



CONTENTS

■ Introduction	1
■ What is empowerment?	2
■ Approach	2
■ Household energy usage pattern	2
■ Role of gender in household energy expenditures	3
■ Decisions related to expenditure on income	3
■ Linkages between electricity, LPG and other factors	3
■ Conclusion	4
■ Recommendations	4
■ References	5

This Cooperation Brief has been prepared as a part of a research collaboration between TERI, IISD and IRADe under the Gender and Energy Research Programme, funded by the UK Department for International Development (DFID), and coordinated by the International Network on Gender and Sustainable Energy (ENERGIA). The views expressed are those of the authors.

The Energy and Resources Institute
Darbari Seth Block, IHC Complex,
Lodhi Road, New Delhi- 110 003

Tel. 2468 2100 or 2468 2111
Fax. 2468 2144 or 2468 2145
India +91 Delhi (0) 11

www.teriin.org

What drives the switch to modern energy? linkages and gender implications

Research brief for policy and practice

Deborshi Brahmachari¹, Chandrashekhar Singh², Chris Beaton³, Mini Govindan⁴, Shruti Sharma⁵

Introduction

Provision of modern energy for cooking, lighting and other household use is often considered to be a driver in improving social and gender inclusion. Evidence from around the globe shows that there is a positive impact of access to modern energy—such as electricity for lighting and LPG (liquefied petroleum gas) for cooking—on women's empowerment (GSI 2016; Winther 2008; Practical Action 2010). But few studies show interactions between different types of energy use.

This Cooperation brief summarizes findings from an analysis of the ways in which there are interlinkages between household take-up of electricity and LPG for cooking and what this means for women's empowerment. This comes at an important time, when the Government of India is implementing two large-scale programs to ensure near universal access to these energy sources: 1) Saubhagya Yojana, an initiative to provide electricity to all households, and 2) Pradhan Mantri Ujjwala Yojana (PMUY), a 2016 initiative to provide women with subsidies to help them afford the up-front costs of converting to LPG for cooking, with a target of 80 million Below Poverty Line households as of financial year 2018-19.

¹ Associate Fellow, Rural Energy and Livelihoods Division, The Energy and Resources Institute.

² Senior Research Analyst, Integrated Research and Action for Development.

³ Senior Policy Advisor, Global Subsidies Initiative and Lead, India Program, International Institute for Sustainable Development.

⁴ Fellow, Rural Energy and Livelihoods Division, The Energy and Resources Institute.

⁵ Associate and Energy Specialist, International Institute for Sustainable Development.

What is empowerment?

The definition of “empowerment” for this analysis is drawn from the ideas of Kabeer and Duflo which assess changes in women and men’s relative rights and the ability of women to access the drivers of development (Kabeer 1999; Duflo 2012). This links fuel use to indicators such as the burden of fuel collection, decision-making power, appliance usage, education, income and expenditure, where possible.

In the current discourse on energy and gender, one of the paths to women’s empowerment is using electricity and time-saving appliances which would help them reduce time on tasks that involve hardship and drudgery (UNDP/ESMAP 2004; van de Walle et al. 2015; Dinkelman 2011). Implicit in this thesis is the expectation that women would use their resulting freed-up time to pursue income generating activities and thereby become economically empowered. Also implicit is that, with access to electricity as a given, women have the power and means to decide on and use the appliances they desire. In the case of LPG, time savings would accrue by reducing the time required to collect fuel, prepare fuel and conduct cleaning, while life quality and years would be improved by eliminating indoor air pollution that causes serious respiratory disease. The design of LPG subsidies—for example, being gender neutral or focused explicitly on women—also has implications for empowerment.

Approach

The data for this paper has been sourced from two different research studies under ENERGIA’s Gender and Energy Research Programme (funded by DfID), which are independently focused on understanding the gender dimensions from electricity access and reform of LPG access, use and policy. One of the studies focused on the policies and practices that enhance and restrict women’s opportunities and empowerment through electrification. The other study looked at how energy subsidies for LPG affect the welfare, productivity and empowerment of women from poor households.

For electricity, a survey of 215 households was conducted in the Baloda Bazar and Mahasamand

districts of Chhattisgarh in 2018, while for LPG a survey was conducted of 120 households in the Raipur district of Chhattisgarh in 2017. The data sets were then merged where possible. The resulting analysis draws on a total of 335 households from these three districts.

Household energy usage pattern

In the surveyed villages, 63 per cent of households had grid electricity while 27 per cent of households had access to a mini grid. 10 per cent of households used batteries or did not have access to electricity.

The solar mini-grid systems in Balodabazar were designed to offer only basic services i.e. lighting and mobile charging facility keeping in view the costs and affordability conditions of the users. The systems were in the process of being upgraded during the course of the study. However, there were no major differences observed in the kind of appliances used in grid- and mini-grid households. The common appliances found among grid and mini-grid include radio, mobile phones and TV.

For cooking, most of the households under study were observed using biomass, such as firewood and cow dung cake. LPG was only used by 25 per cent of households. Half of the LPG-consuming households were based in Raipur district. Most households using LPG did not use it as their primary cooking fuel. In Raipur district, LPG was the primary cooking fuel in only 6 per cent of the households. Correspondingly, in Baloda Bazar and Mahasamand only 5 per cent used LPG as their primary cooking fuel. Among households in Raipur who did not have an LPG connection, 53 per cent said they could not afford LPG cylinder refills.

Among the subset of LPG users, there were households with a medium or low level of income. In our sample, of 40 LPG user households in Raipur district, 17 had received their LPG connection under PMUY, which subsidises the acquisition of an LPG connection. The survey also found that, even though usage of LPG is low, it is an aspirational fuel: 76 per cent households from Raipur reported that they want to use LPG in the future.



Traditional fuels such as firewood have adverse impact on indoor air quality and women's health.

Role of gender in household energy expenditures

Fuel expenditure and fuel-related decisions are predominantly a male responsibility. In Baloda Bazar and Mahasamand, 93 per cent of households reported that the male member is responsible for covering the costs of LPG, predominantly related to refills. A large share of connections are likely to be in the name of women, as a result of the PMUY policy, which stipulates that the PMUY subsidy can only be received by women beneficiaries. However, the surveys did not collect data on the role of men and women in paying for LPG connections. Likewise for kerosene, 82 per cent of households reported that the male member is responsible for covering the cost.

On the other hand, traditional fuel collection is predominantly a female responsibility: an average female spends two and half hours a week on biomass collection in Baloda bazar and Mahasamand.

Decisions related to expenditure on income

It was commonly reported that joint decision making is practiced when it comes to spending income. In Baloda Bazar and Mahasamand, 64 per cent of women respondents said that the decision to spend their

income was taken jointly. 15 per cent of households said that the woman decided herself, while 8.8 per cent reported that a man decides how to spend the income earned by the woman. On the other hand 45% of man reported to decide on their own how to spend the income they have earned and 55% of them reported that the decision to spend their income is taken jointly. In majority of households of Raipur too (61 per cent), men and women jointly decided how women's earnings will be spent.

Linkages between electricity, LPG and other factors

Existing literature on what exactly drives a household to adopt modern cooking technology suggests that electrification, per capita expenditure, price, access to tapped water, television, mobile phones and bank accounts among others are important variables that may influence a household to switch from solid to non-solid fuels (Heltberg 2003; Kroon, Brouwer, and Beukering, 2013). It is also noteworthy to mention here that appliances that reduce drudgery like mixer grinders, refrigerators (Van de Walle et al., 2015; Dinkelman, 2011) and women's access to media like TV and mobile phones (Jensen and Oster 2007,



Households' access to electricity, mobile phones, TV and a bank account are positively correlated with LPG ownership

Dayoung Lee 2009) are seen as appliances that may potentially enhance pathways towards empowerment of women. In the studied areas, the only appliances found (that required electricity as a source) were TV, mobile phones and lights bulb. Even in grid households with reliable electricity, ownership of drudgery reducing appliances was found to be negligible.

In statistical analysis of the survey data, we looked at the correlation between LPG ownership and households' per capita income and their possession of electricity, mobile phones, TV and bank accounts. The analysis found that households with electricity, mobile phones, TV and bank accounts are positively correlated with LPG ownership.⁶ Strangely enough, we do not find significant correlation between per capita income and LPG ownership.⁷ This result may be attributed to a small size of LPG owners in our sample and to the fact that we looked into a rather crude measure of association like correlation and not causality. In addition, few higher income households also used firewood exclusively. It is also possible that the PMUY has helped in increasing the availability of LPG among low-income households who now own LPG. Also, it is important to note here that few large

sample surveys do establish that Household income and education of male and female members of the family positively influences the LPG transition (IISD, BIDS, IRADe and Spaces for Change, 2019). Further, if correlation between consumption levels of LPG and per capita income were looked into, we may have found different results.

However, the results give us some indication that while affordability may be a necessary condition for LPG ownership, the use of appliances and adaptability (of new technologies) of a household (brought in through awareness generated via TV, mobile phones) may actually contribute to the switch from biomass. The importance of bank accounts may also imply cross-correlation with the government's two main subsidy schemes: the PMUY (to subsidize the cost of connections) and the DBTL (to subsidize the cost of refills), both of which require beneficiaries to possess bank accounts.

As regards the impacts of empowerment, the usage of LPG by a household was associated with women having more time to pursue other activities such as leisure, reading the newspaper, watching television and time with children. In Raipur district, the survey

⁶ Households with electricity and bank accounts at 10% level of significance, rest at 5% level of significance or less.

⁷ A binary variable that codes "1" if a households has LPG, "0" otherwise.

found that women in households using LPG reported that they spent 20 minutes more on leisure and 10 minutes more on reading the newspaper or spending time with children, as compared to women from households not using any LPG.

Conclusion

Our study finds that households' access to electricity, mobile phones, TV and a bank account are positively correlated with LPG ownership. Even with the increased availability and supply of LPG, fuel stacking continues and availability of LPG in a household does not necessarily translate to LPG consumption. The survey results show that a very small percentage of households who own LPG in the studied areas actually use LPG exclusively.

Energy-related decision making, such as about the choice of cooking fuel and lighting sources, predominantly remain within the male domain. In the majority of the households, it is also the male members who are accountable for fuel-related payments for covering the costs of kerosene and LPG refills. The PMUY is a major disruptor in this regard, which provides subsidies for LPG connections specifically to poor women, though our data imply it is likely that thereafter male members continue to pay for the refills. Further a small percentage of households covered in our survey have actually received LPG through PMUY. In contrast, when households collect their own firewood or cow dung and they spend large amounts of time doing so, the responsibility of collection predominantly lies with females in the household.

It was also noted that joint decision making is practiced when it comes to spending women's income. Whereas, joint decision-making was less common for men's income, implying that a higher share of men decide individually on how to spend their own income. This also has implications on the kind of appliances that are bought by households and the decisions related to appliance purchase.

While appliance usage may be associated with a household adopting modern sources of energy for cooking (like LPG) and therefore bring benefits

to the women (in terms of reduced health costs and drudgery), the decisions regarding switching to modern forms of energy largely remains with men. Also, despite the lack of correlation of LPG usage with household income levels, further investigation into this puzzling finding is required: it remains likely that in lower income households both men and women may not want to spend resources on LPG refills or invest on drudgery-reducing appliances because of economic constraints. All these factors explain the reluctance of households to switch to LPG or electricity driven appliances to a certain extent, besides others factors like free availability of firewood and local customs and habits.

Recommendations

Based on our findings we present a few recommendations of policy relevance.

- Our analysis suggests that households' adaptive capacity, as well as the level of their awareness, potentially linked to access to media appliances, has a positive impact on their likelihood of LPG ownership. The government should explore whether there is some way to harness inter-community learning, such that early adopter households that take up new energy technologies such as LPG can then help to shift the attitudes and practices of others in their community.
- Among households that use LPG, very few are observed to exclusively use it. A strategy should be developed to promote the ongoing decline of biomass consumption among LPG-using households. The government should explore options for discouraging the use of biomass and inefficient cook stoves for cooking. For example, a market mechanism could be designed to promote alternative uses of biomass, originating from agriculture and allied sector. This would increase the marginal cost of cooking with biomass and thereby discourage its use. Careful complementary policies would be required to help ensure that the welfare of the poorest is not negatively affected. At the same time, sensitizing people on the issue of indoor air pollution and its linkages with health of women and children may

encourage household to use cleaner fuels even though biomass may be readily available.

- There is a need to adopt a systemic approach (e.g. appliance supply chains, financing, credit schemes) and work with local groups and communities to identify suited schemes (rental, instalments etc.) for making appliances and machines that women want available and affordable. Women would get a higher likelihood of adopting appliances that could help reduce the time spent on drudgery tasks and/or make productive activities become more convenient and effective.

References

- Andadari, R. K., Mulder, P. & Rietveld, P., 2014. Energy poverty reduction by fuel switching. Impact evaluation of the LPG conversion program in Indonesia. *Energy Policy*, Volume 66, pp. 436-449
- Dinkelman, T., 2011. The effects of rural electrification on employment: New evidence from South Africa," *American Economic Review* 101 (7), 3078–3108.
- ENERGIA (not dated) For Clean Cooking Energy in Rural India: Women's Empowerment and LPG as Prestige Good. Authors: Govind Kelkar; Dev Nathan; R. Rengalakshmi; Manjula M. http://generypolecon.org/sites/default/files/Policy%20Brief_26-10-2017.pdf
- ENERGIA/DfID, 2006. From the Millennium Development Goals towards a Gender-Sensitive Energy Policy. Research and Practice: Empirical Evidence and Case Studies. ENERGIA/ DfID Collaborative Research Group on Gender and Energy. Leusden: ENERGIA.
- ESMAP, 2003. Household Energy Use in Developing Countries - A Multicountry Study, Washington DC: Joint UNDP/World Bank Energy Sector Management Assistance Programme
- Global Subsidies Initiative-IISD, BIDS, IRADe and Spaces for Change (2019) 'Gender and fossil fuel subsidy reform: findings from and recommendations for Bangladesh, India and Nigeria', ENERGIA.
- Grogan, L., Sadanand, A., 2013. Rural electrification and employment in poor countries: Evidence from Nicaragua. *World Development*, 43 (2013): pp. 252-265.
- GSI (2016) Gender and Fossil Fuel Subsidy Reform: Current Status of Research <http://www.iisd.org/library/gender-and-fossil-fuel-subsidy-reform-current-status-research>
- Haves, E., 2012. Does Energy Access Help Women? Beyond Anecdotes: A Review of the Evidence. Ashden.
- Heltberg, R. (2003) 'Household Energy Use in Developing Countries', The World Bank
- Kabeer, N. 1999. "Resources, Agency, Achievements. Reflections on the Measurement of Women's Empowerment." *Development and Change* 30: 435–464. doi:10.1111/1467-7660.00125.
- Kroon, B. v., Brouwer, R., & Beukering, P. J. (2013), 'The energy ladder: Theoretical myth or empirical truth? Results from a meta-analysis'
- Modi, V., McDade, S., Lallement, D., Saghir, J., 2006. Energy and the Millennium Development Goals. New York: Energy Sector Management Assistance Programme, United Nations Development Programme, UN Millennium Project, and World Bank.
- OXFAM 2017. (Author: Rebecca Rewald) Energy and Women and Girls Analyzing the needs, uses, and impacts of energy on women and girls in the developing world. <https://www.oxfamamerica.org/explore/research-publications/energy-women-girls/>

- Practical Action 2010. Poor people's Energy Outlook 2010. Rugby, UK
- Standal, K. and T. Winther (2016). Empowerment through Energy? Impact of Electricity on Care Work Practices and Gender Relations, Forum for Development Studies.
- Tully, S.R., 2006. The contribution of human rights to universal energy access. North-western Journal of International Human Rights 4, 518–548.
- Winther, T. (2008). The Impact of Electricity. Development, Desires and Dilemmas. Oxford, UK: Berghahn Books.
- Winther, T., M. N. Matinga, K. Ulsrud & K. Standal (2017) Women's empowerment through electricity access: scoping study and proposal for a framework of analysis, Journal of Development Effectiveness, 9:3, 389-417, DOI: 10.1080/19439342.2017.1343368

For more information contact:

Deborshi Brahmachari

*Associate Fellow,
The Energy and Resources Institute (TERI),
HC Complex, Lodhi Road,
New Delhi - 110 003, INDIA
E-Mail: d.brahmachari@teri.res.in*

Chandrashekhar Singh

*Senior Research Analyst,
Integrated Research and Action for Development
(IRADe),
C-80, Shivalik, Malviya Nagar, Delhi-17,
E-Mail: chandrashekhar@irade.org*

Christopher Beaton

*Senior Policy Advisor GSI and Lead, India Program
International Institute for Sustainable Development
International Environment House 2
9 Chemin de Balexert, 1219 Châtelaine
Geneva, Switzerland
E-Mail: cbeaton@iisd.net*