

The role of appliances in achieving gender equality and energy access for all

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A holistic energy access approach, taking into account the role of appliances, is needed if we are to achieve access to energy for all (Sustainable Development Goal 7) and gender equality (Sustainable Development Goal 5) by 2030. Appliances can reduce drudgery and save time in performing household tasks. They can also be transformative from an income generation perspective. This briefing shares evidence and policy recommendations from ENERGIA's Gender and Energy Research Programme and the Efficiency for Access Coalition's Low-Energy Inclusive Appliances (LEIA) Programme on the role of electrical appliances in households and small scale productive uses in achieving these two goals. It highlights the specific contribution of energy efficient solar water pumps and cooling technologies, as they have the potential to improve the lives of women and other underserved populations living in remote areas.

Electricity is bringing changes to lives, both in rural and urban settings. Rapid grid extension and the growth in distributed renewable energy systems are delivering energy services to remote locations. However, the benefits of energy supply can only accrue to end-users when appliances that provide services are made available and used. A key learning from ENERGIA's Gender and Energy Research Programme is that supplying energy supply in itself is insufficient and appliances play a crucial role in achieving beneficial outcomes through provision of energy services.

Not only are modern energy efficient appliances cleaner, more convenient and sometimes cheaper than traditional appliances, their provision, acquisition and use can also empower women. There are multiple pathways to women's empowerment: Firstly, through saving time and reducing drudgery given that heavy work and time poverty are two major aspects of gender inequality; and secondly, through income generation and improved livelihoods, where poverty is closely interlinked with gender inequality. These pathways to empowerment can be

supported through access to appliances for household and productive use. Below we present key findings, case studies and policy recommendations based on research conducted by ENERGIA and the Efficiency for Access Coalition.

Key findings

Purchase and use of household appliances

Our research in India, Kenya, and Nepal shows that households using electricity own an increasing number of different types of appliances, including lights, fans, mobile phones, and televisions. The most common appliance in remote grid connected areas, apart from lights, is mobile phones, followed by televisions. Other types of appliances differ strongly across geographies and energy delivery systems (University of Oslo et al., 2019).

Household appliances are essential for the provision of modern energy services, as they convert energy into the services people need. However, *the impact of increased energy access is largely*

determined by who controls the purchase and use of appliances. Other factors include how available and affordable they are, as well as the reliability of energy supply.

Decisions about what appliances to buy are often gendered, with women having less influence than men about what is purchased, even for products that are typically used by women. Recent studies from the Efficiency for Access Coalition's and ENERGI's research programmes (IDS and GIZ, 2019; MSSRF and CRT Nepal, 2019; University of Oslo et al., 2019) provide evidence on the differences between men and women with regards to decision-making, ownership, and use of appliances. Women's ability to access and control assets is deeply influenced by social norms in society. In Kenya and particularly in India, social norms hinder women in accumulating wealth and thereby also investing in appliances of their choice.

The user of an appliance may not be the person who made the purchasing decision or retains ownership. For example, ENERGI's study in Nepal indicates that while women are the main users of rice cookers, the majority of purchase decisions had been taken by men. Aside from the appliances used by all household members, such as televisions and fans, women prioritise appliances that help them perform their daily chores better, such as electric kettles (Kenya) and rice cookers (Nepal). Men, on the other hand, tend to prioritise television sets, radios, refrigerators and sound systems.

As the majority of appliances are purchased and owned by men, much of the data on understanding customers is from men. A major source of information about appliances for East Africa is the Global LEAP Results Based Finance programme, which surveyed over 40,000 people who purchased appliances through the programme. 68% of the customers were men. Having a disproportionately high number of men's voices sharing their perspectives on appliance use and impacts influences product design, marketing and distribution strategies, as well as policy and donor programme design.

Improving lives and reducing inequities

Our research has found that household appliances that deliver modern energy services can reduce drudgery, save time, generate income and empower women – and ultimately contribute to transforming gender roles and relations.

Many common appliances meet women's practical needs and reduce drudgery in their current roles – both in unpaid care work and household tasks and in their income-earning activities. These appliances also contribute to building women's human and social capital, by replacing the need for manual labour. The evidence from Nepal and Kenya show that, despite electricity being primarily a male realm of responsibility

and influence, women are acquiring and using electric convenience technologies related to cooking. These technologies include rice cookers, kettles and blenders.

Appliances can also support income generation which may promote gender equality. Our research in India has found that some women have been able to start tailoring (sewing machines). In Kenya, access to lighting allowed for businesses to stay open for longer hours and enabled people to undertake activities such as brick production (men) and rope production (women) at night. In these countries, electricity has enabled longer working hours or more efficiency in production (University of Oslo et al., 2019).

Appliances potentially have a range of effects on women's empowerment, and can to some extent transform gender relations. When drudgery is reduced, more men were found to be willing to share household responsibilities and to take on some household tasks, thereby introducing small changes in gender roles. Examples of stronger empowerment impacts were found in our research in Ghana where access to particular appliances enabled women to enter higher-paying professions as car mechanics and carpenters, jobs which were previously barred from them as they required physical strength (IDS and GIZ, 2019). Similar experiences were found in India and Nepal, where the use of water pumps and farm machinery made it possible for women to do jobs that they previously could not (related partially to physical strength, but largely to norms around which jobs are appropriate for women). Appliances can thus have a transformative impact on households and increase the productive use of energy (MSSRF and CRT Nepal, 2019).

Case study: Refrigeration and cooling in Kenya and Bangladesh

Cooling technologies are essential for the health and well-being of those living in developing countries. Moreover, these technologies have the potential to increase productivity and empower women through time saved and opportunities for income generation.

Buying and preparing food in homes is typically a female role in Sub-Saharan Africa and South Asia. Like water pumps, refrigerators can empower women by reducing drudgery and freeing up valuable time (M-KOPA 2019). The ability to preserve food decreases the amount of time needed to shop and cook, and can reduce food expenditures. While refrigerators are traditionally thought of as a household appliance, in rural off-grid communities they are also commonly used to generate income (Lai E. and Ileri M. 2019). In the Off-grid Appliance Market Survey, off-grid refrigerators for productive use were ranked third for both perceived impact and consumer demand (Efficiency for Access 2018).

In Kenya, our research found a range of impacts from off-grid refrigerator ownership for women in terms of freeing up their time spent on household activities and

Policy considerations

1. Energy efficient appliances should be included as part of a holistic approach to achieving universal energy access.

- Recognise that for impacts to materialise, energy supply alone is insufficient – access and use by men and women of appropriate appliances for household and productive use is essential.
- Ensure that national energy policies and plans explicitly support demand side initiatives, such as the promotion of efficient appliances.

2. Policy makers should create incentives and consumer financing schemes that improve affordability and avoid implicit gender bias.

- Create incentives – such as including tax incentives and facilitating access to financing - to ensure that appliances are more affordable to people living in poverty.
- Design incentives and activities, which address women's specific needs and mitigate gendered barriers in acquiring appliances. This will ensure that women are able to access the appropriate appliances for their household and productive needs.
- Financing through innovative, outcome-focused mechanisms such as results-based financing, can initiate the propagation of new models in reaching women.

3. Donors and governments should support the private sector to raise consumer awareness for energy efficient and high quality appliances

- National governments should work together to develop regional approaches to labelling schemes and other programmes that will enable consumers to identify appliances that are energy efficient and of high quality.
- Support consumer awareness campaigns that target women and provide critical information and knowledge to consumers on off-grid appliances, productive uses and the broader market. This will help consumers in their decision-making, and will encourage market growth and energy access.

4. Donors and policy makers should commission research in the following areas where there are evidence gaps to inform policy and programme design and maximise impact on women:

- The occurrence of socioeconomic impacts that appliances achieve, on women and men and their families.
- Usage and custody of appliances.
- How to increase the realisation of the potential role of appliances in reducing gender inequalities and empowering women.
- How appliances can be designed to better meet the needs of women.
- How distributors can develop strategies to target women and create an enabling environment for productive use.

providing them with new micro- business opportunities, such as selling vegetable and fruits, ice or beverages. Pay-as-you-go solar fridges were said to save households over KES 480 (around USD 5) and two hours every week as food was preserved for longer, leading to less trips to the market and less money spent on cooking fuel (CDC Group, 2019).

Fans are a relatively low cost appliance, which can help increase productivity and help those at most risk adapt to climate change. As part of the Global LEAP results based financing programme, 1,614 new customers who purchased fans in Bangladesh were interviewed to verify sales and understand customer experience and impact. Most households reported that they were able to work an additional 2 hours and 20 minutes each day on average after purchasing the fan. Like in many other countries, it is mostly the elderly, women and children who often spent the most time in the home (e.g. cooking, studying, and childcare) in Bangladesh. Therefore, any productivity and quality of life improvements from the new fan are expected to primarily accrue to these groups.

Case study: Energy efficient solar water pumps in Kenya, Tanzania and Nepal

In developing countries, women comprise 43% of smallholder farmers. *The use of solar water pumps provides a large scope of benefits for women, including reduced drudgery and providing opportunities for income generation and increased productivity.*

The use of water pumps can drastically reduce women's drudgery and time spent collecting water. The amount of time spent collecting water varies significantly depending on country and context, but LEIA research found that women in East Africa spent seven hours each week collecting water before purchasing a solar water pump (Efficiency for Access Coalition and 60 Decibels 2019). This allows women to allocate more of their time to other activities, including income generating activities. Solar water pumps can also radically improve the productivity of farms with irrigation and reduce the drudgery and time associated with manual irrigation. Smallholder farms that are irrigated have two to three times higher yields than that of rain watered farms (Efficiency for Access 2019). Improved agricultural productivity can also increase food security for households and communities. Female customers were more likely than male counterparts to use the pump to collect water for domestic use—which can be used to improve hygiene and sanitation as well as for cooking.

Women tend to have less access to inputs and resources necessary for operating farms, including irrigation. In Tanzania, vegetable farms headed by women earn less than farms headed by males (Mutabazi, Khamaldin, et al. 2013). Giving more women access to solar water pumps can help close this gap. Our research in Kenya, Tanzania, and Uganda found that most solar water pump customers reported increased productivity, most often mentioning increased yields and a lack of seasonality in their production as the benefits. Moreover,

81% of customers felt that their lives had improved since purchasing the pump (Efficiency for Access and 60 Decibels 2019).

In Nepal, the out-migration of men from rural communities has resulted in increasing the role of women in agriculture. Heightened frequency and severity of climatic risks are adding pressure on women farmers in Nepal to adapt to unpredictable weather conditions. One of the most promising options for adapting to such weather extremes is to improve water management systems and water use efficiency. However, poor irrigation systems, high cost of pumping groundwater and limited availability of electricity in the rural areas of Nepal are major concerns. New water management technologies such as solar water pumps can help women to mitigate these risks and concerns. Specific targeting of women farmers is needed to reduce the barriers they face in accessing these technologies, including affordability and lack of awareness about the benefits that these appliances can bring.

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About the ENERGIA Gender and Energy Research Programme

ENERGIA's Gender and Energy Research Programme was a five-year research programme (2014–2019), funded by DFID which explored gender, energy and poverty linkages. Research was conducted in 12 countries: Bangladesh, Ghana, India, Indonesia, Kenya, Myanmar, Nepal, Nigeria, Rwanda, Senegal, South Africa, and Tanzania. In all, 29 universities and research institutions, 21 of which were from the Global South, participated in the Programme.

About the Low-Energy Inclusive Appliances (LEIA) Programme

The DFID and IKEA Foundation funded LEIA programme seeks to double the efficiency and half the cost of a range of electrical appliances suited for off- and weak-grid customers. LEIA is a flagship programme of Efficiency for Access—a global coalition working to promote high performing appliances that enable access to clean energy for the world's poorest people. CLASP and the Energy Saving Trust are the co-secretariat of the Coalition.

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ENERGIA is an international network of like-minded organisations and professionals, active in Asia and Africa. Our vision is that women and men have equal and equitable access to and control over sustainable energy services as an essential human right to development. To achieve this, we:

- contribute to energy access for all by scaling up the delivery of energy services through women-led micro and small businesses,
- advocate for and provide technical support to mainstream gender approaches in energy policies and programmes,
- provide the evidence base for improving energy investment effectiveness through research,
- raise awareness and enhance knowledge of issues related to gender and energy through networking and knowledge products