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Working Paper: Study on the impact of electricity tariff increases on consumption behaviour and overall wellbeing among urban households in Ethiopia

This study focuses on analysing how electricity tariff increase affects household energy consumption by situating the price change within the broader context of energy service provision in Addis Ababa, Ethiopia.

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Study on the impact of electricity tariff increases on consumption behaviour and overall wellbeing among urban households in Ethiopia

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Abstract

Although affordability is important, people do not need to be money poor to experience energy deprivation. This paper examines how an electricity tariff increase affects household energy consumption by situating the price change within the broader context of energy services provision in Ethiopia. We place households' lived experience in interaction with the institutional and infrastructural dynamics that constitute the energy sector in Addis Ababa to observe how the price increase intersects with service provision. Since the tariff increase was implemented, households have changed their daily routines to control cost. Our findings show that energy consumption behaviour is also shaped by service-related inadequacies (unreliable supply and frequent power outages). However, families coping capacity (to the tariff increase and power supply shortfalls) is undermined by an energy market that is rife with information asymmetries and uncertainties. Thus, although socioeconomic factors underpin the energy insecurity households experience and inadequate supply appears to heighten their vulnerability. The paper argues that while the price change has an overall effect on consumption, its impact needs to be seen within the context of its systemic interaction with the broader energy governance and service delivery challenges.

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1. Introduction

Committed to becoming a middle-income country by 2025, Ethiopia has been making significant efforts in the last two decades to accelerate economic growth through large-scale public investments in infrastructure, industrial parks, the redevelopment of urban areas, and the power sector. The latter has included significant investments to increase access to electricity and to enhance Ethiopia's power generation capacity. Progress in this area has taken place under a policy that has focused on the development of large-scale hydropower plants. From 1991 to 2019, the country's power generating capacity increased from 380 megawatts (MW) to 4260 MW. The construction of the Grand Ethiopian Renaissance Dam (GERD), Africa's largest hydro dam, promises to double current generation capacity. The dam is expected to make Ethiopia the largest exporter of power in Africa. In addition, the National Electrification Programme (2019) set the goal of achieving universal electrification by 2025.

Alongside the capital investment in generation capacity, the energy sector has also been subject to a restructuring process to improve the financial strength of sector entities and to untangle the state from direct economic engagement with the sector. In 2013, the Ethiopian Electric Power Corporation was split into two public companies: Ethiopian Electric Power, in charge of generation and transmission; and Ethiopian Electric Utility, responsible for distribution. Revenue collection was outsourced through a public–private partnership and a prepaid metering system was introduced with the aim of (eventually) ending reliance on a monthly door-to-door meter reader. The restructuring incorporates corporate principles and a market-based approach to improve operational efficiency and cost recovery.

Compared to neighbouring countries in East Africa, Ethiopians for a long time enjoyed low electricity tariffs. However, this also meant that the utility company operated at a loss. Over the years, as the gap between the electric supply cost and the cash collected widened, it resulted in a depletion of profits and an increase in public debt (Kojima and Trimble, 2016). Burdened with large debt, in 2018 the government – partly with the aim of sending a price signal to private investors and partly driven by the need for revenue recovery – revised the tariff rate structure. The revised electricity tariff was announced by the utility company, which stated that the revision was necessary to meet energy demand. The change included an incremental increase in tariff rates over four years: a minor increase for the first 12 months, followed by a progressively steeper annual increase until 2022. The policy also introduced a change in how consumption would be calculated, from an increasing block tariff (IBT) to a volume differentiated tariff (VDT) structure (Ethiopian Energy Authority, 2018). The shift from IBT to VDT effectively withdrew subsidies for all groups of consumers except those consuming below 50 kilowatts per hour (kWh), for whom the tariff remained unchanged. Under the VDT, if the monthly consumption exceeds the 50 kWh/month threshold, all consumption must be paid for at an unsubsidised and much higher rate.

The rest of the paper is organised as follows: in the next section (Section 2), we state the main objective of the paper. In section 3, we provide a literature review and outline the conceptual framework within which the paper is developed. Section 4 introduces the context for the study, with a specific focus on Addis Ababa. In this section, we also summarise the results from our survey of the needs and desires fulfilled by households through accessing modern energy services. Section 5 discusses the service- and supply-related challenges households in Addis Ababa face. Section 6 reviews household response and coping strategies to the tariff increase and to the service- and supply-related challenges discussed in Section 5. Finally, we conclude the paper in Section 7 with a call for intervention efforts to be grounded in an assessment that combines consideration of household-level circumstances with consideration of structural constraints.

2. Objectives and motivations of the study

This paper has two objectives: i) to examine the effect of the latest tariff increase on households' energy consumption; and ii) to situate the tariff increase within the broader context of domestic energy provision, in order to observe its impact on the overall wellbeing households achieve through accessing modern energy services.

Our study originated with the question of how the tariff increase has affected consumers' behaviour. However, discussions about cost appear inseparable from issues like accessibility, reliability, accountability, and households' understanding (and coping strategies) in Ethiopia. Discussions around how households are coping with the tariff increase revealed other dimensions to the barriers people face in terms of the relationship between users and service providing institutions. For example, as we argue, households' capacity to assess and mitigate their situations is undermined by an energy market that is rife with information asymmetry. Considering these factors, and the recognised interconnected nature of households' lived experience, we widened the scope of the research: placing the tariff increase within the overall systems of provision and governance of electricity supply.

3. Literature review

Although the energy-related wellbeing that households are able to achieve varies between societies, and depends on various subjective variables, how people experience access to energy cannot be separated from the technologies, institutions, and infrastructure that constitute the systems of provision (Bouzarovski and Petrova, 2015; Buzar, 2007a). In other words, affordability is an important factor: people do not need to be money poor to experience energy deprivation. There is a growing consensus that energy poverty cannot be reduced to monetary metrics only, and that how households access and use modern energy is mediated by a range of factors, including the provision of energy and the suitability as well as reliability of the available technology, among other context-specific factors (Khandker et al., 2010). To be energy poor is to be in a situation in which an individual or a community is unable to realise essential capabilities as a result of insufficient access to affordable, reliable, and safe energy services (Day et al., 2016). In this case, the concept of 'energy services' shifts the focus to the benefits that energy bring for human

wellbeing (Modi et al., 2005). 'Energy services' entails a multifaceted process that requires the alignment of a complex network of activities, infrastructure, and resources, as well as institutional dynamics (Bouzarovski, 2017; Kalt et al., 2019). In other words, the wellbeing aspect of access to modern energy services needs to be examined in light of how the institutional, infrastructural, and individual elements are drawn together to enable or hinder consumers' ability to flourish within them.

Bouzarovski and Petrova (2015) recast energy poverty as 'energy service poverty' to capture the range of factors that contribute to inadequate domestic energy provision. Similarly, the concept of energy vulnerability has been useful in highlighting the conditions that contribute to households experiencing a socially and materially inadequate level of energy services (Bouzarovski, 2018). Although the wellbeing households achieve from accessing modern energy services is dependent on subjective variables, their state of vulnerability can also be exacerbated by the persistent deficiency of energy provision, and as a result of decisions made elsewhere within the energy system (Jenkins et al., 2016). Hence, although energy poverty can be attributed to a range of institutional, policy, and sociodemographic processes, to understand how the problem is manufactured it is necessary to delve deep into the nature of the relationships among them (Buzar, 2007a).

For instance, how energy is priced plays a role in determining whether a household is likely to live in conditions of domestic energy deprivation. Bouzarovski and Thomson (Bouzarovski and Thomson, 2018) attribute the rising incidence of household-level energy poverty in Eastern and Central Europe to a sector reform that saw an increase in energy tariffs without adequate social welfare and energy efficiency mechanisms. How institutions capture and measure access to energy services can also hide the underlying vulnerability some communities face. In urban areas, access to electricity is often treated as akin to universal access. However, this representation of access masks the energy challenges urban households experience due to unreliable service, hazardous infrastructure, affordability, and other insecurities related to tenure issues (Bhatia and Angelou, 2015; Bouzarovski et al., 2013; Padam et al., 2018; Singh et al., 2015). Technological changes also expose some communities to energy deprivation. For instance, prepaid meters, which have the advantage of enabling households to have control over their consumption, are also seen to further entrench energy poverty among lower-income households (Baptista, 2016; Jacome and Ray, 2018). Finally, the (energy) vulnerability some households experience is partly shaped by their relationship with service-providing institutions such as Ethiopian Electric Utility. Many have noted that a household's attitude towards the service provider plays a role in influencing their energy-related decisions (Fjeldstad, 2003; Sovacool, 2014; Stenner et al., 2017; Winther, 2012).

4. Energy services in Addis Ababa

Our paper draws on a qualitative study we carried out with households in Addis Ababa. Data were collected using a combination of a questionnaire-based survey and focus group discussions (FGDs). Before each FGD started, participants were asked to fill in a questionnaire survey. The team carried out eight FGDs in four sub-cities: thus two FGDs per sub-city. Sessions lasted from 90 minutes to two hours. In each session, six to eight individuals participated. FGDs were carried out in the local language, Amharic.

Our study focuses on Ethiopia's capital Addis Ababa, which over the last two decades has been the recipient of high public investment in urban renewal and redevelopment projects. As a result, the city has experienced high rates of economic growth (The World Bank, 2015). In Addis Ababa, energy consumption patterns have changed with income. Addis Ababa is urbanising at a rapid rate and has experienced significant economic growth in recent years. Between 2006 and 2016, the percentage of residential areas occupied by high-rise condominiums (four floors or higher) increased from 1% to 11%. Within the same period, the percentage of residential land occupied by single-family housing increased from 5% to 25% (Larsen et al., 2019). This dramatic increase represents a transformation of the city landscape and reflects the increased economic prosperity for many residents. It also suggests an increase in the use of modern kitchens, where electrical appliances are more convenient and can provide services that were once provided by traditional fuel (Heltberg, 2004).

The provision of energy services requires an adequate energy supply, as well as the use of various end-use appliances. Based on our survey of household appliance ownership, we identified three categories of appliances that households in Addis Ababa possess, according to the services they perform. The first category is appliances that are used for illumination, communication, cooking, preserving, and entertainment. The appliances under this category include bulbs, refrigerators, televisions, satellite dishes, electric stoves, mobile phones, and radios. In terms of electricity consumption, appliances in this category typically include low- and medium-load appliances, with the exception of electric stoves, which require Tier 5 capacity (Padam et al., 2018). The benefits that are associated with lighting are many and extend to ensuring safety, security, and psychosocial wellbeing. Depending on household size, participants reported that there is a minimum of one and a maximum of eight mobile phones in the household. Those who are self-employed, partake in the informal economy, or are currently seeking employment noted that a mobile phone is an important lifeline. In addition, entertainment devices are widely popular. The fact that these appliances, including electric stoves, are widely used across all income groups suggests that their acquisition is weakly dependent on socioeconomic status.

The second category is electrical appliances with benefits that are commonly associated with convenience, comfort, and cleanliness (Shove, 2003). The appliances under this category are used to save time (food processors, kettles, bread toasters, washing machines), enhance communication and access to information (computers), and engage in

personal grooming and ensure hygiene (irons, hair clippers, and hair driers). The load requirement of appliances in this category ranges from Tier 2 to Tier 4 capacity. Relative to the previous category, appliances in this category are owned by fewer households; they offer a clear indication of the evolving nature of demand, attitudes, and consumers' expectations about modern energy services.

The third category of appliances, which we refer to as 'luxury goods and services', is owned by a minority of the study participants. These are higher-load appliances and tend to go the extra step to add comfort and indulgence to daily household routines and the general atmosphere of the home (e.g. water heater, cooling fan, space heater, home decoration lighting, video games, microwave). High-load appliances are generally less common in Ethiopia (Padam et al., 2018).

The distinctions we draw here need to be seen in the context of evolving energy services and service demands. The grouping is not meant to suggest that differences between household appliance ownership are based on socioeconomic characteristics, but instead we consider them as a demonstration of how energy demands and expectations are evolving. Our sampling is insufficient to demonstrate whether ownership of these appliances is a clear indication of higher economic status. However, we observed that higher proportions of participants who own their residence also own more energy-consuming appliances compared to participants who do not. Furthermore, although we found no clear patterns of relationship between education level and appliance ownership, we observed that those with a university degree are more likely to own a computer, a food processor, an iron, a hair clipper, a washing machine, and a water heater.

Our FGDs revealed how electricity is woven into the lives of the city's residents. Emotional wellbeing and utilitarian benefits are seen not only in terms of saving time or achieving comfort, but also as signs of a life well-lived. The use and usability of electricity were often framed from a perspective of what is at risk of being lost, either due to service interruptions or the tariff change. While access is seen as a sign of progress, power outage is seen as a reversal of those social and economic gains. This was even more apparent when participants expressed personal anxiety about their ability to continue to obtain the essential services modern energy affords.

5. The problem of unreliable supply and inadequate service

Despite rapid growth at the supply end, access to electrification at the household level is low. According to the World Bank's Multi-Tier Framework (MTF), only 44% of all households in Ethiopia have access to a basic electricity supply, while 56% of households have no access (Padam et al., 2018). The study also notes that 38% of not-electrified households are located within 7 km of the national grid, and report administrative barriers or delays as the main reason for not having a grid connection. Those with grid connection also experience frequent and long hours of power outages (Meles, 2020; Padam et al., 2018). The MTF survey shows that over 55% of grid-connected

households face power disruption four to 14 times a week (Padam et al., 2018). The key reason behind the frequent power outages is the poor physical condition and low capacity of the transmission and distribution lines, as well as a shortfall in supply and scheduled outages (Meles, 2020).

With 99.9% of households connected to the grid, almost all households in Addis Ababa are said to be connected to the grid. According to the World Bank's MTF survey, which was carried out two years before the latest tariff increase, the average electricity consumption in Addis Ababa at that time was 193 kWh per month (Padam et al., 2018). However, power outages and service interruptions are major sources of dissatisfaction. The ageing electricity network is overloaded and unable to provide efficient service. In a typical month, households in the city experience power outages seven times, with an average duration of six hours (UN-Habitat, 2017). In the survey we carried out for this study, 26% of the participants said they experience more than six power outages in a week (i.e. four times more than reported by UN-Habitat), while 40% said they experience up to four power outages in a week. For more on households' energy consumption behaviour in Addis Ababa, prior to the tariff change, see Asfaw (2012), Meles (2020), and Padam et al.(2018).

Service interruption is a critical factor that prevents grid-connected households from achieving optimal service in Addis Ababa (Padam et al., 2018). Households experience two kinds of service interruptions: rolling blackouts and power outages. Rolling blackouts occur in response to demand management: power is shut down intermittently for 6 to 12 hours to overcome energy gaps during certain times of the year and when there is insufficient water in dams to drive electricity-generating turbines. Power outage is the second form of service interruption households experience. Outages occur because of a technical problem specific to either a house or cluster of houses, or elsewhere along the distribution network. Besides power outages, households regularly experience fluctuations in voltage, affecting the overall quality of supply. Voltage issues from an overloaded electricity system mean supply is either too low to operate some appliances or so high that it damages them (Meles, 2020; Padam et al., 2018).

In our study, we found that households appear to be concerned as much about the rising cost of electricity as they are about the deterioration in the quality of service. 62% of those surveyed said electricity service provision has worsened in the past 12 months, while about 10% said it has improved. 63% of those surveyed said they worry about the quality of service 'a lot and all the time'. Similarly, 65% said they are concerned about the rising cost of electricity 'a lot and all the time'. A significant number of the respondents (49%) also expressed support for a further tariff increase if the provider improved overall service.

Service interruption affects households in multiple ways: there is the disruption to daily routines, ranging from getting children ready for school to preparing meals and carrying out other household chores. Damage to property is typical, not only from power surges, but also from power outages that at times last for days. Many of our

respondents talked about food rotting in the refrigerator, expressed their concerns about safety when walking at night in the dark, and made clear their apprehensions about the danger from exposed electric wires and transformers on street corners. Besides the psychological distress and possible damage to property, there is also the financial cost households incur, in the form of additional expenditure on candles, charcoal, firewood, and batteries (Meles, 2020). For those running small businesses, the opportunity cost from lost services due to power outages is particularly high.

Households also sustain costs in terms of time, money, and effort as they seek to resolve their service-related problems. The FGD participants noted that one problematic aspect of service interruption is the uncertainty about when power will be restored. During service interruptions, customers are advised to dial the utility call centre, '905'. However, by all accounts the system is overwhelmed and unable to receive and process all calls. Calls are often unanswered, or requests for maintenance service are not passed on to those who can address the problem. According to one study, 44% of the '905' calls customers made are not picked up by the utility (Ayele, 2018). Even after calls are received, it is common for problems to remain unaddressed for days, and even weeks. According to one study, the top three reasons why customers call '905' is to 'report a power interruption', to 'follow up on a delayed service repair', and to 'report a fallen pole, damaged cable or burnt transformer' (Yihdego, 2018). When the call centre fails to deliver results, consumers resort to visiting the utility office in person to appeal directly for resolution. However, as many noted, it generally takes multiple visits before people find the right office, staff, or information with the solution to their problems.

Besides frequent power outages and voltage fluctuations, delayed bill collection and unclear billing and payment procedures contribute to customer frustration (Barnes et al., 2016; UN-Habitat, 2017). In our study, we observed that, being dissatisfied with service interruptions, delayed repair and maintenance work, and a general lack of clarity, consumers have come to believe that the utility is either incapable of meeting, or unwilling to meet, their needs. Customers also extend their wariness across a wider area of service delivery, questioning the trustworthiness of the utility employees, the maintenance crew, and the meter readers. Lack of confidence in the service-providing institutions also stems from households' limited understanding about the tariff increase and their own energy consumption. None of the participants seemed to be aware of the changes in how their bills are now computed and how that change is affecting their consumption-based billing. This fact is important as consumers are effectively making their energy-related decisions in the dark, so to speak. At the same time, the less informed consumers are, the easier it is for them to assume the worst.

6. Coping with unreliable electricity supply and a tariff increase

The overall impact of the tariff increase on household energy consumption behaviour needs to be seen within the context of unreliable supply, inadequate service, and consumer scepticism about the utility's ability to behave in a way that is consistent with their energy interests. In Addis Ababa, the effect of a tariff increase on household energy

consumption can be placed into two categories – an increase in their use of traditional and solid fuels, or a change in their energy use practices – or some combination of the two. Faced with a scarcity of supply or an increase in price, low-income households either cut back consumption or switch to using traditional fuels, while households that are financially well off tend to either maintain consumption or purchase efficient appliances.

Under the current tariff structure, for low-income households the penalty for consuming over 50 kWh is high due to the doubling of the cost per unit (between the first and the second block), and a significant change in how the service charge is calculated and priced. Under the current tariff structure, households that consume below 50 kWh are charged 10 Ethiopian birr (ETB) (US$ 0.34), while households that consume over 50 kWh/month are charged ETB 42 (US$ 1.45) (see Table 1). According to the authors' calculations, under the old tariff structure, a family consuming 200 kWh per month would have paid ETB 96 (US$ 3.31); as at December 2019, the same family's monthly bill would have risen to ETB 254 (US$ 8.80).[1]

Table 1: Tariff calculation

Electricity consumption	Monthly bill before 2018 (in ETB)			Monthly bill in 2019 (in ETB)		
	Cost	**Service charge**	**Total**	**Cost**	**Service charge**	**Total**
50 kWh/month	13.65	3.40	17.05	13.65	10.00	23.65
51 kWh/month	18.18	6.82	25.00	28.65	42.00	70.65

Source: Authors' calculation

Many people reported changes in their daily routines to cut the cost of electricity, while also constantly rearranging their energy use practices in response to service interruptions. A woman in Gulele sub-city said she uses only one electrical appliance at a time: 'If I am baking, I do not turn the television on or charge my phone'. Essential appliances like cooking stoves and lights are not abandoned but are only used when necessary. One woman in Ledeta sub-city said she no longer allows her children to use the electric stove to reheat meals. Households also made a clear connection between the rise in prices and the need to reduce consumption by cutting down activities they considered to be a luxury, such as ironing and using the washing machine frequently. Some families said they have stopped the practice of keeping the gate or porch light on overnight. Many also commented that they bake injera after midnight, when the power supply is relatively stable and strong.

[1] At the time of the survey, the exchange rate was US$1= ETB 28.98. Note also that the service charges for owners of prepaid and postpaid meters are different. For the sake of simplicity, we assume that customers use postpaid meters. The latest tariff can be accessed and viewed online at the Ethiopian Electric Utility website: www.eeu.gov.et

The majority of the study participants said they have increased their use of biomass fuels to curb costs; a handful of them said they have acquired solar home systems and rechargeable lanterns. With 89% of the participants identifying electricity as their primary cooking and baking fuel, discussions around the impact of the tariff increase focused on the fact that households have increased their reliance of charcoal and firewood. It is important to make a note of the difference between switching and increasing the use of biomass fuels. Switching suggests a complete shift in practice; however, in reality, fuel stacking is common and necessary due to the inherent uncertainty in the availability of electricity (Alem et al., 2016; Masera et al., 2000). Thus, although over 90% of the study participants said electricity is their primary cooking fuel, households have not abandoned their charcoal stoves.

Some households appear to be more resilient in regard to managing their energy needs by embracing different alternatives to satisfy their energy demand. A little over 40% of the participants said they use a rechargeable lantern in combination with a candle or a battery-operated torch when the power goes out. A few said they are considering installing solar home systems to mitigate the impact of rising cost. Thirteen households said they had acquired smaller solar photovoltaic products, with functions limited to charging phones and lighting. In contrast, 30% of the study participants (16 households) said they use a candle and firewood during power outages.

Income is not the only factor that affects a family's capacity to cope with service disruptions and tariff changes. Social and economic competencies appear to be instrumental when it comes to assessing the energy technologies available in the market, or acquiring the information necessary to navigate institutional processes. Situations are more severe for those who lack the economic and social capital to manage costs and alleviate the emotional toll they take. Under normal circumstances, a meter reading error, a delayed bill, a technical failure, or an unanswered appeal for repair and maintenance can induce anxiety and financial difficulty. However, for those who are vulnerable due to their financial status or other intersection of social characteristics (age, health, and employment status), such encounters add to their growing concern and anxiety regarding the system. Households that lack those competencies (e.g. awareness and resources) do not only incur the cost of inconvenience: their capacity to adapt is also affected negatively. Our study identified, for example, that women with no formal education return to cooking with charcoal and firewood and the elderly, whose adoption of technology is relatively low, continue to rely on candles for lighting. Those with pre-existing health conditions also expose themselves to further risks by increasing their reliance on traditional cooking fuels. One woman in Kirkos sub-city commented that those with health issues like high blood pressure and diabetes find it particularly difficult to bake injera with firewood and be in a room filled with smoke (WHO, 2014). Tenants who must adhere to occupancy rules are also limited in their energy options, as they have no control over the physical conditions of their homes. For instance, some of the study participants noted that after the tariff increase was announced, they had to renegotiate with landlords regarding the types of electrical appliances they can and cannot use. However, for households with unpredictable incomes and those who can only afford to purchase

units in small quantities, the prepaid system represents a different form of inconvenience. More importantly, where service is unreliable, prepaid customers are particularly vulnerable, as they are being asked to pay in advance for electricity that may not be delivered when needed (Kojima et al., 2016).

7. Conclusion and recommendations

The electricity tariffs in Ethiopia are considered among the lowest in the world. However, affordability is a matter of perspective and depends on which side of the fence one sits. This paper looked at the impact of the latest tariff adjustment in Addis Ababa from the perspective of domestic consumers. We focused on changes in how households consume electricity (daily routines and practices). Viewing impact from the consumers' perspective allowed us to observe the types of energy services households seek. Energy services as a concept was used to shift the focus to the wellbeing and quality of life households achieve. We drew from the literature on energy vulnerability to also highlight the infrastructural and institutional processes that contribute to the energy insecurity people may experience – not only due to the tariff increase, but also due to frequent power outages, as well as their relationship with service-providing institutions.

Cost remains an important factor. However, the welfare impact of a tariff increase cannot be seen or understood in isolation from other aspects of service provision that shape how households experience access to modern energy. In fact, many respondents expressed a willingness to support further increases in tariffs if the service were improved. Affordability and reliability are important ingredients in efforts to mitigate the prospects of domestic energy poverty. At the same time, it is evident that socially and economically better-off households are well equipped to cope with systemic changes and infrastructural deficiencies. Meanwhile, those that lack the economic and cultural capital necessary to navigate the system bear the brunt of tariff increases and unreliable service. This is due to a combination of three factors. First, poorer households often experience greater difficulty resolving power supply problems due to structural constraints in how the sector is organised combined with lack of information and transparency. As a result, low income households that had been enjoying cheap electricity to cook with electric stoves are now either reverting to traditional cook stoves or are suffering a reduction in disposable income if they maintain the convenience of cooking with electricity. Third, unreliable power supply implies that poor households still holding onto their modern cooking appliances (among other things) have to spend more on charcoal and other traditional fuels for backup supply.

The energy sector in Ethiopia is undergoing major structural changes. It is not yet clear how the market-driven approach, which emphasises a cost-recovery modality, will address the needs of the energy vulnerable in urban areas. One effect of this ongoing transition, which involves big and small changes, including the restructuring of tariff rates, along with the introduction of prepaid meters and outsourcing of customers' relation, is that it is also increasingly shifting the cost of service delivery onto users. Currently, the consumption of grid electricity is subsidised, in the

form of a lifeline tariff (50 kWh/month). However, the fact that those confined to the 50 kWh/month limit also experience inadequate service means they are carrying a heavy burden due to the additional costs. In addition, and more importantly, the lifeline tariff ceiling assumes that consumers have the necessary information to manage their consumption. However, as discussed here, families are making decisions in an energy market where the information asymmetry between the provider and consumers is significant. Under-informed and uncertain, households are making decisions that appear illogical in the short run, and possibly harmful in the long run.

With electricity becoming an ever more essential part of urban economic and social life, living and working without it is becoming increasingly inconceivable. This is even more salient as people start working from home due to COVID-19-related restrictions. For those who are already vulnerable (either due to cost, inferior service, or lack of capacity), the impact is not limited to the time, effort, and money involved, but also extends to wellbeing (e.g. health and safety), lifestyle, and the environment (e.g. cooking with polluting fuels). Thus, while all customers can experience negative outcomes due to tariff change, attention needs to be paid to those most in need of support and protection. Policymakers in low- and middle-income countries have many tools they can use to regulate the behaviour of affluent end-users with large consumption, without harming those that are vulnerable to energy poverty. There is some empirical evidence on how differentiated analysis can be used to identify and provide the targeted provision of support to the most vulnerable (SEforALL, 2020). Ethiopia already has a strong portfolio of pro-poor interventions – including fee-waiver schemes covering health expenses in both rural and urban areas, as well as a safety net programme that reaches 8 million people in rural areas with unconditional and conditional cash transfers – from which lessons can be drawn. Identifying those in need will require carefully calibrated policy measures and efforts towards a differentiated analysis of users and their needs. It also depends on the service provider's ability to recognise how the existing system contributes to households' negative experiences. In the short run, service-providing institutions could focus on changing the underlying factors that contribute to the problem, such as building communities' trust, improving the quality of service, and re-evaluating the institutional approach to customer care.

This paper is one attempt to underscore the effect of inadequate service, unreliable supply, and a tariff increase on urban households. More studies and empirical evidence are needed to document the phenomenon further and to develop a mitigation strategy. This could involve several aspects: for example, a better appreciation of the linkages among institutional procedures, governance approaches, and infrastructural deficiencies is relevant to identifying how some communities are predisposed towards experiencing energy poverty. Policies and programmes could be designed to empower consumers to become better at managing their energy needs, while also resolving institutional and procedural barriers in order to build better community relations with the service-providing utilities.

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The views expressed in this Working Paper do not necessarily reflect the UK government's official policies.