

Policy Monitor

Principles for Designing Effective Fossil Fuel Subsidy Reforms

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Designing Fossil Fuel Subsidy Reforms: Guidance for Policymakers

There is a strong consensus emerging within the international community that fossil fuel subsidies (FFSs) are fundamentally unsustainable; that the economic, environmental, and social side effects are severe, and include market distortions, escalating fiscal burdens, increased greenhouse gas (GHG) emissions, poverty, and income inequality (IMF 2013b). As the momentum for FFS reforms continues to build, policy practitioners can draw on the experiences and lessons of past reforms (both failed and successful) to guide the design and implementation of future reforms.

Reviews of past FFS reforms indicate that the most common driver of reforms has been mounting fiscal pressures, which make subsidy reform an attractive fiscal rescue measure (Vagliasindi 2012). Environmental and other socioeconomic objectives have at most played a secondary role. As a result, past FFS reform efforts (and evaluations of them) have focused primarily on their ability to manage downside risks (i.e., avoid public opposition and major shocks to livelihoods), for instance, through communication and compensation. While such measures are indeed indispensable, they do not necessarily guarantee that the development potential and environmental benefits of a subsidy reform are maximized.

This article distills key principles for designing effective FFS reforms, based on evidence from past FFS reforms and complemented with insights from the environmental taxation and development planning literature. Thus we provide an overview of the state-of-the-art on FFSs, as

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well as suggesting how FFS reforms can not only serve as a fiscal emergency measure, but also be more fully integrated into a country's long-term development strategy. We emphasize that FFS reform is not only about removing subsidies, it requires an integrated strategy comprising a range of carefully designed and sequenced policy measures. More specifically, we offer the following lessons and advice for policy practitioners:

- **Communication and compensation are key to managing the political economy.** If FFSs are removed without providing compensation, both households and firms will be hurt in the short run. A transparent, timely, and credible public outreach campaign is crucial for communicating the overall benefits of reform and the government's plans for mitigating price shocks and compensating those who are adversely affected. While the rich benefit the most from subsidies, the poor may suffer the most (in relative terms) from subsidy removal as energy prices increase. As we will discuss, cash transfers have emerged as an effective compensation tool: of 25 FFS reform case studies (mainly in the Middle East and North Africa), all reforms that used cash transfers and communications strategies successfully removed FFSs, but without cash transfers only 17% of reforms succeeded, and without a communication strategy only 50% succeeded (Sdralevich et al. 2014).
- **FFS reform offers an opportunity to use and strengthen social protection systems.** In countries with existing social protection and cash transfer systems, this infrastructure can be used to significantly improve the cost-effectiveness and speed of delivering targeted cash compensation. For countries without such systems, FFS reforms present an opportunity to establish national social protection programs that go beyond temporary compensation for subsidy reductions. For example, the government of Yemen established a cash transfer scheme alongside its 1996 FFS reform, which has become the country's main poverty alleviation and social assistance program, now serving more than 1.5 million households (Bagash, Pereznieto, and Dubai 2012).
- **Establish transparent systems for reinvestment and redistribution of reform revenues.** FFS reforms are also an opportunity to implement transparent institutions and prudent strategies for reinvesting reform revenues in ways that are consistent with a country's long-term development goals. Especially in resource-rich countries, this is closely linked to the issue of managing natural resource rents. Conventional sovereign wealth funds (following Norway's example) or investment funds for enhancing domestic infrastructure, social safety nets, or health and education systems (as in Mozambique, Tanzania, Uganda, Zambia, Kazakhstan, and Malaysia) can be effective vehicles for long-term reinvestment if operated with transparent management and oversight (Halland et al. 2014). Institutionalized "resource dividends" can be an effective method for redistributing resource rents directly to citizens; they have a proven track record in Alaska and, as we will discuss later, detailed viability studies have been undertaken in Uganda and Nigeria.
- **Manage energy price volatility through smoothing measures and smart timing.** Price smoothing is critical, both during and after the subsidy reform. Reform experiences from Namibia, Uganda, and Brazil show that gradual subsidy reductions can reduce energy price shocks and make compensation policies more manageable (IMF 2013a, 2013c). Recent reforms in India, Indonesia, and Saudi Arabia have also shown that aligning the timing of reforms with low international energy prices can minimize price shocks (and public opposition). Moreover, the establishment of automatic pricing and smoothing mechanisms

can help to stabilize domestic energy prices and associated tax revenues by moderating the pass-through of international market fluctuations (as has been done in Malaysia and Saudi Arabia).

- **Price deregulation is not enough: complementary policies are also needed.** Similar to a carbon tax, the reduction of FFSs increases energy prices, but may not be enough per se to trigger desired environmental benefits. Evidence suggests that even if fuel prices increase, households and firms may face significant barriers (e.g., information, capacity, infrastructure, or financial constraints) that prevent them from adjusting their behavior or investing in more efficient technology. The governments of Indonesia (since 1997), the Philippines (1998), Niger (2010), Iran (2010), and Ecuador (2015) have all complemented FFS reforms with active support to households and firms to switch from fossil to clean energy sources and increase energy efficiency. By complementing FFS reforms with wider energy sector reforms and investments, Kenya and Uganda have shown that subsidy reforms can not only improve financial sustainability, but also increase energy access, improve the distributional efficiency of electricity transmission and power supply, and replace unsustainable fuels such as charcoal (IMF 2013c).

Our discussion is organized as follows. First we provide some background on FFSs, including definitions, adverse effects, and recent reform efforts. Then we discuss the key principles for designing and implementing effective FFS reforms and illustrate them with evidence from past reform efforts. For this purpose, we discuss measures that must be taken in advance of reform implementation (including impact assessments and public communication), measures that are critical to mitigate immediate adverse effects on vulnerable population groups (including social protection and compensation), and measures that are critical to ensure the long-term sustainability of the post-FFS system (including transparent resource revenue management, reinvestment, and institutional reform). We conclude with a summary of the key insights and policy recommendations.

Background: Fossil Fuel Subsidies and Their Reform

Kojima and Koplow (2015) define an FFS as any policy action that targets fossil fuels or fossil fuel-based electricity or heat and causes one or more of the following effects: (1) a reduction in net energy costs, (2) a reduction in energy production or distribution costs, and (3) an increase in the revenues of energy suppliers. FFSs can take various forms, but can be divided into two main categories: Consumer subsidies and producer subsidies (Whitley 2013; IEA 2014).

Consumer subsidies refer to fiscal measures that lower the price of fossil fuel products below their market price (e.g., the international market price or the cost-recovery threshold), thus making such products more affordable to end users. Producer subsidies are more difficult to observe and accurately quantify, as they refer to different kinds of preferential treatment of energy intensive companies, industries, or products (GSI 2010a, 2010b). Producer subsidies may be explicit, such as direct payments or tax exemptions, or they may be implicit (i.e., in-kind), such as government guarantees to protect investment (UNEP 2003; Whitley 2013; OECD 2011). Overall, producer subsidies are estimated to be in the range of \$80 billion to \$285 billion annually in emerging and developing

countries and \$444 billion in G20 countries (Bast et al. 2015; OECD 2013), while consumer subsidies in 2013 amounted to \$548 billion (IEA 2014).

In addition to the two main categories of subsidies, the International Monetary Fund (IMF 2013a; Coady et al. 2015) provides the measure of “posttax subsidies,” which it estimates at \$5.3 trillion per year. This not only accounts for consumer and producer subsidies, but also for government failure to price the negative externalities from fossil fuel use (including the social cost of carbon emissions, local pollution, and road congestion). This definition is particularly relevant from an environmental perspective because it highlights the substantial external costs that result from FFSs. However, it should not be interpreted as an exact and fully robust quantification of externalities. For the purpose of this article, we focus on consumer and producer subsidies.

In the remainder of this section we provide a brief overview of the adverse effects of FFSs and ongoing reform efforts.

Adverse Effects

Subsidies are typically implemented with the stated intention of alleviating poverty, redistributing national wealth, or promoting economic development by supporting energy-consuming industries (Commander 2012; Strand 2013). However, the evidence suggests that FFSs perform poorly at achieving these objectives and are generally detrimental to the economic, social, and environmental dimensions of sustainable development (Rentschler and Bazilian 2016). In particular, by eliminating incentives for innovation and investment, FFSs perpetuate inefficient technology and behavior, thus reducing the competitiveness of the private sector (IMF 2013b). FFSs have also been shown to aggravate fiscal imbalances, crowd out other productive public investments (e.g., in health, education, or transport infrastructure), lead to significant energy shortages, and encourage fuel adulteration and smuggling (Victor 2009; IEA 2014; IMF 2013a, 2013b; Calvo-Gonzales, Cunha, and Trezzi 2015).

In addition, FFSs have been shown to be highly inequitable because they reinforce existing patterns of poverty and inequality (Rao 2012). For instance, empirical evidence from twenty developing countries indicates that subsidies on most energy goods are highly regressive, with an average 43 percent of the total subsidy amount reaching the richest 20 percent, but only 7 percent reaching the bottom 20 percent (Arze del Granado, Coady, and Gillingham 2012). Nevertheless, although the subsidies reaching poor households may be small in absolute terms, subsidy removal is likely to have the greatest proportional adverse impact on the poor (IEA, OECD, and World Bank 2010; Ruggeri-Laderchi, Olivier, and Trimble 2013; Dickinson 2015; Clements, Jung, and Gupta 2007).

Finally, FFSs are associated with severe environmental externalities, which in turn can have adverse impacts on human and economic development in the long run. By reducing energy prices, FFSs encourage overconsumption and remove incentives for investing in energy efficiency, modern electricity infrastructure, and low-carbon energy sources (including renewables). The International Energy Agency (IEA 2014) identifies FFS reform as one of the key measures for stabilizing global warming at 2°C above preindustrial levels, and estimates that even a partial removal of FFSs could reduce global GHG emissions by 360 million tons. At the local level, removing subsidies can help to curb traffic congestion and local pollution, and

associated health threats (Davis 2014; Commander, Nikoloski, and Vagliasindi 2015; Coady et al. 2015).

Recent Reform Efforts

FFS reform has become an increasingly high priority on the international policy agenda. For example, FFS removal is a “subgoal” (12.c) under the United Nations Sustainable Development Goals (United Nations 2015). Moreover, according to the International Energy Agency (IEA 2014), in 2014 some 27 governments were actively pursuing FFSs, including some of the countries with the largest subsidy schemes (e.g., India, Indonesia, Russia, Ukraine, Egypt, and Iran).

Although rising fossil fuel prices in the early 2000s made the continuation of FFSs increasingly unaffordable, especially for developing countries that have high subsidy rates, the track record of reforms has been mixed. For example, Nigeria’s attempt to remove FFSs in 2012 triggered extensive strikes and public protests, prompting the government to immediately reintroduce subsidies (Bazilian and Onyeji 2012; Siddig et al. 2014). The governments of Bolivia (2010), Cameroon (2008), Venezuela (1989), and Yemen (2005 and 2014) were all forced to abandon their reform attempts following strong public protests, particularly by low-income population groups (Segal 2011; IEA 2014). On the other hand, recent reforms in India and Indonesia (2014) are regarded as having been more successful (Benes et al. 2015). Overall, the successes and failures of past subsidy reforms illustrate the economic and political complexities and underscore the need for tailored and effectively designed reforms.

The Effective Design and Implementation of FFS Reforms

As discussed earlier, there is clear evidence that FFSs have detrimental effects. Thus the question for policymakers is not whether to reform subsidies, but how. The lessons learned from past reform efforts converge towards several guiding principles for the design and implementation of successful future FFS reforms. For this purpose, we define the minimum notion of “reform success” as the permanent removal of subsidies, which mitigates major economic and social disruption and ensures affordability and social protection. A more extensive notion of “success” includes not only successful subsidy removal, but also a comprehensive set of reform measures, which ensure that FFS reform contributes to a country’s long-term economic development objectives rather than simply fiscal relief.

This section describes the design and sequencing of the main elements necessary for effective FFS reforms and illustrates these elements with evidence from past reform experiences. In particular, as summarized in figure 1, we show that FFS reform is not merely about removing subsidies; rather, to ensure effectiveness and long-term sustainability, it must follow a comprehensive strategy that includes social protection measures, transparent systems for long-term revenue redistribution and reinvestment, and additional complementary policies. We discuss each of these elements in turn.

Assessment of Subsidies and Pricing Mechanisms

It can be difficult for policymakers to identify and quantify domestic energy subsidies, as reflected by the wide range of definitions and subsidy estimates discussed earlier. However, conflating

Assessment of subsidies and pricing mechanisms	Building public acceptance	Social protection and compensation	Revenue redistribution and reinvestment	Complementary measures	Timing and price smoothing
Definition	Communication strategies	Compensate vulnerable households (e.g., cash transfers)	Infrastructure investments	Support for energy efficiency and innovation	Sequencing reforms for different fuels
Identification			Public spending (e.g., health, education)	Infrastructure investments	Gradual subsidy reductions
Measurement and estimation	Mapping of interest groups	Support firms (energy access and efficiency programs)	Institutional reforms	Training and capacity building	Phase out ad hoc pricing
Assessing potential reform impacts	Stakeholder identification and engagement	Social safety nets	Tax cuts (e.g., labour taxes)	Reform market structures	Automatic fuel pricing and price smoothing mechanisms
		Anti-inflationary policies	Direct transfers ("resource dividend")	Complementary fiscal reforms	

Figure 1 Key elements of an integrated FFS reform (adapted from Rentschler and Bazilian 2016)

different types of government interventions into the same subsidy “basket” can result in generic and inadequate reform attempts. Thus, before designing a specific reform, policymakers must first conduct a thorough assessment in order to understand (1) the types and magnitude of energy subsidies, (2) whether and to what extent these subsidies are harmful and inefficient, and (3) what effects subsidy removal is likely to have, particularly on low-income households.

Three-stage assessment

To help guide such an assessment, the Global Subsidies Initiative (GSI 2010a, 2010b) proposes a three-stage process that allows policymakers to prioritize their FFS reform efforts (see also Lang 2011). The first stage comprises the definition and identification of all existing subsidies in a given sector, including both “beneficial” and “harmful” subsidies. The second stage is a quantitative measurement or estimation of the subsidies. In the third stage, the policymaker assesses whether existing subsidies are the most effective and efficient way to achieve policy objectives or if reforms are required.

Kojima and Koplow (2015) provide an overview of existing definitions of FFSs, as well as valuation and quantification methods, which can assist governments in conducting this three-stage assessment of domestic FFSs. Throughout the assessment process, policymakers must be careful not to examine subsidies in isolation from the more general issues concerning domestic energy pricing, which include

- **Pass-through:** the degree to which domestic and international price fluctuations coincide.
- **Transparency:** the degree to which the composition and regulation of energy pricing is open and transparent.
- **Enforcement:** the degree to which actual fuel pricing follows officially adopted energy pricing arrangements (GSI 2013).

Once domestic energy subsidies have been identified and quantified, policymakers need to determine whether existing subsidies meet the criteria of sustainable fiscal policy or are, in fact,

harmful from an economic, social, or environmental perspective. The United Nations Environment Programme (UNEP 2003) presents criteria for assessing whether energy subsidies are sustainable:

- **Well-targeted:** Subsidies should reach only those who are meant and deserve to receive them.
- **Efficient:** Subsidies should not undermine incentives for suppliers or consumers to provide or use a service efficiently.
- **Soundly based:** Subsidies should be justified by a thorough analysis of the associated costs and benefits.
- **Practical:** The amount of subsidy should be affordable and it must be possible to administer the subsidy in a low-cost way.
- **Transparent:** The public should be able to see how much a subsidy program costs and who benefits from it.
- **Limited in time:** Subsidy programs should be of limited duration and defined at the outset, to avoid end users getting “hooked” on subsidies and the cost of the program spiraling out of control.

While some renewable energy subsidies (e.g., feed-in tariffs) arguably meet these criteria, FFSs virtually never do because they are often highly politicized and do not achieve policy objectives effectively and efficiently. If subsidies are found to be unsustainable and harmful, then there is a case for governments to undertake reforms, which can yield substantial economic, social, and environmental dividends (GSI 2010a, 2010b). As we will discuss later, governments have, in the past, underestimated the importance of careful advance planning and have rushed (under mounting fiscal pressure) to remove subsidies, which has resulted in ineffective and thus unsuccessful FFS reform.

Assessing likely reform effects

A central element of advance planning of FFS reforms is a thorough assessment of the likely effects of such reforms. Ellis (2010) reviews analytical approaches for evaluating the effects of FFS reform and shows that general and partial equilibrium models can be used to conduct economic and social impact assessments. The objective of such impact assessments is to inform policymakers of the potential consequences of energy price increases on the income and livelihoods of various population groups and to identify effective strategies for protecting poor and vulnerable groups from energy price shocks. The impacts to examine should include both those that are direct (e.g., a decline in households' purchasing power) and those that are indirect (e.g., increased cost of nonenergy consumption).

Various such *ex ante* impact assessments of FFS reforms have been conducted that can provide guidance for policymakers seeking to estimate reform impacts. For example, econometric simulations of the fiscal and welfare impacts of fuel subsidy reforms in India, Libya, and Turkey highlight the need to provide adequate social protection (e.g., in the form of cash compensation) along with FFS reform (Anand et al. 2013; Araar, Choueiri, and Verme 2015;

¹For additional impact assessments of FFS reforms, see Jiang, Ouyang, and Huang (2015) and Ouyang and Lin (2014) for China, and Solaymani and Kari (2014) for Malaysia.

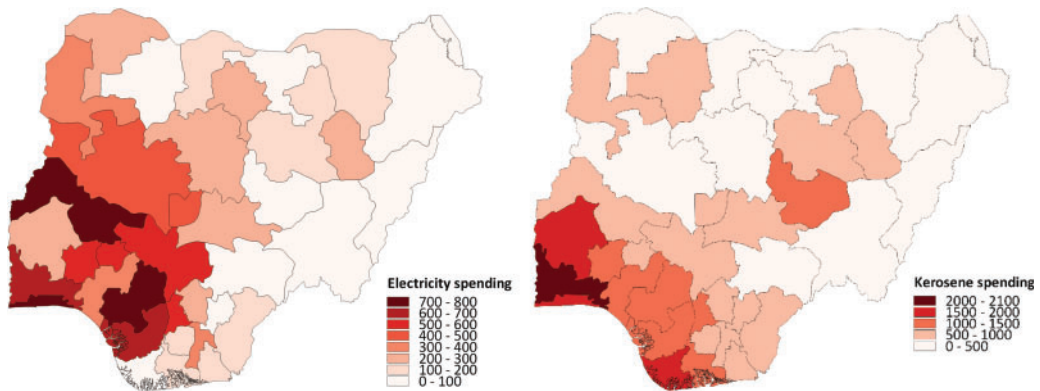


Figure 2 Average monthly spending on energy goods by Nigerian households living in absolute poverty, by state and in Naira per month.

Note: Absolute poverty is defined here as overall consumption expenditure below 55,000 Naira per year in 2010. (Rentschler 2016)

Zhang 2011). Verme and El-Massnaoui (2015) evaluate the impacts of Morocco's 2014 energy and food subsidy reform on household welfare, poverty, and the government budget, and also simulate the likely effects of further reforms; they conclude that subsidy reforms have been well designed and adverse effects managed well.¹

To facilitate such impact assessments, Araar and Verme (2012) provide an analytical toolkit that enables policy analysts to simulate the effects of subsidy reforms using a single cross-section dataset. Moreover, the IMF (2008) provides a practical but more general guide to conducting comprehensive poverty and social impact analyses for macroeconomic and fiscal policy reforms. Ultimately, the purpose of such impact analyses is to identify vulnerable population groups and design adequate compensation schemes.

Public Acceptance and Social Protection — Mitigating Short-Term Price Shocks

In order to build public support for FFS reforms, it is essential to communicate and implement effective compensation and social protection schemes (World Bank 2014b). Although the poor account for a relatively small fraction of total energy demand, FFSs may constitute a significant share of this group's overall income (Arze del Granado, Coady, and Gillingham 2012). Thus, removing subsidies may have detrimental effects on the livelihoods of the poor, especially if they rely on energy-intensive income-generating activities. Moreover, the degree of energy dependence can vary significantly, even for households in the same bottom income quintile, depending on energy access and regional circumstances, including urban versus rural (Rentschler 2016).

Energy subsidies and poor households: lessons from Nigeria

Data from Nigeria on household expenditure illustrates how some low-income households' reliance on FFSs may be far greater than the average for their income group, suggesting that these households may be far more vulnerable to experiencing a substantial income shock when FFSs are removed (Rentschler 2016). As shown in figure 2, while in most states the poorest households do indeed consume very little kerosene, in several southern states kerosene consumption by the poorest is significantly above the average for their income group. These

regional differences may reflect issues such as differences in employment types, access to energy, and availability and affordability of alternative fuels.

This highlights the importance of focusing on the implications of FFS reform for different energy goods, income groups, and regions and tailoring reforms and social protection measures to the needs of specific population groups. If policymakers focus only on national averages and use income levels as the sole indicator of vulnerability, they may underestimate the vulnerability of certain population groups and provide inadequate social protection measures for the poor. For example, “blanket” compensation (i.e., uniformly covering a large share of the population) may provide adequate compensation on average, but it is likely to fail to protect particularly vulnerable households.

Communication

The main obstacles to FFS reform tend to be political challenges rather than fiscal complexity (Calvo-Gonzales, Cunha, and Trezzi 2015; Rentschler and Bazilian 2016). Thus, in order to generate public support for FFS reforms, transparent, credible, and clear communication and public outreach campaigns play a central role (GSI 2013). Such campaigns must detail the reasons for and benefits of reforms and address the public’s concerns with realistic plans for mitigating adverse effects on energy affordability and poverty. If communication is not credible, or is not followed by actions, past experience shows that public opposition to FFS reform is likely (Segal 2011).

Cash transfers

Ruggeri-Laderchi, Olivier, and Trimble (2013) provide an in-depth account of the challenges associated with reconciling the need for subsidy reforms with the imperative of ensuring social protection and maintaining affordability. In particular, direct cash transfers have been an important component of numerous successful FFS reforms in the past (Vagliasindi 2012; IMF 2013a, 2013c; Salehi-Isfahani, Stucki, and Deutschmann 2015). For instance, Sdralevich et al. (2014) note that out of a series of FFS reform attempts in the Middle East and North Africa, all reforms that used cash and in-kind transfers were successful, while only 17 percent of the FFS reforms that did not include cash transfers were successful.

In another example of cash compensation, Iran implemented subsidy reforms in December 2010, increasing the price of petroleum products by between 230 and 840 percent. However, prior to the removal of subsidies, the government started making monthly cash payments to 70 to 80 percent of all citizens. The government later increased its targeting to the poor and vulnerable, facilitating transfers by opening bank accounts for heads of households. Overall, this structured cash transfer scheme and its timely implementation are argued to be two reasons for public support of Iran’s 2010 FFS reform (Salehi-Isfahani, Stucki, and Deutschmann 2015). Recent subsidy reforms in Indonesia (2005 and 2014), Mauritania (2012) and Armenia (2000) also relied on cash transfers.

The effectiveness with which cash transfers can be disbursed also depends on the existing social protection infrastructure. For instance, if a government maintains systematic records of the beneficiaries of existing social protection schemes, then compensatory cash transfers can be administered more easily. In fact, large-scale cash transfer systems already exist in several countries (e.g., Brazil’s Bolsa Familia, Mexico’s Prospera), which could be used as

compensation vehicles for subsidy reforms. However, in certain circumstances, in-kind transfers and compensation measures may be easier and quicker to administer than cash transfers (e.g., if the banking infrastructure is inadequate). The IMF (2013a, 2013c) discusses past FFS reforms that have relied on such in-kind compensation measures targeted to the most vulnerable households. These include the provision of gas vouchers (Brazil, 2002), college scholarships and rice subsidies (Philippines, 1998), and the strengthening of social safety nets (Armenia, 1995–1999), all of which can assist in coping with price shocks. In addition, as we discuss later, governments can mitigate price shocks by implementing reforms in phases.

Ensuring social stability and public support

Compensating vulnerable households is also critical for ensuring social stability and public support for reforms. Especially in countries where low-income and vulnerable households account for a large share of the population, disregarding their needs and endangering their livelihoods can result in nationwide unrest. In Nigeria, for example, inadequate attention to the needs of low-income households in 2012 resulted in public protests and fierce opposition (Bazilian and Onyeji 2012; Siddig et al. 2014). Public protests were concentrated in urban regions (e.g., Lagos, Abuja), where low-income households are particularly fuel dependent (figure 2).

Private sector compensation

The need for compensation measures applies not only to households, but also to the private sector. In particular, it may be difficult for small businesses and energy intensive industries to quickly adjust their operations to the energy price shock associated with subsidy reduction (Rentschler and Kornejew 2016). Without adequate support measures in place, economic activity and jobs may be at risk. Recognizing this risk, the Iranian government complemented its 2010 fuel subsidy reform with financial and technical support to help enterprises cope with higher energy prices, for example, by restructuring and reducing their energy intensity (IMF 2013a, 2013b). In other examples, transport businesses in Niger were offered temporary subsidies (in 2010) to cope with the higher energy prices resulting from the reduction in diesel and petrol subsidies, while the governments of Indonesia (1997) and the Philippines (1998) provided support to small businesses to help them convert to more efficient and cheaper energy sources (mainly liquefied natural gas; IMF 2013a, 2013b).

Short-term versus long-term measures

Broadly speaking, by compensating for sudden energy price increases, compensation measures (such as cash transfers) help to manage the downside risks of FFS reforms for vulnerable households and firms and can increase public acceptance of reforms in the short term. However, it is important to note that these short-term compensation measures cannot replace longer-term measures for reinvesting reform revenues, such as infrastructure investments and public spending. Compensation measures per se do not guarantee that FFS reform will lead to transparent postreform fiscal governance and equitable redistribution. Thus, whether FFS reform is successful in the long-term (i.e., is an efficient and equitable alternative to FFS) depends on mechanisms for efficient energy pricing, prudent overall fiscal policy, and sustainable reinvestment of revenues.

Revenue Redistribution and Reinvestment in the Long Term

FFSs are often substantial relative to gross domestic product. Thus it is crucial for policymakers to make transparent their plans for allocating the revenues from FFS reform in a way that is consistent with a long-term development and public finance strategy. Depending on a country's specific needs, the use of FFS reform revenues for prudent and sustainable development financing can take many forms, including investments in infrastructure, social safety nets, health, and education.

Investing revenues domestically or abroad

Resource revenues that are no longer devoted to an FFS could be invested abroad, with the objective of generating a future revenue stream (Gelb et al. 2014). However, there is also a strong rationale for developing countries to invest natural resource revenues domestically, despite several macroeconomic risks (e.g., exacerbating boom–bust spending cycles; Gelb et al. 2014). By using transparent public tenders and international partnerships, public domestic investments have the potential to yield significant development benefits and are generally preferable to using resource revenues for FFSs (Halland et al. 2014). For instance, investments in education systems in Indonesia in 2008, in health care in Nigeria in 2011, and in social protection programs in Mauritania in 2011 were measures aimed at reinvesting the funds unlocked from subsidy reforms, and thus contribute to the longer-term development of an economy (IMF 2013a, 2013c).

Particularly in resource-rich developing countries, where FFSs are often financed by resource exports, subsidy reform is also an opportunity to create institutional and regulatory frameworks for transparent management and reinvestment of natural resource revenues.

Permanent cash transfers

As discussed earlier, cash transfers are a crucial tool for compensating vulnerable households. However, cash transfers are often gradually phased out once they have helped to smooth short-term energy price shocks. Recently the notion of institutionalized long-term programs of universal cash transfers (i.e., uniform lump-sum payments to every citizen) has been gaining traction in debates about how to redistribute funds in resource-rich developing countries. Studies suggest that permanent cash transfers can be an efficient and equitable tool for redistributing resource revenues, consistent with overarching development objectives of reducing poverty and inequality (Plante 2014).

Concrete proposals to institutionalize universal cash transfers exist for Ghana, Uganda, and Nigeria (Moss and Young 2009; van der Ploeg, Stefanski, and Wills 2011; Gelb and Majerowicz, 2011; Sala-i-Martin and Subramanian 2013; Standing 2014). These proposals extend the role of cash transfers from short-term compensation towards long-term redistribution, with the underlying notion that lump-sum transfers, which are paid uniformly to the entire population and funded by resource or FFS reform revenues, are a significantly more equitable and efficient way of stimulating development than FFSs (Segal 2011; Fay et al. 2015). Besides reducing poverty rates, universal transfer schemes (or “resource dividends”) have also been argued to enhance the efficiency of public spending and increase accountability and transparency more generally (Van Parijs 2004; Devarajan, Le, and Raballand 2011; Sala-i-Martin and Subramanian

2013). In addition, Plante (2014) presents theoretical evidence that replacing subsidies with uniform cash transfers may reduce long-run aggregate welfare losses by a factor of 15 to 25.

Although universal cash transfer schemes have frequently been used as a compensation measure, there is little evidence that they have been used as long-term redistribution programs in conjunction with FFS reform. There are some successful real-world examples, however. The Alaska Permanent Fund—a sovereign wealth fund—directly applies the concept of universal cash transfers. Since 1982 it has redistributed resource revenues by paying an average unconditional annual dividend of \$1,200 to every resident of Alaska (Widerquist and Howard 2012).

Other types of funds for managing resource rents exist in a large number of developing and developed countries (Makhlouf 2010; Gelb et al. 2014). In some cases (e.g., Norway and Malaysia), these funds are thought to be at the core of sustainable resource revenue management and successful economic development. This suggests that reforming FFSs is not only about removing subsidies, but can also be an opportunity to reform the management of resource revenues to promote a country's long-term development and to improve fiscal governance more broadly.

Complementary tax reform and the double dividend

There is a prominent strand in the environmental taxation literature suggesting that there is a “double dividend” - i.e., if environmental taxes are increased but other distortionary taxes are reduced (while maintaining revenue neutrality), then not only can environmental benefits be reaped, but also fiscal efficiency can be increased (Goulder 1995b; Fullerton and Metcalf 1997). Especially given the significant economic efficiency costs of labor and consumption taxes (Bovenberg and Goulder 1996; Goulder 1995a; Parry 1997), there may be a rationale for using FFS reform revenues to reduce these taxes. However, there is a trade-off between efficiency and distributional effects (Parry and Williams 2010). That is, income tax reductions are economically efficient, but regressive, while cash transfers are progressive, but less efficient. Moreover, whether it is practical to use tax cuts to redistribute FFS reform revenues depends largely on country-specific characteristics. For example, in economies with large informal sectors, tax cuts are unlikely to reach the entire population and may need to be complemented with other measures, such as direct transfers.

Complementary Measures

Although there are differences in practice, in principle FFSs are equivalent to a negative carbon tax. Economists have long favored such price-based instruments for addressing environmental externalities. In fact, in the global debate about climate change mitigation policy, the implementation of carbon taxes has been one of the most frequently and prominently proposed measures (Sterner 2007; World Bank 2014a). However, although the implementation of carbon taxes and FFS reforms are indeed crucial steps toward accounting for the external costs of carbon and thus for reducing GHG emissions, complementary policies are required to ensure that these price-based measures are effective and publically acceptable (Fay et al. 2015).

For instance, Avner et al. (2014) find that in an urban setting the effectiveness of carbon and fuel taxes is cut in half when they are not complemented by investments in public transport infrastructure. This is because even if fuel prices increase, people will continue to rely on fossil fuel-intensive private transport if there are no public transport alternatives.

This example highlights that even if subsidies are reduced and fuel prices increased, there may be significant barriers that make households and firms unable or unwilling to adjust their behavior or invest in more efficient technology (Rentschler, Bleischwitz, and Flachenecker 2016). These barriers may include information, capacity, or financial constraints or may be related to infrastructure, fiscal mismanagement, market structures, or systemic risks and uncertainty (including the long-term credibility of such fiscal policy). This means that it cannot be taken for granted that the removal of subsidies will alone automatically trigger large environmental benefits. For instance, trade or information barriers may prevent firms from having access to modern, energy efficient technology, which they could install once energy prices increase. Capacity or financial constraints may cause firms to struggle to implement energy efficiency measures or prevent households from retrofitting their dwellings to increase energy efficiency. As emphasized by the World Bank (Fay et al. 2015), environmental taxes or FFS reforms alone cannot address the complexity of existing market and government failures.

Fay et al. (2015) provide an overview of the types of complementary policy measures that may be needed in the specific case of carbon taxes. These measures cover a wide range, including government support for research, development and innovation, performance standards, fiscal incentives for green investments, and social policies. Broadly speaking, the objective of such complementary measures is to (1) ensure that the necessary technologies are available and affordable, (2) ensure that there is adequate infrastructure (e.g., for transport or electricity transmission), and (3) account for biases and barriers that prevent behavioral change (Rozenberg, Vogt-Schilb, and Hallegatte 2014; Fay et al. 2015).

In practice, complementary policies for FFS reforms can comprise a large variety of measures, which ultimately depend on country-specific needs and circumstances. For example, in the case of Indonesia, the government was concerned that removing subsidies for kerosene (frequently used as a cooking fuel) would prompt poor households to switch to energy sources that are more harmful to health and the environment (e.g., charcoal, biomass) (IMF 2013a, 2013b). To prevent this, the government complemented its subsidy reform program (which began in 1997) by providing support to households to convert to liquefied petroleum gas (LPG), for example, by offering free LPG ovens. Similar measures were undertaken in Niger in 2010 and the Philippines in 1998. Other governments have addressed financial constraints by establishing dedicated loan facilities to finance firms' investments in energy efficiency (e.g., Iran in 2010). In another example, Kenya complemented its 2005 fuel subsidy reform with large-scale investments in electricity infrastructure, allowing households to switch away from fossil fuels (such as kerosene or charcoal) for domestic needs (IMF 2013b, 2013c).

Finally, in Ecuador, complementary measures form the foundation for the government's ongoing FFS reform program. Rather than focusing on the removal of FFSs, the government has been implementing the Efficient Cooking Program, which subsidizes electricity and provides low-cost electric induction stoves to households. The aim is to radically reduce demand for subsidized LPG. With residential demand in Ecuador accounting for 92% of LPG use, by incentivizing a large-scale fuel switch away from LPG, the government can maintain existing LPG subsidies until LPG demand has diminished,

²The initial successes of Iran's subsidy reform program were reversed to a large extent by the effects of economic sanctions.

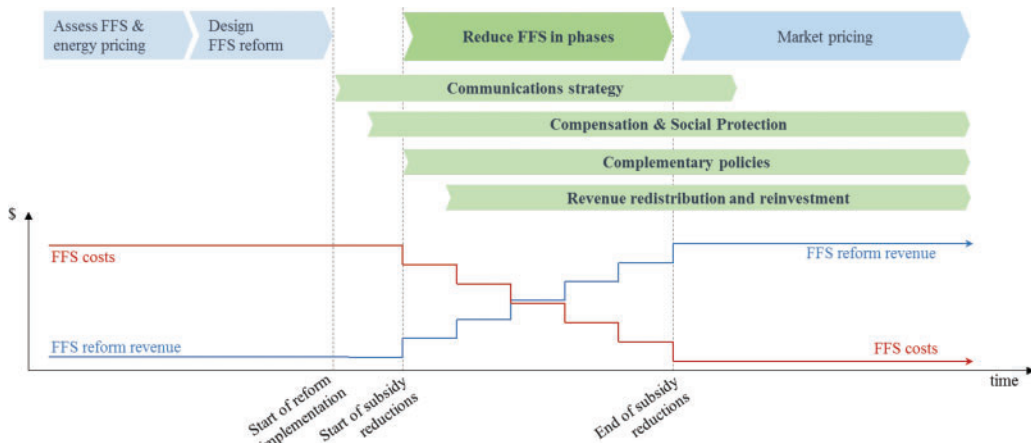


Figure 3 An illustration of the timing and sequencing of FFS reform components.

and thereafter remove FFSs in a formal, inconsequential step (Ministerio del Ambiente 2015).

Timing and Price Smoothing

The potential for a reform to be successful depends to a large extent on external factors (e.g., fuel prices) and political circumstances (Fattouh and El-Katiri 2013). This underscores the vital role of getting the timing right: decreasing fossil fuel prices may temporarily ease the fiscal pressures of subsidies, but they also provide an opportunity for governments to eliminate FFSs. Fuel subsidy reforms in India (November 2014) and Indonesia (December 2014) have highlighted how political will for reform paired with low oil prices can pave the way for a smooth implementation of FFS reforms (Benes et al. 2015). However, these successful reforms were preceded by a thorough process of planning and preparation. We will argue in this section that effective FFS reform includes (stepwise) subsidy removal, but also depends on the careful timing of complementary measures (such as communication and compensation; see figure 3).

Timing is crucial not only for determining when but also how to reform. The GSI (2013) underscores the importance of avoiding large sudden price shocks and thus recommends reducing subsidies gradually. The mostly unsuccessful reform attempt in Nigeria (2012) illustrates why: with little advance notice, the government removed FFSs entirely, causing a one-time 117% increase in energy prices. The benefits of removing subsidies had not been sufficiently communicated to the population and intense public protest ensued (Bazilian and Onyeji 2012). In contrast, the experience in Iran (2010), which phased in subsidy reductions over 5 years, shows that gradual adjustments and well-timed reform measures can be successful. Moreover, in Iran, the benefits of reform were clearly communicated in advance and compensatory cash payments were provided to 70–80 percent of the population before the first stage of the fuel price increase (Salehi-Isfahani, Stucki, and Deutschmann 2015).²

The issue of “price smoothing” is relevant not only during reform implementation, but also concerns the postreform energy pricing regime. Indeed, instead of pure market pricing, many countries have implemented pricing mechanisms that prevent fluctuations in the international fuel price from translating uniformly into domestic retail prices. Such

pricing mechanisms can be important when liberalizing fossil fuel prices, as the removal of subsidies typically not only increases energy price levels, but also exposes households and firms (thus tax revenues) to the risk of price volatility. Coady et al. (2012) provide guidance for designing and implementing automatic fuel pricing mechanisms with smoothing functions that avoid adverse consequences on tax revenues. Implementing such pricing mechanisms can help governments to protect postreform fiscal stability against volatility. Based on data for 68 resource-rich countries, Sugawara (2014) finds that stabilization funds can indeed help governments to smooth expenditures. However, Coady et al. (2012) emphasize that to protect low-income households, direct measures are needed in addition to automatic pricing mechanisms.

Conclusions

This article has presented evidence from the economic development literature and country case studies of past subsidy reforms to identify key principles for designing and implementing effective FFS reforms. Past reform efforts show that despite strong incentives for subsidy reform, the record of success has been mixed and reform failures have often been rooted in a violation of the principles we have highlighted here.

To summarize, we have argued that the success rate of reforms is significantly improved when reforms are guided by strong government commitment and credibility, thorough preparation, careful reform design, effective communication, and smart timing. In particular, we have highlighted that FFS reform is not only about removing subsidies, but also requires a range of carefully designed and sequenced policy measures that help to ensure public support and social protection of vulnerable population groups.

In addition, we have argued that governments have typically focused on managing the downside risks of reforms and have thus fallen short of maximizing the development potential associated with subsidy reform. For this purpose, complementary measures and prudent reinvestment of reform revenues are critical to ensure that such reforms provide not only short-term relief in times of fiscal crisis, but also serve as a fully integrated component of a long-term sustainable development strategy. Moreover, complementary policies and structural reforms can integrate FFS reforms into long-term sustainable development strategies.

The need for a variety of policy measures also means that FFS reforms are not a purely fiscal task. Rather, they require multisector collaboration that includes fiscal and environmental policy; the energy, transport, and industrial sectors; poverty and social protection; as well as natural resource management and development financing.

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