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Policy Brief: How to Promote Energy Efficiency and Energy Conservation in Ethiopia

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Why do households use energy efficient appliances and other energy conservation methods? How can adoption be improved in Ethiopia? We provide insights from the Energy systems development pathways for Ethiopia (PATHWAYS) project, based on a survey of urban households.

KEY MESSAGES

Household's use of energy efficiency methods varies by end use services. For example, about 92% of households use energy efficient light bulbs while only 34% of the sample households use electronic appliances like refrigerators. Increasing energy efficiency methods will require policy that:

- Mandates that information on imported products is provided in local language(s) in order to reduce information barriers.
- Incentivizes or promotes firms to sell energy efficient products on instalment-based credit to overcome financial barriers.

Background and Methodology

Investment in energy efficiency in the residential sector has the potential to reduce the consumption of energy resources. This makes energy more accessible to many households and enterprises. It also reduce power outages by reducing overburden of generation, transmission, and distribution infrastructure; which in turn may also improve customer satisfaction and reduction in payment rates. Given these benefits of energy efficiency, it is important to investigate on factors that promote or inhibit the diffusion or adoption of these technologies.

Although there are several driving factors for the households' adoption of energy efficient technologies, prices can be one factor. This means adoption of energy efficient technologies are one of the coping strategies for increased electricity prices. In Ethiopia, electricity price had not been revised in the past decade. However, in December 2018, Ethiopian Electric Utility Adjusted (increased) electricity tariffs.

Thus the purpose of the study is to investigate barriers of the adoption of multiple energy efficient technologies and households coping strategies to increased electricity prices.

The study used phone survey method to collect data from nine regions of the country. The phone survey was conducted due to COVID-19 restrictions¹. A total of 1,400 households were randomly selected from urban areas of these regions. In selecting the sample households, we followed the sampling frame provided by the World Bank's Multi-Tier Framework (MTF), a survey that was conducted in Ethiopia in 2016/2017. The survey questions include questions on types of energy efficient appliances they use, barriers of adoption, households' energy consumption behaviour, households response to increase energy prices, motivation for energy

¹The phone survey was conducted due to COVID-19 restriction. The study covers only the urban part because the mobile phone availability is limited in the rural area. In urban areas, the mobile phone access is 100% and all urban MTF have mobile phone number.

conservation, and households income, education, and access to credit.

Both qualitative and quantitative data analysis methods were used to analyse the collected data

Motivation for Energy Conservation and energy efficiency

Households have different motivations to conserve energy. These include reducing energy expenditure, conserving natural resources for future generations and reducing emissions of greenhouse gases. Respondents were asked about their main motivation to use any of the energy conservation activities. About 86% of the adopters responded that their main motivation was to reduce expenditure. A minority (12%) responded that their main motivation was concern about climate change and impacts on future generations.

New tariff and adoption of energy conservation strategies

The Ethiopian Electric Utility, government owned utility company, has revised its electricity price in December 2018 which increased the electricity price depending on the monthly consumption block of the customers. Until 2021, each year tariff will increase by 36%.

Households use different coping strategies in response to this in electricity tariffs in Ethiopia, one of which is the adoption of energy conservation strategies. 61% households have been using energy conservation methods prior to the increment of the price. These households may cope the increased electricity price better than those households that do not use the energy conservation methods after the increment.

In this study, we investigated five coping strategies undertaken by households, which are shown in Table1. About 23 of the sample households have not taken any new action to cope with the higher tariff. However, the large proportions of the households have used at least one coping strategy following the introduction of the new tariff. However, the rate of use of the methods varies. For example only about 4% of the sample households purchased energy efficient appliances following the increased electricity tariff in Ethiopia. About 31% of the sample households reduce the frequency of cooking and baking following the two tariff increments, while about 11% reported that they have shifted to other fuels, such as biomass, for cooking and baking activities. This shift has implications for forest degradation and greenhouse gas emission

Table 1: Households response to new tariff

Adoption/non-adoption	Percent (Sample size=1400)
No new action taken in response to the tariff increase	22.56%
Reduced frequency of baking and cooking	31.36%
Adoption of energy efficient appliances	3.96%
Turning off light bulbs and other devices when not in use	27.32%
Reducing the number of light bulbs	2.86%
Switching to other fuel sources, such as biomass fuels	10.99%

Current adoption status

The survey revealed that almost all proportion of (about 92%) the respondents uses energy efficient light bulbs. It is expected because the government has banned the import and local production of the incandescent light bulbs. Further, between 2009 and 2012 there was a free and subsidized distribution of CFL light bulbs by the Ethiopian Electric Utility. This may have increased create awareness and continued use of energy efficient light bulbs

34% of the respondents use energy efficient electronic appliances. Compared to previous studies, this shows an increment.² These products may be purchased in recent years. C Recently purchased electronic appliances are mostly energy star as the energy inefficient electronic appliances are becoming out of the market.

Households were also asked if they generally acted to preserve energy, including shifting baking and cooking times, adopting energy efficient technologies, turning off light bulbs and other appliances when not in use, and reducing the number of light bulbs. The survey revealed that a majority of respondents (61%) did one or more

² Mondal, MA.,H.,Bryan, E.,Ringler,C., Mekonnen,D. Rosegrant,M.(2018). Ethiopian Energy Status and Demand Scenarios: Prospets to improve energy efficiency and GHG emissions. Energy 149,161-172.

energy conservation activities. These activities have the advantage of reducing the load during the peak hours³.

Barriers to adoption of energy efficient technologies.

Sample households were asked to list the main barriers of adoption of energy efficient appliances. More than half of the respondents reported that they have a difficulty of identifying the efficient appliances in the market because the description of product specifications is not in local languages. Almost all imported products have product descriptions in non-Ethiopian languages. In most European and Latin American countries, imported products have product descriptions in the national language of importing country. 30% of households also reported that access to credit as a barrier for adoption.

Gender and decision-making on energy efficiency

Intra-household decision-making power is an important variable in decision-making about the purchase of energy efficient appliances. This study shows that most urban households (65.9%) make decisions about whether to buy energy efficient appliances together, while in 24.12% of households it is women who make the decisions. This result differs from other studies, mainly taken in rural areas, where it is men who hold the decision-making power.⁴ Most urban households depend on purchased energy sources and, as a result, both husband and wife have an interest in buying energy efficient appliance, which reduce energy expenses. Most rural households depend on collected firewood, which require only time and effort of the women and youth.

Policy implications

This study has several implications for policy that seeks to promote energy efficiency in Ethiopia.

1. The results imply that the government needs to set a new policy, which mandates to

2. include specifications of imported products in local language. Most European and Latin American countries have this privilege.
3. The results also imply that access to credit is important in the use of energy efficient technologies. A policy that incentivizes or promotes firms to sell energy efficient products on an instalment basis would help to address this barrier.

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³ Allcott, A., Allan Collard-Wexler, and Stephen D O’Connell(2016). ‘How do electricity shortages affect productivity? Evidence from India. *American Economic Review*, 106(3): 587–624

⁴ Alem, Y., S. Hassen, and G. Köhlin. 2020. Decision-making within the household: The role of autonomy and differences in preferences (2020). Ruhr Economic papers, RWI, No.874