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The Socioeconomic Impacts of Energy Reform in Tunisia

A Simulation Approach

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Abstract

Tunisian social development policy making has always counted on energy subsidies to play a pivotal role. Due to the increasingly unsustainable budget implications, a new strategy has begun to reform the subsidy system in the energy sector while striking a balance between improving fiscal and equity considerations without increasing social tensions. This paper presents an analysis of the fiscal and distributive consequences of the changes to the subsidy setup announced by the government at the end of 2014. The results show that raising electricity prices for consumers and removing subsidies for other energy sources would lead to a short-term increase in the poverty rate of 2.5 percentage points. In addition, compensation mechanisms that could be readily implemented (such as universal coverage or building on the existing health cards system) will not bring substantive counterweight to the increased poverty, even if all savings of reforms could be perfectly channeled as cash transfers. The analysis suggests that bold reforms of energy subsidies need to be accompanied by equally bold improvements to the targeting schemes of public spending if poverty and disparities are to be substantively reduced.

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The Socioeconomic Impacts of Energy Reform in Tunisia: A Simulation Approach

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1. Introduction

Tunisia's improvements in monetary poverty have not translated into substantive reductions in disparities and unequal opportunities across individuals and regions. Poverty incidence declined from 35% in 2000 to 15% in 2010 (INS, BAD, and World Bank 2012). Rapid growth rates and generous universal subsidies, especially on energy, food and transport, contributed to that successful poverty reduction, but did not have a similar effect on reducing inequalities. Despite the halving of poverty rates, the Gini coefficient only fell from 0.344 to 0.327 during the same period—a 2 percentage point effect 10 times smaller than that observed for poverty.

Furthermore, drops in inequality where observed *within* regions while inequality *across* regions increased, leading to the concentration of extreme poverty in the (typically less well-off) western regions, which increased to 70% in 2010. In the midst of rapid economic growth and significant poverty reduction, the lack of equal economic opportunities may have contributed to the massive protests that ousted Ben Ali from power in Tunisia and ignited political uprisings in other parts of North Africa and the Middle East (MENA).

Subsidies are integral to the story of growth, poverty and disparities in the MENA region, and Tunisia's tale is no different. IMF (2014) highlights that the generalized price subsidies constitute a critical foundation of the "social compact" in MENA countries, acting as a deliberate cornerstone of social protection in the region. However, those same subsidies can also introduce relative price distortions that typically provoke: overconsumption and underinvestment in subsidized sectors; the crowding out of more productive investments; delays in economic diversification; weaker current accounts and increasing budget deficits; and adverse effects on health and the environment.

In Tunisia too, subsidies constitute a core aspect of its development model (World Bank 2013). Subsidies are pervasively present in critically productive sectors such as agriculture, energy, and tourism. The current social protection model relies on untargeted food and energy subsidies, which have been proven to be unequitable and increasingly expensive. As noted in the following section, subsidies represented some 7% of gross domestic product (GDP) in Tunisia in 2013, but the bottom 40% of the distribution captured only 29 and 34% of energy and food subsidies, respectively (World Bank 2014). This failure to protect the poorest is widely acknowledged in the country, including by the post-revolution government (government of Tunisia 2014), and generally believed to have contributed to past social tensions (World Bank 2013). There are also concerns in terms of governance and transparency. For instance, there are no precise estimates of any hidden subsidies for oil and natural gas generated by the national oil company selling imported crude oil and natural gas at a fraction of international prices to state-owned companies (IMF 2014).

Fiscal and equity concerns have prompted the government of Tunisia to consider changes in its subsidy policy, particularly those regarding energy subsidies. The new proposal forms part of a larger scheme of social protection reform that aims at improving the targeting of public spending. Detailed proposals have not yet been publicly discussed, but the government has announced its intention to partially remove electricity subsidies and completely eliminate other energy subsidies. In this context of uncertainty regarding subsidy reform at a time of a recently elected administration, this paper provides an analysis of the distributive impacts of a

hypothetical subsidy reform similar to the reform currently being considered by the Tunisian government.

This analysis follows an earlier distributional study of energy subsidies in Tunisia using SUBSIM, a subsidy reform simulation methodology developed by Araar and Verme (2012). This paper, however, makes two contributions to the earlier analysis. First, it updates existing estimates (reported in World Bank [2013]) by including the most recent structure of energy prices and the most recent proposal of subsidy changes considered by the Tunisian government. Second, this analysis includes a detailed simulation of the distributional effects of alternative compensating cash transfer schemes financed from the fiscal savings accruing from the subsidy reform.

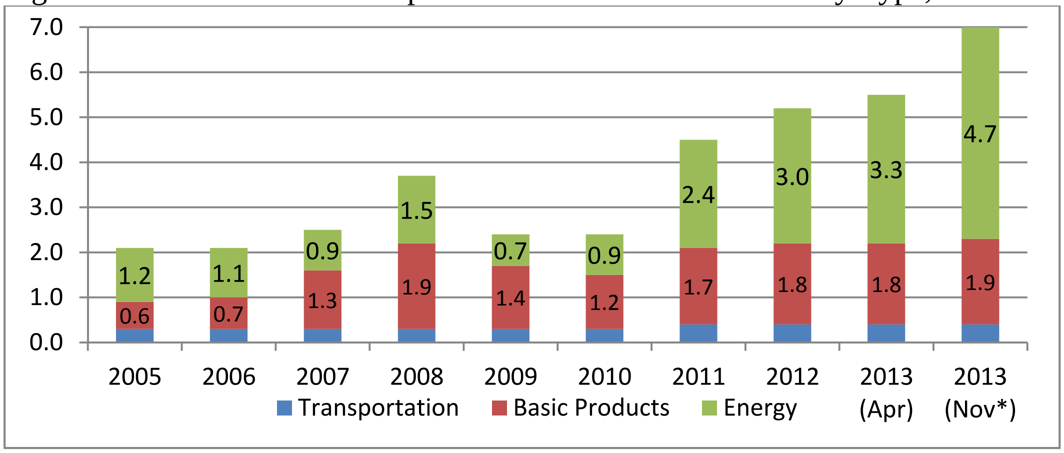
To better understand the implications of the reforms, section 2 starts with the evolution of energy subsidies in Tunisia. Section 3 follows with an outline of the current structure of energy subsidies in Tunisia. Section 4 reports the most updated information on the socioeconomic patterns of energy subsidies, that is, how consumption, spending and subsidy benefits of residential energy differ across different socioeconomic groups. Section 5 analyzes the distributive impacts of a simulated subsidy reform that partially removes residential electricity subsidies and fully removes those of diesel, gasoline, and liquefied petroleum gas (LPG). It separates direct and indirect effects and reports both distributional and fiscal effects. The impacts of fiscally neutral policies are estimated using current and new targeting mechanisms to compensate for the immediate negative welfare effects following the hypothesized subsidy reform. Section 6 concludes with a review of the three proposed scenarios and their impacts on poverty and inequalities.

2. The Evolution of Energy Subsidies in Tunisia

Tunisia has a long tradition of generous energy and food subsidies. Subsidies deliberately became the backbone of the new social protection strategies of the 1970s in Tunisia. At that time, advocates justified the universal subsidies because of the large size of the informal sector, the high levels of poverty, and the lack of information systems and registries to identify and target the poor. Energy subsidies have not been reformed in depth since that time. However, in the early 1980s, Tunisia went through a painful experience reforming its food subsidies. In 1983, food subsidies reached 3% of GDP, with reported significant leaks to the nonpoor. Overnight, the government announced the doubling of prices of cereals and their products, including bread, semolina, pasta, and couscous (IMF 2014). The rushed decision took the public by surprise, and after a month of widespread protests, the reform was abandoned. Later, during the Ali regime, the government did not attempt any in-depth reform of the subsidy systems in place since the 1970s, managing instead to maintain the generous system throughout both difficult and prosperous times. During 1991–93, the government launched a gradual reform on food subsidies, favoring foods largely consumed by the poor—such as lower-quality bread—and phasing out subsidies on foods consumed by the rich (IMF 2014). A well-timed awareness campaign coupled with increases in minimum wages and strengthening of other social protection programs helped improve the targeting and fiscal burden of food subsidies (IMF 2014).

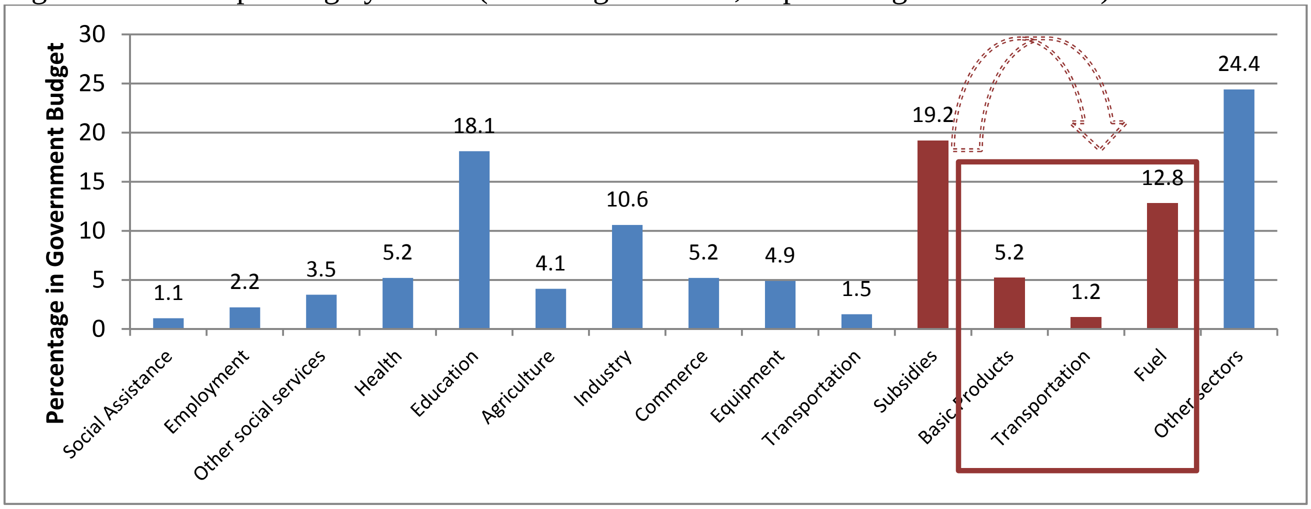
However, during the final years of the Ali regime and the recent post-revolution period, the spending and composition of Tunisia's subsidies have notably changed (Figure 1). During the last 10 years, the combined spending on energy, food, and transportation has more than tripled, rising from 2% of GDP in 2005 to 7% in 2013. Energy subsidies, in particular, increased even more, fourfold, during that period. Energy subsidies reached 4.7% of GDP in 2013, with sustained increases since 2010, reflecting the partial (rather than the full) pass-through of international oil prices to domestic prices sought by the government (IMF 2014). Regarding the composition of subsidies, during the post-revolution period, energy subsidies increased both in absolute and relative terms. As a result, energy subsidies went from one-third of total public subsidies prior to the revolution to about two-thirds in 2013. In contrast, food and other basic needs' subsidies have lost relative weight in the total subsidy bill despite having notably increased in absolute terms. With respect to other public expenditures, energy subsidies in Tunisia account for one-fifth of all public spending, or 7% of the GDP in 2013, the latest available figure. Because they are considered the backbone of the social protection strategy, it is not surprising that public spending on subsidies exceeds that of social assistance, health and education, and individual programs on youth, children, or women (Figure 2).

Figure 1: Evolution of the Composition and Level of Subsidies by Type, 2005–13



Source: WB staff calculations using data from Ministère des Finances (October 2013).
Notes: Basic products refer to food products such as cereals, bread, sugar, and vegetable oil. * = forecast.

Figure 2: Public Spending by Sector (including subsidies, in percentage of 2013 GDP)



Source: WB staff calculations using data from Tunisian Ministère des Finances (October 2013).
Notes: Education includes all levels; subsidies refer to explicit subsidies; social assistance includes cash transfer programs and health cards; other social services includes programs and services of the Ministère des Affaires Sociales, de la Jeunesse, and de la Femme et l'Enfance; health does not include health insurance. Subsidies are further disaggregated into three categories, basic products, transportation, and energy.

These changes in the composition and magnitude of subsidies reflect recent specific changes in the policy of energy subsidies. In effect, after the immediate and deliberate use of subsidies to appease post-revolution social tensions, the government of Tunisia began implementing a gradual strategy of subsidy reduction and improvement in public spending targeting. As reported by IMF (2014), the prices of gasoline, diesel, and electricity increased by 7% in September 2012, followed by similar increases in March 2013. Energy subsidies to cement companies were halved in January 2014 and fully removed in June 2014. Electricity tariffs on low- and medium-voltage consumers were increased in a two-step process, by 10% in January 2014 and another 10% in May 2014. The government introduced a lifeline electricity tariff for households consuming less than 100 kWh per month in 2014. Also in January 2014, the government established a new automatic price formula for gasoline to align domestic price convergence to international prices over time, but without a smoothing mechanism or a clear calendar. In parallel, the government launched a new social housing program; increased income tax deductions for the poorest households; and committed to creating a unified registry of beneficiaries of social programs and to improving social spending targeting (to be finished in 2015). In addition, plans are also in the works to expand the current cash transfer program (PNAFN) to 250,000 beneficiaries and to reduce its exclusion errors.

This brief history of energy subsidies in Tunisia shows that the country is striving to achieve a difficult balance. That balance aims to improve fiscal and equity concerns by reducing subsidies, while also trying to appease social tensions by maintaining subsidies as a cornerstone of its social protection strategy. The transition administration has attempted to maintain that balance through a progressive reduction of subsidies that started well into the post-revolution period and by beginning an expansion of a social protection system less reliant on subsidies.
Not pursuing a more ambitious future energy subsidy reform would represent a big missed opportunity for Tunisian development. According to IMF, Tunisia is the only country in the

MENA region that has made progress in most of the areas necessary for successful reform in both the MENA region and elsewhere during the last 30 years (Table 1).[1] In effect, IMF (2014) argues that the changes observed in energy subsidies since 2012 have benefitted from a gradual pace of adjustment and comprehensive coverage; that is, changes have affected all energy sources and have successively increased all energy prices. Because of fiscal and equity concerns, the Tunisian government supports the reversal of energy subsidies, a position also supported without reservation by international financial institutions. The transition government has included several compensation mechanisms to smooth the effect of the subsidies' removal. No other country in the MENA region has initiated subsidy reforms of such breadth.

Table 1: Implementation Status of Most Recent Subsidy Reforms in MENA

	Preparation	Gradual Pace of Adjustment	Breadth of reform	Consensus Building and Communication Strategy	Role of Partners	Mitigating measures
Egypt	*X*				*X*	*X*
Jordan	*X*	*X*	*X*	*X*	*X*	*X*
Mauritania	*X*	*X*	*X*		*X*	*X*
Morocco	*X*	*X*	*X*	*X*	*X*	*X*
Sudan					*X*	*X*
Tunisia	*X*	*X*	*X*	*X*	*X*	*X*
Yemen	*X*				*X*	*X*

Source: IMF (2014, 48).

The progress made so far on multiple aspects of a successful reform begs the question as to why a more decisive energy subsidy overhaul has not already taken place: the answer is that there are several factors in play. First, even though the universal subsidy system was partly justified as a social protection mechanism, it was also designed to protect and strengthen the competitiveness of local firms by providing them with cheap energy sources. These noncompetitive enterprises, which employ unskilled workers and depend largely on government support through energy subsidies and generous tax exemptions, may not survive if subsidies are eliminated. The World Bank (2014) provides a detailed account of the complex economic, financial, and governance factors associated with generalized subsidies across noncompetitive sectors of the Tunisian economy.

Second, reforms have not only economic, financial and governance implications, but also marked welfare implications. Whether deliberately sought or not, subsidy reforms generate a pattern of winners and losers. Estimates by the World Bank (2013, 17) suggest that a more decisive reform of all energy subsidies—along the lines currently conceived by the government of Tunisia—would have costly and increasing welfare impacts, around 3% of household consumption in the short run and about 5% in the long run.[2] Such impacts—without a careful compensating strategy—do not, expectedly, create a large demand for reform among those currently benefiting from those subsidies.

[1] IMF (2014) analyzes 25 reforms of fuel and food subsidies in 15 countries across five continents between 1983 and 2012.

[2] The increasing effect on household consumption reflects the loss of production among noncompetitive sectors of the economy that lose energy subsidies. See World Bank (2013) for a more detailed explanation.

Third, the failed attempt in the early 1980s and the lack of legitimacy of the previous authoritarian regime made an overhaul of subsidies difficult. The generous subsidy system combined with mass recruitment in the public service and periodic revisions of wages were the main mechanisms for maintaining, at least partially, social peace and stability during the past regime. Similarly, the need to maintain social stability in the onset of the post-revolution period also warned against a profound reform of the subsidy system, even though a national consensus in the face of the economic difficulties of 2011 emerged on the need to streamline subsidies' costs and ensure their fairness.

Finally, there has been the traditional lack of reliable and transparent estimates of the budgetary costs of subsidies. This further complicates the technical aspects of reforms, particularly, a well-informed design of in-depth reform measures. For example, the actual budgetary cost (explicit subsidy) and the cost of inefficiency of refiners and electricity companies (implicit subsidies) are difficult to accurately estimate. According to the World Bank (2013), implicit taxes from the generalized practice of the national oil company selling imported crude oil and natural gas at a fraction of international prices to state-owned companies may have exceeded 2 percentage points of GDP in 2012.

In this complex interplay of economic, fiscal, social, and political economy considerations, there is broad agreement on the need to reform the current system of energy subsidies. The next section provides a detailed outline of the current price, consumption, and subsidy structure.

3. The Current Structure of Energy Subsidies in Tunisia

This analysis focuses on residential energy subsidies, that is, subsidies on electricity, gasoline, LPG, and diesel. As already noted, they constitute the lion's share of the total consumer subsidies funded by the government of Tunisia (two-thirds in 2013), and about 45% of the total consumption of energy among Tunisian households. These four energy subsidies are also among those that the government plans to reform.

The analysis will simulate the fiscal and distributive effects caused by changes in the current structure of energy prices and subsidies. The current structure was introduced in May 2014 and continues to be in effect at the time of this paper. However, the analysis uses consumption patterns in 2010 as reference. This is because the latest household survey reporting households' energy spending—the 2010 *Enquête Nationale sur le Budget, la Consommation et les Conditions de Vie des Ménages* (ENBCV)—is available. The latest input–output matrix (I/O) for Tunisia is also available for 2010. This I/O matrix enables estimation of the indirect effects of the reforms, that is, the effects on household consumption and spending accruing from the impacts that energy prices have on other productive sectors of the economy.

Household spending on energy and other products is then updated using successive rates of the annual Consumer Price Index (CPI), GDP and population growth to construct a distribution of energy spending for (January) 2014. The current energy tariff structures are applied to that distribution of household *spending* on energy to derive a distribution of household *consumption*

on energy sources. It is on these distributions of spending and consumption constructed for 2014 that the subsidy reform is simulated and its distributive and fiscal effects estimated. The first step before beginning the simulation analysis is to look at a detailed outline of the current system of energy subsidies.

3.1. Structure of Residential Energy Prices

The current price structure for residential electricity consumption follows a two-tier system.[3] A different structure—of which analysis is beyond the scope of this chapter—is applied to nonresidential users (which also differentiates between low and high tension use). Table 2 shows that for households consuming less than 200 kWh per month, a Volume Differentiated Tariffs (VDT) is applied to three consumption blocks and three distinctive prices apply: TND 0.075 per kWh, if consumption is 1–50 kWh; TND 0.108 per kWh (applied for all kWh consumed) if consumption is 51–100 kWh; and TND 0.140 per kWh if consumption is 101–200 kWh (also from the first kWh consumed). Households consuming more than 200 kWh per month are subject to an Increasing Blocks Tariffs (IBT) that includes multiple prices across different blocks of consumption. In this high-volume tier, TND 0.151 per kWh is charged for each of the initial 200 kWh consumed; TND 0.158 for each of the subsequent kWh in the 201 and 300 kWh block; TND 0.301 for the next 200 kWh block; and, finally, TND 0.501 per kWh for each of those kWh in excess of 500 kWh per month.

Table 2: Electricity Tariff Structure for Low Tension Residential Consumers (valid since May 1, 2014)

<table>
<tr><th rowspan="2">Fee</th><th rowspan="2">Voltage
(millimes/kVa/month)</th><th colspan="6">Price of energy by monthly consumption bracket
(millimes/kWh)</th></tr>
<tr><th>1–50</th><th>51–100</th><th>101–200</th><th>201–300</th><th>301–500</th><th>501 +</th></tr>
<tr><td rowspan="3">Economic (1 and 2 kVa and consumption under 200 kWh)</td><td rowspan="3">500</td><td>75</td><td colspan="5"></td></tr>
<tr><td colspan="2">108</td><td colspan="4"></td></tr>
<tr><td colspan="3">140</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Economic (1 and 2 kVa and consumption over 200 kWh); normal (> 2 kVa)</td><td rowspan="2">500</td><td colspan="3" rowspan="2">151</td><td rowspan="2">184</td><td>280</td><td>350</td></tr>
<tr><td>250</td><td>295</td></tr>
</table>

Source: Societé Tunisienne d'Eletricité et du Gaz (2014).
Notes: Prices are in TND *millimes* and before taxes.

[3] The price structure described here became effective on May 1, 2014. The previous tariff structure, valid between January and April 2014, had slightly lower fees for the highest consumption block of the first tier, as well as for the second tier of residential consumption. Appendix 1 details the previous structure.

Based on this structure, both low-volume consumers—households consuming below 200 kWh per month—and high-volume consumers face an increasing marginal cost from usage. High-volume consumers pay more than low-volume users for the first 200 kWh, and face increasing fees as their consumption rises. In this respect, the tariff structure is progressive: those consuming more pay higher marginal costs per kWh consumed. However, the pace at which marginal tariffs increase is not linear. If we take 50 kWh increments in consumption, moving from a consumption level of 50 kWh to 100 kWh, the price of the second 50 kWh is 44% higher than for the first tranche (from 75 to 108 millimes TND) among low-volume consumers. For those consumers moving toward the highest block of the second tier, that is, moving from 301–500 kWh to the 501 plus kWh block, the residential tariff increase is 25% or 70 millimes TND. In short, non-linear features (in terms of marginal prices per additional consumption) are combined across different segments of the two-tier system, making the system far from progressive in its entirety.

The pro-poor nature of the system depends on the concentration of consumers who are considered poor in the lower price blocks of each tier. In this light, the system falls short in benefiting the less well-off population: the concentration of poor consumers—specifically those in the bottom quintile of per capita household consumption—in the lifeline block is only 48% (appendix 2). The share of consumers in the lifeline block rapidly declines for subsequent quintiles of the distribution. In turn, the concentration of consumers from the richest quintile ranges from 35 to 60% of all users in the high-volume consumption tier. Consumers from the poorest quintile are hardly represented in the high-volume tier: only 3 to 6% of consumers belong to the poorest quintile. In other words, the poor represent a minimal proportion of consumers of the higher-volume tier, but, more surprisingly, they are not the vast majority of beneficiaries of the lifeline price rates either.

The prices of other energy sources are not subject to differentiated price segments. The prices of gasoline, LPG, and diesel do not vary across consumption levels. Thus, the market price of gasoline is TND 1.67 per liter; the price of 0.2 diesel (containing 0.2 percent of sulfur) is TND 1.25 per liter; and a 13 kilogram cylinder of LPG costs TND 7.4 (or TND 0.57 per kg).[4] As indicated already for the case of electricity, the pro-poor measure of the distribution of those energy subsidies is determined by both the price structure and the extent to which these energy products are consumed by the poor. Yet, the price structure is not progressive in marginal terms, because there is no price increase as consumption increases. In absolute terms, higher-volume consumers benefit from a higher public subsidy, making those subsidies not pro-poor.

3.2. Estimating Energy Subsidies

Most energy sources are publicly subsidized in Tunisia, but to different extents.[5] Based on the observed final—market—prices, price structures, international prices (of imported sources) and

[4] This type of cylinder is typically used by households. Larger cylinders of 25–35 kg are most frequently consumed in the hospitality/tourism industry.

[5] From a public finance perspective, the latest data available for both residential and nonresidential consumers in 2013 indicate that some 51% of total energy subsidies go to finance electricity subsidies; 23% to diesel; 15% to LPG; 6% to gasoline; 5% to crude oil; and 1% to kerosene (World Bank 2013).

local production costs, it is possible to calculate shares of subsidized prices for each energy source. Box 1 summarizes the methodology used to calculate such shares.

Box 1: Estimating Shares of Subsidized Prices

For energy products consumed by the household, namely electricity, LPG, gasoline and diesel, a subsidy level "S" for each product is estimated using the price gap approach. According to this approach, a first price is calculated by adding to the international reference price (IP) all local taxes and domestic distribution costs. The resulting price is assumed to reflect the cost of efficient market supply, given the conditions and regulations of a given country as well as international prices. This price is called the "non-subsidized price" (NP). Subsidies (S) are calculated as the difference between the estimated NP and the observed domestic sale price, or market price (DP): $S_i = NP_i - DP_i$, where *i* refers to each energy source for residential consumption. The subsidy rate SR_i for source *i* is the ratio of S_i to NP_i. In the case of Tunisia, domestic prices used in this analysis are from the Ministry of Finance, while the IPs were obtained from the Ministry of Industries (Direction Générale de l'Énergie) for electricity, LPG, gasoline and diesel, respectively.

Source: Authors based on Araar and Verme (2012) and World Bank (2013).

Table 3 presents the rate of subsidized energy prices with respect to the observed market prices since May 2014. The rate of subsidized LPG prices is estimated at 68% of the nonsubsidized price. In other words, for every liter of LPG consumed at a final price of TND 0.570, some TND 1.220 have been subsidized from the estimated price of TND 1.790 (reflecting international reference prices). Likewise, a similar calculation shows shares of subsidized prices of 10% for gasoline and 21% for diesel. In the case of electricity, the subsidized rates for each block decrease with consumption. This is the case for the two volume tiers. In fact, the two top consumption blocks of the high-volume tier—consumers of more than 300 kWh per month—receive negative subsidies. That is, they are net contributors to the subsidies of consumers of lower-volume consumption. Consumers from the two levels of highest consumption end up paying a higher price than the international reference price plus taxes and distribution costs.

Table 3: Estimated Subsidy Rates for Energy Sources in Tunisia (valid May 2014)

	Nonsubsidized price (NP_i), TND	Subsidy (S_i), TND	Subsidy rate ($SR_i=S_i/NP_i$), %	Market price, ($DP_i=NP_i-S_i$), TND
Gasoline	1.856	0.186	10	1.670
LPG	1.790	1.220	68	0.570
Diesel	1.584	0.334	21	1.250
Electricity: Households consuming less than 200 kWh per month				
Electricity 0–50	0.268	0.193	72	0.075
Electricity 0–100	0.268	0.160	60	0.108
Electricity 0–200	0.268	0.128	47	0.140
Electricity: Household consuming more than 200 kWh per month				
Electricity 0–200	0.268	0.117	43	0.151
Electricity 201–300	0.268	0.084	31	0.184
Electricity 301–500	0.268	-0.012	-4	0.280
Electricity > 500	0.268	-0.082	-31	0.350

Source: World Bank staff calculations.

In the case of LPG, the latest available numbers are from 2013[6] (Table 4) and show a subsidy rate of 68%. In fiscal terms, these subsidies amounted to TND 749 million, 15% of all energy subsidies publicly transferred and 1% of GDP. Diesels (containing either 0.005 or 0.2 percent of sulfur) have subsidies between 16 and 26% of final prices (respectively), representing 1.5% of GDP, 23% of energy subsidies, and TND 1,146 million in 2013. The energy source most highly subsidized in terms of public spending was electricity, with 3.4% of GDP, 51% of all energy subsidies, and over TND 2.5 billion a year (in 2013). Its subsidized price share oscillated between 27 and 50%. The remaining 12% of energy subsidies were distributed among gasoline, kerosene, and heavy fuel.

Interestingly, at the level of residential spending on energy, other forms commonly utilized by households such as charcoal, natural gas, or solid biofuels are not subsidized.[7] Within the household sector, solid biofuels constitute the main source of energy expenditure (42%), followed by LPG (18%), electricity (15%), and natural gas (10%). Diesels and gasoline are very low sources of energy expenditures. Also, as the next section shows, there are marked differences in consumption and spending by socioeconomic groups.

[6] Nonetheless, LPG prices have remained unchanged since February 2010.

[7] In addition, the consumption of each energy source and, therefore, the ultimate beneficiaries of the subsidized prices vary substantially by sector, as shown in appendix 3. Figures reported in appendix 3 refer to 2012, the latest available for the composition of consumption within each sector, residential and nonresidential.

Table 4: Total Public Spending on Energy Subsidies (selected energy sources, latest available year, 2013)

Indicator	LPG	Gasoline	Diesel (50 ppm)	Diesel 0.2%	Electricity
Subsidy rate (%)	68	15	16	62	27/50
Total consumption at sale price (MD)	225	884	230	103	2169
Price increase estimated from elimination of subsidies (%)	214	23	22	165	30
Expenditures					
Amount (MD)	483	199	50	170	1671
As a % of GDP	0.7	0.3	0.07	0.2	2.4
Amount estimated end-2013 (MD)	749	321	75	214	2569
As a % of GDP	1	0.4	0.1	0.3	3.4

Source: WB staff calculations using data from Ministère des Finances and Ministère de l'Industrie.
Notes: All numbers from April 2013 unless otherwise noted. April 2013 GDP in 2012 prices estimated at 70,400 million TND (MD).

4. The Socioeconomic Profile of Energy Subsidies

4.1. Residential Consumption and Expenditures on Energy

Previous sections have discussed the complex structure of energy prices (in terms of progressivity) and the estimated subsidy rates underlying current price structures. To determine the extent to which such price and subsidy structures lead to pro-poor welfare outcomes, the consumption of different socioeconomic groups, their expenditures, and their benefits from subsidies all need to be factored in. First, consumption and spending on energy will be disaggregated by socioeconomic group. This socioeconomic analysis covers both Tunisian individuals and households grouped by their consumption levels in quintiles. Quintile 1 refers to the poorest, while quintile 5 refers to the richest individuals and households.

Panels A and B in Table 5 show that *total* consumption of energy across quintiles varies by energy sources. Richer quintiles consume more energy, with significantly large differences for gasoline and diesel among these quintiles and the rest. Consumption of the top two quintiles represents 80% and 90% of the consumption of diesel and gasoline, respectively. The bottom 40% consumes 2% and 8% of the total consumption of these two sources, respectively. For the other energy sources, the distribution of consumption across quintiles is not so skewed: the share of the top two quintiles (bottom 40%) consumption of LPG and electricity represents 45%–52% (28%–34%).

Table 5: Total Residential Energy Consumption (by source and quintiles of household consumption)

Panel A: Absolute terms

	Gasoline (million liters)	LPG (1,000s tons)	Diesel (million liters)	Electricity (GWH)
Quintile 1	1	80	1	587
Quintile 2	5	99	4	761
Quintile 3	18	107	8	881
Quintile 4	54	122	12	1033
Quintile 5	213	114	37	1440
Total	292	521	63	4702

Source: WB staff calculations using SUBSIM.

Panel B: Relative terms (in %)

	Gasoline	LPG	Diesel	Electricity
Quintile 1	0.3	15.3	1.6	12.5
Quintile 2	1.7	18.9	6.8	16.2
Quintile 3	6.3	20.5	12.9	18.7
Quintile 4	18.7	23.4	19.4	22.0
Quintile 5	73.0	21.9	59.4	30.6
Total	100	100	100	100

Similarly, when it comes to the per capita consumption of energy, Table 6 unequivocally confirms that the top consumption quintiles, the richest quintiles, consume much more than the poorest quintiles. Consumption differences are largest for gasoline, followed by diesel (panel A). On average, an individual from quintile 5 consumes 200 times more gasoline than someone from the poorest quintile. That ratio is still a whopping 38 to 1 in the case of diesel. Much narrower differences are observed for electricity and LPG. A richer individual consumes 4.5 times more electricity and 1.4 times more LPG than an individual from the poorest household. Individuals from the fourth quintile consume more LPG on average than anyone else in the distribution. When the analysis is conducted for households—rather than individuals—(panel B) very similar ratios and distributions are observed, confirming results for individuals.

Table 6: Per Capita and Per Household Consumption of Subsidized Energy (in quantity)

Panel A: Per individual

	Gasoline (liter)	LPG (kg)	Diesel (liter)	Electricity (kWh)
Quintile 1	0.46	36.50	0.45	37.41
Quintile 2	2.30	45.35	1.95	49.59
Quintile 3	8.45	49.08	3.70	61.23
Quintile 4	25.02	55.99	5.58	86.58
Quintile 5	97.74	52.39	17.07	167.20
Total	26.79	47.86	5.75	80.40

Source: WB calculations using SUBSIM.

Panel B: Per household

	Gasoline (liter)	LPG (kg)	Diesel (liter)	Electricity (kWh)
Quintile 1	2.53	200.75	2.47	205.75
Quintile 2	11.5	226.75	9.75	247.95
Quintile 3	38.02	220.86	16.65	275.53
Quintile 4	100.08	223.96	22.32	346.32
Quintile 5	342.09	183.36	59.74	585.2
Total	107.16	191.44	23	321.6

In terms of expenditures, Figure 3: Household Expenditure on Energy (% of total household expenditures by quintiles of consumption) shows that the expenditure of energy represents

between 5% and 6% of households' total spending. In other words, energy spending as share of household total spending is similar across socioeconomic groups, without marked differences across quintiles. But despite being small, these differences are still interesting. In fact, it is the households in the poorest and richest quintiles that spend a higher proportion of their budgets on energy (just over 6% of their total spending). But while the poorest spent its largest share on electricity, the richest does so on gasoline.

Large differences become evident when absolute spending is compared across quintiles of the consumption distribution. Figure 4: Per Capita Expenditures on Energy (by quintiles of consumption, in TND) shows that the richest individual spends more than 200 times per capita than a poor individual. Socioeconomic disparities in spending remain for diesel as well, but are notably reduced for electricity and LPG. In fact, spending on LPG is more uniform across all socioeconomic groups, between TND 20 and 29, and it is the fourth quintile that spends the most.

Figure 3: Household Expenditure on Energy (% of total household expenditures by quintiles of consumption)

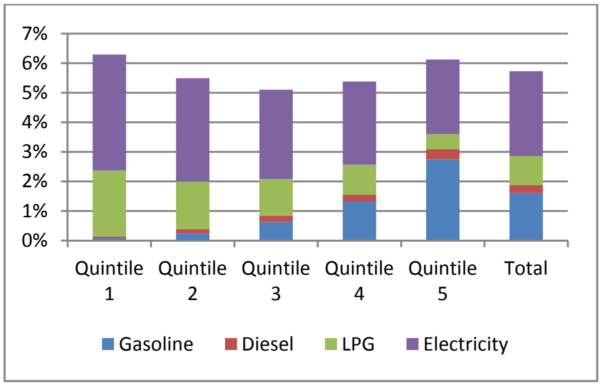
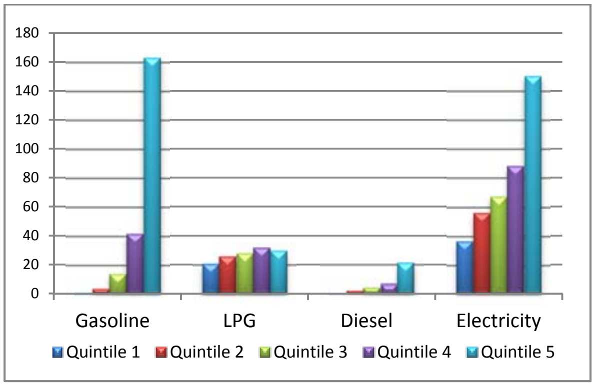


Figure 4: Per Capita Expenditures on Energy (by quintiles of consumption, in TND)



Source: WB staff calculations using SUBSIM

4.2. Socioeconomic Distribution of Energy Subsidy Benefits

The distribution of monetized benefits accruing from subsidies is the result of a number of considerations, such as the degree of price progressivity, the pro-poor nature of the price structure, the share of subsidized price on final price, and the composition and total consumption by socioeconomic group. Unsurprisingly, energy subsidies are concentrated on LPG and electricity subsidies. Moreover, the concentration of benefits from these two sources is true for all consumption quintiles (Table 7, left panel). This implies that all of the poor, the bottom 40%, and richer individuals obtain most of their energy subsidies from LPG and electricity. In relative terms, they represent 53.3% and 40.4% of total subsidies, shares that for the poorest quintile slightly increase to 54.5% and 42.2% of their total energy subsidies, respectively. For the rest of the quintiles, subsidies from both sources also capture the lion's share of total benefits. However, the distribution of total benefits by socioeconomic group also shows that energy subsidies—either universal or targeted—are pro-rich. The poorest quintile captured the lowest share of all

benefits associated with energy subsidies, 14.9%, while the richest quintile captured 25% (Table 7, right panel).

Table 7: Composition of Subsidies Received by Residential Consumers (by source and quintiles of consumption)

	Distribution across each quintile (%)					Distribution over all quintiles	
	Gasoline	Diesel	LPG	Electricity	Total	Total (millimes TND)	Total (%)
Quintile 1	0.1	0.2	54.5	42.2	100	178	14.9
Quintile 2	0.4	0.7	56.6	42.3	100	213	17.9
Quintile 3	1.4	1.1	55.1	42.4	100	237	19.9
Quintile 4	3.8	1.5	55.7	39.0	100	267	22.4
Quintile 5	13.3	4.2	46.8	35.8	100	298	25.0
Total	4.5	1.8	53.3	40.4	100	1192	100

Source: WB staff calculations using SUBSIM.

When analyzed in per capita terms, all energy subsidies are found to be regressive. The absolute amount of subsidy benefits increases as individuals and households become richer. Table 8 reports the distribution of subsidies benefiting each socioeconomic group. By and large, results reflect inequalities in the consumption of energy sources across quintiles. In fact, differences may not be attributed to the different—universal versus targeted—nature of subsidies. Even though gasoline, diesel, and LPG subsidies are all universal, their distributional effects vary. LPG is the energy source with the largest subsidy benefits in absolute and relative terms for the poorest quintile and the bottom 40%: they represent close to 60% of all benefits obtained from energy subsidies. But that is also true for the richer quintiles. So, even LPG is the most pro-poor, or rather, the least pro-rich energy source; it is not particularly progressive in terms of subsidy benefits. On the other hand, electricity subsidies, with their complex interplay of progressive and regressive features, do not perform very differently from the LPG universal subsidy. Electricity subsidies constitute the second largest source of subsidy benefits for Tunisians, around 35–45%, with shares decreasing as individuals become richer.

Table 8: Per Capita Energy Subsidy Benefits (in TND, by source and consumption quintile)

	Gasoline	Diesel	LPG	Electricity	Total
Quintile 1	0.09	0.15	44.53	36.99	81.76
Quintile 2	0.43	0.65	55.33	41.42	97.82
Quintile 3	1.57	1.24	59.88	46.06	108.74
Quintile 4	4.65	1.86	68.30	47.85	122.67
Quintile 5	18.18	5.70	63.91	48.89	136.69
Total	4.98	1.92	58.39	44.24	109.53

Source: WB staff calculations using SUBSIM.

Finally, Table 9 reports the shares that energy subsidy benefits represent on total household spending. Consistent with previous results, LPG and electricity subsidies are the largest contributors to household expenditures, which in the case of the poorest quintile represent a substantive 8.8% of total expenditures. This share of subsidy benefits over total household spending decreases along with expenditure levels, up to 2.4% of total spending for households in the top quintile. Finally, gasoline and diesel do not represent any substantive share of total spending, yet they are larger for the richest rather than the poorest quintiles. For all households, these two sources of subsidies represent about 0.2% of the total 3.9% of household expenditures transferred from energy subsidies.

Table 9: Energy Subsidy Benefits Received by Households (as % of total household expenditure)

	Gasoline	LPG	Diesel	Electricity	Total
Quintile 1	0.0	4.8	0.0	4.0	8.8
Quintile 2	0.0	3.4	0.0	2.6	6.0
Quintile 3	0.1	2.7	0.1	2.1	5.0
Quintile 4	0.1	2.2	0.1	1.5	3.9
Quintile 5	0.3	1.1	0.1	0.8	2.4
Total	0.2	2.1	0.1	1.6	3.9

Source: WB staff calculations using SUBSIM.

5. Simulating the Distributional Impacts of a Subsidy-Reducing Reform

5.1. The Proposed Reform

The government of Tunisia recently announced its intention to remove all subsidies associated with gasoline, diesel and LPG, and to increase the prices of each tranche of electricity for residential consumers (Jomaa 2014).Yet a specific and detailed proposal on the timing, sequence, and compensatory measures is still being discussed internally and has yet to be announced at the time of this paper. In any case, this reform proposal raises the question of what the expected poverty and distributional effects of such changes might be. This section reports the estimated effects of the simulated subsidy reform, but first explains the methodology to estimate those effects. Discussion then turns to the additional distributional effects of expanding cash transfers using the fiscal savings generated by the subsidy reform.

5.2. A Methodological Note on Simulations

Given the preliminary stage of the policy discussion, the estimations consider two effects. One is the direct effect of price increases following the (partial or full) removal of subsidies. Direct effects have unequivocal impacts on individual and household budgets proportional to the

increase in prices. No immediate changes in consumption are assumed, which is consistent with limited substitutability among energy sources in the short run (due to both technical and financial reasons and, presumably, individual preferences). Everyone consumes the same, but at higher prices. This implies that individuals and households have fewer resources to purchase other goods and services. For less-well off households, these may include the necessary minimum consumption basket reflected in the poverty line. Changes in prices are thus equivalent to a proportional increase in the poverty line faced by the household (weighted by its relative composition in the basic consumption basket). The second effect considered is the indirect impact: the changes on prices of goods that result from energy price changes. This indirect effect captures the change in relative prices for the rest of the economy, and therefore, on the prices of the other components of the consumption basket. Price changes across sectors are estimated by applying the price changes of energy to final products that use energy as an intermediary input. Using the a 2010 I/O table for Tunisia, constructed by INS (*Institut National de la Statistique*), a simple approximation of such economy-wide changes following energy price subsidies can be calculated.[8]

It is worth emphasizing that the analysis draws from the distribution of consumption and spending reported in the 2010 Household Budget and Expenditure Survey (that is the reference year). The 2010 structures of consumption and spending are then updated to (January) 2014 using growth rates, population growth, and CPI. It is on those distributions that simulations of a hypothetical reform in 2014 are conducted, as explained above. In other words, the distributive effects of the 2014 reform are applied to the households—and their consumption patterns—existing in 2014. Therefore, the analysis assumes that consumption patterns and their drivers (such as preferences) in 2010 are a good proxy for 2014 consumption patterns. Finally, poverty status is defined in this exercise around the official poverty lines established by INS, BAD, and World Bank (2012) as the monetized cost of a food basket that ensures minimum caloric needs, further adjusted by nonfood needs.[9]

5.3. Spending and Consumption Impacts

Applying the above methodology, table 10a presents the monetary impact of price increases resulting from the removal of subsidies for gasoline, LPG and diesel, and the partial reduction in electricity subsidies. Final results from this simulation are disaggregated between direct and indirect effects. The average *total* impact of this set of interventions on per capita terms is TND 109. The largest effect on consumption comes from the removal of LPG subsidies, followed by diesel, electricity, and gasoline. In effect, about 62% of all the reduction in consumption comes from the elimination of LPG subsidies (Table 10a).

[8] Due to limits on space, the full set of results is not presented here, but is available from the authors upon request.
[9] The monetary cost of the food basket defines the extreme poverty line. This line is also adjusted by differences in cost of living for cities (*grandes villes*), medium-sized towns (*petites communes*), and rural areas (*zones non-communales*). The extreme poverty line based on food needs is further adjusted by adding the average spending of extreme poor households on nonfood items to come up with a "low" poverty line, and by adding the average spending of non-extreme-poor households on nonfood items for setting the "high" poverty line. This exercise uses the upper poverty lines. INS, BAD, and World Bank (2012) provide a detailed description of the construction of the total consumption aggregate.

By type of effects, direct effects represent two-thirds of the total aggregated effect, while indirect effects, the remaining one-third. By energy source, socioeconomic patterns differ between direct and indirect effects. Among direct effects (Table 10b), it is the effect of LPG that once again has the largest impact on household consumption (four-fifths of all direct effects), followed by electricity, gasoline, and diesel. In contrast, it is the removal of diesel subsidies that has the largest indirect effect on consumption (43% of total indirect effects), followed by LPG, electricity, and gasoline (Table 10c).

Among quintiles, the total impact of the reform increases among richer households, with the largest differences across quintiles observed for gasoline; less marked for diesel and electricity; and relatively close for LPG. The increasing impact on consumption among richer quintiles is also observed for both direct and indirect effects.

In relative terms, the impact of the reforms averages 4.7% of households' expenditures (

Figure 5). However, the magnitude of the impact decreases with household expenditure levels. It progressively declines from 6.7% of the poorest households' expenditures to 3.1% of the richest households' expenditures. Similar to the case in absolute terms (that is, in TND terms), it is the LPG subsidy reform that brings the largest relative impact on households' expenditures: some 3.2% of all households' expenditures.

Table 10: Impact of the Reform on Total Per Capita Expenditures (by energy source and quintile of consumption, in TND)

10a. Total effects

Quintile	Gasoline	LPG	Diesel	Electricity	All
Quintile 1	-1.9	-47.3	-5.9	-5.5	-60.5
Quintile 2	-3.7	-60.7	-10.3	-8.7	-83.5
Quintile 3	-6.3	-67.7	-14.7	-11.1	-99.7
Quintile 4	-11.1	-79.6	-19.8	-15.0	-125.5
Quintile 5	-28.1	-85.8	-36.2	-27.0	-177.1
Total	-10.2	-68.2	-17.4	-13.5	-109.3

10b. Direct effects

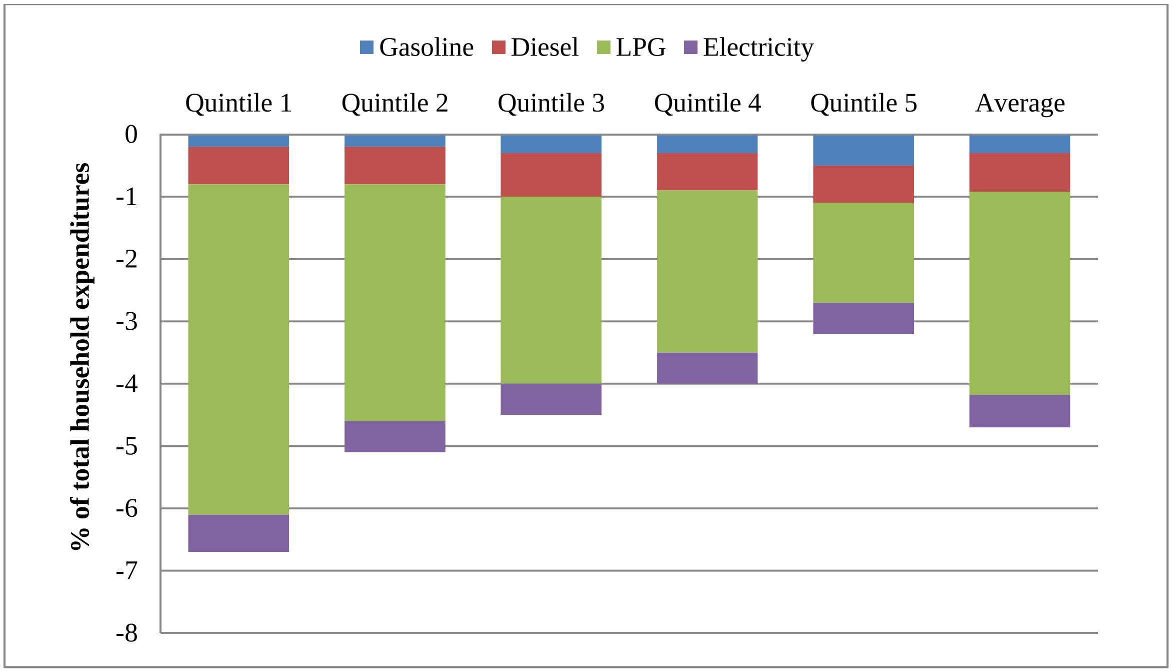
Quintile	Gasoline	LPG	Diesel	Electricity	All
Quintile 1	-0.1	-44.5	-0.1	-3.7	-48.4
Quintile 2	-0.4	-55.3	-0.7	-5.6	-62.0
Quintile 3	-1.6	-59.9	-1.2	-6.8	-69.5
Quintile 4	-4.7	-68.3	-1.9	-8.8	-83.7
Quintile 5	-18.2	-63.9	-5.7	-15.1	-102.9
Total	-5.0	-58.4	-1.9	-8.0	-73.3

10c. Indirect effects

Quintile	Gasoline	LPG	Diesel	Electricity	All
Quintile 1	-1.8	-2.8	-5.7	-1.8	-12.1
Quintile 2	-3.3	-5.4	-9.7	-3.1	-21.5
Quintile 3	-4.7	-7.8	-13.4	-4.4	-30.3
Quintile 4	-6.4	-11.3	-18.0	-6.2	-41.9
Quintile 5	-9.9	-21.9	-30.5	-12.0	-74.3
Total	-5.2	-9.8	-15.5	-5.5	-36.0

Source: WB staff calculations using SUBSIM.

Figure 5: Impact of Reforms on Households' Expenditures (as % of household total expenditures)



Source: WB staff calculations using SUBSIM.

Estimates of the impacts on poverty and inequality show an increase of almost 3 percentage points in the incidence of poverty (2.69), which represents an increase of 17% in the incidence of poverty. Table 11 shows a Gini coefficient increase of 0.61 percentage points, or a 1.7% increase in the pre-reform levels of inequality. A large portion of those changes in poverty result from direct effects, both in poverty and in inequality, and LPG is the largest contributor to poverty and inequality deterioration.

Table 11: Poverty and Inequality Impacts of Energy Reform

	Percentage points (pp)	Change in pp w/ pre reform		Percentage points (pp)	Change in pp w/ pre reform
Poverty pre-reform	**14.93**	**---**	**Gini pre-reform**	**35.81**	**---**
Gasoline	15.02	0.09	Gasoline	35.75	-0.06
LPG	16.84	1.91	LPG	36.43	0.62
Diesel	15.12	0.19	Diesel	35.82	0.01
Electricity	15.13	0.2	Electricity	35.83	0.02
Poverty post-reform	**17.61**	**2.68**	**Gini post-reform**	**36.42**	**0.61**
Misc. direct effect		1.95	*Misc. direct effect*		0.58

Source: WB staff calculations using SUBSIM.
Notes: The reason the prereform poverty and inequality rates are not the official rates for 2010 is that prices have all been updated for this specific exercise to 2013 prices using growth rates and population growth rates. The poverty line has also been updated using CPI trends. Hence, the starting point of this exercise is a poverty rate of 14.9 in 2013, and not the 15.4% official estimate obtained in the 2010 original household budgetary survey. This adjustment enables comparisons across other countries analyzed in this book. However, the rest of the simulation exercise will be conducted using the 2010 household budgetary survey. It is worth noting as well that despite using the 2010 household budgetary survey, a subsample of that survey is used and not the full sample of the original 2010 household survey. In effect, it is a subsample of the original sample that is used to capture beneficiaries of the subsidized universal health care card. Even after re-weighting the subsample, the exact official poverty number of 15.4% could not be fully replicated, only a slim margin (15.3%). Similarly, the estimated prereform Gini of 36.5% differs slightly from the official 35.8% from the full sample (table 13).

The increases in poverty and inequality following the reduction of subsidies imply some TND 817.5 million in fiscal savings (Table 12). Fiscal savings accrue disproportionally from the removal of subsidies in LPG (77% of all fiscal savings) and electricity (13%). Furthermore, the savings accruing from the removal of subsidies affecting the poorest quintile represent some 13% of all fiscal savings, a share that increases across quintiles, so that the savings accruing from removed benefits to the richest group represent 28% of the total savings. These shares are very similar to the proportions of benefits from subsidies that each socioeconomic group captured prior to the reform (table 7 earlier). Given that these simulations do not introduce behavioral effects (only direct and indirect effects are allowed), fiscal savings from the elimination of subsidies for the most part reflect the initial socioeconomic distribution of subsidies.

Table 12: Energy Subsidy Savings from the Reform (by source and quintile of consumption, in TND)

	Gasoline	LPG	Diesel	Electricity	Total
Quintile 1	-186,020	-97,003,152	-325,901	-11,624,507	-109,139,584
Quintile 2	-929,258	-120,432,824	-1,418,063	-16,163,867	-138,944,016
Quintile 3	-3,420,753	-130,381,216	-2,689,996	-19,003,020	-155,494,992
Quintile 4	-10,129,942	-148,695,856	-4,054,068	-23,481,422	-186,361,280
Quintile 5	-39,575,064	-139,133,344	-12,414,583	-36,451,727	-227,574,720

Total	-54,241,036	-635,646,400	-20,902,610	-106,724,543	-817,514,560

Source: WB staff calculations using SUBSIM.

5.4. Compensating Interventions to Energy Subsidy Reforms

A final step includes assessing the poverty and distributional effects of disbursing the total savings from the energy subsidy reform on poverty-reducing purposes. Once again, there is no clear guidance from the government of Tunisia on how these compensation programs will be implemented. For that reason, this analysis considers three hypothetical scenarios. **Simulation 1** uses total savings to provide a universal transfer to each Tunisian. This scenario is called "universal transfer" because it includes a transfer to every Tunisian without discrimination. **Scenario 2**, or "current targeting," uses the current social assistance program, that is, the subsidized health cards, as the targeting mechanism. This name does not intend to judge the current capacity of subsidized cards to reach the poorest. Instead, it simply indicates that no additional targeting efforts take place and that authorities use existing structures to channel all the savings accruing from energy subsidy reforms. Finally, in **Simulation 3**, "perfect targeting," all the savings are distributed exactly to those who are poor after the reform. This is an unrealistic and idealistic scenario that describes a situation in which all the poor after the reform are perfectly identified and compensated on a per capita basis. It is idealistic because it assumes perfect and costless targeting, that is, no additional resources are needed to identify the poor and distribute cash benefits to them. Although these three scenarios vary in terms of implementation feasibility, they are useful in this context where no detailed plans are announced. These results provide information on the boundaries of the distributional effects of the reform, from no compensation following the reform to the complete use of fiscal savings from energy subsidy reform to reduce poverty under perfect targeting. The true impact of the reform and of feasible compensation policies will lie somewhere in between. Table 13 summarizes the simulations' results.

Table 13: Simulated Poverty and Inequality Impacts of Compensatory Mechanisms after Energy Subsidy Reform

	Fiscal cost of compensation	Average benefit transferred (rounded up)	Number of beneficiaries	Poverty (%)	Inequality (Gini 0–100 index)
Prereform	0	0	0	15.27	36.57
Baseline: subsidy reform with no compensation	0	0	0	17.84	37.18
Simulation 1: universal transfer after subsidy reform	TND 817.51 millimes	TND 75	10.9 million	14.87	36.29

Simulation 2: current targeting	TND 817.51 millimes	TND 264	3.1 million	13.83	35.46
Simulation 3: perfect targeting	TND 817.51 millimes	TND 420	1.9 million	5.25	34.22

Source: WB staff calculations using SUBSIM.

These simulations indicate that the complete use of fiscal savings from the energy reform would not reduce post-reform poverty levels by any significant amount with the current targeting mechanism or via universally benefiting the entire population (table 13, simulations 2 and 1, respectively).The fiscal savings accruing from a universal transfer reform (simulation 2) would bring down post-reform poverty levels by 2.5 percentage points—or some 272,000 persons. Using the current health card targeting mechanism (simulation 1) would reduce post-reform poverty by an additional percentage point, to 13.83 percent of the population. A perfect and costless targeting of fiscal savings (simulation 3) would lead to a post-reform poverty incidence reduction of 12.5 percentage points, up to 5.25% of the population. Despite the slash in poverty incidence, the fiscal resources freed from the current level of energy subsidies would not be sufficient to completely eradicate poverty in Tunisia. Neither would it be sufficient to make a notable dent on consumption inequality as measured by the Gini coefficient. The three compensation initiatives would fully reverse the initial increase in inequality following the subsidy reforms. However, the reduction in inequality would by no means be large. The best results, accruing from the perfect targeting scenario, indicate gains of 3 percentage points in the Gini coefficient with respect to the post-reform Gini. In relative terms, the compensation mechanisms simulated after the reform would improve inequality by less than 10%.[10]

6. Conclusion

Energy subsidies have played and continue to play a pivotal role in Tunisian social development policy making. Their fiscal implications are substantial, consuming about 5% of the country's GDP, and, as this analysis shows, their distributional impacts are also considerable. But subsidies have also played an important role in appeasing social tensions. An overhaul of energy subsidies in Tunisia must strike a very delicate balance to improve fiscal and equity considerations without increasing social tensions. The strategy followed so far has been one of progressive reduction of subsidies coupled with an expansion of the non-subsidy elements of social protection. This paper presents an analysis of the fiscal and distributive consequences of the still vaguely defined next step in that strategy: a uniform increase of 10% of electricity prices; a total removal of LPG, diesel, and gasoline subsidies; and alternative improvements in the current cash transfer system, which were announced at the end of 2014.

A review of Tunisia's residential energy subsidies helps to understand the implications of the country's current strategy. In Tunisia, energy transfers are through a system of universal energy sources plus a complex multiblock price schedule for electricity that mixes progressive and regressive features. All in all, the energy price structure results in a regressive and pro-rich

[10] In effect, the 3 percentage point reduction in the Gini coefficient in simulation 3 implies an 8% reduction in the post-reform Gini. The reductions in Gini from the other two simulations render even smaller relative improvements.

transfer system that produces a huge fiscal bill. Furthermore, the distributive impact of the system is heterogeneous, with LPG and electricity the most influential among poor (also among the nonpoor) consumers. This has to do with the price and subsidy structure, on the one hand, and differences in the consumption patterns across socioeconomic groups on the other. Whether the subsidy is universal or targeted does not make much of a distributional difference in the current Tunisian context.

Although the Tunisian authorities have announced their intention to reform energy subsidies, policy is still in the planning stages and final details remain unknown at the time of this paper. Limited information nonetheless points to a complete elimination of LPG, diesel and gasoline subsidies; a uniform 10% increase in the price of electricity; and the introduction of compensation mechanisms to residential consumers. The present analysis simulates the immediate impacts of the increase in energy prices following the reform of subsidies and constructs several scenarios that simulate the poverty and inequality impacts of increasingly effective targeting mechanisms. Those targeting mechanisms make use of the total fiscal savings freed from the reform in energy subsidies to compensate consumers. In other words, the analyzed simulations of compensatory initiatives post-reform are all fiscally neutral. They are also bold and ambitious because they assume that all fiscal savings from the energy reform would be fully invested back into poverty reduction. The scenarios are also unrealistic in that they assume no additional administrative costs. Still, they are useful to set the distributive limits that compensation measures will have after energy subsidies are reformed.

Results from simulations underscore two critical results. First, raising electricity prices to consumers and removing subsidies for other energy sources would immediately—that is, without behavioral responses from users—increase poverty by 2.5 points. Second, "easy" compensation mechanisms— that is, either universal or using current structures—will not bring substantive poverty reductions, even if the government channels the entire TND 817.5 million saved from the subsidy reform. Perfect and costless targeting would slash poverty incidence down to 5 percentage points. Yet while this ideal scenario would imply a huge reduction in poverty, it would still fall short of eradicating poverty. Importantly, inequalities would be reduced in much more modest terms. Further, Tunisia is still far from having such an ideal targeting system with comprehensive and updated lists of beneficiaries and minimal transaction costs. In addition, it should not be expected that all fiscal savings from the energy subsidy be invested back into poverty reduction. What becomes clear from the proposed simulation results is that bold reforms of energy subsidies need to be accompanied by equally bold improvements to the targeting schemes of public spending if both poverty and disparities are to be substantively reduced.

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Appendix 1: Electricity Tariff Structure for Low Tension Residential Consumers (January 1, 2014)

<table>
<tr><th rowspan="2">Fee</th><th rowspan="2">Voltage (millimes/kVa/month)</th><th colspan="6">Price of energy by monthly consumption bracket (millimes/kWh)</th></tr>
<tr><th>1–50</th><th>51–100</th><th>101–200</th><th>201–300</th><th>301–500</th><th>501 +</th></tr>
<tr><td rowspan="3">Economic (1 and 2 kVa and consumption under 200 kWh)</td><td rowspan="3">500</td><td>75</td><td colspan="5"></td></tr>
<tr><td colspan="2">108</td><td colspan="4"></td></tr>
<tr><td colspan="3">123</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Economic (1 and 2 kVa and consumption under 200 kWh); normal (> 2 kVa)</td><td rowspan="2">500</td><td rowspan="2" colspan="3">136</td><td rowspan="2">157</td><td>240</td><td>330</td></tr>
<tr><td>210</td><td>270</td></tr>
</table>

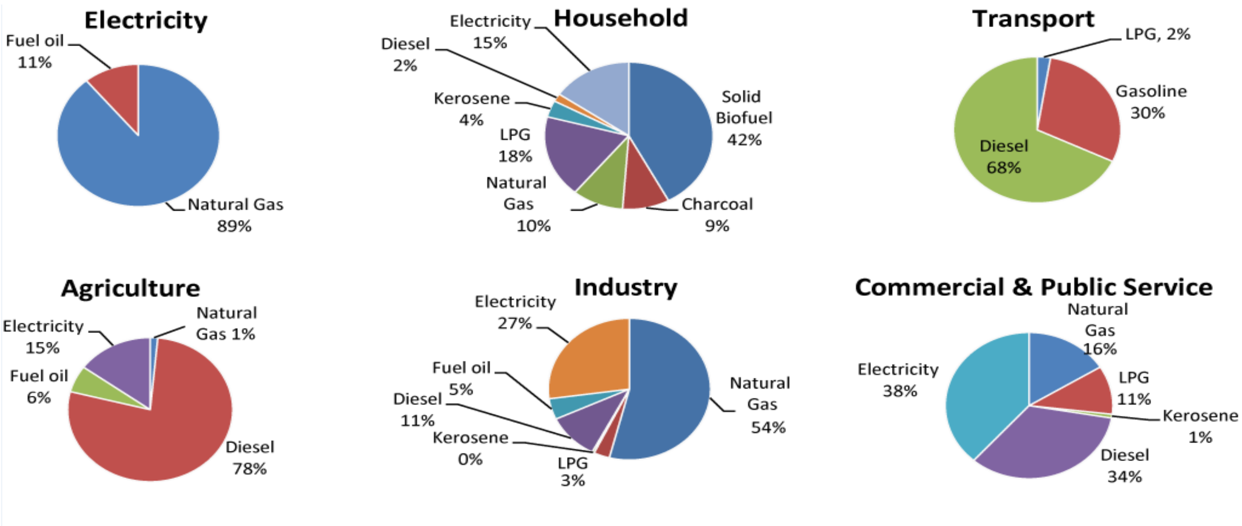
Source: Societé Tunisienne d'Electricité et du Gaz 2014.

Appendix 2: Distribution of Monthly Electricity Consumption by Quintile

Consumer < 200 kWh per month	Monthly consumption 1–50 kWh					Monthly consumption 51–100 kWh					Monthly consumption 101–200 kWh				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
% by quintile	48.1	19.2	12.9	11.6	8.2	32	25.5	20.1	13.7	8.7	15.9	20.5	23.2	22.6	17.9
Consumer > 200 kWh per month	Monthly consumption 1–300 kWh					Monthly consumption 301–500 kWh					Monthly consumption + 501 kWh				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
% by quintile	6.7	15.2	17.8	25.9	34.4	4.4	12.1	15.2	22.1	46.2	2.8	9.1	9.3	19.4	59.4

Source: WB staff calculations using SUBSIM.

Appendix 3: Composition of Consumption of Energy Sources by Sector (2012)



Source: World Bank (2013).
Note: In the case of nonresidential sectors, consumption of energy is an input for their production. For households, it is purely consumption.