

# Gender and Fossil Fuel Subsidy Reform in Nigeria:

## Findings and recommendations

### GSi REPORT

Global Subsidies Initiative-IISD  
Spaces for Change | S4C

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## Executive Summary

The report examines the impact of kerosene subsidies and reform from a gender perspective in Nigeria. The research was based around two overall research questions: “How do existing kerosene subsidy policies affect the welfare, productivity and empowerment of women and girls in low-income households?” and “How might this change given a change in subsidy policy or mitigation measures?” These questions were explored using secondary data, household surveys (covering 1,000 households) and focus group discussions. The questions were answered within the context of hypotheses made during the scoping phase and literature review for the research. This research attempted to answer the above questions in relation to income, energy use and energy supply effects, from a gender perspective. The report is part of a broader project that also examined gender and fossil fuel subsidies in Bangladesh and India.

There is a push within the United Nations’ Sustainable Development Goals (SDGs) to “leave no one behind.” What this research found is that in many cases, energy subsidies are leaving people behind in terms of access to modern energy. In the case of Nigeria, citizens were not benefiting from the kerosene subsidy or were paying significantly higher than the official price. None of the households surveyed reported paying the official price of NGN 50 per litre in 2015. In Lagos, households reported paying almost four times the official price and in Imo, more than six times. In periods of fuel shortages, women also queued for hours and sometimes all day to get fuel, often resorting to informal dealers with the attendant problems of higher prices and safety risks of adulterated fuel. Two thirds of the population were still using firewood for cooking in 2014 when the subsidy was in effect.

Women were negatively impacted by reforms when the subsidy was removed in 2016. Kerosene prices increased further after reforms, and fuel scarcity did not diminish. While many families reported an ability to absorb increasing costs by reducing kerosene use or gaining more income, the recent kerosene price hikes saw increased hardship. Women’s incomes are more likely to be impacted because they are the purchasers of kerosene. Half of the households in Imo and 18 per cent of households in Lagos said they would use more biomass as a result of the kerosene price hikes.

Women were responsible for cooking in 85 per cent and 88 per cent of households in Lagos and Imo respectively. Cooking with biomass therefore will impact women more in terms of exposure to indoor air pollution and time spent collecting biomass. The survey results indicated that women spend 10 to 30 minutes each day collecting wood. Firewood collection is known to have significant opportunity costs for women for both income-generating and family tasks.

In Lagos and Imo, most women in focus group discussions stated that switching to a preferred cooking fuel would enable them to save time spent on cooking. In Lagos, most said they would spend the extra time at their place of work or business, while women in Imo said they would use the time to do more cooking or spend more time with their family. For lighting, women want electricity.

Women do have decision-making authority on energy choices but not over ownership of appliances. In the surveys, 69 per cent and 94 per cent of the women who participated reported being in charge of decision making on cooking fuels in Lagos and Imo respectively. Also, the survey found that women decided slightly more than men on lighting energy sources. However, about half of households indicated that men purchase and own electronic appliances, while only one fifth are purchased and owned by women. Men therefore have an important role in choosing appliances that might have gendered implications for energy use.

Households do not prioritize energy subsidies over other kinds of support. When asked what kind of government support might be helpful, households preferred jobs (28 per cent in Lagos and 24 per cent in Imo), health (14 per cent, 31 per cent), financial support (22 per cent, 22 per cent) and education (19 per cent, 6 per



cent). Access to modern energy was only preferred by 4 per cent and 2 per cent of households in Lagos and Imo respectively. While households might undervalue the benefits of modern energy, this nevertheless raises the question whether the billions spent on an inefficient subsidy system might not be better spent on social protection programs (Adeoti, Chete, Beaton, & Clarke, 2016).

## Policy Recommendations for Nigeria:

- A return to subsidizing kerosene is not recommended. Kerosene subsidies did not work well and it is not a healthy or safe fuel.
- Liquefied petroleum gas (LPG) subsidy policies are also not recommended given that in other countries they have tended to benefit urban and relatively wealthy citizens more than poor and rural populations.
- If an energy subsidy is put in place for clean cooking, it should be technology-neutral to allow households to select the option that works best for their circumstances. Furthermore, such subsidies can be better targeted to beneficiaries that need them, rather than distorting existing markets, such as toward poor women, as the *Pradhan Mantri Ujjwala Yojana* (PMUY) scheme in India (see GSI-IISD and IRADe, 2019).
- Emphasis should be placed on social protection programs rather than energy subsidies. Surveyed households expressed a clear preference for social or income support over energy subsidies. Programs should target the female head of household to improve empowerment and financial inclusion.
- Education and communication policies should provide information to women about fuel choices and allow them to make informed decisions.
- Distribution and supply issues should be addressed to ensure all Nigerians have access to modern fuels at competitive prices.
- Given the realities of Nigeria's high current dependence on fuel wood, financing support for clean-burning cook stoves may be necessary in the interim to provide cleaner alternatives for low-income women predominantly using biomass for cooking in order to reduce their immediate exposure to indoor air pollution. Longer-term measures to address energy access can include investments in electrification infrastructure and renewable energy, supporting women's education and exploring affordable energy pricing for low-income households.

The research concludes with five overarching findings from the cross-country study. First, overall fuel subsidies are not working well for poor women. Second, better targeting of support for energy access is needed and possible. Third, subsidy reform needs to be undertaken with care, and mitigation measures are needed to protect poor women. Fourth, other factors could be significant for fuel switching and better access to cleaner fuels for women. Finally, investing in subsidy alternatives could empower women more directly. A summary of these and other findings from across the three countries can be found at the end of this report.

Nigeria is a “high-impact” country in that the total number of people without access to electricity or clean cooking is among the highest in the world. Like many countries, Nigeria is reviewing energy subsidies, undergoing reforms and increasing prices but also has goals to increase energy access and women's empowerment. These reforms present an opportunity for policy-makers to deliver and target policies that cluster gender and energy access benefits toward poor, often rural, women and ensure that no one is left behind.



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## Glossary

<b>Clean cooking</b>	Clean cooking refers to access to clean fuels and technologies for cooking, following the World Health Organization guidelines for indoor air quality (World Bank, 2018b).
<b>Clean cookstoves</b>	The Global Alliance for Clean Cookstoves (n.d.) rates cook stoves as clean if they meet minimum standards on efficiency, indoor emissions, total emissions and safety.
<b>Connection subsidy</b>	A connection subsidy is a transfer that covers some or all of the costs associated with using a product for the first time. For LPG, this includes the metal cylinder that contains the gas, the first load of gas in the cylinder and the stove and associated equipment required to use LPG for cooking.
<b>Consumption subsidy</b>	A consumption subsidy is a transfer that covers some or all of the cost of a product when it is consumed.
<b>Empowerment</b>	Empowerment is defined as “the process through which people take control and action in order to overcome obstacles of structural inequality which have previously put them in a disadvantaged position” (ENERGIA, 2012).
<b>Energy sector reform</b>	Structural changes in the policies and institutions that govern any part—production, transmission or distribution—of the energy value chain, and any fuel within this value chain.
<b>Fossil fuel consumer subsidy</b>	A fossil fuel consumer subsidy is a policy that reduces the retail price of fossil-derived energy by shifting part of the cost burden onto other actors in the economy. Most often, the cost burden is shifted onto the public budget, where taxpayer money or foregone tax revenue is used to keep energy prices low. But costs can be shifted in other ways too: for example, by requiring energy distributors to operate at a loss. The economic cost of energy includes opportunity costs, so it is still a consumer subsidy if countries provide domestically produced energy at prices below the international market level. Fossil fuel subsidies do not truly reduce the cost of energy for a country; they simply alter who pays and how.
<b>Fossil fuel producer subsidy</b>	A fossil fuel producer subsidy is a policy that shifts the cost of energy production away from the companies that find, extract, refine and generate fossil energy and onto other actors in the economy. Most often, the cost burden is shifted onto the public budget, including where taxpayer money is used to provide project infrastructure or guarantees, tax cuts are provided to incentivize investments, and access is granted to government land or goods and services for free or at below-market prices.
<b>Gender</b>	Gender “refers to the socially-constructed attitudes, values, roles and responsibilities of women and men, in a given culture and location. These attitudes, values and roles are influenced by perceptions and expectations arising from cultural, political, economic, social and religious factors, as well as from custom, law, class, ethnicity and individual or institutional bias. Gender attitudes and behaviours are learned and change over time” (ENERGIA, 2012, p.4). As a social construct, gender is often defined in contrast with sex, which refers to the assignation of “male” or “female” to a body based on the identification of physical, biological differences.



<b>Gender equality</b>	Gender equality is a state where “there is no discrimination on grounds of a person’s sex in the allocation of resources or benefits, or in the access to services. Equality exists when both men and women are attributed equal social value, equal rights and equal responsibilities, and have equal access to the means (resources, opportunities) to exercise them. Gender equality may be measured in terms of whether there is equality of opportunity, or equality of results” (ENERGIA, 2012, p. 5).
<b>Gender equity</b>	Gender equity refers to “fairness and justice in the distribution of benefits and responsibilities. Gender equity is the process of being fair to women and men. To ensure fairness, measures must often be available to compensate for historical and social disadvantages that prevent men and women from otherwise operating on a level playing field. Equity leads to equality” (ENERGIA, 2012, p. 5).
<b>Modern energy access</b>	There is no universally accepted definition of modern energy access. Sustainable Energy for All (2013) states that there is growing consensus that “access” should not be defined as a binary state (access or no access) but as a continuum of improvement against a number of metrics. This scoping paper defines modern energy access as the supply of fuels and combustion technologies that are reliable, convenient and do not cause indoor air pollution, as well as the increased rate of consumption of such fuels and combustion technologies. By this definition, improving modern energy access might include expanding the supply and increasing the consumption of electricity among households, as well as liquefied petroleum gas, clean cooking fuels, clean cooking stoves, advanced biomass cook stoves and biogas systems.
<b>Non-solid fuel</b>	Non-solid fuels include liquid fuels like kerosene, ethanol and biodiesel, and gaseous fuels like LPG, natural gas and biogas. This is in contrast to solid fuels like wood, charcoal, agricultural residue, dung and coal.
<b>Pre-tax consumer subsidy</b>	A pre-tax consumer subsidy is one that reduces the retail price of energy before any kind of taxation is taken into account. Pre-tax subsidies can take many forms: for example, direct budgetary transfers to state-owned enterprises; legislation that requires energy marketers to operate at loss, with or without compensation; or the provision of domestically produced energy and prices below the international market level.
<b>Tax subsidy</b>	A tax subsidy is one that shifts the burden of energy taxation onto other actors. Opinion differs as to what should be included in this category. It is generally accepted that deviations from the established tax structure, such as exemptions from value added tax, are a subsidy. More controversial, but argued by the International Monetary Fund, is the idea that tax rates should reflect the full cost of a good or service to society, and any taxation below this rate is a subsidy. By this definition, tax rates that do not cover the costs of road infrastructure, local air pollution and greenhouse gas emissions are conferring a subsidy.



## Abbreviations

<b>BIDS</b>	Bangladesh Institute of Development Studies
<b>CCT</b>	Conditional cash transfer
<b>EA</b>	Enumeration Areas
<b>EMI</b>	Equated Monthly Income
<b>FGD</b>	Focus Group Discussion
<b>GDP</b>	gross domestic product
<b>GSI</b>	Global Subsidies Initiative
<b>IEA</b>	International Energy Agency
<b>IGAs</b>	Income-generating activities
<b>IRADe</b>	Integrated Research and Action for Development
<b>LPG</b>	liquified petroleum gas
<b>LSI</b>	Lembaga Survei Indonesia
<b>NDS</b>	National Bureau of Statistics
<b>NNPC</b>	Nigeria National Petroleum Corporation
<b>NPC</b>	National Population Commission
<b>OLS</b>	Ordinary Least Squares
<b>PPMC</b>	Pipelines and Products Marketing Company
<b>PV</b>	photovoltaic
<b>S4C</b>	Spaces for Change
<b>SHS</b>	solar home system



## 1.0 Introduction

Analysis of energy subsidies rarely considers the effects of policies depending upon the gender of the consumer (Kitson, Merrill, Beaton, & Sharma, 2016). Instead, attention has focused on identifying the size and nature of fossil fuel subsidies, assessing performance with respect to aspects of social welfare (e.g., del Granado, Coady, & Gillingham, 2012; Coady, Flamini, & Sears, 2015), price control and supply (e.g., Adeoti, Chete, Beaton, & Clarke, 2016), and their environmental impact (e.g., Gerasimchuk, et al., 2017, Jewell, et al., 2018; Merrill, Bassi, Bridle, & Christensen, 2015). A further body of research considers the effects of reforming subsidies, particularly on poorer consumers, and measures to protect these consumers (e.g., ADB, 2016; Cameron, et al., 2016; Beaton, et al., 2013).

Broadly speaking, this literature points to three main effects of subsidies and reform (Kitson et al., 2016): an “income effect,” where the subsidies represent an effective transfer to household incomes due to lower fuel prices; an “energy use effect,” where the subsidies may influence the type or quantity of fuel that is used by the household; and an “energy supply effect,” where the subsidy changes the availability of an energy source. Each of these effects may have specific consequences for women, as described in the figure below. However, to date, there has been no empirical work exploring or quantifying these potential effects. The research described here is a first attempt to address this gap, focusing on the income and energy use effects of subsidies and subsidy reform.

This report focuses on Nigeria as a country with gender inequality gaps, fossil fuel subsidies and energy access issues. According to the Gender Gap Index of 144 countries (where one has the smallest gap and 144 the largest), Nigeria ranks 122 (World Economic Forum, 2017). Access to modern energy, as estimated by available metrics, is limited (see Table 1). The study is part of a broader project that also examined gender and fossil fuel subsidies in Bangladesh and India (Box 1).

**Table 1. Fossil fuel subsidies (total and per household) and population without access to modern energy, 2016**

Total fossil fuel subsidies (2014) (million USD)	Total subsidies per cent GDP (2013)	Subsidies per household (USD)	Population without access to electricity (million; percentage of population) (2016)	Population without access to clean cooking (million; percentage of population) (2016)	Population without access to clean cooking (million; percentage of population)
2,472 (3,598)	0.6 (1.3)	61	76 (41%)	177 (95%)	177 (95%)

Sources: World Bank, 2018a; IEA, 2014; IEA, 2018; United Nations Department of Economic and Social Affairs, 2017; World Bank, 2018b; authors' calculations.

### Box 1. Multi-country study summary

When this study commenced, Bangladesh, India and Nigeria were the countries with the largest numbers of people globally without access to electricity (in 2016): India (15 per cent of population, 270 million), Nigeria (41 per cent, 76 million) and Bangladesh (24 per cent, 39.2 million) (World Bank, 2018). With China, they also have the largest populations without access to clean cooking (India: 781 million, China: 572 million, and Nigeria: 177 million, Bangladesh: 134 million).

All three countries have gender inequality gaps and fossil fuel subsidies. Bangladesh and India rank 47 and 108 on the Gender Gap Index, respectively. In Bangladesh, the focus was on subsidized kerosene for lighting and in India, liquified petroleum gas (LPG) for cooking.



A coordinated multi-country study was undertaken by in-country researchers and an international team. The methodology was consistent across countries, and results were analyzed for country-specific and cross-country findings. A summary of the cross-country findings and recommendations is provided at the end of this report, but readers are encouraged to view the multi-country report for full details (Global Subsidies Initiative-IISD, BIDS, IRADe & Spaces for Change, 2019).

As part of this research an audit of secondary data was undertaken in 2017 on LPG subsidies in Indonesia from a gender perspective, with findings published in Kusumawardhani et al. (2017). Indonesia is highly relevant because it implemented a kerosene-to-LPG conversion program, “Zero Kero,” from 2007. The program provided a “connection” subsidy (an LPG cylinder, stove, regulator and hose) and set a “consumption” subsidy (a fixed price for LPG refills). Both subsidies are universally accessible by all citizens.

The subsidies were successful in switching many Indonesian households from kerosene. However, the benefits tended to accrue to wealthier households. As of 2014, a nationally representative survey found that LPG was used by 51 per cent of households living below the poverty line and 79 per cent of households above this threshold (Lembaga Survei Indonesia [LSI], 2014). Survey data collected by LSI (2014) found that only 30 per cent of subsidy benefits were captured by the bottom 40 per cent of households; while the top 40 per cent of households captured 47 per cent of the subsidy benefits. Consumers spent on average 315 minutes per week acquiring LPG cylinders (LSI, 2014). The majority of consumers reported problems with high prices (significantly above the official price) and at least occasional problems with the availability.

LPG subsidies cost the Indonesian government USD 1.9 billion in 2016. Several options to reduce subsidy expenditure and better target the program have been publicly discussed by the government but not yet implemented (Ministry of Energy and Mineral Resources, 2016).

Because of the importance of LPG as a cooking fuel in Indonesia, with associated health and time saving benefits for women, any reforms planned for LPG would need to mitigate negative impacts on the poor and for women. The government could target LPG subsidies to low-income consumers or target women for non-energy forms of compensation; reform the distribution and pricing system, and increase education and communication as to the impacts from other cooking fuels.

The research was informed by a review (Kitson et al., 2016) of the literature on Nigeria as well as Bangladesh and India. The research also reviewed 28 reform episodes from around the world from a gender perspective, finding that 18 relied on targeted mitigation measures, including expansion of public works, education and health programs in poor areas. Gender-sensitive policy-making can consider the extent to which such policies can be designed to compensate for inequalities in intra-household decision making. This might include the use of universal or conditional cash transfers, structured to be more likely to increase the power of women in determining household expenditure decisions. Alternatively, policies might include social assistance measures intended to meet women’s essential needs, such as health care, or to enable their participation in the labour market, such as infrastructure programs or microloans targeted at women.

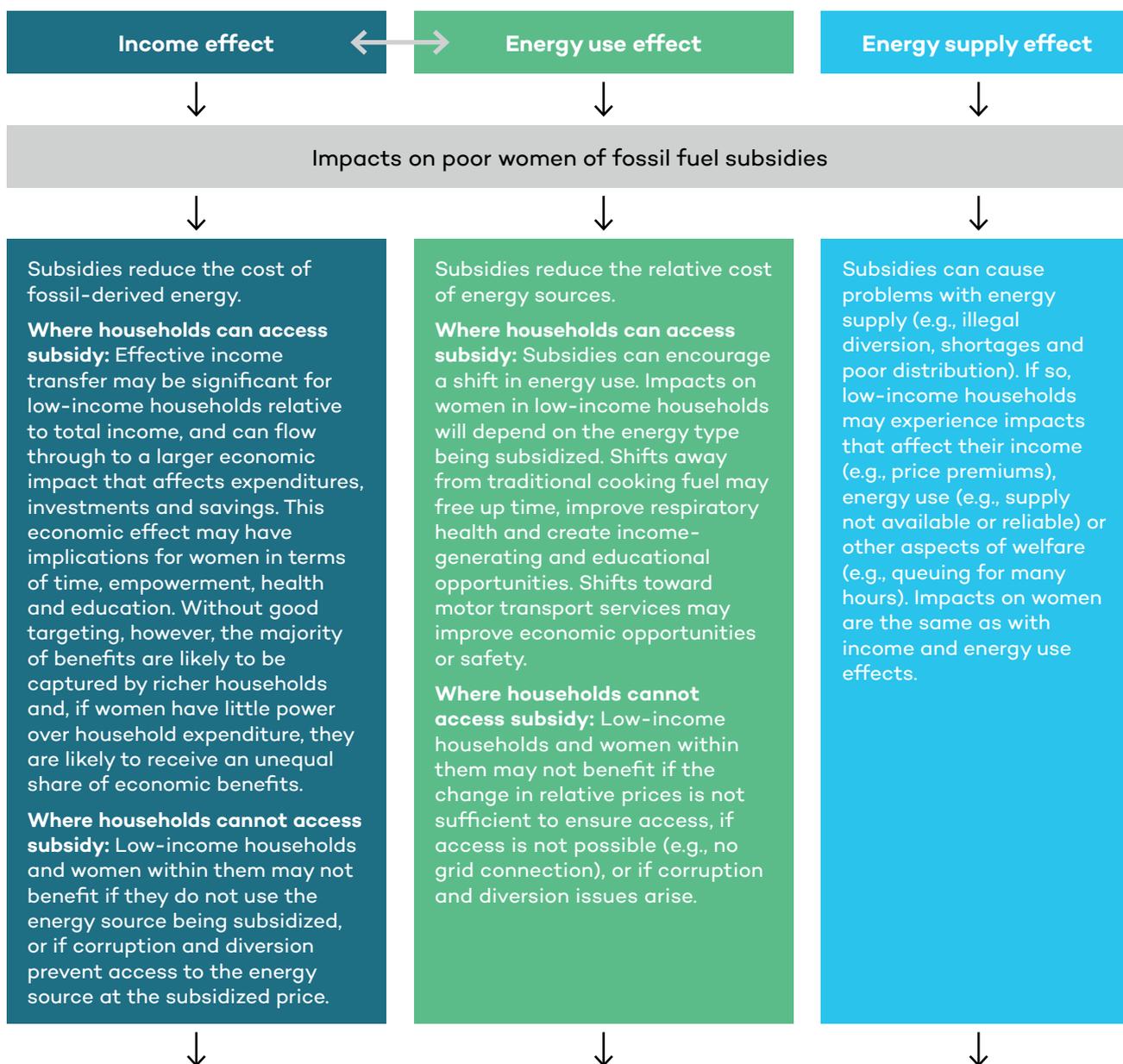
Overall, the literature review (Kitson et al., 2016) also found that there is a substantial body of knowledge examining the range of measures that can address the adverse impacts of increased energy prices resulting from subsidy reform. This knowledge is drawn from analysis of previous reform attempts, as well as more theoretical analyses. However, to date, few of the measures implemented or discussed with respect to fuel subsidy reform consider how to address the specific effects on men and women. As with fuel subsidy policies themselves, reform policies are rarely gender-specific and can thus have unintended impacts on gender equality. If the government objective is to promote gender equality, reforms should be designed and implemented so as to not only counteract potential negative effects upon women, but also to maximize opportunities for improving women’s lives.

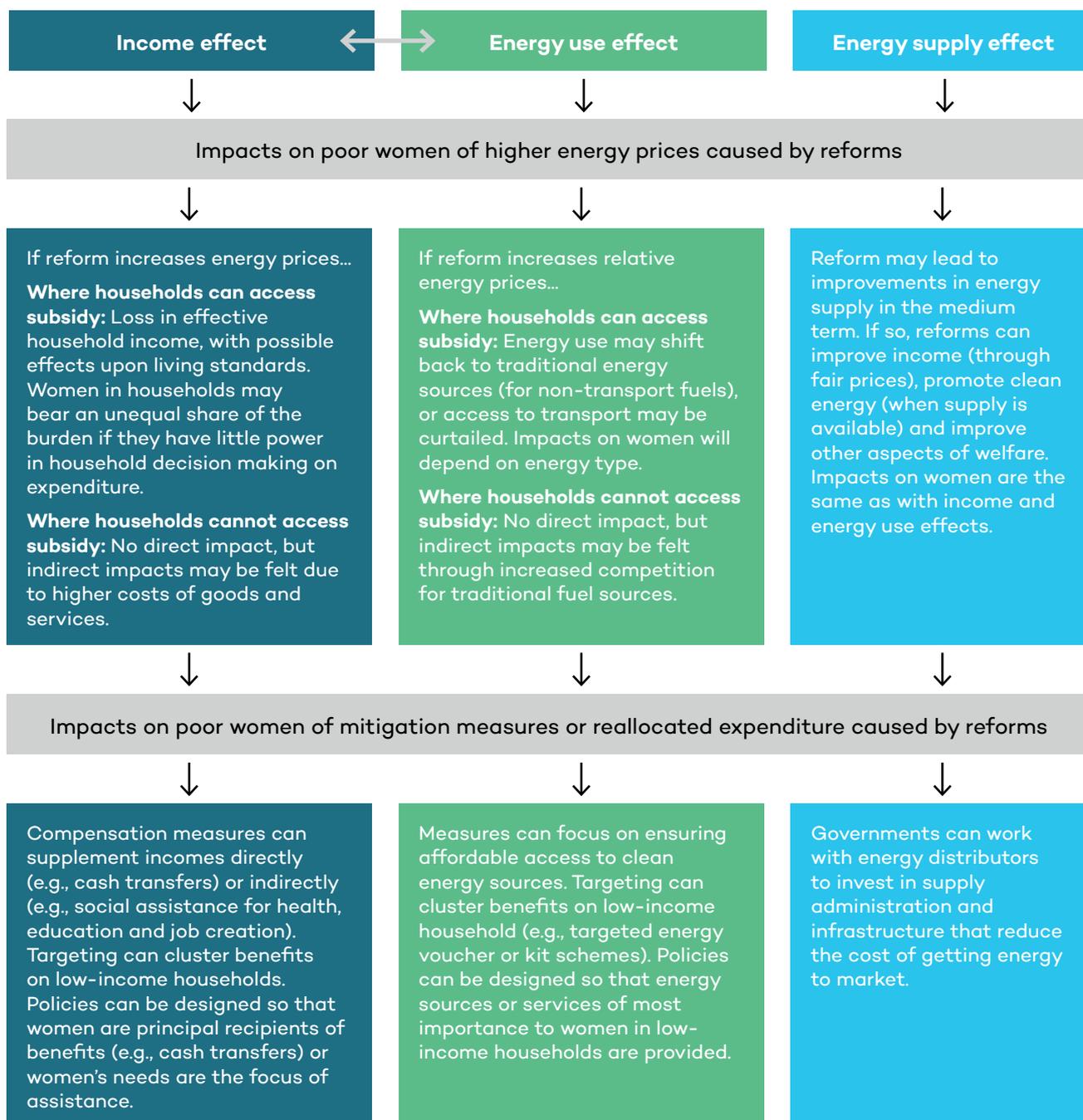
The literature review further revealed that the impacts of energy subsidies, the impacts of energy sector reform, and workable or appropriate mitigation measures associated with any reforms are extremely context-specific.



Nonetheless, strong evidence indicates that in many countries a significant proportion of subsidy benefits are captured by well-off households, suggesting a general phenomenon of energy subsidy inefficiency if the desired policy objective is to target income and energy access benefits to women and men living in poverty.

Figure 1 describes the hypothesis as set out based on the literature review. This is followed by a chapter describing the research methodology, followed by the country-specific results for Nigeria. The final chapter presents findings for Nigeria as well as a summary of overall findings across the three countries.





**Figure 1. Likely impacts of subsidies, their reform and mitigation measures on women**

Source: Kitson et al., 2016.



## 2.0 Methodology

On the basis of the literature review, two overarching research questions were established:

1. How do existing kerosene subsidy policies affect the welfare, productivity and empowerment of women and girls in low-income households?
2. How might the welfare, productivity and empowerment of women and girls in low-income households change as a result of specific, nationally relevant proposals for the reform of existing kerosene subsidies?

This two-stage approach reflected the facts that: a) the literature review found a paucity of research on the impacts of subsidies on gender; and b) the policy agenda in many countries is focused on the reform of fossil fuel subsidies, such as the phasing out of kerosene, as well as policies to support decentralized renewable energy generation.

The full research questions are outlined below.

**Table 2. Overall research questions and specific to Nigeria**

<b>Overall country research questions</b>	
<p>1. How do existing kerosene and LPG subsidy policies affect the welfare, productivity and empowerment of women and girls in low-income households, taking into account:</p> <ul style="list-style-type: none"> <li>• Impacts of the subsidy on kerosene distribution?</li> <li>• The extent to which the subsidized price is actually reflected in kerosene and LPG retail prices paid by consumers?</li> <li>• The extent to which lower kerosene and LPG retail prices influence household fuel use?</li> </ul>	<p>How might the welfare, productivity and empowerment of women in low-income households be impacted through changes in subsidy policies and mitigation measures?</p>
<b>Nigeria-specific research questions</b>	
<p>How do the changes in kerosene subsidy policies affect the welfare, productivity and empowerment of women in low-income households in urban slums and rural areas, in different geographical zones in Nigeria, taking into account the extent to which changes in kerosene subsidy policy have:</p> <ul style="list-style-type: none"> <li>• Impacted kerosene distribution</li> <li>• Impacted kerosene retail prices paid by consumers</li> <li>• Influenced household choice of cooking fuels?</li> </ul>	<p>How might the welfare, productivity and empowerment of women and girls in low-income households change as a result of the following policy reforms:</p> <ul style="list-style-type: none"> <li>• Policy interventions intended to promote renewable energy?</li> <li>• Policy interventions intended to promote LPG?</li> </ul>

Research was based on a combination of primary and secondary data. Primary data was collected through household surveys, focus group discussions and personal interviews. The study employed a multi-stage stratified random sampling design for identification of households for primary data collection

Survey data was collected from 1,000 households in two urban slums in Lagos and six rural villages in Imo State. Households were selected based on the Enumeration Areas developed for the 2006 census of Nigeria as the sampling frame.

Data collection had three main pillars: an extensive review of secondary data (data mining), two large surveys and in-depth focus group discussions. The data mining reviewed an extensive amount of journal articles and papers to scope the issue and collect information. Based on this, primary data collection took place, focused on



poor women in urban and rural areas. Data was collected with numerical and check-box questions, as well as open questions, with a full interview taking about 45 minutes.

**Lagos survey:** 500 households were interviewed in two urban slums: Badia East in Apapa Local Government Area and Ebute-Metta in Lagos Mainland Local Government Area in Nigeria's South-West zone. In Lagos, the surveys targeted an area characterized by a lack of adequate housing infrastructure, clean water and proper sanitation. As with most parts of the country, houses are connected to the grid, but electricity supply in these areas is not stable. The majority of households had an average size of 3 to 6 people (78 per cent). A significant number of households were headed by females (24 per cent). Most respondents (85 per cent) had primary or secondary school education, and 3 per cent none at all. 80 per cent of respondents are self-employed, 6.6 per cent are in public sector employment and 4.4 per cent are full-time housewives. Most respondents (55 per cent) claimed to have household earnings between NGN 1,000 (USD 2.78) and NGN 20,000 (USD 56) per month; 25.8 per cent of respondents did not provide details.

**Imo survey:** 500 households were interviewed in six villages in Uzoagba community, in Ikeduru Local Government Area, South-East zone. The surveys in Imo State took place in a rural area. Imo State is characterized by lower incidences of poverty compared to the North, when measured by the United Nation's Multidimensional Poverty Index. Almost all respondents lived in their own block houses. Respondents reported that 44 per cent of households were headed by females. The average size of households surveyed was 4.8 people. Most respondents (74 per cent) had primary or secondary school education, and 6.4 per cent none at all. 55 per cent of respondents are self-employed, 15 per cent run family businesses and 20 per cent are full-time housewives. 45 per cent of respondents in Imo earn between NGN 1,000 (USD 2.78) and NGN 20,000 (USD 56.00) monthly while 33 per cent of respondents did not provide information.

The focus group discussions (FGDs) and interviews were designed to collect textured information about the rationale and experiences of vendors and households with respect to the data collected from secondary and primary sources. In Nigeria, two FGDs were conducted in Lagos and Imo State. They took place in Ebute-Metta (Lagos) with 56 women living or doing business in Badia, Ebute-Metta and environs, and Ikeduru (Imo) with 27 women living and operating businesses in the six Uzoagba villages surveyed under this project.

A similar approach was used in Bangladesh and India (Box 2).

## **Box 2. Multi-country methodology**

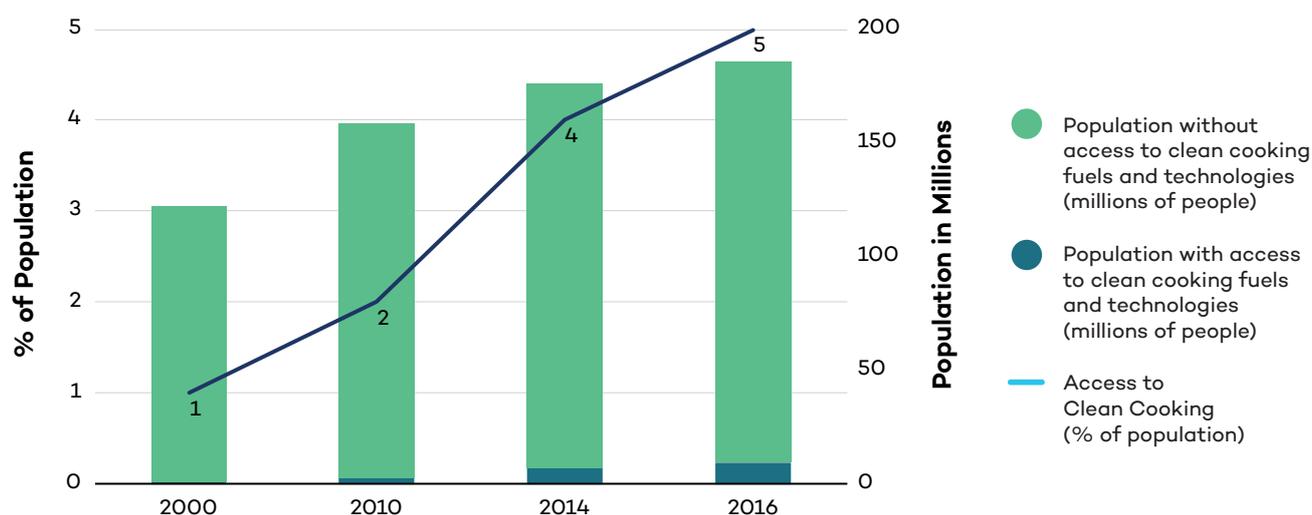
Household surveys focused on selected regions in each country. A common questionnaire structure was developed, piloted and adapted to suit national circumstances. In total, 2,400 surveys were conducted across the three countries. Each country (Bangladesh, India and Nigeria) was analyzed independently before attempting to conduct a comparative analysis, such that perspectives deriving from each individual case would inform the larger whole. Conducted jointly by all partners in the consortium, the analysis is based on interpretation of descriptive primary and secondary quantitative data within the broader context of qualitative analysis of other literature and qualitative data. The comparison between countries is qualitative in nature.



## 3.0 Background

Nigeria has a long history of subsidizing petroleum products. For household kerosene, the government fixed an official retail price that was below the market price of the product and paid the price difference to marketers. The official price was not uniformly enforced across the country. Partly due to the challenges in the petroleum importation and distribution systems, kerosene shortages were widespread, with episodes of scarcity frequently recorded. At the same time, the cost of these subsidies was high: USD 3.38 billion was spent on kerosene subsidies between January 2012 and July 2013 (PWC 2015). In 2016, subsidies to kerosene were reformed while the official pump price of the product tripled.

Kerosene is a “poor people’s fuel” and is used by many low-income households in Nigeria for cooking and lighting, although it is polluting and can be harmful to health. It often replaces or is used alongside biomass as a cooking fuel, especially in urban areas. In both urban and rural areas, women are primarily responsible for cooking with kerosene and a host of other cooking fuels. Less than 5 per cent of the population has access to clean cooking (Figure 2). Taking the traditional gendered roles within households into account, energy sources can have differentiated impacts on men and women. It is therefore important to understand how energy use can influence gender empowerment, as well as the linkages between kerosene subsidies, reform and gender.



**Figure 2. Access to clean cooking in Nigeria, 2000–2016**

*Note: The share of the population with access to clean cooking fuels and technologies is the proportion of population with primary reliance on clean fuels and technology is calculated as the number of people using clean fuels and technologies for cooking, heating, and lighting divided by total population, expressed as a percentage. “Clean” is defined by the emission rate targets and specific fuel recommendations (that is, against unprocessed coal and kerosene) included in the normative guidance World Health Organization guidelines for indoor air quality: household fuel combustion (World Bank, 2018a).*

*Source: Re-created from World Bank, 2018b.*

## 3.1 Energy and Economic Context

Nigeria is Africa’s largest oil producer and the largest economy in Africa. Nevertheless, the riches are unequally distributed, and Nigeria ranks 152 out of 187 in inequality rankings.<sup>1</sup> While Nigeria has experienced fast economic growth, 53 per cent of the population lived on less than USD 1.9 per day in 2009 (World Bank, 2018a). Poverty levels are higher in rural areas, and in particular the northern states (NBS, 2016). While Nigeria is a major exporter of oil, many petroleum products are imported, due to limited refining capacities.

<sup>1</sup> A ranking of the income Gini coefficient that measures the deviation of the distribution of income among individuals or households within a country. For more information, see <http://hdr.undp.org/en/content/income-gini-coefficient>.



Energy access has been increasing steadily in recent years. Electricity access rose from 48 per cent in 2006 to 59 per cent in 2016 (World Bank, n.d.). Nevertheless, the supply is not stable and power cuts are frequent. Access to clean cooking stood at 5 per cent. While more people have gained access to clean cooking, the massive population growth that Nigeria is experiencing has meant that more people were without access to clean cooking in 2016 (177 million) than had been 16 years before (121 million) (SDG7, n.d.; cf. Figure 29).

**Table 3. Access to electricity and clean cooking in per cent, 2016**

Energy	Urban	Rural	Percentage of total population
Electricity	86	41	59.3
Clean cooking	5.3	0.7	2.3

Source: World Bank, n.d.; NPC, 2014.

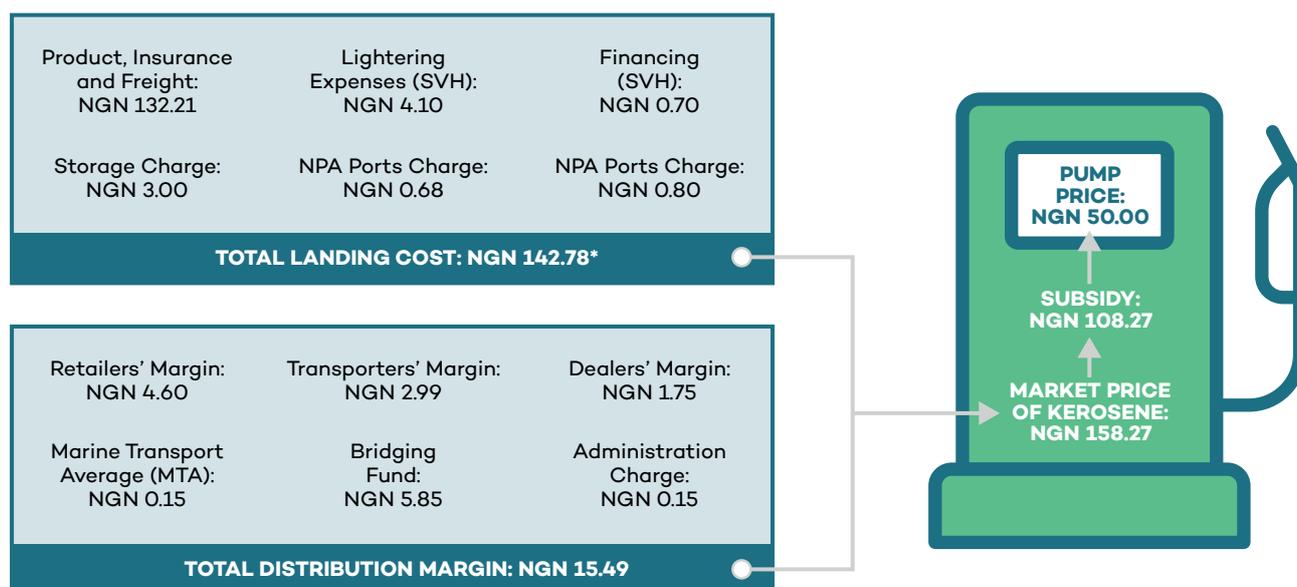
## 3.2 Gender and Energy

Large geographical disparities account for wide differentials in human development outcomes for girls and women in Nigeria. In the North-East, poverty levels stood at 72 per cent, compared to 26 per cent in the South-East and a national average of 54 per cent (British Council, 2012). 71 per cent of young women in the North-West are unable to read or write, compared to 10 per cent in the South-East. Women own 4 per cent of land in the North-East, and just over 10 per cent in the South-East and South-South (British Council, 2012). Some of the reasons for the inequality include early marriage, early childbirth, poor sanitation, and the shortage of female teachers (British Council, 2012). While Nigeria ranks only 122nd on the Global Gender Gap Index (WEF, 2017), it scores relatively high on the criterion on economic opportunity and participation.

Energy access is important for women and impacts gender roles, both in terms of alleviating the burden of domestic tasks performed by women, but also in opening up new economic opportunities. In performing their traditional gender roles, women need energy for domestic work such as cooking, heating, laundry, cooling, lighting and storage. The 2013 National Energy Policy recognizes this and includes as one of its primary objectives “promote gender sensitivity and draw special attention to rural needs” (Energy Commission of Nigeria, 2013). It also aims to ensure the availability and effective distribution of kerosene as an alternative to fuelwood in the interim.

## 3.3 Kerosene Subsidies

Until 2016, household kerosene was subsidized through a reimbursement mechanism that targeted marketers. A subsidiary of the Nigerian National Petroleum Corporation (NNPC) imported and distributed kerosene, while most independent marketers would receive kerosene from their depots. The government paid the price differential between the market price and the government-regulated price (see Figure 3; for a detailed description of the subsidy mechanism, cf. Aramide et al., 2012). Large sums were spent on these subsidies: USD 3.38 billion was spent on kerosene subsidies between January 2012 and July 2013 (PWC 2015).



**Figure 3. Subsidy mechanism for kerosene.**

Note: In the pricing template published by the PPPRA, the total sum of the reported components of the HHK landing cost do not equal the total reported HHK landing cost, with a discrepancy of ₦1.29. No explanation is given for this discrepancy.

Source: Aramide et al., 2012.

Faced with volatile oil prices in the international market, the Government of Nigeria started to reform oil prices in 2012. In January 2016, Nigeria’s petroleum pricing body revised the pricing templates for kerosene and increased the official price from NGN 50 to NGN 83.<sup>2</sup> In August, NPPC depots confirmed that the price of kerosene at official NNPC depots and stations had been increased to NGN 150 per litre (Eboh, 2016), essentially tripling the official price. At the same time, the mechanism for subsidy payments was changed, and the government stopped payments to oil marketers.

Nigeria experienced a foreign exchange shortage during this period that also affected imports by independent companies. As the difficulty marketers faced in accessing foreign exchange worsened, the government-owned NNPC’s subsidiary, the Pipelines and Products Marketing Company (PPMC), took over and monopolized fuel and kerosene imports and distribution (Ohaeri & Adeyinka). As the major importer of petroleum products, the government now incurs what it refers to as “under-recoveries” when importing kerosene at prices that are too high to maintain the official sales price (Adetayo & Asu, 2018). Consequently, even after the changes in kerosene subsidy policy, kerosene subsidies still exist, while kerosene supply challenges remain.

Table 4 shows the average prices reported by households. The official sales prices were NGN 50 (until early 2016) and NGN 150 (from mid-2016). Table 4 shows that households were paying several times more than the official sales price. Product price differentials between states is linked to distribution and logistical issues.

**Table 4. Average kerosene prices reported in household surveys**

	Price of kerosene (NGN per litre)	
	LAGOS	IMO
2015	204	302
2016	221	302
2017	278	296

Source: Household surveys.

<sup>2</sup> PPPRA Press Statement, signed by Farouk Ahmed, Executive Secretary on December 29, 2015.



## 4.0 Results

The following section analyzes how Nigeria's previous kerosene subsidies affected the uptake of kerosene (energy use), the impact on women's household budgets (income) and on the availability of kerosene (energy supply). It then examines the impact of the removal of these subsidies on women in terms of energy use, income and energy supply effects. A final section discussed the impacts on women's welfare, empowerment and productivity.

### 4.1 Did Kerosene Subsidies Work for Poor Women?

#### 4.1.1 Energy Use Effect

Households in Nigeria use a wide range of fuels for their energy needs. For cooking, wood dominates the energy mix (64 per cent), followed by kerosene (26 per cent) (Table 5). Kerosene is the most common cooking fuel in urban areas with almost 50 per cent of households using it. Only 8 per cent of rural households use kerosene for cooking (Table 5; similar figures in NBS, 2012).

Wood and other biomass are used by 90 per cent of rural households and 38 per cent of urban households. Firewood is more limited in availability in urban areas and women are more frequently engaged in income-generating activities, enabling them to purchase kerosene and with less time for fuelwood collection. In rural areas, wood largely collected "for free" from community areas and woodlots owned by the household (NBS, 2013). The use of fuelwood for cooking is particularly high in the northern states, which are characterized by higher levels of poverty and unemployment (Naibbi & Healey, 2014).

The use of LPG is low in the country, with the majority of LPG users located in Lagos and Ogun in the South-West region. (Accenture, 2011).

**Table 5. Cooking fuels used by households in Nigeria**

Cooking fuel	Urban (per cent)	Rural (per cent)	National average (per cent)
Electricity	0.7	0.2	0.4
LPG/natural gas/biogas	4.6	0.5	2.3
Kerosene	47.6	8.7	25.5
Coal/lignite	0.7	0.0	0.3
Charcoal	5.3	1.6	3.2
Wood	37.9	89.3	63.7
Agricultural crops/grass	0.2	3.1	1.8
Animal dung	0.0	0.1	0.1
No food cooked in household	2.9	2.4	2.6
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: NPC, 2014.

For lighting, the picture is even more diverse (see Table 6). There is a large difference between urban and rural areas. More than 70 per cent of urban dwellers use electricity, followed by kerosene. In rural areas, where electricity access is lower, only 25 per cent of households use electricity, while 21 per cent used kerosene. The surveys confirmed this diversity, with the large majority of households using several energy sources for lighting.



**Table 6. Energy sources for lighting, 2015 (2010–11)**

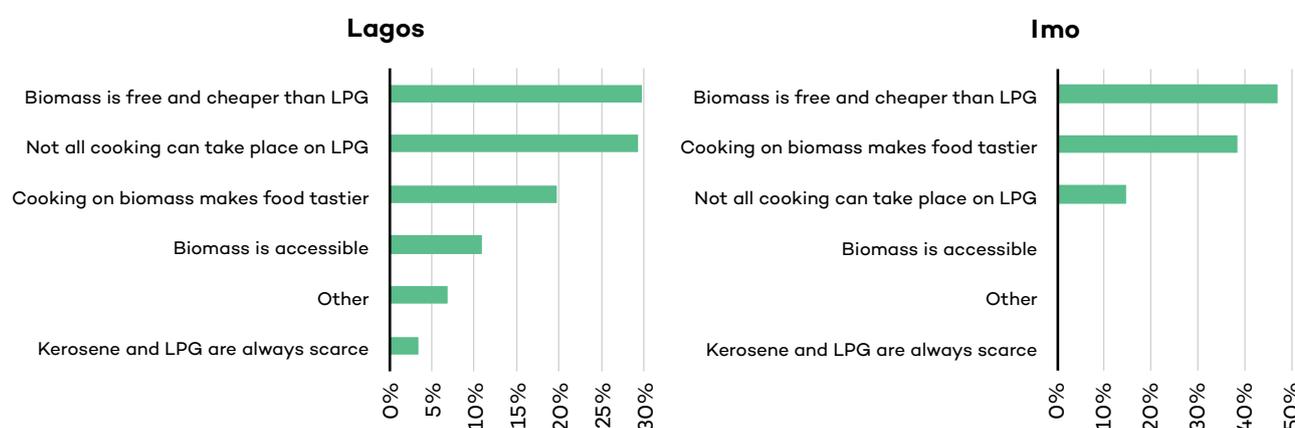
Region	Collected firewood	Purchased firewood	Grass	Kerosene	Electricity (PHCN only)	Gas	Generator	Battery/Dry cells	Candles	Other
Urban	1.2 (2.6)	1.2 (1.5)	0.1 (0.4)	9.7 (32.8)	72.9 (57.2)	n.a. (0.2)	4.9 n.a.	9.1 (3.6)	0.5 (0.4)	0.2 (1.2)
Rural	6.2 (9.5)	1.4 (3.6)	0.1 (0.7)	21.2 (41.3)	25.6 (20.0)	n.a. (0.1)	4.5 n.a.	38.5 (19.6)	0.7 (0.9)	1.6 (4.2)
National average	4.1 (6.8)	1.3 (2.8)	0.1 (0.6)	16.6 (38.0)	44.8 (34.7)	n.a. (0.1)	4.7 n.a.	26.6 (13.3)	0.6 (0.7)	1.1 (3.0)

Note: Numbers in parentheses from 2010/2011. Numbers not in parentheses from 2015. Power Holding Company Nigeria (PHCN) 2016 only. Sources: NBS, 2016, p.40 and NBS, 2013, p.38.

The household surveys found that almost every household in Imo State uses some quantity of kerosene. The focus groups indicated that kerosene is a backup fuel for lighting. For cooking, almost all participants in focus groups said they would abandon a fuel source for cooking when they switch to another type of fuel. Nevertheless, firewood was used as a backup fuel, an economy measure or for food taste preferences.

While households continue to use a wide range of fuels including biomass, the surveys found an almost uniform preference for electricity for lighting and a strong preference for liquid cooking fuels, especially in urban areas. In Lagos, households identified kerosene (66 per cent) and LPG (27 per cent) as the preferred fuels for cooking. This confirms the perception of liquid fuels as “aspirational” fuels in urban areas. In rural areas, households preferred wood stoves (44.6 per cent), followed by kerosene (30 per cent) and LPG (24 per cent). The preference for modern fuels such as LPG was also found to increase considerably with level of education.

The reasons for using different cooking fuels were explored in FGDs and surveys. Affordability was cited as the key issue for the type of fuel used, referring both to the cost of the fuel and cooker compared to available income. Availability was another key concern, with kerosene supply particularly affected by scarcity. The assumed properties of fuels, e.g., firewood burning faster, and the taste of meals cooked with wood were also cited. Safety concerns about explosions and fires seem to hinder the uptake of LPG. Respondents perceived charcoal as fast to use, causing less soot and a useful fuel for small-scale cooking businesses. The household surveys also asked why households with an LPG connection kept using biomass (see Figure 4). Most households cited the fact that biomass was cheaper, some cooking needs that cannot be met with LPG and preference for the taste of food cooked with biomass.



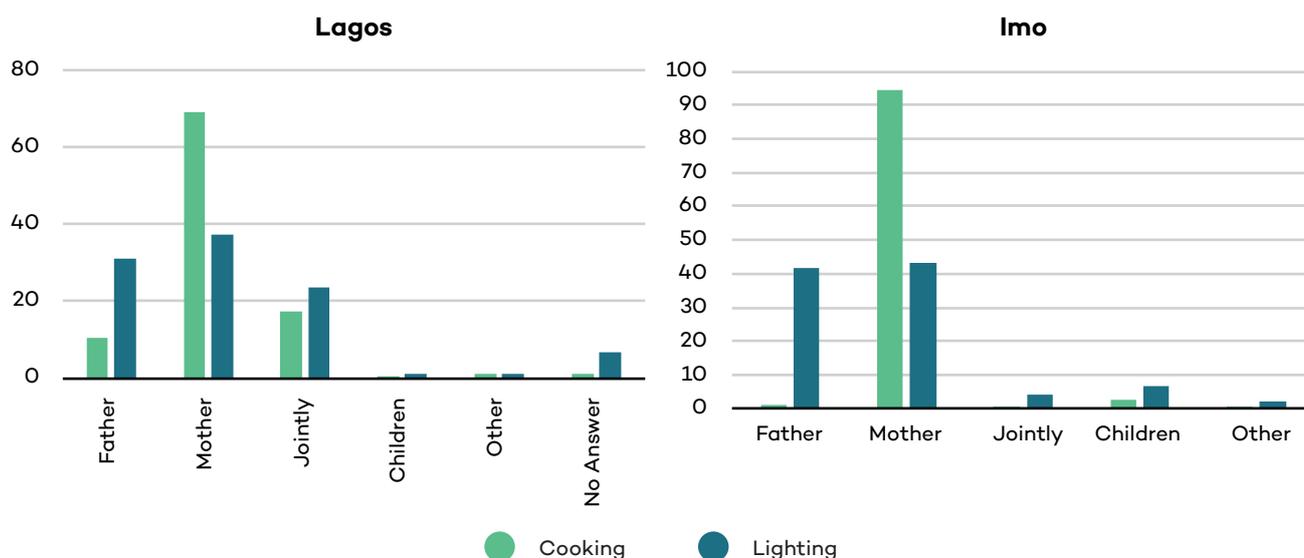
**Figure 4. Reasons for households with an LPG connection to continue using biomass, per cent**

Source: Household surveys.



This partly confirms findings on household fuel choices in the literature. Udoffia (2015) finds that income is the major determinant for the choice of fuel type which determines the spending pattern on the selected fuel type, followed by availability of the fuel.

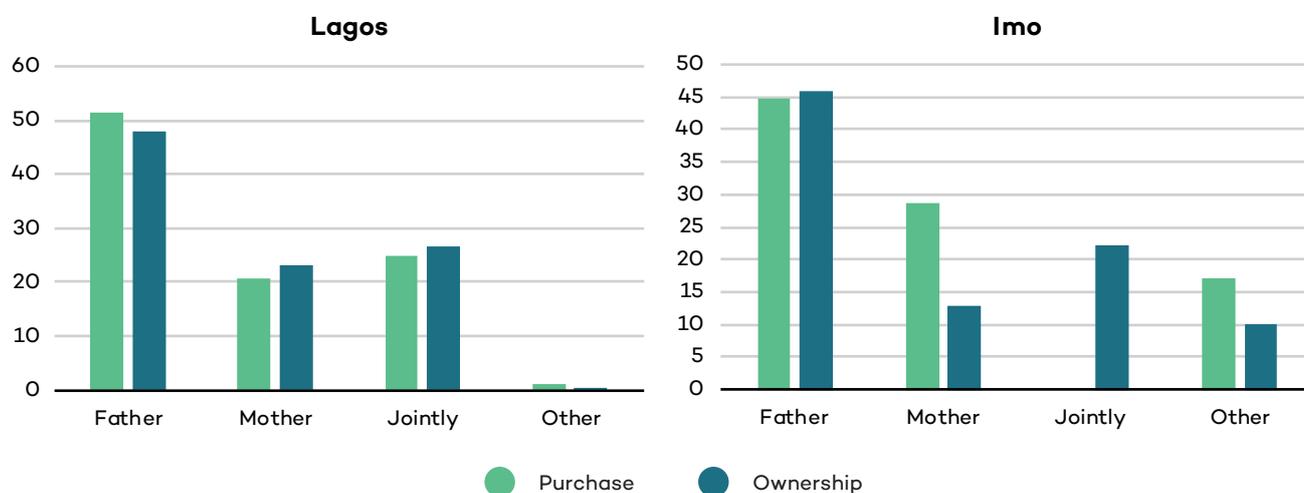
A large majority of the women surveyed reported being in charge of making decisions about which household energy source to use. In the Lagos and Imo surveys, 69 per cent and 94 per cent of the women who participated reported being in charge of decision making on cooking fuels. Also, for lighting, the survey found that women chose which energy source to use in slightly more households than men (see Figure 5).



**Figure 5. Decision making about cooking and lighting fuels by gender, per cent**

Source: Household surveys.

There is a marked gender differential in the purchase and ownership of electronic appliances (see Figure 6). About half of households indicated that men purchase and own electronic appliances, while only one fifth are owned and purchased by women. This means that men have an important role in choosing appliances that might have gendered implications for energy use. FGDs found different decision-making patterns about changes in cooking and lighting fuels. In Lagos, respondents indicated that the decision to change the cooking and lighting fuel was mostly made by women, whereas women in Imo stated that it was primarily made by men.



**Figure 6. Purchase and ownership of electronic appliances by gender, per cent**

Source: Household surveys



### Key Points

- Even though kerosene was subsidized, households used a wide variety of energy sources for their cooking and lighting needs. Biomass still accounted for 64 per cent of cooking fuels, especially in rural areas.
- Households in urban areas expressed a preference for liquid fuels for cooking, with a range of factors hindering their uptake, among them affordability, safety concerns and availability.
- The vast majority of respondents would like to use electricity for lighting.
- While women claim to be in charge of decisions about cooking fuels, and in many households also about lighting fuels, men have an important role in deciding about purchases of electronic devices, as well as changes in energy sources.

### 4.1.2 Income Effect

To understand the impacts of kerosene subsidies on income, it is important to understand the limitations of the previous system. The subsidy system in Nigeria did not ensure uniform low prices across the country. While there was an official government-approved price for kerosene of NGN 50 per litre until January 2016, average prices paid by consumers were significantly higher. There was no uniform distribution across the country. As a result, diversion to the black market and middlemen drove average retail prices as much as 300 per cent above the official retail price (Aramide et al., 2012).

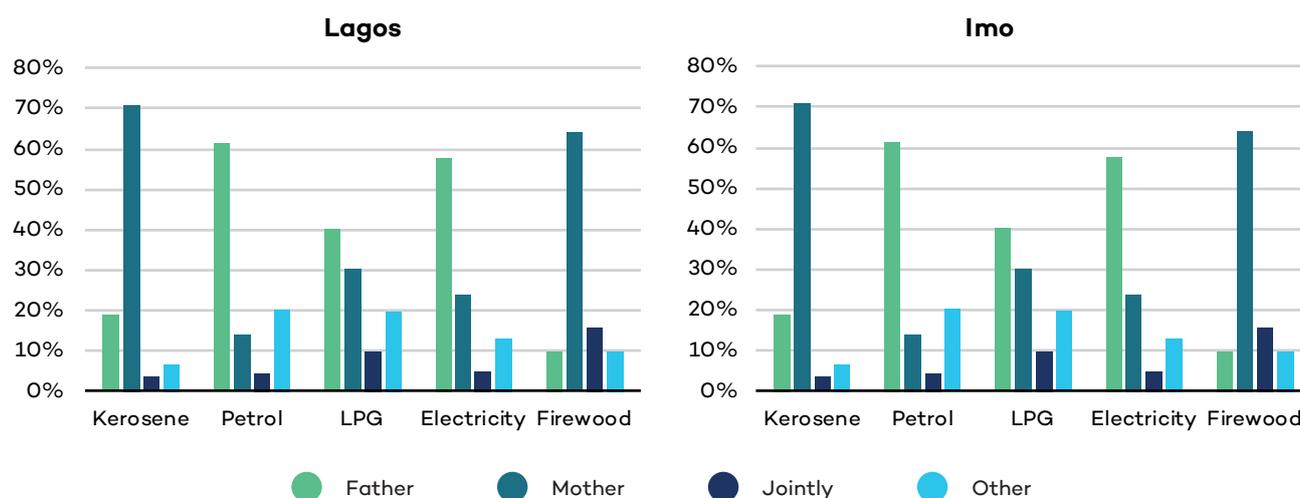
The household surveys conducted in 2017 investigated the prices households were paying before and after the price increases in 2016. Both in Lagos and in Imo area, none of the households reported paying the official sales price of NGN 50 per litre in 2015. In Lagos, households reported paying on average NGN 204 in 2015, more than four times the official price. In Imo, households reported paying NGN 302 per litre of kerosene, more than six times the official sales price.

The kerosene subsidy scheme was also inefficient in reaching the poor, even though kerosene is considered “poor people’s fuel.” The subsidy was not targeted to poor households, or women, but to anyone who buys the fuel. Based on statistical consumption data, Soile & Mu (2015) found that the richest quintile receives a larger share of subsidies (17.1 per cent) than the lowest quintile (14.7 per cent).

The surveys also inquired whether women knew about the subsidy scheme. Awareness of government fuel subsidies in the sampling areas was limited. Two thirds of survey respondents claimed to have heard about fuel subsidies. Nevertheless, when asked to explain what a subsidy is, over 90 per cent of respondents did not know what subsidy actually means, i.e., provided no answer or a wrong answer.

The survey found a gendered difference as to who pays for which fuel.<sup>3</sup> In both areas, mostly men pay for petrol, LPG and electricity (see Figure 7). Kerosene seems to be more the responsibility of women. In Lagos both men and women pay for it, whereas in Imo women pay for it in 71 per cent of all cases. In rural areas, women are also clearly in charge of payments for firewood.

<sup>3</sup> The analysis for this paragraph is based on a smaller sample of survey questionnaires (250 each for Lagos and Imo).



**Figure 7. Payment for fuel type by gender, per cent**

Price changes for kerosene can therefore be expected to affect women’s income more than for other fuels. The Nigeria Demographic Health Survey in 2013 (NPC, 2014, p. 281) found that in 69.7 per cent of urban households and 70.4 per cent of rural households, decisions on household expenditure are mainly made by women. Most women surveyed in Lagos (71 per cent) and Imo (78 per cent) stated that they mostly decide how to spend their income. This is especially important, as energy expenditure already makes up a large share of household budgets in low-income households.

Soile & Mu (2015) calculated household energy expenditures in Nigeria based on statistical consumption data and the official sales prices of fuels and found that the poorest quintile spends 8.7 per cent of their budget on kerosene, compared to 2.9 per cent for the richest quintile. Nevertheless, as the authors themselves point out, this might still underestimate the magnitude of energy expenditure, especially of poor households in remote areas, as most households paid much higher prices for kerosene than the official sales price, which points to the challenges in the official distribution system and the relevance of the black market.

**Key Points**

- Even though kerosene was subsidized and an official price was fixed, none of the households surveyed reported paying the official sales price, but rather prices that were between two and six times the official sales price.
- Kerosene and firewood are the fuels paid for more by women, while men pay mostly for petrol, LPG and electricity. Higher prices for kerosene might therefore impact women's budgets and incomes more.

**4.1.3 Energy Supply**

As outlined above, prices paid by consumers were much higher than the official sales prices. Fuel distribution suffered from smuggling, inefficiencies in the system and corruption (Ehinomen & Adeleke, 2012; Naibbi & Healey, 2014; PWC 2015). High subsidies for kerosene also contributed to the problem and increased scarcity (Lawal, 2011). Kerosene scarcity was frequent, which resulted in long queues at filling stations. Distribution of petroleum products was very unequal across the six regions (NNPC, 2014), partly because distribution points in rural areas are further away from homes. In the surveys, households in these areas were found to spend more time to reach sales points for kerosene or LPG. In Lagos, 62 per cent live within 10 minutes’ walk to a formal vendor, and 81 per cent within 10 minutes’ walk to an informal dealer. In rural areas, only 10 per cent of



households live within 10 minutes' walk from a formal dealer, and 18.5 per cent from an informal dealer. More than a third of households in rural areas have to walk more than 30 minutes to a formal dealer (36 per cent), or to an informal dealer (40 per cent).

The informal sector plays an important role in kerosene distribution in Nigeria. The surveys found that many households preferred informal vendors—in Lagos that number reached 57 per cent of survey respondents, even though households reported paying higher prices there. Households named closer proximity, sales in smaller quantities and a variety of containers, as well as less queuing as reasons to prefer informal vendors to the formal filling stations. The survey also found that shortages were experienced more frequently with formal dealers.

During periods of scarcity, women mostly queue at the filling stations to buy cooking fuel (S4C, 2015). Women that participated in a focus group discussion in Imo reported that during periods of scarcity, they queue as much as two to four hours and sometimes all day. Reliance on the informal sector can also be seen as a coping strategy, with the possibility of buying in small quantities, with less queuing and less kerosene scarcity. Nevertheless, this also comes with risks. Products sold on the informal market are poorly regulated, and the risk of adulteration is high. Marketers may adulterate kerosene products to increase profits, which results in explosions and domestic accidents.

### Key Points

- The fuel distribution system has been unable to ensure uniform prices, distribution across the country or a reliable supply of fuel and was characterized by smuggling, inefficiencies and corruption.
- During periods of scarcity, women queue for hours for kerosene.
- The informal sector plays an important role in supplying kerosene to poor households.
- Relying on the informal sector can be seen as a coping strategy. Closer proximity, sales in smaller quantities and a variety of containers, as well as less queuing, seemed to outweigh the higher prices at informal vendors compared to official sales points.

## 4.2 How Did the Reform of Kerosene Subsidies Impact Poor Women?

### 4.2.1 Energy Use

Faced with the increase in the price of kerosene as subsidies were removed, households adopted a variety of strategies (Figure 8). The household surveys showed a marked difference between urban and rural areas, as well as income groups. In Lagos, most households reduced their kerosene consumption or increased their total expenditure, but 18 per cent also mentioned that they would switch to or use more biomass.

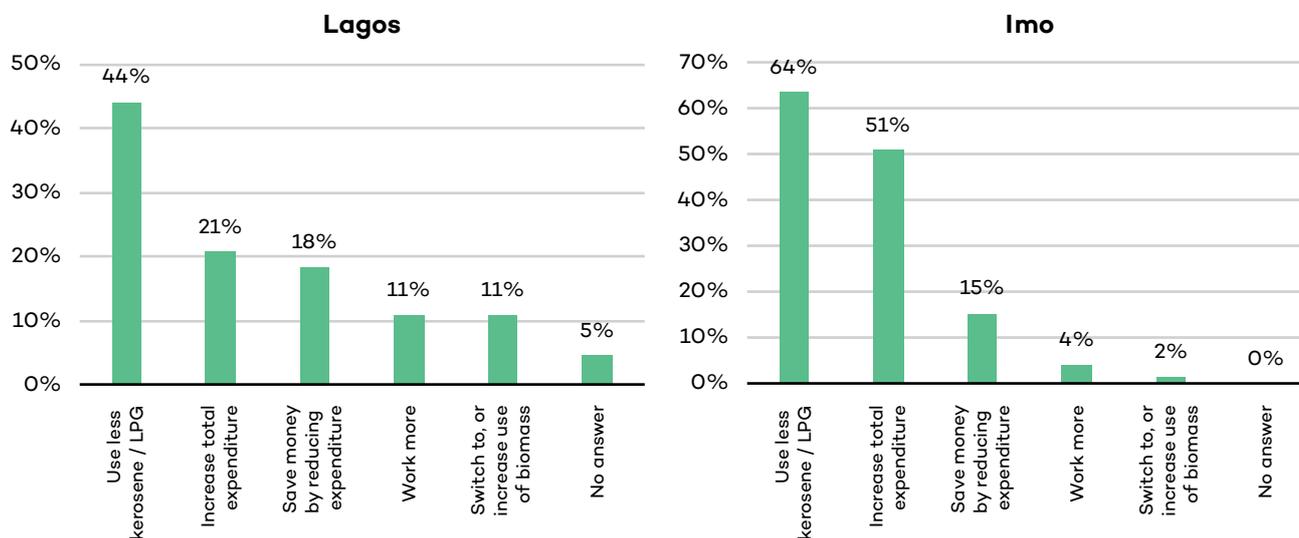
In rural areas, households seem to be neither able nor willing to increase their financial expenditure on fuel. They would reduce their kerosene consumption, or switch to other fuels, most likely firewood. These findings are in line with findings in the literature. Akujobi (2015) found that after the removal of the kerosene subsidy and subsequent increase in price, the number of households using firewood in Owerri (Imo State) increased by 5.6 per cent and in Ibadan (Oyo State) by 6.3 per cent.

Income seems to have a large influence on strategies for coping with price increases in urban areas—this effect was not observed in rural areas. Over 85 per cent of respondents in Lagos who earn below NGN 10,000 (28 USD)<sup>4</sup> monthly will use less cooking fuel and reduce their expenditure on other things if the prices of fuel

<sup>4</sup> Conversion rate used for data collected in the survey results: NGN 360 = USD 1; <http://thenationonlineng.net/banks-to-adopt-n360-rate-for-2018-results/>



increase. Just over 60 per cent of respondents who earn above NGN 45,000 (125 USD) monthly use less cooking fuel and reduce their expenditure on other things if the prices of fuel increase, while none of the respondents who earn above NGN 80,000 (222 USD) monthly reduce other household expenditure if the prices of fuel increase.



**Figure 8. Coping strategies for kerosene price increases reported by households' priorities, per cent**

Source: Household surveys.

### Key Points

- When faced with price increases for kerosene of between 52 per cent (Lagos) and 145 per cent (Imo State), households adopted a variety of coping strategies.
- While only 18 per cent of households in Lagos would switch to or use more biomass, over 50 per cent of rural households would employ this strategy.
- Income also has a large influence on coping strategies and energy use. Households that were comparatively better off were more likely to spend more or reduce other expenditure.

## 4.2.2 Income

While households reported paying considerably more than the official price before 2016, prices rose even further after subsidy reforms. This was due to both reforms and supply challenges. The surveys did not collect data on household income and expenditure before and after reforms, but it can be expected that increased spending on kerosene would have had a significant impact on women's disposable income given their responsibility for both household energy expenditure in general and kerosene in particular.

The financial impact is likely larger for women in urban areas, where it is not possible to resort to "free" collected firewood. A significant number of respondents in Lagos reported that they would use less kerosene, increase their total expenditure or save on other items. In rural areas, where biomass is more available, many households reported they would use less kerosene and increase the use of biomass. While this does not imply a financial cost to women, it has a large opportunity cost given the time spent on firewood collection. An interesting finding that was reported from a focus group discussion in Imo stated that during a fuel price increase, women will support men financially to pay for fuel.



### Key Points

- High prices associated with reforms place high demands on household income, especially women's income.
- In Lagos, women cope with price increases mostly by saving fuel, or shifting expenditures within their budgets. In rural areas, women seem to have less access to financial strategies and are more likely to resort to biomass for cooking.

## 4.2.3 Energy Supply

The reforms did not improve the supply of kerosene, as shortages persisted. The Nigerian National Petroleum Corporation (NNPC) is currently the major importer of petroleum products. In its January 2018 monthly operations report, NNPC showed that the total imports of petroleum products increased (NNPC, 2018, p. 20). Marginal increases in product supplied remain insufficient to meet the energy needs of the ever-growing population. Declining local refining capacities further complicate efforts to achieve product supply sufficiency, especially for kerosene (NNPC, 2018, p. 20). The petroleum product (gasoline and dual-purpose kerosene) production by domestic refineries in January 2018 amounted to 112 million litres, compared to 233 million litres in December 2017. A combination of these factors contributed to product scarcity, which has resulted in profiteering by cartels (Bayagbon, 2018).

Respondents in household surveys conducted in 2017 reported that they experience scarcity of fuels, especially the scarcity of kerosene and petrol. Over 60 per cent of respondents in Lagos who use kerosene and petrol say they experience scarcity often or very often. This seems to be less the case in Imo State.

### Key Points

- Kerosene scarcity persisted or was even worsened after reforms, with over 60 per cent of households in Lagos reporting that they experience scarcity often or very often.

## 4.3 How Did the Reforms Impact the Welfare, Empowerment and Productivity of Women?

The previous subsidy system in Nigeria was not effective in ensuring uniform prices, did not lead to a transition to liquid cooking fuels in rural areas and might even have contributed to fuel scarcity. Nevertheless, the survey results indicate that the price hike for kerosene has pushed a significant share of the poorest women to reduce their kerosene consumption or spend more on it, or to resort to biomass for cooking. This section will analyze how the observed changes in energy use, income and energy supply resulting from reforms might have impacted the welfare, productivity and empowerment of women.

### 4.3.1 Welfare

Half of the households in Imo State and 18 per cent of households in Lagos said they would use more biomass to cope with price increases, despite its negative impacts on women's health. Both kerosene and biomass are health hazards. Merem et al. (2018; cf. Ozoh et al., 2018) cite fire hazards from kerosene explosions, destruction of property, burns, compromised vision, indoor air pollution and asthma that affects particularly women and children. It is estimated that household air pollution causes more than 64,600 deaths in Nigeria (GACC, n.d.). Air pollution is aggravated if cooking takes place inside with insufficient ventilation. The survey indicated that in Lagos most of



the cooking takes place indoors (70 per cent) and some outside the house (28.4 per cent). In rural areas, 46 per cent of households cook outside, while 22 per cent cook inside the house and 31 per cent in a separate building.

At the same time, the use of kerosene, often adulterated by informal marketers driven by profiteering, has also led to considerable hazards, including fatalities through household explosions along with broader health and environmental risks (Merem et al., 2018; Lawal, 2011). Three multi-year reviews of admissions to Nigerian hospitals attributed about 30 per cent of all burn cases to kerosene (Mills, 2012). Women also make up the majority of affected casualties of domestic accidents caused by adulterated kerosene explosions.<sup>5</sup> According to the survey, kerosene is used as a lighting fuel in bedrooms, living rooms and kitchens. This can affect the whole family, but especially family members who spend more time at home, like women and children.

To positively influence the health of women, it is therefore necessary to not only reduce the use of biomass, particularly for indoor cooking, but also fight the use of (especially) kerosene and promote the use of LPG and electricity for cooking. LPG uptake would require well-regulated distribution networks and safety awareness campaigns.

### 4.3.2 Productivity

Energy is essential for women's productivity, both as an input into economic activities, and in terms of saving time that can be used for other economic activities. Most low-income women in Lagos and Imo are self-employed and are involved in catering, hairdressing, tailoring, beadmaking, fashion designing and sales of Ankara accessories. All these business activities are heavily dependent on energy supply. Kerosene is, for example, used for lighting businesses at night, and higher prices can increase the operating costs of these businesses. Nevertheless, this only holds if electricity is not available. Electricity not only provides better service in terms of lighting output, it also provides interesting economic opportunities. There is therefore an important case for redirecting kerosene subsidies toward access to on- or off-grid electricity (Gill, Shardul, Sharma, & Bridle, 2018).

The use of firewood for cooking is extremely time-consuming, especially if it has to be collected and is not available in close proximity. The survey found that women are in charge of cooking in 85 per cent of households in Lagos, and 88 per cent of households in Imo. This means that women bear the burden of both acquiring the fuel and cooking itself. In rural areas, a third of respondents need over 30 minutes to collect the firewood, while a third of respondents say that it takes less than 10 minutes. Firewood collection happens several times per month, with 75 per cent of respondents collecting it more than three times per month. This confirms findings in the literature. One study found that women spent about 1.7 hours per day gathering firewood for cooking (Lambe, Jürisoo, Wanjiru, & Senyagwa, 2015). Another study found that farmers spent 17 hours over the course of a week walking 11 kilometres (Madukwe, 2014). A study of 300 female farmers in Gombe State of Nigeria found that the gender roles for energy management and particularly wood collection profoundly impacted the time available for both income-producing and domestic tasks (Yahaya, Nabinta, & Olajide, 2007).

In both Lagos and Imo, most women in FGDs stated that switching to a preferred cooking fuel would enable them to save time spent on cooking. The surveys found in Lagos that electric and LPG stoves were faster to prepare, while in Imo biomass stoves were identified as the fastest to prepare. An important issue to take into account though, is that women were also found to spend a considerable amount of time queuing for kerosene during periods of scarcity. To improve the productivity of women, it is necessary to continue efforts to reduce the use of biomass, but also to introduce the availability and uptake of modern fuels, especially electricity and LPG. Efficient distribution systems are essential for this.

<sup>5</sup> Mills (2014) found that in individual events of kerosene disasters that occurred in Lagos in 2001, the female-to-male ratio of the number of people killed/injured was 59:35, and 2500:358 in Edo State as of 2004 respectively.



### 4.3.3 Empowerment

It is difficult to establish whether or how the change in the subsidy regime has impacted the empowerment of women. The subsidy did not target women specifically, for example through cash transfers. Nevertheless, the fact that women's incomes might be more affected by higher kerosene prices than men's could translate into negative impacts on empowerment. Having more time might benefit women's economic empowerment, but this depends very much on the context. Most women in an FGD in Lagos said they would spend the extra time (from fuel switching) on their place of work or business, while women in Imo stated that they would use this time to do more cooking or spend more time with their family and children.

Education also seems to play an important role in the preference for modern fuels. Overall, it seems that fuel subsidies are an extremely inefficient tool to support the empowerment of poor women. Investing directly into women's education, providing business opportunities or financial empowerment through cash transfers can be expected to have better results.

#### Key Points

- Women's welfare is impacted by reforms if users switch back to biomass use.
- To promote the welfare of women, it is necessary to not only reduce the use of biomass, but also fight the use of (especially) adulterated kerosene, and promote the use of LPG and electricity for cooking.
- For women who switched back to biomass, the reforms might have impacted their economic opportunities.
- To improve the productivity of women, it is necessary to continue efforts to reduce the use of biomass, and to increase the availability and uptake of modern fuels, especially electricity and LPG and increase the safety of using these fuels.
- Women's incomes might be more affected by higher kerosene prices than men's, which could translate into negative impacts on empowerment. Nevertheless, fuel subsidies in Nigeria seem to be an extremely inefficient tool to support the empowerment of poor women.
- Investing directly into women's education, providing business opportunities or financial empowerment through cash transfers can be expected to have better results.

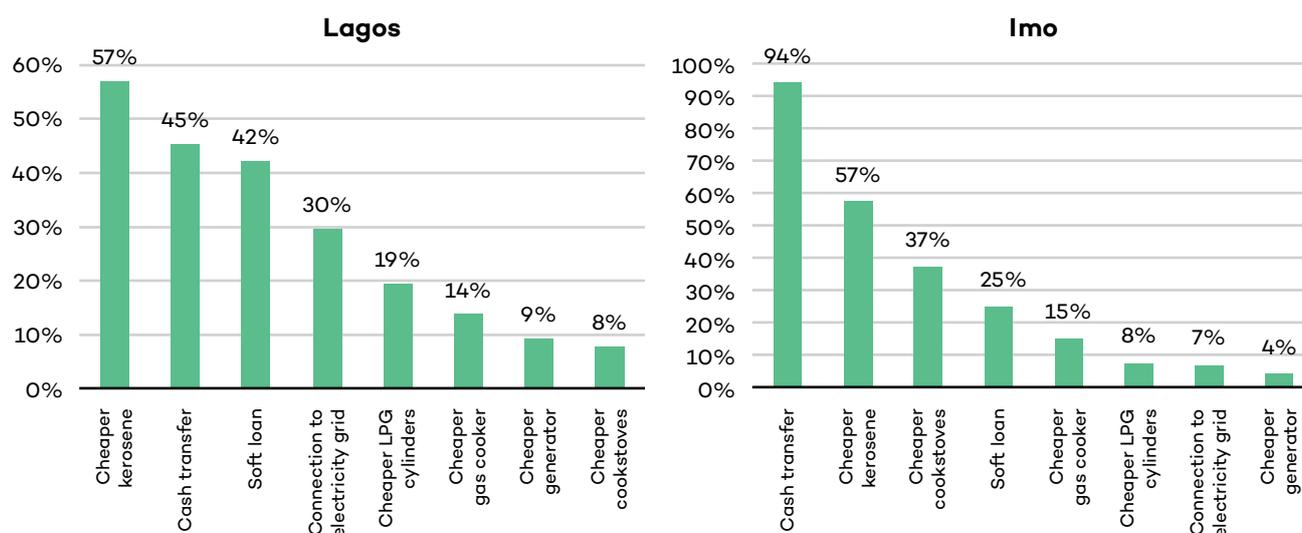
## 4.4 What Subsidies and Government Support Do Poor Women Prefer?

Fuel subsidies are not the only way to support the affordability of modern energy. Affordability depends both on the income available and the relative price of fuels or electricity and equipment. This means that affordability can also be influenced by an increase in the amount of income available, for example through social protection programs or cash transfers. In addition, other fuels or technologies might be able to provide similar or even better energy services. The surveys therefore explored women's preferences and possible alternatives to fuel subsidies.

The research aimed to explore how alternative policy reforms might support the empowerment and welfare of women in low-income households. The research team in Nigeria broadened the initial research question to go beyond LPG and renewable energy and included support through social programs.

### 4.4.1 Support for Energy Access

When asked for their top three preferences for government support for energy access, in Lagos 57 per cent of households picked cheaper kerosene, 45 per cent cash transfers and 42 per cent soft loans. In Imo, 94 per cent of respondents would prefer cash transfers, with 57 per cent opting for cheaper kerosene and 37 per cent cheaper cookstoves (Figure 9).



**Figure 9. Preference for government support for energy access, per cent**

*Note: Percentages do not sum to 100 because respondents had been asked to choose their three highest preferences. Source: Household surveys.*

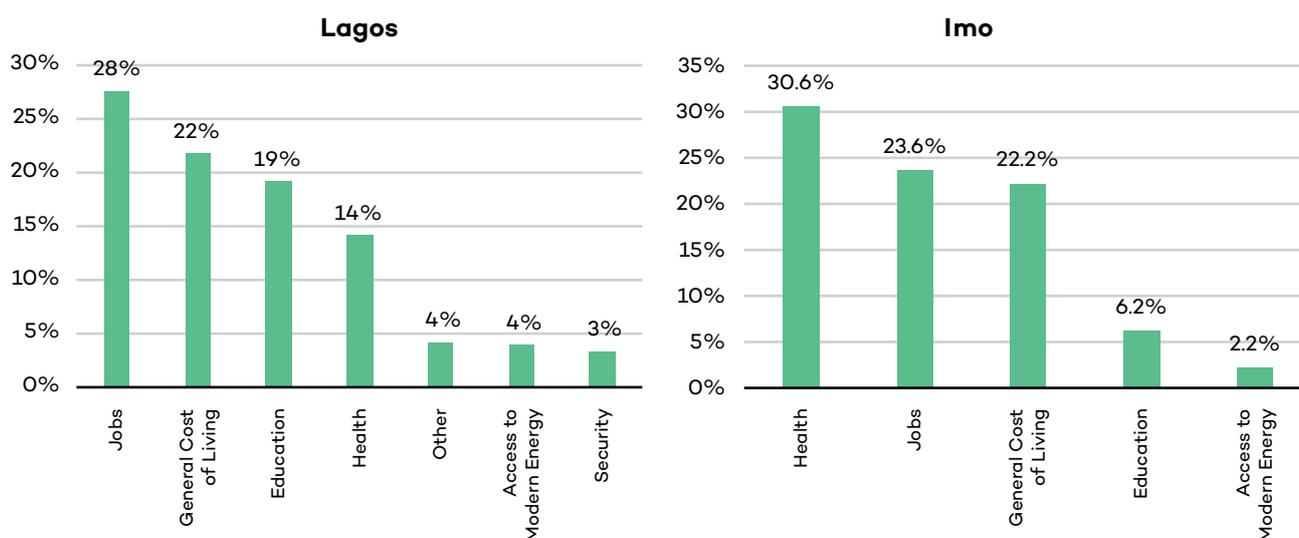
#### 4.4.1.1 LPG and Renewable Energy as Alternatives

The surveys explored how alternative energy sources could support the empowerment of women, especially solar energy and LPG. Survey respondents stated a clear preference for electricity as a lighting fuel. 54 per cent of respondents in Lagos and 63 per cent of respondents in Imo say they would use renewable energy appliances if subsidized by the government.

Households in urban areas expressed a preference for liquid fuels such as LPG and kerosene, while households in rural areas opted for wood. 59 per cent of respondents in Lagos and Imo say they would use LPG stoves if there was a government subsidy on LPG and cylinders. Preference for a clean cooking fuel (LPG) increases as the level of income and education increases. This was observed in both Lagos and Imo area.

#### 4.4.1.2 Social Protection as an Alternative to Fuel Subsidies

When asked what kind of government support households preferred, jobs (28 per cent/24 per cent), health (14 per cent/31 per cent), financial support (22 per cent/22 per cent) and education (19 per cent/6 per cent) ranked highly in Lagos and Imo respectively (Figure 10). Access to modern energy received only 4 per cent and 2 per cent. While households might undervalue the benefits of modern energy, this nevertheless raises the question whether the billions spent on a fairly inefficient subsidy system might not be better spent on social protection programs (Adeoti, Chete, Beaton, & Clarke, 2016).



**Figure 10. Preference for government assistance, per cent**

*Note: Percentages do not sum to 100 because respondents had been asked to choose their three highest preferences.*

*Source: Household surveys.*

A challenge with regard to strengthening social protection is the low reach of current programs. The implementation of programs to support low-income households has been mixed. Previous interventions, like the SURE-P programs (initiated to mitigate effects of high energy prices and reallocate subsidy savings to women empowerment) have been scrapped. The awareness of government support programs in the household surveys was extremely low. Only 10.6 per cent of women in Lagos and 9.2 per cent in the rural areas claimed to be aware of the existence of government welfare programs.



## 5.0 Key Findings and Policy Recommendations

The key findings of the research in relation to the two research questions are outlined below, followed by country-specific recommendations, the cross-country finding and the overarching policy recommendations.

### 5.1 Key Findings

**The kerosene subsidy did not work well for poor women.** None of the households surveyed reported paying the official price for kerosene when it was subsidized, but rather prices that were between two and six times the official sales price. Women also queued for hours and sometimes all day to get fuel, often resorting to informal dealers with the attendant problems of higher prices and health dangers of using adulterated fuel. Two thirds of the population were still using firewood for cooking in 2014 when the subsidy was in effect.

**Women were negatively impacted by reforms.** Kerosene prices increased further after reforms and fuel scarcity did not diminish. These impacts are summarized below.

**Higher prices associated with the reforms placed stress on household incomes.** Survey results found that women generally pay for kerosene and firewood. Higher prices for kerosene might therefore impact women's budgets and incomes more. In Lagos, women coped with price increases mostly by saving fuel, or shifting expenditures within their budgets. In rural areas, women appeared to have fewer financial strategies and resorted to using inferior fuels, especially firewood. Half of the households in Imo and 18 per cent of households in Lagos said they would use more biomass to cope with price increases.

**Women were found to be in charge of cooking** in 85 per cent of households in Lagos and in 88 per cent of households in Imo. Any switch to biomass therefore will impact women more in terms of exposure to indoor air pollution and time spent collecting biomass. The survey results indicated that women spend 10–30 minutes each day collecting wood. The literature indicates that firewood collection can have significant opportunity costs for women for both income-generating and family tasks.

**Women want to switch to cleaner modern energy sources.** In Lagos and Imo, most women in FGDs stated that switching to a preferred cooking fuel would enable them to save time spent on cooking. In Lagos, most said they would spend the extra time at their place of work or business, while women in Imo said they would use the time to do more cooking or with their family. For lighting, women want electricity.

**Women report having decision-making power on energy choices but not on ownership of appliances.** In the surveys, 69 per cent and 94 per cent of the women who participated reported being in charge of decision making on cooking fuels in Lagos and Imo respectively. Also, the survey found that women decided on lighting energy sources slightly more than men. However, about half of households indicated that men purchase and own electronic appliances, while only one fifth are purchased and owned by women. Men therefore have an important role in choosing appliances that might have gendered implications for energy use.

**Households do not prioritize energy subsidies over other kinds of support.** When asked what kind of government support they preferred households chose jobs (28 per cent in Lagos and 24 per cent in Imo), health (14 per cent, 31 per cent), financial support (22 per cent, 22 per cent) and education (19 per cent, 6 per cent). Access to modern energy was preferred only by 4 per cent and 2 per cent of households in Lagos and Imo respectively. While households might undervalue the benefits of modern energy, this nevertheless raises the question whether the billions spent on an inefficient subsidy system might not be better spent on social protection programs (Adeoti, Chete, Beaton, & Clarke, 2016).



**Figure 11. Summarized findings from the impacts of fossil fuel subsidies, their reform and mitigation on poor women in Nigeria**

Source: GSI-IISD and IRADe, 2019.



## 5.2 Policy Recommendations for Nigeria

**Any return to subsidizing kerosene is not recommended.** Kerosene subsidies did not work well, and it is not a healthy or safe fuel. Clean cooking options include LPG, biogas, electricity and natural gas. Any subsidy for clean cooking should be technology-neutral, allowing households to select the option that works best for their circumstances. Furthermore, such subsidies can be better targeted to beneficiaries that need them, rather than distorting existing markets, such as toward poor women, as in the PMUY scheme in India (see GSI-IISD and IRADe, 2019).

**LPG subsidies may promote clean cooking for some but not necessarily the poor.** In Indonesia, the “Zero Kero” program assisted households transition from subsidized kerosene to subsidized LPG. In India, a program provides a free LPG “connection” (equipment) to poor women, which has been successful in increasing LPG uptake and may have side benefits for female empowerment (see the paper on India from this series). However, in both countries urban and relatively well-off households have disproportionately benefited from the subsidies. Distribution challenges to remote areas and the cost of LPG compared to “free” biomass have resulted in low uptake by the poor, and ongoing LPG consumption subsidies are a major fiscal burden.

As a result of cost and access issues, India and Indonesia are considering reforms to LPG subsidies. Indonesia has canvassed better targeting of the LPG subsidy to the poor and replacing the subsidies with cash transfers. India’s draft National Energy Plan recognizes the need for a National Cooking Mission to address clean cooking more holistically but has made efforts toward targeting the subsidy toward poor women via the PMUY scheme.

**Emphasis should be placed on social protection programs rather than energy subsidies.** Surveyed households expressed a clear preference for social or income programs over energy subsidies. While this may be partially due to a lack of awareness of the problems associated with poor-quality cooking fuels, it also highlights household priorities and needs, which should be considered in policy development. Provision of cash transfers—preferably to the female head of household—along with education about fuel choices would allow women to make their own choices about where to spend government assistance. This approach would empower women and promote their inclusion in the financial system.

**Distribution and supply issues should be addressed** to ensure all Nigerians should have access to modern fuels at competitive prices, even if they are unsubsidized.

**Improve access to fuel wood cooking stoves as an interim measure.** Given the realities of Nigeria’s high current dependence on fuel wood, financing support for clean-burning cook stoves may be necessary in the interim to provide cleaner alternatives for low-income women predominantly using biomass for cooking in order to reduce their immediate exposure to indoor air pollution. Longer-term measures to address energy access can include investments in electrification infrastructure and renewable energy, supporting women’s education and exploring affordable energy pricing for low-income households.

## 5.3 Core Findings From Multi-Country Study

The findings from the three country studies are broadly consistent with those found for Nigeria. The detailed results from the studies of Bangladesh (kerosene for lighting) (GSI-IISD & BIDS, 2019) and India (LPG for cooking) (GSI-IISD & IRADe, 2019) are available in Global Subsidies Initiative–IISD, BIDS, IRADe and Spaces for Change (2019). This section provides a summary of the key themes.

**Energy subsidies are helping some but not all poor women.** In Bangladesh, kerosene subsidies (for lighting) are not being passed on to consumers. Bangladeshi householders surveyed were generally not aware of subsidies or the government’s official price for kerosene. Indeed, in the areas surveyed kerosene prices were on average 14 per cent higher than the official price. In rural areas in India, when subsidies are helping



households convert to LPG, women are benefiting through decreased indoor air pollution and fuel management responsibility, freeing their time for other activities and reducing their drudgery. However, half of the households surveyed in the Indian sample (810 households) were not using LPG and therefore not benefiting from the subsidies.

**Subsidies are poorly targeted.** In India, the majority of people benefiting from ongoing LPG consumption subsidies are higher-income consumers. Among surveyed households, only 48 per cent of LPG connection subsidy beneficiaries were among the poorest 40 per cent of households.

**Women do most of the cooking in the areas surveyed and save time when switching to modern fuels.** In Bangladesh, the survey found it is generally only women who cook, and they reported spending 80 minutes every day cooking at night. Only nine men reported cooking in the survey of 630 households in Bangladesh. In India, women saved on average about one hour per day due to reduced cooking and cleaning times on LPG compared to cooking on biomass.

**Subsidies can increase fuel scarcity that can lead to long queuing for fuels,** and this burden often falls on women. The informal sector in Bangladesh and Nigeria is key to accessing kerosene in small, but more expensive, amounts than via official channels, and reforms need to plan for impacts in the informal sector.

**Subsidy reform needs to be undertaken with care.** Cost is an important factor influencing fuel choices and prices need to reflect the ability to pay for the poorest if a switch from biomass is to occur. A price increase in cooking fuels could impact women adversely in terms of greater time spent searching for biomass as well as health impacts. In India, when asked to imagine a scenario where prices increased by 40–50 per cent, the majority said they would reduce LPG consumption or revert to biomass.

In Bangladesh, around half of the households surveyed said they would absorb a hypothetical 20 per cent price increase and half would reduce the use of kerosene. Given a potential doubling of the price of kerosene, two thirds of households would reduce their use of kerosene as well as other strategies, such as reducing expenditure on other goods (e.g., food). In case of a price shock, 74 per cent of households reported that all household members would be equally affected.

**Different genders are in charge of decision making around fuel and lighting choices in different countries.** In Bangladesh, our survey found that it was overwhelmingly men who take decisions on energy sources for lighting and cooking. In general, women in India were found to have greater decision-making power over cooking energy than men, and the decision to require female beneficiaries of cooking gas connection subsidies is likely to strengthen women's control over decision making.

**Subsidies are not the only factor that leads to fuel switching and better access.** Fuel subsidies are not sufficient to promote the use of modern fuels. To promote alternatives to biomass—especially LPG and electricity—several factors are necessary. Reliable distribution systems adapted to the needs of poor households, education about the health benefits and safety of LPG, and better regulation. The surveys found a high correlation between the level of education and the preference for modern fuels.

**Investing in fuels rather than outcomes may be hindering more effective options.** The large sums invested in subsidizing one fuel could be used more efficiently to support economic and social empowerment. “Picking winners” with fuel subsidies can crowd out effective policy alternatives such as addressing non-price barriers (distribution, price competition) or innovative solutions (such as solar products or biogas). Women indicated their preference for support with jobs, health, education and the general cost of living. There is therefore a large potential to improve the effectiveness of social programs to empower women.



## 5.4 Cross-Country Policy Recommendations

In terms of broad policy recommendations to governments, this research suggests that governments could

- Continue to phase out fossil fuel subsidies that do not support energy access for poor women or the target population. In particular, there is a need to phase out subsidies for kerosene (which is prone to large-scale diversion, more costly than other lighting alternatives and not clean-burning) while also ensuring there is a clean alternative to switch to.
- Work to better target subsidies for fuels that are currently deemed necessary for sustainable energy access so more resources are available to efficiently help achieve SDG7 on energy access and to fund programs that support women and promote gender empowerment.
- Make energy access support more technology-neutral, to achieve better outcomes and avoid technology lock-in by fostering solutions adapted to the context. This should include not only focusing access policies on transitional fossil fuels but also on ensuring that the right market incentives and structures are in place to cultivate new and renewable lighting and cooking technologies.
- Consider alternative support policies such as social safety nets, health care, education or business loans for women.
- Recognize that subsidy reform needs to be undertaken extremely carefully, based on an impact analysis that accounts for the effects on women and alongside a robust package of measures to mitigate against potential negative impacts of price increases.
- Use comprehensive strategies for energy access that recognize the importance of gender and incorporate it into policy design.



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