The Energy Subsidy Reform Assessment Framework (ESRAF)

GUIDANCE NOTES

Toward Evidence-Based Energy Subsidy Reforms

WORLD BANK GROUP

ESMAP

OVERVIEW NOTE

Guidance for Comprehensive Energy Subsidy Reforms

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ACKNOWLEDGMENTS

This is an Overview of the Energy Sector Reform Assessment Framework (ESRAF), an initiative of the Energy Sector Management Assistance Program (ESMAP) of the World Bank. ESRAF consists of 10 guidance notes, which provide a guide to analyzing energy subsidies, assessing the impacts of subsidy reform and understanding the political context for subsidy reform in developing countries.

ESRAF was produced by a team led by Thomas Flochel and Sudarshan Gooptu. The principal authors of the Guidance Notes are Sandra Bernick, Arlan Brucal, Andrew Burns, Ezgi Canpolat, Calvin Djiofack, Santiago Enriquez, Thomas Flochel, Verena Fritz, Sophia Georgieva, Sudarshan Gooptu, Leonardo Iacovone, Gabriela Inchauste, Masami Kojima, Caterina Ruggeri Laderchi, Bjorn Larsen, Amr Moubarak, Anne Olivier, Dinar Prihardini, Ernesto Sanchez Triana, Eva Schiffer, David Victor, Heather Worley, and Ruslan Yemtsov. The authors are indebted to Masami Kojima whose careful review of all notes and incisive comments have greatly improved the coherence of the framework.

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ACRONYMS AND ABBREVIATIONS

CGE	computable general equilibrium (models)
ESMAP	Energy Sector Management Assistance Program
ESRAF	Energy Subsidy Reform Assessment Framework
LPG	liquefied petroleum gas

INTRODUCTION

Countries around the world are finding that energy subsidies can threaten their economic, fiscal, and environmental health. The benefits of energy subsidies are often captured largely by higher-income groups and specific industries. Subsidies can create budget pressures on governments—pressure that can even reach crippling levels over time. In some countries, spending on subsidies represents an unacceptably high proportion of government revenue. Energy subsidies tend to grow and shrink with world fuel prices, making them unpredictable and difficult to manage. Price distortions in the energy sector can jeopardize its financial sustainability and deter investment. When they keep prices of fossil fuels artificially low in the form of consumer price subsidies, subsidies increase their consumption, thereby contributing to pollution and greenhouse gas emissions. According to one estimate, global fossil fuel subsidies in 2015 totaled US$322 billion, nearly double the global subsidies to renewable energy in that year (IEA 2016).

In recent years, many countries have taken advantage of low world oil prices to tackle consumer price subsidies in the energy sector. The landmark voluntary commitments by governments in Paris to address climate change have also highlighted concerns about greenhouse gas emissions from the combustion of fossil fuels, to which consumer price subsidies contribute. At least 11 countries—Arab Republic of Egypt, Ethiopia, Ghana, India, Islamic Republic of Iran, Kuwait, Morocco, Rwanda, Togo, the United Arab Emirates, and Vietnam—have formally committed to fossil fuel subsidy reforms in their intended nationally determined contributions.[1] A number of countries, including several that include fossil fuel subsidy reforms in their intended nationally determined contributions, have energy subsidy policies that have been entrenched for decades, and they find it difficult to navigate through the politically sensitive paths of reforms.

The *Energy Subsidy Reform Assessment Framework* (ESRAF) proposes a guide to analyzing energy subsidies, the impacts of subsidies and their reforms, and the political context for reform in developing countries. Reforming energy subsidies in a sustainable and socially responsible way requires a clear understanding of a range of economic, financial, social, and political factors. Subsidies have implications for the health of the energy sector, the affordability as well as the quality of energy service delivery, and the government's fiscal position and debt sustainability. They affect people's livelihoods, firms' competitiveness, macroeconomic stability, and the environment.

The impacts of reforming energy subsidies are interconnected, and are therefore best examined in a comprehensive framework. Where energy subsidies keep prices artificially low, subsidy reforms will likely increase energy prices. Other forms of subsidies, however, may have no obvious effects on prices, at least in the near term, while subsidies to protect energy producers may even raise, rather than lower, prices charged to consumers. The impact of reforming energy subsidies on households and firms therefore varies considerably depending on the type of subsidy and how it is administered. Similarly, subsidy reforms vary in their ability to generate the savings governments can use to compensate affected

households or firms, or redirect to other priority programs in the government budget. The political environment for reform is affected by who benefits from as well as who is harmed by the subsidy regime, and how the distribution of benefits and disbenefits are perceived. Energy subsidies in developing countries tend to benefit the rich disproportionately, but to the extent that consumer price subsidies are considered essential for making energy affordable for the poor, they may be seen as vital and their removal opposed by many. As such, a government's ability to deliver a coherent communication campaign is crucial to a reform's success, and coordination among policy makers from different government ministries is essential for reforms to be well rounded.

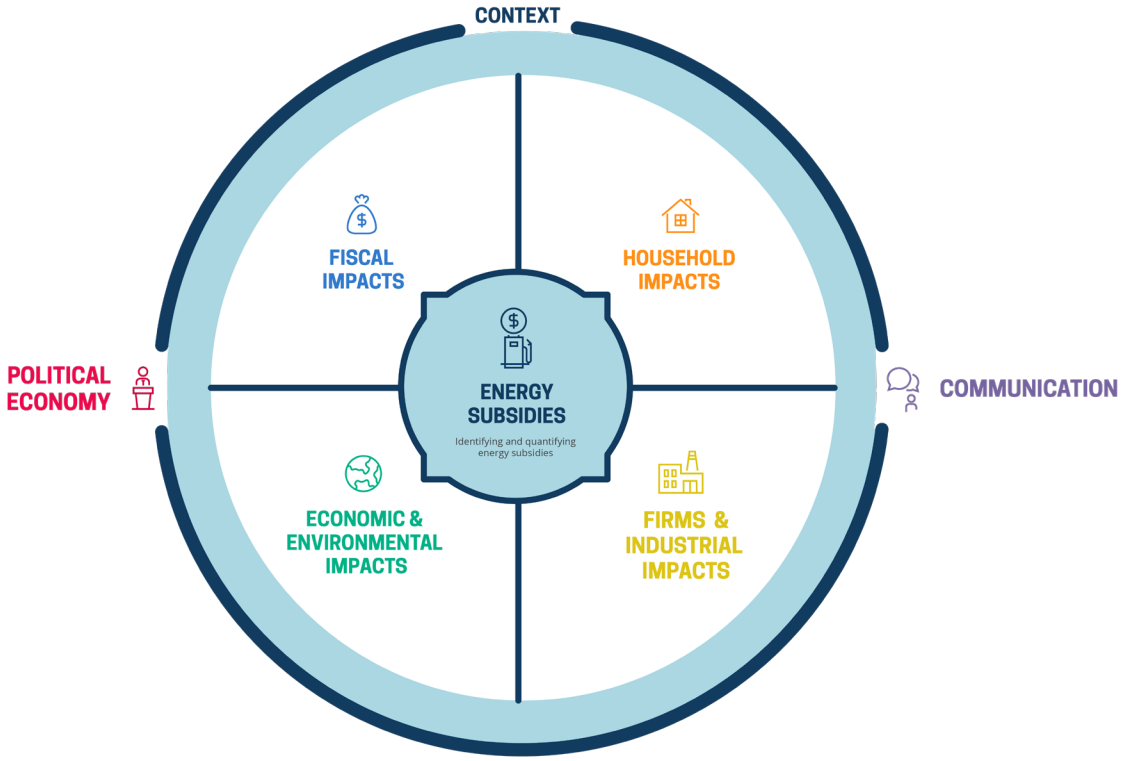
SCOPE OF THE FRAMEWORK

ESRAF is intended for use in developing countries and covers subsidy reforms for fossil fuels (oil, natural gas, and coal), electricity, and district heating. Subsidies for renewable energy are covered only as part of overall subsidies for electricity, and are otherwise excluded. To be useful in a wide spectrum of contexts, each guidance note is general and modular. Each guidance note flags where other sectoral experts may provide data, where other notes may provide the analysis needed as an input, and where coordination with other experts may be necessary to complete the analysis. Guidance on how to deal with regional specificities—such as varying data quality and availability—is covered to the extent possible, and illustrative examples are provided. The modular structure also enables users to focus on areas of priority in their context and areas of specialization.

Given the economic, sectoral, and political diversity, ESRAF is, by design, focused on analysis, rather than policy recommendations. Policy recommendations need to be specific to each country and the sectors affected, with due consideration to the country's political, business, and economic environment at the time. ESRAF provides the set of tools to design and prioritize reforms in the light of an assessment of their interconnected impacts.

The notes are meant to be "living documents" and will be updated from time to time; later versions may capture some of the topics not yet fully covered. Areas only tangentially touched upon in ESRAF include complementary measures to help energy consumers cope with higher prices. Decreasing energy consumption through demand management and energy efficiency improvement may play an essential role, and the government may also consider, on a temporary basis, targeted subsidies outside the energy sector, such as passenger transport. Further, energy subsidy reforms are often undertaken within the context of a broader reform of the energy sector. Energy sector reforms are a vast and complex topic, which is beyond the scope of ESRAF, but it is important to understand the reform context and the role that reforming subsidies plays in reaching the objectives of the sector reform.

FIGURE O.1: Energy Subsidy Reform Assessment Framework: Energy Subsidies, Impacts, and the Context of Reform



STRUCTURE OF THE FRAMEWORK

Figure O.1 shows the areas covered in the 10 guidance notes of ESRAF:

Energy Subsidies:

1 | ***Identifying and Quantifying Energy Subsidies.*** The starting point for any reform is to understand the types and magnitude of energy subsidies.

Fiscal Impacts:

2 | ***Assessing the Fiscal Cost of Subsidies and Fiscal Impact of Reform.*** These subsidies often imply budgetary risks related to both direct fiscal costs and debt sustainability. The note discusses how to model and project fiscal scenarios following reform.

Household Impacts:

3 | ***Analyzing the Incidence of Price Subsidies and the Impact of Reform on Households:*** Quantitative Analysis. How price subsidies flowing to households are distributed by income and other indicators, and how consumer price subsidy reform may affect households, depend on the consumption patterns of households. The note discusses the data and tools available to conduct the analysis.

4 | ***Analyzing the Incidence of Price Subsidies and the Impact of Reform on Households***: Qualitative Analysis. Asking energy consumers about how they perceive the benefits and disbenefits of consumer price subsidies and their reforms, and how they may change their behavior and energy purchase patterns

in response to reform, will yield valuable information. As with Note 3, an important criterion is selecting different income groups and those who are considered particularly vulnerable.

5 | ***Assessing the Readiness of Social Safety Nets to Mitigate the Impact of Higher Prices.*** Where subsidy removal results in price increases, governments need to be able to rely on their social safety net infrastructure to assist vulnerable segments of the population.

Firm and Industrial Impacts:

6 | ***Identifying the Impacts of Higher Energy Prices on Firms and Industrial Competitiveness.*** Globally, more energy is consumed by firms than by any other consumer category. Ensuring the competitiveness of suppliers of goods and services is among the frequently cited objectives of consumer price subsidies. Higher energy prices from price subsidy reforms will have different short-term effects depending the characteristics of those firms, while the efficiency of the affected firms that outlive the subsidy reforms is likely to increase in the medium to long term.

Economic and Environmental Impacts:

7 | ***Modeling Macroeconomic Impacts and Global Externalities.*** Impacts on households and production sectors can be combined to explore the macroeconomic effects of higher energy prices. Macroeconomic models, such as general equilibrium models, offer a way of projecting some of the economywide impacts of reform on economic growth and inflation, as well as changes in the country's greenhouse gas emissions.

8 | ***Assessing the Local Environmental Externalities of Consumer Price Subsidies.*** Where energy subsidies lead to overconsumption of fossil fuels or lower fuel quality and increase emissions of harmful pollutants, subsidies aggravate air pollution with associated public health effects in the form of premature deaths and illnesses.

Political Economy:

9 | ***Understanding the Political Economy of Reform.*** A good understanding of the historical and political context of subsidy reforms is essential to their successful design.

Communication:

10 | ***Designing Communications Campaigns for Energy Subsidy Reform.*** A well-designed communications strategy can reduce the political risk of reform and enhance the conditions for success.

It is important to stress that energy subsidies are not synonymous with lower prices, and subsidy reforms do not always lead to higher energy prices. However, because consumer price subsidies—whereby prices charged to consumers are kept artificially low—are usually the most visible form of subsidy and create large economic distortions, Notes 3–8 focus primarily or even exclusively on this form of subsidy. It is nevertheless important to bear in mind that other less visible forms of subsidies can also be large and damaging, while escaping public scrutiny and attention from policy makers.

The next section summarizes the main issues covered in each note. It is followed by a user guide for the framework. At the end of this note, a checklist that can be used in a rapid

assessment is proposed. It aims to guide the production of diagnostic reports that will help provide the analytical base to decide how to sequence and prioritize various aspects of a reform.

EXECUTIVE SUMMARY

ENERGY SUBSIDIES

This note defines an *energy subsidy* as a deliberate policy action by a government that specifically targets electricity, fossil fuels, or district heating and that has one or more of the following effects:

- Reducing the net cost of energy purchased
- Reducing the cost of energy production or delivery
- Increasing revenues retained by energy producers and suppliers

Fossil fuels comprise crude oil and various petroleum products, including kerosene, gasoline, diesel, and fuel oil; liquefied petroleum gas (LPG); natural gas; and coal. Although the focus of ESRAF is primarily on energy use of fuels, where they are used as feedstocks, such subsidies are also covered. Examples include natural gas as a feedstock for fertilizer manufacture and LPG used in petrochemicals.

Subsidies can be provided through four main channels. Some attract much attention—with price controls arguably being the most visible of all—while others, such as tax expenditures and shifting of risk burdens, are seldom, if ever, reported, let alone scrutinized. The latter are difficult to identify, and a lack of scrutiny in turn helps perpetuate and even increase these forms of subsidies. The different types of subsidies can also be categorized as consumer support, producer support, and general services support (not specifically benefiting an identified group). Whichever way one chooses to categorize energy subsidies, the eventual goal is to capture all types of subsidies in a unified framework, as follows:

1 |	Direct transfer of government funds	• Direct transfers to energy producers • Cash transfers to consumers, where transfers are directly linked to energy consumption
2 |	Government-induced transfers between producers and consumers	• Prices or price ceilings set by the government • Domestic price effects of restricting import or export of energy • Cross-subsidies among consumers or among different forms of energy • Mandate to purchase or supply a specific form of energy

3 |	Forgone government revenue	• Tax expenditure (such as corporate income tax reduction and sales tax waiver) • Other forgone fiscal revenues (such as royalties and production share in upstream oil and gas production) • Lower government revenue from energy suppliers: Where energy suppliers are absorbing subsidies, dividends from state-owned energy companies and corporate income tax from all energy suppliers would be lower than in the absence of subsidies
4 |	Underpricing of other goods and services, including risk	• Subsidized inputs, such as fuels and water • Lending and credit (loan guarantees, below-market provision of loans) • Goods and services provided by government (such as underpricing of access to government land) • Shifting of risk burdens (government assumption of price, safety, and other risks; consumer or resident assumption of risks through limits on commercial viability) • Special treatment of state-owned energy enterprises enabling undue risk-taking, amplified by soft budget constraints

Who pays for the subsidies is an important driver of how likely they are to be retained or reformed. While governments are often assumed to be paying for subsidies, that is not necessarily the case, and not grasping who pays, directly or ultimately, can lead to flawed analysis and misguided policy conclusions. The subsidies are paid for by the following:

- *Taxpayers* who pay for on and off-budget transfers, either today or in the future, or make up for lower fiscal revenue due to producer support or higher cost of government borrowing due to debt forgiveness caused by subsidies
- *Energy consumers* who pay higher prices to provide producer support
- *Energy producers* who suffer financial losses due to payment arrears or non-payment of subsidy reimbursements, or whose margins are kept artificially low by the government so as to lower prices charged to consumers
- *Commercial lenders, other governments, international financial institutions, and other financiers* who have to accept debt cancellations in the energy sector, especially for state-owned companies, or provide concessional financing

Because price subsidies create distortions with ripple effects throughout the economy, they arguably represent the most serious form of energy subsidies. In particular, price subsidies that keep end-user energy prices artificially low (also referred to as *underpricing*) have plagued policy makers in many countries, because their removal raises prices, an unpopular move in any country. Higher prices invite public resentment and political backlash, and have varying adverse effects on different segments of society with equity implications.

For this reason, ESRAF gives more attention to reforming consumer price subsidies than any other form of energy subsidies.

In countries with large energy price subsidies, how much official prices may need to increase for subsidy removal is an important policy question. The price adjustment needed (also referred to as the *price gap*) is defined as the difference (*gap*) between a likely unit price of energy (either in a competitive market setting or to achieve cost recovery) and the official or some other indicator of an artificially low (or high) unit price on the local market. The total value of the subsidy for a particular form of energy is its price gap multiplied by the total units subsidized. The price gap is positive for consumer support and negative for producer support.

Unintended consequences of energy subsidies can be considerable, and can even harm rather than benefit consumers. Examples include commercial malpractice (two prime examples being black marketing and smuggling of subsidized fuels) whereby subsidies are captured by those engaged in criminal activities rather than the intended consumers; energy shortages; prices paid by consumers being markedly higher than official prices; and declining performance in the energy sector. If energy suppliers are forced to operate at a loss and absorb the subsidies, the financial viability of energy suppliers can be threatened, resulting in declining investment in operation, maintenance, rehabilitation, and capacity expansion. Possible outcomes include electricity and fuel shortages, an unreliable supply of energy, and increasing reliance on fuel imports in countries with domestic fuel resources, which in turn could further increase the subsidy bill, foreign exchange shortages, and budgetary transfers.

Subsidies actually delivered to the intended beneficiaries need to be studied with care. Because of the unintended consequences, large positive price gaps (consumer price subsidies) do not automatically translate to low prices for consumers. Price and availability—what consumers actually pay, and how much subsidized energy they are able to purchase—are two questions that need to be examined systematically, especially in distributional and political-economy analyses.

FISCAL COST

The important fiscal issues are the impact of subsidies on the fiscal balance, how to finance them, and how subsidy reforms may affect key debt and fiscal sustainability indicators. Assessing the fiscal impacts of energy subsidy reforms is an essential prerequisite for designing and implementing the reforms. Energy subsidies may be provided through various channels on the production and consumption sides, and may generate contingent liabilities—explicit or implicit—that the government must monitor and manage as part of overall macroeconomic management.

From a macro-fiscal perspective, it is useful to distinguish between explicit and implicit liabilities that subsidies may generate. Explicit liabilities are government commitments based on laws and contracts, such as government guarantees and budgetary transfers specified in budget laws. The transfers may be to suppliers to compensate them for the price gap, or to households to purchase energy. Implicit liabilities are commitments that are typically based on political announcements, public expectations, and possible interest group pressures. Examples include losses, nonguaranteed obligations, arrears, and deferred maintenance of state-owned energy suppliers.

Fluctuating international fuel prices and exchange rates can introduce uncertainty and increase fiscal risks. Where subsidies include underpricing of fuels, rising world fuel prices or currency depreciation can pose an additional threat to fiscal sustainability. Even where fuels are not underpriced, currency depreciation or higher interest rates can increase capital and non-fuel operating expenditures, potentially increasing the magnitude of subsidies in the absence of corresponding increases in energy prices. The fiscal impacts from the uncertainty in key macroeconomic variables and fiscal risks from the government's contingent liabilities should be incorporated in the fiscal analysis. Similarly, natural disasters, such as extreme weather events, can pose fiscal risks—for example, a drought may force a large shift from hydropower, typically the least-cost source of electricity, to emergency diesel generation, among the most expensive—thereby immediately creating a large price gap and corresponding contingent liabilities for the government.

Contingent liabilities through the balance sheet of state-owned energy suppliers can represent an important source of fiscal risk, especially when losses threaten their financial viability. Even when such enterprises are supposed to operate on a commercial basis, the government is likely to come to their rescue if their failure is not considered acceptable and especially if their failure could result in non-delivery of essential energy services. Knowing that the government considers them too big or too important to fail, these energy suppliers may and often do take undue risks. New infrastructure investments using public-private partnerships may also create claims on future public resources, calling for a careful assessment of associated fiscal risks and contingency planning by the fiscal authorities in the government.

Governments must carefully balance between the likely need to compensate losers during the reform and maintaining fiscal sustainability over the medium term. Where there is underpricing of energy, the path of energy prices toward fully market-based pricing mechanisms influences the fiscal and debt trajectories during the transition. During this period, some fiscal space is needed to ensure that the poor and vulnerable are compensated for higher energy prices and to address some of the concerns of those opposed to reform. The ability of the government to redirect resources to existing or new social safety nets (Note 5) and to firms for short-term assistance (Note 6) depends on the size of the fiscal space created by the subsidy reform and the relative importance of other competing priorities.

Policies to mitigate adverse effects of the subsidy reforms on households and firms must therefore be designed hand in hand with the fiscal strategy. Where energy prices rise as a result of energy subsidy reforms, the prices of goods and services that use previously subsidized energy. Higher prices of energy and of other goods and services consuming previously subsidized energy—such as food and transportation services—can markedly affect the consumption basket of the poor and other vulnerable groups, who will need to be provided with appropriately targeted social protection. These reforms will also affect future fiscal deficits and associated public sector financing requirements which, in turn, will affect the country's gross public sector borrowing requirements and the affordability of the government's overall public spending needs in the medium term.

IMPACT OF HIGHER ENERGY PRICES ON HOUSEHOLDS

Consumer price subsidies for energy are often introduced on social grounds. One frequently cited rationale is making clean, modern energy affordable to low-income groups to meet their basic needs. If prices are made sufficiently low, underpricing can enable many households to shift from the traditional use of biomass, which may be the cheapest source of energy albeit polluting and damaging to health, to electricity or gaseous fuels. Another cited justification is to reduce disruptions to the economy and shield it from energy price volatility, thereby dampening spikes in inflation.

While consumer price subsidies are generally inefficient as a means of redistributing income to the poor, their removal is likely to affect low-income households negatively. In most cases, higher energy prices would appear to have a relatively limited effect on the incidence of poverty (the number of people living below the poverty line). However, for the low-income households now facing higher energy prices, their having to cut further into their budgets to meet basic energy needs can have serious adverse consequences.

For households, the two primary channels of impacts of higher energy prices are through the changes in consumption patterns and effects on income streams. Both consumption and income can be affected directly by higher energy prices, and indirectly through induced price changes, such as higher transport costs. These indirect effects, though harder to quantify than direct effects, can be significant. Actual impacts on people's welfare depend on their consumption patterns, the extent to which consumers can adjust their consumption when prices change, and the distribution and type of income-generating activities, particularly those in which the poor tend to engage. These effects typically differ significantly between rural and urban areas in low-income countries.

Direct impacts will depend on the share of household expenditures spent on subsidized energy source, the potential for substitution, and the degree of nonessential consumption. Direct effects caused by higher prices of energy purchased affect all households paying for the previously subsidized energy sources. The urban poor are more dependent on purchased energy than their rural counterparts—many of whom use wood and other forms of biomass that are collected rather than purchased for cooking and heating—and hence are generally more vulnerable. However, one exception is where biomass cannot be used as a substitute: energy for lighting. Especially in low- and lower-middle-income countries, rural households in general and the rural poor in particular are less likely to use electricity, and more likely to rely on kerosene for lighting. Therefore, a higher share of rural households is affected by higher kerosene prices than in urban areas.

All households that use subsidized energy sources for income-generating activities will be affected. The relevant energy sources for income-generating activities are gasoline, diesel, and electricity. For those engaged in commercial activities, the extent of the impact depends critically on how much of the additional input costs they can pass through to final consumers (Note 6). Groups that have been found to be particularly vulnerable include fisherfolk (who use gasoline or diesel fuel in fishing boats), farmers (who use diesel or electric pumps for irrigation), all businesses that use gasoline or diesel in delivery of goods and services, and all businesses that use electricity

or backup generators fueled by gasoline or diesel. In addition, some microbusinesses rely on subsidized LPG, such as street vendors selling food cooked using LPG.

Indirect effects will depend on the consumption baskets of poor households and the price elasticity of demand for different goods. Indirect effects touch all households through (a) general inflation arising from increases in costs of goods and services that depend on subsidized energy sources, as well as increases in the costs of other energy sources from higher demand through substitution; and (b) lower employment in energy-intensive activities. Higher prices of energy sources that are intermediate goods are responsible for the first indirect effects. They are likely to be significant where transport fuels were previously underpriced, particularly diesel fuel (used in long-distance transportation). For the poor, higher food prices—from any combination of higher costs of transporting food to consumption centers (affected by higher prices of gasoline or diesel), higher costs of irrigation (diesel, electricity), higher fertilizer prices (natural gas), and higher costs of operating farm equipment (diesel, electricity)—would particularly be a concern. The urban poor tend to depend more on goods transported from elsewhere for their basic needs and on public passenger transport, making them more vulnerable to these effects. Because LPG and kerosene for household use are much less likely to be intermediate goods—in fact, if these price subsidies are perfectly targeted, by definition they are not intermediate goods—their indirect effects are usually minor.

All households involved in productive activities are likely to be affected by increases in input costs stemming from higher energy prices. In some sectors, indirect effects can be particularly strong. For example, agricultural households are likely to be more affected by rising fertilizer costs and higher costs of transporting their products to markets. Firm-level impacts are explored in more detail in Note 6.

Finally, higher energy prices can result in broader impacts on the livelihoods of poor people and their communities. Where clean, modern energy is subsidized for household use, raising prices could force some households to rely much more on the traditional use of solid fuels, if not shift back altogether, with their attendant air pollution and adverse health effects. Such a move affects not only the households now making greater use of solid fuels, but exposes their communities to greater air pollution. Because women and children are often tasked with biomass collection and household chores, they are more vulnerable to these adverse effects than others.

SOCIAL PERCEPTIONS OF PRICE SUBSIDIES AND THEIR REMOVAL

Different households have specific vulnerability factors and will adopt divergent coping mechanisms and behaviors in response to higher energy prices. Qualitative analyses can illustrate households' experience with energy subsidies, and how they are likely to respond to their reforms. Note 4 on qualitative analysis focuses primarily on coping with the removal of consumer price subsidies by analyzing contextual factors and what it means for households to access sufficient energy for their basic needs. Households cope with the same increases in energy prices in different ways, some by cutting back on different types of spending and others by substituting different energy sources. It is important, however, not to assume low official prices and instead probe whether the government policy of keeping

the prices of (for example) liquid fuels low have resulted in large-scale diversion, fuel shortages, and high prices on black markets—energy subsidy reforms may eliminate fuel shortages, and in extreme cases lower rather than increase prices.

Knowing how people respond to price increases is critical to informing social policy responses. Information on how people have experienced prior price increases, what parts of the household expenditures will be most affected, and how they perceive the overall impact on their well-being is critical to guiding policy makers toward supporting positive coping mechanisms and avoiding behaviors with possible negative social or environmental consequences. Understanding their coping mechanisms with subsidies—fuel shortages and black market prices, to name a few—is equally important; focusing only on higher prices, assuming perfect delivery of energy subsidies before the reform, could deliver misguided analysis and conclusions.

Citizen perceptions of existing social safety nets and associated institutions also affect how people will respond to different options for mitigating the impact of higher prices. These considerations should shape a government's expectations and resulting choice of social safety net programs (Note 5). The perceptions or narratives that citizens attach to reforms in the energy sector, such as expectations about service quality or accountability of providers, play a role in their overall acceptance of, or resistance to, reforms. The level of citizens' awareness about reforms is likely to vary considerably. Understanding this and what drives their attitudes toward the reforms of energy subsidies and social protection is important for understanding the political-economy environment and designing communication strategies (Notes 9 and 10).

These qualitative findings should encompass the types and scope of subsidy- and reform-related issues that concern different categories of respondents. Qualitative findings are not expected to be nationally or geographically representative, and they should not be extrapolated to the rest of the country to arrive at generalized conclusions. Nonetheless, they can help anticipate impacts or monitor ongoing impacts that are experienced and attributable to the specific reform measures, such as rising energy prices or greater availability of energy. It is advisable to undertake such qualitative assessments periodically in order to track any changing perceptions that may emerge as the reforms progress in a country.

SOCIAL ASSISTANCE FOR COPING WITH HIGHER ENERGY PRICES

Where subsidies are large and take the form of low prices charged to consumers, subsidy reforms can lead to a price shock. Price shocks for something as essential as energy can have economywide effects, and harm to the poor and the vulnerable can be considerable without appropriate mitigation.

While the need to protect the poor from price shocks is well known, often subsidies are removed without any accompanying social safety net measures.[2] A recent report states that in only 9 out of the 28 cases analyzed were any social safety nets used in energy subsidy reform efforts, and in an additional eight cases, vouchers for energy or retargeting of subsidies to the poor were implemented (Clements and others 2013). A lack of mitigating effort is closely correlated with a lack of capacity in government to implement social safety nets to provide an adequate and timely response. The lack of capacity was also evident in a global response to the food and fuel crisis of 2008–10,

which revealed the weaknesses of social safety nets, especially in low-income countries. A survey conducted at the time of 146 countries showed that only 39 of them had expanded targeted safety nets, while many more had reduced food or fuel taxes, increased food or fuel subsidies, or undertaken a combination of these measures, despite such across-the-board tax reduction and subsidy measures generally being regressive, distortive, costly, and difficult to reform (IMF 2012).

Governments can reduce the fiscal burden of energy price subsidies without harming low-income households by reforming the subsidies and deploying different social safety net programs. Where the benefits of energy subsidies are captured largely by the better-off and financed mostly by taxpayers, subsidy reforms can achieve significant savings while avoiding adverse effects on the poor and near poor.

Where subsidy reforms increase government revenue or decrease government spending, governments can often use the additional fiscal space to provide direct support to households. Which measures are desirable depends on the incidence of the subsidies (Note 3), and their likely uptake by citizens depends on popular perceptions of these programs (Note 4). An assessment of the welfare consequences of higher prices caused by energy subsidy reforms (Note 3) is required to determine the resource allocation to social safety nets needed to compensate the poor. The government's fiscal space during the transition will constrain the scope of feasible compensatory mechanisms (Note 2).

Protecting the poor against energy price shocks is no different from protecting the poor against any economic shock. Safety nets are needed not only in times of energy price subsidy reforms, but as long as economies remain exposed to shocks and fluctuations. For this reason, most countries already have some type of social safety net program in place, and are typically working on reforming them to improve coverage, adequacy, and efficiency.

Governments should aim to use existing programs to respond to shocks specific to energy subsidy reforms without undermining the longer-term objectives of building a coherent and sustainable social safety net system. Countries around the world operate a variety of social protection and labor programs and policies to help buffer individuals from shocks, and equip them to improve their livelihoods. Social protection and labor programs have evolved in complexity over time, and the mix of instruments greatly depends on the country context and the starting point of the programs. Some countries operate only a few programs, such as a single cash transfer, a contributory pension for formal-sector workers, and a handful of other services, often with limited coverage. Other countries offer a number of social protection and labor benefits and services, managed as coherent packages covering most in need of support within the system.

Important considerations for compensation measures include (a) the identification of the most appropriate scalable or at-scale social safety net interventions to mitigate adverse effects on the poor, and (b) assessment of the delivery chain, institutions, and administration for providing an adequate response. A variety of programs can often be used to transfer resources to the poor. To guide in this decision, governments will need to assess the readiness of different parts of the social safety net system to transfer these

resources to those in need, and how to include those not currently served by the system.

Institutional inertia and the need for robust delivery mechanisms for any social safety net program imply that social safety nets cannot be adjusted and expanded overnight, even when there is fiscal space to do so. Providing timely compensation that avoids drastic changes to the living conditions of the poor requires accurate sequencing of reforms, assessment of market transmission channels, assessment of agility of social safety nets, and the ability to monitor the situation and make rapid adjustments. Hence, the design of mitigation measures should always start with the assessment of available social safety nets.

In the face of inadequate cash-based social safety nets, other forms of compensation may be used. Among them are energy subsidies targeted to the poor, such as lifeline rates for electricity, district heating, and natural gas, and low prices set aside only for poor households (for example to purchase a fixed quantity of LPG). An important policy question is how to enable the poor to meet their basic energy needs. Targeting is more challenging for liquid fuels than for energy delivered through networks—networks limit scope for illegal diversion. Lifeline pricing is most effective if the poor are connected to the network, each household is individually and accurately metered, and the subsidized block of service is consonant with energy consumption by the poor. However, they represent second-best options: compared to unconditional cash transfers, they suffer from inefficiencies; poor targeting in implementation, if not in design; and economic distortions.

IMPACTS OF HIGHER ENERGY PRICES ON FIRMS AND INDUSTRIAL COMPETITIVENESS

Although industrial competitiveness is a frequently stated reason for introducing subsidies, the effects of the removal of energy price subsidies on firms have rarely been studied. In 2015, industry consumed more energy than the transport or residential sectors, the other two major consumer categories (IEA 2016). This makes firms the largest consumers of energy relative to others in the economy. Energy subsidies are often introduced in developing countries to support their industrialization and the competitiveness of key industries' exports through underpricing energy inputs. Many major producers of crude oil, natural gas, and coal shielded their industries from rising world fuel prices in the decade following the first oil price hike in 2004, introducing or expanding existing subsidies.

Price subsidies distort incentives for firms to allocate resources and to operate efficiently. Where prices are subsidized, firms do not receive an accurate price signal. This distorts the input choices of firms, and reduces their incentives to tackle energy intensity and wastage, since investing in energy efficiency improvement when energy prices are low may deliver small or even negative financial returns.

Price subsidy reforms could have disruptive impacts in the short term, while in the medium term, the effects are likely to be more positive. In the short term, higher energy prices could have large and disruptive impacts on firms' operating margins, thereby affecting their profitability and potentially even driving some firms out of business. In the medium and long term, the removal of subsidies can not only increase economic and energy efficiency,

but also accelerate innovation and adoption of more advanced technologies.

When faced with rising energy prices, firms can either pass on these costs, absorb them, or adapt to them. Some firms may be able to pass on price increases to the purchasers of their goods and services. Other firms may have to offset higher energy costs by (a) increasing energy efficiency and reducing energy consumption; (b) switching to alternate production processes that consume less of the now more expensive energy; (c) switching to other forms of energy that are cheaper (such as from LPG to wood); and (d) cutting other costs, such as labor (by reducing either the wage or working hours, or by laying off workers).

The effects of price shocks induced by subsidy reforms may therefore differ greatly across industries and across firms within the same industry. The relative energy intensity of production processes and technologies, and hence dependence on energy, is substantially different based on what industries produce. Within each industry, there are important differences due to such factors such as firm size, ownership structure (or other management factors), level of competition in the market, available infrastructure (electricity, rail, ports, and roads), proximity to markets and essential infrastructure, and exposure to foreign technology, all influencing the manner in which each firm responds to the price shock.

Particular regions or sectors may be disproportionately at risk. The regional concentration of firms in affected sectors (as is often the case of countries of the former Soviet Union) could imply that specific regions of a country are disproportionately affected by subsidy reforms, especially if labor is relatively immobile. Key sectors and firms whose competitiveness and employment performance are most likely to be affected include petrochemicals (natural gas, naphtha, and LPG used as feedstocks), transport (gasoline and diesel), and agriculture (electricity and diesel), as well as small firms generally. Where energy price increases are large and sudden, employment is likely to be affected, since firms seek to lower operating costs. While adjusting wages is one avenue in the medium to long term, short-term employment losses are likely. Job losses will likely be larger where industries are more reliant on energy as an input and labor is immobile within or between industries and regions.

Unintended consequences of subsidies may offset the adverse effects on firms of price subsidy reforms. In assessing the impact of higher energy prices, it is important not to overlook the unintended consequences of subsidies that adversely affect firms. As an example, one out of every three firms interviewed globally cites electricity as a major constraint on business.[3] Where subsidies contribute to the poor financial health of power utilities and to power outages, subsidy reforms may improve the reliability of electricity. If firms can switch from diesel power generation to grid electricity, they can capture significant savings even if grid electricity prices are raised markedly.

IMPACTS OF HIGHER ENERGY PRICES ON MACROECONOMY AND GREENHOUSE GAS EMISSIONS

Energy price subsidies and their reforms have indirect and dynamic effects on consumers through the interaction between households (both as consumers and workers) and firms. In addition to the direct impact that a price subsidy reform can have on consumers (people and firms), there are indirect effects

through increases in the price of other goods and services that require energy as an input. These indirect effects can ripple through the economy, with potentially wide-ranging consequences for the economy—including for investment, industrial structure, and household welfare—and economic growth, which should inform the timing and pace of reform.

Economywide models can go beyond the direct effects of price subsidy reforms and help assess their overall costs and benefits. They provide useful information about how the reforms will affect macroeconomic stability and the structure of the economy in the long term, and how to prudently spend any fiscal savings generated by the reform. By capturing the direct impacts of price subsidy removal on the government's budget (Note 2), the impacts on households (Note 3) and on firms (Note 6), and integrating the interrelationships between economic sectors in a country, these models can help quantify the overall economic impacts on the real sectors. They can also estimate the second-round repercussions of price subsidy removal on households and firms. Different economywide modeling tools—in particular, computable general equilibrium (CGE) models—can be used to quantify these macroeconomic effects.

By examining all sectors of the economy, general equilibrium models can be used to design integrated reform scenarios, including reallocation of resources following the reform, and approximations of changes in greenhouse gas emissions. After identifying the incidence of price subsidies on households and firms, and the fiscal implications of a reform package through partial equilibrium models, these tools can be used to design and sequence mitigation strategies, for example, by using any resulting fiscal windfall to pay down debt, invest in public infrastructure, and offset adverse effects on specific population groups or industries. The fiscal windfall can also be used to design macroeconomic policies to offset the short-term cyclical effects of reform, such as inflation, employment dislocation, and increases in the cost of living of the poor. By using emission factors for various energy uses, they can also estimate changes in greenhouse gas emissions (although with a low level of reliability).

However, CGE models are unable to reliably track the short-term and cyclical impacts of policy reform, which are better captured by macrostructural models. These general equilibrium models should therefore not be relied on to study direct and short-term impacts on households and firms, in part because these long-term models assume the ability to adjust energy consumption pattern perfectly, an unrealistic assumption in the short term. By contrast, macrostructural models can be used to quickly quantify the likely short-term macroeconomic impacts of a reform measure. These models also have the advantage of relatively low data requirements, and are typically easier to work with than CGE models.

ENVIRONMENTAL AND HEALTH IMPLICATIONS OF HIGHER ENERGY PRICES

Energy subsidies linked to fossil fuels can have serious local and global environmental consequences. Where subsidies keep prices paid by consumers artificially low without causing serious energy shortages, subsidies can lead to inefficient, as well as nonessential, consumption of energy. Combustion of more fossil fuels increases local air pollution and greenhouse gas emissions. There may be other adverse environmental externalities associated with increased energy production, such as land

and water contamination. Artificially low prices can also increase energy-dependent activities and production of fuel-intensive goods with attendant environmental effects, such as unsustainable extraction of groundwater and harm from excessive application of chemical fertilizers.

Energy subsidies can also have positive environmental externalities. Low prices of gas, electricity, and district heating can reduce household air pollution by enabling households to shift away from traditional use of solid fuels, such as wood, straw, crop residues, dung, and coal (see Note 4 on how to capture this information). Subsidies to natural gas can reduce combustion of coal and oil products in the power and industrial sectors, with net reductions in hazardous local air emissions, while subsidies to gaseous automotive fuels reduce particulate emissions in the transport sector. However, energy subsidies are rarely the most cost-effective and economically efficient solution to realize such environmental gains. An understanding of the energy subsidy, air pollution, and health linkages, along with their magnitudes, can prove beneficial in designing energy subsidy reforms, so that measures can be identified and considered for mitigating adverse effects of subsidy removal.

Premature deaths and increased morbidity caused by fine particulate air pollution represent the largest economic effects of lower energy prices from a local environmental point of view. For outdoor air pollution, low prices aggravate air pollution, whereas for indoor air pollution caused by household use of solid fuels, subsidized prices of clean energy help reduce air pollution, saving lives and reducing illnesses. As such, energy price subsidies carry high social costs, as well as large social benefits, depending on how the subsidized energy is being used. An estimated 6.5 million people die from outdoor ambient and household air pollution each year according to the Global Burden of Disease 2015 (Forouzanfar and others 2016). Combustion of fossil fuels and solid fuels accounts for a large share of these deaths.

Quantification of contribution of energy subsidies to local air pollution should be interpreted with care. Quantifying how much more fossil fuels are burned as a result of subsidies is challenging, because doing so requires not only own-price and cross-price subsidies, but also information about availability of the subsidized energy and the actual, rather than the official, prices paid. Moreover, unlike greenhouse gas emissions, quantities of fuel consumed alone do not determine the level of air pollution. Combustion technologies, the state of equipment used, how well vehicles and equipment are maintained, and how they are used (such as vehicle driving patterns) all affect emission levels, while no analyses take account of these factors in detail. Within these constraints, Note 8 offers the types of analyses that may be used to estimate the health costs and benefits of energy price subsidies.

POLITICAL CONTEXT

Policy makers understand well the need to reform energy subsidies, but they are hampered by political-economy challenges. There has been significant variation in the outcomes and sustainability of energy subsidy reforms. Successes have come where important pro-reform actors have strategically addressed the political-economy barriers and opportunities for reform. Implementing reforms that endure requires tools that make it easier to understand and navigate those barriers and opportunities.

While there has been extensive research on optimal design of subsidy policies, systematic research on the political economy of subsidy reform is much thinner and yet essential to effective policy design and implementation. A political-economy perspective pays close attention to such factors as the ability of interest groups to organize for or against policy reforms and how institutions, financial benefits, or disbenefits of subsidies for consumers and energy suppliers, and energy markets shape political behavior. In this regard, it is important not to assume automatically that consumers benefit from subsidies. At one end of the spectrum, they may be the ones paying for producer subsidies, and similarly, energy suppliers may welcome subsidy removal if they are partially paying for consumer subsidies. A political-economy framework also puts an important spotlight on incentives that affect the behavior of political leaders and administrators. It helps understand the need for pragmatic approaches that adapt what might otherwise be ideal objectives to the compromises required for success. Often, the question is not "How can we achieve a result that mirrors global best practice?" but rather "How can we make and maintain progress on energy subsidy reform?"

Most governments create energy subsidies with stated goals, which partly determine how different interest groups react to the reform. Subsidies often begin with the goal of advancing a legitimate social goal. Those goals inform how interest groups are organized, as well as the goals that need to be retained in a reform program. A first step should be to publicize the magnitude of subsidies and their costs (Note 10). Understanding who gets the subsidy and who pays for them is crucial to understanding whether and how the subsidy actually reaches a socially desirable target and who stands to lose upon its removal. Equally important is understanding the developments that had led to the introduction of subsidies in the first place and the major policy changes made since then, as well as a sound knowledge of the decision-making structure, stakeholder interests, and the reform track record.

Reform efforts begin and succeed where they tackle the political-economy challenges effectively in a given context. Analysis of the political economy of reform involves understanding the relative power of stakeholders based on analysis and mapping of the goals and capabilities of major interest groups. It also requires understanding how the groups are organized internally to advance their goals and their internal dynamics, as well as how different groups connect to each other, how strong their connections are, which coalitions they form, and how their interests overlap.

The scope for reform is influenced by the interplay between the government incentives to adopt policies with potentially large political costs and the divergent incentives of distinct interest groups. Those interactions will depend on the organization and political power of the groups, and will also hinge on the ability of the reformers within the government to choose their political allies and blunt the political influence of groups that could block adoption or reverse the implementation of energy subsidy reforms, both inside and outside the government. When reformers in the government are confident of their mandate and feel secure in power, progress can be made even in the face of opposition from powerful groups, which can include powerful politicians. Other aspects that can shift the political equilibrium toward reform include (a) the ability of the reformers to create a strong, simple, and credible narrative on the need for reform, (b) the ability of

the government to offer credible alternative policies delivering benefits to some or all of the citizenry, (c) a sharp increase in the cost of providing subsidies, and (d) increased external pressure to reform.

COMMUNICATIONS AND CITIZEN ENGAGEMENT

International experience shows that communicating before, during, and after subsidy reform is essential to ensuring the smooth rollout of a well-planned and executed energy subsidy reform program. Energy subsidy reform is not a goal in itself, but rather a means of achieving lasting economic and social progress. Communicating with the public and other important stakeholders about the benefits of reform, the drawbacks of existing subsidies, and the government's plans to protect the vulnerable from negative effects of subsidy reform helps build support and acceptance. It can also increase trust and understanding of the political decisions that underpin the reform.

Some governments undertaking energy subsidy reform programs either ignore communication with stakeholders or take a top-down approach that fails to recognize stakeholder views and concerns. This happens for many reasons, including a lack of understanding about the powerful role communication plays in a successful energy subsidy reform program and the absence of capacity within the government to undertake communication activities. Yet communicating about energy subsidy reform—and doing so through a holistic and effective communications campaign—is crucial.

Failure to consult stakeholders and to gain their support has stalled and sometimes reversed much-needed reforms in many countries. Public reactions to subsidy reform programs are highly contextual and dynamic. Reforms can be successful only if there is an informed and supportive public that understands the rationale for reform. International experience has shown that well-planned and consistent communications is critical to the success of energy subsidy reforms.

Active engagement with citizens helps build the consensus, support, and incentives for behavioral changes needed for subsidy reforms. A communications strategy, plan, and campaign constitute a strategic effort to listen to stakeholders' concerns and perceptions, coordinate messages within the government, and communicate with one voice critical messages tailored to the audience's circumstances and perceptions. Phasing out energy subsidies can be politically difficult, but a number of countries have managed to build support and acceptance among a variety of stakeholders and reformed subsidies without major disruptions. They have succeeded in part through well-planned and executed communications campaigns.

Communications is an investment, not a cost, and should be planned and implemented by professionals before and during the stages of reform. By assessing risks early, informing the public in accessible ways, and explaining the mitigation measures to protect poor and vulnerable households, public understanding and eventually goodwill can be built for a reform process. Communications campaigns must be flexible to accommodate shifting political, social, and cultural aspects of reform, and a well-planned strategic communications strategy based on empirical research will greatly enhance the acceptance and the effectiveness of any subsidy reform program.

HOW TO USE THE FRAMEWORK

ESRAF is intended to guide the production of comprehensive evidence to underpin a reform of energy subsidies. Applying the full analysis suggested in all guidance notes is not always feasible, nor is it always necessary. One can choose areas to focus on, depending on the objectives and context. Factors affecting the choice of coverage include the purpose of the analysis, timeline to complete it, audience, and data availability, as well as the characteristics of the subsidized products and types of subsidies to be reformed. This section provides guidance on how to pull together the selected facets of analysis. In addition, a minimum recommended analysis is outlined, which includes the following steps:

1 | Assessing the subsidies

2 | Modeling the impacts of energy price subsidies and of their reform

3 | Assessing the political context and preparing communications

Where time and resources are limited, the analysis may be confined to a rapid assessment of energy price subsidies.

ASSESSING THE SUBSIDIES

The starting point of any analysis is identification and measurement of energy subsidies.

NOTE 1 provides a definition of energy subsidies and extensive categorization of the different forms of subsidies for different energy products. This will ensure that the analysis does not fail to capture subsidies that do not give the appearance of influencing energy prices or do not appear as line items in the budget. Although these less visible forms of subsidies all too frequently escape scrutiny, they can be large in magnitude. Examples include tax expenditures and shifting of risk burdens from energy suppliers to the government or consumers. The note discusses how to identify different forms of energy subsidies, how to quantify them where possible, and the policy issues to consider when reforming subsidies in developing countries.

For a complete analysis, practitioners should complement the price gap approach with an inventory of energy subsidies, in order to capture subsidies that do not directly affect prices. For subsidies that are not amenable to quantification without considerable data collection or subjective judgment, noting their presence and recommending a review alone would be useful. A comparison with peers—neighboring countries, similar economies, or similar energy markets—can help gain a better understanding of whether a country's subsidy policies are reasonable, how they can be reformed, and what is achievable in the near and long term.

For fuel price subsidies, the subsidy delivery channels should be reviewed to understand who the winners and losers are and the political economy of the reform (Note 9). The delivery channels determine the effectiveness of the subsidies at reaching their intended beneficiaries and influence the prices actually paid by consumers as well as quantities available for purchase, both of which should be considered when estimating the impact on households (Note 3) and firms (Note 6). If energy suppliers are forced to operate at a loss and absorb the subsidies,

the financial viability of energy suppliers may be threatened. Deteriorating financial health can prompt budgetary transfers, subsidized loans, and other forms of assistance to failing state-owned energy suppliers, affecting the government's fiscal position (Note 2). Capture by unintended beneficiaries, which may not be apparent without analysis, compromises the objectives of subsidies, but will likely lessen the adverse effects of subsidy reforms (Notes 3 and 6), while introducing new dimensions to the reform's political economy (Note 9).

For power sector subsidies, Note 1 also details how to estimate the level of cost recovery against which to benchmark existing tariffs to be able to measure the price gap. Where to set the benchmark performance varies by country and the maturity of the power market.

Electricity, natural gas, and district heating share characteristics that distinguish them from liquid fuels. Each officially connected consumer is metered and billed, enabling targeted assistance to those with low consumption, which serves as a proxy for poverty, however imperfect (Note 5). Inaccurate metering, infrequent reading of meters, and multiple connections to a single meter—which can be assessed through qualitative methods (Note 4)—all compromise the ability to send appropriate price signals and deliver targeted assistance. Poor quality of service, measured by the frequency and duration of service interruptions, is a prevalent problem in a number of developing countries. Qualitative tools (Note 4) can help assess perceptions of service quality, and information on such perceptions can help shape a communications strategy (Note 10). It generally takes much longer to improve the quality of service for network energy than for liquid fuels, and the time lag between price increases and quality improvement poses a challenge to winning public acceptance of higher prices (Note 9). Finally, a hidden cost analysis enables decomposition of the price gap into underpricing and different types of operational inefficiency, providing an indication of the scope for reducing costs, and therefore subsidies (Note 1).

For nonprice subsidies, the fiscal analyst should refer to section 4 of Note 1 on subsidies arising from tax expenditure items (such as tax-rate reductions, accelerated depreciations, allowance for additional deductions, tax credits, and tax deferrals), and other support measures (such as underpricing of permits and cash transfers earmarked for energy purchase). Special attention should be paid to these forms of subsidies in the fiscal analysis (Note 2), and the fiscal and energy experts will need to work closely together to enter the subsidies appropriately in the fiscal model, as different forms of subsidies have different fiscal implications.

MODELING IMPACTS OF ENERGY PRICE SUBSIDIES AND OF THEIR REFORM

Modeling of subsidies and their reforms is confined largely to subsidies that lower prices paid by consumers. Several approaches exist to model changes in energy prices, although estimation of the actual changes in energy prices faced by consumers and quantities purchased under the subsidy regime may carry large uncertainties. By contrast, subsidies that are not directly linked to price levels are seldom, if ever, modeled, especially in developing countries.

Once energy price subsidies are quantified, their impacts on the government's fiscal balance, households, firms, the economy, and the environment, as well the impacts

of reform on each, can be estimated. Impacts are interdependent. For example, understanding the consumption patterns of households and productive sectors, as well as the share of subsidies financed by the government and how that financing fits within the government's fiscal infrastructure, are inputs to a macroeconomic model. This model, in turn, will calculate the indirect effects of higher energy prices on households. The design of qualitative and quantitative tools to estimate impacts on people can also inform each other. The fiscal impacts of a reform will depend on whether mitigation measures will be taken. How to target mitigation measures depends on who is harmed by the reform, and how many resources are available for reallocation to mitigation. It is therefore crucial that all analysts start with a good grasp of what energy subsidies exist, and carry out analyses in an integrated and collaborative manner.

NOTE 2 addresses a series of questions that should guide the analysis of fiscal sustainability, and points to models and tools to address each question. The essential task of the fiscal analysis is to measure the fiscal burden of the energy subsidies, and model how the fiscal balance and debt sustainability will evolve with the reform. This requires modeling energy subsidies within an integrated medium-term fiscal framework. Building such a unified analytical framework requires having a good grasp on the budget, financing, intergovernmental fiscal system, and asset-liability management in a country. Assessing sustainability requires forming a view about how outstanding stocks of liabilities are likely to evolve over time. In the best case where the data are available, such assessment can be carried out within a spreadsheet-based stochastic fiscal sustainability model.[4] Such a model can generate scenarios and run stress tests for a wide range of circumstances to see how government debt is likely to evolve in a world with uncertainty, as well as project contingent liabilities in different reform scenarios.

Weak financial sustainability of state-owned energy suppliers creates contingent liabilities and poses fiscal risks that can be measured using the government's balance sheet. Access to financial data from state-owned enterprises is needed to go beyond estimation of aggregate fiscal risks and identify the specific sources of such risks and how to handle them. Such analysis requires deep sector or utility knowledge and calls for close collaboration with the energy expert conducting the assessment of subsidies.

In general, government liabilities can be characterized in two-by-two matrices with *direct* or *contingent*, and simultaneously, *explicit* or *implicit*, as the key categories. The approach uses a fiscal risks matrix on the liabilities side, and a fiscal hedge matrix on the assets side, with the latter capturing different sources of potential revenues that can cover the government's obligations. The exercise involves mainly matching the different existing subsidies to different types of liabilities.

As the analysis moves from evaluating the status quo to modeling reform scenarios, the fiscal analysis should integrate the fiscal impact of any planned expansion in social safety nets from the social protection expert (Note 5), because such expansion will increase budgetary expenditures and affect the fiscal position of the government. In turn, the fiscal analysis can determine how many resources can sustainably be allocated to mitigation programs in the short and medium term.

IMPACT ON HOUSEHOLDS

Notes 3 and 4 explore quantitative and qualitative tools, respectively, for assessing the impact of consumer price subsidies and of their removal on households, while Note 5 describes tools for assessing the readiness of social safety nets to mitigate the impact of higher energy prices on households.

NOTE 3 provides guidance on calculating how energy subsidies affect people at different income levels and how energy price increases may affect them. Broadly speaking, one can distinguish three types of analyses: (a) general equilibrium analyses, incorporating both the direct and the indirect welfare effects of higher energy prices; (b) limited general equilibrium, incorporating only a subset of the indirect effects; and (c) partial equilibrium approaches, focusing only on the direct effects of higher energy prices on household expenditures. The latter two are commonly considered the short-term effects of reforms prior to longer-term adjustments by households and economic agents affected by higher energy prices. They can also be interpreted as an upper bound on longer-term adverse effects, since household responses (such as shifting consumption away from goods with higher prices to lower-price substitutes, increasing energy efficiency to reduce consumption, and eliminating nonessential consumption) will reduce the initial adverse effects.

The different issues that a quantitative assessment of the distributional impacts of price increases would seek to address are outlined in Note 3, and will require the energy analyst to provide information on the types and delivery channels of the subsidies. The note outlines important practical difficulties related to performing this type of analysis, in particular with respect to estimating quantities consumed which can be challenging in many circumstances on account of the nature of data collected in household expenditure surveys.

NOTE 4 provides guidance on the use of qualitative research tools. These can complement quantitative analysis (Note 3) in understanding the distributional impacts of consumer price reforms on households (see box O.1). Focus group discussions and in-depth interviews are the most commonly used tools. They rely on open-ended questions

BOX O.1: COMBINING QUALITATIVE AND QUANTITATIVE TOOLS

Combining qualitative and quantitative tools can provide a comprehensive understanding of the poverty and welfare impacts of energy subsidy reforms. They can be integrated in a parallel, sequential, or iterative way. In parallel approaches, the quantitative and qualitative research teams work separately, but compare and combine findings during the analysis. Where there are resources to conduct a household survey, qualitative findings can be used to inform the design of the survey and help define survey questions.

Sequential and iterative approaches, on the other hand, require varying degrees of dialogue between the qualitative and quantitative research at all phases of the research (Rao and Woolcock 2003). In the context of energy subsidy reforms, parallel approaches are frequently used. For example, qualitative assessments can show the value of collecting seasonal data in energy expenditures, thus informing the design of new survey modules, and conversely, available survey data can inform qualitative research, such as by highlighting specific locations or categories of respondents to target in focus group discussions, or the types of issues to be discussed.

and give voice to citizens to describe their own experience in dealing with welfare impacts.

Focus group discussions and in-depth interviews also allow exploration of consumer perceptions and attitudes to reforms and mitigation measures, and the social and political factors driving these perceptions and attitudes. As such, they can provide inputs to the design of a communications campaign (Note 10), and should be designed to serve both purposes. These tools are geared toward a relatively rapid qualitative assessment, although other tools involving ethnography and participant observation, among others, can also be used. The latter require a longer timeframe and deeper immersion of the researcher in the field.

Specific areas of investigation include household use of energy and the direct impacts that subsidies have on their livelihoods, including whether they have had to develop coping mechanisms to deal with unintended consequences of subsidies (such as energy shortages and high prices of liquid fuels on black markets) in addition to coping with price changes following the subsidy reform.

Note 4 provides detailed guidance on how to design focus group discussions and in-depth interviews, how to adapt these to the context, and how to select a sample. Sample guides for each method are provided in the technical annexes. Section 4 of the note provides a step-by-step checklist of how to conduct the research, while section 5 gives some tips and advice on analyzing and validating research findings.

NOTE 5 provides guidance on the analysis of social protection options available to governments to mitigate the adverse effects of higher prices. The main goal is to understand the coverage and adequacy of existing social safety nets, as well as their capacity to be expanded, if needed. Four options are available to governments: (a) keep and not make changes to the existing program, (b) increase benefits, (c) expand coverage, and (d) launch new programs. An important aspect is the delivery system within a given country's existing social safety net system. The framework for the delivery systems is organized around five important interrelated components: (a) the delivery chain; (b) institutions and governance; (c) information systems platform; (d) citizen interface; and (e) performance monitoring, evaluation, learning, and adaptation. For each component, the note outlines the detailed questions that structure the analysis, data sources, and primary steps to perform the analysis.

In general, the assessment of existing programs should begin in parallel with the assessment of impact on households, and particularly analysis of which segments of the population will be affected and how (Note 2). Combined, these two areas of investigation form the basis for evaluating options for delivering more benefits through social safety nets. The note describes where the data on existing social programs can be found and some tools that can be used to model mitigation scenarios. It is also useful to capture questions on people's perceptions of social protection programs in the qualitative tools (Note 4), given enrollment in social safety nets carries a stigma in some countries. The assessment of the fiscal cost of compensation under different scenarios can then be provided to the fiscal analysis (Note 2).

IMPACT ON FIRMS

NOTE 6 looks at the impacts on firms, an area little studied and for which a broad body of research does not exist. The note proposes a

framework to think through the channels of firm-level impacts and some approaches to their assessment.

Firms form the largest consumers of energy and, as such, the impact of price subsidies and their reforms on firms merit close attention. Prices that are kept artificially low distort firms' production choices, particularly in energy-intensive sectors. While efficiency gains from reforming price subsidies can be expected at the sector level in the long term, firms may be heavily impacted in the short term, with social and political consequences that governments need to foresee and be prepared to manage.

The analytical approach and tools proposed provide diagnostics on three important issues. First, they allow estimation of the distortionary effects of existing energy price subsidies and the potential efficiency gains from their removal. Second, the approach helps identify those sectors and firms potentially at risk from higher prices induced by the price subsidy reform in the short term, and quantify the potential effects, both direct and indirect, through industry linkages following different transmission channels. Third, the proposed analysis helps identify some of the potential longer-term benefits of subsidy reforms.

Alternative approaches for assessing the impact of price subsidy reforms on firms or economic sectors are proposed for countries with different types of data. A full methodology is proposed for application where high-quality, firm-level panel data are available, and alternative approaches for countries with less detailed, firm-level data or only industry-level data. The note has several annexes, including a checklist for each step and some mathematical formulations.

IMPACT ON THE ECONOMY AND THE ENVIRONMENT

NOTE 7 proposes a series of models to estimate impacts of reform on macroeconomic indicators, such as economic growth, gross domestic product by expenditure or by industry, the balance of payments, government fiscal aggregates, labor markets, and financial markets (inflation, interest rates, and exchange rates).

A first approach is using input-output models and social accounting matrix multiplier models to take into account interactions between different sectors of the economy, providing insights into the indirect effects of price subsidy reform on household expenditures and cost structures of firms.

Alternatively, macrostructural models based on econometrically estimated relationships can be used to track the short-term and cyclical impacts of the initial price shock more realistically. However, they do not allow the same level of sectoral or product detail as CGE, or partial equilibrium models.

Data permitting, CGE models have generally been the tool of choice for analysis of the long-term effects of energy price subsidy reforms because they capture the many complex direct and indirect effects of these reforms on the structure of the economy while allowing for stimulation of price changes for individual energy products. However, CGE models require a lot of data manipulation and careful calibration of the input-output table and social accounting matrix upon which they are based in order to break down the impact of price subsidies to different energy products.

Note 7 provides detailed guidance on how to disaggregate input-output tables and social

accounting matrix into the energy products of interest and how to simulate different types of energy subsidies using a CGE model. This requires close collaboration with the energy expert and analysis from Note 1. Integrating distributional analysis of households in the CGE model calls for a close collaboration with the poverty expert and analysis from Note 3. CGE models can also be used to project long-term fiscal impacts of reforms, integrating the choice of how the government can spend any additional fiscal space created by the reform. This should be informed by the fiscal analysis of Note 2. Finally, CGE models can be adapted to estimate the impact of higher energy prices on global greenhouse gas emissions, with the help of an environmental specialist.

NOTE 8 focuses on economic valuation of health effects of air pollution associated with energy price subsidies. This note involves multiple fields and disciplines and attempts to provide clarity by breaking the assessment down into several distinct steps, each with its own methodologies. The assessment involves analyzing (a) the effect of artificially low prices on levels and patterns of energy consumption (section 4), (b) air emissions from the combustion of fossil fuels (section 5), (c) human exposure to air emissions (section 6), (d) health effects of exposure to particulate air pollution from the combustion of both fossil fuels and solid biomass (section 7), and (e) monetary valuation of health effects (section 8).

Price subsidies aggravate air pollution when they increase the combustion of fossil fuels, with one important exception. Where households are currently using subsidized LPG, natural gas, or electricity for cooking and heating, or subsidized district heating for space heating, and the alternative to consuming the subsidized energy is the traditional use of solid fuels (solid biomass or coal), subsidy removal would worsen air pollution and health damage.

As a general rule of thumb, the pollutant most damaging to health is fine particulate matter. Natural gas and LPG contribute little to fine particulate pollution, making them suitable for use by households for cooking and heating. For outdoor air pollution, the focus of Note 8 is therefore largely on subsidies that increase the consumption of coal, gasoline, diesel, and fuel oil. For indoor air pollution, the focus is relative affordability of solid fuels (coal and solid biomass) on the one hand and household energy that is clean at the point of use (electricity, natural gas, LPG, and district heating) on the other. Main contributors to fine particulate air pollution are (a) mobile sources using gasoline and diesel; (b) household use of solid fuels for cooking and heating; (c) small and numerous stationary sources, such as diesel backup power generators; and (d) large stationary sources, such as power generation plants and factories consuming coal, diesel, and fuel oil.

Recent meta-analyses of the price elasticities of energy demand by type of fuel and energy provide a basis for assessing the effect of subsidies on energy consumption. Cross-price elasticities may be applied in sectors and to fuels where significant fuel substitution may be expected. Where automotive gasoline or diesel is subsidized, using country-specific urban transport-environment models is recommended, if available, because of the complexity of air emissions from motor vehicles. However, as with estimation of the impact of higher energy prices on household expenditures and energy use patterns (Note 3), a lack of information on the prices actually paid and the extent of energy shortages present challenges. More seriously, with the exception of sulfate-based secondary fine

particles from small sources, fine particulate levels in the atmosphere depend only weakly on fuel consumption and much more on the technical states, as well as the operating characteristics of stationary and mobile sources burning the fuel. Yet taking account of these factors is beyond the scope of any study, forcing analysts to make vastly simplifying assumptions.

The note advocates the use of intake fractions to estimate population exposure to fine particulate matter, an approach taken in some recent studies of the global burden of disease. The intake fractions are combined with the relative risk functions for major health outcomes of air pollution from the Global Burden of Disease Project (Forouzanfar and others 2016) to estimate the health effects from energy subsidies. The note proposes a geographic-demographic scale consisting of (a) urban areas with populations of more than 100,000, (b) urban areas with populations of less than 100,000, and (c) rural areas. It then discusses the availability of monitoring measurement data and alternative options for estimating ambient concentrations of fine particulate matter at the proposed geographic-demographic scale, as well as approaches that can be used to deal with data scarcity. The proposed method for economic valuation of mortality caused by air pollution uses a cross-country transfer method of the value of statistical life. Finally, methods for incorporating the valuation of increased illnesses are outlined, although morbidity is generally found to constitute a relatively minor share of health costs of air pollution.

ASSESSING THE POLITICAL CONTEXT AND PREPARING COMMUNICATIONS

Political-economy factors are central to the success and failure of energy subsidy reforms, but they are difficult to address for at least two reasons. One is the sheer complexity of these factors and their dependence on the country's historical path. The other is that these factors themselves are politically sensitive to study and utilize.

Any political-economy analysis requires analyzing and mapping the goals and capabilities of major interest groups, both organized and unorganized. Note 9 provides a framework for understanding the relative power of those groups affected by the reform. The analysis aims to achieve three goals:

- A political explanation for the country's current energy subsidies
- An understanding of the history of reform, including how successes or failures in past reforms can inform what may be possible for future reforms
- An assessment of the prospects and identification of elements of most suitable strategies for reform in the future

NOTE 9 identifies the information required for the analysis, and then describes how to obtain that information—initially with desk research and then with structured interviews.

The political-economy analysis draws on the information gleaned from other analyses in ESRAF. The stated goals of the subsidy schemes, the initial period and context when the subsidies were introduced, the evolution of the subsidy policy since introduction, type and size of subsidies, the mechanisms used

to deliver subsidies, and who ultimately pays for them can be obtained from Note 1; their cost to the government from the fiscal analysis in Note 2; and who receives them from the energy, poverty, and firm analysts (Notes 1, 3, and 4 for households, and 6 for firms and economic sectors). Finally, the social protection specialist can outline options available to mitigate adverse impacts on the poor and the vulnerable (Note 5).

Three types of information inform a forward-looking political-economy analysis of the subsidies and their reform. The first is the decision-making structure, including the institutional setup, the de facto control over subsidies, and the influence of interest groups over these decisions. In addition, the note recommends taking a historical perspective on how these structures have evolved. Second is the stakeholder interests and dynamics. The note sketches matrices to map out the ability of groups to organize for or against the reform and their relative benefits and disbenefits due to the subsidies. A simple framework then allows inference of the conditions that affect the likelihood of a successful reform under each case. Third, the note proposes retracing the track record with reform and mapping it out to understand historical factors influencing success.

A first step toward reforms often requires that the subsidies and their costs become better known, as well as social safety nets that will be used to mitigate adverse effects, something that can be achieved through communications campaigns. The importance of communications is often overlooked, receiving the attention of reformers in the government at a late stage. While it comes last in ESRAF, it is recommended that governments begin, as early in the process as possible, the upstream work on communication defined below in parallel with the analysis of impacts.

NOTE 10 on communications discusses how to raise awareness about the subsidies and the government's intentions, and build acceptance for the reform, thereby lowering its political cost. It covers several important aspects of communications campaigns, including the tools for (a) identifying and consulting stakeholders, (b) conducting research on opinions, and (c) delivering tailored messages. Communications campaigns implemented in support of energy subsidy reform can take many forms. Note 10 outlines common elements and proven practices that transcend country borders and political contexts.

The note provides step-by-step guidance for an approach that starts with establishing the objectives, timeline, and governance for the communications campaign. The second step involves mapping the main internal and external stakeholders according to their level of importance and influence over the reform agenda. This should be carried out in parallel with the political-economy analysis (Note 9). Next, the note provides some instructions on how to conduct opinion research to understand stakeholder views. More detailed information on these qualitative tools can be found in Note 4.

Note 10 provides additional guidance on coordinating, through a range of institutional bodies, a common approach to messages about energy subsidy reforms among internal stakeholders. The fourth step provides guidance on creating and pretesting compelling messages to address external stakeholders' views and build awareness. A simple set of characteristics of what makes a good message is outlined. The fifth step concerns the messenger. In particular,

the note explains how to assign credible messengers and spokespeople depending on the audience, and recommends media training. The sixth step identifies the best channels for communicating messages to different stakeholders. The seventh step outlines how to set a set of measurable goals to track progress and ensure that the communications campaign is achieving its objectives.

A RAPID ASSESSMENT OF ENERGY PRICE SUBSIDIES

Where resources and time are scarce and underpricing of energy is the subsidy of interest, a rapid assessment of the magnitude of subsidies may be carried out through the price gap approach. The amount by which prices will need to rise to eliminate the price subsidies is a necessary input to all subsequent analyses of the impacts of reform on households (Note 3), firms (Note 6), and the economy (Note 7). The total value of the subsidy for a given form of energy, measured by the price gap multiplied by the total units subsidized, is an input to the fiscal analysis (Note 2), although price gaps do not usually capture tax expenditures and other fiscal losses.

A rapid diagnostic examination of price gaps may miss several dimensions of effects of subsidies and their reforms. However, where price subsidies have material effects on the government budget, it is useful to assess the government's fiscal balance and debt situation to estimate the fiscal implications of continuing with or reforming the energy price subsidies. Resources and time permitting, a more detailed model may be developed to project the fiscal implications of different reform scenarios, including the costs of different mitigation policies. In addition, a rapid assessment will rely on analysis of existing household data to estimate households' consumption of subsidized energy products, perhaps focusing only on the direct effects of reforms on prices and people's welfare—although even such a limited assessment would be difficult where there is rampant illegal diversion and black marketing of subsidized fuels or where metering of network energy consumption is poor. An assessment of existing social safety nets, in particular their ability to mitigate the adverse effects of higher prices, is among governments' most pressing concerns. A list of existing programs should be drawn up, including their basic characteristics (targeting, coverage, generosity, leakage, and administrative features, such as whether comprehensive social registries exist), and compared to the findings of the distributional analysis. The qualitative analysis can be left for a more complete assessment, especially if it requires some on-the-ground data collection. While the firm-level data needed to estimate impacts on firms may not be available, a simple analysis of energy intensity by sector using an input-output table can identify the sectors that are most likely to be affected. The macroeconomic context will help define the right timing and pace of the reform.

For the political context, a full stakeholder analysis may not be feasible. A rapid assessment should map out the different actors and interest groups, who is paying for the subsidies, how subsidies are delivered, who is benefiting indirectly or even illegally from the price subsidies, and the self-interests and capabilities of the interest groups. In addition, basic information on the history of the subsidies is vital, as well as the stated goals at the time of their creation, which partly determine how different interest groups react to the reform. A review of the press coverage and government communication about the subsidies would be a good starting point.

The checklist in the appendix aims to guide a team preparing diagnostic reports to help provide the evidence base to decide how to sequence and prioritize various aspects of a reform. While these questions may not all be addressed by a rapid assessment, they will help ensure that important main aspects are considered at the onset.

APPENDIX: CHECKLIST FOR RAPID ASSESSMENT: ANALYTICAL ISSUES RELATED TO ENERGY SUBSIDY REFORM

A. THE NATURE AND MAGNITUDE OF SUBSIDIES

1 | **What are the various subsidies** on liquid fuels (LPG, gasoline, kerosene, diesel, and fuel oil), natural gas, coal, electricity, and district heating, and what are their values, individually and combined?

- **a.** Subsidies to consumers (as well as other benefit transfers conditional upon energy consumption)
- **b.** Producer subsidies
- **c.** Financial cost of subsidies under current policies at projected benchmark prices
- **d.** Size of subsidies allocated to renewable energy as a point of comparison

2 | **How are various energy products priced?**

- **a.** Description of the pricing principles (including taxation) and mechanisms, including legal and administrative frameworks
- **b.** Price controls and smoothing mechanisms, if any
- **c.** Whether pricing and taxation principles are being followed, and if not, degree of departure
- **d.** Benchmarking against relevant international comparators

3 | **Who pays for the subsidies?**

- **a.** Tax payers (for on- and off-budget transfers for subsidies and liabilities due to guarantees, soft budget constraints, tax expenditures, and other losses of government revenue)
- **b.** Consumers of the subsidized energy (for producer support)
- **c.** Producers of the subsidized energy (for consumer support)
- **d.** Lenders and other financing institutions (debt forgiveness, concessional financing)

4 | **For what, where, to whom, and how are the subsidies delivered?**

For what

- **a.** Forms of energy subsidized
- **b.** If a liquid fuel, all of one type (for example, subsidy to all gasoline), or a particular fuel grade (subsidy to gasoline with a research octane number of 90 but not higher octane numbers)

Where

At the port of entry, upstream production, ex-refinery, at power or heat generation plant gate, wholesale, retail

To whom

- **a.** All consumers, targeted consumers, or for a specified use (such as natural gas used in vehicles, but for no other purposes)
- **b.** All energy suppliers or a select few (state-owned suppliers only or both state-owned and private)

How

- **c.** Subsidized prices provided to purchasers of energy
  - **i.** Compensated by monetary reimbursements to energy suppliers
  - **ii.** Compensated by provision of subsidized inputs, loans, tax expenditures, and other concessions made to energy suppliers
  - **iii.** Covered by financial losses suffered by energy suppliers
- **d.** Cash transfers, in-kind payments, and other benefits provided directly to consumers that are ear-marked for consumption of specific energy types
- **e.** Benefits provided to energy suppliers without lowering consumer prices, enabled by the following:
  - **i.** Higher prices paid by consumers or taxpayers
  - **ii.** Fiscal concessions, subsidized loans, shifting of risk burden from suppliers to government or consumers, and other benefits provided to energy suppliers

5 | How does actual delivery compare to the official delivery mechanism?

- **a.** Timeliness of subsidy reimbursement to energy suppliers, the size of reimbursement compared to the official guidelines, and the adequacy of the reimbursement
- **b.** Effectiveness of targeting
- **c.** Actual prices paid by consumers versus official prices set
- **d.** Amount of subsidized energy that should be available versus the amount actually available to eligible beneficiaries
- **e.** Intended versus actual beneficiaries: Percentage of intended beneficiaries reached and degree to which ineligible beneficiaries capture the subsidies

6 | How does the country compare with similar countries on the nature and volume of energy subsidies?

B. ECONOMIC AND SOCIAL CONSEQUENCES OF SUBSIDIES

7 | What is the macro-fiscal impact of subsidies?

- **a.** Evidence of pressure on fiscal balance and contribution to debt, and pressure on external balance
- **b.** Evidence of volatility in fiscal management due to volatility of total subsidies from year to year
- **c.** Potential fiscal revenue from reducing producer subsidies, such as lower tax expenditures, or from reducing consumer subsidies absorbed by energy suppliers, such as higher dividends from state-owned energy suppliers and higher corporate tax revenue
- **d.** Macroeconomic impact of removing price subsidies

8 | Do subsidies help the poor and the vulnerable?

- **a.** Distribution of subsidies by wealth status and their importance in the budgets of the poor
- **b.** Spatial (including urban and rural) distribution of subsidies, and other relevant disaggregation
- **c.** Amount captured by households versus amount captured by nonresidential consumers, and the percentage of total subsidized energy captured by poor households or other consumer categories of interest

9 | Do subsidies help improve the competitiveness of industries producing tradeable goods and services?

- **a.** What is the energy intensity of the main sectors of the economy? Are some of the most energy-intensive sectors also open to foreign competition?
- **b.** What is the level of energy efficiency of firms in these sectors?

10 | What are the opportunity costs of energy subsidies?

- **a.** Evidence of low public and private investment in energy infrastructure, such as energy shortages; international benchmark comparisons; and impact on economic growth
- **b.** Evidence of rationing of public expenditure in priority areas that could lead to higher economic growth and faster human development
- **c.** Loss in long-term growth and employment from economic distortions caused by subsidies
- **d.** Efficiency losses due to overconsumption of energy and misallocation of resources

11 | What might other consequences of subsidies be?

- **a.** Evidence of exacerbation of social harms resulting from excess production and consumption of energy, such as air pollution and greenhouse gas emissions

b. Estimation of the extent of diversion, black market activities, smuggling, and other forms of corruption

c. Health and other benefits of making modern clean household energy affordable

C. CONSIDERATIONS FOR REFORM OPTIONS AND PRIORITIES

12 | **What factors support or hinder reform?**

a. Characteristics of the energy sector: importer or exporter status, consumption share of different forms of energy, quality of energy service delivery, market concentration of energy suppliers, sector performance, sector governance, performance and other characteristics of state-owned energy suppliers, energy efficiency in the economy

b. Dependence of the economy or specific sectors on subsidized energy

c. Public perception of, and level of awareness about, energy subsidies

d. Lessons from previous experience of reforms

e. Opportunities for and hindrances to subsidy reform due to exogenous developments, such as world fuel price movements, extreme weather events, global financial crisis, and sharp currency depreciation

f. Political support for reforms

g. Key constituencies likely to benefit from or suffer losses as a result of reforms

h. Performance of social safety nets and support systems to protect the vulnerable population

13 | **What adverse effects of consumer price subsidy reforms call for mitigation measures?**

a. The poor and near-poor who will be adversely affected through direct and indirect effects of subsidy reforms

b. Appropriate monetary and fiscal policy responses to short-term macroeconomic impact on output, inflation, and other macroeconomic indicators

c. Competitiveness of industries and commercial firms reliant on subsidized energy and mitigation mechanisms to help them adapt to new input prices

ENDNOTES

1 The registry of intended nationally determined contributions, which become nationally determined contributions upon entry into force, is available at http://www4.unfccc.int/ndcregistry/Pages/All.aspx. Additional information at regional, country, and sectoral levels can be found at indc.worldbank.org.

2 Social safety nets are noncontributory transfers in cash or in kind targeted to the poor and vulnerable. Social safety nets span various forms of support: conditional and unconditional cash transfers, public works, fee waivers, food rations and feeding programs, and social services. Social safety nets are part of broader social protection and labor policies, which also include contributory transfers (such as pensions) and employment promotion (such as retraining or job search assistance). If the cash transfer or any other benefits are conditional on purchasing a specific type of energy, this framework categorizes such measures as energy subsidies.

3 Responses from more than 130,000 firms around the world are tabulated and regularly updated at http://www.enterprisesurveys.org/data/exploretopics/infrastructure.

4 Stochastic models, however, are unlikely to be suitable in countries with material dependence on oil revenue combined with subsidies on petroleum products, because oil revenue calculation is complex and not amenable to incorporation in a stochastic model.

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Energy Subsidy Reform Assessment Framework

LIST OF GUIDANCE NOTES

WORLD BANK GROUP