforts to improve the efficiency of energy use and reduce oil consumption, this should help to maintain support for a full passing-on of prices.

37 Where governments have subsidized final prices, the cumulative burdens of this policy need to be considered. The financing of these subsidies comes from either a reduction in government expenditure or an increase in government liabilities. The ability to continue these policies depends in part of the growth of the economy. If the economy is growing rapidly and the government is receiving buoyant tax revenues from non-oil sources, the ability to maintain an acceptable growth of public spending or of total public debt may not be much impaired. Also, the higher price of oil will enhance the contribution of oil revenues from the upstream in producing countries, and they will find it easier to bear the fiscal burden of fuel price subsidies. For countries that are growing only slowly and have no buoyant source of revenue to compensate for the costs of supporting a policy of subsidization, the cumulative effects of this policy will become progressively more burdensome. A shift in policy to gradually reduce subsidies and to encourage fuel switching and improved energy efficiency is likely to become increasingly necessary.

General Lessons for Coping with Future Oil Prices

38 Some policy stances would be beneficial under all price scenarios. Eliminating subsidies that benefit mostly the rich would increase government revenue,

remove pricing distortions, and also reduce wasteful or nonessential use of energy. Tackling demand management would be particularly helpful. Some policy measures have primary objectives other than fuel demand management, but they can give sizeable collateral fuel saving benefits. They tend to have long "gestation" periods, but can derail demand management in the long run if poorly handled. There are many such examples in the transport sector in which the primary objective may be reducing congestion or providing higher-quality public transport—elimination of publicly funded free car parking, traffic management, and bus sector reform are just a few examples. Governments should press for those policies that can bring about multiple benefits.

39 In countries where current prices contain some elements of subsidy, an important aspect of the government's overall strategy is to persuade the public that raising prices to market-clearing levels is a cost-effective way of handling higher oil prices in the long run. An energy audit of government activities, checking to see if all government-funded vehicles and trips are essential and eliminating those that are not, would not only help reduce fuel consumption by the government but might go a long way in winning public trust, especially in countries where the public may be critical of what they view as "extravagance" by high-level government officials.

40 In helping the poor, traditional fuel subsidies have been found to have large leakage, resulting in low cost-effectiveness. Household surveys have confirmed that the lowest-income groups often receive the smallest share of the benefits of the subsidies, even though removal of the subsidies will have sizeable impact on them. Governments are well advised to strengthen the data base that can be used to accurately identify poor households and develop a delivery mechanism for income transfer and other types of compensation that targets lower-income households better.

1

Background

1.1 The rise in oil prices and the associated increase in the prices of petroleum products that has occurred since the end of 2003 are having adverse effects on the users of petroleum products in all countries. The effects have been felt especially in countries where price increases have been passed through, to a large extent or fully, to end users. In many developing countries, the pressure for government response to lessen the burden of higher world oil prices has become great, and policies to minimize budgetary support have met with fierce opposition.

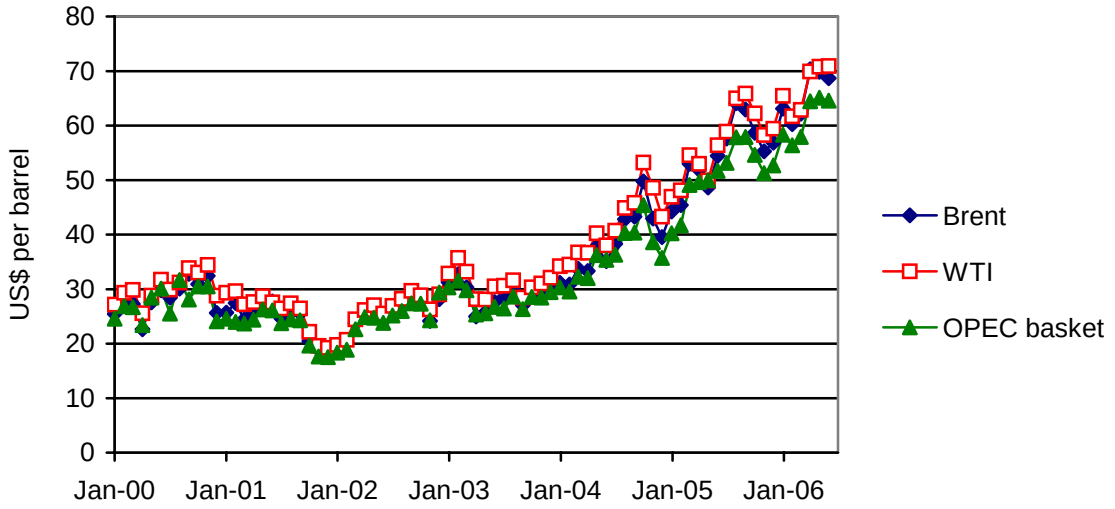
1.2 The importance of the rise in crude oil and petroleum product prices since2003 has been estimated by a number of studies (see, for example, ESMAP 2005a and 2005b). The studies estimate that the additional import bill would be equivalent to greater than 3 percent of GDP in many countries that import all their crude oil and refined petroleum products and as much as 5 percent of GDP in some countries. In the face of these estimates, all governments have been considering how best to protect the economy from the potentially damaging effects of sharp oil price increases.

1.3 Users in many developing countries are urging their governments to take action to ensure that the domestic fuel prices not increase as rapidly as the world oil price, and to control inflation. The individual characteristics of petroleum products strongly influence the way consumers react to various policies that might be tried. Some policy measures that are effective for other basic consumption items for the purpose of protecting consumers, and especially the poor, from price increases are not necessarily suitable or effective for petroleum products.

The Rise in Crude Oil and Petroleum Product Prices

1.4 Discussions on the impacts of the recent oil "shock" have focused on the increases of certain marker crude oils (Brent and West Texas Intermediate[WTI]). The monthly average prices for Brent, West Texas Intermediate , and OPEC (Organization of Petroleum Exporting Countries) basket of crude are shown in Figure 1.1. Prices differ depending on the quality of crude, and, among the three crude oils shown, OPEC basket is the lowest priced, WTI the highest.

Figure 1.1 Prices of Brent, WTI, and OPEC Basket



Source: Energy Intelligence 2005
Note: Monthly average price for UK Brent-38, WTI-40 (Cushing), and OPEC basket

1.5 Indications of how unforeseen were the recent price increases can be gathered from the events in the last six years. At its March 2000 meeting, OPEC established a price band mechanism, set between US$22 and US$28 a barrel. If OPEC basket prices are above US$28 for 20 consecutive trading days or below US$22 for 10 consecutive trading days, production would be adjusted. This price band mechanism has been used only once. On October 31, 2000, OPEC increased its total production quotas by 500,000 barrels per day (bpd). After a fairly large decline in late 2001–early 2002, world oil prices began to rise, reaching a peak near the time of the U.S. invasion of Iraq in March 2003. This peak did not last long and prices fell in mid-2003.

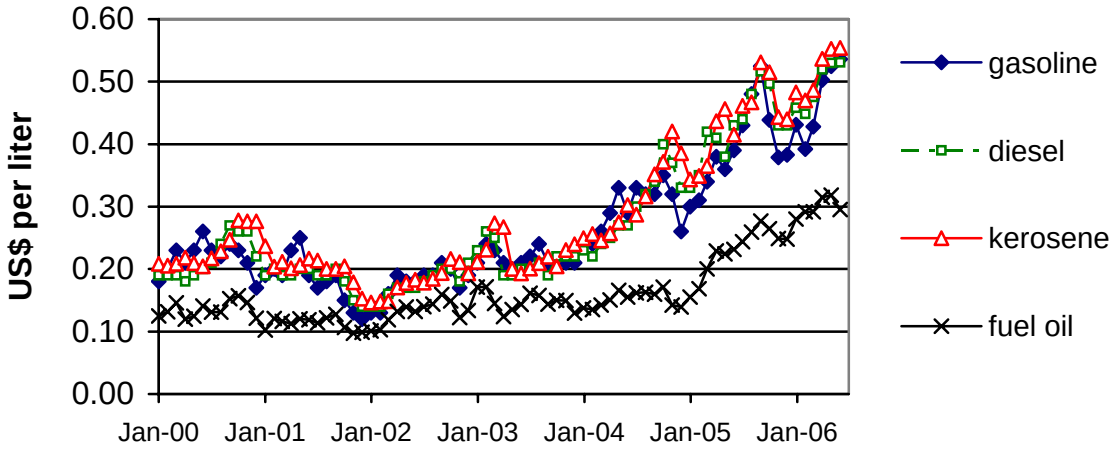
1.6 Beginning in late 2003, world oil prices started to climb steadily until October 2004. Prices fell by about US$10 per barrel in the next two months, raising hopes that prices might be "normalizing." Such expectations were short lived; prices began to rise again in early 2005, reaching a peak in August–September when OPEC basket sold for almost US$58 a barrel, Brent US$64, and WTI more than US$65. In January 2005, after OPEC basket prices remained above US$28 a barrel for more than a year, OPEC officially announced that it was suspending its price band target of US$22–28 a barrel.

1.7 Prices fell in the last three months of 2005, although not as much as at the end of 2004. The decline in prices nevertheless fueled hopes that the days of high oil prices might be over. These hopes were dashed in 2006, with oil prices reaching or even surpassing the peaks seen in August–September 2005 in the first four months. This chronology of events illustrates that high oil prices do not appear to be temporary, and there are yet no obvious changes in the fundamentals that would suggest that prices would fall by, for example, US$10 to US$20 a barrel in the near term. One surprising aspect of the oil price increases since end-2003 is how small their impact on the world economy has been.

Sustained economic growth worldwide has contributed to rising oil prices by reducing spare production capacity and leading to a precarious balance between supply and demand.

1.8 Because consumers buy petroleum products and not crude oil, petroleum product prices are what concern end users. There is strong arbitrage between the different oil markets so that product import prices in various countries are strongly correlated and differences reflect mainly differences in transportation costs of getting the products to these markets. Product prices broadly track crude prices, but different factors are at play so that product prices do not follow crude prices exactly. Figure 1.2 shows the price trends for petroleum products in the Northwest European market, which is one of the major export markets and which forms the basis for imported prices in many developing countries. Product prices peaked in September 2005 following hurricane Katrina, and these prices were surpassed in June 2006 except in the U.S. Gulf.

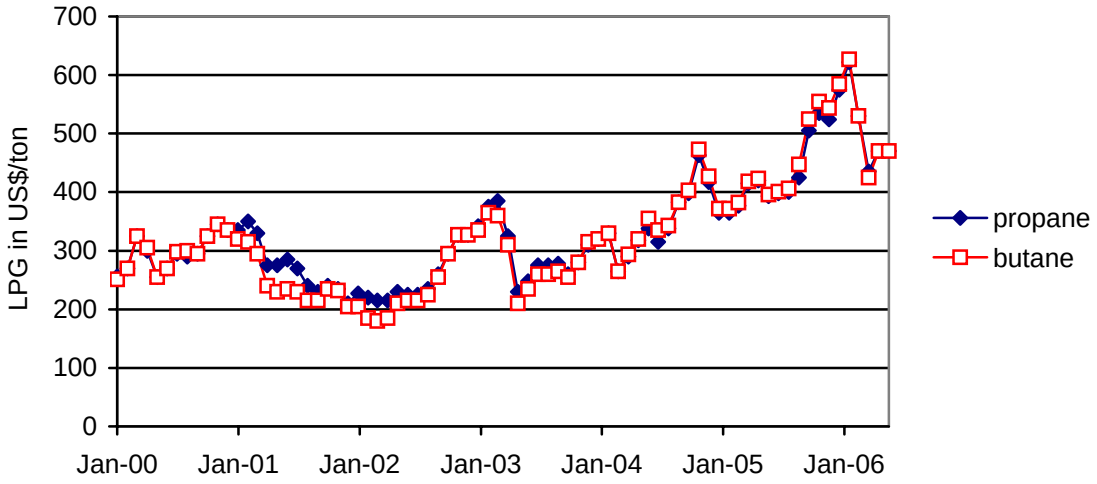
Figure 1.2 Monthly Northwest Europe Prices of Petroleum Products



Source: Energy Intelligence 2006.
Notes: Regular unleaded gasoline, diesel with 0.2 percent sulfur, jet kerosene, and fuel oil with 3.5 percent sulfur, Northwest Europe monthly spot prices, barges, free on board.

1.9 Figure 1.3 shows prices of propane and butane—the principal components of liquefied petroleum gas (LPG)—in the Persian Gulf, which sets LPG benchmark prices for regions to both the east and west of the Suez Canal. LPG prices reached a maximum in February 2006, followed by a decline of more than US$150 a tonne in the next two months. LPG prices track crude oil prices broadly, but the correlation is weaker than that between crude and refined products.

Figure 1.3 Monthly Saudi Aramco Contract Prices for LPG



Sources: Platts Commodity News, various issues.

1.10 The percentage increase in prices between January 2004 and September 2005 are given in Table 1.3. As the preceding paragraphs show, crude and refined product prices in September 2005 were among the highest in recent years, and prices in 2006 are nearing or surpassing the levels seen in September 2005. The September propane and butane prices were not much lower than those in April 2006. The table shows that the prices doubled on average between the two months examined, with the exception of LPG which registered a much smaller increase.

Table 1.3 Prices for Major Petroleum Products between January 2004 and September 2005

Fuel type	*Brent*	*Gasoline*	*Kerosene*	*Diesel*	*Heavy fuel oil*	*LPG*
Unit	US$/barrel	US$/liter	US$/liter	US$/liter	US$/tonne	US$/tonne
January 2004	31.17	0.237	0.256	0.235	137	320
September 2005	62.91	0.527	0.527	0.516	278	436
Increase	102%	122%	106%	120%	103%	36%

Sources: Energy Intelligence 2006 for crude and petroleum products, *Platts Commodity News* for LPG.
Notes: Regular unleaded gasoline, diesel with 0.2 percent sulfur, jet kerosene, and fuel oil with 3.5 percent sulfur, Northwest Europe monthly spot prices, barges, free on board; Saudi Aramco propane and butane contract prices, averaged, for LPG.

Characteristics and Use of Petroleum Products

1.11 Petroleum products have three features that distinguish them from other forms of energy—inter-fuel substitutability, ease of transport and distribution, and the difficulty of monitoring the first units of consumption by each end-user. These features strongly influence the effectiveness of policies designed to influence their retail prices within a country.

1.12 *Substitutability*. To varying extents, some products are close substitutes for each other and differential pricing schemes result in substitution of cheaper fuels for more expensive ones. Depending on the application, inter-fuel substitution can result in inferior performance. The most common practice is to add kerosene to diesel. Diesel and kerosene share many characteristics in common, and, depending on the quantities added and the quality difference, diesel users may detect little or no difference in fuel performance. Another common practice is to add about five percent kerosene to gasoline. Such adulteration of gasoline has an adverse impact on both the vehicle performance and the environment, but the difference in the vehicle performance may be sufficiently small that consumers may not notice. If the cost savings are partially passed on to end users, the loss of performance incurred may be more than offset by savings in expenditure resulting from purchasing the cheaper substitute.

1.13 *Ease of transport, distribution, and sale*. All of the products, with the exception of heavy fuel oil, can be sold in finely divisible amounts, and there are usually many outlets within a country. The ease of transport and sale of liquid fuels facilitates possibilities of resale of "underpriced" or rationed products, for example on the black market or smuggling into other countries where fuel prices are higher. The large number of retail outlets makes it difficult to monitor transactions taking place. For goods distributed through networks, such as electricity, natural gas, and water, the resale of these services is much more difficult, so that black market activities in these items are more localized and smaller scale.

1.14 *Difficulty of monitoring the first units of consumption*. The physical nature of the commodity, with the many points of purchase, means that it is impossible to monitor or meter the amounts purchased by any individual with a view to providing a price subsidy for the "first" so many liters consumed. This contrasts with power and water where, with metering facilities in place, it is possible to charge less for the first (say) 50 kilowatt-hours (kWh) consumed per month (rising block tariff), or to charge a lower price per unit for households whose total consumption is below a certain threshold (volume differentiated tariff). In an attempt to offer a lower price for the first few units purchased by each household, governments have tried voucher systems whereby vouchers are issued for limited amounts at lower prices and the government recompenses the companies for the difference between the general sale price and the voucher price. More recently, smart cards have been introduced for this purpose, Malaysia being one example where smart cards have been set up for use by fishermen and public transport operators eligible for fuel price subsidies.

1.15 The different products are used for different purposes and are of different importance for households at different income levels. Their uses and properties are described below.

Gasoline

1.16 Gasoline is used in both passenger cars and small public-transport vehicles (mainly two, three, and four-wheel taxis). In a handful of countries, gasoline is also used for small stationary power generators. Household expenditure surveys indicate that direct expenditures on gasoline are incurred mainly among the upper quintiles of low-income

countries. As such, gasoline is not a "fuel of the poor." Its overall importance in the total share of petroleum product consumption varies considerably between countries, depending both on general income levels and on the importance of the diesel market. Gasoline is sold at filling stations, which, even in the lowest-income countries, are likely to be numerous in large towns and cities.

Diesel (gas oil)

1.17 The main use for diesel is in transportation, agriculture, and, to a lesser extent, power generation. In nearly all countries, all large-size vehicles (full-size buses, trucks, and tractors) are fueled by diesel.[1] Because diesel engine technology (compression ignition) is more efficient than gasoline, many medium-size vehicles (goods delivery vans and medium-size and mini-buses) also run on diesel. In countries where diesel is much cheaper than gasoline, vehicles as small as three-wheelers have been known to run on diesel. In agriculture, diesel is used not only in tractors but also for water irrigation. In the electricity sector, diesel is an expensive fuel but is used as a back-up fuel. In countries with frequent power outages or shortages, small-scale diesel generators are common.

1.18 As automotive fuels, diesel and gasoline are not directly substitutable because they require different engines, although engine replacement has been known to occur in some countries if the price difference between the two fuels is very large. Furthermoree, substitution comes about in the longer run as vehicle owners change their fuel choice at the time of vehicle renewal if it is financially more attractive to purchase and operate a diesel vehicle. For a given vehicle category, diesel vehicles are more expensive than gasoline vehicles, so that the higher purchase price of diesel vehicles must be offset by lower operating costs, arising primarily from lower fuel costs. As long as diesel is not priced markedly above gasoline, diesel can be a more economic fuel. The financial advantage of diesel vehicles increases with increasing annual distance traveled. This is the primary reason commercial and goods, but not private, vehicles, tend to operate on diesel. Because households tend not to own diesel vehicles, the direct expenditure of households on diesel is usually small (except among the better-off in countries where diesel is much cheaper than gasoline and where even passenger cars run on diesel). In contrast, the indirect effects of higher diesel prices on households can be large. Diesel is the fuel of choice in goods transport, affecting the prices of all goods that have to be transported to the consumer. Diesel is also used extensively in public transport, which tends to be important for lower-income urban households. Diesel fuel for transportation is sold at filling stations, although some public transportation fleets buy from fuel supply depots that may be limited in number.

Kerosene

1.19 Kerosene is used for lighting, cooking, and heating. For households not connected to electricity, kerosene is the fuel of choice for lighting. Cooking with kerosene is expensive for the poor if kerosene does not receive a favorable tax treatment.

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[1] One exception is the former Soviet Union where even large vehicles used to be fueled by gasoline.

In many countries, however, kerosene has been historically subsidized. Using kerosene for space heating is not common unless kerosene is heavily subsidized. Kerosene can be sold in very small amounts, which makes it particularly attractive to low-income households who are credit constrained and cannot afford more lumpy expenditures related to certain other fuels used for lighting and cooking. For these reasons, kerosene is regarded almost universally as a "social" fuel, and many governments have historically kept the price of kerosene substantially below that of diesel in order to support the poorer households.

1.20 However, kerosene's ability to be used as a substitute for diesel means that, if there is a large price differential between the two products, kerosene becomes a convenient, cheaper alternative fuel source for users of diesel. As a result, diversion of low-price kerosene to the diesel sector is widespread in countries with large price differences between the two fuels. In India, where kerosene for household use is heavily subsidized, a study found that as much as 50 percent of the subsidized kerosene was likely diverted to the automotive diesel and other sectors (ESMAP 2003). Kerosene is retailed by a large number of outlets, not only filling stations, and for this reason is the least easy petroleum product to monitor at the point of final sale. Simple, low-cost schemes for distinguishing commercially sold kerosene from diesel, for example using color dyes, have not been successful in discouraging this type of fuel adulteration.

Liquefied petroleum gas

1.21 LPG is used in many countries for cooking, heating, and lighting. It needs to be purchased in a pressurized cylinder, which gives "lumpiness" to the purchases made. While selling LPG in small cylinders makes each purchase more affordable, there are economies of scale in selling LPG and the unit cost of LPG rises markedly with decreasing cylinder size. The bulkiness of supply, additional safety measures required for storage, and the need to fill cylinders and distribute them to end users tend to result in fewer outlets for this product than for kerosene, especially in rural areas. Accordingly, the most frequent users of LPG are the better-off households in urban areas that do not have a natural gas distribution network. In low-income countries, the poor, and especially the rural poor, do not use much LPG. In recent years, though, LPG has also started to be used as a fuel for vehicle propulsion.

Heavy fuel oil

1.22 Heavy (or residual) fuel oil is used exclusively in industry and for power generation. It can be an important category of oil product imports for countries with no other fuel source for power generation (natural gas, coal, or hydro). Savings from power use come mainly from increased system efficiency or rationing, unless there are possibilities from hitherto undeveloped alternative sources of fuel. In the short run these are likely to be unimportant since redesigning the power generation system is costly and takes time.

Alternative Fuels

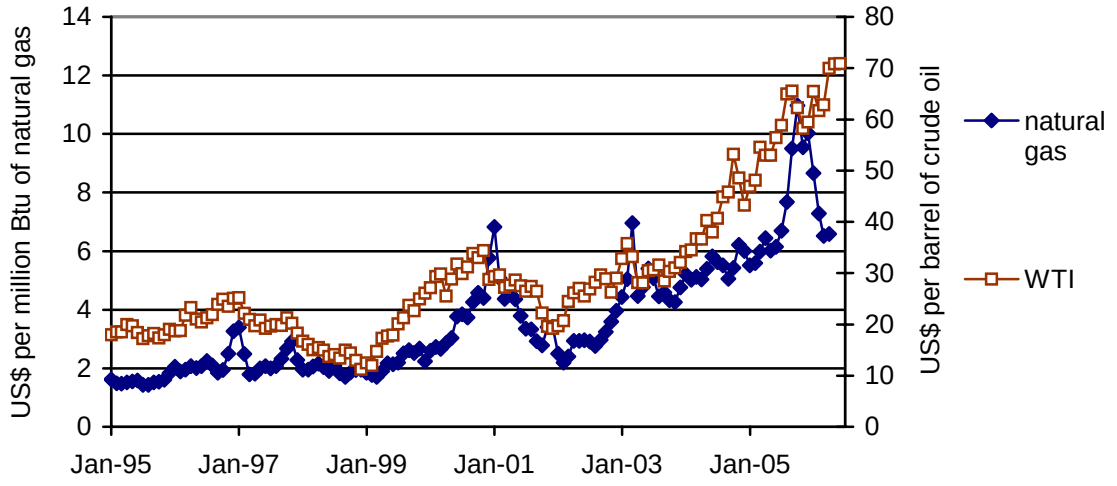
1.23 Two alternative fuels are gaining popularity as substitutes for oil products: natural gas and biofuels. They are discussed briefly in this section.

Natural gas

1.24 Natural gas is increasingly valued as a clean alternative fuel. Compared to solid fuels such as coal and liquid fuels such as kerosene, diesel, and heavy fuel oil, combustion of natural gas emits far less harmful pollutants, and notably much less fine particulate matter which is very damaging to public health. Natural gas emits about half as much greenhouse gases on a lifecycle basis compared with coal. In power plant applications, natural gas also enables adoption of higher thermal-efficiency technologies. Diversification of energy sources has been another reason for switching to natural gas: at the end of 2004, the ratio of proven reserves to production of natural gas was estimated to be 67 years, 50 percent higher than that of oil, at 41 years (bp 2005).

1.25 In countries with wide natural gas distribution, it is generally a fuel of choice for heating, cooking, and other activities. Because natural gas is a substitute for petroleum fuels, its price tends to be correlated with world oil prices. Figure 1.4 compares wellhead natural gas prices in the United States since January 1995 with the price of the U.S. benchmark crude, WTI. Wellhead natural gas prices more than quintupled from less than US$2 per million British thermal units (Btu) in 1995 to more than $10 per million Btu in October and December 2005.

Figure 1.4 Comparison of U.S. Wellhead Natural Gas and WTI Prices



Sources: EIA 2006b, Energy Intelligence 2006.

1.26 One drawback of natural gas is that it is much more expensive to transport and store than are liquid fuels. For transporting natural gas, pipelines must be built. For longer distance, gas liquefaction and regassification plants may need to be constructed for trading liquefied natural gas (LNG). Long-distance pipelines and LNG facilities are extremely capital intensive, often costing billions of dollars. In countries with plentiful gas exporting to far-away markets, export-parity gas prices may be reasonably low. Nevertheless, if alternatives are petroleum fuels which are increasingly expensive, then the opportunity cost of natural gas, and its market price, tends to rise with rising world oil prices.

Biofuels

1.27 Ethanol and biodiesel are commercially produced mostly from agricultural crops. The two most widely used crops for ethanol production are sugarcane (Brazil, Thailand) and maize (China, United States). Biodiesel is currently made on a commercial scale mainly from rapeseed (Europe) and soybeans (United States). The United States is the largest producer of ethanol, while Brazil is the world's largest ethanol exporter. The largest manufacturer and consumer of biodiesel is the European Union. Biodiesel has historically been more expensive than ethanol to produce and the global production of biodiesel is an order of magnitude smaller than that of ethanol, but is growing rapidly. Because interest in biofuels for use in transport is rapidly growing, this section describes biofuels in some detail.

1.28 Biofuels are often designated by the amount of the biofuel contained in conventional petroleum products. Letters "E" and "B" are used for ethanol-containing and biodiesel-containing fuels, respectively. For example, the term E10 is used to designate a mixture of 10 percent ethanol and 90 percent gasoline. Gasohol is a gasoline blend containing at least 10 percent ethanol. Similarly, B100 represents pure biodiesel, B5 a blend containing 5 percent pure biodiesel and 95 percent petroleum diesel, and so on. Biofuels are typically used as low-blends, in the neighborhood of 5 to 10 percent mixed into petroleum fuels.

1.29 Biofuels have several potential environmental advantages. One is a reduction in lifecycle greenhouse gas emissions relative to petroleum fuels, since biofuels are derived from biomass. Another is a reduction in the emissions of local pollutants at the tailpipe. Ethanol has the greatest air-quality benefits where vehicle fleets are old, as is often the case in developing countries. It helps to reduce the exhaust emissions of carbon monoxide and hydrocarbons, especially in cold climates. Ethanol has a very high blending octane number. It can replace harmful lead additives for raising the octane of gasoline. Biodiesel reduces emissions of carbon monoxide, hydrocarbons, and particulate matter, but can slightly increase emissions of nitrogen oxides. Against the backdrop of a worldwide move to reduce sulfur in fuels as much as possible, all biofuels are sulfur-free.

1.30 The impact of substituting gasoline with ethanol on vehicle fuel economy varies from vehicle to vehicle and application to application. As a broad generalization, a reduction in fuel economy of 20–30 percent can be taken as representative of study findings (ESMAP 2005c). This means that the price of ethanol would have to be 20–30 percent lower than that of gasoline on a liter basis for the two fuels to be financially equivalent to consumers. As for biodiesel, one of the most comprehensive reviews of existing studies found that the impact on fuel economy of using biodiesel was a decrease of 0.9 to 2.1 percent for B20 and 4.6 to 10.6 percent for pure biodiesel (U.S. EPA 2002). This would mean that the price of biodiesel would need to be about 5–10 percent lower than that of petroleum diesel on a liter basis to be equivalent.

1.31 The greatest barrier to the widespread development of the biofuel industry is economics. Biofuels have historically been more expensive than petroleum fuels, and every biofuel program implemented to date has required significant and ongoing government subsidies to the industry, mandates, or both. Ethanol from sugarcane grown

in the center-south region of Brazil is by far the cheapest biofuel today in terms of production cost. Costs of ethanol production from other feedstocks are markedly higher.

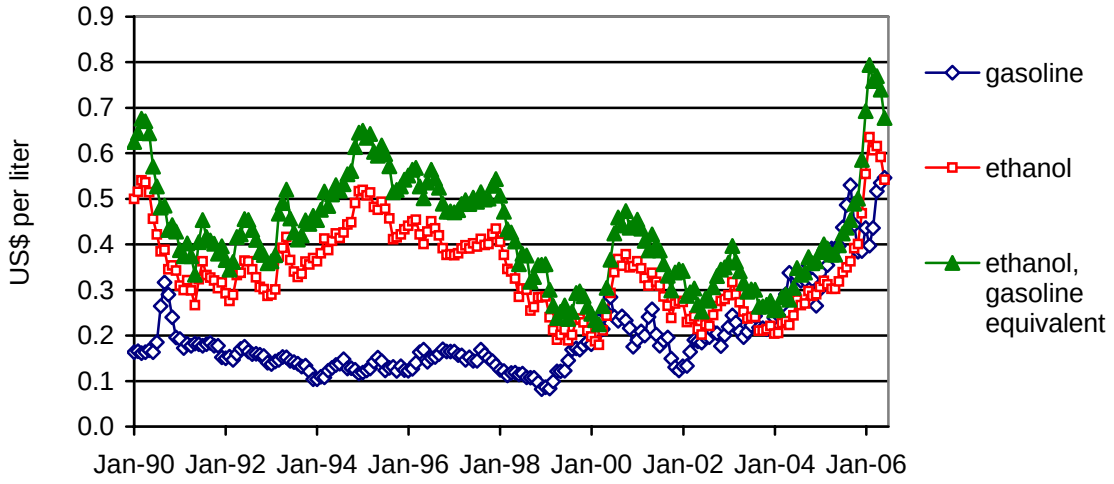
1.32 Feedstock costs account for 58 to 65 percent of the cost of ethanol production in Brazil. As such, the commercial viability of ethanol is critically dependent on the cost of cane production. Brazil is the lowest-cost producer of sugarcane in the world. Close to 100 countries around the world are growing sugarcane, but none have been able to match Brazil's sugarcane cost structure. The center-south region of Brazil, which accounts for 85 percent of the country's cane production, is virtually unmatched in its productivity and low production costs for the following reasons (ESMAP 2005c):

- Cane cultivation is water-intensive, but nearly all cane fields in this region are rain-fed, in contrast to irrigated sugar production in countries such as Australia and India.
- Sugarcane and other activities do not have to compete for land because there is still plentiful unused land in this region of Brazil for expanding cane production
- Productivity in Brazil has also been boosted by decades of research and commercial cultivation. To cite one example, cane growers in Brazil use more than 500 commercial cane varieties that are resistant to many of the 40-odd crop diseases found in the country.
- Most distilleries in Brazil belong to sugar mill/distillery complexes, capable of changing the production ratio of sugar to ethanol. This capability enables plant owners to take advantage of fluctuations in the relat ve prices of sugar and ethanol, as well as benefit from the much higher price that can be fetched by converting molasses into ethanol.
- Flex-fuel vehicles have further increased the attractiveness of building hybrid sugar-ethanol complexes and allayed consumer fears about potential ethanol shortages.

1.33 The financial cost of ethanol production in Brazil was estimated to be in the range US$0.23–0.29 per liter in mid-2005, corresponding to US$0.29–US$0.41 per liter of gasoline equivalent. The price—as opposed to the cost of production—of ethanol from sugarcane is closely linked to world sugar prices, because the opportunity cost of sugarcane is the higher of that selling into the ethanol or sugar market. The world sugar market is one of the most distorted in agriculture, with price volatility comparable to that of oil. Complete trade liberalization, which would dramatically reduce the production of sugar in high-production-cost countries, is forecast to raise the world price of sugar by about 30–40 percent according to most estimates (ESMAP 2005c). This in turn would raise world ethanol prices until sugarcane supply expansion responds to the much higher world sugar price. In part in anticipation of the start of liberalization of the European sugar market, world sugar prices reached a 25-year high in early 2006, causing the price of ethanol to exceed that of gasoline equivalent in Brazil despite a large tax reduction, and prompting the government to reduce the required ethanol content in gasohol from 25 percent to 20 percent in March.

1.34 At a given world price of sugar, the corresponding ethanol price (or opportunity cost of ethanol) can be computed. The results are shown in Figure 1.5 and compared to Northwest Europe unleaded premium gasoline prices.[2] Two prices for ethanol are shown: on a per liter basis, and converted to gasoline equivalent based on a fuel economy penalty of 20 percent. The calculations show that ethanol was competitive with gasoline in some months in 2004 and 2005. As world sugar prices began to surge steeply, despite high world oil prices, the opportunity cost of ethanol became much higher than gasoline prices on an equivalent basis by early 2006.

Figure 1.5 Comparison of Gasoline Prices and Opportunity Costs of Ethanol



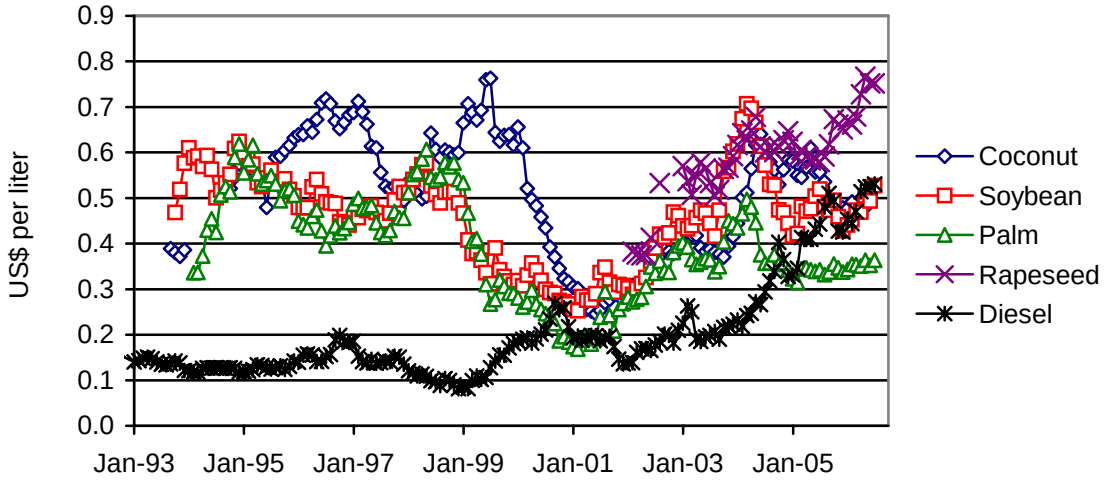
Sources: World Bank calculations, premium unleaded gasoline in Northwest Europe from Energy Intelligence 2006, raw sugar cane prices from the International Sugar Agreement.
Notes: Opportunity costs of ethanol are calculated based on the following parameters used to calculate the equivalencies between 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. For gasoline equivalent prices of ethanol, a fuel economy penalty of 20 percent is assumed. Gasoline prices are Northwest Europe monthly spot prices, barges, free on board for premium unleaded.

1.35 Biodiesel is made by reacting oils (such as soybean oil, rapeseed oil, palm oil, and coconut oil) with methanol. The opportunity cost is thus the higher of biodiesel or vegetable oil prices in the international market. A liter of a vegetable oil typically produces a liter of biodiesel. World prices of several oils that are feedstocks for biodiesel for the last dozen years are compared to diesel prices in Northwest Europe in Figure 1.6. To vegetable oil prices must be added the capital cost recovery for biodiesel plant construction and operating costs, including the purchase cost of methanol. Byproduct sale revenues (the most important byproduct being glycerin) are subtracted and a reasonable profit margin is added to arrive at the plant-gate price of biodiesel. The calculated biodiesel price should be compared to that of petroleum diesel prices, taking into account the fuel economy penalty associated with using biodiesel, and environmental benefits where governments incorporate

[2] *Premium* rather than regular gasoline prices are used to better match the high blending octane number of anhydrous ethanol.

environmental externalities in fuel pricing. The figure shows that, even in the face of rising diesel prices, biodiesel has remained relatively expensive; feedstock costs have generally been higher than petroleum diesel prices, barring palm oil since early 2005.

Figure 1.6 Prices of Coconut Oil, Soybean Oil, Palm Oil, Rapeseet Oil, and Diesel



Sources: USDA oilseed data for coconut oil, soybean oil, and palm oil; World Bank Development Economics Prospects Group for rapeseed oil; and Energy Intelligence 2006 for diesel.
Notes: Coconut oil prices are average monthly export values, Philippines; soybean oil prices are for crude oil, tank cars, free on board, Decar; palm oil prices are crude, delivered, Malaysia and converted from Malay ringitts using the average monthly exchange rate for each month; rapeseed oil prices are Dutch, free on board, ex-mill; diesel prices are Northwest Europe monthly spot prices, barges, free on board for diesel with 0.2 percent sulfur.

1.36 In the medium term, biofuel production costs will come down and other feedstocks may become attractive, expanding feedstock options and enabling countries not suited for growing sugarcane to enter into biofuel production. Particularly interesting over the medium term is the potential for cost reduction in biodiesel manufacture from plants not requiring much rainfall and nutrients, such as jatropha.

1.37 In the long run, one of the developments with the greatest promise to become commercially viable is manufacture of ethanol from cellulose: forest products, wood wastes, crop residues, and energy crops such as switch grass. Their widespread availability, abundance, low cost, and significant lifecycle greenhouse gas emission reductions make them suitable and attractive for biofuel production. Breakthroughs may emerge in other alternative technologies, such as conversion of biomass to synthetic gas followed by liquid fuel production. At the same time, world oil prices as well as the price of carbon may rise appreciably, altering the comparative economics of biofuel manufacturing greatly in their favor.

Policy Questions for Governments

1.38 Governments, especially those in countries that are petroleum importers, are considering several questions:

- How can the increasing burden of the higher costs be shared between various parties in the economy in order to optimize social welfare?
- How can the costs of supply to users be reduced, so that the total burden is reduced?
- How can governments encourage the reduction of petroleum product consumption (and of the aggregate petroleum import bill in the case of an importer)?
- How can governments achieve buy-in from the public to the policies they pursue?

1.39 This study focuses on the impact of higher fuel prices on consumers and evaluates the various approaches to answering the four questions posed above. It does not consider the use of macro-level policies (such as monetary or exchange rate policy) to cope with the impact of the oil price shock on the macroeconomy, nor the measurement of the impact of the oil price shock on the macroeconomic performance of countries. Also, it does not discuss the management of the windfall income by large oil exporters and the long-term economic consequences of the revenue management. The study draws its evidence and conclusions from the recent experiences of 38 countries that have tried various policy alternatives. There are two categories of policies that need to be pursued in parallel. Given the low price elasticity of demand to petroleum product prices in the short run that has been found in many studies, there may not be a substantial immediate fall in demand even where governments allow the full rise in prices to be felt by consumers. The exception to this observation is when apparent demand includes fuels smuggled out of the country on account of inter-country fuel price differences, typically arising from different tax levels. If fuel smuggling is contributing significantly to total apparent demand, then a sudden and large drop in demand could occur as prices are raised and inter-country price differences are narrowed or eliminated. Otherwise, some policies may be able to enforce a reduction in consumption through some form of rationing, but the main short-run focus will be on policies that can enable the burden of higher prices to be shared more equitably among different parts of society. In the longer run, not only will consumers start to reduce nonessential use of energy and adopt energy-saving measures in response to higher prices (if these are passed on to them) but governments will also try to implement policies that can reduce consumption in the medium to long run.

1.40 This report discusses various policy options for dealing with higher oil prices in chapter 2. Chapter 3 reviews international experience with government response to higher oil prices to date, complemented by detailed descriptions in annexes 1–3. Chapter 4 discusses longer-term policy considerations under three long-term price scenarios: higher, lower, and the same levels relative to the present.

2

Policy Options

2.1 For short-run responses, governments can use price-based policies, quantity-based policies, or both. Both sets of policies will have several effects and need to be judged by their overall impact. One important aspect of these policies is how the burden of the higher petroleum product prices is shared among three groups: consumers (both households and businesses), firms as suppliers of petroleum products, and the government. Since the government is an agent for society as a whole, any extra burden on the government is merely a way of transferring the burden to those who finance the government, either in the current period through taxes, or through future generations who will have to pay for the costs of any increased borrowing that the government may undertake to accommodate the present financial burdens of the higher oil prices. The political economy of a given country is likely to determine the burden sharing that is adopted.

Price-Based Policies

2.2 Faced with higher prices for petroleum products on the world market and the unpopularity of large rises in domestic product prices, governments have to make a choice on how the burden of these higher prices is to be shared. There are three broad strategies:

- Pass the full price increase on a given product onto final users.
- Pass on only a part (or none) of the price increase and either finance the subsidy involved through the budget or a cross-subsidy from other products, or impose overall losses on oil companies.
- Adjust prices in such a way that companies supplying the petroleum products receive a lower margin for each unit sold, or negative margins cross-subsidized by other business units, thus absorbing some of the price increase.

2.3 These approaches are not mutually exclusive and a number of governments have used a combination of the above options. Prices of gasoline and aviation fuels are usually raised first to keep up with the price increases on the world market; prices of kerosene, diesel, and LPG are often the last to see a full price-increase pass through. In the interim, the subsidy to the latter three fuels may be financed directly

by the government, through an additional levy on gasoline and other fuels (for cross-subsidization), through forcing oil marketing companies to absorb some or all of the subsidy, or any combination of these mechanisms. The pricing policy for each fuel depends primarily on who will be affected significantly by price increases. Where subsidies are given, those fuels that affect the poor or that have economy-wide effects usually enjoy the largest and longest period of subsidy: kerosene and LPG, which may be used as lighting and cooking fuels, and diesel, which affects agriculture, fishing, industry, and goods and passenger transport.

Full passing on of price increases

2.4 In a completely deregulated market, price increases are passed on fully to consumers. Linking domestic prices to international prices in a pricing formula attempts to mimic a deregulated market. The government may choose to have a pricing formula if, for example, there is not yet full competition. A formula-based pricing mechanism raises the question of the frequency of adjustment and the time period over which the reference price is averaged. Given the volatility of world product prices, as the monthly averages shown in Figure 1.2 illustrate, in countries where governments wish to exercise some measure of control over pricing, it may be reasonable to take a moving average of actual prices spread over a period of more than one month. If the period is too short, the retail prices could prove highly volatile—in a four-week period between March 21 and April 18 of 2006, the spot price of Brent jumped by US$11 from US$59.96 per barrel to US$70.97—and could trigger panic among consumers. Too infrequent price adjustments based on a moving average of several months, however, will lead to a temporary need to finance the difference between actual prices and the smoothed recommended price (which will be financed later as the moving average lies above the actual price if and when it starts to fall back) and possibly large adjustments when price adjustments are finally made. The underlying assumption is that oil prices are mean reverting and not trend dominated over a medium term, and that the average difference between the current price and a moving average of past prices will be small eventually.

2.5 Adjusting formula prices very frequently, whatever the length of moving average chosen, is likely to track prices more closely, but it does impose an increased cost of administration ("menu costs" of physically changing the prices, and costs of collecting the data, calculating the averages, and informing retailers of the decisions). Too infrequent a change runs the risk of allowing the formula price to diverge more sharply from the actual international price, with the consequent burden on financing. Also, infrequent price changes run the risk of needing to increase the formula-based price at a time when current market prices are decreasing, thus adding to consumer confusion and antagonism.

2.6 A variation is not to select a fixed averaging period, but to change prices when international (spot) prices change by more than a certain percentage in local currency. Retail prices in this case are adjusted as a result of foreign exchange fluctuations, international oil price movement, or both. The larger the minimum percentage change set to trigger an adjustment, the less frequently prices will be changed but the larger the change. This mechanism shields consumers from small, frequent price changes, but does not

achieve price smoothing in the face of large fluctuations: large price shocks outside of the price band are instantly passed on to consumers.

2.7 Petroleum product price stabilization funds have been used in some countries to manage revenue shortfall in times of rising oil prices, but a fund that had not accumulated large funds before the recent oil price increase would be unable to smooth prices without an initial transfer from the government. The objective of the fund is simply to permit the smoothing of domestic prices without creating a long-run subsidy. Such a fund can be used when the state is the importer of products or when the private sector imports products, but in the latter case the fund mangers will need to have confirmation of the import prices paid by the private sector.

2.8 A related policy is the establishment of a strategic stock, where the government acquires and stores crude oil or products at a time of lower prices, to be released when there is an actual supply shortage or a spike in world market prices. The difference in the prices experienced may be sufficiently large to cover the costs of financing the purchase and storing the oil. A further development for smoothing prices to final users would be for the appropriate government agency to hedge future product prices. But such schemes require some sophistication to operate and need tight control in order to avoid possible loss-making through overly optimistic trading by inexperienced civil servants.

2.9 Governments that are considering a full pass through of prices to consumers are concerned with the effects on the rate of inflation as well as those on fuel purchasers. If the price rise were to become embedded into the core rate of inflation, macroeconomic policies would be needed to control the inflation created. This usually calls for tighter control over monetary policy and some form of wage restraint. These issues will be even more severe for a government that is currently subsidizing product prices and is considering removing the subsidies and setting prices at the international market level.

2.10 A large but one-off price change is less likely to become embedded into the core rate of inflation, since consumers will not expect it to be recurrent, especially if the government follows an active program of public information. For this reason, schemes of adjusting prices toward international market prices stretching over several years are more likely to affect the core rate of inflation and require offsetting macroeconomic policies.

Subsidizing of end-user prices

2.11 Even before the recent oil price rise, a number of countries were subsidizing some or all of petroleum product prices to final users. This means that consumers have already become accustomed to low prices, and are likely to resist more strongly the raising of prices to market levels. Governments in this position have found themselves facing an even larger potential bill than those that had not previously subsidized prices, and may already be so stretched fiscally that they cannot afford to subsidize the whole of the recent price increases. Because the burden of a complete subsidy to cover all of the oil price rises since early 2004 is large, governments have been

anxious to find schemes that subsidize only part of the price increase, largely by providing differential subsidies on the various products and to different consumers.

2.12 Governments have to decide the depth of the subsidy and its relative magnitude for the different petroleum products. The shares of the different petroleum products in their total demand, and the uses to which they are put by different groups within society, are important factors in determining the relative subsidies. For example, in a country where gasoline imports are significant and gasoline is consumed mainly by better-off households, the government may be willing to let prices rise most (or all) of the way to the costs of imports. In contrast, where nearly all low-income households consume kerosene, a desire to protect this group may lead to a substantial subsidy on this product. The depth of subsidy in the long run will depend, among others, on the government's ability to finance it on a sustained basis, and on its judgment of relative merits of alternative uses of the budget allocated for fuel price subsidies.

2.13 Subsidies are usually enacted through controlled final prices, possibly fixed by a formula that passes on only a fraction of international price increases. Where the suppliers of products are private sector companies that are not asked to share any of the burden of the increased prices, subsidies necessitate a transfer mechanism from the government to the companies. Where petroleum product sale is in the hands of a state body, a scheme of subsidized prices means that this body sells on to final users at a price below the cost-recovery level and has to be recompensed by the government directly or indirectly for the loss involved. The state-owned purchasing body may attempt to finance its shortfall through borrowing from the domestic banking system, but such a policy may not be sustainable and its liabilities are in effect those of the government itself.

2.14 A general consideration for all subsidy schemes is that selling a highly transportable product below international prices raises opportunities for profitable smuggling. In towns and cities near borders of countries where there is a ready market for lower-cost products, even individuals will risk smuggling small amounts. Where geography dictates that urban centers on either side of the border are far from each other, the smuggling has to be in larger amounts and is more likely to be undertaken by organized criminals. Governments in many countries are attempting to combat smuggling through border patrols and other means, but this is made more difficult if profit margins from smuggling are large or if there is not popular support for the government. In extreme cases, smuggling even of barge loads of oil has been known to occur.

2.15 Determination of a subsidy—whether there is a subsidy and what the magnitude is—is not straightforward. In the broadest sense, any government intervention that lowers the price of a fuel below its economic opportunity cost may be considered a subsidy. There are a number of equivalent ways available to the government to lower fuel prices. These relate to the structure of costs, and whether or not the country is an oil producer and refiner. Because of their importance, a framework for considering the various points along the supply chain where subsidies can be introduced is given below.

Framework for considering subsidy introduction

2.16 Three cases are considered: a country with no refining capacity, a country that produces no oil but has refining capacity, and a country that both produces oil and

refines it. First consider the case of a country with no refining capacity. Domestic retail product prices are built up from the import cost of products, margins for wholesaling and retailing, and taxes, which are typically both specific (excise) and *ad valorem*. Where taxes are compounded, this may be expressed as

$$P_R = (P_i + M + T) \times (1 + \tau) \qquad \text{(Equation 1)}$$

where

P_R = price of one unit of product at retail

P_i = price of one unit of imported product

M = margin for internal marketing (retail, wholesale, internal transport, and storage)

T = specific tax per unit of product sold

τ = tax rate per unit value of final sale.

2.17 If the government wishes to reduce the price at retail, it can effectively achieve the same results in a number of ways.

- Reduce the effective cost of imported product (P_i) by paying the importers a subsidy
- Reduce the margins (M) by paying a subsidy to retailers or wholesalers
- Lower the specific (T) or ad valorem (τ) tax rates
- Lower the final price (P_R) by paying a subsidy to retailers.

2.18 For an oil producer that exports all its crude, the price received is determined by the world market price less the transport costs of exporting the crude to the effective market area, as shown below.

$$\pi_D = \pi_W - F \qquad \text{(Equation 2)}$$

where

π_D = price of one unit of crude received domestically

π_W = price of one unit of equivalent crude on world markets

F = transport cost of taking one unit of crude to the international market.

In this case the export price of crude is delinked from the mechanisms for introducing a subsidy on domestic products.

2.19 Second, consider the case of a country with domestic refining capacity but no domestic crude production. The country has a choice between importing products at world market prices, or importing crude at world market prices and refining it domestically. Whichever can deliver refined products at lower costs (before adding internal margins and taxes) would be the one that would be chosen by consumers. The cost of imported products is equal to the cost of world crude plus world refining costs plus import transportation costs:

$$P_i = \pi_W + R_W + F \qquad \text{(Equation 3)}$$

where R_W is the world cost of refining one unit of product.

2.20 Three simplifying assumptions are made in this illustration. First, the transport costs of importing one unit of product and the equivalent amount of crude, and of exporting crude to the world market are all assumed to be the same. In practice, refined products are more expensive to transport than crude. Second, the cost of taking to the markets of domestically refined and imported petroleum products are assumed to be the same. Third, there is only one type of crude on the world market and there is one world price for crude.

2.21 Under these assumptions, the cost of domestically produced product at the factory gate is

$$P_D = \pi_W + F + R_D \qquad \text{(Equation 4)}$$

Where P_D is the price of a unit of domestically refined product and R_D is the cost of domestic refining on the equivalent unit of crude. If the price of domestic product (P_D) is greater than the import price of product (P_i), the government would need to provide it with a subsidy equal to the difference between the two prices to keep the domestic refinery in operation, or impose import restrictions, or impose an import tax. If a subsidy is given, the retail price is built up from the import parity price as in Equation 1. Reducing prices to consumers would be achieved through the same mechanisms as those for a country with no refining capacity.

2.22 It is assumed that typical importing developing countries do not have lower per-unit refining costs than those on the international markets. If the costs were lower, then their lower domestic costs would provide an opportunity to raise refinery gate prices toward import parity, potentially resulting in a larger profit, which could be captured by the government through an additional tax.

2.23 Lastly, consider a country that produces crude and also has refining capacity. It can supply the domestic refinery with either domestically produced crude or imported crude. The cost at the refinery gate of products refined from international crude may be expressed as

$$P_{DW} = \pi_W + F + R_D \qquad \text{(Equation 5)}$$

where P_{DW} is the cost of domestically refined product supplied from world crude.

2.24 The cost at the refinery gate of products refined from domestic crude is similarly expressed as

$$P_{DD} = \pi_D + R_D \qquad \text{(Equation 6)}$$

where P_{DD} is the cost of domestically refined product supplied from domestic crude. Since the price of domestic crude should be linked to the world crude price by the export parity equation 2, equation 6 may also be expressed as

$$P_{DD} = \pi_W - F + R_D \qquad \text{(Equation 7)}$$

The consumer choice would be that of the minimum of imported products (equation 3) or domestically refined products using international crude (equation 5) or domestically refined products using domestic crude (equation 7).

2.25 It may be difficult to achieve the level of refinery efficiency needed to make the cost of domestic refining of imported crude markedly lower than refined product

imports. Refining domestic crude, however, can provide a distinct advantage, because the opportunity cost of the crude for export (which should determine its price) will be lower than the import cost of crude, by a factor equal to twice the transportation cost as a leading-order estimate. Hence, even if domestic refining costs are above world refining costs ($R_D - R_W > 0$) the transport cost advantage of using domestic crude may offset the higher cost. More specifically, if the following condition is satisfied,

$$R_D - R_W < 2F \qquad \text{(Equation 8)}$$

it would still be economic to use domestic crude in the domestic refinery. The cost advantage of using domestic crude allows the price of products at the refinery gate to be increased toward the product import parity level.

2.26 This possibility allows another route for subsidies to be introduced. Prices of products do not have to be increased to import parity, so that the margin that could have been captured by domestic refining is transferred to consumers. A further strategy is to price domestic crude below export parity, thus forgoing part of the rent available to the government through its pricing (or taxation) of domestically produced crude.

Different schemes for price subsidies

2.27 The foregoing framework shows that subsidies can be explicit or implicit. Subsidies are explicit when a sum of money is transferred from the government to the importers, refiners, wholesalers, or retailers. They are implicit when possible government revenue is forgone (lower tax rates, or selling domestic government-owned crude below export parity). These different schemes are discussed below.

2.28 *Universal direct subsidies* whereby all petroleum products are subsidized more or less equally will not distort relative demands very much. Because this approach places a heavy burden on the treasury and because some fuels are used predominantly by the rich (gasoline being a prime example)—raising questions about social justification for subsidizing those fuels—most countries have wished to depart from it. A more common approach, which is also referred to as universal subsidies, is to subsidize a given fuel for all consumers without restrictions in quantity while allowing for the possibility of giving greater subsidies to some fuels than to others.

2.29 *Cross-subsidies between products* enable redistribution of the burden between users of products. This can be done by allowing some prices to rise more than others. Some governments that were originally providing only small or no subsidies may be able to introduce revenue-neutral cross-subsidies, whereby the price of certain products rises by more than costs, so that others can increase by less than costs. Such a scheme could provide protection for lower-income groups through its redistribution policy. Because certain products are more intensively consumed by better-off households and others by less-well-off households, protecting the poor would mean that the larger subsidy be given on the petroleum product consumed more intensively by poor households (such as kerosene).

2.30 A particular problem with cross-subsidies between products is inter-fuel substitution and adulteration. As mentioned in chapter 1, if the price of kerosene is substantially below that of other fuels, kerosene is added illegally to diesel and, to a

lesser extent, gasoline. This not only increases total kerosene consumption—hence the cost to the government of the differential subsidy on kerosene—but, all too often, makes kerosene scarce for the poor. It is not uncommon to find as much as 30 percent kerosene added to automotive diesel in countries with large price differentials between the two fuels. Inter-product cross-subsidization has the disadvantage that, although its coverage could be high in the absence of rationing—the subsidy is made available to all low-income users of the product—its leakage can also be very high, potentially benefiting the non-poor even more than the poor. This indicates that cross-subsidization is likely to be an inefficient, and often expensive, policy.

2.31 *Cross-subsidies between groups of consumers* for the same product occur when prices charged are not correlated with the cost of supply. The final cost of supply of petroleum products is likely to vary by region because of internal transportation costs. A liberalized market would therefore exhibit higher prices in rural and remote areas because of these increased costs of supply. A scheme of pan-territorial pricing, whereby all consumers pay the same price, effectively cross-subsidizes remote users by users living nearer to points of production or import. The financing of this type of cross-subsidy can also use a "stabilization fund" for equalizing freight costs, but there is a problem in estimating reasonable transportation costs and monitoring whether deliveries to remote areas actually take place and whether the products are actually sold at the nationally specified prices. Another policy under this category is to raise prices for certain consumers and discount prices for others. The consumers who enjoy this type of cross-subsidies include public transport operators, farmers, and fishermen. Monitoring would be required to ensure that the subsidized fuel is used only by the intended beneficiaries and not other users. Because there are numerous farmers, fishermen, and sometimes independent bus operators, effective regulation to prevent leakage could be difficult.

2.32 *Implicit subsidization by reducing product taxation* is perhaps the most common form of subsidy. The policy is simple and can be easily implemented. Many governments tax petroleum products (especially transportation fuels) through both general consumption taxes (for example, value added tax [VAT] or general sales tax which tend to be levied on all commodities) and excise taxes. A policy of reducing excise taxes, which is being considered in some countries, is effective in moderating the price increase to users. The loss of revenue to the budget, however, will result either in a reduction in government spending or an increase in government borrowing, both of which affect society as a whole. The tax reduction transfers some (or all) of the burden to those who are affected by the cuts in government spending, or those in future generations who will have to pay higher taxes or receive lower benefits as a result of the increased government borrowing.

2.33 *Indirect subsidies downstream of petroleum products* can provide an alternative approach to subsidizing the fuels themselves. In this scenario, the government subsidizes products that have a large cost element of petroleum products and that are used by lower-income groups. Subsidizing bus fares, which are affected by the price of diesel, is one option widely discussed. The actual operation of this policy is typically implemented by giving subsidies to transport operators, although in a few cases diesel is

sold at lower prices to bus companies. To the extent that bus transport is used mainly by lower-income households, this may be a fairly well targeted subsidy in urban areas.

2.34 Subsidizing electricity prices, possibly for the first block of consumption, is fairly easy to implement, but contains a large element of leakage since it would apply to all households. The leakage can be minimized by making the size of the subsidized block small, but political pressure to increase the block size makes this approach difficult in the medium to long run. Schemes to subsidize only those households whose total consumption falls below a certain limit require adequate metering. In addition, if the limit is small to minimize leakage, many poor households may end up crossing the limit, thereby paying much higher tariffs. The suggested approach would be appropriate only in countries where it is known that most households use electricity. In very-low income countries, many of the poor do not use electricity so that few of the poor would feel the rise in electricity prices caused by higher fuel prices.

2.35 *Indirect subsidies upstream of petroleum fuels* entail selling crude at prices below those on the international market. Several oil-producing countries that have domestic refineries sell crude to the refineries below the world market price for the crude, thus providing a subsidy to the refinery. The refinery is expected to pass on this subsidy to consumers who benefit from the implicit subsidy provided from the crude oil pricing. Effectively the government has transferred some of the rent from oil prices from its budget (or that of the national oil company) to the users of petroleum products. This approach can be combined with a cross-subsidy between products where some are sold at a lower markup than others. Countries that have a policy of pricing their domestic crude sales below world market prices may need to impose export taxes or export restrictions in order to ensure that the domestic market remains supplied.

2.36 *Targeted subsidies* have been used to provide relief for the lower-income households for several other items of budget expenditure. Targeted subsidies by definition are not universal, and exclude the better-off who can afford to pay a higher price. To have an effective targeting scheme, two conditions are required: first, there be a reliable list of low-income households to be the beneficiaries, and second, there be a low-cost method of delivering the subsidy to these households. Both conditions may be satisfied in countries that are already providing compensation to the poor through income support or subsidies for other commodities. Achieving high coverage (reaching most of the households in the target group) with low leakage (excluding households outside the target group) is a highly desirable feature of a subsidy scheme for achieving its objective without incurring unnecessary expenditures. Another type of targeted subsidies is to target certain consumer types, such as public transport operators, farmers, and fishermen. These groups were discussed under "cross-subsidies between groups of consumers," except in this case there is no cross-subsidy from one group to another but certain groups are subsidized by the government. Vouchers and, more recently, smart cards have been used for targeted subsidies. They are discussed in 2.43 and 2.44.

2.37 *Self-targeting* subsidizes goods that are used primarily by the poor. A scheme that subsidizes low-quality food items consumed primarily by the poor (such as yellow maize) is a typical example. Another might be an electricity or water or natural gas tariff scheme that charges lower per-unit prices only for households consuming

quantities below a threshold level typical of consumption by poor households. Households can then choose to consume less than this threshold amount in order to avail themselves of the low price. Self-targeting is not possible for petroleum products for a number of reasons. First, there is no equivalent to a metering system for petroleum products. Second, there is no quality differentiation for a given fuel. Third, there is no fuel that is used much less by the rich and businesses.

2.38 *Subsidizing fuel uptake by the poor* is another option if taking up the fuel incurs a large cash outlay upfront. Among liquid petroleum fuels, LPG requires the greatest uptake cost, making it difficult for the poor to switch to LPG, a convenient and clean fuel. Where serious deforestation makes fuelwood very expensive, such as in Haiti, it may be cheaper to use LPG, but many poor households are prevented from switching to LPG because they cannot afford the initial cylinder deposit fee and LPG cook-stove purchase. Under these circumstances, providing subsidies to the poor to help pay for the startup cost of LPG may merit policy consideration. An analogy is subsidizing connection charges for water and electricity. One marked difference between LPG and electricity is that the LPG cylinder deposit fee is typically only a small multiple of monthly operating cost of LPG, whereas the electricity connection charge is considerably larger than a monthly electricity bill for a poor household. Where governments have tried to help the poor by subsidizing the cylinder deposit fee, it has been found that those who cannot afford the LPG uptake costs are often not in a position to use LPG regularly (ESMAP 2002).

2.39 *Income subsidies* do not target any particular goods. Some countries have countered the effects of the costs of increased petroleum product prices by providing income-type subsidies, typically to targeted households. The amount of the subsidy is related to the extra expenditures by lower-income households caused directly and indirectly by higher oil prices. This scheme avoids any distortionary effects of differential pricing—illegal diversions, smuggling, inter-fuel substitution—and of encouraging excess demand by holding prices below costs. Where there is a list of low-income households and a delivery mechanism to ensure that the income subsidies reach them, this can be the most effective policy.

2.40 *Stabilization funds* smoothe price increases and in effect provide a subsidy in one period to be balanced by an extra charge in another period. When market prices are higher than some "expected" or planning price, the fund releases money to consumers or marketers in order to prevent prices from rising; when the price is below the "expected price," the government increases the price charged through some form of levy or tax, and deposits the balance into the fund.

2.41 For such a scheme to be self-financing, it is necessary that the "expected" price used for the scheme be close to the actual average experienced over the short to medium term. Several problems exist with such a scheme. First, if the scheme is inaugurated at a time of "high" prices and prices set below the prevailing market prices, then the fund will need a substantial amount of initial financing from the government. Second, if the basis for calculating the expected price is incorrect, then the scheme could run a persistent deficit, which would again have to be financed by the government. Third, even if the "correct" expected price is identified, in that oil prices are "mean-reverting" to

this level, it can take a long time for the scheme to break even. Long "runs" of higher than normal prices are not necessarily immediately balanced by similar runs of lower than normal prices, so that the duration of the time the fund spends in deficit can be surprisingly lengthy.[3] This again can place a severe temporary financing strain on the government, and lead policy makers to abandon the scheme.

2.42 For subsidies that are targeted to certain groups of consumers or that have monthly quotas, some governments have introduced special delivery mechanisms. They generally have to do with issuing consumers with coupons or cards.

2.43 *Voucher schemes* (discounted coupons) have been used for limited purchases of kerosene in some countries. The voucher entitles the designated households to receive a limited supply at a subsidized price. This scheme requires an effective method of allocating and providing the vouchers to the appropriate households. If retail outlets are provided with fuels at market prices, the retail outlets need to be compensated for these sales at prices below costs. This compensation requires a further administrative mechanism to be put in place, which can be cumbersome unless the number of authorized outlets is restricted. Restricting the number of authorized outlets, however, can mean that some households are unable to take advantage of the scheme because of the inconvenience of traveling frequently to the appropriate retail outlet. A further difficulty with a two-tier pricing scheme with vouchers for a subsidized fuel is that retailers have an incentive to divert earmarked supplies to the open market, especially if there are shortages and they can obtain more than the official value. Slowness in compensating retailers, or failure to do so, increases the incentives to divert away from the target market. If households with vouchers sell their vouchers, this scheme becomes an income subsidy. Households may not benefit or benefit little from the subsidy if organized crime confiscates vouchers before their reaching the intended beneficiaries or purchase the vouchers at discounted prices from (poor) households. A variation on this scheme is one in which households are issued cards certifying that they are below the poverty line, qualifying them to purchase certain quantities of goods commonly used by the poor at subsidized prices, including a cooking or lighting fuel.

2.44 *Smart cards* are increasingly considered as a means of tightening control over targeted subsidies. They may be prepaid, or accounts may be settled periodically, for example at the end of each month. Each card may contain information about the vehicle or fishing boat, for example, the operator's details, the allotted quota, and how much of the quota has been purchased. The balance remaining may be printed at each transaction, and a higher price charged if the quota is exceeded. As annexes 1–3 show, experience with smart cards to date is limited.

Limits on price increases

2.45 In some countries, governments have ensured that prices charged by companies do not rise as fast as the costs of products on the world market. The policies used to achieve this have been either mandatory, where price caps have been placed on

[3] This phenomenon is referred to as the "arc-sine law." See Marrewijk and de Vries (1990) for an application.

petroleum products, or exhortatory, whereby governments have encouraged such action. In either case, if there is no offsetting compensation from the government, the company bears the burden of the price rise.

2.46 Higher crude oil prices are often associated with greater profits from upstream oil activities by international and national oil companies. Where these are vertically integrated into refining and selling petroleum products, there is a widespread demand from consumers that some of the profit be returned to them in the form of lower prices. For companies that are not involved in upstream oil production, a policy that limits price increases may not be sustainable, unless there are inefficiencies in supply that they can remove under the pressure of reduced profits.[4]

2.47 The more competitive the downstream sector, the less opportunity there will be for firms to have been inefficient (or to have followed monopolistic pricing practices). In contrast, there may be very few suppliers (or even just one where there is a national oil company) in countries with small product markets. Although there will be less scope for economies of scale and lower costs per unit, the lack of competition may have allowed some inefficiencies and excess profit to exist, which a downward squeeze on margins may be able to reduce without long-term damage to the sector.

2.48 Where price caps have been related to a series of permitted margins for each stage of the supply process, there may be scope to revisit the size of these margins with a view to ensuring that they be consistent with best commercial practices. Another area where there may be room for cost reduction is freight equalization for pan-territorial pricing; because freight charges are guaranteed by the government, it is not unusual for them to be higher than in a fully competitive system.

Policies To Reduce the Cost of Supply

2.49 If the cost of supply can be lowered in a market-based way and the cost reductions are passed onto consumers, end-user prices would not have to rise as much. There are a number of ways in which governments have sought to reduce costs or reduce margins in the downstream petroleum product sector.

Creating economies of scale through pooled bulk purchasing of imports

2.50 In smaller economies, each supplier may be too small to obtain the lowest possible price for imported products. Accordingly, some countries have established bulk purchasing agencies, or agreements between companies, so that economies of scale through single purchasing arrangements can be obtained. Such a scheme needs to be transparent in order to ensure that the prices paid are indeed lower and that cost savings are passed on to consumers.

[4] Schemes of placing downward pressure on margins are commonly used in price regulation of privatized utilities (so-called RPI-X schemes, where RPI stands for retail price index and X for efficiency gains) but in that case the companies have not been subject to competition prior to privatization and may have been adopting inefficient practices.

Hedging of product purchases

2.51 Commercial companies, particularly where these are subsidiaries of large international companies, may well have considerable experience to draw upon in hedging product purchases. This can help to smooth out variations in costs of purchasing products, but cannot be expected to lower the average price paid over a lengthy period. Companies are likely to be able to evaluate the potential benefits of hedging and to execute it if they think it advisable. Governments may wish to be informed of the costs of purchasing, especially in a regulated system, but are unlikely to wish to mandate private sector hedging.

Security of stocks

2.52 Many governments require product marketers to carry a certain amount of security stocks (measured in terms of a given number of days of normal consumption). This provides a buffer against disruptions in supply caused by possible delays in delivery. As a precaution against more erratic supply conditions that appear to be associated with price spikes in the market, governments can increase this requirement, or indeed establish their own security stocks. A mechanism for bearing the cost of the stocks has to be agreed. These costs include both the interest on working capital tied up, as well as the costs of the storage facilities themselves.

2.53 It is possible to use these stocks to smooth out very violent swings in prices, but this strategy is likely to be effective only when it is clear that the price spike will be short lived; in that case purchasing of supplies from the market can be delayed until the price returns to normal. Security stocks are more likely to be used when there is physical disruption, and supplies are actually disrupted. Landlocked countries, which have very limited sources of supply, are usually the most vulnerable to such disruptions and have the greatest need of some security cover from extra stocks.

2.54 There have been regionally based discussions on establishing security stocks, particularly in Southeast Asia, to which producing countries would supply oil or product, that could be drawn on by consuming governments in times of crisis. Again this proposal is likely to be most effective against supply disruptions, but at a regional level these are much less likely to occur than at an individual country level, since oil is easily transportable and world markets are highly integrated. Financing such a scheme would require intergovernmental cooperation.

Increasing competition

2.55 Where the petroleum product market is government-owned or there is a high degree of concentration in a privately owned sector, then policies to increase competition in order to reduce costs may be considered. These policies are likely to take time to design and implement; thus they cannot be expected to deliver benefits to consumers in the short run.

2.56 *Introducing competition for the market*. Where the government wishes to maintain ownership of the downstream sector but is prepared to entrust its management to a private sector company, it can use a "management contract" approach in which private sector operators bid for the right to operate the market. The bids can be tied to the

price formula whereby the best bid is the one that will deliver the lowest price. These schemes usually limit the duration of the contract and give the government the right to appoint another operator after a period of time. Too short a contract length will discourage potential bidders, because there are fixed costs of setting up the operation that have to be recovered during the length of the contract. At the opposite end of spectrum, too long a contract length will lessen the incentive for the winning bidder to maintain a high quality of service, because it is guaranteed a market during the length of the contract. This approach may be especially relevant for supplying remote areas: some governments impose pan-territorial pricing to protect consumers in remote areas that are expensive to supply. Instead of imposing pan-territorial pricing on the entire country, it may be more cost-effective to liberalize pricing and offer protection to consumers in remote areas by means of, for example, competition for an exclusive right to supply certain regions at the lowest subsidy.

2.57 *Privatization*. Governments often have privatized all or part of the downstream product market. Privatization typically occurs first with filling stations, because (a) the startup costs are not too high and (b) fostering competition is easiest on account of the potentially large number of station operators. This gives an opportunity to bring in an element of competition into those stages of product supply that do not have natural monopoly characteristics.[5] Product pipelines and storage facilities have also been privatized but their natural monopoly characteristics give little scope for competition in the market.

2.58 *Increasing the number of suppliers in the market*. Where the downstream market is already privatized, governments can still increase the number of suppliers by placing legal limits on market shares at the various stages of the downstream. This policy requires existing firms to divest some of their assets. Policies toward the number of competing suppliers in a market depend on the size of that market. For a large market, each of a number of suppliers can achieve a large enough turnover to enjoy the available economies of scale. For a small market, however, dilution of market share can result in a loss of economies of scale that would negate any cost reductions from a more competitive environment. Countries that have permitted a very large number of firms at retail tend to find that these are not necessarily efficient and that they are difficult to monitor for pricing, quantity, and quality purposes.

Quantity-Based Policies

2.59 Many countries have considered quantity-based policies with respect to the wider issue of security of supply for oil and petroleum products, of which higher prices are a subset. These policies come in two principal forms:

- Policies that effectively ration the purchase of oil products
- Policies that effectively ration activities that intensively use oil products.

[5] A natural monopoly is an industry where the most efficient production and operation is through a monopoly because of large economies of scale. For example, it would be much more cost-effective to lay down one large product pipeline between two cities than 10 small pipelines in parallel.

Rationing the purchase of oil products

2.60 Schemes for rationing the purchase of petroleum products that are sold at a large number of outlets, as is typical for transportation fuels and for kerosene, cannot rely on the seller to impose a ration based on previous purchases by an individual consumer. New Zealand has considered a scheme of setting maximum and minimum amounts that can be purchased on a single occasion, but this is likely to have only minor effects on total purchases because drivers can move from one filling station to another with relatively little inconvenience. A ration card type system, which may be more effective, requires an administrative apparatus to issue the ration cards on an appropriate basis. Such schemes usually involve larger rations for "priority" users, such as doctors. An effective ration system serves to cut demand, but rationing a commodity almost inevitably leads to a black market.

2.61 A black market may emerge in two forms. The first is a market in the ration cards themselves, where better-off users purchase the ration cards of less-well-off households who may feel that the extra cash is of more value than the ration itself. This situation in fact provides an income redistribution mechanism. However, this rationing of supply itself, which accompanies the issuance of ration cards, can lead to local shortages as supply points run out of petroleum products. That in turn sometimes leads to queuing for supplies.

2.62 The second is a black market for the rationed fuel. Prices for the fuel on the black market will likely rise and supply points will be tempted to divert supplies to these more profitable markets. Under these circumstances, consumers often have to pay the higher prices in order to purchase the rationed fuels without having to queue for hours or even days. If prices are lower in neighboring countries, the rationed fuel will be smuggled in from the border countries. Smuggling increases consumption beyond the ration scheme amount, indirectly affecting both (a) the balance of payments as currency flows out and (b) GDP as the continued high expenditure diverts resources away from other sectors. The greater the degree of smuggling, the less effective is a rationing scheme in reducing the effects on the economy as a whole. Worse, if fuels are rationed because their prices are subsidized, and if prices in neighboring countries are higher, the rationed fuels may be smuggled out of the country—subsidizing consumers in other countries—while domestic consumers face even greater fuel shortages and may be forced to pay a hefty premium on the black market.

Restricting activities that consume petroleum products

2.63 A different strategy to reduce petroleum production consumption is to limit activities that use them. The policies commonly considered depend on which activity is being considered. Most examples relate to the transport and electricity sectors.

Limiting petroleum fuel consumption in transportation

2.64 A number of different policies can reduce petroleum fuel consumption in the transport sector. Some increase the efficiency of fuel use while others restrain demand for motorized transport. Measures that can improve fuel efficiency include traffic management, speed limits, and more fuel-efficient driving practices. Demand restraint

measures include limiting the opening hours of filling stations, parking policies, physical restraints on vehicle use, promoting public transport and car-pooling, limiting work days, road pricing, limiting rail and aviation systems, and promoting biofuels. Biofuels are discussed under alternative energy. The primary objectives of most of the policies described below are to reduce congestion or to improve the efficiency of goods and passenger transport, but they have the collateral benefit of reducing fuel consumption.

2.65 *Traffic management in urban centers.* Where there is severe traffic congestion, vehicle speeds are often below that for efficient fuel use, typically 60–80 kilometers per hour (km/h). Stop-and-start operations also reduce fuel efficiency markedly. Traffic management aims to improve traffic speed with existing traffic volume and it has a side-benefit of reducing fuel consumption for the same distance traveled. It is important, however, that improvements in the flow of traffic not generate significant new traffic. The most common traffic management instruments are traffic signal control systems, such as coordinating traffic lights to create "green waves" which can reduce fuel consumption and which could be implemented in the short run. Other devices include one-way street systems. In the longer run, a major component of traffic management is separating different traffic modes.

2.66 *Speed limit.* In countries where a considerable amount of driving takes place on inter-city roads, and where these roads are of high quality, a reduction in average driving speed can reduce fuel consumption. The International Energy Agency considered that this could be an important source of fuel saving (based on evidence from several high-income countries) and cited a German study where a limit of 100 km/h on motorways and 80 km/h on other roads in non-built up areas would save 4.8 percent of domestic fuel sales (IEA 2005a). In many developing countries, road infrastructure is in poor condition and little road traffic is likely to occur at speeds and under conditions where a substantial reduction would increase fuel efficiency. Enforcement of this policy is also unlikely to be easy, since it requires the transportation police to have the appropriate speed detection equipment and to be sufficiently numerous to be an effective deterrent. Where the probability of being caught is low, the incentive to obey such a restriction is also low.

2.67 *More fuel-efficient driving practices.* Public information campaigns to promote more fuel-efficient driving have received some attention. The IEA (2005a) estimated that, with an effective campaign and awareness and cooperation from drivers, savings of up to five percent could be achieved. The list of good driving practices to be encouraged included the following:

- Shifting the gear as soon as possible
- Maintaining a steady speed
- Anticipating traffic flow
- Decelerating smoothly
- Switching off the engine at short stops
- Reducing vehicle load to the extent possible (such as by removing unnecessary items from the trunk)

- Avoiding a reduction of vehicle aerodynamics from items attached to the exterior of the car
- Keeping tires properly inflated and purchasing low-rolling resistance replacement tires
- Using low-viscosity motor oils.

2.68 The most effective of these policies was the maintenance of the proper tire pressure—a study estimated a 2.5 to 3 percent increase in fuel consumption for every pound per square inch (7,900 pascals) below the optimal tire pressure. Because this group of actions will all be voluntary, it is essential to have a public information campaign. In addition, action might be needed to ensure that an adequate number of filling stations have accurate facilities for inflating tires and for measuring tire pressure.

2.69 *Limiting the opening hours of filling stations*. Making it more difficult to purchase transportation fuels may reduce the use of vehicles. The effect on the total distance traveled is not expected to be substantial because drivers can plan their fuel purchases to fit with opening hours, but this measure may help reduce nonessential journeys.

2.70 *Parking policies*. Parking pricing and availability can be used as a demand restraint measure. Parking policies affect both the effective supply of road space and the demand for it. Increasing parking fees, avoiding the provision of publicly funded free or low-cost parking, and strong regulation limiting on-street parking to locations where it has no effect on traffic flow could help reduce traffic and, in the case of the last measure, improve traffic flow. Policies that restrict parking or make it more expensive will result in a visible and direct increase in the costs of vehicle use, and the effects are likely to fall more on the better-off members of society. Parking policies are also likely to be less unpopular with the mass of the population than the rise in fuel prices themselves. Higher parking charges can be easily implemented. Parking policies do present some difficulties: parking restriction schemes have to allow for the use by legitimate business interests, for example unloading of goods, and this needs enforcement as well as careful design. In general, parking restriction enforcement schemes can be difficult to implement and require additional labor and supervision to avoid collusion between motorists and parking enforcers.

2.71 *Physical restraints on vehicle use*. One widely discussed policy, which has been used in certain countries to reduce urban congestion, is to limit the use of private vehicles. The best known scheme is an odd-even day restriction, whereby vehicles with registration numbers terminating in an odd (or even) digit are banned from use on certain days, and the other vehicles are banned from other days. High-income families circumvent this by purchasing two vehicles with different end digits on the license plate. A related policy is a complete driving ban on one day of the week (usually a non-working day). These policies are aimed at reducing nonessential trips, and by encouraging the use of alternative methods of traveling to work (buses, or car or van pooling). Enforcement again relies on the ability of the urban traffic police to provide an adequate deterrent.

2.72 *Promoting public transport*. Public transport provides an alternative to a much larger number of private cars. If public transport is sufficiently attractive to draw

passengers away from private vehicles to high-occupancy public transport vehicles, public transport promotion can reduce fuel consumption. In the immediate run, promotion policies include increased parking charges and road-user charges, restrictions on private car use during certain hours, and, in some circumstances, reduced bus fares. In many developing countries the urban bus system is already operating at capacity during rush hours, so that motorists could switch to buses only if capacity were increased. This is not possible in the short run because of the requirement to purchase extra rolling stock. In the longer run, public transport priorities—dedicated bus lanes or totally segregated busways—are essential to counteract the problems of mixed traffic and making public transport efficient. The feasibility of this policy depends on the existence of spare road capacity. A further elaboration of a modal shift to conserve fuels is to provide adequately for nonmotorized transport by making them safe and convenient.

2.73 *Promoting car and van pooling*. Car pooling in order to reduce congestion from commuting traffic has been used in industrial countries for a number of years. This policy is generally enacted by restricting certain lanes of roads to "high occupancy vehicles," as well as by public information campaigns that encourage drivers to adopt this policy. In some developing countries restricting traffic flow in this way may be feasible and effective. It may also encourage some motorists, faced with longer delays and unable to use car pools, to switch to bus transport if there is spare capacity in the system. This policy is relatively cheap to implement, through the costs of signage and other means, but does require some monitoring and enforcement capacity.

2.74 *Limiting work days*. A more aggressive policy measure that has been implemented in some countries is the reduction of the number of days worked by individuals. This could be accommodated by lengthening the working day, and also by staggering the days off of different individuals. Such a policy is designed to reduce the number of trips to, and during, work, and would have some effect where a substantial fraction of these were made by car. Where workers travel by bus or other means, the reduction in the number of vehicle trips made might be negligible.

2.75 *Road pricing*. Direct road pricing can include charges for entering or traveling within a designated part of the city experiencing congestion and for use of selected roads. Some higher-income countries, faced with severe urban congestion, have introduced congestion charging to make motorists pay for some of the negative externalities created by their trips. Such schemes could be introduced into large conurbations with a view to reducing the number of vehicle trips. Schemes of this nature depend on there being alternative methods of the transport within the town or city. The administration of these schemes requires a network of points to provide congestion tickets, and a scheme of monitoring and enforcement.

2.76 *Limiting the use of railway systems*. In countries with extensive rail networks that do not use coal, there may be some potential for fuel savings by reducing nonessential services. Where there is excess capacity, some re-timetabling may be able to cut fuel use without substantial hardship to users. Such a scheme is most likely to be viable for state operated railways that have not optimized their provision of services.

2.77 *Limiting the use of aviation*. In developing countries, most airline transportation is either international or commercial, and the provision of these services is already likely to have been optimized against fuel use. However, state airlines may provide excess flights for social or prestige related reasons, and some economies in scheduling may be possible.

Limiting petroleum fuel consumption in the power sector

2.78 Where the electricity sector is a major user of petroleum fuels, a second approach to rationing is aimed at electricity use. One important consideration is whether the marginal generation capacity that would be reduced uses petroleum fuels. If a unit being shut down were based on hydro or coal, then clearly the policy would be ineffective in its stated objective of reducing the consumption of oil products. Policy options include reducing the use of air-conditioning, central heating, and elevators; imposing restrictions on public and office lighting; promoting energy conservation measures; setting earlier closing hours and daylight savings time; instituting shorter working hours; and power rationing.

2.79 *Reducing the use of air-conditioning, central heating, and elevators*. The government can mandate higher thermostat temperatures for cooling and lower temperatures for heating, and limit hours of use in office environments. These policies can easily be applied in government offices, and also in large businesses, which are likely to be the dominant users of these activities. Monitoring should be manageable, because the number of entities involved will be small in all but the largest developing countries. Similar considerations apply to limiting the use of elevators.

2.80 *Imposing restrictions on public lighting and on office lighting*. Reducing public lighting has social implications and its feasibility will depend on the extent to which there is excess lighting relative to that required for safety and security. Requiring offices to turn off all lights after a certain time would be fairly easy to implement and would not adversely affect output, except for those businesses which, by their nature, need to work longer hours than normal.

2.81 *Encouraging more energy-efficient practices.* Energy-efficiency policies for homes and businesses are usually focused on the medium to long term since they often require replacing home appliances and office equipment—refrigerators, air-conditioning units, light bulbs, and so on—with more efficient versions. A public campaign of awareness might be able to target nonessential or inefficient use of energy, however, and at a minimum steer those planning to purchase new appliances to consider energy efficiency as a criterion. Governments may set efficiency standards for appliances, provide financial incentives by imposing a tax differential in favor of higher-efficiency appliances, or make combined use of these two approaches.

2.82 *Imposing earlier closing hours on retailing and offices and introducing daylight saving time*. Programs to reduce the number of hours businesses stay open, at times when lighting is required, may involve an important change in social habits and hence be unpopular. Some countries are considering tackling this by introducing daylight saving schemes as an alternative method of matching business hours more closely to daylight time.

2.83 *Reducing the length of the working week*. Programs that reduce the length of the working week, when applied to all employees at the same time (without staggered work weeks), can also lead to energy saving from reducing lighting and heating.

2.84 *Imposing power rationing*. The most radical approach to reducing power consumption and hence the use of certain petroleum products is to ration power. This is effectively a policy for short-run emergencies, since a sustained period of power shortages would be unpopular, lose valuable production for the economy, and force consumers to turn to individual diesel generation sets, possibly resulting in higher overall fuel consumption. Again, this would be effective only if the power generation that has been switched off used petroleum products. Such a policy is easy to mandate and to implement but would require an effective public relations campaign and a plan for other methods of rapidly reducing petroleum product consumption, so that it would indeed be only temporary.

Diversification into Non-Petroleum Sources of Energy

2.85 Reliance on oil can be reduced by diversifying into non-petroleum sources of energy. The most common alternatives are natural gas and renewable sources of electricity such as hydro, geothermal, solar, and wind. Biofuels are attracting growing attention as substitute for liquid transportation fuels. Some consumers are forced back to use more solid biomass, with damaging public health and environmental effects.

Natural gas

2.86 Natural gas can be used in a number of sectors, including households, industry, power generation, and the transport sector as a substitute for gasoline and diesel in the form of compressed natural gas (CNG). There has been a steady shift to natural gas as a clean and relatively cheap source of power in recent years. By virtue of being a gas, natural gas is more costly to transport and store than liquid or solid fuels.

2.87 There are economies of scale in laying down pipelines. A pipeline network is economically viable if there are large consumers (such as power plants and large industrial operations). The factors needed for sustainable conversion to CNG include the existence of a gas distribution pipeline for other users of natural gas, close proximity to the supply, and inter-fuel taxation policy that eliminates or reduces the potential financial burden of the substitution of gas for fuel to acceptable limits. Because diesel is taxed much less than gasoline in many developing countries, it is often difficult to stimulate substitution of diesel for CNG through tax policy alone.

2.88 Natural gas prices have risen markedly in recent years, broadly tracking world oil price increases. While there are no "international natural gas prices," indications of rising gas prices can be seen in the doubling of U.S. wellhead prices between December 2003 and December 2005 (Figure 1.4). These price increases have slowed down the pace of fuel switching to natural gas in countries with abundant coal supplies, such as the People's Republic of China and India.

Renewable power sources

2.89 Hydro is the most common form of renewable source of power. One of its main drawbacks is its dependence on the climate. In East Africa and some parts of Asia, continuing droughts have dramatically reduced the amount of electricity generated from hydro in recent years. This, combined with steeply rising oil prices, has led to a large-scale electricity crisis, with grid electricity available for as few as less than 10 hours a day in some countries.

2.90 Geothermal does not suffer from the climate-related problems found with hydro, but a much smaller amount of electricity is generated from geothermal sources. Solar and wind have limited applications on account of their costs. Wind and solar power is also gaining growing attention.

Biofuels

2.91 A policy of promoting the blending of a certain proportion of ethanol into gasoline or biodiesel into diesel will reduce the total use of petroleum transportation fuels. This policy may be able to reduce the fuel import bill in the short run if a country can import biofuels at prices lower than those of petroleum fuels, or if there is surplus feedstock and biofuel production capacity. Otherwise it is a medium to long-term solution.

2.92 Argentina, Canada, Colombia, the European Union, India, Malaysia, the Philippines, Thailand, and the United States have all adopted targets—some mandatory—for increasing the contribution of biofuels to their transport fuel supplies. In terms of production costs, ethanol from sugarcane has historically been the lowest-cost biofuel. Recent surges in world sugar prices, however, have altered the relative economics of biofuels, with biodiesel from palm oil emerging as potentially more viable under certain market conditions.

Increasing Domestic Supply

2.93 An increasing number of countries are promoting oil and gas development. With rising oil prices, the economics of exploration, development, and production have changed. Even in areas where past exploration did not yield promising results, there are hopes that newer exploration technologies might lead to commercial discoveries. Oil companies have been particularly active in exploration in Africa, as annexes 1–3 show.

2.94 A variation on increasing the domestic supply of oil and gas is increasing domestic refining capacity. Several arguments have been put forward in favor of enhancing refining capacity.

- Although a fundamental disagreement persists over causes of higher oil prices, some industry analysts have argued that one reason is tight refining capacity. Increasing refining capacity would address this bottleneck directly and would, in time, help lower world oil prices.
- Having sufficient domestic refining capacity could enhance security of supply of refined products.

- Refining margins have widened in recent years, especially for complex refineries with conversion capacity which can convert lower-priced heavy crude into light products (LPG, gasoline, kerosene, and diesel). Domestic refineries can capture higher margins and pass benefits on to the economy through taxes paid to the government. It is important to note, however, that refining margins fluctuate widely—for many years many refineries were barely making profits—and there is no guarantee that the current high refining margins will last long.

2.95 Economies of Scale. Significant economies of scale are an important asset in refining. This is true especially for cracking units which convert the heavy end of crude into light products. As a generalization, there is a surplus of heavy fuel oil and a shortage of light products on the world market. Many refineries in developing countries are doing poorly even in the current climate of high refining margins because they are too small and lack sufficient conversion capacity. Small-scale refineries are unable to capture the economies of scale that are necessary to bring costs to a level that can compete with international prices.

2.96 One factor that affects the economics of refining is the size of the domestic market relative to that of an economic-size refinery; the latter is in the neighborhood of 100,000 barrels per day (bpd) or larger. If the domestic market is relatively small, building a refinery large enough to capture economies of scale might require that an export market for refined products be found. Selling into a domestic market provides some competitive advantage because of transport costs. Transport cost advantages are obvious for oil-producing countries. Even for oil-importing countries, shipping crude is cheaper than shipping refined products, so that it is possible for a domestic refinery to enjoy a cost-advantage compared to refined product imports. An export refinery, on the other hand, cannot enjoy the transport-cost advantages of selling into a domestic market. Instead has to compete fully with all other international sources of supply, including large, complex refineries in major oil-producing countries.

2.97 Capital Costs. The capital costs of constructing a competitive refinery are very large and would constitute a substantial fiscal burden for any government that chose to support a state-owned oil company to enter such a market. Where the private sector is unwilling to build a refinery, it is unlikely that it would make economic sense for the state sector to undertake such a project.

2.98 Security of Supply. For oil-importing countries, whether or not increasing domestic refining capacity would enhance security of supply is not straightforward. In response to fuel shortages that occurred in Southern Africa in late 2005—following the closure and partial operation of the refineries in South Africa as they prepared to phase out lead in gasoline entirely—the government of Namibia stated that they were considering building their own refinery in order to meet demand. One question is the frequency and causes of fuel shortages. If they arise from tight refining capacity, or from serious problems with the refineries supplying the region (for example, old and dilapidated, or a history of weak and inefficient management), it might make sense to explore increasing refining capacity to meet demand. If fuel shortages are rare—for example, lead phaseout is a one-

off event—and there is generally adequate and competently managed refining capacity in the region, it would probably not make sense to add to the regional refining capacity. In the extreme, a market dependent on one domestic refinery that is poorly managed might even be better off turning entirely to product imports.

Policies to Win Public Buy-In of Government Actions

2.99 A number of governments that have attempted to eliminate subsidies on petroleum products by imposing large price rises have faced strong reaction from civil society, both trade unions and non-affiliated groups. Political opposition parties have also built on the hostility to these price rises to encourage demonstrations and protests, which may be opportunistic but which may also be aimed at a wider dissatisfaction with the government.

2.100 The reaction of the public to possible measures designed to cope with the price rises depends on

- The extent to which there is understanding for the necessity of a price increase and other effects that will be felt directly
- The perceived legitimacy of the government
- The credibility of the government in delivering promises that it may make, especially with respect to compensation measures or how budgetary savings may be used, in designing these policies
- The general popularity of the government
- The extent to which the burden is seen to be shared equitably
- The speed with which the policy changes are implemented
- Transparency of adopted policies.

Public awareness of the need to take action

2.101 Public awareness of the implications of the oil price rises involves three separate aspects:

- The actual magnitude of the price rise on the world market
- The importance of petroleum product consumption (especially imported products) in relation to the size of the economy
- The government's ability to absorb the shock in terms of its overall budgetary position, including its debt, and the magnitude of its balance-of-payments deficit (or surplus).

2.102 Where informative and accurate public comment on the oil price increase exists (for example, through the press), then too will be a better understanding that this is a problem not of the government's making. The relationship between the current price from crude oil on international markets and the price of products, which will reflect the crude price increase after a delay, needs to be explained. Without such an explanation, users will be hostile to product price increases that reflect earlier crude price increases at a time when the crude prices are no longer increasing. It is more difficult to persuade users to accept product price increases in major oil-exporting countries, because the users

find it difficult to understand why they should pay more for oil when the cost of production has not gone up and oil companies are making enormous profits.

2.103 If the importance of petroleum products to the economy, and to various groups within society, is better understood (including by policymakers), then the rationale for policies to support different groups within society may be given more support. If there is knowledge of the extent to which the government has room to manoeuvre, then hard-pressed governments may be able to obtain more public support for unpopular measures. In all respects, increased transparency about the issue is required to set the stage for the desired policy initiatives.

Perceived legitimacy of the government

2.104 A government that has not come into power through democratic elections that are acknowledged to have been fairly conducted usually finds it difficult to push through unpopular policies, fuel price increases being one. If election results are hotly contested by opposition groups and accusations of election irregularities are supported by the public at large, or if there were no elections and a political group simply seized power, then the public might very well see and oppose price increases as acts of an illegitimate government, even if the government has a track record of delivering results.

Credibility of the government

2.105 The credibility of the government is important in affecting the level of support for its policies to cope with higher oil prices. If citizens have little faith that the government is doing its best to minimize the petroleum fuel price increases, then the willingness to accept policies that will have negative effects on some or all consumers will be low.

2.106 For some policies, such as removal of subsidies, governments have offered alternative benefits, such as continued or increased welfare expenditures. Where the government has failed to deliver on such promises on earlier occasions, its lack of credibility will undermine the acceptance of the proposed policy. This is particularly important in oil-producing countries where a previous policy of subsidizing petroleum products is proposed to be replaced by a policy of charging opportunity costs for them. Many oil-exporting countries have poor records for targeted government spending and have experienced large amounts of waste and corruption, so that citizens tend to be skeptical that this new pricing policy will change underlying behavior.

2.107 Governments that have previously tried to introduce similar policies (such as price increases) and have been forced to withdraw them following strong opposition are less credible when they announce a new round of price increases. They may need to engage in a more intensive public information campaign, and also to seek alternative approaches to increasing fuel prices to the ones that failed previously.

Popularity of the government

2.108 Governments that, for whatever reason, are unpopular will find it more difficult to implement policies that would be unpopular with a sizable section of the population. This is likely to be especially true where the policy appears to favor certain

groups in society (for example, the wealthy) that the mass of citizens identify with the less popular aspects of the government's record.

Policies that share the burden in an equitable manner

2.109 Many governments have deliberately adopted policies that reduce the burden of higher prices on certain groups within society. In some countries the governments have attempted to reduce the burden on the politically powerful groups, usually the urban population and the rich. Those who are truly in need of burden reduction are not as politically influential, especially the rural poor. Governments that have designed their policies in accord with the aim of redistribution toward lower-income groups should ensure that there is general awareness not only of the policy, but also of the extent to which the key groups are being favored.

Policies that are phased in at an acceptable speed

2.110 Faced with the sudden rise of oil prices and the negative effects of this on the macroeconomy, governments will wish to react rapidly to offset these effects. However, some policies, if implemented very rapidly, will place large burdens on consumers. For example, if prices are suddenly allowed to rise to match import parity, the "overnight" impact on total household expenditure could be so large that some households have difficulty in adjusting their budgets and may need to borrow to pay their bills. If the household is poor or credit-constrained, they may need to cut back sharply on other essential items.

2.111 Spreading out the price rise, rather than using the "big bang" approach, can give time to households to adjust several categories of expenditure, as well as to learn how to economize on the use of petroleum products themselves. On the other hand, gradual adjustments based on a series of small adjustments spread over a long period may undermine the political will, risk the danger of policy reversal, and increase the burden on the treasury. Users will tend to downplay the importance of a large price shock that occurred many months before, and wonder why they are still facing increases in petroleum product rises at the current time.

Transparency of adopted policies

2.112 Policies that are transparent in formulation and implementation are more likely to be accepted than those that are not. Transparency entails both making information available widely to the public and selecting measures that are easily verifiable.

2.113 Making public know how retail prices are arrived at can help quell public concerns about whether oil companies were exploiting the situation and over-charging consumers. A time lag between the world oil price movement and the domestic fuel price movement, especially in times of falling oil prices, often leads to charges of consumer exploitation. If prices are not fully liberalized, a price formula that is automatically adjusted on the basis of international oil prices can address these concerns to a large extent.

2.114 Where governments propose compensation measures to help the poor cope with higher costs of living, choosing compensation measures that are easily verifiable by nearly all citizens can go a long way in winning public support. For example, waiving fees

for primary school pupils can be verified by most people since they either have children of primary school age or have relatives and neighbors with children in primary school.

3

Assessment of Country Experience

3.1 Chapter 2 reviewed possible sector-level policy responses to higher oil prices. This chapter provides an overview of the response of 38 developing countries to the higher oil prices experienced since the beginning of 2004. A wide spectrum of developing countries was selected based on the size of the economy, the level of economic development as measured by per capita GDP, the contribution of indigenous oil production to domestic oil consumption, the level of vulnerability to oil price volatility as measured by the ratio of oil imports to GDP, the fiscal position of the government, fuel pricing policy prior to 2004, and the quantity and quality of information publicly available on policies to cope with higher oil prices.

3.2 The countries studied are Arab Republic of Egypt, Argentina, Bangladesh, Brazil, Cambodia, Cameroon, Chile, Ethiopia, Ghana, Guatemala, Honduras, India, Indonesia, Kazakhstan, Kenya, Kyrgyz Republic, Lao People's Democratic Republic (PDR), Madagascar, Malawi, Malaysia, Mexico, Morocco, Mozambique, Nicaragua, Nigeria, Pakistan, People's Republic of China, Philippines, Rúpublica Bolivariana de Venezuela, Rwanda, Senegal, Sri Lanka, Tanzania, Thailand, Tunisia, Uganda, Vietnam and Zambia. In addition, the regional Petrocaribe initiative is included because it was launched in direct response to rising oil prices, linking together many countries in the Caribbean. The amount of information available on policies carried out varies greatly by country. The detailed studies are provided in annexes 1–3, which divide countries by their status as a non-oil producer, an oil producer but net oil importer, or an oil exporter.

3.3 The study focuses on sector-level policies with a considerable emphasis on the extent to which governments have allowed the effects of price increase to be passed through to users. Because the impact of increased consumer prices on the volume of consumption of oil products depends largely on the magnitude of the short- and long-run price elasticities of demand, the chapter begins with a brief account of these values to place the impact of price responses in context.

3.4 The second section of the chapter reviews current product prices for gasoline and diesel in the sample countries and compares these with those in certain industrial countries. The material, which forms a backdrop to the study and shows the enormous variation in consumer prices, is followed by an analysis of the degree of pass through of these prices (measured in local currency) since January 2004. From this

material, which highlights the large number of countries that have passed through much less than the full international price increase, a series of regressions with macroeconomic variables measured in 2003 were carried out, to see if there were general patterns in how a country's macroeconomic circumstances affected its pass-through policy.

3.5 The third section of this chapter categorizes policy responses under ten criteria that provide a general overview of trends and patterns in the qualitative nature of responses to the oil price shocks. The scores on these variables are reported in a table. The final section of the chapter provides observations on the experiences with the various policy responses identified. The case studies have examined, in as much detail as has been publicly available, not only the price responses to the oil price shocks, but also other non-price policies that have been adopted. Such policies are important in complementing or even substituting for price-based policies.

3.6 A number of studies have recently been undertaken that make preliminary estimates of how much the oil shock has affected or will affect the macroeconomic performance of developing countries (World Bank 2006a, 2006c, and 2006d), and earlier studies quantified the magnitude of the oil price shocks relative to the size of the economy (ESMAP 2005a and 2005b). The impact studies tend to confirm that, based on preliminary data for 2005 as well as actual data for 2004, the slow-down in GDP for non-oil exporters has so far been only modest, and the inflation also has increased only slightly. For many countries offsetting improvements in the terms of trade have come about due to the rise in other commodity export prices. A more detailed assessment will be possible only when more data become available that would allow the identification of the effects of the higher oil prices, against the counterfactual of smaller price changes. This would also require a detailed analysis of the other drivers of these variables. Such analysis is beyond the scope of the present study.

3.7 Similarly, the impact of the actual price changes on household incomes and welfare would require much more extensive data than is currently available. Most countries lack detailed annual household expenditure surveys that separate out purchases of fuels from expenditure on energy generally. The household survey data would also need to be complemented by an input-output table to assess indirect effects of higher oil prices. As recent household surveys become available, it will be possible to form a picture of the likely effects of the relative product price changes on the various income groups within countries.

Demand Response to Price Increases

3.8 The key policy response is the extent to which governments have passed on the price increases, or have moderated them by subsidies, tax reductions, or pressure on oil companies to hold down prices. Those countries that have been raising prices, and especially those that have been passing on the full price increase to end users, may have expected by now to have seen some reduction in the demand for oil below what would otherwise have occurred. Where domestic prices have not fully reflected international price movements, the demand for oil products will stay more buoyant, and the potential negative effects on the balance of payments and GDP will be larger. A central issue in the

adjustment of the economy to any price rise that has occurred is the magnitude of the price elasticity of demand for oil products.

3.9 There are two principal drivers of the demand for any product: the growth of GDP and the price of the product. These two drivers can in turn be divided into four factors:

- The rate of growth of income
- The income elasticity of demand for the product
- The rate of increase of prices
- The price elasticity of demand for the product.

3.10 Unfortunately, evidence on price and income elasticities in developing countries is sparse, partly because of lack of data, and tends to be based on data that are several years old. For non-OECD (Organization for Economic Cooperation and Development) countries, excluding oil exporters, but including countries with more rapid and less rapid income growth, one of the most extensive and widely quoted studies used data from 1971 to 1997 and found that the long-run income elasticity was almost equal to unity, while the long run price elasticity was between 0.1 and 0.2. Short-run elasticities were about one-quarter of these values (Gately and Huntington 2002). Recent analyses of the international impact of higher oil prices have used values similar to these.

3.11 The impact of an increase in crude oil and refined product prices on end-user prices depends on the amount of tax and other components that are included in the markup from the product cost to end-user price. If a government levies substantial excise duties and they are left unaltered, then final prices will increase by a substantially smaller percentage than product costs. For example, if the tax plus markup component is equal to 40 percent of product costs, then a doubling of net-of-tax product costs would result in a 70 percent increase in final prices. If the short-run elasticity of demand for these products is 5 percent (taking one-quarter of 0.2 for price elasticity), then demand would fall by 3.5 percent below where it would have been in the absence of the price increase. This effect will also be partially offset by the short-run income effect. If GDP grew by five percent, and the short run income elasticity of demand is 25 percent, then this would add 1.25 percent to demand, leading to a net fall in demand of about 2 percent.

3.12 In the long run, if GDP grew a total of 20 percent over a five-year period (that is, about 4 percent a year) and retail petroleum product prices doubled, taking long-run elasticities of unity for income and 0.15 for price would give a net increase in consumption of 5 percent. A net reduction from the doubling of retail product prices would be 15 percent: without a price increase, fuel consumption would rise by 20 percent.

3.13 In practice, the situation is more complex because oil prices and GDP growth are not delinked. Too high a rise in world oil prices could dampen economic development and even send the world economy into a recession, as with earlier oil price shocks. A decline in economic development would reduce demand, potentially leading to a large fall in world oil prices, the Asian financial crisis of 1997–98 being the most recent example. During that financial crisis, Brent fell below US$10 a barrel in December 1998.

The numerical illustrations in the foregoing paragraphs do not consider these feedback effects.

3.14 A rather unexpected aspect of the current oil price rise is how little impact a doubling of oil prices appears to have had on the world economy and hence on the GDP of individual countries so far. In this context, the above numerical examples are representative of the current situation. They show that the demand for oil products is not likely to exhibit a large decline in the face of rising prices in the short run. Where governments feel a need to reduce the costs of the import bill for oil and its impact on the economy, they will need to complement the effects of letting the market work with other policies. Even so, if every country managed to achieve a net 2 percent reduction in oil consumption, this would take out 1.7 million barrels per day (bpd) of demand and could potentially lower world oil prices significantly. Over a longer time period, fuel savings from price increases are significant, but as long as the economy continues to grow at a reasonable rate, aggregate consumption rises, albeit at a much slower rate.

3.15 One key factor is the speed of response to higher oil prices—it is widely accepted that the short-run elasticities (usually based on annual data) are extremely small, so that little reduction in demand in the period 2004 and 2005 could be expected even in those economies that have fully passed price increases through to consumers.

Product Prices and the Extent of Passing-Through of Oil Price Increases

3.16 Data on retail prices of diesel and gasoline were collected for virtually all countries in the sample, covering the period from January 2004 to April 2006. For some countries the prices were not available in a published form for the selected period and a shorter period had to be used. Data on kerosene prices stretching over this period were available to a much lesser extent, although this study was able to gather some information on recent kerosene prices in some countries. The details are given in annex 4.

3.17 Table 3.1 and Table 3.2 give retail prices of regular gasoline (when price information was available, otherwise the nearest grade) and diesel in April 2006 (or the nearest month for which data are available) converted into U.S. dollars and arranged in descending order of magnitude. Data for selected industrial countries are also included for comparison. It is important to note that fuel quality varies markedly from country to country, not only in terms of octane (for gasoline) or cetane (for diesel), but also in terms of other fuel parameters—most notably the level of sulfur where industrial countries are moving to "sulfur-free" gasoline and diesel while some developing countries have sulfur levels as high as 1 percent in diesel—and hence these prices are not directly comparable across countries. Nevertheless, the range of prices charged varies enormously between countries, far more than what fuel quality differences could account for, illustrating the varying emphasis on tax and subsidy policies between countries.

Table 3.1 Retail Regular Gasoline Prices per Liter in US$ (April 2006[a])

Country	*Price*	*Country*	*Price*	*Country*	*Price*
United Kingdom	1.65	India	0.97	Bangladesh	0.65
Germany	1.62	Pakistan	0.94	Ethiopia	0.63
France	1.57	Madagascar	0.93	Argentina	0.61
Zambia	1.56	Canada	0.92	Mexico	0.60
Uganda	1.20	Mozambique	0.91	Vietnam	0.58
Senegal	1.16	Nicaragua	0.87	China	0.53
Morocco	1.15	Sri Lanka	0.86	Malaysia	0.52
Chile	1.13	Honduras	0.86	Nigeria	0.51
Japan	1.11	Ghana	0.85	Indonesia	0.50
Rwanda	1.10	Lao PDR	0.84	Kyrgyz Republic	0.48
Cameroon	1.05	Guatemala	0.80	Kazakhstan	0.47
Kenya	1.04	Philippines	0.74	Egypt	0.17
Tanzania	1.03	Thailand	0.73	Venezuela	0.03
Cambodia	1.01	United States	0.73		
Malawi	1.00	Tunisia	0.72		

Sources: Local information and various news reports.
Note: Premium gasoline prices in France, Germany, United Kingdom. For other countries, see footnotes in Table A4.1.
[a] April 2006 or nearest month for which price information is available. See Table A4.1 for the month for each country.

Table 3.2 Retail Diesel Prices per Liter in US$ (April 2006[a])

Country	*Price*	*Country*	*Price*	*Country*	*Price*
United Kingdom	$1.46	Chile	$0.83	Sri Lanka	$0.57
Zambia	$1.37	Morocco	$0.82	China	$0.52
Germany	$1.19	Mozambique	$0.82	Ethiopia	$0.50
France	$1.13	Ghana	$0.78	Mexico	$0.49
Rwanda	$1.08	Cambodia	$0.77	Indonesia	$0.48
Uganda	$1.07	Honduras	$0.76	Kyrgyz Republic	$0.48
Tanzania	$1.03	Nicaragua	$0.75	Tunisia	$0.48
Senegal	$1.00	Lao PDR	$0.74	Vietnam	$0.47
Malawi	$0.99	United States	$0.72	Argentina	$0.47
Cameroon	$0.97	Thailand	$0.69	Malaysia	$0.43
Japan	$0.92	India	$0.68	Bangladesh	$0.43
Madagascar	$0.91	Guatemala	$0.67	Egypt	$0.10
Kenya	$0.88	Philippines	$0.66	Venezuela	$0.02
Canada	$0.86	Pakistan	$0.62		

Sources: Local information and various news reports.
[a] April 2006 or nearest month for which price information is available. See Table A4.2 for the month for each country.

3.18 Data on kerosene prices in recent months were available only for 27 countries. The average of the ratios of the product prices (inclusive of the same taxes in each case) was calculated by taking data for the same month in 2006 for each of the products—kerosene, gasoline and diesel.[6] The average ratio of gasoline to diesel prices is 1.3, that for diesel to kerosene is 1.3, and that for gasoline to kerosene is 1.6. In the Northwest Europe market, the April 2006 product prices were equivalent to a ratio of regular gasoline to diesel prices of 1.1, a ratio of diesel to kerosene prices of 0.9, and a ratio of gasoline to kerosene prices of 1.0. The much higher ratio of retail gasoline to kerosene prices emphasizes the widespread attitude of governments in providing considerably higher taxes and lower subsidies to gasoline than to kerosene.

3.19 Analysis of the pass through of changes in international prices to prices at retail provides further information on how governments have been handling the price shock. Insufficient information for the period studied was available to be able to split the changes of retail prices into product cost, tax, and subsidy components, so that only an overall analysis of pass through could be made. To standardize the data and allow comparisons between countries, the pass-through coefficient was defined as the ratio of the change in domestic retail prices over the relevant period (measured in local currency) to the change in the appropriate international product price during the same period

[6] For two countries (Argentina and Egypt), prices in 2006 could not be obtained and those in earlier years were used.

(converted to local currency). This measure reflects the effects of changes in the exchange rate on the cost of imported products. The pass through is measured in local currency because it is the effect on users in local currency, rather than the dollar equivalent, that concerns governments. Studies that have used pass through measured in dollar terms may obtain rather different values. The international reference prices used were U.S. Gulf for all of Latin America and the Caribbean, Northwest Europe for Africa and Central Asia, Persian Gulf for South Asia, and Singapore for East Asia.

3.20 Because oil prices are quoated in U.S. dollars, exchange rate movements affect local prices. For the 38 countries under consideration, the exchange rate on average did not change against the U.S. dollarbetween January 2004 and April 2006. The currencies of 17 countries appreciated against the dollar, and those of the remaining 21 countries depreciated. Zambia's currenty appreciated the most, soaring 47 percent against the US dollar. The largest depreciation was 41 percent in Madagascar. The exchange rate appreciated by more than 10 percent in 4 countries, and depreciated by more than 10 percent in 6 countries. Despite high oil prices, the currency of Venezuela, a major oil exporter, depreciated 26 percent.

3.21 The value of the pass-through coefficient, in the absence of changes in government policy or in the domestic market, will be at least unity where all costs are fully passed through, and no other factors in the markup are affected by the rise in the cost of oil. Where there are ad valorem taxes, or transportation cost margins that increase with increasing oil prices, then the impact on end users of full pass through would be expected to be more than one hundred percent. Where the increase in imported product costs forces an increase in efficiency, or decrease in domestic margins, then the impact of pass through would be lowered. A policy of increasing subsidies or decreasing taxes will tend to lower the coefficient. It is important to note that a high pass-through coefficient does not imply that the product is no longer sold below cost or without subsidy. Where the starting price is very low, the country could increase domestic prices by more than on the world market while still leaving a large subsidy element to be financed. A value in the neighborhood of unity implies that the government has taken steps to ensure that the fiscal burden is neither increasing nor decreasing markedly, given that the volume of consumption is unlikely to be strongly affected by the change in domestic prices.

3.22 For those countries where there are data on prices stretching over at least 20 months for both fuels within the study period, a series of statistical analyses were carried out. The omitted countries are Cambodia, Kazakhstan, Kyrgyz Republic, Morocco, Nigeria, Senegal and Tunisia, leaving a sample of 31 countries. The data are presented in Table 3.3.

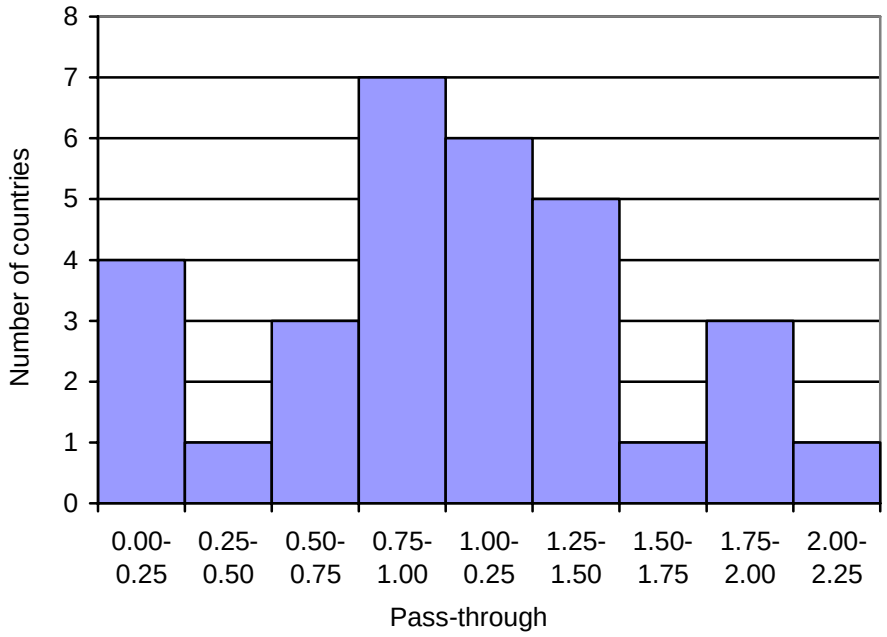
Table 3.3 Pass-Through Coefficients for Gasoline and Diesel in Local Currency (January 2004–April 2006)

Country	*Gasoline*	*Diesel*	*Country*	*Gasoline*	*Diesel*
Argentina	0.02	0.11	Malawi	1.14	1.22
Bangladesh	0.79	0.43	Malaysia	0.75	0.84
Brazil	0.64	0.84	Mexico	0.15	0.11
Cameroon	0.91	0.98	Mozambique	1.10	1.01
Chile	1.15	1.11	Nicaragua	0.95	0.88
China	0.71	0.53	Pakistan	1.98	0.78
Egypt	0.00	0.00	Philippines	1.29	1.30
Ethiopia	0.48	0.64	Rwanda	0.98	0.76
Ghana	1.33	1.21	Sri Lanka	1.80	0.83
Guatemala	0.93	0.99	Tanzania	1.57	1.52
Honduras	0.60	0.87	Thailand	1.37	1.15
India	1.25	0.66	Uganda	1.23	1.14
Indonesia	1.20	1.02	Venezuela	0.00	0.00
Kenya	0.97	0.79	Vietnam	1.03	0.70
Lao PDR	1.86	1.35	Zambia	2.20	1.93
Madagascar	1.46	1.55			

Source: Authors' calculations. See Table A4.4 for more detail.

3.23 Figure 3.1 presents the distribution of pass-through coefficents for gasoline. For the sample of countries chosen, the mean pass-through coefficient for gasoline was 103 percent, but 30 percent of the countries in the sample passed through less than 75 percent of the price increase. Lao PDR, Pakistan, Sri Lanka, Tanzania, and Zambia increased retail prices by at least 50 percent more than the international price increase during the same period.

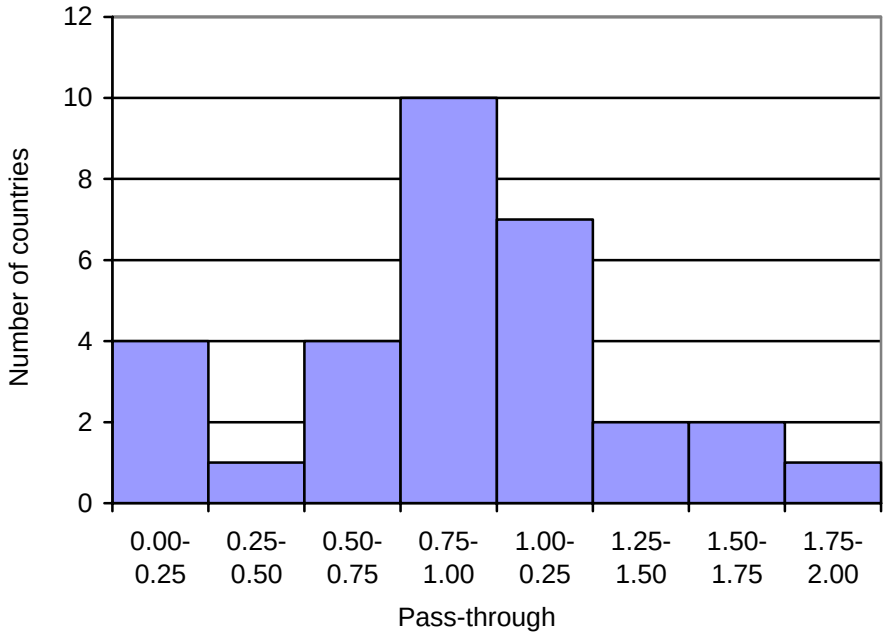
Figure 3.1 Pass-Through Coefficients for Gasoline (January 2004–April 2006)



Source: Authors' calculations

3.24 Figure 3.2 presents the distribution of pass-through coefficients for diesel. The average pass-through coefficient was 88 percent, and 30 percent of the countries passed through less than 75 percent of the international price increase. Madagascar, Tanzania, and Zambia increased prices by at least 50 percent more than the international price during the same period. The generally higher pass-through coefficients for diesel show that countries generally were less willing to pass through price increases on diesel than on gasoline.

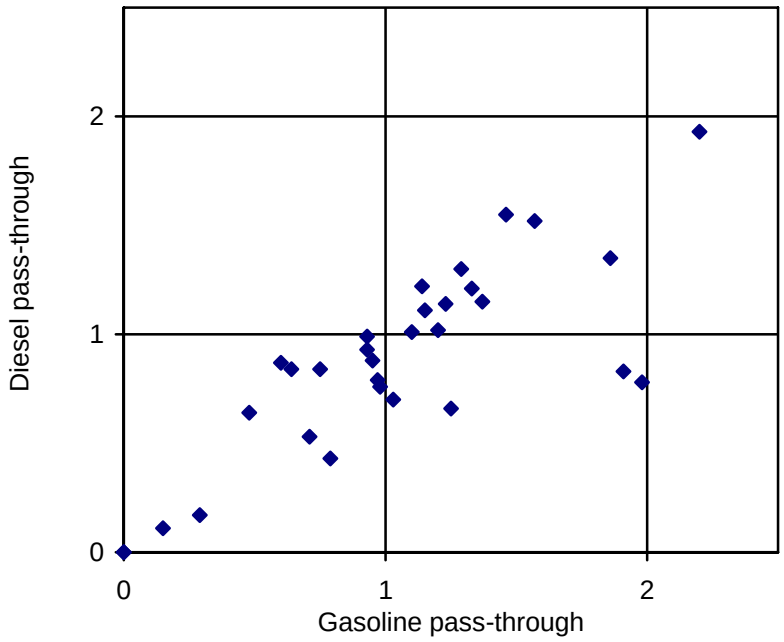
Figure 3.2 Pass-Through Coefficients for Diesel (January 2004–April 2006)



Source: Authors' calculations

3.25 Figure 3.3 plots the gasoline pass-through coefficient against the diesel pass-through coefficient. The squared correlation between the two is fairly strong at 67 percent, indicating a strong tendency for governments to take a similar policy stance on both fuels even though the pass through was lower for diesel in most countries. The figure also shows that one half of the countries (15 out of 31) are clustered in the bottom left box, indicating that, for both gasoline and diesel, the pass through was less than the change in the international price. The four countries showing virtually no pass through for either product are Argentina, Egypt, Mexico, and Venezuela.

Figure 3.3 Gasoline Pass-Through and Diesel Pass-Through Coefficients (January 2004–April 2006)



Source: Authors' calculations

3.26 Comparisons with the coefficients of pass through for selected industrial countries are shown in Table 3.4.

Table 3.4 Pass-Through Coefficients for Selected Industrial Countries (January 2004–April 2006)

Country	*Gasoline*	*Diesel*
Canada	1.06	0.96
France	1.30	1.07
Germany	1.20	0.98
Japan	0.85	0.65
United Kingdom	1.25	1.08
United States	1.02	1.05
Mean of case studies	1.03	0.88

Source: Authors' calculations

3.27 Industrial countries, with the exception of Japan, experienced higher pass-through coefficients than occurred in the study sample of developing countries. In large part this will be due to the high rates of value added taxes imposed, since all of these countries have competitive markets without government interference in price setting.

Factors Related to the Degree of Pass Through of Oil Price Increases

3.28 This section investigates the extent to which different countries have passed through oil price increases to consumers. The state of the economy at the beginning of the price rise may have determined the government's attitude to pass through. A number of macroeconomic variables measured for 2003 determine the economies' ability to withstand the increased costs of subsidies or tax reductions. Table 3.5 reports the unsquared correlations between the pass-through coefficients and the macroeconomic variables. The macroeconomic variables in the table and the findings are described below.

(1) *The vulnerability of the economy to an oil shock.* The ratio of value of the net oil imports to GDP is an index of the relative importance of the oil price rise to the economy in terms of the potential adjustment needed to offset it. The higher this ratio (which is positive for net exporters) the more concerned the government may be to reduce oil imports and hence the more willing to pass prices through so as to stimulate a reduction in demand. The findings in Table 3.5 confirm this hypothesis.

(2) *The terms of trade.* The terms of trade (indexed to a value 100 in the year 2000) indicate changes in the ratio of export price index to import price index in the recent period before the oil price shock. Improving terms of trade would mean that a smaller volume of exports would be needed to pay for a given quantity of imports. The sign of the coefficient for the terms of trade—how a government might adjust its pass-through policy in response to improving or deteriorating terms of trade—is not obvious. The government might be willing to accept a smaller pass through with improving terms of trade, regarding consumer protection relatively more important than oil demand constraint by means of full pass through. Alternatively, the government might opt for greater pass through because the economy is becoming more robust and is in a better position to withstand the price increase. The unsquared correlation shows that the coefficient is statistically significant and the degree of pass through increases with improving terms of trade.

(3) *The overall financial surplus of the government relative to GDP.* The larger the financial surplus (or smaller the deficit) the more willing the government might be not to pass through the whole price increase since it would be better able to withstand the fiscal implications of doing so. The findings are consistent with this hypothesis.

(4) *The real growth of GDP per capita.* Rapidly growing economies will generally experience more rapid growth of non-oil taxation, and hence be better able to withstand the fiscal impacts of a less than full passing on of oil price increases. The findings are not statistically significant.

(5) *Implicit GDP deflator.* Where the rate of inflation is higher, governments may be concerned with adding to it further and hence less willing to see a

full passing on of oil price increases. The findings are not statistically significant.

(6) *Ratio of debt to GDP.* More indebted countries may be less willing to absorb some of the costs of a less-than-full pass through. This was found to be statistically significant for diesel but not for gasoline. The coefficient for gasoline, aside from being statistically insignificant, also had the opposite sign.

(7) *Per capita GDP (in U.S dollars).* Lower-income countries may be especially concerned with the effects on lower-income households and hence less willing to see a full pass through of price increases. This was found to be the case.

(8) *The country as a net oil exporter.* Countries that are net exporters may feel particularly able to withstand the fiscal implications of a less-than-full pass through and face popular demands that some of the higher oil sales revenue be passed on to consumers in the form of lower product prices. This was found to be the case.

(9) *The country as an oil producer.* Countries that produce oil, even if they are not net exporters, may face stronger pressure to ensure that product prices do not rise as fast as crude prices. This was found to be the case.

(10) *Initial product price.* Where prices at the beginning of the period of analysis are already high, then governments may be less willing to see a high pass through of the international prices increases to consumers. The opposite was found, although the finding was statistically insignificant for gasoline. This may suggest that governments that have historically passed price increases to consumers and taxed fuels at relatively high rates have continued to do so.

Measures (1), (8), and (9) place different emphases on the extent to which a country exports or imports oil.

3.29 To examine whether pass through is correlated with combinations of factors (which are themselves inter-correlated) multiple regressions of the coefficient of pass through for gasoline and for diesel were carried out. A stepwise procedure was used: initially all the above variables were included in the regression. Next, from all insignificant variables, the least significant was removed and the equation was re-estimated. This procedure was iterated until all included variables were significant.

Table 3.5 Unsquared Correlations between Pass-Through Coefficients and Macroeconomic Variables[a]

Parameter	*Gasoline*	*Diesel*	*Expected sign*
Index of vulnerability	-0.26	-0.37	Negative
Terms of trade	0.19	0.28	Either
Overall surplus/GDP	-0.44	-0.41	Negative
Real GDP growth per capita	-0.03	-0.06	Negative
Implicit GDP deflator	0.11	0.23	Negative
Debt/GDP	-0.23	0.36	Positive
GDP per capita	-0.51	-0.48	Negative
Dummy variable for net oil exporter	-0.54	-0.51	Negative
Dummy variable for oil producer	-0.46	-0.43	Negative
Initial price level	0.22	0.34	Negative

Source: Authors' calculations.
[a] For a one-sided test a correlation of ±0.24 is just significant using a 5 percent test value.

3.30 For the coefficient of pass through for gasoline, the only significant variable that remained was whether or not the country was a net exporter of oil (with a squared correlation of 37 percent). The average pass through for this group of countries was 80 percent less than that for the non-oil exporters. For diesel the significant variables in the final regression were the status of the country as an oil exporter, the terms of trade, and the debt to GDP ratio. For the group of oil exporters the average pass through was 50 percent less than for the non-oil exporters (at the same terms of trade and debt ratio). For each 1 percentage point increase in the debt to GDP ratio the pass-though was 0.3 percentage points higher, and for each 1 percentage point increase in the terms of trade the pass through was 0.9 percentage point higher. The squared correlation for the diesel regression was 51 percent. Interestingly, the status of the country as an oil exporter dominated the other two measures of its relation to the export or import of oil; neither the vulnerability nor the status of the country as an oil producer was correlated with the pass-through coefficient for either gasoline or diesel in the final regressions. The detailed results can be found at the end of annex 4.

Government Responses

3.31 This section summarizes in a table format the key policy responses adopted in the 38 countries studied in this report since the beginning of 2004. Ten policy questions are considered for the purpose of summary tabulation, focusing mostly on policies specifically designed to address higher oil prices.

(1) For countries with deregulated prices or an automatic pricing formula that follows international prices, has the government suspended its pricing policy so as not to pass higher world prices fully to consumers at any time in 2004–06?

(2) Has the government lowered taxes or fees levied on petroleum products to lower increases in end-user prices at any time in 2004–06?

(3) Has the government financed fuel price subsidies explicitly from the budget at any time in 2004–06?

(4) Is there an oil price stabilization fund? If so, is it operating and being replenished, or has it been depleted and effectively not functioning? For countries that do not have a stabilization fund, did the country used to have one but abolish it some time in the past? Is the government proposing to establish one some time in the near future?

(5) Aside from suspending pricing policy, directly setting prices or price ceilings, or reducing taxes and fees, has the government used its influence in other ways in an attempt to lower end-user price increases at any time in 2004–06? Examples from the 38 countries include threatening to withdraw licenses for increasing prices, calling upon the public to boycott firms that raise prices, requiring that justification be provided for every price increase, and forcing the oil companies to absorb losses from under-pricing of fuels. For the purpose of this summary table, forcing traders to absorb losses is considered use of government influence, even in countries in which the government sets fuel prices.

(6) Have prices to certain consumers been set lower than for others for the same fuel at any time in 2004–06? Targeted consumers might include farmers, fishermen, public transport operators, power producers, and households. For the purpose of this question, if LPG sold in small cylinders is priced lower than that in larger cylinders on a unit weight basis, the price of LPG sold to households is considered to be discounted, even though this price discrimination is based on cylinder size and not consumer type.

(7) Have mandatory conservation measures been announced or implemented, or have financial incentives been given for improving energy efficiency? These include conservation requirements implemented by a government agency.

(8) Has the government introduced a cash transfer or any other compensation mechanism that targets the poor specifically in response to higher oil prices? Since social safety net schemes are common, only those programs explicitly linked to higher oil prices in government announcements are included. Subsidies that existed before the steep increase in the world oil price, such as subsidies given to public transport, are excluded, unless they were introduced in 2004–06.

(9) Has refined product or electricity rationing or shortage occurred in 2004–06?

(10) Has the government implemented or actively promoted switching to alternative sources of energy to reduce dependence on oil: natural gas, renewable energy (hydro, geothermal, solar, wind), biofuels, and coal to liquids?

3.32 Question (3) is not specific to fuel price increases but simply answers whether the budget has been used to lower fuel price increases at any time since the beginning of 2004. The stabilization fund in question (4) is specifically for smoothing prices over time and excludes freight equalization funds used to reduce regional price differences or to achieve pan-territorial pricing. Question (6) is not confined to instances of rising oil prices, but gives an indication of protection afforded to some consumers. Question (8) explicitly excludes subsidies that existed prior to the steep price increase in 2004–06. Such subsidy schemes may have responded to higher oil prices by increasing subsidies in 2004–06. It is difficult to establish the counter-factual, however—how much subsidies might have been increased if oil prices had not increased. For this reason, only new compensation schemes are considered. For question (9), shortages and rationing have occurred for reasons unrelated to higher oil prices, such as operational failures at refineries (Zambia), changes in tax collection (Kenya), and serious drought (East Africa). Nevertheless, higher oil prices have exacerbated the situation in many cases. Examples include not being able to afford diesel for emergency power generation, and price ceilings leading to products being diverted to the export market or lower refinery throughput, resulting in shortages and rationing. With respect to question (10), again, identifying the counter-factual was difficult. Only those instances in which the government explicitly stated that fuel switching was promoted to reduce dependence on oil are cited. Coal was not included among alternative fuels—except when used in coal to liquids, an expensive technology commercially used only in South Africa today and that is viable only at high oil prices—because the counter-factual is difficult to estimate in countries that are already using coal, and especially among such large coal producers as China and India.

3.33 Table 3.6 summarizes the findings. The countries are classified into non-oil producers, oil producers that are net oil importers, and net oil exporters.

Table 3.6 Responses to Higher Oil Prices in 2004–06

Category/country	*(1) Suspended market-based pricing policy*	*(2) Taxes adjusted to smooth prices*	*(3) Fuel price subsidies financed from budget*	*(4) Stabilization fund (Operating, Depleted, Suspended, Proposed)*	*(5) Government influence used to lower prices*	*(6) Lower prices to certain classes of consumers*	*(7) Mandatory conservation measures or financial incentives announced or implemented*	*(8) Cash transfer or other measures to compensate for higher fuel prices*	*(9) Oil product or electricity rationing or shortage*	*(10) Alternative fuels (natural Gas, Renewable power, Biofuels, Coal to liquids) implemented or proposed*
Non-oil producers										
Cambodia	N	Y	N	N	N	N	Y	N	N	N
Ethiopia	—	Y	N	D	N	N	N	N	Y	B

Category/country	*(1) Suspended market-based pricing policy*	*(2) Taxes adjusted to smooth prices*	*(3) Fuel price subsidies financed from budget*	*(4) Stabilization fund (Operating, Depleted, Suspended, Proposed)*	*(5) Government influence used to lower prices*	*(6) Lower prices to certain classes of consumers*	*(7) Mandatory conservation measures or financial incentives announced or implemented*	*(8) Cash transfer or other measures to compensate for higher fuel prices*	*(9) Oil product or electricity rationing or shortage*	*(10) Alternative fuels (natural Gas, Renewable power, Biofuels, Coal to liquids) implemented or proposed*
Honduras	Y	N	Y	N	N	N	Y	Y	N	B
Kenya	N	Y	N	N	Y	N	N	N	Y	B
Lao PDR	N	Y	N	N	N	N	N	N	N	N
Madagascar	N	N	N	N	N	N	N	N	Y	B
Malawi	Y	N	N	O	N	N	N	N	Y	B
Morocco	Y	N	Y	OD	N	Y	N	N	N	N
Mozambique	Y	Y	N	N	N	N	N	N	Y	B
Nicaragua	N	N	N	N	N	Y	Y	N	Y	R
Rwanda	—	Y	N	N	Y	Y	N	N	Y	G
Senegal	—	N	Y	P	N	Y	N	N	Y	N
Sri Lanka	Y	Y	Y	N	Y	N	N	N	N	N
Tanzania	N	Y	N	N	N	N	N	N	Y	GB
Uganda	N	Y[a]	N	N	N	Y[a]	Y	N	Y	RB
Zambia	N	Y	N	P	N	N	N	N	Y	B
Net oil importers										
Bangladesh	—	Y	N	N	N	N	Y	N	Y	G
Brazil	N	N	N	N	Y	N	N	N	N	GB
Chile	Y	N	Y	O	N	N	N	Y	N	NB
China	Y	N	Y	N	Y	N	Y	Y	Y	RBC
Ghana	Y	N	Y	N	N	N	N	Y	Y	N
Guatemala	N	N	N	N	N	N	N	N	N	RB
India	Y	Y	Y	S	Y	Y	N	N	Y	B
Indonesia	—	N	Y	N	Y	Y	Y	Y	Y	GBC
Kyrgyz Republic	N	Y	N	N	N	N	N	N	Y	N
Pakistan	Y	Y	Y	N	Y	N	N	N	Y	GB
Philippines	N	Y	N	S	Y	Y	Y	N	N	GRB

Category/country	*(1) Suspended market-based pricing policy*	*(2) Taxes adjusted to smooth prices*	*(3) Fuel price subsidies financed from budget*	*(4) Stabilization fund (Operating, Depleted, Suspended, Proposed)*	*(5) Government influence used to lower prices*	*(6) Lower prices to certain classes of consumers*	*(7) Mandatory conservation measures or financial incentives announced or implemented*	*(8) Cash transfer or other measures to compensate for higher fuel prices*	*(9) Oil product or electricity rationing or shortage*	*(10) Alternative fuels (natural Gas, Renewable power, Biofuels, Coal to liquids) implemented or proposed*
Thailand	Y	Y	N	O	Y	Y	Y	Y	Y	GB
Tunisia	—	N	Y	N	N	Y	Y	N	N	GR
Net oil exporters										
Argentina	Y	Y	Y	N	Y	Y	N	N	Y	NB
Cameroon	Y	Y	Y	O	N	N	N	N	Y	N
Egypt	—	N	Y	N	N	Y	N	N	N	G
Kazakhstan	—	N	Y	N	Y	Y	N	N	Y	N
Malaysia	—	Y	Y	N	N	Y	Y	N	Y	GB
Mexico	—	Y	Y	N	N	Y	N	N	N	B
Nigeria	Y	Y	Y	O	N	N	N	N	Y	B
Venezuela	—	Y	Y	N	N	Y	N	N	Y	GB
Vietnam	—	Y	Y	N	N	Y	Y	Y	Y	N

— Not applicable (has not had market-based pricing), N no, Y yes.
[a] Tax on diesel for power generation was lowered.

3.34 Of the 38 countries, 14 have suspended market-based pricing (for some, if not all, fuels) to avoid full pass through of price increases. More than one-half (23 out of 38) have reduced taxes to lower end-user prices. The percentage of those that have resorted to tax reduction is disproportionately high among net oil exporters, almost 80 percent. Half the governments have financed fuel subsidies from the budget, and the tendency to do so increases with increasing contribution of domestic oil to meeting domestic demand. Among net oil exporters, all have used the budget to subsidize fuel prices. Only five countries have effectively functioning price stabilization funds, one of which has just been launched (Nigeria).

3.35 About one-third of the governments have tried to influence end-user prices, over and above reducing taxes, setting prices directly, or setting price ceilings. Among the 12 that did, methods employed are described briefly below.

- *Kenya* The government has repeatedly told oil companies to keep prices low, raised questions about "excessive" price increases, and launched an investigation into price collusion,
- *Rwanda* The government has effectively instructed traders to absorb losses to keep prices low.
- *Sri Lanka* Prices have been kept low, forcing Lanka Indian Oil Corporation (IOC), the first foreign operator to enter the downstream market in 2003, to absorb losses temporarily. The long delays in reimbursing Lanka IOC resulted in Lanka IOC announcing a loss of US$70 million in the fiscal year ending in March 2006. The company in May 2006 stated that it would not replenish its stocks unless the Sri Lankan government moved to settle a disputed subsidy claim of US$72 million.
- *Brazil* The government has influenced the pricing policy of Petrobras through its control of the firm's board of directors.
- *China* Refineries are forced to absorb large losses, although the government made a one-off payment of US$1.2 billion in December 2005 to Sinopec to offset some of the losses. Recent increases in LPG prices prompted the central government to issue a circular requiring regional governments to set up intervention mechanisms to prevent sudden price surges. Tax rebates for petroleum product exports were withdrawn in 2005 and again in 2006 to discourage refined product exports, which would increase domestic supply and help keep prices lower.
- *India* The four state-owned downstream companies have absorbed large losses on account of price subsidies, mainly for kerosene and LPG. The "under-recoveries" by the state-owned oil marketing companies, calculated on the basis of import-parity pricing, were US$8.9 billion in the fiscal year ending on March 31, 2006.[7] The upstream state-owned companies were required to contribute US$3.2 billion to cover a portion of this shortfall. In contrast, the portion of the total subsidy directly financed out of the budget was less than US$0.8 billion.
- *Indonesia* Through its control of Pertamina, the government has influenced prices of LPG for households, which is an uncontrolled fuel.
- *Pakistan* The government uses moral suasion to keep LPG prices low, encouraging domestic LPG producers to set prices in the neighborhood of $300 per tonne, which is less than half the international price that prevailed in the region in February 2006.
- *Philippines* The government has forged an agreement with oil companies to offer diesel price discounts to public transport companies. There has been an official investigation into price collusion. Oil

[7] The actual under-recoveries would be lower because of refinery discounts given.

companies are required to provide justification for each price increase and to demonstrate reasonableness of the timing and magnitude. The government has called upon oil companies to keep prices down.

- *Thailand* The government, through its majority share in PTT, has urged the state-owned petroleum firm—which acts as a price-setter—to hold down fuel prices. In 2006, PTT has stated that its margin is negative. In May 2006, the government negotiated an agreement with several oil marketers to offer a price discount of about US$0.026 per liter to public transport companies.
- *Argentina* The government has forged an agreement with oil companies to sell crude at prices below world market prices to refineries. The government has called upon consumers to boycott retailers that increase prices. The government has steadily increased export taxes to keep domestic prices low, including 45 percent export tax on crude at present, and has forced downstream companies with no upstream operations to absorb financial losses.
- *Kazakhstan* Steps taken to increase supply on the domestic market—export bans, export quotas, and government orders for fuel delivery to different regions—keep domestic prices low. The government has forged agreements with oil companies to stabilize prices and keep them low.

3.36 About 45 percent of the countries have price discrimination based on consumer categories. Among net exporters, four-fifths have offered price discounts to certain consumer classes. Mandatory conservation measures have been implemented or announced in one-third of the countries. Not surprisingly, the lowest percentage was among net oil exporters (22 percent implemented or announced conservation measures), but somewhat surprisingly, the percentage was not much higher among non-oil producers (25 percent).

3.37 Compensation mechanisms set up specifically in response to recent oil price surges were not all that common. Indonesia, Chile, and China (in early 2006 in some provinces for offsetting LPG price rises) have introduced cash transfer schemes. Another four set up other types of compensation schemes. A series of measures were announced at the time of the price increase in February 2005 in Ghana and when the diesel subsidy was ended in Thailand; electricity subsidies were given to households consuming less than 150 kWh a month and later expanded to 300 kWh a month in Honduras; soft credit was given to the fishing industry in Vietnam.

3.38 Petroleum product and electricity shortages have been common, occurring in two-thirds of the countries. Ironically, those most likely to experience energy shortages are net oil exporters, highlighting a large indirect cost of fuel price subsidies. In more than 60 percent of the countries that have experienced shortages, the government has suspended market-based pricing, financed price subsidies from the budget, or both.

3.39 About three quarters of the governments are promoting fuel switching to alternative fuels or are proposing to do so. Twenty-three countries are engaged in, or planning to start, biofuel production. Somewhat unexpectedly, these include more than

one-half of net oil exporters. Of these, Malaysia and Mexico are targeting primarily the export market.

3.40 Another important policy dimension concerns information campaigns to explain to the public why prices are increasing and, where applicable, why subsidies are being reduced. Information in this area was difficult to gather, but this report identified several countries where efforts have been made. Ghana used an effective information campaign at the time of subsidy removal in February 2005, as did Indonesia for the October 2005 price increase. The government of the Philippines, in part through its energy conservation efforts, engages the public regularly in discussions on fuel price movements. The government of Malaysia has appointed a minister to be in charge of public information, but this campaign has not been as successful as the one in Ghana, underscoring the difficulties of persuading the public of the need to reduce subsidies in a net oil exporting country.

Observations from Country Experience

3.41 The above table is by no means comprehensive and there are other policies and events that have affected consumer prices and the balance between supply and demand. This section notes observations from country experience, commenting on both the findings in Table 3.6 and other points raised in annexes 1–3, and citing events that offer insights and useful lessons.

Price-based policies

3.42 Generally, price-based policies appear to be far more common than other policies. The objective is two-fold: smooth oil price volatility and keep prices low. An initial assumption of the governments that suspended market-based pricing in early 2004 appears to have been that the price increase was temporary, and that, in a few months, the price of oil would begin to return to its historical average level of, say, US$20–25 per barrel. As an illustration, the government of Thailand introduced price ceilings on petroleum products in January 2004 for an initial period of two months, with the expectation that the price increase would be short lived and that the cost to the government would be at the most US$130 million. In practice, the subsidy on gasoline was continued until October 2004 and that on diesel until February 2005. By the time the subsidies were removed, the total subsidy bill had amounted to US$2.2 billion. The subsidy was not financed out of the government budget but accrued as a deficit to the State Oil Fund, an oil price stabilization fund. The government is currently charging extra levies on fuels—amouting to as much as US$0.066 per liter for premium gasoline—to reduce the Oil Fund's deficit. In other countries that have historically subsidized fuels, the subsidy bill has grown rapidly. In Egypt, the cost of the subsidy on petroleum products during the fiscal year ending in June 2006 was revised upward in February 2006 to US$7.1 billion; in Indonesia the cost borne by the government budget in calendar 2005 was US$9.9 billion. The perception of what would be the long-term average oil price might have changed since the beginning of 2004, but each episode of a price fall lasting two months or more has been accompanied by renewed optimism about prices finally falling back, albeit to a revised and higher level.

3.43 Subsidizing prices entails a transfer of funds. Direct payments are the most transparent and, generally, an efficient way of transferring resources. Politically, however, it is usually easier to transfer resources if an actual exchange of money is not involved. As a result, tax expenditures (where effective tax rates are lowered), administered pricing, and restrictive trade policies tend to be adopted more readily than subsidies financed directly out of the state budget. Hence, it is perhaps surprising that the number of governments that have used the budget to finance price subsidies is nearly as large as that reducing taxes; this in turn may indicate the level of pressure that governments have felt they were under against the backdrop of large and rapidly rising oil prices. Among those that have not subsidized are those whose fiscal position did not leave much room for maneuver, the Philippines being one example.

3.44 Fuel tax reductions have important revenue implications, especially in low-income countries where taxes on petroleum products are a critical source of government revenue. The reason is that taxing fuel is one of the easiest ways to raise revenue: collecting fuel taxes is relatively straightforward, and the consumption of fuels as a group is relatively price inelastic and income elastic, ensuring buoyant revenue as income rises and tax rates are increased (Bacon 2001). Gasoline taxes are also progressive in that gasoline consumption is greatest among high-income groups. When fuel taxes are reduced or waived, other social priorities may have to be dropped. While gasoline tax reduction is rare, ethanol tax reduction or waiver is nearly universal, amounting to as much as US$0.60 per liter (or US$0.75 per liter of gasoline equivalent) in Thailand. Because ethanol is a gasoline substitute and the incidence of the tax now reduced falls primarily on the rich, there is an effective welfare transfer from the society at large to the rich.

3.45 Few countries have successfully used an oil price stabilization fund, in part because no fund could have been expected to sustain the magnitude of the price increase in the last two and a half years. Recent as well as earlier experience has provided few examples of funds that have been successful (Federico and others 2003). Most have had to be abandoned or refinanced when they ran out of money. Chile in 2005 launched a second price stabilization fund for gasoline, kerosene, and diesel: it is time-bound with an initial endowment from the rents of the high copper prices between January and August 2005. This fund was used for the first time at the end of March 2006 to subsidize fuel prices as international fuel prices soared. Earlier, when U.S. Gulf prices soared right after Hurricane Katrina, the government intervened to cap domestic fuel prices. It is worth noting that the fuel price subsidies in Chile have been small and temporary. The government could have subsidized more, given the quadrupling of the price of copper, its main export, in three years and a near-doubling in the first five months of 2006. Instead, the government is continuing to keep the strict fiscal rules that have been in place since 2000 and proposes to save much of the windfall. The government's prudent fiscal stance helps insure that the fuel price subsidy policy is sustainable and correct price signals are sent to consumers for the most part.

3.46 Among the markets where fuel prices are not completely deregulated, the frequency of price adjustments has been debated. The government of the Philippines has urged oil companies to implement frequent and small price changes, whereas Nigeria has opted for one price adjustment a year. Some change prices on a weekly or fortnightly basis.

Malawi, Mozambique, and some other countries change prices when domestic prices based on international prices change by more than a certain percentage, typically 3 to 5 percent. Infrequent price adjustments run the same risks as price stabilization funds: it may be difficult to offset periods of higher-than-average prices with periods of lower-than-average prices. And when adjustments are finally made, they may have to be very large, as would have been the case if one price adjustment a year had been adopted beginning in 2003.

Policies and events that can increase prices

3.47 Supply disruptions and tightness in the market, difficult under all circumstances, have become even more damaging in recent years, because supply shortages make already high fuel prices even higher. Ironically, price subsidies can cause serious fuel shortages and, in extreme cases, increase the prices charged to some end users above what they might have paid in the absence of the subsidy. Large subsidies increase apparent demand—one potentially important contributing factor being out-smuggling, or simply motorists from neighboring countries crossing the border to refuel legally as in Argentina and Malaysia, both of which are considering charging border-crossing fees to vehicles with foreign license plates—and reduce supply at official prices because suppliers typically do not make market-based profits. Even in those countries where the government has pledged to reimburse suppliers fully for the subsidy, long delays in reimbursement are common (Morocco, Senegal, and Sri Lanka being three examples), effectively forcing fuel suppliers to suffer financial losses. Where governments have decided not to reimburse and financial losses are allowed to continue, supply could eventually fall. Holding down prices at the expense of oil marketers has led to fuel shortages and rationing even in such formerly liberalized markets as Thailand. In India, providers of subsidized LPG stopped taking on new customers in 2005 for a period. Serious fuel shortages have also been experienced in China. Policies to boost supply under these circumstances include export bans, export taxes, and suspension of export incentives; Argentina, China, and Kazakhstan have adopted these policies to reduce or stop fuel exports and divert fuels to the domestic market. Fearing that sporadic rationing could threaten agriculture, the government of Argentina in December 2005 issued a resolution, warning refiners not to ration the sale of diesel to contract-holding filling stations.

3.48 If demand far outstrips supply, then black marketing emerges as a lucrative business, and consumers can either queue for hours to get a limited supply of the subsidized fuel at the official price, or pay much more in exchange for immediate purchase. Both Kazakhstan and Nigeria, major oil exporters, have suffered from repeated fuel shortages and product price spikes. In May 2006 in Nigeria, where the government controls and subsidizes the prices of gasoline and kerosene, gasoline was selling for anywhere from 65 naira (US$0.51) a liter to 150 naira (US$1.17), and kerosene from 50 naira (US$0.39) to 150 naira. The majority of the poor in developing countries live in rural areas, and it is the rural poor who inevitably end up paying higher, black-market prices. In these extreme cases, fuel price subsidies could even become anti-poor in effect.

3.49 Refinery protection is common in the countries surveyed, but any protection is likely to raise price levels. Cameroon, India, Kenya, Morocco, and Pakistan have policies that are intended primarily to protect domestic refineries: import-parity pricing for products

that are exported, requiring fuel marketers to buy from domestic refineries, and customs duties on petroleum product imports. In India, a government commission reported that differential customs duties offered an effective rate of protection to domestic refineries of as high as 40 percent (Committee on Pricing and Taxation of Petroleum Products 2006). In Morocco, fuel imports are allowed only if the domestic refineries cannot meet full demand. In Kenya, fuel marketers are required to process 1.6 million tonnes of crude, or approximately 70 percent of local consumption, at the domestic refinery. Analysts estimate that domestic refining, by virtue of its inefficiency, could be adding an extra US$0.01–0.04 a liter compared to imports (*The Nation* 2004a).

3.50 Zambia and Uganda illustrate the particular difficulties faced by landlocked countries in handling fuel shortages. Zambia has one refinery, and it has been subject to frequent unscheduled maintenance and repair, leading to serious fuel shortages, black-marketing, and several episodes where actual retail prices were well above the recommended prices. The fuel crisis in September–November 2005 was particularly damaging to the economy. The refinery initially shut down for routine maintenance—the fourth shut-down of the year—but problems discovered during the maintenance forced the refinery to remain closed longer than planned, causing a serious fuel shortage. The refinery did not resume operation until mid-October, by which time illicit dealers in the Northwestern Province were reportedly selling gasoline at prices two and a half times that in the capital (Xinhua News Agency 2005i). A month later, the refinery suffered a serious fire, again forcing closure. The copper mines, a significant foreign exchange earner and the largest employer in the country, paid a high price for the fuel shortage. A shortage of rail tankers exacerbated the situation. The country's largest copper producer not only paid much more for imported fuel but was forced to halve production at its Nkata smelter, while the country's second largest copper producer had to close its Mufulira smelter for almost four weeks.

3.51 Government attempts to enforce tax collection—metering fuels that are imported (Tanzania), collecting taxes upfront (Kenya), testing all fuels for quality at the point of entry into the country to check adulteration or mislabeling (Tanzania)—have caused supply disruptions, suggesting that the cost of regulation can be high. Because Kenya and Tanzania export refined products to neighboring countries, several other African countries have been affected. An example is Uganda, which imports fuel from Kenya. To tackle tax evasion, the government of Kenya in August 2005 changed its excise tax collection mechanism, requiring taxes to be collected at entry at the Kenya Petroleum Refinery and the Kenya Pipeline Company import depot. Previously taxes were not paid until products were taken out for sale (within one month of accepting deliveries). Exporters did not have to pay taxes on the products destined for export, leading to illegal dumping of such products on the domestic market. The new excise tax collection policy, together with the introduction of a new computerized clearing system, exacerbated supply shortages and disruptions markedly throughout the region supplied by Kenya, raising prices. In Tanzania, installation of 14 meters at the port in Dar es Salaam in July 2004—to measure fuel imports and eliminate under-declaration of volumes—led to massive and costly congestion at the oil jetty.

3.52 The primary objective of the policies adopted in Kenya and Tanzania was to clamp down on commercial malpractice and tax evasion. Indeed, current indications in Kenya are that the new tax collection system has substantially curtailed illdgal dumping on the domestic market of untaxed fuels destined for export (*The Nation* 2006d). These policies should bring about important long-term benefits—creation of a more level playing field for fuel marketers, leading to healthy and fair competition and lower prices, and higher government revenues that can be used to build human and physical capital to the benefit of the economy. The events in Kenya and Tanzania and their neighboring countries nevertheless illustrate the complexity of the consequences of different policies in the downstream petroleum sector and their interlinkages. And if enforcement measures to stop in-smuggling of fuel and tax evasion are successful, then domestic fuel prices will rise in the near term, although the long-term benefits will far outweigh any short-term losses.

3.53 Freight equalization involves extra calculations which are never precise, and usually result in higher average prices. If a government is concerned about high costs of supply to remote areas, it might be more cost-effective for the economy if the government addressed this issue directly than try to equalize prices throughout the country. For example, the government could consider "negative concessions" whereby firms bid for a subsidy to supply remote areas.

Compensation and subsidy delivery schemes

3.54 The experience with cash transfers is particularly important because these could be the most effective way of compensating lower-income groups for the hardships caused by the large and sudden increase in oil prices. Chile and Indonesia introduced cash subsidies targeted to low-income households. Cash transfer can help governments move away from universal price subsidies, which are known to have large leakage, to assistance targeted to the poor.

3.55 The government of Indonesia raised fuel prices by 29 percent in March 2005 and by another 114 percent in October. In preparation for the major price increase in October, the government in August 2006 decided to rapidly roll out a cash transfer scheme. The program was initially for 15.5 million poor and near-poor households in Indonesia (some 28 percent of the national population and in excess of the poverty rate of 16 percent). The size of the transfer was about US$30 per household every three months, to be continued for one year in four payments. The speed at which the program had to be put in place—the cash transfer began in October 2005—inevitably meant that there would be some implementation problems. There were numerous media reports about problems with initial implementation, including cases of mistargeting, leakage, and lack of crowd control at cash disbursement points. The Central Bureau of Statistics stated in February 2006 that the process of identifying eligible beneficiaries was becoming increasingly difficult with time: at the beginning, households being assessed were not fully aware of the benefits of being qualified, but by February 2006, people knew and put pressure on the bureau officials to declare them eligible (*Antara* 2006).

3.56 Overall, however, considering the amount of time available to the government, the program performed well. Out of the original 15.5 million cards, about 600,000 cards were withdrawn on the basis of verification conducted in late 2005. Of the

12 million new applications, 4.3 million households have been found eligible. As a result, the total number of beneficiaries has increased to 19.2 million for the second tranche. The government responded quickly to reports of irregularities and commissioned an early assessment of problems with the first tranche disbursement. The assessment pointed to overall satisfactory results: regional targeting and transfer of funds worked on time and beneficiaries expressed satisfaction with the program. For poor recipients, the cash transfer more than compensates the losses incurred as a result of the fuel price increase. Even under assumptions of moderate mistargeting—with cash benefits randomly distributed to the bottom 40 percent instead of the targeted bottom 28 percent—the program is anticipated to prevent an increase in the poverty rate due to the fuel price increase. There were additional savings as a result of shifting away from universal price subsidies to targeted cash transfer. These savings were redirected to pro-poor programs in education, rural development, and healthcare. Thanks to all these measures, in a country marked by a history of violent protests against fuel price increases, the very large price increase in October 2005 passed without major public protest.

3.57 In Chile, the government announced one-off cash transfer in 2005 and 2006. In 2005, poor households were given US$28 to compensate for higher fuel prices, and 1.4 million households consuming less than 150 kilowatt-hours of electricity a month were also provided with extra cash compensation. In 2006, another round of cash transfer was announced, US$35 to 1.25 million families living on less than $350 per month. Certain provinces in China in early 2006 for a limited period provided poor residents sums between $1.24 and $2.48 a month to offset the rising costs of LPG.

3.58 In China, the government is increasingly shifting away from fuel price subsidies to targeted subsidies. In April 2006, the government announced that grain farmers would receive more than US$3.3 billion in direct subsidies for diesel fuel, fertilizer, and pesticides. By June, the finance ministry said that the government had paid out more than US$1 billion in subsidies to offset the higher fuel prices to the fisheries, forestry, and urban and rural public transport. Taxis in some cities also receive subsidies in the form of cash compensation.

3.59 An interesting recent development is use of smart cards to deliver subsidized fuels to certain consumers. To contain the subsidy bill, Malaysia in 2006 launched a smart card scheme for two consumer categories: public transport operators and fishermen. This follows the failure of a previous attempt in January 2005 to contain the subsidy by placing a limit on diesel fuel supplies to filling stations based on 2003 sales. That quota system led to diesel fuel shortages and a quarter of the filling stations reportedly running out of diesel fuel. Under the smart card system, subsidized fuels are rationed with the monthly quota based on the vehicle category or boat size. The quotas appear to be generous for vehicles, perhaps in part because the subsidy—US$0.04 per liter—is not large, although the aggregate cost to the government could still be large. A monthly allocation of 720 liters for taxis would translate to annual distance traveled of more than 100,000 kilometers (km) even if fuel economy were as low as 12 km a liter, and 130,000 km at 15 km a liter. Given these generous allocations, one option for reducing the subsidy bill is to lower the monthly allocation gradually. Because targeted fuel price subsidies are very

difficult to implement efficiently, the smart card system in Malaysia merits close examination in the coming months.

Supply considerations

3.60 Faced with higher oil prices, some governments have looked for ways to reduce the cost of supply. Many governments have tried to negotiate price discounts or concessionary financing terms with major oil producers. In March 2006, it was reported that the governments of Kuwait and the United Arab Emirates had agreed to sell oil under concessional terms to Bangladesh (Asia Pulse 2006e, Xinhua News Agency 2006f). By far the most extensive and widely reported concessionary schemes are the series of petroleum purchase arrangements between the government of Venezuela and various countries in Latin America and the Caribbean, the largest agreement of which is the PetroCaribe accord. These government-to-government agreements are only now beginning to be implemented and there are still logistical problems to be addressed before the programs can be assessed.

3.61 Bulk purchase appears to be gaining increasing popularity. Honduras is the most recent country to announce a government-supervised bulk purchase scheme. Whether governments can achieve lower prices more efficiently in this way than the private sector remains to be seen. In Kenya, some analysts have argued that the Open Tender System, started in January 2004 and under which crude is purchased by a single company on the basis of a public tender, has increased, rather than decreased, import costs because of the way it is designed (*All Africa* 2005a, *The Standard* 2004).

3.62 No country in this study has used strategic reserves to lower price volatility in times of supply disruptions, in part because most countries did not have significant strategic reserves prior to 2004. Among those that are considering building reserves, recent high world oil prices have slowed down reserve build-up. Malaysia has even urged other governments not to build reserves, because doing so would add to overall global demand and exert upward pressure on prices. For countries that are dependent on one refinery that has a history of operational and other problems for the bulk of their demand, experience in Kenya and Zambia show that it would be wise to have sufficient commercial or strategic reserves to avoid supply disruptions. This applies equally to countries that import from the countries dependent on one domestic refinery.

3.63 In some countries, commercial malpractice extends to criminal attacks on oil infrastructure for theft. Attacks on the pipeline in Kenya illustrate this problem. Stealing oil from pipelines has caused serious supply disruptions in Kenya and Nigeria. Higer oil prices make such criminal attacks all the more profitable, exacerbating the problem.

3.64 If fuel supply is declining because a portion of the subsidies is borne by refiners and marketers and they cannot sustain increasing financial losses, then raising prices may remove or at least reduce supply constraints. Total demand following the price increase will consist of two opposing trends: a fall in consumption as a result of nonzero elasticity of demand with respect to price, and a rise in consumption because there is now greater supply to meet pent-up demand. The latter may more than offset the former, resulting in a net increase in consumption. Some analysts posit that this could happen in China.

3.65 High oil prices are creating new opportunities for the upstream sector in Africa and elsewhere. Philippine President Aroyo told the heads of other Southeast Asian countries that disputed Asian seas could become sources of energy if governments could join forces and agree to explore for oil together. A number of governments are increasing efforts to promote exploration in onshore and offshore fields, especially in Africa.

Reducing demand

3.66 The elements of many energy conservation programs could be applied in any country, but relatively few governments among non-oil producers have actively promoted efficiency improvement or demand management. This appears to be a lost opportunity, especially for those countries that have been hard hit by the oil price increases. Where these programs have been implemented, the most common approach has been to start with government ministries and agencies. A review of what some governments have done is informative.

3.67 The government of the Philippines ranks among the most active in promoting energy efficiency and saving programs. The government has introduced a number of measures to economize on the use of oil and to encourage fuel switching. In August 2004, the purchase of government cars was halted; air conditioning in government offices was switched off at 4 p.m.; lights were switched off during lunch breaks; unnecessary trips by government officials were suspended; and reduced use of elevators was advised. Ministries and government agencies were encouraged to undertake proper maintenance of vehicles (including correct tire inflation); and driving of government vehicles was reduced. Shopping malls and movie houses were asked to shorten their business hours. In April 2005, the government introduced a four-day working week for a two-month period, which substantially reduced the use of electricity. An administrative order signed in August 2005 directed all government offices to implement a mandatory 10 percent reduction in their fuel consumption. Government agencies and offices were prohibited from using vehicles, aircraft, and watercraft for purposes other than official business; the use of government vehicles was banned on Sundays and official holidays, or outside regular office hours; air-conditioning was banned during the cooler months; and monthly energy consumption reports had to be submitted. An Energy Audit Team was formed, tasked with carrying out random spot checks on government offices, universities, and state-owned corporations. Gas stations also agreed to limit their opening hours to a maximum of 20 hours a day, for an initial 6-month period. In October 2005 the Energy Audit team reported savings by the Office of the President of 23 percent in energy and 13 percent in fuel under the energy conservation initiative (Asia Pulse 2005c). These measures would not only reduce fuel and energy consumption by the government, but also send a strong signal to the public that everyone should do all that is possible to economize on fuel consumption. Although a number of factors influence fuel consumption and attribution is difficult, the overall result is impressive: consumption of petroleum products from January to November 2005 declined by 8 percent from the same period in 2004 (DOE 2006). Such a large reduction in the absence of a financial crisis—the economy grew 5.1 percent in 2005 (IMF 2006i)—is remarkable.

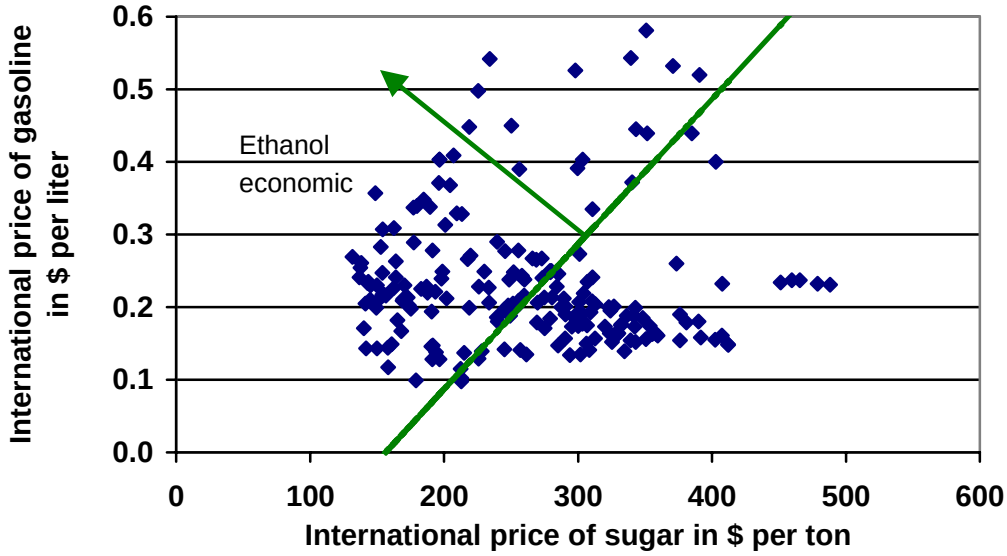
3.68 Guatemala, Honduras, and Tunisia have adopted daylight saving time in summer to reduce electricity consumption. The government of Honduras in April and May 2006 introduced several new measures to save fuel costs. The government changed fuel taxation to encourage fuel switching from gasoline with a research octane number of 95 to 87 and ordered the 60,000 state vehicles to use the cheapest fuel available and to circulate on alternate days depending on their license plates. In Vietnam, government agencies were ordered to reduce fuel purchase expenditures by 10 percent in 2005 and 2006. In Malaysia, increasing subsidy burden and depleting oil reserves have prompted the government to require all government agencies to target 10 percent savings in energy consumption in 2006. In May 2006, the cabinet in Thailand strengtehend energy-saving measures; these included permitting certain government officials to work from home, limiting overseas trips, suspending motorcades for the most part, and adding energy-saving measures as additional performance indicators for state agencies (Thai News Service 2006i). The government has also made a number of calls on the public to switch from motorized transport to bicycling. Tunisia requires the public sector to choose low-energy-consumption equipment and carry out annual energy audits. Several governments are providing tax incentives and publicity campaigns to promote purchase of energy-efficient appliances or imposing a ban on the import and marketing of inefficient appliances. The government of Indonesia, which has so far chosen not to raise fuel prices or fuel subsidies in 2006, is developing a plan to control demand for subsidized fuels by restricting use of transportation fuels and shifting households away from kerosene to LPG, which carries a smaller subsidy, for cooking.

Biofuels

3.69 Recent oil price increases have strengthened the resolve of the countries that had already launched or were seriously considering biofuel programs. As Figure 1.5 and Figure 1.6 show, however, biofuels remain expensive even at current world oil prices. The economics of potentially the cheapest biofuel today—ethanol from sugarcane—has been adversely affected by surging world sugar prices.

3.70 The most promising biofuel markets are those in landlocked, oil-importing countries. Consider a gasoline-importing, sugarcane-growing country where the cost of transporting sugar to the nearest port is $100 per tonne, and the cost of transporting gasoline to its border is $150 per tonne (US$0.1125 per liter). For a given price of sugar, there is a breakeven price of gasoline above which manufacturing ethanol for domestic production is more attractive than exporting sugar. This is shown in Figure 3.4 using historical world sugar and Northwest European premium unleaded gasoline prices, expressed in 2006 U.S. dollars, since January 1990 and assuming a fuel economy penalty for ethanol of 20 percent. About half of the historical data lie above the breakeven line. It is worth noting that, despite high oil prices, ethanol was not economic during February and March of 2006, when the European Union's November 2005 announcement on its sugar reform program, the news of low sugar production in Thailand, and other events exerted large upward pressure on world sugar prices.

Figure 3.4 Viability of Ethanol in Landlocked or Small Economies



Sources: World Bank calculations, premium unleaded gasoline in Northwest Europe from Energy Intelligence 2006, raw sugar cane prices from the International Sugar Agreement.
Notes: Opportunity costs of ethanol are calculated based on the following parameters used to calculate 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 30 percent of sugar prices, and the sucrose content of molasses is 55 percent of that of sugar. Gasoline prices are Northwest Europe monthly spot prices, barges, free on board for premium unleaded. Sugar prices are raw, free on board, and stowed at greater Caribbean ports.

3.71 Many of the points above the breakeven line lie below sugar prices of US$200 per tonne. For a given country, the cost of sugar production cannot be adjusted downward easily. Super-efficient producers, of which there are only three (Brazil, Australia, and Thailand), produced sugar at US$200 per tonne or less in 2005, but half of world sugar production occurs at a cost of US$400 per tonne or higher. For a landlocked country where the cost of sugar production is US$200 per tonne—it should be noted that no landlocked country has achieved such a low level of production cost—ethanol production would have been economic 44 percent of the time. If the data between January 2004 and June 2006 only are taken, the percentage increases to 93.

3.72 For a country where the cost of sugar production is US$250 per tonne, ethanol would have been economic 16 percent of the time. The percentage corresponding to the historical data since January 2004 is 80. At US$300 per tonne, the percentages fall to 10 percent since January 1990, and 53 percent since January 2004. At US$350 per tonne, ethanol production would have been economic 4 percent of the time since January 1990 and 23 percent since January 2004. While the results appear encouraging for low-cost producers (US$200 and US$250 per tonne) if the recent period of high oil prices is taken (2004–06), ethanol production would not have been economic during February and March of 2006. These numbers, together with forecasts of rising sugar prices with increasing trade

liberalization in the coming years, suggest that ethanol may not necessarily be economic even in landlocked oil-importing countries despite high world oil prices seen recently.

Winning public buy-in

3.73 Governments that decide to remove or reduce subsidies face several issues of implementation. The first is winning public acceptance. If managed poorly, there could be violent public protests, at their worst resulting in the deaths of protestors and the riot police. Information campaigns prior to announcements of subsidy reduction can be helpful but are challenging to mount successfully. Ghana and Indonesia provide useful lessons in this regard. It should be noted, however, that Malaysia, which has mounted a public information campaign similar to Ghana's (see annex 3), has been much less successful in winning public acceptance for subsidy phase-down, illustrating the challenges facing large oil exporters.

3.74 In his state-of-the-nation address in at the beginning of February 2005, President Kufuor of Ghana stated the government's commitment to proceed with petroleum sector deregulation. Acknowledging that the deregulation would accelerate inflation in the short term, the newly re-elected president stressed that the deregulation would free significant government resources for investment in other areas, most importantly in social priority areas. The government announced fuel price increases of 50 percent in mid-February 2005, coupled with an extensive public information campaign. This was helped considerably by prior preparation and studies carried out by the government. In 2004, when it became apparent that world oil prices were unlikely to come down markedly and the government was not in a position to maintain a policy of subsidizing petroleum products for a prolonged period of time, the government launched a poverty and social impact assessment (PSIA) for fuel. A steering committee was established, drawing stakeholders from various ministries, the national oil company, and academia. The PSIA was awarded through a competitive tender, and draft reports were reviewed by the steering committee at every stage. The PSIA was completed in less than a year. By the time the government announced the 50 percent price increases in February 2005, the government had the findings of the PSIA which helped them to argue their case for liberalizing fuel prices to the public—who were winners and losers, and who was benefiting most from the price subsidies (better-off members of society more than the poor). It also allowed the government to assess how other sectors would be affected, and to indicate what mitigation measures would be implemented.

3.75 The public relations campaign started with the Minister of Finance making a radio broadcast about the price increases and the need for them, and at the same time announcing various mitigation measures. This was followed by a series of interviews on the radio with various government officials, as well as with trade union officials. The Energy Ministry took out newspaper advertisements with charts showing that Ghana's fuel prices were the lowest in West Africa after Nigeria (*All Africa* 2005b). The mitigation measures were transparent and could easily be monitored by society. They included an immediate elimination of fees at government-run primary and junior-secondary schools, and a program to improve public transport. As a result, although the

trade unions remained opposed to the price increase, there was general public acceptance of the increases, and no large-scale demonstrations against the increases took place.

3.76 In Indonesia, the large price increase enacted in October 2005 was accompanied by a very active public information campaign to publicize the cash transfer scheme. Information was disseminated through announcements in newspapers, TV talk shows, notices in village announcement boards, and distribution of pamphlets and brochures with frequently asked questions. Key information was also printed on the back of the beneficiary card. This helped to ensure that as many eligible beneficiaries as possible were aware of the existence of the cash transfer scheme and how to claim and receive the benefit.

3.77 One difficulty in designing public information campaigns to prepare the public for large price increases is that any prior knowledge of imminent price increases could lead to hoarding, speculation, and fuel shortages. Some governments have had to clamp down on retail outlets displaying false "no fuel" signs, waiting for the price increase. A "surprise" price increase would circumvent this problem but could anger the public, as with the February 2006 price increase in Malaysia. More importantly, surprise price increases would not give sufficient opportunity to the public to understand the underlying reasons for price increases prior to their implementation.

3.78 A related issue is timing of price increases. It is easier to reduce price subsidies from a position of strength (for example, following strong election victories). By the same token, no government has reduced price subsidies before elections; governments hold off price increases until after elections, Ghana and Thailand being two examples. Other governments have chosen particular times to introduce price increases related to a reduced likelihood of popular opposition. In Indonesia the price increase in October 2005 coincided with the beginning of Ramadan, while in Morocco a price increase was introduced immediately after the harvest season, when the rural poor were more likely to have some income and when price increases would have much less impact on farmers.

3.79 Indonesia, perhaps more than any other country studied in this report, illustrates the extent to which the perceived credibility and legitimacy of the government contribute to winning public acceptance. In January 2003 the previous administration attempted to increase prices amidst a widespread dissatisfaction with the government and with the corruption and inefficiency that was perceived to permeate the political life and bureaucracy. The subsidy reduction was judged against the backdrop of other government decisions that appeared, to many, to favor powerful interests. The government decision in November 2002 to relieve five of the country's largest debtors from repayment obligations arising out of the 1997–98 financial crisis, although reversed after a public outcry, reinforced the view that the rich and the powerful continued to receive special treatment. Following large demonstrations against the fuel price increase in January 2003, the government was forced to roll back much of the diesel price increase. In contrast, despite more than a doubling of fuel prices (and a near tripling in the case of kerosene) in 2005, a poll conducted in December showed that the president's popularity rating had fallen only slightly, and that the president had won respect across the country for his integrity and for his performance in the areas of legal, security, and social welfare (see Box 1 in annex 2).

Consistent with the poll ratings, the price increase of October 2005 met with muted opposition. The legitimacy of the newly elected government, its rapid roll-out of the cash transfer scheme targeting the poor, its perceived ability to deliver social services, and the public information campaign undoubtedly all contributed to the public acceptance of the subsidy reduction.

4

Long-Term Policy Considerations

4.1 Chapter 3 and annexes 1–3 examine the responses of countries with varying fiscal positions, income levels, and oil resources to oil price increases since the beginning of 2004. Given the time frame under study, many responses are necessarily short run, or else it is too early to assess the effects of longer-term policies. This chapter appraises how governments may respond in the coming years in the light of uncertainties about future world oil prices.

4.2 For the purpose of this chapter, three future oil price scenarios—rising, falling, and remaining the same—are treated separately. The most challenging case, that of rising oil prices, is discussed first. Falling prices are treated briefly, followed by oil prices remaining at the current level.

4.3 Given the diverse circumstances in which developing countries find themselves—different income levels, budgetary situations, amounts spent on price subsidies, availability of indigenous petroleum resources, sources of electricity, and the impact of weather on hydropower, to mention a few—there is no simple or universal strategy for dealing with higher oil prices. In addition, no single policy step can be expected to meet multiple government objectives, such as minimizing the foreign exchange outflow for oil product purchase, controlling inflation, ensuring that higher energy prices do not damage the economy markedly, and protecting the poor from higher prices. A package of measures needs to be formulated, whereby each measure may make only a small contribution but their combined impact is measurable and helps the government and the public deal with higher oil prices effectively.

4.4 In considering how best to formulate an overall policy package appropriate for the many different situations found in developing countries, it is helpful to classify countries on the basis of the amount of fiscal support given to oil product prices. A first group of countries have avoided subsidizing oil products either directly or by reducing product taxes. A second group has either subsidized products directly or reduced product taxes. These different policy responses place the strain of the adjustment onto different parts of society. A policy of passing on the price increases places the burden immediately on users of oil products, while the costs of subsidizing users places the burden of the increased fiscal deficit on those who will be financing it, possibly through reduced government expenditure on other items. In both cases, the higher import price of oil is

likely to lead to a worsening of the balance of payments situations unless the demand for oil falls substantially, or the government deflates the economy through monetary and fiscal stringency.

Coping with a Further Oil Price Increase

4.5 As chapter 1 shows, following a decline during the last three months of 2005, world oil prices bounced back in 2006, frustrating the hopes of those who had believed that, having reached a peak in 2005, oil prices would slowly start to decline as markets returned to a more "usual" state of balance. The price trends in 2004 and 2005 serve to show that the oil market is currently very sensitive to actual or potential supply disruptions. The shut down of about 450,000 bpd of oil production in Nigeria during March 2006 due to civil unrest and the political sensitivities to Iran's nuclear program and its relation to Iranian oil supply have been major factors exerting upward pressure on the oil price. Further disruptions to world oil supply could come from other civil disturbances or from weather related incidents (as hurricane Katrina did in September 2005). Fears of the implications of a shortage of supply in the coming months have led to precautionary purchasing, driving up current and futures prices.

4.6 Faced with these developments, oil-importing countries need to plan for the possibility that the oil price may rise even higher. Policies of not planning for such an eventuality and instead waiting for the oil price to fall by a considerable amount to some "historical mean" could seriously exacerbate the problems of adjustment that would be forced on governments should prices indeed rise much further.

Sustainability of continuing price subsidies

4.7 For countries that have elected to subsidize products through a direct transfer to consumers or oil supplying firms, the fiscal costs would continue to escalate, unless the administered price is allowed to rise in line with international prices to make up for the growing price gap. The size of future oil price increases could potentially be large, and the costs of meeting these through deepening subsidies could involve a substantial further budgetary burden. Even in the case where the subsidy has been effected through a reduction in taxes on petroleum products, the loss in revenue from further tax reductions could be unsustainable. In the extreme case, once taxes have been completely eliminated, a direct subsidy would be required to hold the final retail product price increase below the increase of the international price.

4.8 The increased costs of subsidizing petroleum products will obviously depend on how high oil prices rise and over what period the increase lasts. The longer governments wait before embarking on a policy of reducing subsidies, the larger the adjustment and more difficult the adjustment process could become. Lessons on how to manage a reduction in subsidies can be drawn from those governments that have done so in recent years.

4.9 Delaying the implementation of a subsidy removal policy also runs the risk that the size of the adjustment would be so large that it becomes politically very controversial. A phased approach, in which the price adjustment takes place over several months in steps, may be necessary. A key issue is then the relative size of such steps.

Starting with too small steps runs the risk of policy fatigue after a number of adjustments have been made while still leaving domestic prices below the international equivalent.

Demand management and efficiency improvement

4.10 Several countries have introduced demand management and energy-efficiency improvement strategies, mostly exhortatory but some mandatory. At a minimum, they may be psychologically important in supporting other policies to reduce oil consumption, particularly where the government itself takes the lead in applying such policies. The Philippines is one such case, driven in part by a severe fiscal squeeze which has ruled out price subsidies or large tax reductions.

4.11 The evidence on the actual impact of these measures is thin, but probably small in the short run unless there is considerable inefficiency and waste of fuels in the economy. Longer-term policies that relate to the use of more energy-efficient appliances, vehicles, and plants through giving financial incentives or setting efficiency standards will steadily reduce the consumption of oil below where it would otherwise have been. These policies are typically felt only gradually because it takes years to turn over a vehicle fleet, appliances, boilers, and power plants. But because vehicles and other fuel-consuming hardware last many years or even decades, it is important that governments be pro-active now, even if such policies do not produce a large, immediate impact. Surprisingly few among non-oil producers appear to have made concerted efforts to promote these measures aggressively.

Fuel switching

4.12 As oil prices continue to rise, the potential attractiveness of alternative fuels will steadily increase. Examples include some renewables such as wind and solar, biofuels, gas to liquids, and coal to liquids. Where oil prices continue to rise and appear to be staying high for some period, encouraging fuel switching is likely to be one of the most powerful policies available to a government. Its effects may be felt only gradually due to the need to invest in new capital equipment by producers and, for some applications, by users.

4.13 In those countries where the retail price of petroleum products is held down by some form of subsidy, the market signals that would encourage substitution to other fuels would be weaker, and the switch might not be commercially viable. Policies towards the taxation of the different fuels are also important in providing signals for consumers to switch their preferences. It is important to ensure that alternative fuels are not taxed more heavily than the petroleum products they might replace.

4.14 In the power sector, for those countries that already use a substantial amount of fuel oil or diesel, several alternatives can be considered. Countries that are using diesel for generation could look at the possibilities of switching to fuel oil which is a lower-cost fuel as one option. Improving system reliability will also decrease the use of standby generators that use diesel and have a much lower efficiency than a conventional power station.

4.15 Depending on the hydrological conditions, investment in large and small-scale hydro is a particularly attractive option because of its beneficial impact on global

warming as well as providing a lower-cost source of supply. Unfortunately, some countries have recently faced severe droughts and even existing hydro plants are being forced to operate well below their design capacity.

4.16 Natural gas is an important alternative to oil. As chapter 1 shows, gas prices have been rising in tandem with world oil prices. For countries with plentiful indigenous natural gas, it is still an attractive alternative. Gas trade is expanding and costs of transport, gasification, and regasification are falling, partly compensating for rising wellhead prices. Even for gas-importing countries, natural gas serves to increase diversification of energy sources, potentially enhancing security of supply and lowering overall energy costs.

4.17 Some developing countries already use coal for part of their generation. Many Eastern European and Central Asian countries use substantial amounts of coal; and about a dozen countries in Africa use some coal. Once the facilities for coal use exist, further increases in the amount consumed are likely to occur, so that looking for opportunities to use improved coal-burning technologies to obtain better economic value and lower emissions could provide an important alternative to oil use. A few large coal-producing countries (including China, India, and Indonesia) are planning to increase their production in order to reduce their dependence on oil.

4.18 A major market for petroleum products is that for transportation fuels. CNG has been used for many years in some countries, most notably Argentina. Increasingly, governments are showing interest in biofuels. Higher oil prices could make biofuels commercially viable without sustained government support. This would depend on biofuel feedstock and byproduct price movements as well as future trends in production costs. Commercial production of biodiesel from jatropha and other non-agricultural vegetation growing on marginal land would delink biofuel production costs from agricultural product price movements but is very much in the early stages of development. Much more additional data would be needed concerning the logistics of planting and harvesting jatropha, factors affecting yield, and the economics of importing or manufacturing methanol to make biodiesel. As such, jatropha-based biodiesel may need to be viewed as a medium- to long-term solution.

Protecting the vulnerable

4.19 In countries where direct and indirect expenditures on petroleum products form a substantial fraction of the budget of lower income households, governments will likely face increasing pressure to find a way to shield such households from the full impacts of oil price increases. If long-run oil prices are to rise, the cumulative costs of any targeted subsidy will increase. The danger for governments is that the targeted subsidies will come to be seen as permanent. If such schemes are to be time bound, then governments should be making this transparent now and developing a re-entry strategy in which the level of such subsidies is phased down over time. Fixing the level of support in nominal terms without further increases, even as oil prices continue to rise, will lead to a slow reduction in the cost of the program in real terms depending on the rate of domestic inflation. However, in most countries the rate of inflation is sufficiently low so as to make this a very weak and slow adjustment mechanism.

4.20 To minimize the cost of such targeted support, governments need to choose schemes with the smallest leakage to higher-income groups, and also to define the support given to lower-income groups as a sustainable proportion of the extra costs they are bearing. This calls for detailed analysis of household expenditure data (if surveys are available) and the acceptance of a principle of limited support, rather than full compensation, even for the lowest-income groups. Where a "flat" compensation scheme is to be used (as with an equal cash transfer to all "poor" households), the size of the transfer has to be chosen to balance between giving too much to the lowest decile, and too little to the highest decile defined as "poor."

Responding to Lower Oil Prices

4.21 It is possible that world oil prices fall and remain lower than the current level on average for several years. It is unlikely that prices will return to the levels seen in 2003 and earlier. Prices in the neighborhood of US$40 a barrel would be low compared to prices in the neighborhood of US$60 seen in mid-2006, but would still lead to an increase in costs to consumers or to governments above that felt only two and a half years ago. This price increase would stimulate a small but steady downward adjustment in demand, but continuing economic growth (which is more likely at a lower price scenario) would probably increase net demand for oil and an increase in the trend of the cost of oil imports.

4.22 A decline in world oil prices would allow governments to move toward a removal of subsidies without an increase in domestic prices. Again, users need to be informed of the rationale for such a policy since they are likely to expect that domestic prices would reflect the fall in international prices. Such a policy could involve increasing excise taxes, where these had been previously reduced, once it became clear that the price fall was sustained. A phase-out of targeted subsidies, such as cash transfers, could also be undertaken at such a time, without consumers feeling that they had suffered a loss of welfare.

4.23 If oil prices fall back by a substantial amount, the immediate fiscal and welfare adjustments would be easier to sustain. Nevertheless, the lessons from this recent episode should reshape government and individual policies to the use of oil. Further periods of sustained price shocks are possible and even probable, and economies need to adjust to be in a position to face them at lower costs. Policies to encourage the diversification of fuel source away from oil take time to become effective, and a period of lower oil prices should be used to begin this process, rather than waiting for the next oil shock.

4.24 If oil prices do fall back somewhat, then the commercial incentives for introducing alternative fuels will be weakened. They would be less likely to be able to be produced, without a subsidy, at prices that would attract consumer interest. In particular, short of large cost reductions, the commercial viability of biofuels is uncertain in a lower-oil-price environment.

4.25 For countries that are facing possible supply disruptions, a particularly good time to start to accumulate strategic stocks would be once prices had fallen back by a reasonable amount. Since the interest cost of the purchase of the stocks needs to be

financed, there is a strong incentive to control this by judicious timing of purchases. Similar considerations apply to governments considering setting up stabilization funds to smooth out future price fluctuations. Putting resources aside to provide cover against future price rises would be best done once prices had moved substantially lower, when a levy on fuels could be introduced to provide the fund with some initial financing that could be accommodated without having to raise prices.

Long-Run Average Price at the Current Level

4.26 The last scenario this chapter considers is the one in which, averaged over the next few years or longer, world oil prices remain at the current level, establishing a new mean as it were. If oil prices remain in the neighborhood of US$60 a barrel, governments have to consider whether the policies that they adopted to cope with the initial surge in prices are sustainable. Where prices were fully passed on to consumers, and there has been no major reaction to these, then the policy of leaving it to the market should continue. If governments are able to continue or intensify their efforts to improve the efficiency of energy use and reduce oil consumption, this should help to maintain support for a full passing on of prices.

4.27 In the case where governments have subsidized final prices, either directly or through reduced taxation, the cumulative burdens of this policy need to be considered. The financing of these subsidies comes from either a reduction in government expenditure or an increase in government liabilities (possibly as a quasi-fiscal deficit of state-owned companies). The ability to continue these policies depends in part of the growth of the economy. Where the economy is growing rapidly and there are buoyant tax revenues from sources other than petroleum products, the ability to maintain an acceptable growth of public spending or of total public debt may not be much impaired. Also, the higher price of oil will enhance the contribution of oil revenues from the upstream in producing countries, and they will find it easier to bear the fiscal burden of fuel price subsidies.

4.28 For countries that are growing only slowly and have no buoyant source of revenue to compensate for the costs of supporting a policy of subsidization, the cumulative effects of this policy will become progressively more burdensome. A shift in policy to gradually reduce subsidies and to encourage fuel switching and energy efficiency improvement is likely to become increasingly necessary.

4.29 For those countries that have managed to force or persuade private sector companies to absorb some of the price increase, the accompanying reduction in their profit margins will start to lead firms to reconsider their business strategies, particularly if they believe that the government intends to continue with this policy approach. Even though companies with an upstream interest are benefiting from the higher international oil prices, the lower profit margins will lead to the country in question being less competitive with respect to oil production. This result could lead to a slowdown in investment in further exploration and development as in Argentina. This suggests that the government will gradually have to relax its policy of asking the business sector to bear the burden of price adjustment, and will have to switch towards a policy of passing on prices to end users.

Concluding Remarks

4.30 There are policy stances that would be beneficial under all price scenarios. Eliminating subsidies that benefit mostly the rich would increase government revenue, remove pricing distortions, and also reduce wasteful or nonessential use of energy. Tackling demand management would be particularly helpful. Some policy measures have primary objectives other than fuel demand management, but they can give sizeable collateral fuel saving benefits. They tend to have long "gestation" periods, but can derail demand management in the long run if poorly handled. There are many such examples in the transport sector where the primary objective may be reducing congestion or providing higher-quality public transport—elimination of publicly funded free car parking, traffic management, and bus sector reform are just a few examples. Governments should press for those policies that can bring about multiple benefits.

4.31 In countries where current prices contain some elements of subsidy, an important aspect of the government's overall strategy is to persuade the public that raising prices to market-clearing levels is a cost-effective way of handling higher oil prices in the long run. An energy audit of government activities, checking to see if all government-funded vehicles and trips are essential and eliminating those that are not, would not only help reduce fuel consumption by the government but might go a long way in winning public trust, especially in countries where the public may be critical of what they view as "extravagance" by high-level government officials.

4.32 In helping the poor, traditional fuel subsidies have been found to have large leakage, resulting in low cost-effectiveness. Household surveys have confirmed that the lowest-income groups often receive the smallest share of the benefits of the subsidies, even though their removal will have sizeable impact on them. Governments are well advised to strengthen the data base that can be used to accurately identify poor households and develop a delivery mechanism for income transfer and other types of compensation. Although there is little experience to date, smart cards may offer a better chance of reducing leakage and ensuring that government assistance reaches the intended beneficiaries.

4.33 Energy diversification will be an important strategy, especially if oil prices stay high. Governments should seek opportunities for fuel switching (into both renewables and non-renewables) where this is economic and can be supported without resorting to subsidies. Even if the price of oil falls back somewhat, in some countries opportunities will occur for fuel diversification that will strengthen the economy's ability to cope with the higher oil prices and also position it better to deal with any further oil shocks.

Annex 1

Non-Oil Producers

A1.1 This and the next two annexes review the response of representative developing countries to rising oil prices to date. Thirty-eight countries with large and small markets, liberalized and regulated downstream petroleum markets, market-based and subsidized prices, and varying income levels were studied. Individual country cases are not intended to provide an in-depth analysis but an overview of different circumstances, problems, and responses. The countries are categorized into non-oil producers, oil producers that are net oil importers, and oil producers that are net oil exporters.

A1.2 Virtually all the information has been drawn from publicly accessible documents. The level of detail that could be found varied widely from country to country and from topic to topic within the same country. This meant that some potentially important policy decisions have had to be given less attention than if all information was readily available. Attempts were made to cover events through May 2006, but given the rapidly evolving nature of the oil market and government policy responses, some important recent developments may have been missed.

A1.3 The country cases studies begin with a description of the extent to which the country is a net importer of oil and petroleum products, taking into account its own oil production (if any) and its domestic refinery capacity. The breakdown of demand by the various products is also provided. As a reference to the state of inflation in the country—which is one of the policy concerns driving some governments to adopt policies to keep domestic petroleum product prices down—a table is provided on the consumer price index (CPI) from 2001 to 2005.[8] Throughout this report, where prices are shown in U.S. dollars, the monthly average exchange rate prevailing at the time is used. If the monetary value in question spans several months (for example, annual fuel subsidy), the monthly average exchange rates are in turn averaged over the relevant period first before currency conversion.

A1.4 Each country case next describes the pricing regime, the approach to taxation and subsidies, and how the government exercises control over prices, if at all. Because the organization of the sector affects the way prices are determined, the

[8] CPI increases in this report are annual averages (over calendar years) rather than end-year, reflecting price changes throughout the year relative to the previous year.

ownership structure is described. Information of product prices during the period is given. Where LPG is important and information is available this market is also discussed.

A1.5 The three annexes provide material on changes in government policies to cope with higher oil prices, covering both price-based and quantity-based aspects. Where information is available on the forces that persuaded the government to take action, this is included, as well as major civil society reactions to the policies. Where applicable, the annexes discuss policies designed to reduce the impact of higher oil prices on users via the electricity, transport, and other downstream sectors. This is followed by a discussion of any policies to improve energy conservation, and to encourage the production and use of alternative fuels. Finally, the annexes briefly assesses the general policy response of each of the governments within the period covered.

A1.6 This annex describes the policy responses to higher oil prices of 16 countries that do not produce oil: Cambodia, Ethiopia, Honduras, Kenya, Lao People's Democratic Republic (PDR), Madagascar, Malawi, Morocco, Mozambique, Nicaragua, Rwanda, Senegal, Sri Lanka, Tanzania, Uganda, and Zambia. Of the 16, Kenya, Nicaragua, Senegal, Sri Lanka, Tanzania, and Zambia have one refinery each, and Morocco has two refineries.

Cambodia

A1.7 Cambodia currently imports all of its oil needs in the form of products, although there are hopes that it will soon be able to develop domestic crude oil production. According to government statistics, Cambodia imported about 800,000 tonnes of petroleum products in 2004. Extensive in-smuggling of fuels from neighboring countries makes precise determination of domestic consumption difficult. Diesel is the most important product, accounting for 55 percent of total imports by volume in 2002, while gasoline accounted for 17 percent, heavy fuel oil for 13 percent, kerosene for 7 percent, and LPG for 4 percent (Socheat 2005). Historical inflation rates in Cambodia are given in Table A1.1.

Table A1.1 Consumer Price Index Trend in Cambodia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	5.7	2.0	9.8	11.6	10.3

Source: IMF 2006i.

A1.8 There are 9 oil marketing companies, both national and international, with a total of about 360 retail outlets with approximately 200 located in Phnom Penh. Retail prices are not set by the government but are high, in part on account of high taxation. In addition to the high tax rates, it has been reported that the gross profit margin of US$0.13 a liter, when compared to that of US$0.04 in Thailand, may also be contributing to higher retail prices (IMF 2005a). Taxation on oil products is based on a reference price, and this reference price has been below the international market price since 2004, resulting in an effective lowering of the tax rate and giving some protection to consumers from the higher international prices (IMF 2004b). However, tax rates are still substantial and,

according to the Ministry of Finance, yield about 30 percent of total government revenue (Xinhua News Agency 2005e).

A1.9 Throughout the period from January 2004, gasoline and diesel prices steadily increased, while the differential between them remained fairly constant. By September 2005 the price of super gasoline in Phnom Penh reached US$0.92 a liter, which was very much greater than that in neighboring Vietnam, where the equivalent price was US$0.63 a liter (Reuters News 2005d). Typical retail prices in Phnom Penh in May 2006 are shown in Table A1.2. The LPG price shown in the table is for LPG sold in 15 kilogram (kg) cylinders. There are three cylinder sizes: 8, 15, and 40 kg.

Table A1.2 Typical Fuel Prices in Phnom Penh in May 2006

Units	*Regular gasoline*	*Super gasoline*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per kg
US$	0.98	1.01	0.77	0.867
Riels per liter	3,950	4,050	3,100	3,484

Source: Local information.

A1.10 The large differences between Cambodian and Vietnamese and between Cambodian and Thai prices have resulted in significant in-smuggling, thus robbing the Cambodian government of much needed revenue. The International Monetary Fund estimates that more than US$60 million of revenue was lost to smuggling in 2003 (IMF 2005a). The Ministry of Finance reported in September 2004 that 1.5 million liters of fuels were confiscated in 2003, and another 1.0 million liters during the first 8 months of 2004 (Xinhua News Agency 2005e). In one incident, customs officials reportedly caught smugglers bringing in more than 500,000 liters of gasoline from Thailand. Although the smugglers had to pay customs duty and a fine, the fuel was not confiscated (Agence France Presse 2005b). Boats from Vietnam travel as much as 20 kilometers (km) into Cambodia where they are met by pony carts that can transport as much as 300 kg of gasoline up to five times a night. Drivers are paid US$1 a load which is substantial compared to the average income. Smuggling of smaller parcels takes place by motorcycle and bicycle. Smugglers are becoming increasingly organized and violence is starting to appear (Reuters News 2005d). The government does not have the resources to effectively clamp down on smuggling, but removing the inducements to smuggle poses a challenge because of the government's great reliance on product taxes for revenue. Widening price differences in 2006 have reportedly increased smuggling activities (Vietnam News Brief Service 2006b).

A1.11 Petroleum products carry import duties, excise taxes, value added tax (VAT), and an additional tax introduced in 2002. Gasoline and diesel taxes constitute the bulk of petroleum tax revenue for the government. Taxes on kerosene and fuel oil are considerably lower. The total tax rate in 2004 was 85 percent of the market price for gasoline, 43 percent for diesel, 19 percent for kerosene, 8 percent for fuel oil, and 11 percent for LPG. Perhaps not surprisingly, officially recorded petroleum imports nearly doubled between 1994 and 2003 but gasoline imports declined 20 percent. This is

inconsistent with an annual average increase of 5 percent in passenger car population during the same period, and suggests that growing domestic demand for this most heavily taxed petroleum product has been met through increased smuggling (IMF 2004b).

A1.12 To reduce the impact of higher oil prices on the economy, the government has been pursuing two strategies. First, it is altering the fuel mix used in the power sector: in 2004, 96 percent of power generation was said to have used oil products (*Power in Asia* 2005). The government's policy is to shift from diesel to lower-cost heavy fuel oil for power generation. Second, it is actively promoting oil and gas exploration, which it hopes will lead to field development and commercial production in the next few years. In September 2005 the government announced that it would reduce by 10 percent the amount of fuel allocated to state-owned vehicles (Xinhua News Agency 2005e). No other energy-saving initiatives appear to have been announced.

Assessment

A1.13 Cambodia has so far managed to cope with higher oil prices without resorting to subsidizing their use. Taxes were reduced somewhat at the beginning of 2004, but are still very substantial and crucial to the government's overall fiscal position. The high retail prices compared to those in neighboring Vietnam and Thailand have led to massive in-smuggling, at considerable cost to the government. This highlights the merits of working to move regional tax rates toward one another.

Ethiopia

A1.14 Ethiopia is entirely dependent on imports for all its consumption of petroleum products. Ethiopia imported about 1.4 million tonnes of petroleum products in the fiscal year ending in July 2005. Diesel accounts for more than half of total consumption, jet fuel nearly one-fourth, and gasoline and heavy fuel oil about 10 percent each (EPE 2005). LPG accounts for only a very small part of total consumption. Historical inflation rates in Ethiopia are given in Table A1.3.

Table A1.3 Consumer Price Index Trend in Ethiopia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	-8.2	1.7	17.8	3.3	11.6

Source: IMF 2006i.

A1.15 All petroleum products are imported by the state-run Ethiopian Petroleum Enterprise. Ethiopia has no refinery. In marketing and retail, some international as well as local companies are involved. Since Ethiopia is landlocked, imported products carry a high transportation costs element. More than 90 percent of installed power generation capacity in 2002 was hydro, and oil-based capacity totaled 42 megawatts (MW) (EEPCO 2002).

A1.16 Prices are controlled by the government. Price adjustments have been erratic, with periods as long as two years between adjustments. In 2004, prices were adjusted in April, August, and December. There were no price adjustments in 2003, and the last price adjustment prior to April 2004 occurred in October 2002. There was no

price increases between December 2004 and May 2006—prices were frozen throughout 2005. This is in part because of the May 2005 elections, the results of which have been contested. The May 2006 price increases varied between 11 and 74 percent—the latter for jet fuel—but still retained subsidies. As a result, the Ethiopian Petroleum Enterprise is having to bear a large subsidy cost, which it can ill afford.[9] The prices of petroleum products after the price increase of May 2006 are shown in Table A1.4.

Table A1.4 Fuel Prices in Ethiopia in May 2006

Parameter	*Gasoline*	*Kerosene*	*Jet fuel*	*Diesel*	*Heavy fuel oil*
US$ per liter	0.75	0.40	0.60	0.55	0.47
Birr per liter	6.58	3.45	5.23	4.78	4.11

Note: All prices are for Addis Ababa. Prices are set by the government but differ from location to location to reflect transportation costs.

A1.17 Immediately after the May 2006 price increase, the Ministry of Trade and Industry informed the public that the fuels were still subsidized, and announced that the government would spend 342 million birr (US$39 million) in the next three months on fuel subsidies. The ministry added that the cost of the fuel price subsidy in the previous 16 months had amounted to 1.6 billion birr (US$184 million) (*All Africa* 2006h).

A1.18 An excise tax of 30 percent is levied on gasoline. A 15 percent VAT is imposed on all fuels except kerosene and jet fuel. A road fund contribution and a municipality tax are levied on gasoline and diesel. A stabilization fund was set up in 1996, intended to permit cross-subsidization of kerosene by gasoline, diesel, and heavy fuel oil. By the end of fiscal 2005 (which ended on June 30, 2005), the stabilization fund had been depleted.

A1.19 An estimate of the distribution of fuel subsidies indicates that the nonpoor capture a disproportionate amount of the subsidy. About 80 percent of households in Ethiopia use kerosene. Nearly 85 percent of the population lives in rural areas and they use small mounts of kerosene, primarily for lighting. Many urban households appear to use kerosene for cooking. The urban poor who use kerosene for cooking make up less than 2 percent of all households in the country; they will be hit the hardest by kerosene price increases (World Bank 2005b). Overall, in part because Ethiopia is very short of domestic energy resources, households use a substantial amount of firewood and charcoal, leading to deforestation, especially around urban centers.

A1.20 The small LPG market has been subject to fierce competition and apparent malpractice, with some marketers accusing others of stealing their cylinders (which were rented out to consumers). Agip and Shell have already exited from this sector, and Mobil began looking for a buyer for its business in early 2005. In September 2005, the

[9] More specifically, the Ethiopian Petroleum Enterprise is borrowing from the Commercial Bank of Ethiopia to pay for the shortfall, and this ultimately represents a contingent liability for the government in the form of a loan implicitly guaranteed by the government.

government exempted LPG from VAT following a price increase and LPG shortage in the market (*Addis Fortune* 2005).

A1.21 The government has granted several exploration licenses in recent years to promote oil development and production. After signing a production sharing contract with Malaysia's Petronas in June 2003, the government said that the country could be producing oil within four years (*WMRC Daily Analysis* 2003a), but no commercial discoveries have been made to date.

Assessment

A1.22 Ethiopia's poverty and weak fiscal performance have made it highly vulnerable to oil price increases. The government has subsidized fuels, especially kerosene, in an attempt to mitigate the effects on low-income households, but this policy is unlikely to be sustainable if oil prices continue to remain at high levels. The events leading up to the elections in May 2005 and their aftermath, whereby the legitimacy of the government continues to be challenged, have made it more difficult for the government to adjust prices.

Honduras

A1.23 Honduras does not produce oil and has no refinery so that it imports all of its oil requirements in the form of products. According to International Energy Agency (IEA) statistics, Honduras consumed 1.8 million tonnes of petroleum products in 2003. Diesel accounted for 44 percent of the total, heavy fuel oil 32 percent, and gasoline 18 percent, while kerosene and LPG accounted for 3 percent or less each (IEA 2005b). Four-fifths of electricity generation is based on oil (IMF 2006a). Historical inflation rates in Honduras are given in Table A1.5.

Table A1.5 Consumer Price Index Trend in Honduras

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	9.7	7.7	7.7	8.1	8.8

Source: IMF 2006i.

A1.24 Chevron, Esso, Shell, and locally owned Dipsa import fuels and retail the products they individually import through their own filling stations. Prices are adjusted weekly based on a formula that includes the average price of U.S. Gulf fuel products of the previous week, taxes, and margins for distributors and retailers. The taxes levied on petroleum products are substantial, resulting in the highest retail prices in the region for gasoline and diesel until February 2006. In 2004, tariffs on petroleum products were increased by 10–12.5 percent to yield revenue equivalent to 0.6 percent of GDP (IMF 2006d). Retail fuel prices in early May 2006 are shown in Table A1.6. The price for LPG sold in 11.4 kg cylinders is slightly lower than that in Nicaragua, considerably lower than that in Guatemala and Costa Rica, but about double that in El Salvador.

Table A1.6 Fuel Prices in Honduras, April 30–May 6, 2006

Units and currency	*Super gasoline*	*Regular gasoline*	*Kerosene*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	1.02	0.91	0.62	0.81	0.70
Lempiras	19.34	17.26	11.75	15.36	13.30

Source: www.sieca.org.gt/SIECA.htm.
[a] LPG sold in 25 pound (11.35 kg) cylinders.

A1.25 Until September 2005, the impact of higher international prices was passed through to consumers. For a period of three months beginning in September 2005, when Hurricane Katrina led to a supply-demand imbalance and a large price spike in the region, the government put a hold on the full pass through of increased costs. On September 3, 2005, President Ricardo Maduro declared "a preventative state of emergency" which would remain in effect for 10 days in response to a crisis triggered by high fuel prices. Under the decree, filling stations would open only for 14 hours per day and would shut all day Sunday. The working day for public-sector employees would start an hour earlier than normal, and the prices of refined oil products would be revised every two days. The government also decreed a 19.7 percent increase in gasoline prices on September 3, but was forced to backtrack and announce a 9.9 percent price reduction on September 7 following protests by hundreds of taxi drivers in the capital. Congress froze the prices of refined products for 10 days from September 8 but extended the decision for another 10 days through September 28 and extended again through October. The government was to subsidize any upward variation in price through October 2, but fuel import companies would be responsible for paying the extra cost after that date. The price freeze was extended to October 16, and then to the end of November. At the time the extension to end-November was announced, the government said that the measure would cost the government some 300 million lempiras (US$15.9 million) while importers would pay about 80 million lempiras (US$4.2 million) (*Business News Americas 2005d*). When international prices fell to pre-Katrina levels, the government reintroduced the flexible pricing formula, except for LPG, whose small market share would result in only a minor financing burden for the government. Following elections in November 2005, a new administration came into power in January 2006. In April, the new government froze retail fuel prices. Despite subsequent increases in world oil prices, domestic fuel prices have not been raised since, resulting in growing subsidies.

A1.26 In 2004 the increase in international oil prices led the government to propose changing the basis of its pricing formula, linking it to U.S. Gulf prices rather than to Caribbean prices. This change was expected to lower free-on-board prices by US$0.04–0.05 a liter, although the extra transportation costs would partially offset this price advantage. In addition, the President sought support from OPEC countries to give Caribbean countries preferential treatment, and from the United Nations to help stabilize and reduce oil prices for developing countries (*Business News Americas* 2004a). Neither of these initiatives has produced tangible results.

A1.27 In March 2006, in another attempt to lower fuel supply costs, the government announced a plan to buy petroleum products in bulk. According to this plan, which would give the government greater control over fuel imports, the government would set up a new office that would be put in charge of importing and selling imports on to the oil marketing companies (*Platts Commodity News* 2006d). In May 2006, the government was negotiating with the government of Venezuela to obtain favorable payment terms for purchasing petroleum products (*National* 2006).

A1.28 The government subsidizes public transport in Tegucigalpa. In early 2005, the government was paying a daily subsidy of about US$17 for each public transportation vehicle offering service in the capital's poor neighborhoods. In exchange, riders were charged about US$0.13 a ride. In December 2004, against the backdrop of mounting unpaid subsidies estimated at US$6.1 million, public transport workers went on strike, demanding that they be reimbursed for unpaid subsidies (EEE News Service 2004).

A1.29 In May 2005, in order to reduce the impact of higher oil prices on low-income households, the government introduced a subsidy to the year end for electricity to those households consuming less than 100 kWh a month, and increased health expenditures (including medicines for public hospitals and expanded health services in poor neighborhoods). In September, Congress broadened the subsidy to electricity users consuming up to 300 kWh and increased the coverage from 40 to 80 percent of residential users, while mandating expenditure cuts elsewhere in the budget to offset the fiscal cost (IMF 2006a).

A1.30 The impact of higher oil prices on the economy at large has been substantial, since the ratio of the cost of oil imports to GDP rose from 5.8 percent in 2002 to 12.5 percent in 2005. This was balanced by rapid increases in remittances from abroad, however, growth has been resilient, and the inflation rate has remained steady as well (IMF 2006a).

A1.31 In April and May 2006, the government introduced several new measures to save fuel costs. Most motorists in Honduras have historically consumed gasoline with a research octane number (RON) of 95. The government approved a law that reduced the taxes on 87 RON gasoline from US$0.30 to US$0.26 per liter, while maintaining the taxes on 95 RON gasoline at US$0.31. As a result, consumption of 87 RON gasoline increased from 7 percent of the total in March 2006 to 15 percent by May. The government has ordered the 60,000 state vehicles to use the cheapest fuel available and to circulate on alternate days depending on their license plates. The government has also adopted daylight saving time in an effort to save electricity and reduce fuel oil use (*Platts Commodity News* 2006i, *National* 2006).

A1.32 The government has also shown interest in fuel switching initiatives. It has authorized the use of LPG in taxis, and, as a sugarcane grower, is exploring with the Brazilian government the blending of ethanol from sugarcane into gasoline. The government is also considering manufacture of biodiesel from palm oil.

Assessment

A1.33 For most of the last two years Honduras was able to pass on product price increases fully to consumers. For a short while it felt obliged to initiate a period of

subsidization, to be partly born by the oil importing companies, but fortunately was able to phase this out when international prices declined post the Karina hurricane. The government did use some indirect subsidies via electricity prices and increased public spending that targeted lower-income households.

A1.34 The policies to reduce oil consumption were initially very short term under the preventive state of emergency, but continuing high prices prompted the government to introduce more fuel conservation measures in 2006. Limited fuel switching initiatives have commenced.

Kenya

A1.35 Kenya imports the majority of its oil in crude form and the rest in the form of refined products. It also exports products—equal to 15 percent of its consumption in 2003 (EIA 2005a)—to Burundi, the Democratic Republic of Congo, Rwanda, Sudan, northern Tanzania, and Uganda. According to the IEA, Kenya consumed 2.5 million tonnes of petroleum products in 2003. Diesel accounted for 30 percent of the total consumption, heavy fuel oil 23 percent, aviation kerosene 20 percent, gasoline 14 percent, non-aviation kerosene 11 percent, and LPG 2 percent (IEA 2005b). Historical inflation rates in Kenya are given in Table A1.7.

Table A1.7 Consumer Price Index Trend in Kenya

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	5.7	2.0	9.8	11.6	10.3

Source: IMF 2006i.

A1.36 The government does not subsidize the petroleum sector. Fuels carry a number of taxes—import duties, excise duties, a fuel levy, and value added tax (VAT). The market for petroleum products has been deregulated since 1994 when government control of fuel prices was ended, although, as explained below, refined product imports are still controlled. Retail prices are regularly changed, at times very frequently, and price differentials exist between geographical regions reflecting transport-cost differences. A large number of companies are active in the sector, comprising both small independents and several large international companies: 19 companies are licensed to import, and 110 licensed companies operate in the wholesale and retail sectors (*The Nation* 2005b). Typical petroleum product prices in August 2005 are shown in Table A1.8. By early May 2006, the price of premium gasoline in Nairobi had reached a high of 79 Kenyan shillings (US$1.10) per liter, in part on account of fuel shortages being experienced.

Table A1.8 Fuel Prices in Kenya in August 2005

Units	*Premium gasoline*	*Regular gasoline*	*Kerosene*	*Diesel*
US$ per liter	0.94	0.92	0.77	0.82
Shillings per liter	71	70	58	62

Source: The Nation 2005a.

A1.37 In January 2004 the government implemented an Open Tender System (OTS) and single entry point regulations. The Ministry of Energy centrally coordinates OTS, under which crude is purchased by a single company on the basis of a public tender, transported through one terminal, and shared among all marketing companies in proportions determined by the ministry. This is intended to have the dual benefit of ensuring competitive prices (which are made public) and transporting the oil in a way that would minimize evasion of the import duty. Each company is required to take the crude oil allocation and pay for the consignment within a specified time frame or risk penalties for late payment. Kenya Petroleum Refineries Ltd. (KPRL) determines the frequency of crude oil importation, but does not take into account whether the previous allocation has been sold by the companies. Recent high oil prices have led to financial hardships and inability of some marketers to pay on time. Delayed payments in turn have resulted in subsequent crude shipments being delayed, lower refinery throughput, and fuel shortages. In addition, all refined oil products (except LPG, bitumen, and low-sulfur fuel oil) are required to be offloaded from tankers to the state-owned Kipevu oil storage facility first, again to ensure that there is no under-reporting of quantities or tax evasion, and to undergo third-party inspection for quality. Some oil industry analysts posit that these regulations have resulted in fuel supply disruptions, fuel shortages, and higher prices (*All Africa* 2005a, *The Standard* 2004).

A1.38 When international oil prices began to rise sharply, the government as well as the public started raising questions about whether domestic price increases were "excessive." Many questioned if domestic retail price increases were due solely to world crude price increases, or if the major oil companies were taking advantage of the events in the world oil market and were colluding to raise prices higher than warranted. In June 2004, the Commissioner of Monopolies and Prices accused oil companies of price collusion and announced that his office had formally launched investigations to establish whether the country's monopoly laws had been breached (*All Africa* 2004b). The investigation examined petroleum product prices in Nairobi between July 2003 and May 2004 and found instances of parallel price movements, but not enough to justify allegations of explicit coordination (UNCTAD 2005). In addition, many complained that companies exhibited "rockets and feathers" pricing—as soon as the world price rose, domestic retail prices were increased, but when the price fell, retail prices did not fall immediately and instead took time to be adjusted downward. Oil companies have responded to these charges by pointing out that the price structure in Kenya is transparent, that the price of crude imported into Kenya is known to the government which supervises the OTS, that taxes and other costs are also known, and that margins are not large.

A1.39 The government has attempted a number of actions to moderate the effect of the world price increases. To protect the lower-income households, kerosene was already zero rated for VAT, but LPG (which is of much lesser importance among the poor) was also zero rated in 2005. In August 2005, Energy Minister Nyachae threatened to gazette the Price Control Act, which had been suspended but not abolished, if oil marketers in the country continued to increase fuel pump prices.

A1.40 Kenya's sole refinery, KPRL, is owned 50 percent by the government and the remaining 50 percent by bp (which is exiting the Kenya downstream petroleum market),

Shell, and ChevronTexaco. The government provides protection to the refinery through the so-called base oil rule, whereby marketers are required to process 1.6 million tonnes of crude oil, or about 70 percent of local consumption, at the refinery according to their market share. The stated aim of this requirement is to assure adequate LPG supply. The refinery is old and inefficient, and not suited for making cleaner fuels required around the world today. As a result, a cost disadvantage estimated to range between 1 and 3 Kenyan shillings (US$0.01–0.04) is associated with processing crude at the refinery (*The Nation* 2004a). Because of the refinery's limitations and high refining costs, the possibility of refinery closure was debated through 2004, but in 2005 the government decided to opt for a refinery upgrade scheme at an estimated cost of about US$200 million.

A1.41 Since the sector deregulation of October 1994, no new regulatory act has been passed. Sector regulation has been made difficult by the absence of an appropriate regulatory framework. Tax evasion and product adulteration remain serious problems. A number of practices have led to government loss of revenue and to some international oil companies giving consideration to exiting from the sector. Three practices have been especially problematic.

- Some companies were importing products without paying duties, resulting in the undercutting of companies who did pay the duties and a loss of revenue to the government. To the extent that evading duties results in some companies cutting retail prices, their customers benefited.
- Some companies were taking products destined for export (pre-imposition of export taxes) and selling them in the local market as a means of tax evasion. This also lowered prices to some domestic consumers.
- There was adulteration of products, especially from the use of kerosene in motor fuels.

A1.42 To block possible tax evasion on products formally destined for export but actually sold locally, the government in August 2005 began to tax products at entry at the Kenya Petroleum Refinery and the Kenya Pipeline Company (KPC) import depot. Previously taxes were not paid until products were taken out for sale (within one month of accepting deliveries). Where the products were destined for export they would not pay the taxes, and this had led to illegal dumping of such products on the domestic market. The oil companies complained that the extra costs of financing the pre-payment of taxes would require them to raise retail prices. When they were not able to raise prices immediately to cover the incremental cost, they started to reduce supply orders at the Mombasa refinery, while the refinery began refusing to release refined products without the authorization of the tax authority. This system led to shortages of products for both the domestic and export markets and higher prices. The government also closed Shimanzi and other terminals to enable centralized accounting through the Kipevu storage facility, causing additional physical backlogs. The Shimanzi terminal was not re-opened until May 2006.

A1.43 The government and oil marketers reached a compromise deal and agreed that the companies would pay the full tax due 45 days after the time of entry to the country, while the KPC depot in Mombasa would remain a bonded facility. The result of

the compromise solution is that the government is able to increase its revenue from eliminating some tax evasion, while the extra costs to the companies and the resulting higher prices to consumers should be modest. There were initial teething problems when the Kenya Revenue Authority introduced a computerized cargo-clearance system in July 2005 to stem tax evasion and revenue loss, resulting in backlogs. Ironically, there are reports that the revenue collected began to fall after the installation of the system, as a result of the clearing agents being able to manipulate the system (*The Nation* 2005c). There is also a backlog of refunds to oil marketers for refundable taxes paid for exported fuels, reportedly amounting to some 2 billion Kenyan shillings (US$28 million) by mid-February 2006 (*The Nation* 2006b). The backlogs and delays in refunds inevitably contribute to rising costs and prices, if not fuel shortages.

A1.44 The Kenyan fuel market has been suffering from periodic fuel supply shortages, resulting in higher prices. The shortages have been caused by a variety of factors: delays of tankers to dock and discharge oil products at the Kipevu oil terminal in Mombasa; "excess exports" of diesel (*The Nation* 2006a); a long delay lasting months in crude delivery to the refinery caused by payment delays for the previous cargo (LiquidAfrica Holding Limited 2004); power supply disruptions and acts of vandalism adversely affecting pipeline operations; inadequate pipeline pumping capacity; and the implementation of new tax rules in August 2005 as mentioned above. Product-specific shortages include a shortage of kerosene resulting from the tax rebate—giving incentives for diversion of kerosene to the automotive diesel sector (*The Nation* 2004b)—irregular supply of fuel oil by KPRL (*All Africa* 2005a), and LPG shortages on account of inadequate LPG handling and storage facilities in Mombasa. Vandalism on the main pipeline is another serious problem. In the four months up to February 2006, the pipeline was attacked four times by thieves intent on stealing oil, stopping the flow of 13 million liters of oil (*The Nation* 2006c). These supply disruptions affect not only Kenya but also Uganda, Rwanda, and other countries that import from Kenya.

A1.45 Reports indicate that there has been fierce, and not necessarily fair or healthy, competition at retail, with some independents cutting quality as well as selling unexcised fuels. The loss in revenue to the government has led to a tightening of the tax regime. This may well drive some smaller firms out of business and lead to less variation in prices between retail outlets. The overall level of competition will remain strong, however, while there are a large number of players, including some international companies. Were there to be excessive government interference over pricing in the sector and the major companies withdraw (as bp is already doing) then quality standards are likely to fall and the operation of imports and wholesaling could become less competitive with resulting higher prices.

A1.46 In the face of higher oil prices and costs to domestic firms, such as flower exporting, the government is looking at other ways to reduce its dependence on imported oil. These include encouraging energy efficiency and management, and investigating possibilities of introducing biofuels from domestic crops. Already some progress has been made by companies on improving energy efficiency, but the introduction of biofuels would take time and likely require government support. The Kenyan Association of Manufacturers drafted guidelines for efficient use of energy in 2006. Savings in excess of

2.5 billion Kenyan shillings (US$35 million) are believed possible through energy efficiency improvement (*Daily Nation* 2006).

A1.47 Another means of reducing dependence on imported oil is to increase indigenous supply. Kenya has recently attracted interest from oil companies around the world for offshore oil exploration. An Australian firm will drill a deep-water well later in 2006. The hope is that more sophisticated exploration technology will yield better results than East Africa's only other previous deep-water well drilled in 1978.

Assessment

A1.48 Kenya has a largely deregulated sector, and pricing is set on a commercial basis. There are indications that attempts by the government to tackle tax evasion and protect the domestic refinery—through the OTS, single entry point requirements, requiring marketing firms to pay taxes upfront, and the base oil rule—may be exacerbating periodic supply disruptions and leading to higher prices. Even more affected than the Kenyan consumers are those in the neighboring countries that import refined products from Kenya. The cost to consumers of refinery protection alone is estimated to amount to US$25–30 million annually (*All Africa* 2005d). This has led some to argue that Kenya would be better off relying on product imports from large, efficient refineries in the Middle East which take full advantage of economies of scale. These observations suggest scope for further cost reductions. Such considerations will also be affected if commercial oil discoveries are made in Kenya.

A1.49 The rise in international prices and the pass through to the domestic market has led to various attempts by the government to reduce the effect on consumers, largely by trying to cut the margins of the oil importing companies. On several occasions, the government has accused the companies of anti-competitive behavior, and only recently has the government admitted that it cannot shield consumers from the effects of market forces. This strategy may reflect government's attempts to avoid any blame for the situation, particularly at a time when it faces domestic opposition.

A1.50 Attempts by the government to intervene in the pricing of products through exerting pressure on oil companies and past failures to deal effectively with commercial malpractice—tax evasion and selling of substandard quality products, both practices of which enable selling product at lower prices on the domestic market—has made it difficult for firms not engaged in commercial malpractice to continue operating in the sector. One major oil company is already withdrawing from the market. If this trend continues, Kenya will be left with a very much weakened system, which would not have the financial strength to undertake the expansion and maintenance that is required. Current indications are that the new tax collection system has substantially curtailed illdgal dumping on the domestic market of untaxed fuels destined for export (*The Nation* 2006d), thereby helping to level the playing field.

Lao People's Democratic Republic

A1.51 Lao PDR produces no oil, has no refining capacity, and imports all its needs for petroleum products. According to the Ministry of Commerce, the country imported 365 million liters (6,300 bpd) of petroleum products in 2004. Consumption was

dominated by diesel, accounting for 61 percent of total demand, followed by gasoline at 33 percent (predominantly regular gasoline), aviation kerosene at 3 percent, and LPG at 1 percent. Historical inflation rates in Lao PDR are given in Table A1.9.

Table A1.9 Consumer Price Index Trend in Lao PDR

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	7.8	10.6	15.5	10.5	7.2

Source: IMF 2006i.

A1.52 There are 11 companies, two state-owned, that import and distribute fuels. Retail prices are fixed by a decree of the Ministry of Commerce, but competition seems to exist at the import and wholesale level. The government does not provide a direct price subsidy to petroleum products. Prices are uniform in any given province but differ from province to province, primarily on account of transport costs.

A1.53 Before 2002, a specific customs duty and turnover tax were levied on gasoline in kip per liter. Starting in 2003, the government began to levy an excise tax and changed the three taxes—excise, turnover, and customs—to *ad valorem*. In addition, a road fund levy in the amount of 150 kip per liter is collected. In 2004 and 2005, the government lowered retail prices by reducing the tax rates set by the 2003 decree. For a brief period in late 2004, the excise tax on diesel was eliminated altogether. Some months earlier, the customs duty on gasoline was reduced to 5 percent before being raised to 10 percent, and then to 13 percent. These tax reductions—introduced to shield consumers from the full impact of rapidly rising world oil prices—were withdrawn on November 1, 2005. The current taxes, duties, and fees on gasoline and diesel are shown in Table A1.10. Customs duties and excise taxes are lower on diesel than on gasoline to keep the end-user price of diesel low.

Table A1.10 Fuel Taxes, Duties, and Fees in Lao PDR

Fuel	*Customs duty*	*Excise tax*	*Turnover tax*	*Road fund fee*
Premium gasoline	20%	23%	5%	150 kip/liter
Regular gasoline	15%	24%	5%	150 kip/liter
Diesel	5%	12%	5%	150 kip/liter

Source: Lao authorities.

A1.54 Reducing taxes on gasoline and diesel in 2004 is estimated to have cost the government about US$3 million. By increasing the taxes in 2005 toward the rates specified in the 2003 decree, the government is estimated to have recovered about US$7.8 million of what they might otherwise have lost as a result of tax reduction. In 2006, the government increased the road fund levy, earmarked for road maintenance, from 100 to 150 kip a liter.

A1.55 The retail prices of gasoline and diesel in January 2003, 2004, 2005, and 2006 are shown in Table A1.11, as well as the prices revised on May 12, 2006, all weight-averaged across the country. The prices rose at an annual average of about 30 percent between January 2003 and January 2006 in nominal terms. As a result of the tax

structure, the retail price of diesel is 12 percent lower than that of regular gasoline. In the first five months of 2006, retail prices rose by approximately 20 percent.

Table A1.11 Fuel Prices in Lao PDR January 2003–06, and May 2006

Units	*Date*	*Premium gasoline*	*Regular gasoline*	*Diesel*
US$ per liter	January 2003	0.36	0.30	0.28
Kip per liter		3,842	3,179	3,002
US$ per liter	January 2004	0.51	0.41	0.37
Kip per liter		5,275	4,316	3,849
US$ per liter	January 2005	0.57	0.51	0.45
Kip per liter		5,873	5,227	4,651
US$ per liter	January 2006	0.74	0.69	0.62
Kip per liter		7,930	7,386	6,640
US$ per liter	May 2006	0.95	0.89	0.78
Kip per liter		9,526	8,998	7,868

Source: Lao authorities.

A1.56 Rising oil prices have affected other sectors of the economy, and cases have been reported in which prices have been raised by more than would be justified by the fuel price increases (Organization of Asia-Pacific News Agencies 2005a). Lao PDR, which is landlocked, has also faced problems of in-smuggling, especially from Vietnam where prices are somewhat lower. Smugglers have used all forms of conveyances, including boats, tricycles, passenger coaches, and trucks (Vietnam News Brief Service 2005).

Assessment

A1.57 Lao PDR passed through the full impact of higher world prices gradually, and had reduced taxes on oil temporarily for that purpose. By November 2005, however, the taxes were raised back to the specified rates, thereby leading to full pass through of world prices to consumers. The government does not appear to have announced concerted fuel-saving or energy conservation measures, apart from exhorting users to be economical.

Madagascar

A1.58 Madagascar produces no crude oil. It has a refinery, which is not operating. Forty percent of product consumption is diesel and another 25 percent is gasoline. Heavy fuel oil and kerosene are each 10 percent of total consumption, while the use of LPG is negligible (EIA 2005a). According to government statistics, Madagascar consumed 650 million liters (11,200 barrels per day) of fuel in 2005 (Reuters News 2006c). Historical inflation rates in Madagascar are given in Table A1.12.

Table A1.12 Consumer Price Index Trend in Madagascar

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	6.9	15.9	-1.2	13.8	18.5

Source: IMF 2006i.

A1.59 Fuel imports were liberalized in October 2003, with the aim of providing competition to the refinery privatized in 2000, and product prices have been liberalized since July 2004. There are four oil marketing companies. The government does not subsidize fuel prices, although there is a freight equalization fund to enable pan-territorial pricing of oil products. No measures seem to exist to protect poor households from the effects of higher fuel prices. Prices of gasoline and diesel in April 2006 are shown in Table A1.13.

Table A1.13 Fuel Prices in Madagascar in April 2006

Units	*95 RON gasoline*	*91 RON gasoliner*	*Diesel*
US$ per liter	1.09	0.93	0.91
Ariary per liter	2400	2035	1990

Source: Madanight 2006.

A1.60 Events in the last three years have hit the economy very hard, compounding the difficulties caused by the higher oil prices. During the political struggles of 2003, a blockade of the capital resulted in fuel prices increasing four to fivefold. In 2004 two cyclones severely damaged the infrastructure of the country. Despite these disruptions, the President announced the liberalization of the oil product prices in July 2004.

A1.61 Diesel fuel accounted for 60 percent of power generation in early 2005, but rising fuel prices have forced the ailing, wholly state-owned, energy-and-water company to cut back diesel use to 35 percent. The company, burdened with large debts, raised electricity tariffs, historically set below cost, by 30 percent in July 2005 and 35 percent in November 2005 (Reuters News 2006b). The cut-back on diesel fuel consumption has led to severe power shortages, crippling business and sparking protests. In the long run, hydro power is considered the most viable path for enhancing security of power supply.

A1.62 The higher prices have found their way into the general cost of living. Higher inflation has given rise to serious concern on the macro-economic stabilization of the economy. A new tax on petroleum products raised fuel prices further in early 2006 (Reuters News 2006c). In response, the government has considered a number of policies to ease the pressure from higher oil prices, including biofuels, hydrocarbon exploration, and increased use of hydro power.

A1.63 In January 2006, the government selected a law firm to draft a legislative text on biofuels. The text will define the legislative status of biofuels and present a basis for taxing biofuels (*Indian Ocean Newsletter* 2006). D1 Oils Madagascar announced in March 2006 that it would be building a biodiesel plant in Madagascar in 2008. The firm

is in the process of planting jatropha, which can grow on marginal land with little rainfall, on 20,000 hectares to extract oil as a feedstock for biodiesel (Xinhua News Agency 2006c).

A1.64 Madagascar is aggressively promoting oil exploration and development. The government plans to offer 96 new oil and gas blocks for tender in 2006. Its hydrocarbon potential was considered sufficiently promising for ExxonMobil to open an office in January 2006.

Assessment

A1.65 Madagascar has liberalized the petroleum products sector and allowed prices to rise. The continuing increase in their level has led to an adverse effect on the rate of inflation. The government is looking at longer-term policies to reduce oil dependence. The government does not appear to have implemented policies to reduce oil consumption in the short term. Such a move might send an important signal that the government is doing whatever it can to tackle the country's energy crisis.

Malawi

A1.66 All of Malawi's demand for oil is satisfied by imported products. According to the U.S. Energy Information Administration (EIA), Malawi consumed 0.31 million cubic meters (m^3) (5,400 barrels per day) of petroleum products in 2002. Diesel accounted for 42 percent of demand, gasoline 31 percent, non-aviation kerosene 7 percent, LPG 3 percent, and heavy fuel oil negligibly small (EIA 2005a). Being a landlocked country the transportation cost element is substantial. Historical inflation rates in Malawi are given in Table A1.14.

Table A1.14 Consumer Price Index Trend in Malawi

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	22.7	14.7	9.6	11.4	15.4

Source: IMF 2006i.

A1.67 Fuel imports are undertaken by a consortium of oil companies, while there is a single licensed wholesaler that controls the storage and distribution depot. The Petroleum Pricing Committee submits proposed fuel price adjustments to the government. Until 2004, product prices were determined through an automatic pricing formula and were altered whenever the import price of fuels in the local currency changed by more than 5 percent. A petroleum price stabilization fund compensates the companies if the established price is lower than the import price. Movements in the exchange rate have been an important factor in pushing up domestic prices: the local currency depreciated 14 percent against the U.S. dollar in 2005, and by a further 12 percent during the first five months of 2006.

A1.68 In 2004, the application of the price adjustment formula ceased to be automatic and price adjustments were made on a more discretionary basis. There were increases in October 2004 (the first for seven months), June 2005, August 2005, and November 2005. The increases were such that the stabilization fund managed to stay in

surplus for most of 2004–05. In November 2005, the price of gasoline was increased to 134.80 kwacha (US$1.09) a liter, while in August gasoline had been priced at 130.40 kwacha ($1.06) a liter, kerosene 102 kwacha (US$0.83) a liter, and diesel 125.2 kwacha (US$1.02) a liter (PANA Daily News Wire 2005, ISI Emerging Markets Africawire 2005). In April 2006, against the backdrop of depreciating kwacha and rising international oil prices, the Petroleum Pricing Committee recommended increasing fuel prices—which were 134.80 kwacha (US$1.00) for gasoline and 132.70 kwacha (US$0.99) for diesel—to about 150 kwacha, but the government responded that the circumstances had to be analyzed first. Fuel importers reported that delays in price adjustments cost them about 600 million kwacha (US$5 million) in 2005 (ISI Emerging Markets Africawire 2006a).

A1.69 Taxes on petroleum products are an important source of revenue for the government. Ad volarem import and excise duties are imposed on gasoline, kerosene and diesel, with a lower percentage on diesel. In addition, there are a large number of levies: road maintenance levy, safety net levy 1, safety net levy 2, Price Stabilization Fund levy, Petroleum Control Commission levy, Energy Fund levy, Bureau of Standards access levy, and in-bond landed cost recovery levy (for compensating fuel importers' losses). In June 2005, 21–24 percent of retail gasoline, kerosene, and diesel prices consisted of the various levies and another 11–20 percent taxes. In total, the government fees and taxes made up 32, 41, and 42 percent of kerosene, diesel, and gasoline prices, respectively.

A1.70 Malawi has suffered from years of serious food shortages and drought. The government has not yet faced widespread discontent over the petroleum product prices. This may be due to the very weak state of the economy, coupled with the majority (90 percent) of total primary energy demand relying on fuelwood. The government has considered oil supply options to improve access to fuels, such as a product pipeline from Mozambique and increased storage facilities, but these schemes have recently been abandoned due to cost considerations. Fuel switching to hydro has been severely restricted by drought conditions along the Shire river, where much of the country's capacity is located. Instead local businesses have had to acquire generators to compensate for power blackouts.

A1.71 The Malawian Biodiesel Agricultural Association has been promoting jatropha for its potential as a source of biodiesel. The association gives farmers trees to plant and teaches them about production, as well as finding marketing outlets through the UK-based Climate Change Corporation. Agreements to plant up to 20,000 hectares have reportedly been reached (*All Africa* 2005j).

Assessment

A1.72 Malawi is one of the most stressed economies, having experienced years of food scarcity. Although the government has not rigorously applied a pricing formula to fully pass through international oil prices to domestic users, it has managed to avoid the costs of subsidizing fuels. The petroleum price stabilization fund has continued to operate without going into persistent deficit, which contrasts sharply with the experience of other countries, and the government is trying to keep domestic prices in line with external prices.

A1.73 As a means of shielding households from higher world oil prices, the government kept the rate of kerosene price increase markedly lower than that for gasoline or diesel until August 2005. For example, between January 2004 and June 2005, the price of gasoline increased 33 percent and diesel 43 percent, but kerosene 15 percent. In August 2005, the government increased the price of kerosene by 37 percent, the largest one-time percentage increase for any fuel. This large increase presumably reflects a growing burden on fuel importers from cost under-recoveries,

A1.74 The government's reliance on petroleum product taxes and levies has meant that consumers could not be protected through a reduction in tax rates. The price stabilization fund provides some protection from sharp price increases, with the exception of the kerosene price increase in August 2005. As yet, there does not appear to be a program to effect energy saving and improve energy efficiency.

Morocco

A1.75 Morocco imports virtually all its oil, two-thirds in the form of crude which it processes in its two refineries. Consumption grew at an annual rate of 3 percent between 2000 and 2004, and amounted to 7.0 million tonnes in 2004. In 2004, consumption was dominated by diesel (nearly 50 percent), heavy fuel oil (22 percent) and LPG (about 20 percent)(Arab Oil and Gas 2005). Kerosene consumption was negligibly small. Gasoline consumption was modest at 6 percent of the total, comprising mainly the premium grade. Historical inflation rates in Morocco are given in Table A1.15.

Table A1.15 Consumer Price Index Trend in Morocco

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	0.6	2.8	1.2	1.5	1.0

Source: IMF 2006i.

A1.76 The government suspended a fuel price indexation system in 2000. The government has been using an oil price compensation fund to compensate downstream private sector distribution companies for selling petroleum products at subsidized prices. Butane (used for household consumption) is heavily subsidized while propane is unsubsidized. Subsidies are also given to diesel, kerosene, and heavy fuel oil. For these three fuels, subsidy amounts are smaller than the total taxes imposed on the respective fuels, with the greatest subsidy given to diesel, amounting to 28 percent of the total taxes. In the first six months of 2005, the government spent US$386 million on fuel subsidies (*Platts Commodity News* 2005d), and the annual subsidy amounted to 7.9 billion Moroccan dirhams (US$890 million) by the end of the year, one-half of which was directed toward butane (Maghreb Arabe Presse 2005). LPG is cross-subsidized in part through a levy on liquid products. The compensation fund is in a deficit, and the deficit has grown steadily in the last several years.

A1.77 There are two refineries in Morocco, both belonging to Société Anonyme Marocaine de l'industrie du Raffinage (SAMIR). The main refinery in Mohammedia was destroyed extensively during a fire in 2002, but production has been recovering since. A US$1 billion upgrade program is being planned for this refinery. To protect the domestic

refining sector, the government imposes a quota on imports of refined products: imports are permitted only to fill the gap between demand and what the refinery can supply. The Ministry of Energy and Mining organizes periodic meetings to decide the quantity of imports needed and how much each operator should import. In addition, the government imposes a 2.5 percent surcharge on import-parity prices to arrive at ex-refinery prices. In a freely competitive market, there would be no quotas or protection margin. For products that are exported (currently gasoline and heavy fuel oil), market-based prices would not only exclude the 2.5 percent import surcharge but fall further to export-parity levels. The cost to the economy of the government's pricing policy just on this score relative to a market-based scenario is estimated to amount to tens of millions of dollars annually.

A1.78 Fuel prices were raised by 10.8 percent in September 2000, and then were not raised again until immediately after the harvesting season in August 2004 (to spare farmers hit by drought), when they were raised by 3.5 percent. Fuel prices were raised twice in 2005, in May and August, but butane prices were unchanged. In February 2006, as the fiscal costs of the subsidy became unsustainable, the government raised fuel prices, but butane prices were again unchanged. At the same time, the government stated that it had re-established fuel price indexation (with the exception of regular diesel and kerosene) whereby prices are adjusted whenever costs fluctuate by more than 2 percent. The prices after the increase on February 9, 2006 are shown in Table A1.16.

Table A1.16 Retail Prices in Morocco after February 9, 2006

Parameter	*Butane*	*Premium gasoline*	*Regular diesel and kerosene*	*Diesel 350*[a]	*Heavy fuel oil*
Unit	Per kg	Per liter	Per liter	Per liter	Per kg
US$	0.37	1.15	0.82	1.02	0.36
MAD[b]	3.33	10.51	7.46	9.34	3.307

Source: *Aujourd'hui Le Maroc* 2006.
[a] Diesel with a sulfur level of 350 parts per million
[b] Moroccan dirhams

A1.79 Following the February 2006 price increase, the Morrocan Federation of Fuel Traders went on strike to protest against the price hike and the 7 percent increase in VAT on fuels marketed by service-stations. The latter measure was introduced by the Finance Act aimed at reducing the deficit, estimated at reportedly close to US$1 billion, arising from differences between import costs and domestic prices (Panafrican News Agency Daily Newswire 2006a).

A1.80 In the butane market, the government is financially involved at every stage in the supply chain. Not surprisingly, the consumption of unsubsidized propane is less than one-tenth of that of butane. Butane is sold in 3 kg and 12 kg cylinders, and unit prices are the same between the two. Short selling of butane is reportedly rampant. The butane market has been growing at an annual rate of 6 percent, three times faster than the demographic growth. More than 99 percent of households in Morocco have at least one butane cylinder. There are 20 million 3 kg cylinders and 10 million 12 kg cylinders in circulation (SHV Gas

2004). Although consumption is dominated by the better-off, the universal use of this heavily subsidized product makes subsidy reduction politically challenging.

A1.81 Morocco, which produces only a very small amount of oil, is currently encouraging further exploration. The finance ministry has called for resuming efforts on saving energy (Arab News 2005), but no concrete steps appear to have been taken by the government.

Assessment

A1.82 Morocco is a non-oil producer that nevertheless subsidizes petroleum products. Butane has been heavily subsidized and, even during 2005, when the fiscal pressures of the subsidy forced the government to make small upward adjustments to the prices of transportation fuels, its price remained frozen. The costs of this program have escalated as oil prices continued to climb. The government's decision to return to fuel price indexation is welcome, although how quickly and fully the government will implement the indexation system remains to be seen.

A1.83 One obvious area that can be changed to lower retail prices is the formula used for arriving at ex-refinery prices and restrictions on product imports. The 2.5 percent protection margin placed on all products, unlike an import duty, gives no fiscal benefit to the government and merely serves to protect all domestic marketers. Basing prices on import parity, irrespective of whether a given product is imported or exported, provides additional protection to the refinery. Eliminating the 2.5 percent surcharge and shifting to export-parity for exported products, coupled with liberalization of imports, would not only lower prices to end users but also could help enhance efficiency of the domestic refineries and marketers.

Mozambique

A1.84 Mozambique imports all its oil needs in the form of products. According to IEA statistics, consumption in 2003 amounted to 440,000 tonnes and was dominated by diesel and heavy fuel oil, which accounted for 41 and 28 percent of the total, respectively. Gasoline accounted for 15 percent, aviation kerosene 5 percent, non-aviation kerosene 6 percent, and LPG 3 percent (IEA 2005b). Historical inflation rates in Mozambique are given in Table A1.17. Despite fuel price increases of about 40 percent between January and September 2005, the cumulative inflation rate was 4.2 percent in September 2005 (IMF 2006f).

Table A1.17 Consumer Price Index Trend in Mozambique

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	9.0	16.8	13.4	12.7	7.2

Source: IMF 2006i.

A1.85 An association of oil marketing companies, which includes Empresa Nacional de Petróleos de Moçambique (Petromoc), imports petroleum products jointly in bulk. The system of bulk purchase has been required by law since the mid-1990s. Petromoc, a state-owned oil company, controls about half of the downstream market.

Significantly, Petromoc owns 20 of the country's 28 depots. Restructuring of Petromoc has been under consideration for several years.

A1.86 The government sets, but does not subsidize, product prices. Fuel prices are reviewed every month and set on the basis of movements in import prices and the exchange rate. Price changes have been determined by a formula that alters prices if the cost of importing petroleum products, expressed in local currency, changes more than 3 percent since the previous price adjustment, or if there is a change in fuel tax. The formula relates to prices charged at cities where the products are imported. Elsewhere, fuel distributors are allowed to add transport costs when calculating final prices.

A1.87 Customs duties, VAT, and specific fuel taxes are levied on petroleum products. Until 2003, specific fuel taxes were not systematically revised. In May 2003, the government raised specific taxes on petroleum products by 62.5 percent and also took a decision to earmark the tax revenue for road maintenance. The decision to raise the specific fuel taxes was preceded by an analysis of the impact of the tax increase on the economy, which concluded that the aggregate short-term impact of a rise in fuel tax on poverty would be modest. In January 2004, the government adopted an automatic quarterly adjustment mechanism for specific fuel taxes to maintain their real values, with a ceiling of 5 percent. Fuel taxes are estimated to have amounted to 1.4 percent of GDP in 2005. Kerosene, considered a fuel for the poor, does not carry VAT or specific fuel tax. Gasoline carries the highest fuel tax, followed by diesel for which the fuel tax is less than half that of gasoline. The fuel tax on LPG is low. In December 2004, taxes accounted for 47 percent of the retail price of gasoline, 33 percent of diesel, 18 percent of LPG, and 3 percent of kerosene (IMF 2005f, 2006d).

A1.88 The government stopped adjusting fuel prices for a period of three months in 2005 in spite of rising import costs. In June 2005, prices were changed twice, but were not adjusted again until October. Following the two price increases in June, there was some social unrest, and this undoubtedly affected the government's decision not to change prices until October, at which point the burden carried by importers was becoming unsustainable. Fuel taxes were not altered between April and October 2005, despite a general policy of realigning them every three months. Fuel prices were raised again in November, and then lowered in succession in February and March 2006. Fuel prices in April 2006 in port cities, following two fuel price reductions, are given in Table A1.18; in the rest of the country, prices are slightly higher on account of transport costs. In May 2006, fuel prices were increased by up to 5 percent, increasing the price of gasoline to 25,000 meticais (US$0.98).

Table A1.18 Fuel Prices in Mozambique in April 2006

Parameter	*Gasoline*	*Kerosene*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per kg
US$	0.91	0.54	0.82	0.85
Meticais	23,850	14,250	21,490	22,500

Source: Panafrican News Agency Daily Newswire 2006b.

A1.89 In 2004, public transport volume declined slightly (2.4 percent), in part on account of higher fuel prices and the public's response to higher fares. However, in the same year, rail transport grew by 14 percent, and road transport by 19 percent (IMF 2005e). A rapidly growing transport sector would suggest high growth in fuel consumption in the coming years. Public bus companies are subsidized. In 2005, the state-owned bus company in Maputo, which reportedly had a total of 30 *operating* buses, was given a subsidy of 32 billion meticais (US$1.4 million), and the Beira Public Transport Company a smaller subsidy (*All Africa* 2005c, 2005h). After the two successive fuel price increases in June 2005, mini-bus taxi operators in Maputo raised fares by 50 percent to 7,500 meticais (US$0.31) a trip, and the Maputo Public Transport Company 29 percent to 4,500 meticais ($0.18) (*All Africa* 2005e, 2005f).

A1.90 The government does not appear to have publicly announced energy conservation policies. As a means of reducing dependence on oil, the government launched a national biofuel project in February 2006. According to the director of the project, the plan is to manufacture biodiesel from jatropha and ethanol from cassava, and fiscal incentives will be given to the biofuel industry (*All Africa 2006c*). In March 2006, Petromoc and the Committee for the Facilitation of Agriculture between Mozambique and South Africa announced that they planned to invest US$125 million on a plant to produce ethanol from sugarcane, of which about US$45 million would be for sugarcane production (AWKnowledge 2006b). The government is also promoting oil and gas exploration. Its offer of five areas for international bidding in July 2005 attracted foreign investors from diverse countries.

Assessment

A1.91 Mozambique has been able to follow a policy of passing on oil price increases to end users, although for a period of three months importers had to bear the extra burden caused by the import price rises during that period. Price adjustments since then would be designed to gradually recover the losses suffered during the three-month period. The use of the tax structure to produce much lower prices for kerosene than diesel is likely to support low-income households, but experience elsewhere would suggest that a substantial amount of diesel might be diverted into adulteration with diesel for transportation.

A1.92 Similar to Kenya, Mozambique has opted for bulk fuel imports on the grounds that there are economies of scale and small markets such as Mozambique can achieve cost savings in this way. The purchase arrangement is different from that in Kenya in that the oil industry consortium imports jointly rather than have the government select an importer for each purchase. There have been no studies examining the efficiency of the system or the magnitude of savings; such a study would be informative.

A1.93 The proposal to offer fiscal incentives for biofuels raises questions, given that little is known about the economics of biodiesel from jatropha worldwide, the failure of Brazil to establish a commercial ethanol industry from cassava (ESMAP 2005c), and the large upward pressure on world sugar prices in recent months on account of world sugar market liberalization and other factors. As with many other African countries, high oil prices are creating new opportunities for hydrocarbon exploration in Mozambique,

indicated by the number of international oil majors that have expressed interest in the most recent licensing round.

Nicaragua

A1.94 Nicaragua imports all of its oil needs, about one-third in the form of products and two-thirds as crude which is refined at the country's single refinery owned by Esso. According to government statistics, Nicaragua consumed 1.3 million m^3 (22,000 barrels per day) of petroleum products in 2003. Heavy fuel oil and diesel each accounted for about 35 percent of total demand, gasoline 19 percent, LPG 8 percent, and kerosene 1 percent (INE undated). Historical inflation rates in Nicaragua are given in Table A1.19. Fuel price increases have been a main contributor to inflation in Nicaragua in the last two years (IMF 2005j).

Table A1.19 Consumer Price Index Trend in Nicaragua

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	7.4	4.0	5.1	8.4	8.4

Source: IMF 2006i.

A1.95 The downstream petroleum sector has four major players: Esso, Texaco, Shell, and Petronic. Their market shares in 2003 were 52, 15, 14, and 13 percent, respectively. LPG is marketed by Tropigas, Zetagas, Esso, and Petronic, with respective market shares in 2003 of 55, 20, 18, and 8 percent, respectively (INE undated). An import-parity-based formula for setting price ceilings was established in 1994, and the formula was abandoned in 1999 in favor of price liberalization for all products except LPG. A selective consumption tax is imposed on petroleum products (18 percent in 2004), and it accounted for 18 percent of total central government revenue in 2001 (Central Bank of Nicaragua 2002).

A1.96 Average monthly prices at retail in 2005 in Managua are shown in Table A1.20 for January, October, and December. The retail prices were lowest in January, and reached the highest level in October except gasoline for which prices were slightly higher in September than October. Prices fell sharply in November. There are no marked inter-fuel price differences at retail.

A1.97 The fuel prices from early May 2006 are shown in Table A1.21. Gasoline prices surpassed the highest levels in 2005. Among the Central America countries, Nicaragua in fact had the highest gasoline, kerosene, and diesel prices in May 2006. LPG prices were higher in Guatemala and Costa Rica.

A1.98 Maximum retail LPG prices effective May 28, 2006 were 14.00 cordobas (US$0.82) a kilogram for 10 pound (4.53 kg) and 25 pound (11.34 kg) cylinders, and 17.85 cordobas (US$1.04) a kilogram for 100 pound (45.36 kg) cylinders (INE undated). Because there are economies of scale in LPG cylinder refilling and management, this pricing system, under which LPG is more expensive when purchased in large cylinders, represents cross-subsidization: large users are subsidizing small users who would almost universally be households.

Table A1.20 Average Monthly Fuel Prices in Managua in 2005

Units	*Month*	*Regular gasoline*	*Super gasoline*	*Kerosene*	*Diesel*
US$ per liter	January	0.67	0.69	0.63	0.61
Cordobas per liter		10.83	11.14	10.13	9.94
US$ per liter	October	0.93	1.01	1.00	0.90
Cordobas per liter		15.22	16.61	16.39	14.66
US$ per liter	December	0.82	0.85	0.78	0.76
Cordobas per liter		13.52	13.93	12.82	12.55

Source: INE undated.

Table A1.21 Fuel Prices in Nicaragua on May 5, 2006

Units and currency	*Super gasoline*	*Regular gasoline*	*Kerosene*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	1.08	1.03	0.80	0.87	0.79
Lempiras	18.45	17.60	13.78	14.99	13.61

Source: www.sieca.org.gt/SIECA.htm.
[a] LPG sold in 25 pound (11.35 kg) cylinders.

A1.99 The main effects of higher international petroleum product prices have been felt downstream of the petroleum products in the power and public transport sectors. Price increases in both sectors have to be approved by the legislature. The power distribution companies have the right each October to request an increase in the tariff if fuel prices have risen by more than 5 percent during the first nine months of the year.

A1.100 The country has recently experienced political unrest with the opposition in Congress blocking Presidential policies, and the judiciary also becoming involved. In May 2004 the owners of private sector buses and taxis threatened a strike because of higher fuel prices and demanded that the selective consumption tax, introduced in 1999, on gasoline and diesel be cut. The strike was called off when the transport workers and the government agreed to work out a compromise. The government was unable to accede to their request to cut fuel taxes, because of the need for revenue, but in June 2004, the National Assembly approved additional spending, which included subsidies to public transportation cooperatives. Intended to cushion the impact of higher fuel prices on the poor, the revised subsidy amounted to 40 million cordobas (US$2.5 million) (IMF 2004c).

A1.101 In April 2005 there was a strike by transport workers—again demanding a reduction in the selective consumption tax on gasoline and diesel—while a counter demonstration by students protested the (illegal) increases in transport fares that had occurred. A further transport strike was threatened in Managua in February 2006, demanding that the government pay a US$1.1 million monthly subsidy to the transport sector, or else authorize an increase in the fares, frozen since January 2003 for bus rides. The strike was called off when the government, although not confirming the subsidy,

pledged to impose a temporary 3 percent fuel tax, earmarked for public transport operators. In April, transport operators in Managua went on strike again to demand government subsidies to offset rising fuel costs. In May, transport workers in Managua announced an unauthorized fare hike (*Global Insight Daily Analysis* 2006b).

A1.102 In the power sector, two-thirds of power generation is based on fossil fuels (25 percent heavy fuel oil, 29 percent diesel, and 12 percent natural gas) (IMF 2005j). The tariffs are low, and the distribution companies have been unable to fully pay the generators, thus resulting in the start of rolling blackouts. In May 2005 the President declared a state of emergency, which included a decree to raise power tariffs 12 percent for those consumers using more than 150 kWh per month (covering about 25 percent of the population according to the President's estimate) (*Latin American Weekly Report* 2005). The state of emergency was brought to an end after only three days, but it had seemed unlikely that the National Assembly would have passed the measure. A new Superintendency for Public Services was appointed and recommended prices increases for power, but these were then blocked by the Supreme Court in September 2005. Congress agreed to pay US$30 million to the distribution companies to compensate them for their inability to raise prices. In June 2006, the Nicraguan Institute of Energy, the country's electricity regulator, gave the utilities 10 days to end the rolling blackouts. The utilities had continued to fall behind in their payments to the generators, in part because of the debt the government owes the utilities for power tariff subsidies (*Global Insight Daily Analysis* 2006e).

A1.103 In order to reduce the cost of imported oil, different parties in the government have been exploring the possibility of arranging discounted sales from Mexico and Venezuela, including a proposal to rework Pacto de San José, under which Mexico and Venezuela supply crude to Central American countries under relatively easy terms. In April 2006, Venezuela's national oil company Petróleos de Venezuela, S.A. (PdVSA) signed an agreement with an association of Nicaraguan mayors to set up a joint venture for importing and supplying oil at preferential terms. Under the agreement, Venezuela will accept 60 percent of payment within 90 days of shipment, while the remaining 40 percent can be paid off over 25 years at 1 percent interest, including a two-year grace period (*Platts Commodity News* 2006h).

A1.104 In 2004, a presidential directive was issued, ordering a reduction in public fuel and electricity consumption (IMF 2004c). The government has a plan to develop renewable energy generation projects in order to reduce dependence on fossil fuels in the power sector. In 2006, one of Europe's largest operators of renewable energy projects was awarded a concession to explore and develop the El Hoyo-Monte Galán and Chiltepe geothermal fields. In addition, Brazil's Export-Import Bank said it would finance plans to expand output from the San Jacinto-Tizate geothermal field (Economist Intelligence Unit–Business Latin America 2006)

Assessment

A1.105 The Government of Nicaragua has not intervened directly in petroleum pricing or taxation in order to help consumers weather the higher oil prices. However, the freezing of power tariffs has been forced by strenuous opposition to the President's

policies. As a result, the country is experiencing blackouts. The transport sector has not been able to recoup its cost increases, leading to strikes by the bus and taxi drivers, followed by counter demonstrations from students opposing any increase. The room for maneuver by the government has been extremely limited, largely on account of the willingness of the opposition to seize opportunities to oppose the President.

A1.106 As with other countries in the region, some in the government of Nicaragua have turned to Venezuela to to mitigate higher oil prices. The agreement between PdVSA and Nicaraguan mayors led by Daniel Ortega signed in April 2006 is the second to be negotiated at sub-national levels, after a similar arrangement with mayors from El Salvador earlier in the same month. The accord is on the same terms as the PetroCaribe initiative, which Central American governments have opted not to join.

Rwanda

A1.107 Rwanda imports all of its oil needs in the form of petroleum products. Petroleum fuel consumption in 2006 is projected to amount to an estimated 0.17 million m^3 (2,900 barrels per day). Diesel will account for half of demand, gasoline less than 30 percent, and kerosene and fuel oil slightly more than ten percent each (World Bank 2006b). The imports come by road from Kenya, via the Mombasa to Nakuru pipeline, and from there via Uganda by truck. Historical inflation rates in Rwanda are given in Table A1.22.

Table A1.22 Consumer Price Index Trend in Rwanda

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.0	2.3	7.1	12.0	9.4

Source: IMF 2006i.

A1.108 The demand for petroleum products has been strongly affected by the performance of the power sector. At one time only 5 percent of power used petroleum products as fuel, but currently thermal power accounts for more than 40 percent of total supplies. This is due to a combination of circumstances: droughts have reduced hydro capacity; demand has been growing rapidly; and dilapidated infrastructure (transmission and generation) resulting from years of neglect and the civil war has resulted in large system losses. Until recently there was a distinct shortage of capacity and blackouts were experienced. A series of measures have been taken to increase capacity. A large fraction of the thermal generation—especially rented generators—now uses diesel. Given high costs of power generation from diesel, the government is looking to switch to heavy fuel oil. Other sources of power are also being explored: power via interconnectors to other countries, and from methane gas extracted from Lake Kivu.

A1.109 The government controls the price of petroleum products and increased them three times in 2004 and twice in 2005. After the increase of September 2005, a liter of super gasoline and of automotive diesel cost $1.03. During 2003 and 2004, the government reduced taxes and duties on petroleum products to partially offset the impact of higher international oil prices on consumers. However, the Government increased the import duty on gasoline by $0.13 a liter and on diesel by $0.07 a liter in December 2005.

At the same time the Government instructed that retail prices should not be increased, thus forcing traders to absorb the tax increases. A government official stated that the government would now be absorbing 55 percent of the subsidy (through its previous reductions in taxes) while traders would now be absorbing 45 percent as opposed to their previous 24 percent (*New Times* 2005). Import duties on diesel for power generation were set below those for other uses in order to help keep power tariffs from rising too quickly. Fuel prices following the price increase in April 2006 are shown in Table A1.23.

Table A1.23 Fuel Prices in Rwanda in April 2006

Units	*Gasoline*	*Diesel*	*Kerosene*
US$ per liter	1.10	1.08	1.08
Rwanda francs	607	595	594

Sources: BBC Monitoring Africa 2006b, *All Africa* 2006f.

A1.110 Rwanda's dependence on the import route from Kenya via Uganda not only imposes very high additional transportation costs, but has at times also resulted in product scarcity. Following the Kenyan government's decision that oil importing companies should pay duty upfront on imports, these companies started to reduce their orders from stocks, thus creating shortages. In addition, the new electronic clearance system installed in Kenya in July 2005 initially resulted in lengthy delays in obtaining import clearance.

A1.111 The government's policies toward coping with the higher oil costs so far have concentrated on reducing taxes and duties to the extent possible, and looking toward lowering the costs of power generation. The use of gas to power could make a substantial difference to the energy balance, but the use of lake gas is a completely new energy source with unknown performance. No other energy saving or energy efficiency program has been announced.

Assessment

A1.112 Tthe government has so far been able to shield consumers from much of the impact of higher oil prices, through a reduction in taxes and duties. The sustained oil price increase, plus the large increase in the dependence on petroleum products for thermal generation, however, is placing a substantial strain on government finances. Medium-term solutions focusing on fuel switching may not be effective quickly enough to prevent a worsening of the current situation.

Senegal

A1.113 Senegal produces no oil and has a domestic refinery. In 2003, Senegal imported sixty percent of its oil as crude and the rest as products (EIA 2005a). According to IEA statistics, Senegal consumed 1.35 million tonnes of petroleum products in 2003. Diesel accounted for 41 percent of the total consumption, heavy fuel oil 28 percent, LPG 9 percent, aviation kerosene 13 percent, and non-aviation kerosene 1 percent (IEA 2005b). Historical inflation rates in Senegal are given in Table A1.24.

Table A1.24 Consumer Price Index Trend in Senegal

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.1	2.2	0.0	0.5	1.7

Source: IMF 2006i.

A1.114 The government sets price ceilings for all petroleum products except LPG sold in small cylinders. The ceilings are based on the sum of import parity, internal transport, and other costs, and calculated on the fourth Thursday of every month. There are no subsidies other than those for LPG sold in 2.7 kg and 6 kg cylinders. As for the LPG subsidy, the government reimburses the Société Africaine de Raffinage for the difference between costs and receipts. The retail prices of LPG sold in small cylinders were frozen between January 2000 and August 2005, when prices were increased by about 4 percent. The procedure for reimbursing the Société Africaine de Raffinage has caused delays of as long as six months, resulting in the firm's carrying a deficit (*All Africa* 2006a). There is also a low tax on diesel for small-scale industry (*LKBN Antara* 2005). Retail prices in May 2006 are given in Table A1.25. The large size of the cross-subsidy given to LPG sold in 6 kg cylinders is evident.

Table A1.25 Retail Prices in Senegal in May 2006

Units and currency	*Super gasoline*	*Diesel*	*Kerosene*	*LPG 6 kg*	*LPG 12.5 kg*
Units	Per liter	Per liter	Per liter	Per kg	Per kg
US$	1.26	1.05	0.81	0.54	1.27
Franc communauté financière africaine (CFA francs)	650	540	416	279.2	651.6

Source: www.ausenegal.com/pratique/prix.htm.

A1.115 Despite the country's ability to pass on prices fully to consumers (with the exception of LPG), the government, facing elections in 2006, has been looking at ways to reduce prices for consumers. In October 2004, the government said that a price stabilization fund would be put in place to insulate consumers from the volatility of oil prices. A year later in October 2005, the Minister of Energy and Mines reiterated that money would be set aside to create a petroleum products stabilization fund, but at present no further details are available. The minister also announced the government's intention to increase refinery capacity.

A1.116 Over the last thirty years, Senegal has followed a policy of encouraging the use of LPG as a means of protecting the environment and preventing deforestation. Much of the use of LPG is in Dakar, with 50 percent of urban households using it. This has been achieved historically through heavily cross-subsidizing 2.7 and 6 kg cylinders with larger cylinders—in December 2000, for example, the subsidy given to LPG sold in 2.7 and 6 kg cylinders reduced the ex-refinery bulk price of LPG to one-third of its actual cost (Nordic Consulting Group 2000). The annual subsidy amounted to 19 billion CFA francs (US$36 million) in 2004 (2.5 percent of the budget receipts), increased to 20–25 billion CFA francs (US$38–47 million) in 2005, and could reach 37–40 billion CFA

francs (US$68–73 million) in the future. In early 2006, the government was said to be providing a subsidy of 337,000 CFA francs (US$615) for each tonne of imported LPG (*All Africa* 2006b).

A1.117 In 2006, power shortages in Senegal became longer and more frequent. The national electricity company attributed the outages to disruptions in the delivery of diesel fuel to power plants. In part on account of fuel prices which had increased by two-thirds in the last two years, the electricity company was having increasing difficulties paying for diesel. The power outages have led to a buying rush on generators by businesses and others (Reuters News 2006k).

A1.118 Senegal has been prospecting for oil and gas for more than 50 years without notable success. The government in the last few years has renewed efforts to market hydrocarbon exploration and production. Encouraged in part by recent offshore oil discoveries in neighboring Mauritania, the government stated in June 2005 that eight oil firms had committed to drilling 29 wells. The government has expressed hope that, with more sophisticated seismic techniques than those used in the past, the current efforts at promoting exploration and production will meet with greater success (Reuters News 2005a).

Assessment

A1.119 Senegal's policy of charging market prices for petroleum products, with the exception of LPG, has so far not resulted in substantial popular opposition. Nevertheless, mindful of the pending elections, the government is starting to show concern that they should be seen to be taking action if oil prices continue to stay at current levels, if only to smooth them out via a price stabilization fund.

A1.120 With rising international prices of LPG and an effective freeze on the domestic prices, the government is finding it increasingly difficult to fund the LPG subsidy. Because this subsidy benefits mainly consumers in Dakar, its removal could be politically difficult, even though the very poor do not use LPG and, as such, subsidy removal would have only a modest impact on relative poverty.

Sri Lanka

A1.121 Sri Lanka has one refinery and imports all of its oil needs, of which about 40 percent was in the form of products in 2002 (EIA 2005a). According to IEA statistics, Sri Lanka consumed 3.5 million tonnes of petroleum products in 2003. Diesel accounted for 51 percent of the total consumption, heavy fuel oil 21 percent, gasoline 10 percent, aviation and non-aviation kerosene 6 percent each, and LPG 5 percent (IEA 2005b). Historical inflation rates in Sri Lanka are given in Table A1.26.

Table A1.26 Consumer Price Index Trend in Sri Lanka

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	14.2	9.6	6.3	7.6	11.6

Source: IMF 2006i.

A1.122 Sri Lanka's refinery is old and inefficient, and lacks economies of scale. The plan to build a new and larger refinery has been hampered by opposition from the trade union of the state-owned Ceylon Petroleum Corporation's (CPC) which fears eventual privatization of the refinery and removal of fuel price subsidies (*Platts Commodity News* 2006b). Until 2003, the petroleum sector was entirely in the hands of CPC. As part of petroleum sector liberalization, the government decided to invite two additional players to enter the market. In 2003, a subsidiary of the Indian Oil Company (Lanka IOC) became the first foreign operator in downstream petroleum in Sri Lanka, having acquired about a third of retail outlets. A third player is scheduled to enter the sector, but this has been delayed.

A1.123 Retail fuel prices are controlled by the government. In 2002, the retail market (import, storage, and distribution) was deregulated. The government in February 2002 introduced a market-based pricing mechanism, whereby all petroleum product prices were reviewed each month and adjusted on the basis of world oil prices and the exchange rate. In February 2003, the rising price of oil caused the government to step in and begin subsidizing diesel and kerosene. The government announced at the time that the subsidy scheme would last a maximum of two months and cost an estimated Rs300 million (US$3.1 million) a month (*Dow Jones International News* 2003a). Upon instructions from the government not to raise prices for 45 days, CPC did not raise fuel prices between February 13 and March 28, 2003, and incurred a loss of Rs900 million (US$9.3 million) in these two months (Xinhua News Agency 2003, *Dow Jones International News* 2003b). Prices were not changed between April and September 2003, after which they were adjusted on a regular basis for a few months, but not sufficiently to cover costs. The pricing formula was revised in early 2004, to be in force for five years. The new formula was similar to the February 2002 formula, and in addition included an accurate allocation of a retail margin for all players. By February 2004, CPC stated that its monthly loss had grown to Rs1.5 billion (US$15 million) (*Dow Jones International News* 2004). The onset of a national election in April 2004, followed by provincial council elections in July 2004, led to promises that petroleum product subsidies would continue. The mechanism for providing subsidized fuel was to control the prices charged by the two companies, and to reimburse them the difference between the price charged and the price indicated by the formula. In the case of CPC, the company was able to offset the unreimbursed subsidies against corporate taxes payable—in 2005, almost Rs21 billion (US$210 million) in subsidy claims were offset in this way—and had little financial impact on the firm. In the case of Lanka IOC, however, the delays in subsidy reimbursements have had serious financial consequences.

A1.124 The government froze fuel prices between February and July 2004. In June 2004, the finance minister announced that raising fuel prices would be the government's last resort, to be implemented only if all other options failed (*Bernama Daily Malaysian News* 2004). After price increases in July, August, and September 2004, prices of petroleum products remained constant between September 2004 and May 2005, at which time price increases ranging from 9 to 12 percent were implemented for gasoline, kerosene, and diesel. This was followed in June by further 7–9 percent fuel price increases. In July 2005, a 15 percent VAT on diesel was removed, but the retail price was

not adjusted downward. Even these increases still left a substantial element of subsidy in the kerosene and diesel prices. The strategy has also been to provide a larger subsidy to kerosene, which is widely used by lower income households. However, the very large differential between the kerosene and diesel prices raises concerns that kerosene could be adulterated into diesel for vehicle use. The government raised retail fuel prices in April and June 2006. Table A1.27 gives product prices after the price increase of June 2006. It is worth noting that kerosene is as cheap as furnace oil.

Table A1.27 Fuel Prices in Sri Lanka after the Price Increase of June 2006

Units	*Gasoline (90 RON)*	*Gasoline (95 RON)*	*Kerosene*	*Regular diesel*	*High grade diesel*	*Furnace oil*
US$ per liter	0.90	0.93	0.42	0.59	0.64	0.42
Rupees per liter	93.0	96.0	43.5	61.0	66.3	43.3

Source: Local information.

A1.125 Faced with the increasing cost of the subsidies—Rs15 billion in 2004 increasing to Rs26 billion (about US$250 million) in 2005 (*Global Insight Daily Analysis* 2006d)—the government has looked for various ways of obtaining financial relief (Economist Intelligence Unit–ViewsWire 2005a). In 2004 the Government of Sri Lanka asked the Government of India for a line of credit (a loan over a seven-year period) to help pay for its imports. The Indian Oil Corporation, which was already owed US$30 million by the government of Sri Lanka, declined to provide a company guarantee to the Government of India against this loan. Other avenues explored by the Government of Sri Lanka included requesting OPEC to delay its import bill for up to one year, and Petronas to also defer repayments. The government also requested Lanka IOC to convert the money owed to it into a loan, and also argued that it did not need to recompense the company (see below).

A1.126 The fuel price subsidy bill in 2004 was close to Rs20 billion (US$200 million). Although the fiscal situation in Sri Lanka during 2005 was temporarily helped by the large flows of aid and a freeze on some debt repayment following the tsunami at the beginning of 2005, the government was unable to remove or reduce the subsidy burden. In May 2006, CPC stated that 93 RON gasoline should be sold at Rs100 per liter rather than Rs88, diesel at Rs69 instead of Rs58, and kerosene at Rs67, nearly double the prevailing retail price, to eliminate losses (*Asian Tribune* 2006).

A1.127 Although the government began reimbursing Lanka IOC regularly starting in October 2005, in May 2006 the company stated that it would not replenish its stocks—amounting to 43 days for diesel and 18 days for gasoline at the time—unless the Sri Lankan government moved to settle a disputed subsidy claim of Rs7.44 billion (US$72 million) (Asia Pulse 2006g). By June 2006, Lanka IOC retail outlets had run out of gasoline. The company announced in December 2005 that it would have to shut down within three months if the money owing was unpaid, which led to the suspension of its shares on the Colombo stock exchange (Asia Pulse 2005d). A controversy erupted when the Public Enterprises Reform Commission, which carried out the petroleum sector

restructuring that enabled Lanka IOC to enter the Sri Lankan market, said that Lanka IOC was entitled to a subsidy reimbursement only if they incurred a loss (Asia Pulse 2006a). In May 2006, Lanka IOC announced that in the fiscal year ending on March 31, 2006, the company made a loss of US$70 million (Organization of Asia-Pacific News Agencies 2006c).

A1.128 The position of CPC, which is also owed money by the government to cover the costs of subsidies, has been adversely affected by the problems of the power sector. A prolonged drought reduced the availability of hydropower and necessitated increased consumption of diesel, while power tariffs were also being held down. As a result the Ceylon Electricity Board was behind in its payments to CPC, as were some government departments, leading to unpaid dues totaling Rs7 billion (US$70 million) by various government entities by mid-June 2005 (Economist Intelligence Unit–ViewsWire 2005a). By the end of 2005, the Ceylon Electricity Board alone owed CPC Rs10 billion (US$100 million), although about 40 percent of this debt was offset against CPC's taxes payable.

A1.129 There is a proposal to amend the CPC Act to change the present constitution of CPC from that of a government corporation to a government-owned company, coming under the purview of the Companies Act. This would provide the entity with more commercial autonomy and enable it to compete effectively with Lanka IOC (and a third player at some future date).

A1.130 In the LPG sector, Shell Gas Lanka Limited (owned 51 percent by Shell, 49 percent by the government) had a five-year monopoly in importing and supplying LPG, which expired in December 2001. LPG is sold in 2.3 kg and 12.5 kg cylinders. Shell Gas Lanka and Laugfs Lanka Gas are the main marketers today. Pricing of LPG, based on a two-month formula, has been politically sensitive. The Commerce and Consumer Affairs Ministry conducted a study into what it claimed were unfair LPG price hikes by Shell Gas in 2002. Following the study, the Fair Trading Commission in January 2003 instructed Shell Gas Lanka to pass on "potential interest income" earned on its products to consumers. Shell Gas appealed, but settled out of court. The condition for the out-of-court settlement was that Shell reduce its LPG prices immediately, which Shell did. In November 2004, January 2005, and March 2005, the government rejected Shell's application for price increases. Laufgs Gas has similarly had its requests for price increases rejected.

A1.131 It reached a point where LPG marketers threatened to cut off supply if their requests to increase prices were not granted. The government responded that it would use emergency regulations to ensure continuous supply of LPG (South Asia Logistics 2006). In January 2006, Shell Gas Lanka was selling LPG in 12.5 kg cylinders for Rs960 (US$0.75 per kg) (Laugfs News 2006). To help keep LPG prices down, the government also offered a temporary subsidy of Rs67 per 12.5 kg cylinder in early 2004, but withdrew it in July. In August 2005, the government removed the 15 percent VAT on LPG.

A1.132 The government of Sri Lanka, which relies on a coalition of parties for its support, has felt unable to introduce unpopular measures, especially in the periods before

elections. This has ruled out not only increasing prices, except at times of severe pressure from international donors and financial institutions, but also engaging in any major program designed to save energy. The only well publicized move was to sharply increase import duties on private vehicles in late 2004.

A1.133 The government is increasingly pinning hopes on oil and gas discovery in Sri Lanka. In October 2005, it formed a new ministry for petroleum resources development to help move forward with its plans to invite bids in 2006 for oil and gas exploration. The new Petroleum Resources Development Minister, addressing the ministry's inauguration ceremony in January 2006, stated as a government goal production of oil in Sri Lanka within three years.

Assessment

A1.134 The experience of Sri Lanka illustrates the difficulties faced by a government in a weak political position and entirely dependent on imported oil. The government embarked on a policy of subsidization through a scheme of compensation to the oil companies against the backdrop of rising world oil prices in anticipation of U.S. invasion of Iraq in February 2003. Despite its initial intent to terminate the subsidy after two months, the government was not able to do so—hopes that this would be short-lived were dashed by the prolonged oil price rise and, once the subsidy scheme had started, it became increasingly difficult to remove it since the required price increases became larger and larger. The fiscal deficit has remained above 8 percent of GDP over the last few years (*Global Insight Daily Analysis* 2006a).

A1.135 The government has attempted to push some of the costs onto the oil companies, one of which was the first private sector entrant into the sector. In the LPG market, there is a continuing battle between LPG suppliers and the government over price adjustments, even to the point of making threats about cutting off supply and invoking emergency regulations. The delay in compensating Lanka IOC for the subsidized prices, and at times even refusing to acknowledge that repayment is due, does not build confidence and may deter further private sector entry both in the hydrocarbons sector and other sectors. The situation is made difficult by the oligopolistic structure of the market and inadequate competition following recent sector deregulation.

Tanzania

A1.136 Tanzania is entirely dependent on imports, all in product form. According to government statistics, Tanzania consumed 1.45 million tonnes of petroleum products in 2004 (Government of Tanzania 2005). IEA statistics for 2003 show that diesel accounted for 53 percent of the total consumption, gasoline 16 percent, non-aviation kerosene 12 percent, heavy fuel oil 10 percent, and aviation kerosene for 7 percent. LPG consumption was negligibly small (IEA 2005b). About 90 percent of imports come through Dar es Salaam port (*East African* 2005a). Historical inflation rates in Tanzania are given in Table A1.28.

Table A1.28 Consumer Price Index Trend in Tanzania

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	5.1	1.0	3.5	0.03	8.6

Source: IMF 2006i.

A1.137 The oil sector was deregulated and prices liberalized in 2000. Retail prices are unregulated and float freely. Although there are 43 registered marketing companies, fewer than 20 are currently active. Of these, 14 own and operate storage depots. Tanzania had a refinery which closed following sector deregulation. Currently it acts as an oil storage depot.

A1.138 Tanzania relies heavily on hydro energy. According to government statistics on the national grid, 93 percent of installed capacity and 98 percent of total electricity generated in 2004 was from hydro power.[10] The total amount of electricity generated declined steadily between 2002 and 2004. Electricity generation at 2.0 terawatt-hours in 2004 was lower than 2.1 terawatt-hours produced in 1998. The decline was a result of droughts in the region (President's Office–Planning and Privatization 2005). The rise in oil prices has coincided with a drought which has required switching to thermal capacity. Gas from the Songo-Songo field came on stream in July 2004 and supplies some power, initially with an installed capacity of 115 MW and recently expanded to 180 MW. The increased generation capacity from the gas-fired power plant, however, was nowhere near sufficient to offset the reduction in hydropower generation, resulting in blackouts. Users are turning to back-up generators to ensure continuous supply. In February 2006, Tanzania extended load shedding from 8 to 12 hours a day, cutting power to all household consumers, businesses, and offices in residential areas from 7:00 a.m. to 7:00 p.m. By March 2006, load shedding was increased further to 16 hours a day. Out of the total hydro capacity of 561 MW, the effective capacity had declined to 168 MW by the end of January 2006, and to 51 MW by the end of February (Reuters News 2006e).

A1.139 The government imposes a number of taxes on petroleum products. These include excise duties, 20 percent VAT (which is also levied on the excise duty), customs duty, and a fuel levy. Estimates indicate that about a third of the retail price is due to the tax component. In mid-May 2006, gasoline was selling in Dar es Salaam for 1,360 Tanzanian shillings (US$1.10) per liter, and diesel for 1,356 shillings (US$1.09) (Xinhua News Agency 2006e). The 2005–06 budget exempted jet fuel from excise tax to cushion domestic airline operators from higher fuel prices. This exemption is believed to have led importers to import illuminating kerosene as jet fuel to avoid the excise tax. The Tanzanian Bureau of Standards has reportedly not found a single consignment of illuminating kerosene in its inspections. The Bureau has formally proposed that the excise tax exemption on jet fuel be eliminated (Xinhua News Agency 2006d, *East African* 2006b).

[10] The total capacity was reported as 619 MW, of which 42 MW was thermal and the balance hydro. The statistics do not include 115 MW from the Songas gas-to-power project.

A1.140 There appears to have been no widespread criticism of, or resistance to, the increases in retail product prices that have occurred, and the government has not proposed any scheme for reducing their impact on users. However, in Zanzibar in 2005, there were occasions in which there were fuel shortages, due to late arrival of cargoes, and this pushed up the price of gasoline to as high as Sh2,000 (US$1.76) a liter in September 2005 (BBC Monitoring Africa 2005b).

A1.141 The government has, for some time, been combating the effects of tax evasion, adulteration, smuggling, and dumping, which have resulted in substantial losses to the Treasury. Adulteration of kerosene into diesel has been widely reported, exacerbated by recent excise tax exemption on jet fuel, while "no name" filling stations have appeared with lower prices, but at which adulteration and short selling are said to be rampant. Smuggling is profitable partly because of the substantial tax rates that are levied on legitimate sales, and partly because of the sale of sub-standard fuels. Smuggling has largely taken place at other points of entry than Dar es Salaam, since tax evasion is easier in such locations. The government first tried to combat this practice through use of color bio-coding. According to the figures released by the Tanzania Association of Oil Marketing Companies, the number of illegal sites selling bad fuels was reduced from 60 percent in 2001 to 19 percent in 2004 (Xinhua News Agency 2005a). These statistics notwithstanding, consumer complaints about deteriorating fuel quality persisted. From April 2004, the government tried testing all products at the point of entry to the country in response. Fuel marking was discontinued in April 2005.

A1.142 In July 2004, the government installed 14 flow meters at the port in Dar es Salaam to measure fuel imports and to eliminate under-declaration of volumes. However, this has resulted in massive and costly congestion at the oil jetty, in part because the meters operate slowly or not at all. Some ships are said to have queued for up to two weeks before discharging because of frequent breakdowns in the meters. Demurrage charges have increased and are blamed for contributing to higher retail prices (*East African* 2005b). The government in April 2005 formed a team to investigate the allegations that some oil marketing companies had tampered with the flow meters to make it operate intermittently to evade taxes. According to records, for example, the flow meter on the diesel line was reportedly out of order between March 24 and April 22, 2005, likely resulting in a large loss of revenue to the government (Xinhua News Agency 2005b).

A1.143 No program of fuel saving measures has been publicly announced, but the impact of increased use of heavy fuel oil and diesel in the face of hydro shortages and power blackouts is placing an increasing strain on the economy. These concerns have heightened interest in fuel switching to natural gas and coal, and in hydrocarbon exploration. Tanzania is giving consideration to promoting CNG in the transport sector. Kiwira Coal and Power Ltd. plans to double its annual coal production to 300,000 tonnes to boost the country's power output by up to 200 MW (*East African* 2006a). The government is also reportedly considering legislation for the production of bioethanol (*All Africa* 2006g). As with Kenya, interest in exploration in Tanzania is largely focused on offshore. The government attracted several new investors through its third licensing

round in 2005. Discoveries of natural gas deposits in Tanzania's shallow waters—the only development of which to date is Songo Songo—are giving grounds for optimism.

Assessment

A1.144 Tanzania, despite substantial taxes on petroleum products, has seen the increased cost of petroleum products passed on to consumers, without any offsetting government policies. So far, this has not resulted in widespread opposition or calls for subsidies. An important reason for the increasing impact of higher prices is the increasing use of petroleum products for power generation, which may be reduced as further gas-fired power stations come on stream, and if the hydro conditions improve.

A1.145 Commercial malpractice, in the form of tax evasion and fuel adulteration, has made it difficult to have fair and healthy competition, while the steps taken by the government to address tax evasion are blamed for introducing additional inefficiencies in the market and increasing prices markedly. Tanzania's experience mirrors that in Kenya in this respect.

Uganda

A1.146 Uganda has neither crude oil production nor a refinery and is entirely dependent on imports of petroleum products. The major imports are gasoline and diesel (used for transport and for power generation). According to government statistics, Uganda consumed about 630,000 m^3 of petroleum products in 2004. Of the total, 41 percent by volume was diesel, 29 percent gasoline, 12 percent aviation fuel, 8 percent kerosene, and 1 percent LPG (Ministry of Mineral and Energy Development 2005). Because Uganda is landlocked, it depends largely on an oil product pipeline from Mombasa to Eldoret, both in Kenya, from where products have been trucked to Kampala. Some fuels are also transported by railway. The balance is imported through Tanzania. This arrangement has resulted in high import costs and uncertain supply. Historical inflation rates in Uganda are given in Table A1.29.

Table A1.29 Consumer Price Index Trend in Uganda

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	2.0	-0.3	7.8	3.3	8.2

Source: IMF 2006i.

A1.147 The downstream sector was liberalized in 1994, and price controls and bureaucratic resource allocation were abolished. A new petroleum supply act was promulgated in October 2003. A substantial number of licensed companies operate in the country, including several international oil companies. Shell, Total, and Caltex controlled about two-thirds of the market in 2004 (Ministry of Mineral and Energy Development 2005).

A1.148 Excise duties and VAT are levied on petroleum products, including kerosene and LPG, and the tax on petroleum products accounts for a large share of total government revenue, amounting to an estimated 204.5 billion Ugandan shillings (US$113 million) in 2004 (Ministry of Mineral and Energy Development 2005). In July 2005,

VAT was raised by one percentage point to 18 percent, and excise duties on gasoline and diesel were also raised to Sh720 (US$0.41) and Sh450 (US$0.26), respectively, per liter. These taxes account for up to 50 percent of the final sales price of gasoline. The combined impacts of high transportation costs and the taxes levied on petroleum products have led to Uganda's experiencing among the highest prices in Africa. However, there has been little protest against the price levels themselves.

A1.149 The Uganda shilling appreciated 11 percent against the U.S. dollarand 19 percent against the Kenyan shilling in 2004. This enabled retail prices to close almost at the same level as at the beginning of the year in 2004 (Ministry of Mineral and Energy Development 2005). The Ugandan currency slipped 5 percent against the U.S. dollarand 13 percent against the Kenyan currency in 2005, pushing up fuel prices in the local currency. The retail prices in August-September 2005 are shown in Table A1.30. Prices in May 2006 were higher than those shown in Table A1.30 but not markedly so for gasoline. In the second week of May, gasoline prices in Kampala were increased from 2,220 to 2,300 (US$1.25) shillings, kerosene prices from 1,750 to 1,850 (US$1.01) shillings, and diesel prices from 1,950 to 2,050 (US$1.12) shillings per liter (*Monitor* 2006).

Table A1.30 Fuel Prices in Uganda in August–September 2005

Parameter	*Gasoline*	*Kerosene*	*Diesel (urban)*	*Diesel (rural)*	*LPG (6 kg)*	*LPG (15 kg)*	*LPG (45 kg)*
Units	Per liter	Per liter	Per liter	Per liter	Per kg	Per kg	Per kg
US$	1.19	0.89	0.96	1.02	1.75	1.65	1.54
Shillings	2,200	1,650	1,780	1,890	3,166	3,000	2,800

Sources: *All Africa* 2005h for gasoline, kerosene, and diesel; *All Africa* 2005g for LPG.

A1.150 The prolonged drought in East Africa has caused a serious shortage of electricity. The pressure on the power system prompted the government to encourage the entry of an LPG marketer to supply LPG for cooking and lighting. A load-shedding program cutting power off 12 hours every day to all consumers except certain key installations (such as hospitals) was introduced in February 2006. The hydroelectric dams with an installed capacity of 350 MW are operating at less than one-half of the capacity, and the power generated is supplemented by a 50 MW diesel-fired generator. The government is in the process of procuring an additional 150 MW of diesel generators. As a short-term solution to the acute power shortage in the country, the government agreed in February 2006 to waive taxes on diesel used by commercial generators above a certain capacity, in 2006, although the implementation of the waiver was delayed by several months while the government was finalizing the procedures for granting the waiver.

A1.151 Product supply from Kenya has been problematic, causing frequent supply shortages and, at times, rationing by fuel suppliers. One of the causes is the inadequate pumping capacity of the pipeline to Eledoret in the face of growing fuel demand in the countries that rely on Kenya for supply. Acts of vandalism damaging the pipeline for stealing petroleum products and power failures stopping pipeline operations have added to petroleum product transport problems. Fuel shortages have been exacerbated by power shortages and growing reliance on diesel for power generation. Diesel consumption

surpassed gasoline consumption in 2001, and in 2005 the volume of diesel sold was 40 percent higher than that of gasoline (ISI Emerging Markets Africawire 2006b).

A1.152 The Kenyan government's decision to impose prepayment of excise duties beginning in August 2005 led to major supply disruptions. In January 2006, the government of Uganda stated that the product supply to the country remained below the monthly average of 55 million liters during the first half of 2005. A memorandum of understanding was signed between Uganda and Kenya in December 2005, in which Kenya committed to increase petroleum product supply to Uganda to meet its rising demand. In the first meeting with the Kenyan authorities in January 2006 following the signing of the agreement, the government of Uganda expressed concern over the continuing adverse impact on supply to Uganda of the measures introduced by the Kenya Revenue Authority. These included delays caused by the switch to a new computerized clearing system and a substantial delay in processing tax refunds. The Kenya Revenue Authority assured the Ugandan delegation that steps were being taken to address their concerns (Ministry of Mineral and Energy Development 2006). The two governments are also pursuing the construction of the extension of the pipeline from Eldoret to Kampala, which would increase the efficiency in fuel transport and reduce costs in the long run.

A1.153 To enhance security of supply, the government of Uganda stated in 2005 that it was in the process of expanding strategic oil reserves (Xinhua News Agency 2005c), which are stipulated in the Petroleum Act of 2003. The government is also actively promoting the exploration for oil. In January 2006, an Australian firm announced that it had struck oil at an exploration well, and in May 2006, a Canadian firm made a similar announcement. Commercial discoveries have not yet been announced.

A1.154 Smuggling of lower-priced petroleum products from the neighboring countries has been a problem. In particular, products are exported to the Democratic Republic of the Congo, only to be smuggled back in to be sold below the market price. The government has reacted by banning the transportation of products in drums (which are easier to smuggle) and by embarking on a bio-code program to detect and control smuggling and adulteration through the use of marker dyes—biocode marking of all imported products was made compulsory in 2000—and by increased inspection and testing at points of sale. This program appears to have met with some success.

A1.155 To curtail growing demand for oil, the government has taken a number of steps. In December 2004, the energy minister announced that the government would waive taxes on energy-efficient electrical appliances and increase taxes on inefficient ones (*All Africa* 2004c). The government is also promoting alternative energy. The government has waived all taxes on solar equipment and accessories. President Museveni announced in February 2006 that anyone who installs solar equipment for lighting, water heating, and water pumping will be given a 45 percent subsidy (Xinhua News Agency 2006b). In addition, the government is carrying out research into biodiesel.

Assessment

A1.156 Uganda illustrates the difficulties faced by a landlocked country dependent on others for oil product supply. Another example of a landlocked is given by the Kyrgyz Republic, discussed in annex 2. Supply disruptions are not only inconvenient but put

upward pressure on prices. The on-going drought in East Africa has compounded the problems faced by the country. The government has made considerable efforts to hold discussions with the Kenyan authorities. In the near term, the Joint Technical Committee, established under the memorandum signed in December 2005, could do much to help streamline fuel storage and transport in and from Kenya. In the longer term, the pipeline to be built between Eldoret and Kampala can go a long way in achieving an efficient mode of fuel transport.

A1.157 Uganda's deregulated system has so far coped with the price increases without substantial protests, which is all the more remarkable given the high level of prices due to the substantial freight costs of importing, and the need for the government to rely on high tax rates on fuels as a source of revenue. In the context of more serious concerns with power shortages and the shortage of diesel, there appears to have been support for the government's policies in the sector to improve efficiency, to reduce smuggling and adulteration, and to look for longer-term solutions to the problem.

Zambia

A1.158 Zambia produces no crude oil but has a refinery. About 80 percent of its needs are imported as crude via the Tanzania-Zambia pipeline, which is in a bad state of repair and is subject to leaks as well as to vandalism by those who try to steal oil. Unscheduled and longer-than-planned refinery shut-downs have led to supply disruptions, necessitating fuel imports from South Africa and other neighboring countries. According to IEA statistics, Zambia consumed 560,000 tonnes of petroleum products in 2003. Diesel accounted for 47 percent of the total demand, gasoline 27 percent, heavy fuel oil 10 percent, aviation kerosene 8 percent, non-aviation kerosene 3 percent, and LPG 1 percent (IEA 2005b). Diesel demand has surged because of the rapid growth of the mining industry. Historical inflation rates in Zambia are given in Table A1.31.

Table A1.31 Consumer Price Index Trend in Zambia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	5.7	2.0	9.8	11.6	10.3

Source: IMF 2006i.

A1.159 The retail market is deregulated and subject to competition. Several major international oil companies operate in the country. The Energy Regulation Board publishes recommended retail prices, which are changed if international market prices have changed by more than 2.5 percent. However, actual prices charged often diverge from the recommended prices.

A1.160 The government has, on several occasions, reduced taxes on petroleum products in order to moderate the effect of international price increases on domestic consumers. In November 2004, import duties of 5 percent on crude oil and petroleum products were eliminated. In 2005 the government removed the 5 percent VAT on petroleum products and reduced excise duty. Recommended fuel prices in September 2005 are shown in Table A1.32. The kwacha appreciated almost 40 percent between September 2005 and May 2006, enabling local prices to fall. Fuel prices in May 2006

were 5,410 kwacha (US$1.68) per liter of gasoline, 3,601 kwacha (US$1.12) per liter of kerosene, and 4,622 kwacha (US$1.44) per liter of diesel (*Times of Zambia* 2006).

Table A1.32 Recommended Fuel Prices in Zambia in September 2005

Units	*Gasoline*	*Kerosene*	*Jet fuel A1*	*Diesel*
US$ per liter	1.36	0.90	0.58	1.21
Kwacha per liter	5,985	3,946	2,552	5,324

Source: Xinhua News Agency 2005h.

A1.161 The refinery has been subject to scheduled and unplanned maintenance and repair, leading frequently to serious fuel shortages, black-marketing, and several episodes where actual retail prices were well above the recommended prices. Most recently, the refinery had an unscheduled shut-down in March 2006 due to a shortage of crude supply, prompting imports of refined products, mainly diesel. The fuel crisis in September–November 2005 was particularly damaging to the economy. The refinery initially shut down for routine maintenance—the fourth shut-down of the year—but problems discovered during the maintenance forced the refinery to remain closed longer than planned, causing a serious fuel shortage. The refinery did not resume operation until mid-October, by which time illicit dealers in the Northwestern Province were reportedly selling gasoline at prices two and a half times that in the capital (Xinhua News Agency 2005i). A month later, the refinery suffered a serious fire, again forcing closure.

A1.162 The copper mines, a significant foreign exchange earner and the largest employer in the country, paid a high price for the fuel shortage. Konkola Copper Mines, the country's largest copper producer, reported that it was paying US$780 per tonne of imported fuel compared to the US$445 it used to pay for the domestically sourced fuel. A shortage of rail tankers exacerbated the situation. The company was forced to halve production at its Nkata smelter, while the country's second largest copper producer had to close its Mufulira smelter for almost four weeks. Konkola estimated that the losses arising from the fuel shortage would amount to US$12 million in October and US$29 million in November (*Platts Commodity News* 2005g).

A1.163 To alleviate the impact of high fuel import costs, the government in October 2005 reduced the excise duty on gasoline from 60 to 35 percent, on diesel from 30 to 21 percent, and on heavy fuel oil from 30 percent to zero, a week after removing the 5 percent import duty. Whether the waiver on the import duty would be continued was to be assessed in June 2006. As a measure to ensure maximum supply on the domestic market, the government signed a memorandum of understanding in which no firm would be allowed to export petroleum products without written authorization from the Energy Regulation Board (*Times of Zambia* 2005).

A1.164 The government started a program to build a strategic petroleum reserve to help with possible future shortages. This included rehabilitating oil storage facilities, and financing extra purchases, partly financed by the World Bank. The Energy Regulation Board has advised oil marketing companies to maintain 15 days' working supply of fuel as part of establishing strategic fuel reserves. In March 2006, the Minister of Energy and

Water Development stated that the government was calling for expression of interest from the private sector to manage strategic fuel reserves, and that companies that qualified would be compensated for managing the reserves.

A1.165 A particular difficulty for Zambia has been the pricing of jet fuel. Although recommended prices have followed international market prices, the domestic shortages appear to have resulted in an increase in final prices to a point that airlines have cancelled cargo flights to Zambia, with considerable damage to the country's exports of flowers and fresh vegetables. The government removed a 5 percent duty on jet fuel in August 2005 after airlines threatened to boycott the Zambian route.

A1.166 The government stated in June 2005 that it was considering setting up an oil price stabilization fund. The government does not appear to have announced policies for reducing consumption. In 2004 the government conducted negotiations with Iran to purchase crude at discounted prices but they were not successful. The Minister of Energy and Water Development stated in May 2006 that the government would soon amend its national energy policy to allow blending of ethanol into gasoline, and that the Zambia Sugar Company might start producing ethanol from molasses soon (Xinhua News Agency 2006g, Reuters News 2006n).

Assessment

A1.167 The poor performance of the domestic refinery, which is the dominant source for the supply of petroleum products, has proved expensive for the country. The shortages of products at certain times have led to prices often exceeding recommended retail prices (which are linked to the international market price). The fuel shortages experienced in the second half of 2005 were especially damaging to the economy. Government policy has focused almost entirely on dealing with this situation. Until now the government has not subsidized prices, although there has been recent discussion of introducing an oil price stabilization fund.

Annex 2

Net Oil Importers

A2.1 Thirteen countries, which produce oil but are net importers, are discussed in this annex: Bangladesh, Brazil, Chile, Ghana, Guatemala, India, Indonesia, the Kyrgyz Republic, Pakistan, People's Republic of China, Thailand, and Tunisia. All have at least one domestic refinery with the exception of Guatemala.

Bangladesh

A2.2 Bangladesh produces about 10 percent of its oil needs. The rest is imported in the form of products and crude. According to IEA statistics, Bangladesh consumed 3.5 million tonnes of petroleum products in 2003. Of the total demand, diesel accounted for 49 percent, non-aviation kerosene 17 percent, heavy fuel oil 9 percent, gasoline 7 percent, aviation kerosene 6 percent, and LPG 1 percent (IEA 2005b). Historical inflation rates in Bangladesh are given in Table A2.1.

Table A2.1 Consumer Price Index Trend in Bangladesh

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	2.0	3.3	5.7	3.2	7.0

Source: IMF 2006i.

A2.3 The Bangladesh Petroleum Corporation (BPC) is the country's sole importer and distributor of refined products and crude oil. The retail sector has both private and government-owned gasoline stations. Crude oil is purchased largely through state-to-state deals with Kuwait, Saudi Arabia, and the United Arab Emirates at a premium to Middle East spot quotes on the basis of cost, insurance and freight.

A2.4 The prices of petroleum products are fixed by the government and have persistently lagged behind international prices, resulting in large deficits for BPC. Gasoline prices were increased in May 2005 for the first time since January 2003, and this was followed by an increase in September 2005 and a large increase in June 2006. In May 2004 kerosene prices were equalized with diesel prices to stop adulteration. Diesel and kerosene prices were increased in December 2004, May 2005, September 2005, and June 2006. The end-user prices at the end of June 2006 are shown in Table A2.2. The fuel price increase in June 2006 widened the gap between gasoline and diesel prices

Table A2.2 Fuel Prices in Bangladesh at the end of June 2006

Parameter	*Gasoline (95 RON)*	*Gasoline (80 RON)*	*Kerosene*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.84	0.81	0.48	0.48	0.58
Taka	58	56	33	33	40

Source: Dow Jones Energy Service 2005.
[a] Sold in 12.5 kg cylinders.

A2.5 The prices that have been charged during the last two and a half years have resulted in only 40–80 percent of product price increases being passed through to consumers (see annex 4). The result of this is that financial losses to BPC amounted to a sum equal to 0.75 percent of GDP in fiscal 2005, following earlier large losses in 2004. At present the bulk of the losses arise from under-pricing of diesel and kerosene by about 25 percent (IMF 2006g). BPC owed different banks some 105 billion takas (US$1.5 billion) by April 2006 (BBC Monitoring South Asia 2006). In the face of reluctance of the banks to open new letters of credit for BPC, the finance ministry in February 2006 directed the banks to continue to provide this source of financing (United News of Bangladesh Limited 2006). In the 2006 budget, the government cut the duty on crude oil from 25 percent to 7.5 percent, lowered taxes on petroleum products from 25 to 15 percent, and removed the 15 percent supplementary duty on products. Despite these moves to hold down consumer prices, nationwide strikes have been organized by the major opposition party against the fuel price increases that have occurred. In February 2006, the Finance Minister's remarks on the growing subsidy were interpreted as signaling another price rise. This led to substantial hoarding and panic buying, which resulted in a temporary fuel shortage in certain parts of the country—especially of diesel for irrigation, threatening agriculture—and some retail outlets charging nearly double government prices (Xinhua News Agency 2006a). By May 2006, fuel shortage became a major issue, with reports of closure of numerous filling stations nationwide, reflecting increasing difficulties faced by BPC to purchase and deliver fuels to filling stations (*Global Insight Daily Analysis* 2006c).

A2.6 A further implication of the subsidized product prices is the existence of a large amount of out-smuggled fuels to India and Myanmar where prices are higher. The government has identified 13 major sea and river routes by which fuel was being illegally transported out of the country, and it has stepped up patrols to combat smuggling (Associated Press 2006a).

A2.7 The government is pursuing a number of initiatives to reduce the import bill for crude oil and petroleum products. It has looked at various state-to-state deals, including one with India, to reduce or stabilize import prices, but these have not resulted in any major reduction in prices. In May 2006, it was reported that governments of Kuwait and the United Arab Emirates had agreed to sell oil under concessional terms to Bangladesh (Asia Pulse 2006e, Xinhua News Agency 2006f). Bangladesh is continuing to press ahead with its domestic gas production as a source of fuel for power and industry, although this sector also suffers from under-pricing for some end users. Bangladesh has a

fair amount of natural gas reserves, with a reserves-to-production ratio of 33 years in 2004 (bp 2005). A substantial program of investment in CNG buses is underway, and many car owners are converting to CNG use. Bangladesh ranks 12th in the world in the number of CNG vehicles (IANGV 2006).

A2.8 The government also announced several fuel-saving measures in September 2005. It said that it would reduce fuel allocation to government officials, ban the purchase of new cars from the government budget, and restrict overseas tours by government officials. The government also announced that it would reduce the working week from 6 to 5 days and increase the length of the working day by one hour. Such energy-saving measures as closing shops and restaurants earlier, and switching off neon signs, advertising hoardings and street lights after 10 p.m., were reportedly discussed but not implemented (*Global Insight Daily Analysis* 2005, Xinhua News Agency 2005g).

Assessment

A2.9 The substantial subsidies given to diesel and kerosene, as well as the smaller subsidies for other fuels, have had a large negative effect on the quasi-fiscal deficit of the state-owned petroleum company, and BPC's inability to repay its loans to national banks has in turn sparked a domestic liquidity crisis. As in other countries where the subsidized prices are markedly lower than those in neighboring countries, a substantial amount of out-smuggling has occurred. The government has taken some measures to encourage fuel switching and fuel saving, but these have not yet produced measurable results.

A2.10 The 17 percent increase in diesel, kerosene, and petrol prices, implemented in September 2005, was followed by severe and economically disruptive strike action. The government has found it politically difficult to raise prices because of opposition from parliamentary parties, especially in the light of the upcoming elections in January 2007. These political difficulties notwithstanding, further increases in world oil prices during the first half of 2006 and mounting debts owed by BPC to various banks prompted another round of price increases in June 2006. Absent a reduction in world oil prices, further price increases would be needed to bridge the gap with international prices.

Brazil

A2.11 Brazil was a net importer of oil in 2005. It is on its way to becoming self-sufficient in crude oil in 2006. According to government statistics, the sale of petroleum products through distributors amounted to 84 million m^3 (1.45 million barrels per day) in 2005. Diesel accounted for 48 percent, gasoline 28 percent, LPG 14 percent, heavy fuel oil 6 percent, aviation kerosene 5 percent, and non-aviation kerosene negligibly small. In the transportation sector Brazil mandates addition of anhydrous ethanol to gasoline, set at 25 percent in 2005, and also consumes a large amount of hydrous ethanol, amounting to 4.6 million m^3 in 2005 (ANP 2006). Historical inflation rates in Brazil are given in Table A2.3.

Table A2.3 Consumer Price Index Trend in Brazil

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	6.8	8.4	14.7	6.6	6.9

Source: IMF 2006i.
[a] The average CPI increase in 2005 as reported by the Ministry of Planning, Budget, and Management is 7.5 percent.

A2.12 The refining and retail sectors of the downstream sector have been deregulated since 2002. Virtually all (98 percent) of the country's refining capacity belongs to Petrobras, which also has major interests in the upstream. In the downstream, a number of private sector companies are active and can buy products from import, from Petrobras, or from two very small independent refiners. These refiners must either buy crude from import, or from Petrobras which has charged them at import parity for crude. Petrobras aims to follow international prices, taking into account exchange rate fluctuations. This has meant, in practice, that prices are revised every quarter, but not always.

A2.13 The state controls the board of directors of Petrobras and can exercise control over Petrobras' policies. This arrangement, together with the downstream petroleum sector structure, has allowed the government to have strong control over product prices in recent years. The government has not intervened in price setting for naphtha, aviation kerosene, and heavy fuel oil; these are adjusted every 15 days and largely follow international prices. For the more "social" fuels of gasoline, diesel, and LPG, however, the government has placed considerable pressure on Petrobras not to increase prices at the refinery gate. Following the coming to power of the party of President Lula in January 2003, the ex-refinery prices of gasoline and diesel were increased for the first time in June 2004 (10.8 percent and 10.6 percent, respectively), followed by smaller increases in October (2.4 percent and 4.8 percent) and November (7 percent and 10 percent). These lasted until September 2005 when prices were again increased (10 percent for gasoline and 12 percent for diesel). The Brazilian real has been appreciating steadily since June 2004 (45 percent appreciation between June 2004 and May 2006), and the price increases in U.S. dollars are greater. Interestingly, analysts commented that Petrobras chose to implement price increases in the middle of the month in June and October 2004, spreading the impact of the price increase on CPI over two months (AFX International Focus 2004).

A2.14 Taxes on fuels are substantial, including the PIS/Cofins welfare tax, the CIDE economic contribution tax, and the ICMS sales tax, which is the most important. In October 2005, Petrobras reported that taxes accounted for 46.3 percent of the retail price of gasoline, 28.3 percent of the ethanol price and 26.7 percent of the diesel price (*AE Brazil* 2005). The high tax rate means that increases in wholesale prices tend to produce smaller percentage increases in retail prices. According to the National Petroleum Agency, which acts as a government watchdog, domestic gasoline prices were 30 percent below and diesel prices 20 percent below international prices in mid-2005 (Reuters News 2005b). Keeping the wholesale prices below international parity prices is estimated to have resulted in foregone income to Petrobras of R$1.96 billion (US$840 million)

between January and July 2005 (*Platts Commodity News* 2005c). This has been possible because the upstream involvement of the company and its pricing of other products at world market equivalents have given it a financial cushion to provide these implicit subsidies—Petrobras' post-tax net income rose from US$6.2 billion in 2004 to US$10.3 billion in 2005.

A2.15 LPG prices to consumers have been even more tightly controlled with ANP determining producer prices as well as wholesale and retail margins. Producer prices have not increased since April 2004, when there was a 1 percent increase. Again there is a large tax element. For example, in October 2005, the producer could sell a 13 kg cylinder for R$11.53, while the consumer would have to pay R$29.97 (US$1.02 per kg). About R$12 of this difference was attributable to the wholesale and retail margins (ANP 2006). The government lowered the price of LPG slightly in March 2006.

A2.16 Table A2.4 shows product prices ex-refinery and exclusive of sales tax (but inclusive of the welfare tax and CIDE tax). It should be noted that pure gasoline is not sold in Brazil. All gasoline is blended with 20 percent anhydrous ethanol by mandate and sold as E20.

Table A2.4 Fuel Prices in Brazil, April 10–16, 2006

Parameter	*Gasoline*	*Diesel*	*LPG (13 kg cylinder)*
Units	Per liter	Per liter	Per kg
US$	0.72	0.64	0.48
Brazilian real	1.54	1.36	1.04

Source: www.anp.gov.br/petro/petroleo.asp.

A2.17 The structure of the product market in Brazil has meant that the two independent refiners have been squeezed by the price discrimination practiced by Petrobras. It effectively transfers crude to its own refiners below international prices, while selling crude to the independent refineries at international prices. Its dominance in the product market has meant that it determines ex-refinery prices, and the independent refiners are thus unable to recover costs and have started to reduce production.

A2.18 Brazil is the world's second largest producer of ethanol and the largest ethanol exporter. The bioethanol program has a long history and is now well established. The government has historically provided considerable subsidies to the ethanol industry, and ethanol continues to enjoy a large tax reduction, equivalent to US$0.30 per liter in June 2005 in the state of São Paulo (ESMAP 2005c). After a period of decline, there has been a steep increase in ethanol consumption in the automotive sector in recent years, contributed in part by the launching of flex-fuel vehicles capable of running on any combination of hydrous ethanol and gasohol, and further encouraged by rising world oil prices. Ethanol accounts for more than 40 percent of the ethanol-gasoline market.

A2.19 An important feature of any ethanol program from sugarcane is that it is closely linked to the world sugar market. Brazil is the world's least-cost sugarcane grower, and cane is split evenly between sugar and ethanol production. Sugarcane accounts for 58–65 percent of the total ethanol production cost. The world sugar market is one of the most

distorted in agriculture and is gradually being reformed. Liberalization of the world sugar trade is estimated to increase world sugar prices by 30–40 percent (ESMAP 2005c). The European Union, the world's second largest exporter of sugar, announced its commitment to sugar sector reforms in November 2005, and will start cutting back on exports beginning in 2006, eventually to become a net importer. This and other factors have helped to increase world sugar prices, which reached a 25-year high in early 2006. High world sugar prices led to ethanol price hikes in Brazil, making the price of hydrous ethanol higher than that of gasohol for the first time and prompting the government to cut the mandated percentage of ethanol in gasoline from 25 percent to 20 percent in March 2006. The problem was exacerbated by the fact that these events occurred between sugarcane harvests, when there were no fresh supplies of ethanol. The long-term impact of sugar trade reforms on Brazil's ethanol industry remains to be seen.

A2.20 The government of Brazil is actively promoting biodiesel from soy bean oil. The government allowed blending 2 percent biodiesel into petroleum diesel in December 2004. Petrobras in May 2006 began marketing B2 at 200 filling stations in 14 states. The government is considering making blending of biodiesel mandatory in 2008 (*Latin American News Digest* 2006). Another fuel substitution that is occurring is natural gas in the transport sector. Brazil has the second largest CNG vehicle market in the world, with more than 1 million CNG vehicles (IANGV 2006). Brazil is a net importer of natural gas. Its reserves-to-production ratio was slightly lower than 30 years in 2004 (bp 2006).

Assessment

A2.21 The government of Brazil has been extremely anxious to avoid any inflationary pressures in the economy, which has led it to wish to control certain petroleum product prices. Since it is also highly dependent on petroleum products for tax revenue, it has not been able to cut product taxes, or to offer direct subsidies to households. Instead it has looked to squeeze the margins made by the oil companies. Its majority holding in Petrobras, which has considerable interests in the upstream, has allowed the government to control refinery gate prices for certain key products, thus transferring some upstream rent to consumers. This has placed independent refiners in an unsustainable position, not having access to crude at discounted prices.

A2.22 Brazil's ethanol program is drawing growing attention from around the world against the backdrop of high oil prices. World sugar prices have also been surging in recent months, making ethanol from sugarcane much more expensive than gasoline in early 2006. The problem began to ease once cane harvesting was in full swing by May in Brazil. But given declining supply of sugar as a result of gradual sugar trade liberalization, 2006 should prove to be an interesting year for the world ethanol market.

Chile

A2.23 Although Chile produces a small amount of oil, it imports nearly all of its needs, mainly as crude, which is refined in one of the two refineries belonging to the state-owned oil company Empresa Nacional del Petroleo (ENAP). According to government statistics, product sales in 2004 was 12 million m^3 (200,000 barrels per day). Diesel accounted for 47 percent, gasoline 25 percent, LPG 16 percent, and heavy fuel oil

11 percent. Kerosene consumption, other than aviation kerosene, is negligible (CNE 2006). The recent shortages of natural gas supply from Argentina and the drought in Chile have put pressure on the electricity generation system, requiring an increasing use of diesel for power. Historical inflation rates in Chile are given in Table A2.5.

Table A2.5 Consumer Price Index Trend in Chile

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.6	2.5	2.8	1.1	3.1

Source: IMF 2006i.

A2.24 Chile has historically had a petroleum product price stabilization fund that consists of five separate sub-funds. The fund covers gasoline, kerosene, diesel, heavy fuel oil, and LPG. Between January 1991 and December 2003, the fund had an average monthly balance of US$127 million. By December 2003, however, the fund was down to US$5.6 million (CNE 2006), and had been depleted by the time of the oil price hike of 2004–05.

A2.25 ENAP is the most important single company in the downstream market, but other large oil companies are also present in wholesale and retail. Since 2000, ENAP has been setting wholesale petroleum product prices every week according to price movements in the U.S. Gulf. Wholesale prices consist of import-parity prices (which include a 6 percent import duty), specific fuel taxes, VAT, and transfers to or from the petroleum product stabilization fund. In mid-March 2006, the latter three contributions equaled 48.5 percent of the wholesale price for 93 RON gasoline and 26.1 percent for diesel. The contribution to the price stabilization fund was 2.4 percent for gasoline and nil for diesel (CNE 2006).

A2.26 The price levels in the Metropolitan Region in April 2006 are shown in Table A2.6. The unit price of LPG declines with increasing cylinder size; and the price of LPG sold in 45 kg cylinders was US$1.23 per kilogram.

Table A2.6 Average Monthly Fuel Prices in Metropolitan Region in April 2006

Units and currency	*Gasoline (93 RON)*	*Kerosene*	*Diesel*	*LPG (5 kg)*	*LPG (11 kg)*
Units	Per liter	Per liter	Per liter	Per kg	Per kg
US$	1.13	0.83	0.83	1.59	1.28
Peso	586	432	430	825	667

Source: CNE 2006.

A2.27 The elections in December 2005 put pressure on the government to find ways to protect users from the effects of the higher international prices of crude oil and products. In May 2005 President Lagos announced to Congress a subsidy of 16,000 pesos (US$28) each to be paid to low-income households (covering 5 million people) to offset the impacts of rising fuel prices and their impacts on public transport and heating costs. The total cost of this subsidy was 36.4 billion pesos (US$63 million). The announcement also included another US$16 million for subsidies to 1.4 million low-income households

whose electricity consumption did not exceed 150 kW a month (*Business News Americas* 2005a).

A2.28 President Lagos also announced in the annual state of the nation address shortly thereafter that a ceiling would be placed on diesel prices at 420 pesos (US$0.72) a liter, which corresponded to the then crude oil price of US$55 a barrel. If prices rose into the range between US$55 and US$58, ENAP would cover the extra costs from its own resources, while if they rose to between US$58 and US$61 this was covered by a hedge taken out with JP Morgan. Beyond this level, prices would be allowed to rise. The US$38 million costs to ENAP of this program (including the hedge which was to last for 10 months) would be funded by the government (*Dow Jones International News* 2005b). When the price stabilization insurance expired in March 2006, the government decided not to renew the scheme.

A2.29 In September 2005, facing further oil price increases, exacerbated by the effects of hurricane Katrina on the U.S. Gulf coast, the government announced that refinery margins would be capped for one month, at an estimated cost to ENAP of US$14 million, and that gasoline prices would be capped at 620 pesos (US$1.17) a liter (*Business News Americas* 2005c). Without the measure, the price of gasoline would have risen to 700 pesos. When the Gulf of Mexico became an import market following two hurricanes in the autumn of 2005, ENAP began indexing its domestic wholesale prices against other reference markets, such as New York. This move, announced in October 2005, was expected to provide a more realistic and lower-cost basis for imports and domestic products.

A2.30 A new time-bound stabilization fund for gasoline, kerosene, and diesel was established in September 2005 to achieve price ceilings, to last until June 30, 2006. Given an initial endowment from the rents of the high copper prices between January and August 2005, it would operate with a price band of 5 percent above and below a reference price for each fuel (based on West Texas Intermediate). If the import prices were to rise above the upper band, the government would provide a credit to the importer or producer equivalent to the difference; if the price fell below the lower band, the government would apply a tax on fuel sales to inject new resources into the fund. The fund is separate from the petroleum product stabilization fund, which would continue to cover heavy fuel oil and LPG during this period (CNE 2006, *Business News Americas* 2005b). The new stabilization fund was used for the first time to provide subsidies at the end of March in 2006.

A2.31 In May 2006, President Bachelet announced that her government would establish a new fund to cushion consumers from volatile world oil prices. President Bachelet said that the fund would be similar to the existing fund—established in September 2005 and due to expire at the end of June 2006—"but with some technical improvements." She also announced a handout worth Chilean Peso 18,000 (US$35) to 1.25 million families living on less than Chilean Peso 180,000 (US$347) a month (*Platts Commodity News* 2006l).

A2.32 In the face of declining natural gas supply from Argentina and recent declines in rainfall threatening hydropower supply which accounts for some 60 percent of

total electricity production in the country, Chile is looking elsewhere for sources of energy. It is establishing regasification infrastructure to enable LNG imports. The government is also promoting renewable projects, including biofuels. The Minister of Mining and Energy announced in April 2006 that the government was launching a promotional campaign for wind power generation, and the Chilean national energy regulator and state development agency were conducting a joint study to develop a biofuels industry in the country (*Business News Americas* 2006e). Earlier, ENAP signed a memorandum of understanding with a local sugar firm to undertake a feasibility study on a joint biofuel production project (BNAmericas Oil & Gas News 2006). The government has also held talks with the government of Argentina to develop joint biodiesel projects.

Assessment

A2.33 Chile had adopted a market-based pricing system for petroleum products, but the costs to consumers of the higher prices, at a time when elections were approaching, pushed the government to introduce subsidies. The very strong fiscal performance of the economy, fueled by high copper prices, meant that the burden could be shifted away from consumers to the government. Two forms of subsidy have been used. The first was a targeted cash subsidy to low-income households. One part of the direct subsidy was paid to all such households to cover extra heating and transportation costs, given out in 2005 and 2006, while the other was explicitly tied to households using only a small amount of electricity to compensate for the rises in electricity prices. In addition, the prices of gasoline and diesel were also capped, and a time-bound price stabilization fund, second in the country, was established. The diesel subsidy was set in May 2005 to come into effect above a crude price of US$55 a barrel; crude prices have exceeded US$55 a barrel since the inception of the diesel subsidy, making the subsidy operative. The time-bound price stabilization fund became operative in March 2006.

A2.34 The mechanisms for financing these subsidies may not be replicable in other countries. The hedge for diesel imports taken out by ENAP and financed by the government may be appropriate where there is a large national oil company that is used to trading on the market and assessing future market conditions. In any event, the government decided in March 2006 not to renew the hedge scheme, presumably based on considerations of cost-effectiveness. The time-bound stabilization fund required an initial injection of financial capital that was possible only because of the strong budgetary position of the economy and a higher-than-expected world price of copper, which accounts for some 40–45 percent of Chile's total exports. The government has announced that, when the time-bound price stabilization fund expires at the end of June 2006, it will establish another price stabilization fund with technical improvements. It will be interesting to follow its developments in the coming months to see what lessons can be learned from it.

Ghana

A2.35 Ghana produces oil equivalent to about 15–20 percent of its consumption. It has a domestic refinery, imports both crude and products (primarily premium gasoline and diesel), and exports some products (primarily heavy fuel oil and heavy naphtha) to its

neighbors. Its consumption of products is dominated by diesel and gasoline. According to government statistics, Ghana consumed 1.8 million tonnes of refined products in 2004. Of the total, diesel accounted for 50 percent by weight, gasoline 36 percent, kerosene and LPG 4 percent each, and heavy fuel oil 3 percent (Energy Commission 2005). Historical inflation rates in Ghana are given in Table A2.7.

Table A2.7 Consumer Price Index Trend in Ghana

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	32.9	14.8	26.7	12.6	15.1

Source: IMF 2006i.

A2.36 Until 2005 petroleum product prices were subsidized by the government. Prices were increased irregularly and sometimes by large amounts. In January 2003, the government introduced a pricing formula linking domestic prices to world prices and raised fuel prices by approximately 90 percent. There was popular opposition to this increase, but not sufficient to persuade the government to reverse its decision. After the dramatic price increase of January 2003, the government did not apply the pricing formula regularly and, by the start of 2004 (before the large run up in world crude prices had commenced), the International Monetary Fund estimated that retail prices were about 9 percent below cost recovery, widening to 15 percent by April 2004 (IMF 2004a).

A2.37 During 2004, the government, which faced elections in December, continued to subsidize prices. The subsidy to the Tema Oil Refinery amounted to 1.77 trillion cedis (US$200 million), equivalent to 2.2 percent of GDP. The refinery also borrowed to finance its operations, and its outstanding debt to Ghana Commercial Bank amounted to nearly 1 percent of GDP in 2005 (IMF 2005d). Because prices were being held below world market prices, out-smuggling on a large scale was reported to be occurring, thus increasing the burden on the government. In June 2004, President Kufuor announced that fuel prices would not be increased, and requested several state institutions to submit any surplus resources into a consolidated fund to help finance crude oil importation (*WMRC Daily Analysis* 2004). However, by the end of June 2004, the government announced plans to deregulate prices by February 2005.

A2.38 In his state-of-the-nation address in the beginning of February 2005, President Kufuor stated the government's commitment to proceed with petroleum sector deregulation. Acknowledging that the deregulation would accelerate inflation in the short term, the newly re-elected president stressed that the deregulation would free significant government resources for investment in other areas, most importantly in social priority areas. The government announced fuel price increases of 50 percent in mid-February 2005, coupled with an extensive public information campaign. This was helped considerably by prior preparation and studies carried out by the government, as explained below.

A2.39 In 2004, when it became apparent that world oil prices were unlikely to come down markedly and the government was not in a position to maintain a policy of subsidizing petroleum products for a prolonged period of time, the government launched a poverty and social impact assessment (PSIA) for fuel. A steering committee was

established, drawing stakeholders from various ministries, the national oil company, and academics. The PSIA was awarded through a competitive tender, and draft reports were reviewed by the steering committee at every stage. The PSIA was completed in less than a year. By the time the government announced the 50 percent price increases in February 2005, the government had the findings of the PSIA which helped them to argue their case for liberalizing fuel prices to the public—who were winners and losers, and who was benefiting most from the price subsidies (better-off members of society more than the poor). It also allowed the government to assess how other sectors would be affected, and to indicate what mitigation measures would be implemented.

A2.40 The public relations campaign started with the Minister of Finance making a radio broadcast about the price increases and the need for them, and at the same time announcing various mitigation measures. This was followed by a series of interviews on the radio with various government officials, as well as with trade union officials. The Energy Ministry took out newspaper advertisements with charts showing that Ghana's fuel prices were the lowest in West Africa after Nigeria (*All Africa* 2005b). The mitigation measures were transparent and could be easily monitored by society. They included an immediate elimination of fees at government-run primary and junior-secondary schools, and a program to improve public transport. As a result, although the trade unions remained opposed to the price increases, there was general public acceptance of the increases, and no large-scale demonstrations against the increases took place.

A2.41 In May 2005, the government established the National Petroleum Authority (NPA), an independent agency consisting of representatives of public and private sectors in charge of implementing the pricing mechanism. NPA bases its recommended prices on a formula linked to world market crude and product prices and on established domestic margins for distribution. Two small increases occurred in 2005, one in August and the other in October. In 2006, prices were increased in February and May. The prices after the increase in May 2006 are shown in Table A2.8.

Table A2.8 Fuel Prices in Ghana in May 2006

Parameter	*Premium gasoline*	*Kerosene*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per kg
US$	0.93	0.70	0.84	0.68
Cedi	8,517	6,422	7,714	6,207

Source: Ghana Chronicle 2006.
[a] LPG sold in 14.5 kg cylinders

A2.42 In the May 2006 price increase, NPA departed from the previous custom of setting uniform prices and instead announced maximum indicative prices. Immediately, retailers began posting different prices. The lowest price for premium gasoline in Accra right after the price increase was 8,492 cedi per liter, but one outlet was charging 8,560, higher than the price ceiling, because the owner believed that 8,560 was announced on the radio. The outlet was instructed by NPA to comply with the price ceiling (*Ghana Chronicle* 2006).

A2.43 The February 2006 price increase widened the price difference between kerosene and diesel to 1778 cedi (US$0.20) per liter, presumably because the authorities wanted to protect poor households using kerosene. The Chief Executive Officer of Bulk Oil Storage and Transport Company in April raised concerns about the impact of the large price difference, blaming the shortage and black-marketing of kerosene in rural areas to the greater incentive to adulterate diesel with kerosene. He cited cases where kerosene was selling for as much as twice the official price in rural areas and urged NPA to narrow the price gap. The May 2006 price adjustment reduced the price difference between the two fuels from 1778 cedi to 1292 cedi (US$0.14) per liter.

A2.44 To combat short-selling, the National Oil Loss Control Committee—reactivated in 2003 to address complaints from the Petroleum Retailers Association about short delivery of petroleum products by tanker drivers and mandated to prescribe solutions to the losses that occur in the supply chain from transportation all the way down to retail—required oil marketing companies to provide certified 10 liter containers to protect consumers from short-selling. The use of the "10-liter standard measure" will commence in the Greater Accra Region from July 2006 and will be extended to the rest of the country later. Motorists who suspet short-selling can ask to check the pump calibration using 10-liter containers (*All Africa* 2006j).

A2.45 Rumors of impending fuel price increases have been known to lead to what is believed to be speculation and artificial supply shortages, with some retail outlets posting "No Petrol" and "No Diesel" signs, until prices are increased. This presents a challenge to the government. On one hand, an information campaign ahead of a price increase would help to make the public understand why prices are being raised, and also to prepare for the increase. On the other hand, a prior knowledge of price increases could lead to hoarding not only by retailers but also by the public, as happened in February 2005 (BBC Monitoring Africa 2005a). Frequency of price adjustments is a factor. In the extreme, if prices fluctuate daily as in some completely liberalized markets, panic-buying typically does not occur, but frequent price fluctuations make it more difficult for consumers to plan financially, whereas infrequent price adjustments make for long periods of stable prices, but possibly to be followed by large adjustments when they are made. NPA indicated in February 2006 that it was studying the pros and cons of monthly versus quarterly price reviews (BBC Monitoring Africa 2006a).

A2.46 As in Kenya, the efficiency of maintaining a domestic refinery has been questioned in Ghana. In February 2006, the government announced plans to triple the capacity of the refinery from 45,000 barrels per day (bpd) to 145,000 bpd, at a cost of US$250 million. Developing the refinery's capacity to export would help diversity Ghana's export base (Economist Intelligence Unit 2006a). Earlier, Ghana made a deal in 2004 to supply Equatorial Guinea with refined petroleum products processed at its refinery in exchange for crude oil. In March 2005, the government signed an agreement with Arabian Gulf Oil Limited for the construction of a US$2.75 billion, 200,000 bpd refinery in Takoradi. If both refinery projects move forward, Ghana will become a significant refined product exporter.

A2.47 There does not appear to be large-scale public program to promote energy efficiency and saving. There is some interest in biodiesel from jatropha, a plant that already

grows in Ghana and is able to grow on marginal land with limited rainfall. However, a UK firm that began a project in Ghana reported in September 2005 that it found the logistics of planting seeds in Ghana uneconomic (*Dow Jones International News* 2005d).

Assessment

A2.48 The experience of Ghana is particularly important for countries considering how to phase out petroleum product subsidies which they can no longer afford. The large price increase of January 2003 was implemented without public discussions and debates. Predictably, there was strong opposition to the price increases, although not enough to force the government to back down. In the face of rising oil prices through 2003 and 2004, the government was constrained by the timing of the December 2004 elections to maintain the subsidy for longer than it might have otherwise wished to do.

A2.49 The government's strategy to re-link prices to the international market had three key aspects contributing to its success.

- By carrying out a detailed PSIA, the government was in a position to identify the potential winners and losers, and to show which groups were benefiting most from the existing subsidies.
- By engaging in a public information campaign, the government was able to explain to the population the reasons for the price increase and the magnitudes of the price increases, and also to announce various mitigation measures to protect poor households.
- The mitigation measures adopted were ones that could have an immediate and visible impact, so that the government's promises appeared credible.

As a result of this policy, the prices have been re-linked to the international market and an independent agency has started its work in price setting on a formula basis.

A2.50 The response of the retailers to charge less than the price ceiling in May 2006 points to a certain level of competition in the market. There are other countries where it took longer before retailers began departing from price ceilings. Worsening kerosene shortages and black-marketing following a widening price gap between kerosene and diesel in 2006 is consistent with experience elsewhere, and illustrates that good intentions by the government to protect the rural poor from higher fuel prices can have the opposite effect. Short-selling harms all consumers, but it is difficult to spot and control. It would be interesting to follow the impact of the new requirement that all retail outlets have certified 10-liter containers to enable consumers to check pump calibration.

Guatemala

A2.51 Guatemala produces crude oil equivalent to about 30 percent of its final consumption of products. It has no domestic refining capacity. According to government statistics, total petroleum fuel consumption in Guatemala in 2004 was 3.9 million m^3 (66,000 barrels per day). Diesel accounted for 32 percent, gasoline 30 percent, heavy fuel oil 22 percent, LPG 11 percent, and kerosene negligibly small. Nearly two-thirds of

electricity generated in 2004 was thermal (IMF 2005g). Historical inflation rates in Guatemala are given in Table A2.9.

Table A2.9 Consumer Price Index Trend in Guatemala

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	7.3	8.2	5.6	7.6	9.1

Source: National Institute of Statistics, Government of Guatemala.
Note: The figures from the IMF's International Financial Statistics differ from the official government figures, and the latter are shown.

A2.52 The Ministry of Energy and Mining has a policy of passing on changes in the international oil price to domestic consumers, and the competition in the retail sector has ensured that the margins are among the lowest in Central America. Average prices in early May 2006 are shown in Table A2.10.

Table A2.10 Fuel Prices in Guatemala on May 8, 2006

Units and currency	*Super gasoline*	*Regular gasoline*	*Kerosene*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.93	0.92	0.79	0.73	1.00
Quetzales	7.08	6.95	6.03	5.56	7.59

Source: www.sieca.org.gt/SIECA.htm.
[a] LPG is sold in 25, 35, and 100 pound cylinders, and unit prices are the same for all sizes.

A2.53 The higher petroleum product prices have generated a considerable amount of public protest. In particular, the impact on bus fares, which have been raised by the companies despite government instructions not to do so, has been highly unpopular. Unable to raise fares, a transportation cooperative in Guatemala City with 2,896 buses ordered a hold on all repairs in 2005 in order to reduce costs that had reportedly nearly tripled since 2004 (*Irish Examiner* 2005). In December 2004, an injunction was issued against the excise tax on fuel, requiring the government to impose a temporary tax on fuel imports. This legal challenge reflects an entrenched opposition to higher taxes in the country (IMF 2005h). The oil price rises have affected the rate of inflation significantly, accounting for at least one-third of the increase in the general price level in 2005 according to a study by the Central Bank (Latin American Economic and Business Report 2005).

A2.54 Government policy to combat the impact of the higher oil prices has focused on encouraging further development of domestic oil production, which will take some time even if it is successful; trying to reach agreements with Mexico and Venezuela to supply products on favorable terms; and promoting non-oil energy sources. The so-called Mesoamerican energy imitative for integrating energy among Mexico, Colombia, and Central American countries, signed in December 2005, includes a plan to construct one refinery in the region. Guatemala has put forward several reasons for housing the refinery on its soil: it is Central America's only oil producer; it is Central America's largest oil market; and it is closest to Mexican oil reserves.

A2.55 Guatemala, together with other Central American countries, have asked Mexico to supply oil at preferential prices—as Venezuela does to the Caribbean countries under PetroCaribe—but Mexico has so far said that the San José accord already offers financing assistance, albeit only for crude and not refined products. In April 2006, representatives from the Federation of Joint Municipalities of Guatemala—made up of mayors from different political groups—and Venezuelan authorities held preliminary talks on a joint venture to import as much as 450,000 barrels of Venezuelan petroleum products annually at preferential terms. The activities of the joint venture would be part of a broader program to fight poverty. In addition to importing fuel and setting up a storage and distribution system, the proceeds from the venture would also be used by the municipalities to finance infrastructure work in their communities (*Platts Commodity News* 2006j).

A2.56 The government plans to extend the national power grid to areas currently served by diesel generators. It is looking to hydro and geothermal power generation as the most economic sources of energy. Guatemala adopted daylight saving time from the end of April 2006 for five months to cut fuel costs. This measure is expected to save up to US$16.5 million (Kyodo News 2006). Guatemala is a major sugar producer, and as such could mount a bioethanol program to substitute gasoline. Its ethanol program has stalled, however, pending significant expansion of sugarcane plantings (Reuters News 2006d). Nevertheless, the government is in discussion with the government of Brazil for technical cooperation, and ethanol production from sugarcane is taking place.

Assessment

A2.57 Guatemala, despite its domestic oil production, has felt the effects of the higher oil prices through the policy of not subsidizing users. This is having an effect on reducing demand somewhat. Lower-income urban households are feeling the effects of higher bus fares and higher LPG prices. There have been social protests against the higher prices, but so far the government has resisted the introduction of any petroleum product subsidies. Aside from daylight saving time, the government does not appear to have initiated an active program of energy saving, and this may be required if oil prices continue to remain high.

A2.58 Higher oil prices have given impetus to regional energy initiatives. Central America has chosen to go with a Mexican-driven initiative rather than join PetroCaribe (see annex 3 for a description of PetroCaribe). Guatemala is nevertheless strengthening ties with Venezuela, inviting Venezuela's state-owned oil company Petróleos de Venezuela, S.A. (PdVSA) to open retail outlets, build warehouse capacity at ports, and invest in a refinery (Reuters News 2006d). Guatemala has also proposed that it would be beneficial if Venezuela could be brought into the Mesoamerican energy initiative. Whatever the future development of these initiatives, closer regional energy integration could help mitigate the effects of higher oil prices.

India

A2.59 According to government statistics, India consumed 112 million tonnes of petroleum products in the fiscal year ending on March 31, 2005.[11] The country produces about one-quarter of its oil needs and imports most of the rest in the form of crude. In fiscal 2005, net oil imports amounted to 3.2 percent of India's GDP. India imports some products and exports others, depending on the domestic needs and the output of the refining sector. India has been a net exporter of petroleum products for quite some time. Its largest imported product by volume is LPG, and largest exported product is diesel. Petroleum product exports rose by more than US$3 billion in fiscal 2005, partially offsetting the increase in the oil import bill of US$8 billion. For domestic fuel consumption, diesel is the most important item, accounting for about 35 percent by weight of the total. Heavy fuel oil accounts for 12 percent, LPG for 9 percent, and non-aviation kerosene and gasoline account for about 8 percent each (Ministry of Petroleum and Natural Gas 2005, IMF 2006e). Historical inflation rates in India are given in Table A2.11.

Table A2.11 Consumer Price Index Trend in India

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.7	4.4	3.8	3.8	4.2

Source: IMF 2006i.

A2.60 In the upstream, there are three state-owned companies—Oil & Natural Gas Corporation Limited (ONGC), Oil India Limited (OIL), and Gas Authority of India Limited (GAIL). The downstream sector is dominated by four state-owned companies—Indian Oil Corporation (IOC), Hindustan Petroleum Corporation Ltd. (HPCL), Bharat Petroleum Corporation Ltd. (BPCL), and IBP (which is a subsidiary of IOC). Of the 18 refineries in the country, 17 are state owned, belonging to IOC, ONGC, HPCL, and BPCL. Several are stand-alone refineries. The private refinery belongs to Reliance Industries Limited and is the largest in India. Until recently, oil products were priced at import parity. As discussed below, this, combined with differential duty rates on crude and refined products, has provided considerable protection to domestic refineries, which have been able to obtain large margins in recent years.

A2.61 In November 2005, there were about 29,380 retail outlets in India, of which 1,370 belonged to private players. IOC, HPCL, BPCL, and IBP have a market share of 83.5 percent. Private players include Reliance, Essar, and Shell (Committee on Pricing and Taxation of Petroleum Products 2006). Continuing caps on domestic fuel prices have had serious adverse effects on the financial positions and market shares of private retailers which do not enjoy government support to compensate for fuel price subsidies. Ninety-eight percent of LPG and 100 percent of kerosene were sold by state-owned oil companies in the first nine months of fiscal 2005 (Ministry of Petroleum and Natural Gas 2005).

[11] Referred to as fiscal 2005 hereafter.

A2.62 The administered pricing mechanism for gasoline and diesel was dismantled in 2002 and, beginning in March 2002, oil marketing companies were allowed to adjust prices based on import parity after consultation with the Ministry of Petroleum and Natural Gas. Pricing was based on import parity regardless or whether or not a specific product was imported or exported, and freight costs were equalized throughout the country at the wholesale level; retail prices differ on account of varying state taxes. During 2002 and 2003, fuel prices were adjusted frequently.

A2.63 As oil prices began to rise in 2004, the new semi-automatic pricing mechanism was suspended. The government decided that incremental fuel costs would be shared among three groups of stakeholders: the government, oil and gas companies including upstream companies, and consumers. In August 2004, the government put in place a revised pricing mechanism for gasoline and diesel whereby oil marketing companies would be permitted to adjust these product prices within a limited price band: price adjustments would be freely allowed within 10 percent of the mean of rolling average import-parity prices of the previous 12 months and previous 3 months. If world prices fluctuated by more than 10 percent, oil companies were to approach the government to modify excise duty rates to moderate the impact of world price increases. However, against the backdrop of rapidly rising oil prices, this pricing mechanism was abandoned. The government effectively controls pricing over about three-quarters of petroleum product consumption, consisting of LPG, gasoline, kerosene, and diesel.

A2.64 Kerosene sold through the Public Distribution System (PDS) and LPG for household use (referred to as domestic LPG) continue to be heavily subsidized. There are quantitative limits on the amount of PDS kerosene each household is entitled to; there are no quantitative limits on domestic LPG. The price of PDS kerosene has been frozen since April 2002 and that of LPG since November 2004. The fuel price subsidy, which includes a freight subsidy for remote areas, was made explicit for the first time in the fiscal 2003 budget, amounting to 64.95 billion rupees (Rs) (US$1.3 billion). The subsidy was increased to Rs81.16 billion (US$1.8 billion) in the fiscal 2004 budget, but more than halved to Rs36.44 billion (US$0.8 billion) in fiscal 2005, reduced slightly to Rs35.59 billion (US$0.8 billion) in fiscal 2006, and reduced further to Rs30.80 billion (US$0.7 billion) in fiscal 2007 (Ministry of Finance 2006). About 70 to 80 percent of the fuel price subsidy is for PDS kerosene and domestic LPG. The bulk of the subsidy burden has been increasingly shifted to the four state-owned oil marketing companies—all of whom reported first-ever losses in 2004 (IBP) and 2005 (IOC, HPCL, and BPCL)—and importantly, to upstream oil and gas companies—ONGC, OIL, and GAIL. According to the Ministry of Petroleum and Natural Gas, oil companies bore 51 percent of the price increase, the government 36 percent, and consumers only 13 percent in fiscal 2006 (*Hindustan Times* 2005). Refiners have not been asked to bear the subsidy burden and are making large profits, thanks to protection they enjoy and large refining margins on the world market in recent years.

A2.65 Price adjustments for the four price-controlled products between March 2002 and February 2006 are shown in Table A2.12. In 2005, two price adjustments were made, amounting to Rs5.50 per liter for gasoline and Rs5.00 per liter for diesel, but they were insufficient to bring prices to cost-recovery levels. The "under-recoveries" by the state-owned oil marketing companies, calculated on the basis of import-parity pricing, are

reported to be Rs92.74 billion (US$2.0 billion) in fiscal 2004, Rs201.46 billion (US$4.5 billion) in fiscal 2005, and Rs396 billion (US$8.9 billion) in fiscal 2006. The actual under-recoveries would be lower because of refinery discounts given (Committee on Pricing and Taxation of Petroleum Products 2006). Upstream oil companies are expected to cover one-third of the under-recoveries. In fiscal 2006, they contributed a total of Rs140 billion (US$3.2 billion), and in fiscal 2007, without additional price increases, their burden is anticipated to increase to Rs240 billion (US$5.3 billion) (*Times of India* 2006). Because of the growing burden of the subsidies on the companies, the Cabinet in February 2006 approved the issuance of government bonds to the state-owned oil companies in the amount of Rs115 billion (US$2.6 billion) to cover part of the losses incurred by state firms on sales of kerosene and LPG in fiscal 2006.

Table A2.12 International and Domestic Fuel Prices between 2002 and 2006

Item and date	*Gasoline*	*Diesel*	*Kerosene*	*LPG*
International price	US$/barrel	US$/barrel	US$/barrel	US$/tonne
March 2002	26.43	23.27	23.65	194
1–15 February 2006	63.14	62.33	73.13	625
% increase	139	168	209	222
Delhi retail price	Rs/liter	Rs/liter	Rs/liter	Rs/cylinder
31 March 2002	26.54	16.59	8.98	240.45
16 February 2006	43.49	30.45	9.05	294.75
% increase	64	84	1	23

Source: *Hindustan Times* 2006.
Note: An LPG cylinder contains 14.2 kg of LPG.

A2.66 Retail prices in New Delhi as of May 2006 are shown in Table A2.13. The very large differential between diesel and kerosene prices provides a strong incentive to adulterate the latter into transportation diesel. A study examining consumption of PDS kerosene by households in India using the 1993–94 and 1999–2000 data from the National Sample Survey found that about one-half of subsidized kerosene allocated by the central government was diverted from households to other unintended uses (ESMAP 2003). In fiscal 2006, the subsidy for PDS kerosene was estimated to be about Rs13 per liter and LPG about Rs12 per kilogram (Committee on Pricing and Taxation of Petroleum Products 2006). In May 2006, the Ministry of Petroleum and Natural Gas reported that oil companies were losing Rs10.43 a liter on diesel, Rs9.33 on gasoline, Rs17.16 on kerosene, and Rs8.06 a kilogram on LPG (*Times of India* 2006). In June 2006, the government increased gasoline and diesel prices by Rs4 and Rs2 per liter, respectively.

Table A2.13 Fuel Prices in New Delhi in May 2006

Parameter	*Gasoline (93 RON)*	*Gasoline (88 RON)*	*Kerosene*	*High speed diesel*	*LPG (14.2 kg)*
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	1.03	0.96	0.20	0.69	0.46
Rupees	46.80	43.49	8.91	31.07	20.76

Source: www.bharatpetroleum.com.

A2.67 While the calculated fuel price subsidies in India in 2005 were second only to those in Indonesia, it is worth noting that taxation on petroleum products at the central and state levels is substantial. In New Delhi, taxes account for 55 percent of the retail price of gasoline shown in Table A2.13, 34 percent for diesel, 11 percent for domestic LPG, and 4 percent for PDS kerosene. Central government taxes account for 38 percent and 23 percent of the prices of gasoline and diesel, respectively, and state taxes account for the balance for these two fuels and all taxes on LPG and kerosene. State sales tax rates vary widely across states and products: 20–34 percent on gasoline, 9–31 percent on diesel, 0–12.5 percent on kerosene, and 1–14 percent on LPG. In fiscal 2005, petroleum accounted for 24 percent of India's overall customs duty collection, 43 percent of excise duties, and 34 percent of state sales tax revenues. Against the budgeted petroleum subsidy of Rs36 billion in fiscal 2005, the central government collected Rs498 billion from customs and excise duties on crude oil and petroleum products alone. Some states impose additional irrecoverable levies (Committee on Pricing and Taxation of Petroleum Products 2006, IMF 2006d). These high taxes in turn invite in-smuggling of diesel from Bangladesh along border states. In 2006, LPG was proposed to be categorized under "declared goods," thereby attracting a uniform central sales tax of 4 percent as against current rates, which vary from state to state.

A2.68 The central government adjusted customs and excise duties in 2004 and 2005, and most adjustments resulted in reductions. The changes in the duty levels are shown in Table A2.14. With effect from July 2004, an additional levy in the form of an education cess at 2 percent has been imposed. By March 2005, PDS kerosene and domestic LPG carried no import or excise duties. This means that the central government cannot lower retail prices by reducing taxes on these products. In contrast, the excise taxes were raised in March 2005 for gasoline and diesel, equivalent to about Rs2.40 per liter of gasoline at the prices in effect in early 2006, and Rs1.75 per liter of diesel. Ten percent customs duties are levied on gasoline and diesel, against 5 percent on crude. This difference in customs duties affords considerable protection to domestic refineries, reportedly amounting to an effective rate of protection of as high as 40 percent (Committee on Pricing and Taxation of Petroleum Products 2006). In June 2006, the Ministry of Finance cut the customs duties on gasoline and diesel from 10 percent to 7.5 percent.

Table A2.14 Evolution of Excise and Customs Duties on Oil and Refined Products in India

Product	*Excise Mar. 2003*	*Excise June 2004*	*Excise Aug. 2004*	*Excise Mar. 2005*	*Customs Mar. 2003*	*Customs Aug. 2004*	*Customs Mar. 2005*
Crude	Rs1,800 per tonne	Rs1,800 per tonne	Rs1,800 per tonne	Rs1,800 per tonne	10%	10%	5%
Gasoline	30% + Rs7.50/liter	26% + Rs7.50/liter	23% + Rs7.50/liter	8% + Rs13.00/ liter	20%	15%	10%
Diesel	14% + Rs1.50/liter	11% + Rs1.50/liter	8% + Rs1.50/liter	8% + Rs3.25/liter	20%	15%	10%
PDS kerosene	16%	16%	12%	Nil	10%	5%	Nil
Domestic LPG	16%	8%	8%	Nil	10%	5%	Nil

Source: Committee on Pricing and Taxation of Petroleum Products 2006.

A2.69 In response to growing under-recoveries of costs of retailing LPG, state oil companies abandoned branding and advertising efforts in early 2005, and reduced their sales efforts in rural and semi-urban areas. They also withdrew incentives and discounts on new equipment that had been offered earlier, and, between September and December 2005, ceased taking new customers altogether. LPG also experiences substantial black market activity, as supplies are diverted from LPG intended for household use to the industrial and commercial market where prices are higher.

A2.70 In October 2005, the Minister of Petroleum and Natural Resources appointed a committee to examine pricing and taxation of petroleum products and make recommendations. The committee, chaired by Dr. Rangarajan, announced its findings and recommendations in February 2006 (Committee on Pricing and Taxation of Petroleum Products 2006).

- Shift from import parity to trade parity pricing, whereby the price is based on a fixed ratio of import and export-parity price levels, initially recommended to be 0.8 to 0.2, and allow oil companies to determine price levels based on this formula. (The government implemented this recommendation in June 2006.)
- Reduce effective protection given to domestic refiners by lowering the customs duties on gasoline and diesel from 10 percent to 7.5 percent.
- Restrict supply of PDS kerosene to households below the poverty line.
- Immediately raise the price of LPG by Rs75 per cylinder.
- Discontinue the practice of requiring upstream companies to contribute to subsidy payment, and instead make their contributions explicit through a higher cess on crude.
- Make explicit the balance of the subsidy through the budget.
- Substitute specific rates for the *ad valorem* component of excise duties.
- End pan-territorial pricing.

A2.71 The government is made up of a coalition of different political parties, some of whom face elections in key states in early 2006. In the face of public hostility to increased fuel prices, the government has had little room for maneuver, or to increase prices in the near future. The Minister of Petroleum and Natural Gas indicated on television in February 2006 that kerosene and LPG prices would not be increased (*International Oil Daily* 2006a).

A2.72 As regards the recommendation to supply subsidized kerosene only to the poor, a pilot scheme was launched in October 2005 to test whether it could be ensured that the delivery of subsidized kerosene reached the intended beneficiaries. This included providing special underground storage at wholesaler/sub-wholesaler locations and electronically calibrated dispensing units, opening 5–10 sub-wholesaler locations, and delivering through specially colored/GPS (global positioning system) tracked tank lorries (*Hindustan Times* 2005). The focus on ensuring that subsidized kerosene would reach only target households reflects the wide-scale diversion that is presently taking place whereby kerosene is illegally diluted into transportation fuels.

A2.73 The central government does not seem to have mounted energy saving programs along the lines of those promoted in the Philippines and Thailand. To reduce the dependence on petroleum products, the government has been pursuing biofuel programs for some time. India is a major sugar producer and blending 5 percent ethanol into gasoline was mandated in nine sugar-growing states and four union territories in January 2003. Due to ethanol shortages and higher-than-anticipated ethanol prices, the Ministry of Petroleum and Natural Gas issued the text of a gazette notification on October 27, 2004, making ethanol blending optional, contingent on the delivery price of ethanol at a given location being comparable to the import-parity price of gasoline. Three states stopped selling ethanol in December 2004. A dispute has continued for three years over the purchase price of ethanol. In February 2006, All India Distilleries Association said that ethanol should be priced at Rs22.50 (US$0.520) a liter—corresponding to US$0.65–0.74 per liter of gasoline equivalent—against the fixed price of Rs18.50 (US$0.42 per liter) (Press Trust of India 2006). At Rs22.50 per liter, the ethanol program will not be in a position to bring financial relief to oil companies or consumers. The government has proposed that 5 percent blending be mandated from October 2006.

A2.74 India is also actively promoting fuel switching from petroleum diesel to biodiesel. A National Mission on Biodiesel has been proposed, to be implemented in two phases beginning in fiscal 2007. Biodiesel will be manufactured from oil derived from jatropha and other plants that require little rainfall and that can grow on marginal land. The Ministry of Petroleum and Natural Gas announced a biodiesel purchase policy in October 2005, in which the oil marketing companies are required to purchase biodiesel at Rs25 per liter (US$0.56 a liter, or US$90 per barrel of biodiesel) through 20 select purchase centers, beginning January 2006. India's first commercial launch of biodiesel occurred in December 2005 in Maharashtra, derived from karanja seeds. In February 2006, UK petroleum company bp announced that it was launching a US$9.4 million, 10-year project on biodiesel from jatropha in the state of Andhra Pradesh. Archer Daniels Midland is setting up a US$2 million biodiesel plant with a daily capacity of 50 tonnes, which is expected to come on stream in August 2006.

A2.75 In early 2006, India ranked sixth in the world in the number of CNG vehicles (IANGV 2006). This fuel switching in the transport sector has been driven primarily by concerns about increasing urban air pollution, and much less so by rising oil prices. India recently began importing natural gas. Its reserves-to-production ratio stood at 31 years in 2004 (bp 2005).

Assessment

A2.76 The policy issue facing the government of India has been how to keep petroleum product prices to consumers from rising rapidly. The structure and history of the petroleum sector has influenced how this issue has been managed. The downstream marketing sector, which is dominated by state-owned companies, has had to buy products at import parity—although refinery discounts have been negotiated—and sell them at subsidized prices, leading to very large company losses on the transactions. They have been partially recompensed by the government, and by forced transfers from the state-owned upstream oil and gas companies, which have benefited from higher international prices. This approach to pricing, which began at the start of the oil price increase, has become more and more expensive as the increase has persisted and in fact grown steadily larger. The size of the subsidy on kerosene and LPG is presently so great that the political challenge facing the government to make a major step toward their reduction and eventual removal is considerable.

A2.77 Heavily subsidized fuels lead to criminal activities through illegal diversion, and those who stand to benefit from maintaining the status quo oppose price increases as well as make it dangerous to monitor and stop commercial malpractice. The danger of trying to stop illegal diversion of PDS kerosene was amply illustrated recently when an IOC sales officer was murdered in November 2005 for reporting adulteration occurring at three filling stations (*Financial Times* 2005). Reducing criminality in the oil sector is an important benefit of reducing universal price subsidies.

A2.78 The refinery sector, in which both a private sector company and stand-alone state-owned companies operate, has not been affected by the increasing domestic subsidies, and indeed has experienced higher profits, thanks in part to being able to price at import parity where there is a higher import duty than on crude. As with Morocco, reducing protection to domestic refineries would help bring competitive pressure on the 17 refineries, possibly increase efficiency, and lower prices to end users. For kerosene and LPG, however, there is little room for maneuver through tax adjustments, as these two products are already zero-rated for excise and customs duties.

A2.79 Growing concerns about high world oil prices have heightened interests in biofuels. India produces ethanol from sugarcane. Sugarcane cultivation, however, is water-intensive, and subsidized water and electricity used in agriculture, and sugarcane production in particular, has led to a serious water shortage in India. This needs to be contrasted with the Center-South region of Brazil where cane fields are entirely rain-fed. The long-term prospect for the commercial viability of large-scale ethanol production and blending in India is therefore not clear. Biodiesel production in India is very much in the early stages. Biodiesel production to date in the rest of the world has been based mainly on intensive cultivation of rapeseed (Europe) or soybeans (United States). There is little

data on the economics of manufacturing biodiesel from plants growing on marginal or degraded land. The economics of planting, harvesting, and collecting seeds from marginal land would be expected to be quite different from those of farm-based production. The program launched by bp and others will help generate data that can be used to assess the commercial viability of this potentially promising route.

Indonesia

A2.80 Although Indonesia is a major oil producer, it became a net oil importer for the first time in 2004 (EIA 2005b). Domestic petroleum product prices that are considerably lower than international market prices have historically led to widespread smuggling of subsidized fuels out of the country, increasing apparent consumption, and making it difficult to determine actual domestic consumption. Indonesia has substantial domestic refining capacity, but imports and exports products in order to match domestic supply patterns to domestic demand. According to IEA statistics, Indonesia consumed 51 million tonnes of petroleum products in 2003. Of the total, diesel accounted for 42 percent, gasoline 23 percent, non-aviation kerosene 19 percent, heavy fuel oil 12 percent, aviation kerosene 3 percent, and LPG 2 percent (IEA 2005b). Kerosene for non-aviation purposes constitutes a disproportionately high percentage of the total consumption compared to other countries. Historical inflation rates in Indonesia are given in Table A2.15.

Table A2.15 Consumer Price Index Trend in Indonesia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	11.5	11.9	6.6	6.2	10.5

Source: IMF 2006i.

A2.81 The midstream and downstream oil sector is controlled by the state-owned oil company, Pertamina. Prices are set by Pertamina for high-quality products according to market forces, while international market rates are determined by Pertamina for sales to certain consumer groups such as foreign ships and extractive industries. Prices to other users have been subsidized, and the prices and coverage of these subsidized fuels are determined by the government. Retail prices include 10 percent VAT; there is an additional tax of 5 percent on transportation fuels. Pertamina's monopoly in the downstream sector officially ended in November 2005. Royal Dutch Shell began selling unsubsidized fuels at its first filling station in November 2005, and Malaysia's Petronas in March 2006. Citing lack of readiness of other players as the reason, the downstream oil and gas regulatory board, BPH Migas, appointed Pertamina in December 2005 as the sole supplier and distributor of subsidized fuels for another year beginning on January 1, 2006.

A2.82 The prices of subsidized fuels were raised in March 2005 for the first time since January 2003, and again in October 2005. The two price adjustments in 2005 resulted in overall price increases of 149, 161, and 186 percent for gasoline, diesel, and kerosene, respectively, in 2005. The prices after the October 2005 price increase are shown in Table A2.16. It is important to note that the price set by the government for kerosene is not the retail price but the price charged at Pertamina's transit terminals,

installations, and depots. The actual end-user prices have been known to be much higher on many occasions, as the October 2005 example cited in the next paragraph indicates.

Table A2.16 Fuel Prices in Indonesia in October 2005

Units/currency	*Gasoline (88 RON)*	*Kerosene*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per kg
US$	0.44	0.20	0.42	0.42
Rupiah	4,500	2,000	4,300	4,250

Source: AFX Asia 2005.
Note: Prices shown are retail prices except kerosene for which it is the ex-depot price.

A2.83 The October 2005 increase was signaled beforehand, which resulted in extra purchasing and hoarding, with a substantial drop in purchasing immediately after the price rise took effect. According to the Minister of Energy and Mineral Resources, the October increases still left gasoline and diesel prices at about 80 percent of market prices, and kerosene prices at only 40 percent of market prices (AFX Asia 2005). Despite the large increase, the gap between non-subsidized prices and subsidized prices was sufficiently large that localized shortages and black market pricing of subsidized fuels still occurred. For example, against the official depot price of 2,000 rupiahs (Rp) per liter of kerosene, some households were paying as much as Rp3,500 to 5,000 per liter (*Bernama Daily Malaysian News* 2005a).

A2.84 Fuel price increases have historically sparked large and sometimes violent public protests. In 1998, fuel price increases triggered rioting that contributed to the eventual downfall of the government of the then President Suharto. Fuel price increases in October 2000 were followed by violent demonstrations, although price increases were not reversed. In April 2001, a presidential decree established three tiers of prices:

- Group I prices covered more than three-quarters of fuel consumption and applied to all petroleum products consumed by households and small business entities; gasoline, automotive diesel, industrial diesel, and heavy fuel oil, used by local transportation companies and Indonesia's state electricity company. These prices were unchanged from October 2000.
- Group II prices were set at international levels. Group II fuel consumption is negligible and covered fuels consumed by petroleum production sharing contractors, mining contracts of work (excluding coal), and international shipping lines.
- Group III prices were set at 50 percent of the international market prices (mean of Platts Singapore of the previous month plus 5 percent) and covered about one-quarter of national fuel consumption. Group III applied to the industrial sector, the service sector, and the fishing industry.

Group I prices were raised by an average of 30 percent in June 2001 and 22 percent in January 2002 (Reuters News 2002).

A2.85 In January 2002, a presidential decree announced that gasoline for all consumers would be set at 100 percent of international market prices, the price of kerosene

for households and small-scale would not be changed, and for all other uses other than group II consumers, prices would be set at 75 percent of the international market prices. The decree further specified minimum and maximum prices for gasoline, diesel, and fuel oil (President of Government of Indonesia 2002). Following this decree, several price adjustments, some large, were made in 2002.

A2.86 The price increase of January 2003 was met with such fierce opposition that, within less than a month, the government rolled back the diesel price increase from 21.9 percent to 6.5 percent. Analysts described the fuel demonstrations as being symbolic of a wider public dissatisfaction with the government, and with the corruption and inefficiency that was perceived to permeate political and bureaucratic life in Indonesia. The public viewed and judged subsidy reductions against the background of other government decisions that appeared to favor powerful interests (see Box 1). Subsequent attempts to raise prices in 2003 were not politically feasible. Indonesians went to polls in general elections in 2004 which occurred in three phases between April and September. The elections essentially ruled out the possibility of price increases in 2004, giving way to more than two years of no price change between January 2003 and March 2005. The two price increases in 2005 were effected without popular opposition, thanks to the credibility of the new government that was voted in following largely peaceful elections with high levels of voter participation (Box 1). A presidential decree in October 2005 changed the way prices would be adjusted: prices could now be changed at the ministerial level, whereas all previous price changes came in the form of presidential decrees.

A2.87 Pertamina raised the price of LPG from Rp3,000 (US$0.33) to Rp4,250 (US$0.46) per kilogram in December 2004. Pertamina originally planned to raise LPG prices in 2005 but postponed the price increase against the backdrop of large increases in the prices of other fuels. In January 2006, Pertamina announced that it would maintain the price of LPG for household use at Rp4,250 rupiahs, but would increase the price of LPG for industrial use to Rp7,000 (US$0.74). Seventy percent of LPG is consumed by households, the remaining 30 percent by industry. Of daily consumption of 3,500 tonnes, Pertamina produces 2,700 tonnes (*Platts Commodity News* 2006a). As of May 2006, the price increase for industrial users had not been approved by the government.

A2.88 The government directly recompenses Pertamina for its sales of subsidized products, and the fiscal burden of this policy has been rapidly increasing as oil prices have increased. In 2001 the subsidy cost Rp 68.4 trillion (US$6.7 billion); in 2002, when domestic prices were raised several times, the subsidy bill amounted to Rp31.2 trillion (US$3.3 billion). In 2004 the fuel subsidy costs rose to Rp69 trillion (US$7.7 billion, about 3 percent of GDP) (*Dow Jones Emerging Markets Report* 2005) which was more than four times what had been budgeted. Although state revenue from oil and gas also increased, the net income from the sector did not increase because of the soaring cost of subsidies. The State Audit Board alleged in 2005 that Pertamina had overstated the money due to it from the fuel subsidy during 2004 by Rp3.664 billion (US$410 million) (Organization of Asia-Pacific News Agencies 2005b). For the 2005 budget, the government originally estimated a cost of Rp19 trillion (US$2 billion), based on a crude price of US$24 a barrel. A revised budget in June raised this to Rp76.5 trillion (assuming US$45 a barrel). By September, the parliament voted to cap the total cost of the subsidy

for the year at Rp89.2 trillion (US$8.7 billion), which was about one-fifth of the total budget and which necessitated large price increases for subsidized products. The final subsidy bill in 2005 amounted to Rp95.6 trillion (US$9.9 billion), despite the actual annual consumption of subsidized fuels being 3.2 billion liters lower than the planned-for consumption of 59.6 billion liters (Organization of Asia-Pacific News Agencies 2006b). Had the government not implemented the price increases of March and October 2005, the total subsidy bill would have been higher by about US$5 billion.

A2.89 Based on an assumed world oil price of US$57 per barrel, the government initially planned on allocating Rp54 trillion (US$6 billion) to fuel subsidies in 2006. World oil prices reaching US$70 per barrel in the first half of 2006 meant that, despite rupiah's appreciation, the subsidy bill would be markedly higher, absent a large consumption reduction or price increase. The government has so far ruled out another price increase or allocation of more funds for fuel subsidies. To combat the increased cost, the government has announced two strategies. The first focuses on conservation and rationing of subsidized fuels. The second promotes household fuel use switching from kerosene, which is heavily subsidized, to LPG which will carry a smaller subsidy.

A2.90 For reducing fuel consumption, a new law on energy conservation is being contemplated. Although details are not known, one cabinet member indicated that the law would likely limit the use of private cars and ration fuel consumption (Straits Times 2006b). Switching from kerosene to LPG would begin in Jakarta and be gradually extended to the rest of the country as infastrcuture is put in place. The government plans to eventually replace about 10 billion liters of kerosene annually with more than 6 million tonnes of LPG, which it calculates could save Rp22 trillion (US$2.5 billion) in subsidies at the current kerosene and LPG prices. The government will provide three types of subsidies: for LPG itself, for LPG cylinders, and for LPG stoves. Pertamina has announced that it will cease importing kerosene and start reducing the supply of kerosene to Jakarta. A complete withdrawal of subsidized kerosene from Jakarta is aimed for 2010 (Organization of Asia-Pacific News Agencies 2006d).

A2.91 From 2000, the government has introduced various fuel subsidy compensation schemes to ease the burden on the poor of product price increases. The government has encountered difficulties of implementation from the first. The 2002 scheme earmarked Rp2.85 trillion (US$300 million) and allocated money to health, education, food, and social welfare, all targeted to poorer households (Agence France Presse 2002, *Jakarta Post* 2002). In 2003, the government allocated Rp4.4 billion (US$510 million) to below-market-price rice and other services. Other programs were also planned. Much of this program did not materialize—only the rice and education aspects were found to have been implemented for the 12 million poor people identified. An independent monitoring group reportedly found irregularities in the implementation of the fuel subsidy compensation program (*Jakarta Post* 2003).

A2.92 In August 2005, before undertaking the major price increase in October, the government decided to put in place a targeted cash transfer program. The program was initially targeted to 15.5 millionn poor and near-poor households in Indonesia—some 28 percent of the national population and in excess of the poverty rate of 16 percent. The size of the transfer was Rp300,000 (US$30 at the exchange rate prevailing in October 2005) per

household every three months, to be continued for a full year in four tranches. Criteria for being classified as poor related to earnings and assets. The scheme is operated by the Central Bureau of Statistics, PT Pos Indonesia, and BRI Bank. The government has fully disbursed the first tranch and is in the process of disbursing the second quarterly tranche. Out of the original 15.5 million cards, about 600,000 cards were withdrawn on the basis of verification conducted in late 2005. Of the 12 million new applications, 4.3 million households have been found eligible. As a result, the total number of beneficiaries has increased to 19.2 million for the second tranche.

A2.93 The government also undertook public information campaigns to publicize the cash transfer scheme. Information was disseminated through announcements in newspapers, TV talk shows, notices in village announcement boards, and distribution of pamphlets and brochures with frequently asked questions. Key information was also printed on the back of the beneficiary card. Thanks to these efforts and other remedial actions taken by the government (see A2.95), the sharp rise in fuel prices passed without major public protest.

A2.94 The rapid roll-out of the program resulted in numerous media reports about problems with initial implementation, including cases of mistargeting, leakage, and lack of crowd control at cash disbursement points. The Central Bureau of Statistics said in February 2006 that the process of identifying eligible beneficiaries became increasingly difficult with time. At the beginning, households being assessed were not fully aware of the benefits of being qualified, but by February 2006, people knew and put pressure on the bureau officials to declare them eligible (*Antara* 2006).

A2.95 On the whole, however, especially considering that the program was prepared in a matter of months, the cash transfer program performed well. In an effort to rectify the identified problems, the government took some quick actions, including the commissioning of an early assessment of problems with the first tranche disbursement. Despite the reported problems, the assessment pointed to overall satisfactory results. Regional targeting and transfer of funds worked on time and beneficiaries expressed satisfaction with the program. On the other hand, the assessments also noted several problems, particularly in local targeting. Program rules were generally not well communicated, and neither were complaint mechanisms properly implemented. The government is acting on recommendations from field assessments and has worked to resolve early implementation problems. It has organized reviews through public hearings of program beneficiaries, and worked to improve logistics of distribution at the post office and dissemination and complaint resolution mechanisms.

A2.96 For the recipients, the cash transfer more than compensates the losses incurred as a result of the fuel price increase. Without any compensation mechanism, it is estimated that the fuel price increase would have reduced the welfare of the poor and near-poor by some 5 percent, mainly through the increase in the price of kerosene and the overall inflation impact. The cash transfer more than off-set the negative impact of the fuel price increase on the poor who are recipients. Even under assumptions of moderate mistargeting—cash benefits randomly distributed to the bottom 40 percent instead of the targeted bottom 28 percent—the program should prevent an increase in the poverty rate arising from the fuel price increase.

A2.97 Equally important, the government reallocated funds from the fuel subsidy to finance three other major programs. In education, a new program aims at waiving school fees at participating elementary and junior schools while also offering scholarships to poor students. In rural development, the government gave direct grants to some 13,000 poor villages to generate labor-intensive jobs and improve infrastructure. In health care, support is being given to basic health care as well as health insurance coverate to the poor.

A2.98 The government has indicated that the cash transfer program will run through only one year, after which it may be relaced by a conditional cash transfer program. How the transition to a conditional cash transfer will be handled has not yet been communicated to the public. Nevertheless, the government is currently working on developing a pilot conditional cash transfer program for 2007, which could then be scaled up.

A2.99 The initial dramatic decline in the sale of fuels after the price hike of October 2005 was in part due to stockpiling by various consumers, but lower consumption appears to persist. In February 2006, Pertamina announced that national fuel consumption was 15 percent lower than forecasted (Asia Pulse 2006d). Vehicle sales also slumped: the the sale of motorcycles during the first four months of 2006 was almost one-quarter lower than during the same period in 2005 (Reuters News 2006j), while that for sedan cars fell fell 56 percent (Asia Pulse 2006f).

A2.100 In July 2005 a presidential decree, "Implementation Guidelines for Energy Savings," was issued. It requested government ministries and agencies to begin a program of energy conservation, such as raising the temperature for air-conditioning to 25°C. Some measures, such as closing broadcasting between midnight and 6 a.m., were reversed on public protest. Households were encouraged to reduce electricity consumption by 50 watts during peak hours. Government agencies have to submit progress reports every six months. However, most of the instructions were advisory and it is not clear whether substantial savings will emerge.

A2.101 Three presidential decrees, all intended to cut dependence on oil, were issued in February 2006. The first, "The Procurement and Utilization of Plants for Biofuel Basic Materials," concerned production of biofuels, particularly biodiesel from castor oil. In May 2006, the country's first sale of biodiesel, as B5 and B10, was launched (*Jakarta Post* 2006). The second, "National Energy Policy," set out as a goal for 2025 changing the mix of energy in Indonesia to 35 percent coal, 30 percent natural gas, 20 percent oil, and 3 percent each for geothermal energy, biofuels, and renewable energy sources. The third, "The Procurement and Utilization of Liquefied Coal," concerned conversion of coal to high-quality synthetic fuels, including high-cetane, sulfur-free diesel (Organization of Asia-Pacific News Agencies 2006b). Consistent with the third decree, the government has signed a memorandum of understanding with a Canadian firm to build a coal-to-liquid plant, at a cost of US$6 billion (*Automotive World* 2005).

Assessment

A2.102 Indonesia has a lengthy history of subsidizing certain oil products which it has not been able to phase out because of political opposition. The implication of this policy during the recent oil price increases has been to vastly increase the total cost to the

government of the subsidy program. Eventually, this became so severe that prices were raised sharply, although still not to international levels. As with Ghana, Indonesia waited until a strong and credible government was in power to make large price adjustments. Unlike in the past, no large violent demonstrations occurred in response to the March or October 2005 price increases. Some analysts credit the government on the timing of the second price increase, just at the beginning of the Ramadan. The approval rating of the president has remained relatively high under the circumstances.

A2.103 The government's move to implement large fuel price increases and simultaneously address potential adverse effects on the poor by relocating funds to targeted cash transfer and three pro-poor programs in education, health, and rural poverty reduction offers valuable lessons to other countries. The government was operating under very difficult circumstances, given the magnitude of the fuel price increase and the scale of the cash transfer program. Implementation problems would be expected under these circumstances, but the government has been carrying out ongoing assessments to rectify delivery problems. Widespread acceptance of the large price rises signals a vindication of the success of the government strategy.

A2.104 Although it is still early to tell, the indications six months after the last price increase of October 2005 are that fuel consumption has declined. The dramatic fall in the vehicle sale is certain to have an effect on the growth of fuel consumption. While short-term price elasticity of fuel demand is low, one exception is fuel smuggling, which responds instantly to price changes. To the extent that the decline is partly due to reduced incentives to engage in smuggling, there are no losers except those who are illegally profiteering from this activity.

Kyrgyz Republic

A2.105 The Kyrgyz Republic produced about 60,000 tonnes of oil in 2005 (*Times of Central Asia* 2006b). It has a small topping refinery with an installed capacity of about 10,000 tonnes. The total domestic demand is much greater, and the balance is imported. Light products are imported only from Kazakhstan and Russia. According to IEA statistics, total demand in 2003 was 0.43 million tonnes. Gasoline accounted for 52 percent of total product consumption, diesel 23 percent, heavy fuel oil 17 percent, LPG 2 percent, and non-aviation kerosene vanishingly small (IEA 2005). Historical inflation rates in the Kyrgyz Republic are given in Table A2.17.

Table A2.17 Consumer Price Index Trend in the Kyrgyz Republic

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	6.9	2.1	3.0	4.1	4.4

Source: IMF 2006i.

Box 1 Winning Public Support: Indonesia in 2003 and 2005

"The fuel demonstrations are symbolic of a wider public dissatisfaction with Ms Megawati's government, and with the corruption and inefficiency that still permeates political and bureaucratic life in Indonesia. The government made little attempt to explain or justify the price rises, all but guaranteeing a public outburst. The subsidy reductions stand against the background of other decisions that appeared to favour powerful interests. In November, the government sought to relieve five of the country's largest debtors from repayment obligations arising out of the 1997-98 financial crisis. Although the government, after a public outcry, reversed course, the incident has reinforced the view that wealthy, influential figures continue to receive special treatment—while average Indonesians are faced with price rises they can ill afford."

"Indonesia: Price reforms—The pressure's rising." Economist Intelligence Unit–Business Asia, January 27, 2003.

"In spite of mounting criticism of his administration following the fuel price increases, the latest survey shows that President Susilo Bambang Yudhoyono's popularity remains high, with over half of the population deeming that he is doing a good job. However, they are unhappy with the government's economic performance. Released by the Indonesian Survey Institute (LSI) here on Thursday, the poll, conducted in mid-December, put Susilo's job approval rating at 56 percent, a decline from 63 percent in an LSI survey issued in September. The President won respect across the country for his integrity, as well as performance in the areas of legal, security and social welfare ever since he took office 15 months ago."

"New survey rates SBY's popularly as high." *Jakarta Post*, December 30, 2005

A2.106 Oil product imports and prices are controlled by the Oil Traders Association which sets prices independently. The association was established in 1999 by thirteen companies engaged in fuel and lubricant manufacturing and marketing. The association's strategy is to pursue a uniform petroleum product pricing policy and develop a common market development strategy. The government plays an active role in influencing retail prices through its taxation policy. Prices of A-80 gasoline (which has a motor octane number of 80), A-93 gasoline (93 RON), A-95 (95 RON), and diesel in February 2006 are given in **Error! Not a valid bookmark self-reference.**.

Table A2.18 Fuel Prices in Kyrgyz Republic in February 2006

Units	*Gasoline (A-80)*	*Gasoline (A-93)*	*Gasoline (A-95)*	*Diesel*
US$ per liter	0.48	0.54	0.59	0.48
Soms per liter	19.70	22.50	24.50	19.70

Source: *Times of Central Asia* 2006a.

A2.107 The higher import prices experienced led parliament in December 2004 to set zero excise rates for imported diesel and jet fuel for 2005, and to lower that for gasoline than originally proposed. In April 2004, the retail sales tax on gasoline and diesel was reduced from 4 percent to 2 percent in Bishek. Despite the halving of the tax, the revenue to the government did not fall. The excise duty was brought back to 4 percent

later, but decreased to 2 percent again between June and December 2005. Prices were increased several times during 2005, including three times in September.

A2.108 One particular problem for the Kyrgyz Republic has been the nature of its imports from Kazakhstan. The Kazakh government normally supplies petroleum products, but with a seasonal ban in the spring. In 2005, Kazakhstan imposed a much longer and wider ban on fuel exports. The ban was partly driven by the large differences between the domestic fuel prices and those in the neighboring countries, making fuel exports attractive. The ban on diesel exports in the spring began earlier than usual and ended later, and then was re-imposed on July 1 and extended repeatedly until February 28, 2006. A ban on jet kerosene exports was in effect from April to June, and a ban on gasoline exports was imposed in October, to last until December 31 and extended until February 28, 2006. The ban on the three fuels was finally lifted on March 1, 2006.

A2.109 The series of export bans in Kazakhstan led to fuel shortages in the Kyrgyz Republic and other neighboring countries. The ban and large cross-border price differences have led to in-smuggling of cheap and untaxed fuel from Kazakhstan, resulting in revenue loss to the government. The government placed quotas on fuel sales from filling stations in order to prevent purchases of fuel for speculation. In early 2005, for example, microbuses were allocated 30 liters a day (AKI Press 2005). The prolonged export ban in Kazakhstan has forced importers to increase imports from Russia at considerably higher prices. In August 2005, the government asked the Oil Traders Association to acquire a strategic reserve of 20,000 tonnes each of gasoline and diesel (*Times of Central Asia* 2005a).

Assessment

A2.110 The Kyrgyz Republic, being a landlocked country and having only two access routes for products, has been vulnerable to physical shortages of products that have followed the general tightness of the world oil market. Prices for products, that reflect the terms of supply from Russia and Kazakhstan, have been frequently adjusted, and the government has cut taxes in order to moderate the effects of the price increases. The government's response to possible supply disruptions has been to ration filling stations and to build a strategic reserve. More general oil-saving measures apparently have not yet been put in place.

Pakistan

A2.111 Pakistan is an oil producer, but relies on imports for more than 80 percent of its consumption. According to the Ministry of Petroleum and Natural Resources, indigenous crude oil meets 18 percent of total demand; the remaining 82 percent of demand is met through imports of crude oil, high speed diesel, and fuel oil. There are six refineries in the country (MPNR 2005). Pakistan consumed 15.5 million tonnes of petroleum products in fiscal 2004–05. Diesel accounted for 50 percent, heavy fuel oil 29 percent, gasoline 9 percent, LPG 3 percent, and non-aviation kerosene 1 percent (HDIP–MPNR 2005). Historical inflation rates in Pakistan are given in Table A2.19.

Table A2.19 Consumer Price Index Trend in Pakistan

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.1	3.3	2.9	7.4	9.1

Source: IMF 2006i.

A2.112 The downstream sector has one state-owned oil company, Pakistan State Oil (PSO), and six private sector companies which include Caltex and Shell. The sector is largely deregulated, with some elements of regulation remaining, but world oil price increases in the last two years have prompted the government to strengthen its control of the sector, with the result that only heavy fuel oil and aviation fuel are presently fully deregulated.

A2.113 Between July 1, 2001 and April 1, 2006, the Oil Companies Advisory Committee was authorized to review, set, and announce the ex-depot prices of gasoline, kerosene, and light diesel oil twice a month in accordance with the approved pricing formula. Since April 16, 2006, the Oil and Gas Regulatory Authority has been in charge of price notification. This pricing formula is based on Arab Gulf fuel prices and consists of ex-refinery/import-parity price, customs and excise duty, petroleum development levy (PDL), distribution margin for oil marketing companies (currently 3.5 percent of ex-depot sale price), dealers' commission (4.0 percent of ex-depot sale price), inland freight equalization margin (which is based on actual transportation costs determined by oil marketing companies), and a 15 percent general sales tax. Import duties of 6 percent on kerosene and light diesel oil and of 10 percent on HSD have been imposed since July 2002, offering protection to domestic refineries.

A2.114 LPG was deregulated in 2000. Seventy-four provisional licenses have been issued for marketing LPG, and 30 companies are thus far operational. The licensed private firms are free to import LPG, and marketing companies can set prices based on prevailing market conditions. In practice, an informal price ceiling continues to be applied to domestically manufactured LPG. For a long time, this ceiling was in the neighborhood of US$300 per tonne, against international LPG prices exceeding US$500 per tonne at times. This implicit price ceiling discourages LPG imports and creates a shortage, a "black market," and high prices paid by end users. In April 2006, wellhead LPG prices were increased from Rs17,000 (US$283) per tonne to Rs20,200 (US$337). As of early May 2006, LPG was retailing at Rs50 (US$0.83) per kilogram, having risen 47 percent in three weeks on account of supply shortage, and selling for as much as Rs65 (US$1.08) per kilogram in Karachi (*Business Recorder* 2006b).

A2.115 In response to rising world oil prices, the government decided to shield consumers partly from steep price increases and capped domestic sale prices repeatedly in 2004 and 2005 (MPNR 2005). This was achieved in part by adjusting the PDL (other taxes were not changed). The government began to lower the PDL in May 2004 and reduced the PDL to zero for all petroleum products except aviation fuel between August 16 and December 16, 2004. The PDL became positive on December 16, 2004, but became zero again in early 2005 for light diesel oil and kerosene: the PDL has been zero since February 16, 2005 for light diesel oil and since March 1, 2005 for kerosene. In

addition, the government introduced a price differential claim (PDC) beginning on August 16, 2004, which was used to reimburse oil companies for the subsidy to consumers. The PDC particularly targeted kerosene and diesel. The data on automotive diesel are not available after July 1, 2005 at the time of report writing, but for kerosene and light diesel oil, a negative PDC was charged (that is, the fuels were subsidized) between August 16 and December 16, 2004, and between March 16 and November 16, 2005. In contrast, the PDC for gasoline became negative for only a short period, a total of three months in 2004.

A2.116 In November 2005, the Ministry of Petroleum and Natural Resources estimated that the differences between the prices of kerosene, HSD, and light diesel oil based on the pricing formula, and the actual prices in effect, were Rs7.13 (US$0.12), Rs4.47 (US$0.07), and Rs4.13 (US$0.07) per liter, respectively. As of October 31, 2005, the total reduction in revenues to the government was Rs70 billion (about $1.2 billion), and the PDC had amounted to Rs21.4 billion ($360 million) (MPNR 2005). The maximum ex-depot prices in effect from June 16 to June 30, 2006 are shown in Table A2.20.

Table A2.20 Maximum Ex-depot Prices in Pakistan, June 16–30, 2006

Parameter	*Gasoline (87 RON)*	*Kerosene*	*Automotive diesel*
Units	Per liter	Per liter	Per liter
US$	0.96	0.59	0.64
Rupees	57.7	35.23	38.73

Sources: www.psopk.com, www.ogra.org.pk.

A2.117 Although Pakistan has adopted an automatic price adjustment mechanism based on a formula linked to world prices and to published margins, there has been enormous hostility to the price rises that have occurred, despite the element of subsidy for kerosene and diesel. There have been a number of strikes that have targeted the upward movements of retail prices and challenges in the courts to the price-setting process. Both oil companies and the government have been blamed for the situation. This may reflect a more general lack of support for the government and its policies, but also the fact that the general price level (for virtually all goods and assets) has been increasing over the past couple of years—note the considerably higher inflation rates in 2004 and 2005 compared to the previous years in Table A2.19. Oil companies, especially those with refining in the country, declared large profits in 2005, reflecting the global trend caused by shortages of refinery capacity, but this has merely served to increase the suspicions of the population that oil companies are exploiting the global oil market and taking advantage of consumers.

A2.118 The practice of putting oil companies in charge of notifying prices, even if the function were purely mechanical, came under increasing question, and the price-setting function was transferred to the Oil and Gas Regulatory Authority which began issuing price notifications on April 16, 2006. Earlier, the National Accountability Bureau was

commissioned to launch an investigation into determination of petroleum fuel prices over the last five years, after questions were raised about over-charging by oil companies.

A2.119 At the same time that oil prices have been rising, Pakistan's economy has grown rapidly (more than 7 percent in the last year), resulting in a substantial increase in the demand for energy. The demand for oil products did not increase as rapidly, however, because of a strong substitution of natural gas for heavy fuel oil in the power sector. In addition, some 800,000 vehicles fueled by CNG have replaced gasoline vehicles. Pakistan's CNG vehicle industry is the third largest in the world (IANGV 2006). The government's pricing policy gives large financial incentives for switching from gasoline to CNG. The Ministry of Petroleum and Natural Resources was reported in June 2006 as having said that a draft proposal for converting diesel vehicles to CNG would be submitted to the cabinet for approval shortly (Pakistan Press International Information Services 2006). Pakistan is currently self-sufficient in natural gas, but will soon start to import it. Its reserves-to-production ratio stood at slightly less than 35 years in 2004 (bp 2006).

A2.120 Pakistan Sugar Mills Association has been urging the government for a number of years to launch a fuel ethanol program. In March 2006, Prime Minister Aziz directed the Ministry of Petroleum and Natural Resources and the Ministry of Industries and Production to carry out pilot projects to test automotive use of ethanol. The petroleum ministry would test blending 5–10 percent ethanol into gasoline. The industries ministry would import ethanol buses to run on an experimental basis. Depending on the outcome of the pilot projects, ethanol blending might be replicated nationally (*Business Recorder* 2006a)

A2.121 The increased oil bill has led the government to consider hedging between 10 and 20 percent of the oil purchases, although no decision on this has been finalized. Other policies to reduce the oil bill include importing natural gas—LNG and possibly piped gas from Iran, Turkmenistan, or Qatar—and encouraging further petroleum exploration in the country. The government has not introduced any direct mandatory energy conservation measures, which might have added further to its unpopularity.

Assessment

A2.122 Pakistan's downstream petroleum sector had been undergoing steady reform until world oil prices began to surge in 2004. The government has since introduced fuel subsidies by means of PDC and continued with the policy of encouraging companies to hold down the price of LPG. The price gap between the government's implicit ceiling on LPG prices and corresponding import-parity prices has widened considerably in recent months, contributing to supply shortages. Even though the price of gasoline has been raised in the past year so as to partially offset the lower prices of kerosene and diesel, the net tax expenditure has been large.

A2.123 Despite this attempt to shield consumers from the effects of the increase in international product prices, there has been a great deal of opposition to the price changes that have taken place, with the blame being placed on both the oil companies and the government. The lack of policies to reduce oil consumption, apart from the very active encouragement of the natural gas sector, will leave the economy vulnerable if natural gas prices increase, but energy conservation may be difficult to enforce because of the ability

of opposition groups to use any potentially unpopular move by the government as a reason for further demonstrations.

People's Republic of China

A2.124 China is the second largest oil consumer in the world after the United States. It is a large producer but needs to import about 40 percent of its demand. According to IEA statistics, China consumed 183 million tonnes of petroleum products in 2003. The largest share of product consumption was diesel at 44 percent, followed by gasoline at 22 percent, heavy fuel oil at 17 percent, LPG at 9 percent, and non-aviation kerosene at 2 percent (IEA 2005b). Agriculture is the main source of demand for diesel, accounting for 70–80 percent of total consumption. Heavy fuel oil has accounted for most of product imports; China exported both gasoline and diesel at times during 2005. The overall demand for oil increased in 2004 by an exceptional 15 percent, but grew at a very much slower rate in 2005, just 3 percent. Historical inflation rates in China are given in Table A2.21.

Table A2.21 Consumer Price Index Trend in China

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	3.6	2.5	2.8	1.1	3.1

Source: IMF 2006i.

A2.125 The downstream sector is regulated by the National Development and Reform Commission (NDRC), which sets "guidance" prices at wholesale and retail. Most of the market is in the hands of Sinopec and PetroChina, two foreign-listed, majority state-owned companies. About 20 percent of refined product sales are in the hands of independent companies. The government regulates prices charged by refiners and retailers and does not typically provide a direct price subsidy to users. The government has proposed a fuel tax on gasoline and diesel for years, but concerns about inflation, the absence of an effective subsidy scheme (mainly for farmers), and conflicts between the central and local governments over revenue distribution have so far prevented its introduction.

A2.126 Before the large price increases on the oil world market beginning in 2004, China followed a cost-based pricing policy, whereby retail prices were set once a month by a formula that summed

- Average product prices in Singapore, New York, and Rotterdam
- Sea transportation costs
- Import duties and taxes
- Distribution costs
- Consumption taxes and road taxes where they are levied.

A lag of one month in product pricing has historically enabled manipulation of imports and sales to take advantage of anticipated price movements on the domestic market, prompting the government to consider alternative pricing mechanisms. With the onset of steep oil price increases, and concerned about the impact of markedly higher oil prices on the

economy, the government has not been implementing the above pricing formula for quite some time.

A2.127 Retailers are allowed to vary prices by ±8 percent from the indicated price in order to adjust to local market conditions. Failure to adhere to the pricing formula has resulted in regulated consumer prices that are well below import parity, but the companies bear the costs of any difference between costs and sales prices. The government has been especially concerned to shield its large farming population and urban taxi drivers from steep oil price rises. As a result, the refinery segment of Sinopec made a loss in 2005, against a profit in 2004. The oil companies have repeatedly called for price reform. The government announced a one-off payment to Sinopec of 9.42 billion yuan (US$1.2 billion) in December 2005 to compensate for its losses in the refinery business.

A2.128 The government approved (but has not introduced) a new pricing mechanism in March 2006. The new mechanism bases prices on crude rather than petroleum products to reflect the fact that China imports oil mainly in the form of crude. It adds refining costs and profit margin to the average price of crude in three markets to arrive at wholesale refined product prices. Price adjustments are made when international prices move by more than 4 percent. NRCD has urged the government to move to this pricing system on several occasions.

A2.129 LPG prices have been deregulated in some regions. Steep rises in world prices of LPG beginning in the second half of 2005, and a longer-than-usual cold spell which boosted demand, have created LPG shortages in those regions that rely on LPG imports. Domestic LPG prices rose more than 40 percent between August 2005 and January 2006 in some southern provinces. In Guandong, which consumes about one-third of all LPG in China, LPG in 15 kg cylinders was selling for 100 yuan (US$0.83 per kg) by January 2006. The price surge prompted the National Development and Reform Commission to step in and issue a circular, requiring regional governments to set up intervention mechanisms to prevent sudden price surges (*South China Morning Post* 2006a). Some provincial governments began to offer subsidies of 10–20 yuan ($1.24–2.48) a month in January 2006 to poor residents to help offset rising LPG prices on a temporary basis (Dow Jones Commodity Service 2006a).

A2.130 During 2005 retail fuel prices were raised five times, with the last increase in July, but at a much lower rate than that on the world market. Domestic ex-refinery prices were below international prices by as much as 35 percent (*Petroleum Economist* 2005). In 2006, prices were increased in March and May, the latter representing the largest percentage increases since 2003. Representative retail prices in China in May 2006 are shown in Table A2.22. The fuel price increase of May 2006 was regarded by some industry analysts to be about half of what would be needed to eliminate refining losses (Xinhua's China Economic Information Service 2006).

Table A2.22 Representative Fuel Prices in China in May 2006

Units	*Gasoil (93 RON)*	*Gasoline (90 RON)*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per kg
US$/liter	0.64	0.56	0.58	0.74
Yuan/liter	5.09	4.52	4.62	5.93

Sources: *Just Auto* 2006, *Shanghai Daily* 2006, and *Rim LPG Intelligence Daily* 2006.

A2.131 In the first half of 2005, the losses from selling to the domestic market encouraged the refiners to look to export markets, where margins were larger, and to cut down on supplying independent retailers. Some out-smuggling, especially to Hong Kong, also occurred. This led to serious shortages of products in some parts of the country in July and August and fuel rationing in southern China, with the result that prices were being charged above the official maximum prices. In September, the government suspended until December a tax rebate on exported gasoline (11 percent) and naphtha (13 percent) in an attempt to decrease the incentive to export, and to divert supply back to the domestic market. The export rebates were suspended again on March 14, 2006. The suspension not withstanding, localized fuel shortages were experienced in April 2006 leading up to the May price increase.

A2.132 A voucher scheme has been used for petroleum product purchase. Vouchers were purchased at a fixed price per liter and could be redeemed at any time for that same price (apparently with no limits on quantities purchased). Because prices were adjusted infrequently, and when adjustments were made they were relatively large, there tended to be speculation with consumers buying large amounts of vouchers at times that price increases were expected. To combat hoarding and speculation, Sinopec's Beijing branches stopped issuing vouchers in July 2005 and instead offered smart cards purchased for a redemption value in cash equivalent at ruling prices, again with no apparent quantity limit (*Platts Commodity News* 2005b). Earlier in April 2005, expectations of a price hike became widespread and consumers started hoarding. To counter the possibility of temporary shortages Sinopec limited purchases per visit to 20 liters in Beijing and 25 liters in Shenzhen (*Platts Commodity News* 2005a).

A2.133 In March 2006, the government introduced a series of measures in response to higher oil prices and in an attempt to move toward price liberalization. One is a windfall tax which is set at 20 percent when crude oil prices fall between US$40 and 45 per barrel, rising by 5 percent for each US$5 per barrel increase and capped at 40 percent at or above US$60 per barrel. The government has indicated that the revenue from the windfall tax will be used to fund subsidies to low-income oil consumers such as farmers and sectors worst-hit by higher oil prices such as fishing, forestry, and public transport. The aviation fuel pricing scheme was revised effective from April 1 to allow prices to float more freely, one of the steps toward a broader fuel price reform. The government also introduced a new consumption tax on five petroleum products, although only 30 percent of the announced tax rates would be charged initially and the tax on jet fuel would be suspended to ease the impact on consumers. For gasoline and diesel, the government retained the existing rates of 0.20 yuan (US$0.025) and 0.10 yuan (US$0.012) per liter, respectively (Reuters News

2006g). The government in April 2006 announced that grain farmers would receive 26.7 billion yuan (US$3.3 billion) in direct subsidies for diesel oil, fertilizer, and pesticides, about double what they received in 2005. By June, the finance ministry said that it had paid out 8.4 billion yuan (US$1.05 billion) in subsidies to offset higher fuel prices (Reuters News 2006o). Taxi fares and fuel subsidies have gone up in some cities—in Beijing taxi fares were increased for the first time in more than a decade in May 2006. In Shenzhen, the monthly compensation to taxi drivers amounts to 800 yuan (US$100) (Reuters News 2006l). In May 2006, the Ministry of Finance instructed every province to immediately hand out subsidies to the fisheries, forestry, and public transport sectors in the cities and counties under their administration, and urged the local authorities to closely monitor the public's reaction to the fuel price rises (*South China Morning Post* 2006b).

A2.134 Although currently about only one-third of petroleum product consumption is for transportation fuels, government forecasts indicate that this might rise to as much as two-thirds by 2020. Car sales soared by almost half over the first four months of 2006, helping to drive a 20 percent rise in demand for gasoline to around 1.2 million bpd in April (Reuters News 2006m). Recently the government has taken a number of measures to encourage the purchase of more fuel-efficient cars and vehicles. Fuel economy standards, more stringent that those current in the United States, were introduced in July 2005. Beginning April 2006, the government increased the consumption tax on passenger cars from the earlier 5–8 percent to 9–20 percent, with the highest rate applying to cars with engines larger than 4 liters.

A2.135 Faced with the costs of using large amounts of heavy fuel oil in the power generation sector, China is making strenuous efforts to diversify into renewable energy. Its target is to increase current installed capacity of hydro, wind, solar, biogas, and nuclear to about 10 percent of total capacity by 2010. However, the government has been reluctant to increase power prices as a way of discouraging energy use, and indeed controlled coal prices until 2005. In 2004 official coal prices were only 50 percent of spot prices, which led coal companies to divert supplies away from the power sector in order to be able to sell on the spot market. This resulted in brownouts for much of the country. In 2005, NDRC effectively deregulated coal prices, while maintaining price controls in the power sector. A partial pass through of coal price increases into power tariffs, capped at 70 percent, is permitted, subject to approval by NRDC. This led to protracted price negotiations between coal and power producers in 2006.

A2.136 Despite the slowing growth in domestic coal output after the closure of several unsafe mines, the government plans to invest US$15 billion to build coal-to-liquid plants in the Inner Mongolia Autonomous Region and the coal-rich provinces of Shanxi, Shaanxi, and Yunnan over the next five to ten years as part of its efforts to cut down dependency on oil imports, according to the NDRC. The combined annual output of the plants could reach 16 million tonnes (about 320,000 bpd). Shenhua Group, China's largest coal producer, is building a coal-to-liquids plant with an annual output capacity of 3.2 million tonnes of oil products in Inner Mongolia, the country's first such plant, at a cost of 24.5 billion yuan (US$300 million). The plant is expected to become operational in 2007 (AWKnowledge 2006a).

A2.137 The annual rate of growth of the renewables sector is around 25 percent, and already China possesses about 40 percent of the world total of solar heaters. China is the world's third largest producer of fuel ethanol after the United States and Brazil, and 20 percent of all gasoline sold now contains ethanol according to the government. Ethanol is made from maize, sorghum, and sugarcane. Five provinces as well as 27 cities in another four provinces have been selling only gasohol since 2004 (Dow Jones Energy Service 2006). Subsidies of about 1,300 yuan ($US161) per a tonne of ethanol ($0.20 per liter) are given to ethanol producers. The government has stated that the subsidies will be reduced and eventually eliminated (Reuters News 2006f). With declining subsidies, soaring world sugar prices, rising maize prices and the prospect of becoming a net maize importer in the future, the fuel ethanol industry is likely to face challenges in the coming years.

A2.138 China has announced a program to create a strategic petroleum reserve. The plan is to accommodate up to the equivalent of 20 days' supply by 2010. A strategic stock would also be able to give some relief against temporary price shocks, as well as bridging any supply disruption. Although the construction of some storage tanks for strategic reserves were completed in mid-2005, stockpiling for a strategic reserve has not yet begun on account of concerns about the cost of filling the tanks.

Assessment

A2.139 China has largely protected users from the effects of oil price increases, in order to protect agriculture, and to avoid any consumer unrest. Because it does not impose fuel taxes, this has been achieved by squeezing the margins charged by the refiners through control of refinery gate prices. As China is a net importer of crude, this imposes a net financial cost on the economy, rather than a simple transfer from domestic upstream to downstream. This policy has also led to localized fuel shortages and rationing.

A2.140 In 2006, the government introduced a series of simultaneous, offsetting, subsidy measures to shield lower-income farmers as well as the public transport sector from higher fuel costs. The government gave direct subsidies to grain farmers to compensate for higher diesel and fertilizer prices. This introduction of targeted subsidies could pave the way for future price increases under the new pricing scheme.

A2.141 China has embarked on an ambitious program to reduce energy consumption, pledging to cut the energy intensity of its economy by 20 percent by 2010. The government has started a program of increasing fuel efficiency in the transportation sector, and encouraging fuel switching in the power sector, both of which will help to reduce the oil intensity of the economy. An increase in excise tax on cars implemented in 2006 should help increase vehicle efficiency. Faced with rising oil and natural gas import costs, China is even pursuing coal-to-liquids technology, which currently is used commercially only in South Africa, at an estimated cost of $15 billion. Although the government has been reluctant and slow to adopt one policy that has been shown around the world to cut fuel consumption—allowing fuel prices to rise—steps taken in 2006 point to a gradual and steady move toward aligning domestic with international prices, and eventual adoption of fuel taxes.

Philippines

A2.142 The Philippines produces a small amount of oil, importing nearly all of its requirements as crude to be refined in its domestic refineries or as products. There are two refineries in the Philippines, one owned by Petron and the other by Shell. According to government statistics, total oil consumption in 2004 was 20 million m^3 (338,000 barrels per day), of which diesel accounts for 37 percent, heavy fuel oil 22 percent, gasoline 21 percent, LPG 11 percent, and kerosene 2.5 percent. Premium gasoline makes up two-thirds of gasoline demand (Independent Review Committee 2005). Historical inflation rates in the Philippines are given in Table A2.23.

Table A2.23 Consumer Price Index Trend in the Philippines

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	6.8	3.0	3.5	6.0	7.6

Source: IMF 2006i.

A2.143 The oil sector was deregulated in 1998. In 2004, Petron had a 37.8 percent market share at retail, Shell 33.0 percent, Caltex 15.9 percent, and new players the remaining 13.3 percent. In the LPG market, Petron, Shell, and Caltex combined accounted for 57 percent of the market (Independent Review Committee 2005). Prices are liberalized and there are no subsidies. This contrasts with the situation of the early 1990s when petroleum product prices were heavily subsidized, leading to a large fiscal drain. The Oil Price Stabilization Fund, set up in the 1980s, was wound up in 1996, leaving residual debts to oil companies of 5 billion pesos (US$90 million) (Alexander's Gas & Oil Connections 2005). The Fund was abolished in 1998.

A2.144 The government is facing a severe fiscal squeeze with a large budget deficit and very large foreign debt. For example, 86.1 percent of government revenues in 2004 had to be spent on debt service (Ministry of Finance 2005). This has ruled out the reintroduction of subsidies and has also constrained the ability of the government to substantially reduce taxes on petroleum products as a way of mitigating the oil price rises. The government has adjusted taxes and duties several times in the past two years in an attempt to smooth out some of the price variation.

A2.145 In January 2005 the government increased import tariffs on crude and products (except for LPG) from 3 to 5 percent to help with budget finance, in the belief that oil prices were coming down. The VAT Reform Law, which came into effect in November 2005, introduced a 10 percent VAT on petroleum products and electricity for the first time. Excise duties on kerosene, diesel, and LPG were eliminated and that on gasoline was reduced. The import tariffs were reduced from 5 percent back to 3 percent, and to 0 percent for LPG, to help offset the impact of these increases. The VAT Reform Law stipulated that the VAT rate would be further increased to 12 percent in January 2006 if one of two conditions were met—a VAT collection-to-GDP ratio of more than 2.8 percent, and a budget deficit-to-GDP ratio of more than 1.5 percent in 2005. The VAT rate was increased to 12 percent in February 2006.

A2.146 In May 2006, in order to ease the burden of soaring world oil prices on consumers, a presidential executive order established an automatic tariff mechanism for crude oil and refined products based on certain triggers indexed on international prices. Tariffs would be decreased from 3 percent to lower percentage points and would even be eliminated, depending on two-week average prices of Dubai crude and Mean of Platts Singapore diesel. The executive order would be in effect for six months, subject to review (*Dow Jones International News* 2006b, Tariff Commission 2006). The Department of Energy (DOE) and oil companies informed the Senate that they expected high oil prices to continue for another 3 to 5 years (Philppines News Agency 2006b).

A2.147 The frequent increases in petroleum product prices have led to substantial criticism of the government for not doing enough to stop rising fuel prices, and also of the companies which have been accused of unfair pricing. The Department of Energy in 2001 issued a memorandum requiring oil companies to inform DOE of price adjustments one day in advance. In August 2005, this requirement was tightened and oil companies were asked to provide reasons for the price adjustment and demonstrate the reasonableness of the magnitude and timing of the adjustment. The government has at times asked oil companies to explain to the public reasons for price increases, and to lower prices or to make small changes frequently rather than less frequent but large price adjustments. The government has also warned oil companies not to "exploit" rises in world oil prices and appealed to them to moderate their profits for the sake of national interest. The government conducts spot checks on prices of basic commodities to monitor whether some traders might be taking advantage of fuel price increases.

A2.148 In February 2005, DOE created an independent oil deregulation law review committee to review and assess the provisions and implementation of the Downstream Oil Industry Deregulation Act of 1998 and to submit recommendations. The committee noted that price adjustments in the Philippines, made in small increments, had lagged behind international price movements, that there was no evidence of price collusion, and that there was not much scope for squeezing the margins of oil companies further. The committee concluded that deregulation increased competition, and advised against reviving the Oil Price Stabilization Fund and subsidizing fuel prices, on the grounds that such a move would entail large public financing in times of rising oil prices—something that the government could ill afford. The committee recommended that the government continue to urge Petron to act as a price moderator. The committee noted higher incidents of unfair or unsafe practices after deregulation in the LPG market, and called for greater enforcement (Independent Review Committee 2005).

A2.149 In 2003, DOE forged an agreement with oil companies to offer a discount on the price of diesel sold to public transport companies. This discount program has been maintained to this day. Filling stations offering diesel discount numbered 347 as of March 2005 (DOE 2005). The government has made frequent appeals to oil companies to offer assistance to the public transport sector. Despite the diesel discount, transportation companies have mounted several national strikes to protest against rising fuel prices and call for repeal of the Downstream Oil Industry Deregulation Act as well as revival of the Oil Price Stabilization Fund. In Congress, calls for dismantling the deregulation act and for re-nationalizing Petron Corporation continue; in February 2006, for example, a bill

was tabled for re-nationalizing Petron to "ensure public welfare through fair and regulated prices" (Asia Pulse 2006c).

A2.150 Fuel prices in Metro Manila at the end of May in 2006 are shown in Table A2.24. Discounts offered at discount filling stations amount to about 1 peso (US$0.02) per liter of diesel. LPG is sold in 2.5, 2.7, 5.0, 5.5, 7, 9, and 11 kg cylinders. The prices shown in Table A2.24 are for LPG sold in 11 kg cylinders. Unit costs decrease with increasing cylinder size. Recently, to help the poor with cash constraints, Petron said that it would release thousands of additional 2.7 kg cylinders.

Table A2.24 Fuel Prices in Metro Manila in end-May 2006

	Regular gasoline	*Kerosene*	*Diesel*	*Discounted diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.77–0.81	0.73–0.79	0.68–0.71	0.66–0.69	0.74–0.85
Pesos	40.16–42.03	38.19–41.00	35.15–36.78	34.17–36.06	36.64–44.27

Source: www.doe.gov.ph/Oil/pump.htm.

A2.151 The Department of Energy in the Philippine Energy Plan 2005 Update set a target of increasing energy self-sufficiency from less than 56 percent in 2004 to 60 percent in 2010, and outlined the following steps to achieve this goal (DOE 2005):

1) Increasing indigenous oil, gas, and reserves and production
2) Aggressively developing renewable energy potential
3) Increasing the use of alternative fuels (CNG, biodiesel, and ethanol)
4) Forging strategic alliances with other countries
5) Promoting a strong energy efficiency and conservation program.

A2.152 The first strategy makes use of intensive promotion of oil and gas exploration, identification of coal exploration areas, promotion of clean coal technology, and increasing mine productivity. The government hopes to reduce coal imports by 20 percent in 10 years. In the second strategy, the government plans to double renewable energy-based capacity in 10 years by becoming the world's leader in geothermal energy, largest wind power producer in Southeast Asia, and the region's solar manufacturing hub; promoting development of all viable hydropower plants including mini-hydro; and promoting biomass development and utilization for power and non-power applications

A2.153 For alternative fuels, three programs are being pursued: CNG, biodiesel, and ethanol. An executive order issued in February 2004 established a Natural Gas Vehicle Program for Public Transport. Incentives are offered, including an import duty of only one percent on natural gas vehicles (DOE undated), and 0 percent for components for assembly of natural gas, flex-fuel, electric, and hybrid vehicles (Tariff Commission 2006).

A2.154 For biodiesel, a memorandum circular signed in February 2004 directed all government agencies and state-owned corporations to use a blend of 1 percent biodiesel derived from coconut oil and 99 percent petroleum diesel. The pace of compliance with this order has been slow. As of February 2006, only the Philippine Coconut Authority appeared

to have been in compliance (Asia Pulse 2006c), although a few other departments and agencies are now using biodiesel. The country's first large-scale biodiesel plant was inaugurated in May 2006, ahead of anticipated passage later in the year of legislation requiring blending of 1 percent biodiesel in petroleum diesel and 5 percent ethanol in gasoline, possibly rising to 10 percent by 2010 (*Financial Times* 2006). The government has reportedly earmarked some 500 million pesos (US$9.7 million) for the production of jatropha biodiesel, and President Arroyo has encouraged local governments to plant jatropha for biodiesel production (Philippines News Agency 2006a). In August 2005, to encourage fuel switching, the government cut import tariffs on ethanol from 10 to 1 percent. There is no commercial production of ethanol in the Philippines today, but the first ethanol producing plant is slated to come on stream in 2007. In May 2006, the nation's first E10 (a gasoline-ethanol blend containing 10 percent ethanol) was launched by Shell.

A2.155 Under the fourth strategy, the government is seeking cooperation with Thailand on biofuels development, joint upstream exploration with neighboring countries, new oil supplies from Russia, and coal supplies from Australia, China, and Indonesia. Thailand already has an active domestic ethanol market, as the next section shows.

A2.156 The government of the Philippines ranks among the most active in promoting energy efficiency and saving programs. The government has introduced a number of measures to economize on the use of oil, and also to encourage fuel switching. In August 2004, the purchase of government cars was halted; air conditioning in government offices was switched off at 4 p.m.; lights were switched off during lunch breaks; unnecessary trips by government officials were suspended; and reduced use of elevators was advised. Ministries and government agencies were encouraged to undertake proper maintenance of vehicles (including correct tire inflation); and reduced driving of government vehicles. Shopping malls and movie houses were asked to shorten their business hours. In April 2005, the government introduced a four-day working week for a two-month period, which substantially reduced the use of electricity. An administrative order signed in August 2005 directed all government offices to implement a mandatory 10 percent reduction in their fuel consumption. Government agencies and offices were prohibited from using vehicles, aircraft, and watercraft for purposes other than official business; the use of government vehicles was banned on Sundays and official holidays, or outside regular office hours; air-conditioning was banned during the cooler months; and monthly energy consumption reports had to be submitted. An Energy Audit Team was formed, tasked with carrying out random spot checks on government offices, universities, and state-owned corporations. Gas stations also agreed to limit their opening hours to a maximum of 20 hours a day, for an initial 6 month period. In October 2005 the Energy Audit team reported savings by the Office of the President of 23 percent in energy and 13 percent in fuel under the energy conservation initiative (Asia Pulse 2005c).

Assessment

A2.157 Following its unsatisfactory experience with an oil stabilization fund in the 1990s and constrained by its fiscal situation, the government of the Philippines has maintained a policy of free market pricing. This has proved unpopular, but so far the

government has been able to resist calls to return to a policy of subsidizing prices. Diesel discounts offered to public transport are voluntary. The government has used a wide range of measures to reduce oil consumption, and the overall impact is impressive: consumption of petroleum products from January to November 2005 declined by 8 percent from 108.6 million barrels in 2004 to 99.9 (DOE 2006). Such a large reduction in the absence of a financial crisis—the economy grew 5.1 percent in 2005 (IMF 2006i)—is remarkable.

A2.158 An introduction of 10 percent VAT, raised to 12 percent in February 2006, did not have as large an impact as anticipated because the government adjusted other taxes to moderate the impact of VAT reform. The government has tried to keep retail prices low by applying moral suasion, and urging Petron, which is owned 40 percent by the government and which has the largest market share, to act as a price setter and moderator. An independent review of the downstream petroleum sector found that net-of-tax prices and margins were relatively low in the Philippines, suggesting positive effects of increasing competition following deregulation. Ironically, those that are most adversely affected by competition are the new entrants, which have higher costs than the "three sisters" (Petron, Shell, and Caltex) which are already established in the market with sunk costs. This notwithstanding, new entrants are gradually increasing their market share, especially in the LPG market where they may soon capture half the market.

Thailand

A2.159 Thailand produces enough oil and condensates to match one-quarter of its consumption. It imports crude oil to be refined domestically—there are four refineries—as well as some heavy fuel oil. Thailand is a net exporter of all other products. According to government statistics, Thailand consumed 42 million m^3 (720,000 barrels per day) of petroleum products in 2005, 47 of which was diesel, 17 percent gasoline, 15 percent heavy fuel oil, and 10 percent LPG. Kerosene consumption is negligible. Consumption of E10, although small, is growing rapidly (EPPO 2006). Historical inflation rates in Thailand are given in Table A2.25.

Table A2.25 Consumer Price Index Trend in Thailand

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	1.6	0.6	1.8	2.8	4.5

Source: IMF 2006i.

A2.160 The sector was deregulated in 1991, and all fuel prices were liberalized with the exception of LPG. LPG has been subsidized for more than 25 years. There have been several proposals to phase out the LPG subsidy—the most recent one being that in 2003 when the government made a plan to phase out the LPG subsidy by 2005—but the LPG subsidy is continuing. PTT, formerly the Petroleum Authority of Thailand, underwent a partial privatization in 2001. The government still owns a 68 percent stake in PTT. The company, which enjoys a 35 percent market share, is subject to implicit government pressure not to immediately pass on oil prices.

A2.161 The LPG subsidies are provided by the State Oil Fund, which is generally financed by levies on other petroleum products. At the beginning of 2003, the Fund was in deficit by 4.2 billion baht (US$96 million), despite having had a net inflow of 6.2 billion baht in 2002. In February 2003, the government reintroduced subsidies on other products because of the price spike caused by the anticipated invasion of Iraq. These were phased out in April 2003, sooner than originally planned. In January 2004 the government reintroduced price ceilings on oil products for an initial period of two months, with the expectation that the oil price rise would be short-lived and that this would cost the government a maximum of 5 billion baht (US$128 million) (Reuters News 2004). The subsidy for gasoline continued until October 2004. The much larger subsidization of diesel continued until July 2005. The price of diesel was frozen between January 2004 and February 2005; elections in February 2005 ruled out the possibility of an earlier price increase. By the time the diesel subsidy was ended, the total cost of the price subsidy amounted to 92 billion baht (US$2.2 billion), more than 90 percent of which was on diesel (Thai News Service 2005c), and the cost of the subsidy to the Oil Fund had increased to the point at which the government could no longer ignore its fiscal implications.

A2.162 During the period of fuel subsidies, fuel prices were increased from time to time, but to levels well below international equivalents. The price increases nevertheless led to some protests. The continuing subsidy on diesel, once gasoline prices were liberalized, led to a widening gap between diesel and gasoline prices and an increase in diesel demand and switching from gasoline to diesel vehicles for new vehicle purchase. When the diesel subsidy was ended in July 2005, diesel consumption fell markedly. Automotive diesel consumption grew by 9.3 percent between 2002 and 2003 and by 11.7 percent between 2003 and 2004, but by only 0.3 percent between 2004 and 2005. Gasoline consumption registered a decline of 5.3 percent in 2005. The exception to slow or negative growth was LPG, which continues to be subsidized. LPG consumption grew at 8.2 percent in 2005, much higher than the previous figures of 1.4 percent in 2004 and 2.4 percent in 2003. The difference in the growth patterns between LPG and other fuels has been even more pronounced in 2006. Comparing the first three months of 2006 with the corresponding period in 2005, gasoline consumption fell by 2.8 percent and diesel 7.5 percent, but LPG consumption grew by 9.4 percent (EPPO 2006).

A2.163 Although growth in fuel consumption slowed in 2005, vehicle sales surged 12.4 percent to a record 703,432. Sales of passenger cars fell 10 percent to 188,211 units, the first decline since the 1997 financial crisis. However, strong growth in the commercial vehicle category, 24 percent overall, more than compensated for the passenger car sale decline (Agence France Presse 2006a). Strong vehicle sales would support increasing fuel consumption in the long run.

A2.164 Currently LPG for all use (household, industry, automotive) is subsidized from the Oil Fund. There has been discussion on subsidizing gasohol out of the Oil Fund (Thai News Service 2005a, 2006f), but no direct subsidy is given at present. The LPG subsidy was reportedly costing about US$10 million a month in August 2005 (Thai News Service 2005d); the government announced in 2005 that the subsidy would continue until the end of 2005, and then in January 2006, the subsidy was extended to June 2006. The

government in February 2006 stated its intent to float LPG prices by the end of the year, while promising some assistance to households and taxi drivers (Thai News Service 2006b). The policy of subsidizing LPG has encouraged its widespread use, including as a transportation fuel, and led to out-smuggling of LPG. Levies on gasoline and diesel were increased in 2005 to reduce the Fund's indebtedness. Monthly average prices in Bangkok in May 2006 are shown in Table A2.26.

Table A2.26 Fuel Prices in Bangkok in May 2006

Parameter	*Gasoline (95 RON)*	*Gasoline (91 RON)*	*E10*	*Kerosene*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.77	0.75	0.73	0.77	0.70	0.44
Baht	29.11	28.31	27.61	29.1	26.45	16.81

Source: EPPO 2006.

A2.165 The State Oil Fund, which is managed by the Energy Fund Administration Institute, has accumulated a very large financing burden even though it delays repayments to oil companies. Much of this is financed by short-term bank loans, but in 2005 the government permitted the Energy Fund Administration Institute to issue oil bonds at attractive rates, which it expected to be able to finance through future levies on oil products. The government began to increase the levy on gasoline in May 2005 and that on diesel in October 2005. By February 2006, levies were 2.5 baht (US$0.063) per liter on 95 RON gasoline and diesel, and 2.3 baht (US$0.058) on 91 RON gasoline. However, concerns about the economy-wide impact of rising diesel prices led the government to lower the Oil Fund levy on diesel from 2.5 baht to 0.95 baht (US$0.025) per liter in April. Although ex-refinery diesel prices have been higher than gasoline prices, retail diesel prices are lower thanks to a combination of lower taxes and lower Oil Fund levy.

A2.166 The subsidy scheme was popular, especially among farmers and low-income households. The termination of the diesel subsidy in July 2005 was accompanied by social measures, intended to ease the financial burden on consumers, particularly the poor and those in rural areas. They included a 5 percent pay rise for civil servants, higher pension payments, proposed increases in minimum wages, and a provision of 20 billion baht (US$480 million) to villages nationwide (Economist Intelligence Unit–ViewsWire 2005b).

A2.167 In the face of rising oil prices in 2006, PTT began to lag behind in raising retail prices to keep pace with international price increases. In a statement in April 2006, PTT reported that its margin was negative, and that the cost of not adjusting retail prices to match international prices fully in 2005 was 4 billion baht ($100 million) (*Platts Commodity News* 2006f). PTT's pricing policy has led to a number of problems, including fuel shortages and rationing at filling stations. Other oil companies faced two choices: allowing prices to rise and losing their market share to PTT, or keeping prices down by reducing margins. Localized fuel shortages began to occur, and some independent retailers shut down their operations. Others temporarily halted the sale of diesel (Thai News Service

2006g). There were reports of trucks being allowed to purchase only 20 liters at a time, or else having to pay an extra 0.5 baht (US$0.013) per liter above the informal quota (*Bangkok Post* 2006). Despite attempts in Thailand not to allow full price increase pass through, the price difference with Malaysia widened, leading to greater cross-border purchases and smuggling (see the section on Malaysia).

A2.168 As a mitigation package, the government began providing a subsidy of 2 baht per liter in May 2006 to the fishing industry under the "Purple Oil" scheme, for diesel with considerably higher sulfur content than the automotive diesel. Of the 2 baht subsidy, 1.2 baht is reportedly funded out of the Oil Fund (Thai News Service 2006j). The government also negotiated an agreement with several oil marketers to offer a price discount of 1 baht per liter of diesel to public transport companies starting in May (Thai News Service 2006h).

A2.169 Faced with the increasing costs of oil products, and a buoyant demand for them—in part encouraged by the subsidies—the government introduced a number of energy and petroleum fuel conservation measures, initially on a voluntary basis but later making some mandatory. The voluntary program included turning off billboard lights after 10:00 p.m., turning off street lighting in some areas, a campaign to reduce energy consumption at government offices by 10 percent, and closing filling stations between midnight and 5:00 am. Similar measures were implemented during the earlier oil price hikes in 1975 and 1980 (Agence France Presse 2004a). The mandatory measures included ordering large billboards to restrict their lighting between 7 p.m. and 10 p.m., closure of filling stations located off highways at 10 p.m., and reimbursement for government vehicle fuel purchase only for gasohol unless no gasohol was available for sale or if the vehicle was manufactured prior to 1995 (Thai News Service 2005b). In May 2006, the cabinet approved additional energy-saving measures. They included permitting certain government officials to work from home, limiting overseas trips, suspending motorcades for the most part, and adding energy-saving measures as additional performance indicators for state agencies (Thai News Service 2006i). There have also been a number of calls on the public to switch from motorized transport to bicycling.

A2.170 The government is actively promoting the use of ethanol by maintaining a consistent price difference of 1.50 baht (US$0.04) per liter in relation to gasoline. The price difference more than compensates for the slightly lower fuel economy of gasohol, prompting gasohol consumption to increase 23-fold in 2004 and 11-fold in 2005 (EPPO 2006). The price difference is achieved by lowering taxes and levies on gasohol (E10), amounting to a difference of 2.47 baht per liter in late April 2006—corresponding to 24.7 baht (US$0.65) per liter of ethanol—a very large fiscal concession by any measure. The government intends to stop production of 95 RON gasoline in January 2007 and replace it entirely with 95 RON gasohol.

A2.171 World raw sugar prices began to surge in 2004 and reached a 25-year high in February 2006, while local cassava prices doubled between 2005 and early 2006 (Thai News Service 2006c). Ethanol prices are negotiated between ethanol producers and oil companies and set for a few months at a time. Ethanol in Thailand is made from sugarcane and cassava. One ethanol producer stopped plant operation in January 2006 on the grounds that the negotiated price in effect at the time was too low and it could no

longer sustain financial losses (*Dow Jones International News* 2006a). As a result of price disputes and uncertainties, domestic production of ethanol has not increased as rapidly as expected, necessitating ethanol imports. In April 2006, a new price of 23 baht (US$0.60) per liter was negotiated. This corresponds to US$0.75–0.86 per liter of gasoline equivalent, far in excess of the benchmark premium gasoline price in the region (Singapore) of US$0.51 per liter in April 2006. The government is also promoting production and use of biodiesel from palm oil.

A2.172 Thailand has natural gas, and the government is aggressively promoting fuel switching to CNG in the transport sector. The Ministry of Energy in January 2006 revised its target for the number of CNG refueling stations in 2008 from 128 to 420, and to 740 in 2010. The target for the total number of CNG vehicles is 300,000 by 2008 and 500,000 by 2010 (*NGV Global* 2006a). In February 2006, the Cabinet approved a plan by the Bangkok Mass Transit Authority to purchase of 2,000 CNG buses (Thai News Service 2006d). In March 2006, PTT announced that it had set up a loan program—initially for companies operating taxis, buses, and vans—to accelerate conversion of vehicles to run on CNG. The target for the number of vehicles to be converted in 2006 is 70,000 (Thai News Service 2006e). PTT is currently the only retailer of CNG. Expansion of the CNG market has been hampered by a lack of wide coverage of CNG filling stations, fewer than 100 in May 2006, and the high cost of vehicle conversion. As an incentive, the cabinet in May 2006 decided to reduce the excise tax on CNG engines for two and a half years, a move anticipated to put an additional 18,000 CNG vehicles on the road annually (Thai News Service 2006k).

Assessment

A2.173 The government of Thailand initially underestimated the magnitude and duration of the oil price increase. It had announced in early January 2004 that a price ceiling would be imposed for two months. This move was perhaps encouraged by the two-month price ceiling implemented around the time of the invasion of Iraq, which the government was able to lift in April 2003. The second round of price control ended up lasting 19 months. Diesel subsidies proved to be particularly difficult to remove, and even in February 2006, some tax concessions were still being given to diesel.

A2.174 The experience of Thailand illustrates clearly two problems of attempting to smooth out highly volatile petroleum prices through the use of an oil fund. First, the magnitude and duration of the price rise was so large that the "short-term" cost of financing the subsidy became unsustainable, forcing the government to increase its borrowing to cover the deficit. Second, the cross-subsidy approach of holding diesel prices well below the international price level and below domestic gasoline prices encouraged the further growth of diesel use (partly through a switch from gasoline) and hence the cost of the subsidy. Removing the subsidy, even though world prices started to decline, required the government to start increasing the oil fund levy on products in order to recoup some of the debts of the oil fund.

A2.175 After several months of decline, fuel prices began to climb again in 2006, surpassing in April 2006 the previous peak reached in September 2005 in the Asia Pacific region. This is posing an additional challenge in Thailand, where the government appears reluctant to allow full pass through of price increases. The contribution to the Oil Fund was

cut by more than 60 percent in April 2006 for diesel. There is increasing talk of subsidizing gasohol against the backdrop of rising feedstock prices for ethanol. PTT's decision not to fully match the prices on the international market has led to fuel rationing, fuel shortages, and closure of some retail stations. With the Oil Fund still being heavily in the red, the government is likely to have to accept higher fuel prices, should the current high prices continue.

Tunisia

A2.176 Tunisia produces crude oil but, despite a reduction in domestic consumption over the last decade on account of fuel switching to natural gas, it is a net oil importer. It has one small refinery and imports about three-quarters of the products needed for domestic consumption. According to IEA statistics, Tunisia consumed 3.8 million tonnes of petroleum products in 2003. Diesel accounted for 46 percent of total consumption, heavy fuel oil 19 percent, LPG and gasoline 11 percent each, and non-aviation kerosene 5 percent (IEA 2005b). Historical inflation rates in Tunisia are given in Table A2.27.

Table A2.27 Consumer Price Index trend in Tunisia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	2.0	2.7	2.7	3.6	2.1

Source: IMF 2006i.

A2.177 Tunisia has a national oil company, Entreprise Tunisienne d'Activités Pétrolières (ETAP). It handles oil imports and exports and supplies the single state-owned refinery. The government recently opened an international tender for a much larger refinery. Four companies operate in oil marketing and distribution: ExxonMobil, state-owned Société Nationale de Distribution des Pétroles, Total, and Shell.

A2.178 The government controls petroleum product prices and provides price subsidies. The estimated subsidy in 2004 is 203 million dinars (US$160 million), and in 2005 408 million dinars (US$315 million), corresponding to 0.6 and 1.1 percent of GDP, respectively (IMF 2006b). In August 2005, the government, for the first time, publicly stated that it would consider liberalization of product pricing and the domestic petroleum market (but not imports), and issued a national tender for a study. In addition, the power sector has used targeted subsidies, with the price to households for the first 50 kWh set at two-thirds of the price for larger amounts of use.

A2.179 Fuel prices were raised in February, June, and September in 2005. The government has raised fuel prices twice in 2006, the second time in April 2006. The government reportedly based its subsidy budget of 150 million dinars (US$110 million) for 2006 on an average world oil price of US$60 per barrel. The government said that a US$1 a barrel rise in imported oil prices would add 35 million dinars (US$27 million) to the annual energy subsidy bill (Reuters News 2006i). Fuel prices in May 2006 are shown in Table A2.28.

Table A2.28 Fuel Prices in Tunisia in May 2006

Units/currency	*Super gasoline*	*Regular gasoline*	*Kerosene*	*Diesel*	*Heavy fuel oil*
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.80	0.78	0.37	0.53	0.21
Dinar	1.05	1.02	0.49	0.69	0.27

Source: Babnet Tunisie at www.babnet.net/rttdetail-1665.asp.

A2.180 LPG is sold in 3, 5, 6, 13, 25, and 35 kg cylinders. The unit price decreases from 3 kg to 13 kg cylinders, but increases from 13 to 25 kg, indicating cross-subsidization of smaller cylinders by large consumers. The difference between the prices set by the government in September 2005 and the prices corresponding to international levels, as given by the government, are shown in Table A2.29. Gasoline receives the least subsidy. Diesel and heavy fuel oil are used economy-wide and are subsidized more. Kerosene, used by the poor, is heavily subsidized, as is LPG. A 13 kg cylinder of LPG was selling for 6 dinars at the time (US$0.35 per kg).

Table A2.29 Fuel Price Subsidies in Tunisia in September 2005

Units/currency	*Gasoline*	*Kerosene*	*Diesel*	*Heavy fuel oil*	*LPG 13 kg*
Units	Per liter	Per liter	Per liter	Per kg	Per kg
US$	0.08	0.30	0.17	0.15	0.35
Dinar	0.10	0.40	0.23	0.20	0.46

Source: www.babnet.net/rttdetail-1665.asp.

A2.181 In September 2005, the government promulgated a new law that provides 70 million dinars (US$53 million) of state funds to promote schemes that will cut oil consumption by an estimated 1.25 million tonnes over three years. At the time it was estimated that the measures could reduce energy subsidies by 220 million dinars ($164 million). The measures required the public sector to choose low-energy-consumption equipment and components and carry out annual energy audits. Publicity campaigns and financial incentives would be aimed at the private sector.

A2.182 The government re-instated daylight savings time in May 2005 for the first time since 1990 in a bid to save energy costs. Tunisia already had an active renewables sector (including wind, solar, and geothermal) and this was to be further encouraged by providing subsidies for solar water heaters and incentives to private wind farms. The import and marketing of non-economic electric household appliances (refrigerators and air-conditioners) would be banned.

A2.183 Faced with a steadily rising demand for energy and the impact of higher oil prices, the government has followed an active policy of substituting natural gas for oil, while encouraging exploration for both oil and natural gas in order to reduce its dependence on imported sources of supply. Upstream taxes have been sharply reduced to promote exploration and production. The government has followed a very active program of encouraging the use of gas for power, and also for direct household and business use. The government intends to connect 500,000 additional households to natural gas by 2009.

This measure is expected to displace LPG provided through 1 million cylinders (IPR Strategic Information Database 2005a). The high degree of urbanization in Tunisia (64 percent in 2004) has resulted in about 95 percent of households using electricity, and about 8 percent of households using natural gas. Natural gas imports are also being encouraged.

Assessment

A2.184 Even though Tunisia produces an amount of oil equivalent to most of its needs for oil consumption, it has found that the cost of providing subsidized products has had a substantial adverse budgetary impact. Accordingly, it has embarked on an extensive program to reduce oil consumption in general and the petroleum subsidy's claim on the budget in particular. Indications are that the government is seriously considering moving prices toward international levels, oil and energy saving is promoted, and oil substitution is being actively encouraged, using both domestic and imported natural gas as well as renewables. These latter policies can have significant effects in the long run.

Annex 3

Net Oil Exporters

A3.1 Nine net exporters of oil—the Arab Republic of Egypt, Argentina, Cameroon, Kazakhstan, Malaysia, Mexico, Nigeria, República Bolivariana de Venezuela, and Vietnam—are discussed in this annex. Vietnam has no refining capacity but is in the process of building its first refinery. Cameroon has one refinery, and all the others have three or more refineries. Net-oil exporters are more likely to subsidize petroleum fuels than the countries in the previous two categories. This annex also discusses one regional initiative established in response to rising world oil prices, PetroCaribe.

Arab Republic of Egypt

A3.2 Egypt is a net oil exporter, producing almost 50 percent more oil than its domestic consumption. It refines the majority of its domestic consumption of products. According to IEA statistics, Egypt consumed 21 million tonnes of petroleum products in 2003. Diesel accounted for 39 percent, heavy fuel oil 26 percent, LPG 14 percent, gasoline 13 percent, and non-aviation kerosene 3 percent (IMF 2005d). Historical inflation rates in Egypt are given in Table A3.1.

Table A3.1 Consumer Price Index Trend in Egypt

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	2.3	2.7	4.5	11.3	4.9

Source: IMF 2006i.

A3.3 For many years Egypt has followed a policy of subsidizing domestic consumption and has been reluctant to increase prices. In September 2004, diesel prices were raised for the first time in a decade by 50 percent, but this still left the price at 0.6 Egyptian pounds (US$0.10) per liter. The government estimated at the time that the diesel subsidy cost some 5 billion Egyptian pounds (US$800 million) a year (Agence France Presse 2004b). Bakeries were exempted from subsidy reduction as a way of offering some protection on the costs of an essential commodity. At the same time there were a series of large reductions in customs duties of passenger and commercial vehicles. For fiscal 2003–04, the total fuel subsidy was estimated to amount to 21 billion Egyptian pounds (US$3.6 billion) (*Middle East and North Africa Today* 2005). In fiscal 2005–06, the petroleum subsidy (which includes natural gas and all oil products) was made explicit

for the first time at 22 Egyptian pounds (US$3.8 billion); the government in February 2006 revised the subsidy future to 41 billion Egyptian pounds (US$7.1 billion) (IPR Strategic Information Database 2005b). Fuel prices in fiscal 2004 are shown in Table A3.2.

Table A3.2 Fuel Prices in Egypt in Fiscal Year 2004 (July 2003–June 2004)

Parameter	*Gasoline (90 RON)*	*Gasoline (80 RON)*	*Kerosene*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.17	0.16	0.07	0.10	0.035
Pounds	1.01	0.93	0.40	0.41	0.20

Source: World Bank 2005a.
Note: Fiscal year 2004 is from July 1, 2003 to June 30, 2004.

A3.4 In terms of total financial cost to the government, natural gas, diesel, and LPG carried the highest subsidies in fiscal 2004. If subsidies are calculated in terms of economic opportunity costs, they increase even further, but the ranking for the three highest subsidies remains unchanged (World Bank 2005a). The price of bottled LPG, which was US$35 per tonne in fiscal 2004, should be compared to Saudi Aramco's contract price of about US$300 per tonne during the same period. It should be noted that US$300 does not include the cost of bottling LPG and distributing cylinders to retail outlets.

A3.5 In February 2005, the government announced its plan to replace 80 and 90 RON gasoline with more expensive 92 and 95 RON unleaded gasoline in two years. At the time, 92 RON gasoline was selling at 1.40 Egyptian pounds (US$0.24) per liter, against 1.00 Egyptian pounds (US$0.17) charged for 90 RON and 0.90 Egyptian pounds (US$0.12) for 80 RON. Some filling stations had already stopped offering 90 RON gasoline altogether. This move was viewed as the government's attempt to raise prices indirectly and reduce the subsidy burden.

A3.6 In 2006, a report by the Plan and Budget Committee proposed that the fuel subsidy be halved from 40 billion Egyptian pounds (US$6.9 billion) to 20 billion pounds (US$3.5 billion). The subsidy includes 16 billion pounds (US$2.8) for diesel and 7 billion pounds (US$1.2) for gasoline. According to the report, devoting billions of dollars to fuel price subsidies is resulting in a situation in which the government budget lacks funds for such vital sectors as education, health care, road maintenance, water supply, and sewerage (Egyptian News Digest 2006).

A3.7 Egypt is a large exporter of natural gas. Natural gas is used by households as well as by industry and power. A rising block tariff is used for households. The tariff for the first 30 cubic meters (m^3) per month is 0.10 Egyptian pounds per m^3, which is equivalent to about US$0.50 per million British thermal units (MMBtu). The tariff for the next 30 m^3 is 0.20 Egyptian pounds per m^3 (about US$1.00 per MMBtu), and consumption above 60 m^3 is charged 0.30 Egyptian pounds per m^3 (about US$1.50 per MMBtu). Power plants and industrial customers pay US$1.00 per MMBtu; this rate has been fixed until 2010. The government is undertaking a program to switch households from LPG to natural gas. The government is also actively promoting fuel switching in the

transport sector, especially among taxis, to natural gas. Egypt's CNG market ranks 10th in the world (IANGV 2006).

Assessment

A3.8 Egypt's policy of giving extensive subsidies to petroleum products became increasingly expensive in 2004 and 2005, although its position as a net oil exporter may have made the costs of doing so more tolerable. In a country which has established a policy of virtually fixing prices over long periods, a sudden rise in oil prices places an enormous strain on the government, as it is very difficult politically to raise prices by even a fraction of the increase in the world price.

A3.9 By 2006, the size of the subsidies became so large that serious consideration is being given to reducing fuel subsidies. There appears to be open acknowledgement in the government that these subsidies—which are most likely to be captured more by the better-off in society, especially the gasoline subsidy—are being given at the expense of vital social services that would benefit the poor more in the long run.

Argentina

A3.10 Argentina is currently a net oil exporter, but one where production is falling rapidly while demand is increasing, so that within a few years it may become a net oil importer. It has extensive refining capacity in the hands of both major oil companies and some small- and medium-scale enterprises. According to government statistics, Argentina consumed 20 million m^3 (350,000 barrels per day) of petroleum products in 2005. Consumption is dominated by diesel, which accounted for 56 percent of the total in 2005. Gasoline accounted for 18 percent, heavy fuel oil 7 percent, LPG 5 percent, and kerosene for non-aviation uses 1 percent (7 percent including aviation kerosene). There are three grades of gasoline—with a minimum RON of 83, 93, and 97—and the bulk of the gasoline consumed is mid-grade (Secretaría de Energía de la Nación Argentina 2006).

A3.11 Argentina experienced a financial crisis in 2002 which resulted in its currency depreciating to less than one-third of its starting value between November 2001 and April 2002. This led to a large inflation rate in 2002. Historical inflation rates in Argentina are given in Table A3.3.

Table A3.3 Consumer Price Index Trend in Argentina

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	-1.1	25.9	13.4	4.4	9.6

Source: IMF 2006i.

A3.12 The oil sector is almost entirely in the hands of the private sector, and the government has no formal price setting role. However, through the use of export tariffs, political negotiation, and political pressure, the government has controlled retail prices during the last three years, when the rising international oil prices were starting to put pressure on the Argentine economy through their impacts on the rate of inflation. Inflation reached 12.3 percent in December 2005 (IMF 2006i). Retail prices in Buenos Aires in December 2002 and December 2005 are shown in Table A3.4. In peso terms,

gasoline prices remained essentially the same during the three-year period. Kerosene and diesel prices rose a mere 7–8 percent. Only heavy fuel oil prices rose significantly. In U.S. dollars, gasoline prices actually declined between December 2003 and December 2005.

Table A3.4 Average Monthly Fuel Prices in Buenos Aires

Date	*Units*	*83 RON gasoline*	*93 RON gasoline*	*Kerosene*	*Diesel*	*Heavy fuel oil*
December 2002	US$ per liter	0.53	0.58	0.42	0.42	0.21
December 2002	Pesos per liter	1.72	1.88	1.36	1.37	0.69
December 2005	US$ per liter	0.58	0.63	0.49	0.49	0.40
December 2005	Pesos per liter	1.74	1.90	1.47	1.47	1.20

Source: Secretaría de Energía de la Nación Argentina 2006.

A3.13 In the downstream market, Repsol YPF controls slightly more than half the market. Shell, Esso, and Brazil's Petrobras (which has acquired EG3) control about 15 percent each (Secretaría de Energía de la Nación Argentina 2006). All four firms have refining capacity in Argentina, but only Repsol YPF and Petrobras are engaged in upstream oil production. Because of the government's pricing policy for the domestic market, whether a company is vertically integrated affects the firm's financial position, as the next paragraphs show.

A3.14 In January 2003, the government brokered an agreement between domestic oil producers and domestic refiners to sell crude to domestic refiners at US$28.5 a barrel, slightly higher than the international prices prevailing at the time. When international prices dipped below this price, refiners would continue to pay the recommended price in order to allow producers to recoup lost earnings. This was in effect a price stabilization scheme run and financed by the oil companies. At the same time, ex-refinery prices were to be held constant. As international prices began to rise, two problems emerged with this approach. First, the low domestic prices gave a substantial incentive for domestic firms to export crude and products. Second, firms that did not produce crude locally (such as Esso and Shell) were making too little margin on product sales and started to accumulate debts to the domestic oil producers. In contrast, vertically integrated firms could cross-subsidize the implicit loss on product sales from transfers from the upstream, which was still selling above cost.

A3.15 This arrangement effectively broke down in April 2004, and in May Esso and Shell raised the price of diesel by about 4 percent, the first price increase since January 2003. Repsol YPF and Petrobras raised diesel prices by 1 percent. This was followed by a further increase to gasoline and diesel prices of 1–3 percent in July. The government reacted very forcefully to both sets of price increases. It first raised the export tax of crude from 20 to 25 percent, forcing the domestic crude price—which corresponds to the export price net of tax—downward. In August, the government instituted a sliding scale for export taxes ranging between 25 percent and 45 percent (45 percent applying above US$45 a barrel). This policy substantially reduced the incentives to export.

A3.16 Argentina has a strongly seasonal pattern of demand for diesel which increases sharply during the four months of the harvest season. This necessitates importing diesel at that time. To make this financially viable at the low domestic prices that were ruling, the government in 2005 granted import duty relief to companies that agreed not to raise the price of diesel above that prevailing on February 28, 2005. In 2006, this program was extended as a quota program in which up to 200,000 m^3 of diesel would be exempted from import taxes to those who pledged to sell the fuel at internal market prices or consumed it. The quota program gave priority to importers who would purchase diesel from Venezuela under a new bilateral accord. The government also issued a resolution in December 2005, warning refiners not to ration the sale of diesel to contract-holding filling stations and allowing filling station operators to break their contracts in order to buy diesel from other providers, if necessary, in an attempt to address farmers' fear that sporadic rationing could threaten agriculture.

A3.17 In March 2005 Shell and Esso raised gasoline and diesel prices by 2.1–4.2 percent. President Kirchner called on consumers to boycott filling stations run by these companies. The day after his public condemnation, groups of unemployed activists marched on a few dozens of Shell's stations, forcing them to close temporarily. The gasoline price increases were withdrawn within a month, and Esso also dropped the diesel price hike in order to participate in the scheme for the tariff-free importation of diesel. The implication of these policies is that currently petroleum products are sold at well below international prices with gasoline at around US$0.63 a liter (inclusive of excise duties of 0.5375 pesos [US$0.18] and a 62 percent VAT) and diesel at less than US$0.50 a liter (with an excise duty of 0.15 pesos [US$0.05] and VAT) (Economist Intelligence Unit–RiskWire 2005).

A3.18 Overall, the squeeze placed on companies marketing transportation fuels has led to closure of a number of filling stations, mainly of small independents. More serious is the squeeze that has been placed on upstream companies. With profit margins sharply reduced by the government's setting of a low unofficial price for crude combined with the high export taxes, Argentina has become much less attractive for exploration and development than other countries. Some provinces have filed suits against producers to link royalties to West Texas Intermediate (WTI) crude rather than the price actually paid to producers. The legislature in Neuquen, the most prolific hydrocarbon province, passed a law in 2005 to link royalties to WTI. The lack of attractiveness for investment may also be compounded by the variability of the government's policies toward the sector over the last few years. Given the steady decline in domestic oil production, the longer-term impact of these government policies may well be to ensure that Argentina becomes a net oil importer sooner than if its oil sector were more market based, and has to submit to international prices for crude and products.

A3.19 To gain a greater control on the energy sector, the government in 2004 established Energía Argentina Sociedad Anónima (ENARSA), a new state-owned company for the production and sale of oil, gas, and electricity. ENARSA has announced that it will participate in joint offshore exploration activities with several other state-owned oil companies in the region. ENARSA and Venezuela's state-owned company, Petróleos de Venezuela, S.A. (PdVSA), have begun to operate filling stations jointly.

ENARSA has stated that the government could restrict oil exports if producers fail to carry out exploration to rebuild reserves and boost production (*Platts Commodity News* 2005f).

A3.20 Public transportation operators have been given larger subsidies. First established in the wake of the 2001–02 financial crisis, a diesel subsidy program directed refiners to sell diesel to public bus companies at a price well below the domestic price for other consumers, so that bus companies could maintain low fares. The subsidy program was repeatedly extended to the end of 2005. In 2005, bus companies were charged only 0.82 pesos (US$0.29) a liter. In exchange, bus companies would give the refiners subsidy invoices that would eventually be cashed in with the Argentine government (OsterDowJones Commodity Wire 2005). In 2005, bus and taxi operators reportedly received 227 million pesos (US$78 million) in subsidies and from highway funds, an increase of 41 percent from 2004 (*Business News Americas* 2006b).

A3.21 As with Malaysia, low fuel prices in Argentina are attracting motorists from the neighboring countries to refuel in Argentina, causing fuel shortages in some areas. Gasoline and diesel sales in border towns have been noticeably higher in 2006. Filling station owners in Misiones, a narrow northeastern province surrounded by Brazil and Paraguay, even called upon the provincial government in May 2006 to declare a fuel emergency. In response, the federal government said that it was considering measures to restrict fuel sales to foreign-registered vehicles (*Dow Jones International News* 2006c).

A3.22 LPG is an important fuel of poor households that do not have access to natural gas. Argentina produces enough LPG to be a substantial exporter. Prices for LPG have been controlled through the setting of reference prices every six months by the government since July 2005. The pricing formula subtracts the 20 percent export tax and transport costs from an international price. The reference prices set in September 2005, to be operative for October to March 2006, were 27–31.3 pesos for a 15 kg cylinder (US$0.61–0.71 per kilogram) (*Platts Commodity News* 2005e). These prices were extended for another six months from April to September 2006. Producers are also required to meet domestic demand even if this means reducing exports. In addition, the government is in the process of implementing a "bottle-voucher scheme" whereby poor household receive a voucher which enables them to acquire an LPG bottle at a subsidized rate.

A3.23 An economic emergency law—enacted in 2002 and extended repeatedly, last time in December 2005 for another year—authorized the government to convert utility rates from U.S. dollars to pesos and impose a price freeze. Natural gas prices for households have been frozen since 2002. In September 2005, a new pricing system was put in place which required large industrial consumers to negotiate supply contracts directly with producers. CNG prices have been gradually increased, but are much below those of gasoline and diesel. CNG refueling stations, which account for 10 percent of the total gas consumption, were to start buying directly from gas producers at the higher wellhead price from March 2006, but the deadline has been postponed until April 2007, with prices frozen until then. The low level of gas prices has given a large incentive to the CNG market—the largest in the world—and more than 20 percent of Argentina's 6.8 million vehicles have switched to CNG. As a result, there is a surplus of gasoline, which is being exported.

A3.24 Concerned about higher production costs of electricity from heavy fuel oil and coal, the government issued a directive in 2005, ordering power producers to use only natural gas, except under four clearly defined conditions, in September 2004–April 2005. This gas-only directive was renewed in October 2005 to last until April 2006. A stabilization fund for electricity, which was designed to offset higher fuel costs, began running a deficit as a result of rate freeze under the economic emergency law, prompting the government to take steps to minimize reliance on imported heavy fuel oil (*Dow Jones International News* 2005e). Fuel oil consumption in the power sector increased from 0.8 million tonnes in 2004 to 1.1 million tonnes in 2005, and is expected to increase further to 1.4 million tonnes in 2006 (*Platts Commodity News* 2006e).

A3.25 The government appears to have concentrated its reaction to higher oil prices on its strategy of cutting company margins. There has not been a publicly endorsed energy saving program. The government continues to encourage natural gas use by maintaining low prices. The control over the selling price of natural gas will act as a disincentive for further imports of natural gas as well as active exploration and production. In April 2006, the government passed a bill requiring that gasoline and diesel contain 5 percent biofuel by 2010. It also provides fiscal incentives by means of tax exemption for biofuels. A number of firms—Repsol YFP, Mitsui Argentina, Terminal Puerto Rosario, Vicentín, Oil Fox and Cargill—have announced plans to invest in biofuel plants. The government is also in discussion with the government of Chile on carrying out joint biofuel projects.

Assessment

A3.26 Argentina, as a net exporter of oil, has been able to force private sector companies to transfer part of the upstream rent on crude oil production to users of products, through prices that are well below international equivalents net of tax. For companies that have no upstream production there has been a persistent squeeze on profit margins, which is not likely to be sustainable. October 2005 congressional elections and inflation rising to 12.3 percent by the end of 2005 have contributed to the resolve of the government not to allow energy prices to rise. Keeping prices artificially low creates additional problems, prompting the government to explicitly ban fuel rationing and publicly contemplate the possibility of oil export restrictions. In part in response to energy shortage, the government created a new state-owned energy company in a market that had been completely privatized a decade earlier.

A3.27 The longer-term implication of the government policy toward domestic pricing may be serious. Argentina's crude petroleum production fell by 5.2 percent in 2005, continuing the downward trend in output and reserves since 1998 (Economist Intelligence Unit 2006b). The sector requires new investment in exploration and development to arrest the decline. With the present pricing and taxation arrangements in place, it would be surprising if international companies would be willing to look favorably at investment in Argentina as opposed to other countries where the fiscal arrangements are more favorable.

Cameroon

A3.28 Cameroon produced 60,000 barrels a day of crude oil in 2005, but this level was almost 30 percent lower than that in 2000. Most of this crude is exported, and lighter crude is imported to run in the country's single government-owned refinery, Société Nationale de Raffinage (SONARA). According to IEA statistics, Cameroon consumed 1 million tonnes of petroleum products in 2003. Diesel accounted for 42 percent, gasoline 27 percent, non-aviation kerosene 14 percent, aviation kerosene 7 percent, heavy fuel oil 6 percent, and LPG 4 percent (IEA 2005b). Historical inflation rates in Cameroon are not available after 2002. The trend in 2001 and 2002 are shown in Table A3.5.

Table A3.5 Consumer Price Index Trend in Cameroon

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	4.5	2.8	—	—	—

Source: IMF 2006i.

A3.29 The government provides protection to SONARA at a great cost to the economy: the government limits product imports to 20 percent of domestic demand and imposes surcharge on imported products (IMF 2005b). Oil marketing is undertaken by four international companies and a number of domestic companies, while distribution is undertaken by a state-owned company. Prices are determined by the Caisse de Stabilisation des Prix des Hydrocarbures (CSPH) which was established in 1974. Until 2004, prices were adjusted monthly, but during 2004 this process was first slowed and then suspended, resulting in large losses to SONARA. The adjustment mechanism was resumed and prices increased in December 2004, and further price increases were implemented in January, July, August, and November 2005. LPG prices were held constant from April 2003 to August 2005 at 5,000 CFA francs for a 12.5 kg cylinder (US$0.75 per kg at the exchange rate prevailing in August 2005), at which time it was raised to 5,500 CFA francs a cylinder. Fuel shortages have occurred at various times in 2005 and 2006, and black market prices have been far above official prices. The official selling prices after the April 2006 price increases are as shown in Table A3.6.

Table A3.6 Fuel Prices in Cameroon in April 2006

Units/currency	*Super gasoline*	*Diesel*	*Kerosene*	*LPG (12.5 kg)*
Units	Per liter	Per liter	Per liter	Per kg
US$	1.05	0.99	0.67	0.89
CFA francs	565	531	360	480

Source: *All Africa* 2006e.

A3.30 The government imposes several taxes on petroleum products (including customs duties, turnover tax, and a special tax) which in 2004 accounted for 39 percent of the final price for gasoline and 31 percent for diesel. Kerosene however, received a subsidy equal to 11 percent of the retail price. The prices also included a fee paid into the

equalization fund of about US$0.04–0.06 per liter (IMF 2005c). In early 2005, the government reduced tax on petroleum products by 5 percent (Panafrican News Agency Daily Newswire 2005). The cost to the government of not increasing the price of LPG was 2.8 billion CFA francs in 2004 and 1.7 billion CFA francs (US$3.4 million) in the first five months of 2005 (Reuters News 2005c). The cost of fuel subsidies to the central government budget in 2005 is estimated at 17 billion CFA francs (US$31 million), and projected to increase to 20 billion CFA francs (US$36 million) in 2006; this cost takes the form of budgetary transfers to SONARA (IMF 2005i).

A3.31 A particular issue in Cameroon has been the treatment of transport costs, especially for taxis, whose fares are regulated by the government. Caught between occasional price increases for fuel costs, and less frequent fare increases, taxi drivers have called a number of strikes, including those in January 2005, October 2005, and January 2006. When fares have been increased there has been opposition from civil society, as occurred in March 2005.

A3.32 The substantial level of domestic duties on petroleum products has created an active market for smuggling and tax evasion. Fuel is smuggled in from Chad and Nigeria, and fuel imported duty-free through Doula for export to Chad and the Central African Republic has been illegally diverted to the domestic market. The government in 2004 imposed an additional levy on fuel trucks with capacity of less than 35,000 liters entering Cameroon from Chad. The Customs Agency believed that the extra levy could deter fuel smugglers using smaller vehicles. However, this levy had to be lifted when the National Union of Chadian Carriers threatened to blockade Cameroonian trucks entering Chad. In March 2006, gasoline smuggled from Nigeria—called Zoua Zoua—was being sold ar prices that were about 10–35 CFA francs a liter lower (*All Africa* 2006d).

A3.33 Fuel adulteration and short selling are also problems in the market. To combat these, Shell, which recently decided to sell its downstream assets in Cameroon, used to manage all of its filling stations directly in order to ensure fuel quality.

A3.34 Although Cameroon has been relatively well explored for oil reserves, there is renewed interest in its major petroleum basins, and Total was awarded an exploration block in one of these basins in 2005. However, as yet there is no indication of a slowdown in the rate of decline of oil production.

Assessment

A3.35 The decline in Cameroon's oil production, which has occurred during the last several years, has partially offset the gains from higher oil prices, especially because Cameroon's heavy crude sells at a discount to lighter crudes such as the Brent blend. The costs to the government from subsidizing petroleum products are substantial, and the authorities have agreed to cap the total subsidy at 0.2 percent of GDP (IMF 2005i).

A3.36 The decision to protect the domestic refinery, through a restriction on the amount of imported products and the imposition of import duties, is costly to the economy. The government views the refinery as a strategic asset; the government is undertaking an audit of SONARA's operations to assess the refinery's overall economic costs and seek ways to ensure its medium-term viability. SONARA's performance, due in

part to its limited size and technology, may be such that protecting the refinery is an increasingly expensive decision.

A3.37 Attempts to protect consumers from some of the impacts of higher oil prices, through restricting fare increases for urban transport, has placed stress on this sector and generated substantial opposition from sector operators. No other initiatives to reduce the costs of higher oil prices on the economy appear to have been undertaken.

Kazakhstan

A3.38 Kazakhstan is a major net oil exporter. It currently produces about 60 million tonnes of oil, against an estimated domestic demand of 10–11 million tonnes (Interfax Daily Business Report 2006). It has three refineries. As well as exporting a large amount of crude oil, it also exports some products to its neighbors, including the Kyrgyz Republic, Tajikistan, and Uzbekistan. According to IEA statistics, gasoline and diesel accounted for the largest shares of product consumption at 28–29 percent in 2003, followed by heavy fuel oil at 23 percent, LPG at 5 percent, and virtually no consumption of non-aviation kerosene (IEA 2005b). Historical inflation rates in Kazakhstan are given in Table A3.7.

Table A3.7 Consumer Price Index trend in Kazakhstan

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	8.4	5.8	6.4	6.9	7.6

Source: IMF 2006i.

A3.39 A large number of firms operate in the downstream oil sector. Kazakhstan imposes seasonal bans on the export of diesel and fuel oil. Despite being a large producer and exporter of oil, Kazakhstan has suffered from repeated fuel shortages and product price spikes. For example, a fuel shortage in the autumn of 2005 pushed up gasoline prices to as high as 200 tenge (US$1.49) a liter in some regions. In Shymkent, where a refinery is located, the fuel shortage reportedly forced one-third of filling stations to close (*Times of Central Asia* 2005b). Retail prices are much lower in the absence of serious fuel shortages. In October 2005, A-80 (with 80 motor octane number) gasoline prices averaged 57.8–66.6 tenge (US$0.43–0.50) per liter, and diesel prices 58.7 tenge (US$0.44) per liter. In early November 2005, A-80 gasoline prices ranged from 58.2 tenge (US$0.43) in South Kazakhstan to 64.6 tenge (US$0.48) in North Kazakhstan and 66.2 tenge (US$0.49) in Almaty (*Times of Central Asia* 2005c).

A3.40 An important objective of the government is to stabilize fuel prices at relatively low levels—no more than 50 tenge ($0.37) per liter, according to the Ministry of Energy and Mineral Resources (*Oil and Gas of Kazakhstan* 2005). To assure adequate fuel supplies on the domestic market, the government has adopted a number of measures:

- It imposes a seasonal ban, to coincide with agricultural activities and winter season demand, on diesel and heavy fuel oil exports. In 2005, the ban was extended repeatedly. Diesel exports were banned from February to May 2005, and again from the beginning of July 2005 to February

2006. Gasoline exports were banned from mid-October 2005 amidst a serious gasoline shortage. Heavy fuel oil exports were banned from September 2005. The export ban on gasoline, aviation fuel, diesel, and heavy fuel oil was not lifted until March 1, 2006.

- It establishes a schedule of oil shipments to Kazakh refineries each year.
- It introduced taxes on petroleum products for exports outside of the Customs Union of the Eurasian Economic Community in October 2005.
- It has zero-rated excise duties on the production and sale of gasoline and diesel to encourage domestic production.
- It sets export quotas for duty-free exports to member states of the Customs Union of the Eurasian Economic Community (to prevent re-export from the member states).
- It has ordered delivery of gasoline and diesel to different regions.

A3.41 The high propensity of the domestic refineries to export products was caused by the strategy of implicit subsidized pricing of domestic products. For example, it was reported that, during September 2005, the domestic price of diesel averaged US$452 a tonne (US$0.38 a liter), while in Russia the price was US$592 a tonne (US$0.50 a liter), and the world price was US$638 a tonne (Organization of Asia-Pacific News Agencies 2005c). Gasoline price were raised by 9.7 percent between January and September 2005 (mostly in September) while world prices rose 42.5 percent.

A3.42 To achieve low price levels, some agreements have been signed between the government and the petroleum firms. For example, in November 2005, the Ministry of Energy and Mineral Resources, refineries, and main oil producing companies signed a memorandum pledging to stabilize prices on the domestic market and lower them to the August 2005 levels. The government said in late 2005 that it was considering gaining a controlling stake in the country's second largest refinery for the purpose of stabilizing prices. In February 2006, the government and petroleum companies signed a memorandum of social partnership, in which the petroleum companies pledged to provide a minimum of 700,000 tonnes of diesel at no more than US$400 per tonne (US$0.34 per liter) to farmers during the sowing and harvesting seasons (ITAR-TASS 2006). A special commission set up by the government to investigate fuel prices reported that price surges were caused by supply deficits, and that there was evidence of price collusion (Organization of Asia-Pacific News Agencies 2005d).

A3.43 The government has not seen any need to remove subsidies or to encourage fuel saving or fuel switching. The government subsidizes fuels consumed in agriculture in spring and autumn. The Ministry of Energy and Mineral Resources coordinates with refineries shipments of fuels at discounted prices for the planting and harvesting seasons. A new decree on fuel subsidy issued in 2006 stipulates that subsidies be paid once a year (Organization of Asia-Pacific News Agencies 2006a).

Assessment

A3.44 To tackle fuel shortages and keep prices low, the government has adopted a number of administrative measures, controlling both supply and prices of petroleum

products on the domestic market. Predictably, out-smuggling of fuels has emerged as a problem. Kazakhstan has had to ban exports of gasoline and diesel, the latter for much of 2005. This has adversely affected its neighbors, including the Kyrgyz Republic which experienced severe shortages. Unlike Argentina, Kazakhstan cannot discourage exports to the Kyrgyz Republic and Tajikistan by imposing a high export tax because of the duty-free trade agreement with the Customs Union of the Euroasian Economic Community. The very large net export of crude, at a time of high oil prices, has ensured that the fiscal costs of selling subsidized products can be absorbed by the budget.

Malaysia

A3.45 Malaysia is a net oil exporter, with consumption about 60 percent of production in 2005. Some product is imported to balance what is produced in the domestic refineries, and there is export of product as well as of crude. Diesel and gasoline are the dominant products consumed. According to IEA statistics, Malaysia consumed 21 million tonnes of petroleum products in 2003. Of the total, diesel accounted for 43 percent, gasoline 34 percent, aviation kerosene 9 percent, heavy fuel oil 8 percent, LPG 6 percent, and non-aviation kerosene negligibly small (IEA 2005b). Historical inflation rates in Malaysia are given in Table A3.8.

Table A3.8 Consumer Price Index Trend in Malaysia

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	1.4	1.8	1.1	1.4	3.0

Source: IMF 2006i.

A3.46 Esso, Petronas, and Shell have refining capacity in Malaysia. Petronas has a market share of about 30 percent, and the balance is shared by Esso, bp, Shell, Caltex, and others. Petroleum product prices are regulated and subsidized, with the largest subsidy on a unit basis given to LPG. The direct subsidy bill in 2004 was 4.8 billion ringitts (US$1.3 billion), and the total cost to the government of fuel subsidies—taking the reduced tax revenue into account—amounted to 11.9 billion ringitts (US$3.1 billion) (*Dow Jones International News* 2005a). In 2005, despite several price increases, the subsidy borne by the government increased to 6.6 billion ringitts (US$1.7 billion) (NEAC 2006).

A3.47 In 2005, prices were increased in February, March and July, at which time the government announced there would be no further increases for the rest of the year. The July prices were still at a level equivalent to two-thirds of unsubsidized prices, and were the second lowest in the region. On February 28, 2006, the government, in a surprise move, increased fuel prices by as much as 23 percent. According to the Prime Minister, the price increase would save the government 4.4 billion ringitts (US$1.2 billion) in subsidies (AFX Asia 2006b). The government stated that the fuel subsidy bill totaled 2.6 billion ringgits (US$700 million) during the first two months of 2006 alone. Fuel prices following the price increase are shown in Table A3.9. One estimate suggested that, without subsidies, premium gasoline would be 28 percent more expensive and diesel 25 percent (Associated Press 2006b). LPG prices would rise much more, 83 percent higher if consumers were to pay market prices (*New Straits Times* 2006).

Table A3.9 Fuel Prices in Malaysia in March 2006

Parameter	*Gasoline (97RON)*	*Gasoline (92 RON)*	*Diesel*	*LPG*[a]
Units	Per liter	Per liter	Per liter	Per kg
US$	0.52	0.51	0.43	0.47
Ringgits	1.92	1.88	1.581	1.75

Source: Associated Press 2006.
[a] LPG is sold in 10, 12, and 14 kg cylinders, and unit prices are independent of cylinder size, signaling that large cylinders cross-subsidize small ones.

A3.48 The February 2006 price increase came against the backdrop of Petronas being on track to another year of record earnings. Petronas became a target of consumer protests, who asked why an oil-exporting country had to raise fuel prices at a time when Petronas is making record profits from high global oil prices. The unexpected timing and magnitude of the price increase appeared to have intensified public anger (*Straits Times* 2006a). The government's strategy to make a surprise announcement might have taken into account the events of July 2005, when false rumors at the beginning of the month about imminent price increases sparked a panic and resulted in long queues at filling stations (*New Straits Times* 2005b).

A3.49 The government has justified its strategy of limiting price increases on the grounds of inflation control and protecting consumers and businesses. The protection of consumers is highlighted by keeping the regulated bus fares low, despite complaints of the operators, and the granting of soft loans to power companies to cover the purchase of diesel and heavy fuel oil. The government is also looking for ways to support lower-income households through more assistance from the Welfare Services Department. Some consumer protection measures actually encourage fuel consumption at a time when means should be sought to minimize nonessential fuel use. For example, the government in September 2005 reduced road taxes for all vehicles; tax cuts ranged from 25 to 80 percent, 50 per cent reduction for private vehicles and 25 percent for commercial vehicles. The cuts will help offset the higher cost of fuels, but will also continue to encourage the use of such vehicles and hence consumption of fuels. The government has also frozen road tolls until January 2007, again with the objective of controlling the overall price level (Xinhua News Agency 2005f).

A3.50 The government has announced on a number of occasions that there will be no further price increase until January 2007. The February 2006 price hike sparked a wave of public protests, the first significant anti-government demonstrations since the late 1990s. However, higher oil prices since February 2006 reportedly wiped out nearly all of the anticipated savings of 4.4 billion ringitts—which the government intended to spend to improve public transport systems—in two months (Agence France Presse 2006b).

A3.51 Diesel sold to public transport vehicles, trucks, and school buses, as well as fishermen, is subsidized, while that sold to factories and businesses is at a market determined price. In April 2005, the market-based price of diesel was nearly double that of the subsidized price, 1.70 ringitts (US$0.45) a liter against 0.88 ringitts (US$0.23). In addition, diesel and gasoline are exempted from sales taxes, further increasing the costs

to the government of supporting low prices to users. Not surprisingly, the industrial demand for diesel decreased from 7 to 4 billion liters between 2002 and 2005, while demand for subsidized diesel from filling stations increased from 2.1 to 5.5 billion liters during the same period (*Star* 2005).

A3.52 To stem diversion of subsidized diesel to unqualified end users—about 15 percent of the vehicles in the country and 80,000 fishermen are eligible for the subsidy—the government in January 2005 introduced a limit on supplies to filling stations based on 2003 sales (as a more representative year of demand from entitled users), and indicated that it would reduce the quota or even revoke the license of any station illegally diverting the fuel. The quota system led to diesel fuel shortages during the first half of the year, to the point where, at the end of April 2005, one-quarter of the country's filling stations had reportedly run out of diesel. Some stations were caught displaying (false) "No Diesel" signs and diverting subsidized diesel to wholesalers (*New Straits Times* 2005a, *Star* 2005, *Today* 2005).

A3.53 The most recent subsidy scheme for public transport operators was introduced in March 2006, offsetting half of the price increase implemented in February. Those certified by the Ministry of the Domestic Trade and Consumer Affairs are entitled to a discount of 0.15 ringitts (US$0.04) per liter using fleet cards. Fleet cards are obtained from oil companies after obtaining a letter from the Ministry of the Domestic Trade and Consumer Affairs. Twenty-one categories of vehicles are eligible, each with a monthly quota, ranging from 570 liters for school buses and 720 liters for taxis to 1,440 liters for transit and mini-buses, 1,800 liters for general cargo lorries, and 2,280 liters for express buses (*Daily Express* 2006).

A3.54 Earlier on January 1, 2006, the government launched an e-diesel subsidy scheme for fisherman at a cost of 10 million ringitts (US$2.7 million) to the National Fisheries Development Board (*Bernama Daily Malaysian News* 2006). The scheme sets monthly quotas as a function of the boat size and enables fishermen to purchase diesel at 1.00 ringitts (US$0.27) a liter using smart cards at e-diesel selling centers. The owner's name, the vessel registration number, and the monthly quota are printed out at each transaction. The government said that it expected to save 2 billion ringitts (US$530 million) annually by switching to the e-diesel system (*Bernama Daily Malaysian News* 2005b). In March 2006, the government announced that this scheme would be extended to those using gasoline, to be priced at 1.00 ringitts a liter, from June 1, 2006.

A3.55 The costs to the government of the subsidy program led to a concerted effort, beginning in 2004, to win over the public to support a phasedown of the subsidies, largely by explaining (through the media) that the money could be better spent on schools, roads, and other public amenities. The government established a cabinet committee to study fuel consumption and ways to reduce dependence on petroleum products. The government has designated a minister to be in charge of public information, including writing special columns in newspapers. The articles explained how subsidies, designed to help the poor, currently benefit the rich and the poor alike, whereas savings from fuel subsidies could be channeled to build more schools, hospitals, and public facilities which would bring long-lasting benefits to the future generations. Using data, the government showed how expenditures on subsidies compared to those on school textbooks, extra classes for poor

children, health care, and other social services (Straits Times 2005b). However, support for the government has declined as product prices have been increased, and there is still substantial opposition to removing the subsidies.

A3.56 Concerned about depleting oil reserves in the country, higher oil prices, and increasing subsidy burden, Prime Minister and Minister of Finance Badawi in his 2006 budget speech stressed the need for diversifying energy sources and improving energy efficiency. Under energy source diversification, the budget speech proposed import duty and sales tax exemption for dedicated (single-fuel) CNG trucks, buses and conversion kits; tax incentives for expanding natural gas networks; and a government grant of 50,000 ringitts (US$13,400) each for dedicated CNG buses until the end of 2008. The budget speech announced introduction of B5—a blend of 5 percent biodiesel (derived from palm oil) and 95 percent petroleum diesel—on a pilot basis; development of biodiesel fuel specifications; construction of three palm-oil biodiesel plants with a total annual capacity of 180,000 tonnes, principally for export; and tabling of a biofuel act in the parliament in 2006.

A3.57 Turning to energy savings, all government agencies would be required to target 10 percent savings in energy consumption in 2006. In due course, electricity tariffs would be adjusted to promote greater energy efficiency and discourage waste and excessive consumption. Beyond reducing consumption, the government proposed measures to encourage investments in energy conservation. To this end, the government would extend to 2010 the existing incentives given to companies providing energy conservation services, provide an investment tax allowance of 60 percent on capital expenditure for improving energy conservation, and use building development guidelines to promote "smart buildings" which optimize building efficiency (Prime Minister Badawi 2005). Earlier in July 2005, the government required employees in the public sector to increase the temperature setting in all air-conditioned offices. The government has also encouraged its citizens to use their private cars less and take public transportation or share cars for the journey to work (Xinhua News Agency 2005f).

A3.58 Perhaps unusually, Prime Minister Badawi has called on other countries to reduce dependence on stockpiling, on one occasion citing Japan and the Republic of Korea by name. This call arises out of the concern that any large-scale attempt to increase domestic reserves of refined products would, in the short run, put pressure on world prices, resulting in even higher prices (Agence France Presse 205a).

A3.59 Two issues have arisen with the petroleum pricing policy. Despite the low overall level of these prices, the modest increases permitted by the government have been used as an excuse in other sectors to raise prices above any cost impacts—for example, the price of fish was reported to have risen by 60 percent following the small May 2005 product price increases (*Straits Times* 2005a). Other foodstuffs have been increased above government recommended prices. This suggests that the scheme of controlled prices on a number of items is vulnerable to pressures to be increased when a justification can be found. The government has repeatedly called on traders not to take advantage of fuel price increases, and the Ministry of Domestic Trade and Consumer Affairs conducts price checks on essential goods to ensure that traders are not profiteering.

A3.60 Fuel price differences between Malaysia and Thailand have led to Thai motorists along Thailand's southern border traveling to Malaysia to refuel—at times leading to tempoerary fuel shortages—and to smuggling by land and sea. Smuggling has taken place using modified trawlers (which can hold up to a million liters of fuel) and tankers (in one case the fuel tank had been modified to hold 16,000 liters) (Thai News Service 2005e). Increased patrols have been introduced to reduce smuggling by sea, while customs control along the Thai-Malay border has been strengthened. The government of Malaysia has imposed a limit on how much fuel residents of the areas near the border with Thailand are allowed to purchase. In 2006, the government proposed that a levy, probably amounting to 20 ringitts (US$5.45), be charged on each foreign vehicle entering the country.

Assessment

A3.61 Malaysia, being a net oil exporter and having adopted a regulated approach to oil prices, has found that the costs of maintaining only small price increases in the product market has increased the subsidy burden to a level at which it is having serious budgetary consequences. Reducing taxes on products has helped to keep the prices down, but has also resulted in a further large loss of revenue to the government. The two-tier pricing system for diesel has led to significant purchases of diesel at subsidized prices by non-qualified users, while the price differential with neighboring counties has led to substantial out-smuggling. The government has repeatedly issued warnings against fishermen who abuse the subsidy scheme as well as filling station owners who divert subsidized fuels. As long as there are lucrative financial incentives, however, there seems to be no shortage of new and creative ways of smuggling and diversion. The new subsidy scheme based on smart cards should make illegal diversion more difficult. As such, its implementation will be closely watched by other governments considering similar targeted price subsidies.

A3.62 Malaysia's oil consumption has been growing at a much slower rate than the economy, largely due to fuel switching from oil to natural gas for power generation. Preliminary data indicate that oil consumption remained static between 2004 and 2005 (EIA 2006a). Among net oil-exporting countries, Malaysia has perhaps done more than others to stress energy savings, conservation, and fuel switching, in part because of the size of the fuel subsidy bill coupled with the government's concern to lower the budget deficit, and in part because of the long-term trend toward declining oil reserves. The government is actively pursuing alternative fuels, although its policy to keep diesel prices low is in conflict with its policy to promote biofuel—which is more expensive than petroleum diesel—on the domestic market. The government's attempt to keep fuel-related activities as financially neutral as possible—most notably in the use of motorized vehicles—actually serves to encourage continuation of consumption patterns based on cheap fuels. To curb the growth of fuel consumption in the transport sector, the government would, in time, need to allow market forces set optimal consumption and look elsewhere for protecting the vulnerable.

Mexico

A3.63 Mexico is a major net exporter of oil, producing about twice as much as is needed for domestic consumption. The petroleum market is entirely in the hands of state oil company Petróleos Mexicanos (Pemex). According to Pemex, the company sold 103 million m^3 (1.77 million barrels per day) of petroleum products in 2005. The single largest consumption was of gasoline at 38 percent of the total, followed by heavy fuel oil at 19 percent, and diesel and LPG at 18 percent each, while there was virtually no consumption of non-aviation kerosene (*Business News Americas* 2006c). Despite its large oil production, Mexico imported 12 million m^3 (205,000 barrels per day) of gasoline, or 30 percent of total gasoline demand, during this period (*International Oil Daily* 2006b). Historical inflation rates in Mexico are given in Table A3.10.

Table A3.10 Consumer Price Index Trend in Mexico

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	6.4	5.0	4.5	4.7	4.0

Source: IMF 2006i.

A3.64 Mexican consumers have been shielded from the steep oil price rises on the international market in recent years. Prices are set by the Ministry of Finance and rise in line with the Central Bank's projected inflation rate. In order to avoid large price fluctuations, excise taxes are adjusted on a monthly basis. There is pan-territorial pricing except gasoline sold along the U.S. border where prices are lower to discourage vehicle owners from driving across the border to refuel at U.S. retail stations. Domestic fuel prices in January 2004 (the beginning of world oil price increases), January 2005, and January 2006 are shown in Table A3.11. The prices in April 2006 were only slightly higher for all fuels but LPG—6.56, 7.75, 5.38, and 9.72, respectively, for the four fuels listed in Table A3.11. The price increase for LPG was 9 percent.

Table A3.11 Retail Fuel Prices in Mexico in January

Units/currency	*Year*	*Regular gasoline*	*Super gasoline*	*Diesel*	*LPG*
Units		Per liter	Per liter	Per liter	Per kg
US$	2004	0.55	0.64	0.46	0.61
Mexican pesos		6.05	6.96	5.02	6.73
US$	2005	0.55	0.65	0.46	0.71
Mexican pesos		6.24	7.37	5.17	7.95
US$	2006	0.61	0.72	0.50	0.84
Mexican pesos		6.49	7.66	5.33	8.91

Source: www.pemex.com/files/dcpe/epublico_ing.pdf.

A3.65 Between January 2004 and January 2006, regular and premium gasoline spot prices in the U.S. Gulf rose by 71 percent, against 7 percent for regular gasoline and 10 percent for super gasoline in Mexico. The corresponding figures for diesel are 86 percent in the United States, against 6 percent in Mexico. Only the price of LPG rose at

about the same rate, 30 percent, but the increase in Mexico reflects more a gradual decrease in the LPG price subsidy than full pass through of international price increases to end users. Diesel prices are lower than gasoline prices, and in addition there is an extra subsidy to farmers for limited amounts of fuel, based on the size of farm and crops planted. The diesel subsidy program for farmers was launched in April 2003, at a cost of 2.3 billion Mexican pesos (US$235 million) in that year (Reuters News 2003).

A3.66 The LPG market in Mexico is one of the largest in the world. Mexico is not self-sufficient in LPG supply and imports some of its demand. There are a large number of domestic-based LPG marketers. Prices of LPG are controlled and subsidized. LPG is widely used by households and subsidies benefit lower-income groups. In July 2004, Pemex reported that LPG price subsidies had cost the company 4.5 billion Mexican pesos (US$390 million) in the preceding three years (*Latin American News Digest* 2004). A decree issued on February 23, 2001 fixed the price of LPG for residential consumers every month and subsidized the lowest-income consumers. In December 2004, President Fox announced that the import tariff on LPG would be abolished in order to reduce prices to consumers (*Platts Commodity News* 2004). In September 2005, in the wake of rising international prices following hurricane Katrina, the government announced further subsidies to LPG and natural gas. The subsidy program was estimated to cost the government up to US$850–880 million in 2005 (*Business News Americas* 2005d). The finance ministry published a decree in December 2005, stating that the LPG price for residential consumers would be raised by 0.33 percent every month in the future (*Business News Americas* 2006a).

A3.67 It is much more difficult for Pemex to carry fuel price subsidies than other vertically integrated oil companies. Pemex registered before-tax earnings of US$51 billion in 2005, up 13 percent from 2004, reflecting higher world oil prices. However, the company's net result after taxes and duties was a loss of US$3.8 billion. In addition to the very high tax bill, Pemex was adversely affected by growing demand for imported gasoline. Pemex imports of refined products grew by 26 percent, increasing import costs by 45 percent to US$5.1 billion (*International Oil Daily* 2006b).

A3.68 The government also subsidizes electricity prices, shielding households and businesses from some of the effects of higher international prices. There does not appear to be a campaign to encourage oil saving, or to engage in fuel switching, apart from the increased use of natural gas, 20 percent of which is imported.

A3.69 There are several projects to produce ethanol from sugarcane and maize. Much of the production targets the export market, taking advantage of the North American Free Trade Agreement. Unlike Nigeria and Venezuela where the state oil companies are leading the biofuel efforts, Pemex is said to be showing little interest.

Assessment

A3.70 Mexico has benefited from higher international oil prices for its oil exports, which has enabled the government to increase the subsidies on natural gas and LPG. In recent years, the government's policy to raise fuel prices at the same rate as the projected rate of inflation has hurt Pemex as well as the government: although excise taxes are adjusted for this purpose, excise taxes cannot become negative, and especially for fuels

that are imported—such as gasoline and LPG, amounting to about 10 percent of total demand—this policy has become costly to Pemex. The government has not appeared to create an active program to save energy. Fuel switching to natural gas is problematic in that one-fifth of natural gas is imported, with future imports projected to increase and gas tariffs being subsidized.

Nigeria

A3.71 Nigeria is a large oil producer and has four refineries. However, a history of chronic price subsidies and violent protests against fuel price increases has discouraged investment in refining. Nigeria imports a considerable amount of refined products. Up to 60 percent of gasoline and as much as 80 percent of LPG consumption are imported (*This Day* 2005a and 2005b). According to IEA statistics, Nigeria consumed 12 million tonnes of petroleum products in 2003, of which gasoline accounted for 56 percent, followed by diesel at 17 percent, heavy fuel oil at 12 percent, non-aviation kerosene at 10 percent, and LPG negligibly small (IEA 2005b). Gasoline's share of total consumption is as high as that in the United States. Historical inflation rates in Nigeria are given in Table A3.12.

Table A3.12 Consumer Price Index Trend in Nigeria

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	18.8	13.0	14.0	15.0	13.5

Source: IMF 2006i.

A3.72 The downstream petroleum sector was nominally deregulated in 2003. All four refineries remain in the hands of the state-owned Nigerian National Petroleum Company (NNPC), although the government has been trying to privatize them since 2004. Problems ranging from sabotage to poor management and a lack of regular maintenance contribute to reducing the operating capacity of the refineries to half of the installed capacity, despite hundreds of millions of dollars spent on rehabilitating the refineries. There are international oil majors as well as independent national oil marketers in the downstream sector. The fuel price hike in June 2003, which was part of the government's plan to deregulate the downstream sector, had to be reversed in July 2003 after a general strike on June 30–July 8 left a dozen people dead. This action notwithstanding, the government reaffirmed its commitment to price liberalization in July 2003. NNPC began paying market prices for crude in October 2003. The deregulation policy permitted private companies to import petroleum products for domestic sale, and allowed marketers to charge higher prices if approved by Petroleum Products Pricing Regulatory Agency (PPPRA), a government agency that approves price increases. Because price subsidies borne by oil companies were not reimbursed until 2006, NNPC has remained the only firm importing refined products. In July 2005, it cited a monthly loss of 15 billion naira (US$110 million) from product imports (*This Day* 2005c). In June 2005, in the face of continuing shortage of LPG, the bulk of which is imported, the government removed the 30 percent import duty and 5 percent VAT levied on imported LPG (*This Day* 2005a).

A3.73 The government established PPPRA in 2003. The agency sets the pricing policy for petroleum products, regulates their supply and distribution, and periodically

approves benchmark prices for all products (National Assembly of the Federal Republic of Nigeria 2003). The Department of Petroleum Resources monitors and enforces price ceilings. Price enforcement has been a problem; it is not unusual and is in fact common for retail outlets to exceed maximum prices. In September 2003, the Presidential Economic Advisor commented that fuels were sold at the government fixed prices in only three cities, and that 80 percent of Nigerians were paying much more due to fuel shortages (Vanguard 2003). In April and May 2004, 280 filling stations were shut down for failing to display boards posting prices at readable heights, a requirement following sector deregulation (Vanguard 2004).

A3.74 Nigeria has a policy of pan-territorial pricing, funded through the Petroleum Equalization Fund established in 1975. The fund provides a mechanism for reimbursing oil marketing companies for any losses arising from the sale of petroleum products at uniform prices throughout the country and pays 1.00 naira (US$0.007) for every liter of fuel lifted from depots in the coastal areas to the hinterland. A presidential panel that investigated the fund accounts in 2002 reported that the oil marketers defrauded the government of 1.7 billion naira (about US$140 million at the time) in the previous three years when they lifted fuel on credit (*All Africa* 2002).

A3.75 Representative fuel prices from July 2003 to August 2005 are shown in Table A3.13. The July 2003 and June 2004 prices are those after price increase reversals. In June 2003, the government raised the price of gasoline from 26 naira to 40 naira per liter, but after a crippling nation-wide strike mentioned above, the government reached a compromise with the National Labor Congress and lowered the price to 34 naira. Similarly, the government raised the price of gasoline from 42.7–43 naira to 47–50 naira in May 2004, but after trade unions mounted a general strike, the government brought the price down in June 2004 to 41.5 naira, following which the trade unions suspended the strike. By August 2005, the price difference between kerosene and diesel had widened.

Table A3.13 Fuel Prices per Liter in Nigeria

Date	*July 2003*		*June 2004*		*November 2004*		*August 2005*	
Currency	*Naira*	*US$*	*Naira*	*US$*	*Naira*	*US$*	*Naira*	*US$*
Gasoline	34	0.25	41.5	0.31	49	0.37	65	0.49
Kerosene	32	0.23	48	0.36	51	0.38	52	0.39
Diesel	32	0.23	51	0.38	51	0.38	63	0.48

Sources: July 2003 prices from Panafrican News Agency Daily Newswire 2003 and *WMRC Daily Analysis* 2003b; June 2004 prices from *This Day* 2004a; November 2004 prices from *This Day* 2004b; August 2005 prices from Xinhua News Agency 2005d.

A3.76 Unlike other developing countries where the debate on fuel price increases centers around kerosene, diesel, or LPG, gasoline is the most politically sensitive petroleum product in Nigeria. General strikes to protest against fuel price increases in Nigeria are well publicized, particularly those that threaten oil production and exports because of the implications for world oil prices. In November 2004, the government ordered a price reduction to avoid a general strike in which the strikers threatened to disrupt oil exports. In March 2005, the government enacted a new Anti-Strike Bill that prohibited stoppages

in several sectors including power, aviation and water, as well as the security, education, health and fire services. The high court has been asked to intervene from time to time, by the government to declare strikes illegal, and by trade unions to declare price increases illegal. An example of court action is the order issued on June 8, 2004, that directed the unions to suspend the strike and the government to reverse the price increases (OsterDowJones Commodity Wire 2004).

A3.77 In October 2004, President Obasanjo set up a 33-member committee to fashion out ways to cushion the effects of fuel price increases. By the end of the month, the committee recommended a number of mitigation measures, including spending 11.1 billion naira (US$83 million) of the excess crude fund to provide loans to transport owners and operators at an interest rate no higher than 3 percent. These recommendations were rejected by labor and civil society. The committee submitted its report in April 2005. The government came under criticism when, even by August 2005, it had not sought public comments nor released the report, which reportedly recommended that excess oil revenue be used to subsidize fuels (Vanguard 2005).

A3.78 In August 2005, the Senate tabled a bill that sought to establish a petroleum product price stabilization fund. In October 2005, President Obasanjo announced that there would be no more fuel price increases until the end of the year. Later in October, the Senate proposed a bill that would freeze fuel prices for one year at a time, beginning on January 1, 2006. In the 2006 budget speech, President Obasanjo reported that the fuel subsidies amounted to 292 billion naira (US$2.2 billion) in 2005, of which 127 billion naira (US$960 million) was covered by the federal government.

A3.79 The 2006 budget provides 75 billion naira (US$580 million) to be given by the federal government for stabilizing gasoline and kerosene prices, matched by the state and local governments, for a total of 150 billion naira (US$1.2 billion). Prices are not to increase in 2006 (President Obasanjo 2005). Diesel, jet fuel, and LPG prices are deregulated and are not stabilized. To freeze gasoline and kerosene prices, a Petroleum Support Fund was launched in March 2006. The Central Bank of Nigeria is the custodian of the fund and PPPRA is the administrator. By use of this fund, gasoline and kerosene prices would not rise above 65 naira (US$0.50) per liter for the rest of the year. In addition to the funds deposited by the federal, state, and local governments, the fund would accumulate the excesses realized during periods of over-recovery when PPPRA recommended prices are higher than import-parity prices. The government stated that reimbursements for subsidies should remove the disincentives that discouraged marketers other than NNPC from importing petroleum products, thereby opening up imports to competition.

A3.80 Out-smuggling of fuels to neighboring countries is a serious problem in Nigeria. On August 10, 2003, Nigeria closed its border with Benin in protest against oil smuggling. The government has embarked on a strategy of signing contracts with neighboring countries for supply of petroleum products to ensure they source oil from lawful suppliers. Côte d'Ivore's Minister for Mines and Energy admitted in 2003 that much of the crude oil delivered to his country was stolen from Nigeria (*All Africa* 2004a). Illegal imports into Cameroon have been a problem for many years, because the government lacks

the means to monitor the long and permeable border with Nigeria (Economist Intelligence Unit 2005).

A3.81 Attacks on oil installations have caused serious supply disruptions, long queues, and price hikes. In March 2006, for example, kerosene prices rose to as high as 100 naira (US$0.75) per liter and diesel 125 naira (US$0.97), following disruptions of crude supply to two refineries and subsequent acute fuel shortage (*Vanguard* 2006). Earlier, in July 2003, violent protests against fuel price increases led to extreme fuel shortages and pushed gasoline prices up to 200 naira (US$1.54) a liter in the oil-producing state of Akwa Ibom (*WMRC Daily Analysis* 2003b). Deaths from accidents (fire, suffocation from fume) after local residents rupture oil pipelines in an attempt to steal oil are not uncommon.

A3.82 The Petroleum Support Fund is meant to subsidize the difference between the import-parity price of kerosene and the government set price—28 naira per liter in January and much higher by May—and eliminate the fuel shortage. As of May 2006, the mechanism to reimburse marketers had not yet been put in place, and no disbursements from the Fund had occurred (ISI Emerging Markets Africawire 2006c). In the face of continuing fuel shortages, particularly of kerosene, a wide range of prices have been observed on the market. Gasoline was selling for anything between 65 and 150 per liter, diesel 75 and 150, and kerosene 50 and 150 in May 2006 (Reuters News 2006h, *All Africa* 2006i and 2006k).

A3.83 There has been much interest in Nigeria in recent months in biofuels. NNPC has announced that it has begun moves to engage in large-scale farming of sugarcane and cassava for ethanol production. It has signed a memorandum of understanding with the state of Benue to acquire farmland to grow the feedstock crops. NNPC is said to be indiscussion with potential investors to establish a US$60 million ethanol plant (*Platts Commodity News* 2006k). It has also begun importing ethanol from Brazil.

Assessment

A3.84 The government of Nigeria doubled fuel prices from about US$0.20 per liter in mid-2000 to US$0.40 per liter in mid-2004. Fuel price increases are more politicized in Nigeria than in most other countries, and are often met with violent protests. The National Labor Congress argues that fuel prices in Nigeria are among the highest in OPEC countries. Opinion pieces in newspapers highlight the irony of Nigeria, richly endowed with natural resources, remaining one of the poorest countries in the world. They point out that the vast majority of its population does not have access to safe water, electricity, motorable roads, adequate primary health care, or acceptable standards of education. They ask what the government is providing to its citizens that warrants more sacrifices from them.

A3.85 Nigeria illustrates the difficulties of raising fuel prices to economic levels in an oil-rich country where the government is struggling to win credibility: the government has stated that savings from fuel subsidies will be used to build infrastructure and provide social services, but the public questions the government's ability to deliver, based on its past track record. When the government points out that it costs to import fuels and therein lies the need to raise fuel prices, the public questions why fuel imports should be necessary in the first place. President Obasanjo told reporters in June 2004 that his administration

had spent a total of US$450 million on repairs to the refineries and another US$250 million on accessories, without any significant result (Economist Intelligence Unit–ViewsWire 2004). These capital expenditure figures, vast to the public, raise questions about whether fuel prices are really subsidized, or consumers are rather being asked to pay for the inefficiency and corruption in the oil sector.

A3.86 The government points to the telecommunications sector as one that has been deregulated without public opposition, and asks why the oil sector should be treated so differently. The difference may be the size of each sector, the history of perceived corruption, and the magnitude of rent in each respective sector—the oil sector is much larger, there are allegations of billions of dollars having been stolen in the past, and the public views the oil wealth of Nigeria as belonging to its people first and foremost. It may be that fuel price liberalization will need to go hand in hand with broader government reforms, especially in the area of transparency and governance, before the public can be persuaded that fuels are indeed being subsidized, that fuel subsidies are inefficient, and that, most importantly, the government will put the savings from fuel subsidy removal to much better use.

República Bolivariana de Venezuela

A3.87 Venezuela is the world's fifth largest oil exporter. There are refineries, some capable of producing fuels that meet stringent fuel specifications in the United States. On the domestic market tetra-ethyl lead in gasoline was phased out only in mid-2005, and to that end ethanol has been imported from Brazil for use as an octane enhancer. According to IEA statistics, Venezuela consumed 18 million tonnes of petroleum products in 2003. Gasoline consumption accounted for 54 of total demand, diesel 25 percent, heavy fuel oil and LPG 10 percent each, and kerosene negligibly small. Historical inflation rates in Venezuela are given in Table A3.14.

Table A3.14 Consumer Price Index trend in Venezuela

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average PI increase, %	12.5	22.4	31.1	21.8	16.0

Source: IMF 2006i.

A3.88 The mid-stream petroleum sector is in the hands of state oil firm Petroleos de Venezuela SA (PdVSA). There are more than 1,700 filling stations, four-fifths of which are affiliated with the national hydrocarbons business association. PdVSA supplies filling stations at below cost.

A3.89 Among the countries surveyed in this report, Venezuela has the lowest fuel prices. In 1989, newly elected president Carlos Andres Perez increased gasoline prices as part of economic reforms to comply with IMF guidelines. The price increase sparked mass riots that resulted in the killings of several hundred people. Gasoline prices have not been increased for a decade, despite double-digit inflation in the intervening years. Gasoline and diesel prices in Venezuela are given in Table A3.15.

Table A3.15 Fuel Prices in Venezuela

Units	*Regular gasoline*	*Premium Gasoline*	*Diesel*
US$/liter	0.033	0.045	0.022
Bolivares/liter	70	97	48

Source: Local information.

A3.90 The Energy and Mining Ministry and PdVSA conducted a study into fuel pricing in 2004. The study, released in October 2004, concluded that domestic gasoline prices covered only 69 percent of *production* costs for unleaded gasoline and 89 percent for leaded regular. Correcting price distortions and allowing for some profit would require the regular gasoline price to be increased to at least US$0.085 a liter and unleaded to US$0.10 a liter (EFE News Service 2004). In addition, Venezuela's hydrocarbons law allows sales tax to be fully or partly waived for reasons of "public or general interest," and the government exempted gasoline from sales tax in 2004 (*Business News Americas* 2004b). In May 2006, the government announced that it would reduce the gasoline consumption tax by more than one half to increase margins for retailers (*Dow Jones International News* 2006d). Low margins have caused fuel shortages in remote areas.

A3.91 These low prices have many consequences apart from the cost to the government budget. Cheap fuels encourage use of private vehicles, causing congestion and air pollution. After a crackdown on electricity theft in 2005, street vendors in Caracus began to use portable power generators; it costs only a few U.S. cents a day to generate electricity in this way. Predictably, low prices are also stimulating a smuggling industry to Brazil, Colombia, and the Caribbean countries. In the areas bordering Colombia, the roads to Venezuela are lined with people offering plastic jugs of smuggled gasoline. On the Venezuelan side, supplies at filling stations are rationed, but drivers of cars outfitted with large tanks—often extra tanks in the back seat and trunk—drive back and forth across the border, filling up with Venezuelan gasoline and selling it at a large profit in Colombia (*Globe and Mail* 2005). In response, in May 2006, PdVSA raised premium gasoline prices along Brazilian and Colombian borders to 1,235 (US$0.58) and 703.40 (US$0.33) bolívares per liter, respectively (*Business News Americas* 2006f).

A3.92 Venezuela in recent years has been actively engaged in providing fuels at discounted prices to a number of countries in Latin American and the Caribbean, and even for the poor in some U.S. cities. One such regional program is PetroCaribe, which is described at the end of this annex. On the domestic front, subsidized fuel prices are discounted further on occasion. For example, PdVSA in January 2006 announced that it would provide subsidized aviation fuel to domestic airlines and gasoline and diesel to public transport, in response to closure of a highway in Caracas.

A3.93 There are reports that PdVSA hopes to replace 15 percent of the country's gasoline consumption with CNG. Venezuela has the largest gas reserves in South America, but its CNG market has not grown on account of low gasoline prices. PdVSA is reportedly planning to begin by refurbishing the existing refueling stations, of which there are about 160, and targeting public transport vehicles (*NGV Global* 2006b).

A3.94 Venezuela is also embarking on an ethanol program. Venezuela began importing ethanol from Brazil in July 2005 as an octane enhancer in its gasoline lead phaseout program. The government speaks of a project to build 15 ethanol plants in 9 states using sugarcane as the feedstock (*El Universal* 2006). PdVSA is examining a US$150 million project to enable Venezuela to switch to E10 over the next several years (*Platts Commodity News* 2006c).

Assessment

A3.95 Venezuela's fuel pricing policy is similar to that in a handful of other major oil producers, including Iran, Iraq, and Turkmenistan, which have chosen to heavily subsidize domestic fuel prices. This policy has created rampant fuel smuggling, energy inefficiency, and nonessential energy consumption. In all these countries, the public has come to expect cheaper-than-water fuels as their right as citizens of major oil-producing countries. Raising fuel prices becomes increasingly difficult as the public becomes accustomed to very low fuel prices.

A3.96 Large gasoline price subsidies cannot claim to be pro-poor in developing countries, where the poor do not own cars. Congestion and air pollution resulting from cheap fuels also reduce the benefits of lower fuel prices to the public. But a considerable amount of work, or else a crisis, is likely to be needed before the government can win public buy-in for raising fuel prices to their economic levels.

Vietnam

A3.97 Vietnam is a net oil exporter, with crude production nearly 50 percent larger than domestic product consumption. It has no refineries and all products are imported. A project for constructing the country's first domestic refinery has been underway for several years. According to IEA statistics, Vietnam consumed 10 million tonnes of petroleum products in 2003. Diesel accounted for 42 percent of consumption, heavy fuel oil 21 percent, gasoline 20 percent, LPG 6 percent, and non-aviation kerosene 3 percent (IEA 2005b). Historical inflation rates in Vietnam are given in Table A3.16.

Table A3.16 Consumer Price Index Trend in Vietnam

Year	*2001*	*2002*	*2003*	*2004*	*2005*
Average CPI increase, %	-0.4	3.8	3.1	7.8	8.3

Source: IMF 2006i.

A3.98 The whole of the oil industry is controlled by state-owned companies and the government controls prices. Petroleum product importers are assigned annual quotas, and if they do not meet the quota in one year the quota is reduced the following year, giving them an incentive to keep on importing even in the face of financial losses. In 2003, the government prepared a new regulation that would have allowed oil companies to set prices, eliminated ceilings on fuel import volumes, and allowed domestic companies to stockpile fuel when world prices are low. The regulation was to come into effect on January 1, 2004, but the rise in oil prices in late 2003 led to indefinite

postponement of its promulgation. Since then, the government has continued to control prices and attempt to moderate the effects of import price increases.

A3.99 The government adjusted fuel prices three times in 2004 and four times in 2005. There were no downward adjustments except for gasoline in the last adjustment of November 2005. Between February 2004 and November 2005, the prices of gasoline, kerosene, and diesel were raised by about 40 percent more than the rate of inflation, and of heavy fuel oil 35 percent more. Despite these increases, diesel prices remained below international prices. The government calculated that the total cost of the subsidy for 2005 would amount to 13 trillion dong (US$0.8 billion) (*Dow Jones International News* 2005c). The government raised retail prices at the end of April 2006, by as much as 16 percent for 92 RON gasoline. Before the price increase, importers were reportedly incurring an estimated loss of 1,000 dong (US$0.063) per liter of gasoline 1,900 dong (US$0.12) per liter of diesel (*Platts Commodity News* 2006g). Against these estimated losses, fuel price increases were 1,500 dong per liter of 92 RON gasoline and 400 dong per liter of diesel and kerosene. Fuel prices in May 2006 are shown in Table A3.17. Fuel prices are subsidized in remote areas and in areas resided by ethnic minorities.

Table A3.17 Fuel Prices in Vietnam in May 2006

Parameter	*Gasoline (92 RON)*	*Gasoline (90 RON)*	*Kerosene*	*Diesel*	*LPG*
Units	Per liter	Per liter	Per liter	Per liter	Per kg
US$	0.69	0.68	0.50	0.50	0.876
Dong	11,000	10,800	7,900	7,900	13,900

Source: Local information.

A3.100 The petroleum fuel import subsidy is estimated to have grown from 0.3 trillion dong (US$19 million) in 2003 to 4.5 trillion dong (US$360 million) in 2004 (IMF 2006h). Subsidy payments accrued in the first eight months of 2005 are estimated at 0.8 percent of GDP. Marketing companies are required to subsidize across petroleum products—for example, using profits from gasoline sale to subsidize kerosene and diesel—before receiving subsidy compensation from the government (IMF 2006c).

A3.101 The government is beginning to revisit the reform agenda of 2003. In early 2006, the finance ministry proposed that fuel prices be adjusted monthly—on the basis of the average import price of a certain month and the most recent import price level to allow importers to set retail prices—with a view to a gradual phaseout of price subsidies (Vietnam News Brief Service 2006a). At present only LPG prices are adjusted on a monthly basis. Citing continuing price volatility in the world oil market, the Ministry of Trade declined to accept the proposal, saying that this was not the time to be moving to more frequent price adjustments.

A3.102 An important instrument the government has used to maintain price stability is adjustment of import duties. Import duties are frequently changed and eliminated altogether in times of high world oil prices. For example, the government raised import duties on gasoline, kerosene, and diesel from 5, 0, and 0 percent to 10, 5, and 5 percent, respectively, in December 2005 following a decline in world oil prices, and then reduced

these rates back to 5, 0, and 0 percent within less than two months as world prices rose again. The duty reduction was intended, in part, to help importers who were reportedly incurring a loss of 134 dong (US$0.0084) for every liter of gasoline sold (BBC Monitoring Asia Pacific 2006). The increase in the gasoline import duty in December 2005 followed a reduction in the retail price of gasoline in November 2005. Before the April 2006 price increase, the duties had already been reduced to 0 percent.

A3.103 The government has been controlling prices of other goods and services in order to protect households from higher energy prices. Price controls have included electricity, coal, and public bus service. In the first three quarters of 2004, for example, the subsidy given to Hanoi's bus fleet amounted to an estimated 78 billion dong (US$5 million) (Vietnam News Brief Service 2004). In Ho Chi Minh City, a representative of a cooperative of passenger transporters reported in late 2005 that fuel price hikes had forced many carriers to overfill their capacity by up to four times (Thai News Service 2005f). However, during 2005 bus fares in Hanoi were increased by up to 20 percent. In December 2005, the government authorized tax reduction and soft credit to help the fishing industry ease financial hardships caused by higher oil prices.

A3.104 Two problems have arisen with the increasing subsidization of petroleum products. First, between March and July 2005, the price of kerosene was lowered by 600 dong (US$0.038) a liter below that of diesel against the historical difference of 50 dong (US$0.003), and immediately the demand for kerosene jumped by 30–40 percent (Asia Pulse 2005a). It appears that kerosene was being adulterated into diesel for passenger transportation. The government equalized the prices of these two fuels in July 2005. There is also widespread adulteration of gasoline between grades. In fact, the government dyes different grades of gasoline, but adding water to the lowest grade, A83, turns its color to that of A92, which encourages fuel adulteration and has deleterious effects on users (Asia Pulse 2005b).

A3.105 Second, the difference between Vietnamese product prices and those in neighboring Cambodia and Lao People's Democratic Republic where prices are 30 to 40 percent higher has led to serious problems with cross-border out-smuggling (see the section on Cambodia in annex 1) of the subsidized imported fuels. The government's response so far has been to increase border control. Authorities in border provinces have been instructed to strengthen inspection and monitoring of the trade along the border. Various measures have been enacted, including limiting fuel sale to foreign vehicles to 50 liters and boats to 100 liters. Retailers can dispense fuel directly only into vehicle's tanks and not into separate containers. These measures notwithstanding, licenses have been issued for filling stations to be set up along the border, many on the riverbank so that smugglers need to transport fuels only 100 meters across the river (Asia Pulse 2005b). Widening price differences have reportedly increased smuggling activities in 2006 (Vietnam News Brief Service 2006b).

A3.106 The government has taken some measures that would help limit the consumption of petroleum products. To address congestion arising from insufficient infrastructure development in the face of growing traffic, new motorcycle registrations were banned in 2003, and taxes and tariffs on car imports were increased in 2004. These

measures, which slowed down traffic growth, also helped to curb transport fuel consumption. In July 2005, all government agencies and organizations financed with the state budget had their gasoline allowance cut by 10 percent relative to 2004 levels. In May 2006, the Ministry of Finance ordered state agencies at all levels to cut petroleum expenses by another 10 percent. The government has also indicated that it might spend 250 billion dong (US$15.8 million) to build fuel reserves.

Assessment

A3.107 Vietnam's position as a net exporter of oil has permitted it to increase its petroleum product subsidies substantially and reduce or eliminate import duties, in part out of concern for inflation. The widening differential between Vietnamese and neighboring country prices promoted smuggling and resulted in a net loss to the government. The readiness of users to purchases kerosene once a small discount to diesel opened up, as well as the general adulteration of fuels, suggests that users are actively searching for opportunities to make a profit even by illegal means. The government responded swiftly and closed the price gap in three months, thereby putting an end to this commercial malpractice.

Regional Initiative: PetroCaribe

A3.108 The steep world oil price increases in 2004 and 2005 prompted some governments to explore greater regional cooperation. In Asia, the Association of Southeast Asian Nations has discussed what regional efforts might help mitigate the impact of higher oil prices. The proposals put forward have included cooperating in crude procurement to strengthen their bargaining power and secure better prices, coordinating efforts to integrate alternative and renewable energy sources into the regional energy supply chain, undertaking feasibility studies on oil stockpiles, cooperating closely to maintain the stability of the energy market, preparing contingencies for supply disruptions, and carrying out exploration for oil and gas jointly. However, these have remained mostly proposals without any concrete follow-up action.

A3.109 In Latin America and the Caribbean region, the Mexican-sponsored Mesoamerican energy initiative is gaining momentum, in part in response to rising world oil prices. Venezuela has initiated bilateral as well as regional initiatives, and an agreement for PetroCaribe, a flagship program involving 14 Caribbean countries, was signed in September 2005.

A3.110 Under PetroCaribe, Venezuela provides crude and petroleum products under concessionary terms. The program will provide 190,000 barrels per day of liquid fuels for purchase, with an eventual target of 300,000 daily barrels (*Business News Americas* 2006d). Under the terms of the agreement, Caribbean countries can defer payments for 30 percent of their imports for 15 years at an annual interest rate of 2 percent, and if the price of oil rises above US$50 per barrel, the interest rate is halved to 1 percent with payment for 40 percent of the imports being spread over 25 years. Venezuela has also said that it would accept agricultural products such as rice or bananas as partial payments, or even human services, in the same way Cuba has paid most of its fuel bill by sending teachers and doctors to Venezuela.

A3.111 Trinidad and Tobago and Barbados, who have not yet signed the agreement, have raised questions about the legality of PetroCaribe. According to a 1973 treaty of the 15-member Caribbean Community (Caricom), the Caribbean Community Secretariat must certify that any new accord does not place one of its members at a disadvantage. The two countries said that the treaty put them at a disadvantage and have not joined PetroCaribe. Trinidad and Tobago has historically been the region's main fuel supplier. Caricom members have been in discussion to assess if the execution of the Petrocaribe trade agreement with Venezuela infringes the rules of the trade block. The question is whether Trinidad and Tobago would be adversely affected by other countries buying petroleum products from outside the region when Trinidad already sells oil to some states. Trinidad and Tobago has warned that implementation of PetroCaribe may mean that it would find alternative markets, and would not be able to offer guarantees to any Caricom member state attempting to resume fuel purchase from Trinidad and Tobago.

A3.112 In addition, some Caricom officials say that they are unsure whether a 10–20 percent import tax should be applied to the Venezuela oil, as is the case for most imports coming from outside the region. If an import tax is added, then the price per barrel would increase, possibly nullifying all or most of the financial advantages gained from Petrocaribe. In May 2006, however, Trinidad and Tobago announced that it would agree to suspension of Caricom's common external tariff on petroleum products in support of the PetroCaribe agreement (*Oil and Gas Journal* 2006).

A3.113 Some of the countries that are participating in Petrocaribe still need to draft individual supply contracts with PdVSA, which in most cases must also be approved by the legislature in each country. There are also logistical problems in transporting fuel out of Venezuela as well as importing fuels into the Caribbean countries, slowing fuel delivery. One element of the arrangement is that the domestic storage facility must be owned by a state entity, either on its own or in collaboration with PdVSA. PdVSA is investing in new storage capacity for fuel and crude in the Caribbean. A shortage of storage capacity has been identified by PdVSA as the most serious implementation challenge to PetroCaribe (*Business News Americas* 2006g).

A3.114 Venezuela has indicated that the PetroCaribe accord could be extended to any interested Central American countries. Central America has selected to go with the Mesoamerican energy initiative. However, with continuing surges in world oil prices, individual Central American countries, at national and sub-national levels, have approached Venezuela in 2006, striking deals similar to the terms of PetroCaribe in some cases. Haiti formally joined PetroCaribe in May 2006. PdVSA announced in June 2006 that PetroCaribe assistance would be expanded to include electricity generation, following the assistance already given to Antigua & Barbuda (*Business News Americas* 2006h).

Annex 4

Price and Macroeconomic Data

A4.1 This annex gives details on the prices and pass throughs discussed in chapter 3. It also gives the macroeconomic variables used in the regression analysis.

Prices

A4.2 Attempts were made to obtain retail prices of regular gasoline and diesel in January 2004 and April 2006. The results are summarized in Table A4.1 and Table A4.2. For some countries it was not possible to obtain price information for these two months, and hence the tables indicate the number of months covered for each data set. It is important to note that fuel quality varies markedly from country to country, not only in terms of octane (for gasoline) or cetane (for diesel), but also in terms of other fuel parameters—most notably the level of sulfur where industrial countries are moving to "sulfur-free" gasoline and diesel while some developing countries have sulfur levels as high as 1 percent in diesel—and hence these prices are not necessarily directly comparable across countries.

A4.3 Most recent retail prices of gasoline, diesel, and kerosene where all three prices are available, or gasoline and diesel where kerosene prices are not available are shown in Table A4.3. Calculated ratios of prices are also shown. Since product prices are broadly comparable net of taxes, large deviations from unity reflect taxation and subsidy policies of the respective governments.

Table A4.1 Retail Prices of Gasoline in Current US$

Country	*Month*	*US$/liter*	*Month*	*US$/liter*	*Number of months*
Argentina[a]	Jan-04	0.63	Feb-06	0.61	25
Bangladesh	Jan-04	0.56	Apr-06	0.65	27
Brazil[b]	Jan-04	0.43	Apr-06	0.72	27
Cambodia[c]	Nov-04	0.79	May-06	1.01	18
Cameroon	Mar-04	0.84	Apr-06	1.05	25
Chile	Jan-04	0.72	Apr-06	1.13	27
China	Jan-04	0.36	Apr-06	0.53	27

Country	*Month*	*US$/liter*	*Month*	*US$/liter*	*Number of months*
Egypt	Jan-04	0.16	Apr-06	0.17	27
Ethiopia	Jan-04	0.51	Apr-06	0.63	27
Ghana[c]	Jan-04	0.51	Apr-06	0.85	27
Guatemala	Jan-04	0.49	Apr-06	0.80	27
Honduras	Jan-04	0.70	Apr-06	0.86	27
India	Jan-04	0.74	Apr-06	0.97	27
Indonesia	Jan-04	0.22	Apr-06	0.50	27
Kazakhstan[d]	Nov-04	0.52	Feb-06	0.47	15
Kenya	May-04	0.82	Apr-06	1.04	23
Kyrgyz Republic[e]	Dec-03	0.42	Feb-06	0.48	26
Lao PDR	Jan-04	0.41	Apr-06	0.84	27
Madagascar	May-04	0.80	Apr-06	0.93	23
Malawi	Jan-04	0.81	Apr-06	1.00	27
Malaysia	Jan-04	0.35	Apr-06	0.52	27
Mexico	Jan-04	0.55	Apr-06	0.60	27
Morocco[c]	Aug-04	0.96	Feb-06	1.15	18
Mozambique	Jan-04	0.66	Apr-06	0.91	27
Nicaragua	Jan-04	0.62	Apr-06	0.87	27
Nigeria	Jan-04	0.29	Apr-06	0.51	27
Pakistan[f]	Jan-04	0.59	Apr-06	0.94	27
Philippines	Jul-04	0.45	Apr-06	0.74	21
Rwanda[c]	Jan-04	0.81	Apr-06	1.10	27
Senegal[c]	Nov-04	1.09	Apr-06	1.16	17
Sri Lanka	Jan-04	0.54	Apr-06	0.86	27
Tanzania	Jan-04	0.65	Apr-06	1.03	27
Thailand	Jan-04	0.42	Apr-06	0.73	27
Tunisia	Feb-04	0.63	Apr-06	0.72	26
Uganda	Jan-04	0.85	Apr-06	1.20	27
Venezuela	Jan-04	0.04	Apr-06	0.03	27
Vietnam	Jan-04	0.34	Apr-06	0.58	27
Zambia	Jan-04	0.83	Apr-06	1.56	27
Canada	Jan-04	0.57	Apr-06	0.92	27
France[b]	Jan-04	1.26	Apr-06	1.57	27
Germany[b]	Jan-04	1.35	Apr-06	1.62	27
Japan	Jan-04	0.99	Apr-06	1.11	27

Country	*Month*	*US$/liter*	*Month*	*US$/liter*	*Number of months*
United Kingdom[b]	Jan-04	1.36	Apr-06	1.65	27
United States	Jan-04	0.41	Apr-06	0.73	27

Sources: News reports, government data, and local information.
[a] Midgrade (super) gasoline with 93 RON.
[b] Ex-refinery prices for gasolina A (pure gasoline) inclusive of all taxes except sales tax. Gasolina A is blended with ethanol at 20–25 percent before sale at retail.
[c] Super or premium gasoline.
[d] Premium gasoline price in November 2004, A-80 (motor octane number of 80) gasoline in Almaty in February 2006.
[e] A-80 gasoline.
[f] Notified ex-depot prices.

Table A4.2 Retail Prices of Diesel in Current US$

Country	*Month*	*US/liter*	*Month*	*US/liter*	*Number of months*
Argentina	Jan-04	0.47	Feb-06	0.47	25
Bangladesh	Jan-04	0.34	Apr-06	0.43	27
Brazil[a]	Jan-04	0.34	Apr-06	0.63	27
Cambodia	Nov-04	0.61	May-06	0.77	18
Cameroon	Mar-04	0.71	Mar-06	0.97	24
Chile	Jan-04	0.48	Apr-06	0.83	27
China	Jan-04	0.37	Apr-06	0.52	27
Egypt	Jan-04	0.10	Apr-06	0.10	27
Ethiopia	Jan-04	0.32	Apr-06	0.50	27
Ghana	Jan-04	0.44	Apr-06	0.78	27
Guatemala	Jan-04	0.37	Apr-06	0.67	27
Honduras	Jan-04	0.52	Apr-06	0.76	27
India	Jan-04	0.48	Apr-06	0.68	27
Indonesia	Jan-04	0.20	Apr-06	0.48	27
Kazakhstan	Nov-04	0.38	—	—	—
Kenya	May-04	0.64	Apr-06	0.88	23
Kyrgyz Republic	Oct-04	0.39	Feb-06	0.48	16
Lao PDR	Jan-04	0.37	Apr-06	0.74	27
Madagascar	May-04	0.60	Apr-06	0.91	23
Malawi	Jan-04	0.74	Apr-06	0.99	27
Malaysia	Jan-04	0.20	Apr-06	0.43	27
Mexico	Jan-04	0.46	Apr-06	0.49	27
Morocco	Aug-04	0.64	Feb-06	0.82	18

Country	*Month*	*US/liter*	*Month*	*US/liter*	*Number of months*
Mozambique	Jan-04	0.57	Apr-06	0.82	27
Nicaragua	Jan-04	0.52	Apr-06	0.75	27
Nigeria	Nov-04	0.45	Apr-06	—	—
Pakistan[b]	Jan-04	0.40	Apr-06	0.62	27
Philippines	Jul-04	0.35	Apr-06	0.66	21
Rwanda	May-04	0.83	Apr-06	1.08	23
Senegal	Nov-04	0.89	Apr-06	1.00	17
Sri Lanka	Jan-04	0.33	Apr-06	0.57	27
Tanzania	Jan-04	0.63	Apr-06	1.03	27
Thailand	Jan-04	0.37	Apr-06	0.69	27
Tunisia	Nov-04	0.39	Apr-06	0.48	17
Uganda	Jan-04	0.72	Apr-06	1.07	27
Venezuela	Jan-04	0.03	Apr-06	0.02	27
Vietnam	Jan-04	0.28	Apr-06	0.47	27
Zambia	Jan-04	0.71	Apr-06	1.37	27
Canada	Jan-04	0.54	Apr-06	0.86	27
France	Jan-04	0.85	Apr-06	1.13	27
Germany	Jan-04	0.94	Apr-06	1.19	27
Japan	Jan-04	0.80	Apr-06	0.92	27
United Kingdom	Jan-04	1.19	Apr-06	1.46	27
United States	Jan-04	0.41	Apr-06	0.72	27

Sources: News reports, government data, and local information.
[a] Ex-refinery prices inclusive of all taxes except sales tax.
[b] Ex-depot prices.
— Not available.

Table A4.3 Retail Prices of Gasoline, Diesel, and Kerosene in Local Currency

Country	*Date*	*Gasoline*	*Diesel*	*Kerosene*	*G/D*	*G/K*	*D/K*
Argentina	Dec-05	1.9	1.45	1.44	1.3	1.3	1.0
Bangladesh	May-06	42	30	30	1.4	1.4	1.0
Brazil[a]	Apr-06	1.54	1.36	—	1.1	—	—
Cambodia	May-06	3950	3100	—	1.3	—	—
Cameroon	Apr-06	565	531	360	1.1	1.6	1.5
Chile	Apr-06	586	430	432	1.4	1.4	1.0
China	May-06	4.52	4.62	—	1.0	—	—
Egypt	FY2004	0.93	0.4	0.41	2.3	2.3	1.0

Country	*Date*	*Gasoline*	*Diesel*	*Kerosene*	*G/D*	*G/K*	*D/K*
Ethiopia	May-06	6.58	4.78	3.45	1.4	1.9	1.4
Ghana	May-06	8517	7714	6422	1.1	1.3	1.2
Guatemala	May-06	25.54	20.42	22.16	1.3	1.2	0.9
Honduras	May-06	63.44	56.45	43.17	1.1	1.5	1.3
India	May-06	43.49	31.07	8.91	1.4	4.9	3.5
Indonesia	May-06	4500	4300	—	1.0	—	—
Kenya	Apr-06	74	63	48.5	1.2	1.5	1.3
Kyrgyz Republic	Feb-06	19.7	19.7	—	1.0	—	—
Lao PDR	May-06	8998	7868	—	1.1	—	—
Madagascar	Apr-06	2035	1990	—	1.0	—	—
Malawi	Aug-05	130.4	125.2	102	1.0	1.3	1.2
Malaysia	May-06	1.88	1.581	—	1.2	—	—
Mexico	Apr-06	6.56	5.38	—	1.2	—	—
Morocco	Feb-06	10.51	7.46	7.46	1.4	1.4	1.0
Mozambique	Apr-06	23850	21490	14250	1.1	1.7	1.5
Nicaragua	May-06	64.68	55.09	50.65	1.2	1.3	1.1
Nigeria	May-06	65	75	50	0.9	1.3	1.5
Pakistan[b]	Jun-06	57.7	38.73	35.23	1.5	1.6	1.1
Philippines	May-06	39	35	37.5	1.1	1.0	0.9
Rwanda	Apr-06	607	595	594	1.0	1.0	1.0
Senegal	May-06	650	540	416	1.2	1.6	1.3
Sri Lanka	May-06	88	58	38.5	1.5	2.3	1.5
Tanzania	Apr-06	1.1	1.0	0.95	1.1	1.2	1.1
Thailand	Apr-06	27.54	26.69	26.56	1.0	1.0	1.0
Tunisia	May-06	1.02	0.69	0.49	1.5	2.1	1.4
Uganda	May-06	2300	2050	1850	1.1	1.2	1.1
Venezuela	May-06	70	48	—	1.5	—	—
Vietnam	May-06	10800	7900	7900	1.4	1.4	1.0
Zambia	May-06	4622	4622	3601	1.0	1.3	1.3

Sources: News reports, government data, and local information for prices.
[a] Ex-refinery prices inclusive of all taxes except sales tax.
[b] Notified ex-depot prices.
— Not available. G gasoline, D diesel, K kerosene.

Price Increase Pass through

A4.4 To compute the magnitude of passing-through of the price increases on the international market, international prices were converted to local currencies. The fuel

price increases in local currencies were divided by price increases on the international market coverted to local currencies to arrive at the last two columns of Table A4.4. The same calculations were also performed for several industrial countries, shown at the end of the table.

Table A4.4 Gasoline and Diesel Prices in Local Currency and Pass through

Country	*Gasoline*		*Diesel*		*Pass through*	
	Start	*End*	*Start*	*End*	*Gasoline*	*Diesel*
Argentina	1.87	1.88	1.35	1.44	0.02	0.11
Bangladesh	33	45	20	30	0.79	0.43
Brazil	1.23	1.54	0.96	1.35	0.64	0.84
Cambodia	3,042	4,050	2,349	3,100	1.06	0.93
Cameroon	449	565	382	531	0.91	0.98
Chile	417	586	274	430	1.15	1.11
China	2.98	4.25	3.05	4.17	0.71	0.53
Egypt	1.00	1.00	0.60	0.60	0.00	0.00
Ethiopia	4.40	5.50	2.72	4.31	0.48	0.64
Ghana	4,439	7,744	3,883	7,111	1.33	1.21
Guatemala	4.00	6.08	2.95	5.08	0.93	0.99
Honduras	12.49	16.16	9.20	14.37	0.60	0.87
India	34	43	22	30	1.25	0.66
Indonesia	1,810	4,500	1,650	4,300	1.20	1.02
Kazakhstan	67.6	62.0	49.4			
Kenya	65	74	51	63	0.97	0.79
Kyrgyz Republic	18.40	19.70	16.70	19.70	0.19	2.35
Lao PDR	4,316	8,629	3,849	7,555	1.86	1.35
Madagascar	1,103	2,035	820	1,990	1.46	1.55
Malawi	86.9	134.8	78.4	132.7	1.14	1.22
Malaysia	1.31	1.92	0.76	1.581	0.75	0.84
Mexico	6.05	6.56	5.02	5.38	0.15	0.11
Morocco	8.65	10.51	5.76	7.46	2.51	1.42
Mozambique	15,380	23,850	13,200	21,490	1.10	1.01
Nicaragua	9.51	14.98	8.01	12.89	0.95	0.88
Nigeria	41	65	60		0.78	
Pakistan	33.78	56.29	22.78	37.18	1.98	0.78
Philippines	25.3	38.0	19.8	34.0	1.29	1.30
Rwanda	471	607	482	595	0.98	0.76
Senegal	553	624	452	539	0.68	0.96
Sri Lanka	53	88	32	58	1.80	0.83

Country	*Gasoline*		*Diesel*		*Pass through*	
	Start	*End*	*Start*	*End*	*Gasoline*	*Diesel*
Tanzania	700	1,260	680	1,256	1.57	1.52
Thailand	16.31	28.02	14.55	26.27	1.37	1.15
Tunisia	0.77	0.97	0.48	0.64	0.53	0.66
Uganda	1,640	2,200	1,390	1,950	1.23	1.14
Venezuela	70	70	48	48	0.00	0.00
Vietnam	5,400	9,300	4,400	7,500	1.03	0.70
Zambia	3,931	5,000	3,341	4,403	2.20	1.93
Canada	0.74	1.06	0.69	0.99	1.00	0.96
France	1.00	1.29	0.67	0.93	1.30	1.07
Germany	1.06	1.33	0.74	0.98	1.20	0.98
Japan	105	131	85	108	0.85	0.65
United Kingdom	0.75	0.94	0.65	0.83	1.25	1.08
United States	0.41	0.73	0.41	0.72	1.02	1.05

Sources: News reports, government data, and local information for prices, and authors' calculations for pass through.
Note: For start and end dates for gasoline and diesel prices, see Table A4.1 and Table A4.2.

Macroeconomic Variables

A4.5 The macroeconomic variables that could potentially affect government pricing policies and the extent of pass through in particular are given in Table A4.5 for 2003. Vulnerability was computed by multiplying estimated net oil imports (calculated by taking total product consumption in 2003 and subtracting from it total domestic oil production, excluding natural gas liquids) by the average Brent price for the year of US$28.84 a barrel and dividing by GDP. It is negative for net oil importers. Vulnerability ranged from -6.6 percent (Nicaragua) to 35 percent (Nigeria). Terms of trade are indexed to the calendar year 2000, set equal to 100 in that year. A number of net oil importers experienced improving terms of trade during this period. The ratio of overall fiscal surplus to GDP is negative if there was a deficit. The percentage growth of GDP per capita is expressed in real terms (that is, adjusted for inflation).

Table A4.5 Macroeconomic Variables for 2003

Country	*Vulnerability (%)*	*Terms of trade (2004 = 100)*	*Overall fiscal surplus/GDP (%)*	*GDP p.c. growth (%)*	*Implicit GDP deflator (%)*	*Debt/GDP (%)*	*GDP p.c. (US$)*
Argentina	2.4	106	0.5	7.8	10.5	128.2	3,410
Bangladesh	-1.6	86	—	3.3	4.5	36.1	380
Brazil	-1.3	128	3.8	-0.7	15	46.6	2,788

Country	*Vulnerability (%)*	*Terms of trade (2004 = 100)*	*Overall fiscal surplus/GDP (%)*	*GDP p.c. growth (%)*	*Implicit GDP deflator (%)*	*Debt/GDP (%)*	*GDP p.c. (US$)*
Cambodia	-0.9	101	-7.6	5.2	1.1	72.2	321
Cameroon	3.7	98	2	2.4	1.1	75.5	793
Chile	-3.2	95	-0.4	2.1	4.4	59.8	4,600
China	-1.4	95	-2.8	8.6	2.1	13.6	1,274
Egypt	0.7	—	-6.2	1.4	3.8	38.1	1,164
Ethiopia	-4.4	78	-10.7	10.9	12.5	112.3	95
Ghana	-4.4	99	-2.8	3.3	28.7	104.4	359
Guatemala	-1.9	101	-1.6	-0.5	5.7	20.6	2,061
Honduras	-5.7	—	-4.1	0.9	7.7	82.1	996
India	-2.9	94	-9.3	7	3.2	19.2	564
Indonesia	0.0	93	-1.7	3.5	4.7	56.6	1,111
Kazakhstan	22.9	84	2	8.9	11.7	74.2	2,068
Kenya	-3.6	87	-3.6	0	11.4	47.9	459
Kyrgyz Republic	-4.9	106	-4.7	6.1	4	103.3	381
Lao PDR	-1.5	109	-5.9	3.4	15.7	133.6	371
Madagascar	-2.9	164	-6.7	6.8	2.8	90.5	311
Malawi	-3.3	101	-17.3	4	9.2	177.6	143
Malaysia	2.3	102	-5.3	3.5	3.4	47.2	4,254
Mexico	2.2	102	-0.7	-0.1	8.5	22	6,248
Morocco	-3.8	99	-5.6	3.6	0	43.2	1,521
Mozambique	-2.4	112	-11	5.1	12.6	114.1	251
Nicaragua	-6.6	84	-6.7	-0.3	6.9	167.2	788
Nigeria	34.9	97	-1.3	8	20.8	60	463
Pakistan	-3.6	84	—	2.5	4.4	43.6	555
Philippines	-4.4	—	-4.7	1.6	2.7	80.7	969
Rwanda	-3.8	72	-2.5	-1.8	8.7	91.5	192
Senegal	-4.4	107	-3	4	0.9	68.1	675
Sri Lanka	-4.6	109	-8.3	4.8	5	56.1	948
Tanzania	-2.2	94	-8	5	5.7	73	279
Thailand	-4.8	90	0.3	6.2	1.9	36.1	2,263
Tunisia	-0.6	103	-3.2	4.4	2.2	62.3	2,541
Uganda	-1.7	88	-10.8	1.9	10.1	72.3	233
Venezuela	22.8	80	—	-9.3	34.9	41.8	3,250
Vietnam	3.6	105	-2	6.2	6.7	39.9	488

Country	*Vulnerability (%)*	*Terms of trade (2004 = 100)*	*Overall fiscal surplus/GDP (%)*	*GDP p.c. growth (%)*	*Implicit GDP deflator (%)*	*Debt/GDP (%)*	*GDP p.c. (US$)*
Zambia	-3.0	109	-12.7	3.5	20.1	148.2	384

Sources: World Bank 2006e, EIA 2005a, authors' calculations.
p.c. per capita, — not available.

Regression Results

A4.6 The results of regressing the magnitude of pass through shown in Table A4.4 as a dependent variable on the macroeconomic variables in Table A4.5 are presented for gasoline and diesel in Table A4.6 and Table A4.7, respectively. Only those coefficients where the t-statistic was greater than 2 are shown (barring the constant).

Table A4.6 Regression Results for Gasoline

Independent variable	*Coefficient*	*Standard error*	*t-Statistic*	*Probability*
Constant	1.2	0.091	13	0.0000
Dummy for net oil exporter	-0.80	0.19	-4.2	0.0003

Note: R-squared 0.37

Table A4.7 Regression Results for Diesel

Independent variable	*Coefficient*	*Standard error*	*t-Statistic*	*Probability*
Constant	-0.046	0.36	-0.13	0.900
Terms of trade	0.0085	0.0036	2.4	0.025
Debt/GDP	0.0028	0.0014	2.0	0.053
Dummy for net oil exporter	-0.51	0.15	-3.4	0.003

Note: R-squared 0.51

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LIST OF FORMAL AND ENHANCED REPORTS ON COMPLETED ACTIVITIES

Region/Country	*Activity/Report Title*	*Date*	*Number*
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	--
	Francophone Household Energy Workshop (French)	08/89	--
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	--
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercilizing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
	Africa Gas Initiative – Main Report: Volume I	02/01	240/01
	First World Bank Workshop on the Petroleum Products Sector in Sub-Saharan Africa	09/01	245/01
	Ministerial Workshop on Women in Energy	10/01	250/01
	Energy and Poverty Reduction: Proceedings from a Multi-Sector And Multi-Stakeholder Workshop Addis Ababa, Ethiopia, October 23-25, 2002.	03/03	266/03
	Opportunities for Power Trade in the Nile Basin: Final Scoping Study	01/04	277/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Dakar, Sénégal, du 4 au 6 février 2003 (French Only)	01/04	278/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Douala, Cameroun du 16-18 juillet 2003. (French Only)	09/04	286/04
	Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshops held in Africa	01/05	298/05
	Power Sector Reform in Africa: Assessing the Impact on Poor People	08/05	306/05
	The Vulnerability of African Countries to Oil Price Shocks: Major Factors and Policy Options. The Case of Oil Importing Countries	08/05	308/05
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	Power Rehabilitation and Technical Assistance (English)	10/91	142/91
	Africa Gas Initiative – Angola: Volume II	02/01	240/01
Benin	Energy Assessment (English and French)	06/85	5222-BEN
Botswana	Energy Assessment (English)	09/84	4998-BT
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	--
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU
	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five-Year Plan		

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Burundi	(1983-1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cameroon	Africa Gas Initiative – Cameroon: Volume III	02/01	240/01
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessment (French)	08/92	9898-CAR
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
	In Search of Better Ways to Develop Solar Markets: The Case of Comoros	05/00	230/00
Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
	Africa Gas Initiative – Congo: Volume IV	02/01	240/01
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87
	Power System Efficiency Study (English)	12/87	--
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95
	Africa Gas Initiative – Côte d'Ivoire: Volume V	02/01	240/01
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	--
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
	Africa Gas Initiative – Gabon: Volume VI	02/01	240/01
The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
	Corporatization of Distribution Concessions through Capitalization	12/03	272/03
Guinea	Energy Assessment (English)	11/86	6137-GUI
	Household Energy Strategy (English and French)	01/94	163/94
Guinea-Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
Kenya	Energy Assessment (English)	05/82	3800-KE
	Power System Efficiency Study (English)	03/84	014/84
	Status Report (English)	05/84	016/84
	Coal Conversion Action Plan (English)	02/87	--
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87

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Kenya	Power Master Plan (English)	11/87	--
	Power Loss Reduction Study (English)	09/96	186/96
	Implementation Manual: Financing Mechanisms for Solar Electric Equipment	07/00	231/00
Lesotho	Energy Assessment (English)	01/84	4676-LSO
Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-MAG
	Power System Efficiency Study (English and French)	12/87	075/87
	Environmental Impact of Woodfuels (French)	10/95	176/95
Malawi	Energy Assessment (English)	08/82	3903-MAL
	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
Mali	Energy Assessment (English and French)	11/91	8423-MLI
	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-MAU
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-MAS
	Status Report (English)	10/83	008/83
	Power System Efficiency Audit (English)	05/87	070/87
	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-MAS
Mozambique	Energy Assessment (English)	01/87	6128-MOZ
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	Sample Survey of Low Voltage Electricity Customers	06/97	195/97
Namibia	Energy Assessment (English)	03/93	11320-NAM
Niger	Energy Assessment (French)	05/84	4642-NIR
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87
	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-UNI
	Strategic Gas Plan	02/04	279/04
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91
SADC	SADC Regional Power Interconnection Study, Vols. I-IV (English)	12/93	-
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	-
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP
Senegal	Energy Assessment (English)	07/83	4182-SE
	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
	Preparatory Assistance for Donor Meeting (English and French)	04/86	056/86

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	Industrial Energy Conservation Program (English)	05/94	165/94
Seychelles	Energy Assessment (English)	01/84	4693-SEY
	Electric Power System Efficiency Study (English)	08/84	021/84
Sierra Leone	Energy Assessment (English)	10/87	6597-SL
Somalia	Energy Assessment (English)	12/85	5796-SO
Republic of South Africa	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95
Sudan	Management Assistance to the Ministry of Energy and Mining	05/83	003/83
	Energy Assessment (English)	07/83	4511-SU
	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87
Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
	Remote Sensing and Mapping of Woodlands (English)	06/90	--
	Industrial Energy Efficiency Technical Assistance (English)	08/90	122/90
	Power Loss Reduction Volume 1: Transmission and Distribution System Technical Loss Reduction and Network Development (English)	06/98	204A/98
	Power Loss Reduction Volume 2: Reduction of Non-Technical Losses (English)	06/98	204B/98
Togo	Energy Assessment (English)	06/85	5221-TO
	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
	Power Efficiency Improvement (English and French)	12/87	078/87
Uganda	Energy Assessment (English)	07/83	4453-UG
	Status Report (English)	08/84	020/84
	Institutional Review of the Energy Sector (English)	01/85	029/85
	Energy Efficiency in Tobacco Curing Industry (English)	02/86	049/86
	Fuelwood/Forestry Feasibility Study (English)	03/86	053/86
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	Tobacco Curing Pilot Project (English)	03/89	UNDP Terminal Report
	Energy Assessment (English)	12/96	193/96
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Zaire	Energy Assessment (English)	05/86	5837-ZR
Zambia	Energy Assessment (English)	01/83	4110-ZA
	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
	Power Subsector Efficiency Study (English)	02/89	093/88
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	Urban Household Energy Strategy Study (English)	08/90	121/90
Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
	Power System Efficiency Study (English)	06/83	005/83
	Status Report (English)	08/84	019/84
	Power Sector Management Assistance Project (English)	04/85	034/85
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	Petroleum Management Assistance (English)	12/89	109/89

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	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	--
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	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
	Energy Efficiency and Pollution Control in Township and Village Enterprises (TVE) Industry (English)	11/94	168/94
	Energy for Rural Development in China: An Assessment Based on a Joint Chinese/ESMAP Study in Six Counties (English)	06/96	183/96
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	Air Pollution and Acid Rain Control: The Case of Shijiazhuang City and the Changsha Triangle Area	10/03	267/03
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Indonesia	Energy Assessment (English)	11/81	3543-IND
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	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
	Diesel Generating Plant Efficiency Study (English)	12/88	095/88
	Urban Household Energy Strategy Study (English)	02/90	107/90
	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90
	Prospects for Biomass Power Generation with Emphasis on Palm Oil, Sugar, Rubberwood and Plywood Residues (English)	11/94	167/94
Lao PDR	Urban Electricity Demand Assessment Study (English)	03/93	154/93
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Papua New Guinea	Energy Assessment (English)	06/82	3882-PNG
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	Energy Assessment (English)	01/92	979-SOL
South Pacific	Petroleum Transport in the South Pacific (English)	05/86	--
Thailand	Energy Assessment (English)	09/85	5793-TH
	Rural Energy Issues and Options (English)	09/85	044/85
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	Northeast Region Village Forestry and Woodfuels Preinvestment Study (English)	02/88	083/88
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	Assessment of Photovoltaic Programs, Applications, and Markets (English)	10/89	103/89
	National Household Energy Survey and Strategy Formulation Study: Project Terminal Report (English)	03/94	--
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	Power System Loss Reduction Study (English)	07/83	007/83
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	The Future of Natural Gas in Eastern Europe (English)	08/92	149/92
Kazakhstan	Natural Gas Investment Study, Volumes 1, 2 & 3	12/97	199/97
Kazakhstan & Kyrgyzstan	Opportunities for Renewable Energy Development	11/97	16855-KAZ
Poland	Energy Sector Restructuring Program Vols. I-V (English)	01/93	153/93
	Natural Gas Upstream Policy (English and Polish)	08/98	206/98
	Energy Sector Restructuring Program: Establishing the Energy Regulation Authority	10/98	208/98
Portugal	Energy Assessment (English)	04/84	4824-PO
Romania	Natural Gas Development Strategy (English)	12/96	192/96
	Private Sector Participation in Market-Based Energy-Efficiency Financing Schemes: Lessons Learned from Romania and International Experiences.	11/03	274/03
Slovenia	Workshop on Private Participation in the Power Sector (English)	02/99	211/99
Turkey	Energy Assessment (English)	03/83	3877-TU
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Arab Republic of Egypt	Energy Assessment (English)	10/96	189/96
	Energy Assessment (English and French)	03/84	4157-MOR
	Status Report (English and French)	01/86	048/86
Morocco	Energy Sector Institutional Development Study (English and French)	07/95	173/95
	Natural Gas Pricing Study (French)	10/98	209/98
	Gas Development Plan Phase II (French)	02/99	210/99
Syria	Energy Assessment (English)	05/86	5822-SYR
	Electric Power Efficiency Study (English)	09/88	089/88
	Energy Efficiency Improvement in the Cement Sector (English)	04/89	099/89
	Energy Efficiency Improvement in the Fertilizer Sector (English)	06/90	115/90
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	Renewable Energy Strategy Study, Volume I (French)	11/96	190A/96
	Renewable Energy Strategy Study, Volume II (French)	11/96	190B/96
	Rural Electrification in Tunisia: National Commitment, Efficient Implementation and Sound Finances	08/05	307/05

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Yemen	Energy Assessment (English)	12/84	4892-YAR
	Energy Investment Priorities (English)	02/87	6376-YAR
	Household Energy Strategy Study Phase I (English)	03/91	126/91
	Household Energy Supply and Use in Yemen. Volume I: Main Report and Volume II: Annexes	12/05	315/05

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	Energy Efficiency Report for the Commercial and Public Sector (English)	06/96	184/96
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Ecuador	Energy Assessment (Spanish)	12/85	5865-EC
	Energy Strategy Phase I (Spanish)	07/88	--
	Energy Strategy (English)	04/91	--
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